Workshop Manual

Audi TT 2007 ➢

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

Edition 06.2009

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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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Contents

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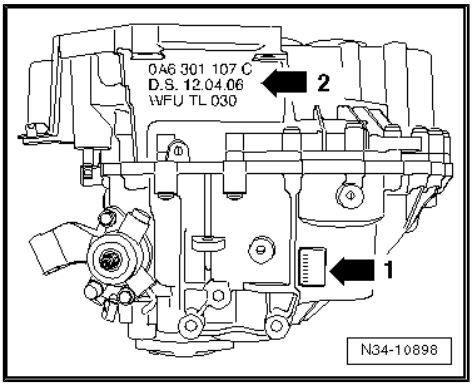
00 – Technical data

1 Gearbox identification

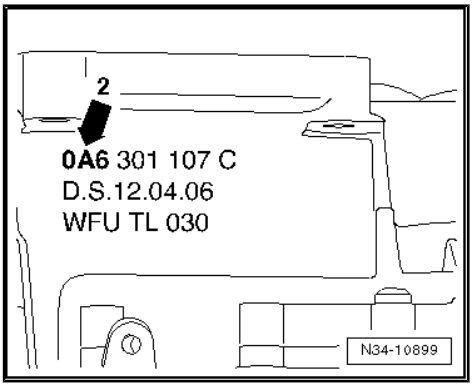
The 6-speed manual gearbox 0A6, four-wheel drive is installed in the Audi TT 2007 ‣. Allocation ⇒ page 2 .

Location on gearbox

- Code letters and date of manufacture -arrow 1-
- Manual gearbox 0A6, four-wheel drive -arrow 2-



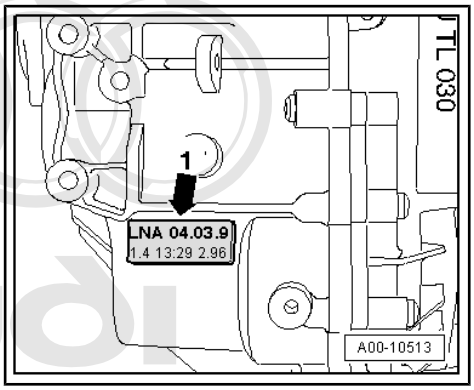
Manual gearbox 0A6, four-wheel drive -arrow 2-



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

Example:	LNA	04	03	9
	I	I	I	I
	Code letters	Day	Month	Year of manufacture (2007)

Additional data identify the factory where the unit was built.



Note

The code letters for the gearbox are also given on the vehicle data stickers.

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2 Code letters, allocation, transmission ratios, capacities

Manual gearbox		0A6 four-wheel drive		
Code letters		**LNA**	**MCK**	
Manufactured	from	07.08	03.09	
	to			
Allocation	Model	Audi TT 2007 ▸	Audi TT 2007 ▸	
	Engine	2.5 ltr. TFSI - 250 kW	2.5 ltr. TFSI - 250 kW	
Ratio	Final drive I for 1st/2nd gear	64 : 17 = 3.765	64 : 17 = 3.765	
$i = Z_2 : Z_1$	Final drive II for 3rd – 6th gear	64 : 22 = 2.909	64 : 22 = 2.909	
	Final drive III for reverse gear	64 : 20 = 3.200	64 : 20 = 3.200	
Capacity of manual gearbox		2.3 litres		
Capacity of bevel box		0.9 litres		
Clutch actuation		Hydraulic		

The following data can be found in the ⇒ Electronic parts catalogue .

- Individual gear ratios
- Gear oil specification
- Allocation of bevel box
- Allocation of drive shaft flange type
- Allocation of clutch type
- Rear final drive identification

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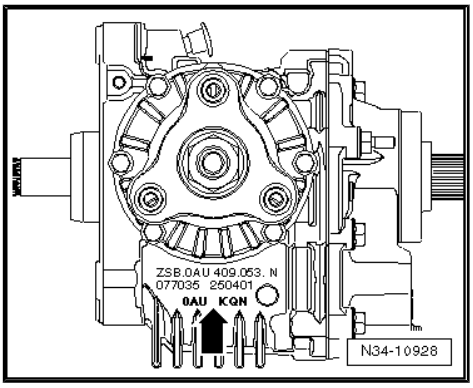
3 Bevel box identification

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

- ⇒ “3.1 Code letters, allocation, capacities”, page 3

Location on bevel box

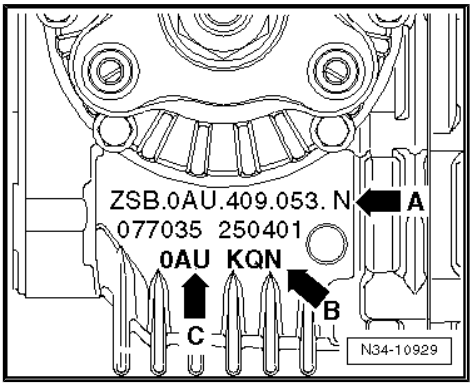
Code letters and part number of bevel box -arrow-



-Arrow A- part number of bevel box

-Arrow B- code letters of bevel box

-Arrow C- bevel box 0AU or 0A6



- If the code letters are not shown, the unit can be identified via the Part No. ⇒ Electronic parts catalogue .

Additional data are manufacture-related.

3.1 Code letters, allocation, capacities

Bevel box		0AU/0A6		
Code letters		LGS	LGY	LGZ
Manufactured	from	07.08	07.08	07.08
	to			
Allocation	Model	Audi TT 2007 ▸	Audi TT 2007 ▸	Audi TT 2007 ▸
	Engine	2.5 ltr. TFSI - 250 kW	2.5 ltr. TFSI - 250 kW	2.5 ltr. TFSI - 250 kW
Capacity		0.9 litres		
The following data can be found in the ⇒ Electronic parts catalogue . ♦ Bevel box gear oil specification ♦ Allocation of manual gearbox				

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4 Transmission layout

Identification

Note

-Arrows- point in direction of travel.

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1 - Engine

2 - Clutch

3 - Manual gearbox

4 - Input shaft

5 - Output shaft for 1st/2nd gear

6 - Output shaft for reverse gear

7 - Output shaft for 3rd – 6th gear

8 - Differential

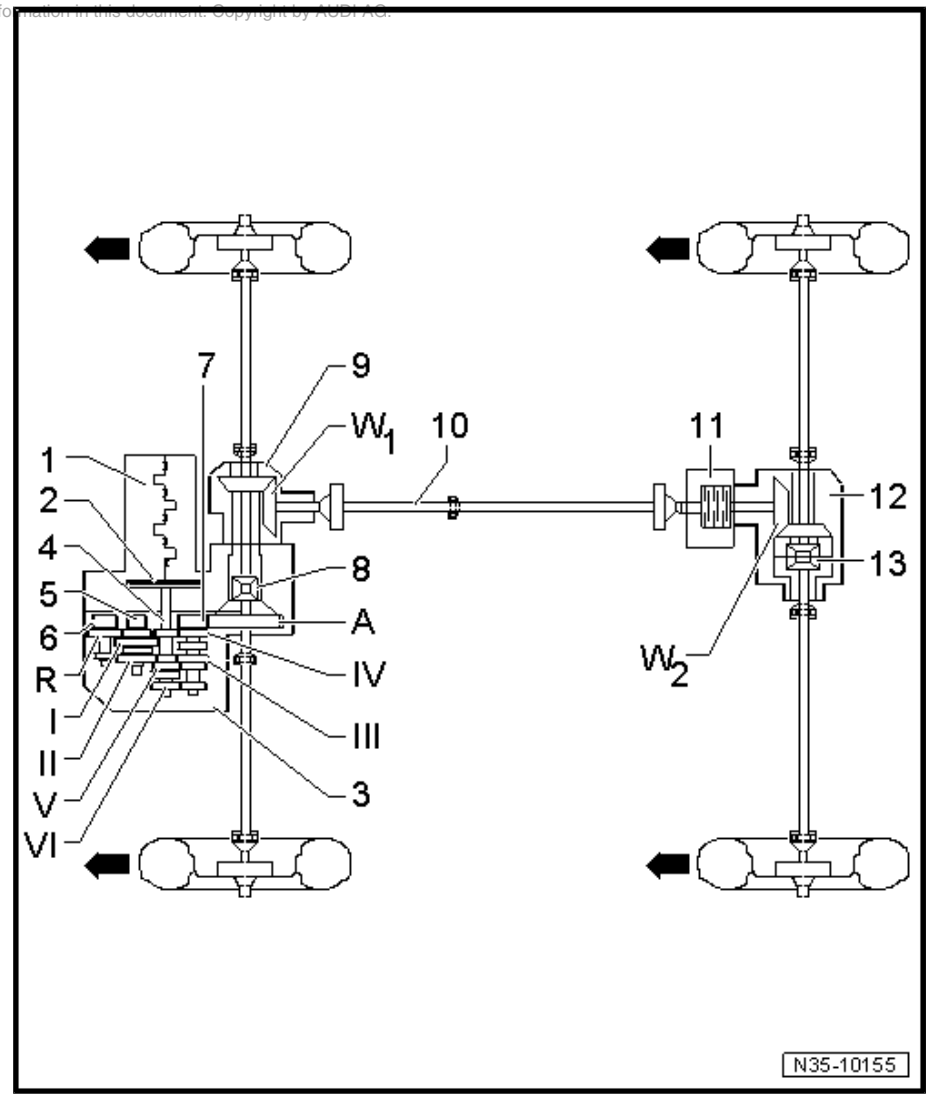
9 - Bevel box

10 - Propshaft

11 - Haldex coupling

12 - Rear final drive

13 - Differential

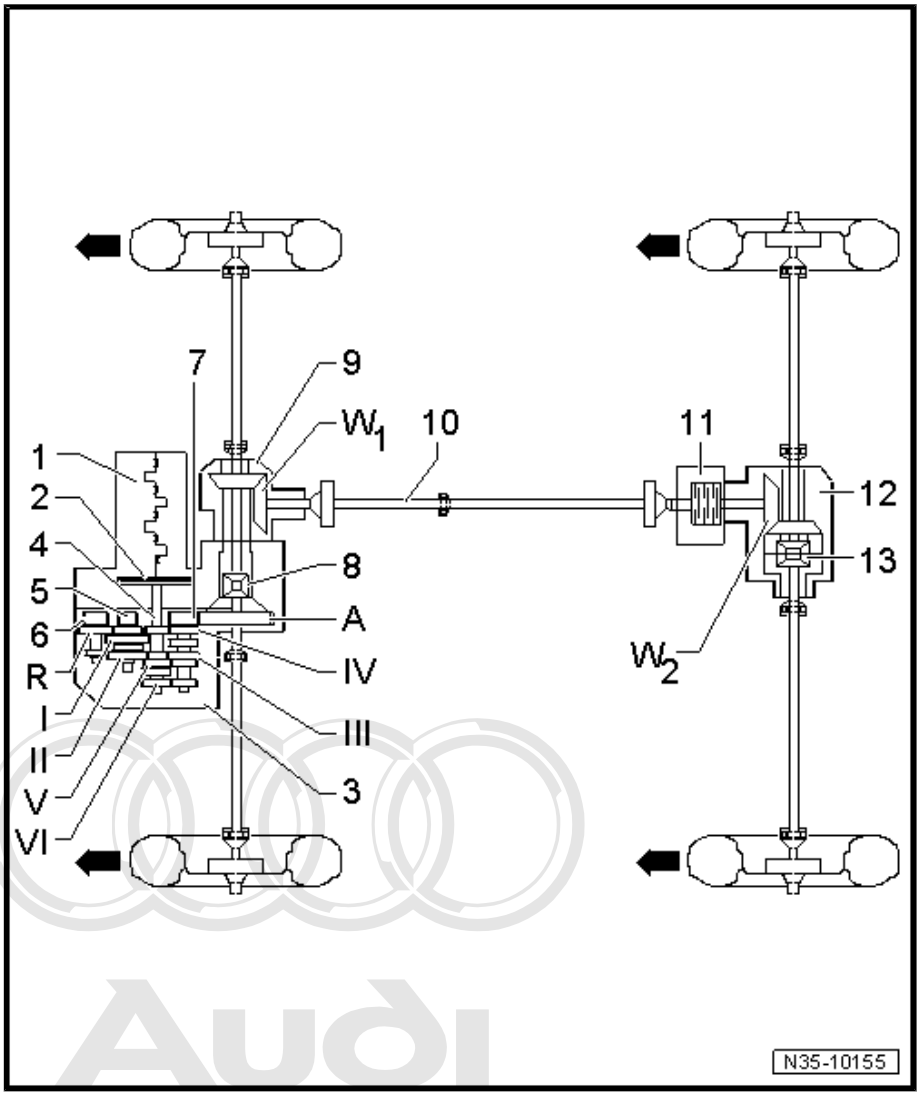


Ratio

Note

-Arrows- point in direction of travel.

I - 1st gear
II - 2nd gear
III - 3rd gear
IV - 4th gear
V - 5th gear
VI - 6th gear
R - Reverse gear
A - Final drive
W1 - Front bevel gears
W2 - Rear bevel gears



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5 General repair instructions

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

A number of generally applicable instructions for the various repair procedures - which were previously repeated at numerous places in the Workshop Manual - are summarised here. They apply to the work described in this Manual.

5.1 Contact corrosion!

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

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Caution

Damage caused by contact corrosion is not covered under warranty.

5.2 Repair instructions

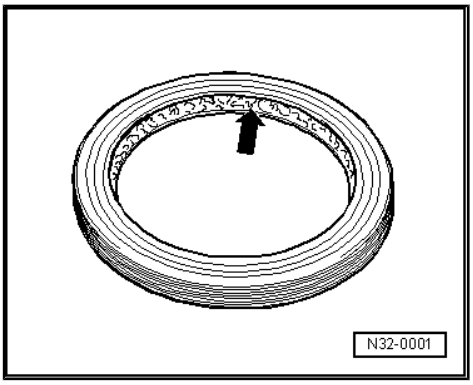
Special tools

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

Gearbox

- Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- When installing manual gearbox, ensure that the dowel sleeves between the engine and the gearbox are correctly located.
- For allocation of bolts and other components, refer to ⇒ Electronic parts catalogue .
- Clean contact surfaces when assembling mounting brackets and waxed components. The contact surfaces must be free of wax and grease.
- After installing a replacement gearbox, check oil level and top up with gear oil as required
  ⇒ “11 Checking oil level in manual gearbox”, page 85 or
  ⇒ “12.1 Checking gear oil level in bevel box”, page 86 .
- Capacities and specifications ⇒ page 2

Oil seals, seals, O-rings and gaskets



- Renew O-rings, seals 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.
- 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 such 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 after installing new gaskets, O-rings and oil seals
  ⇒ “11 Checking oil level in manual gearbox”, page 85 or
  ⇒ “12.1 Checking gear oil level in bevel box”, page 86 .

Sealants

- Thoroughly clean joint surfaces on gearbox housing etc. before applying sealing paste.
- Apply sealing paste -AMV 188 200 03- evenly and not too thick.
- Breather holes must remain free of sealing paste.

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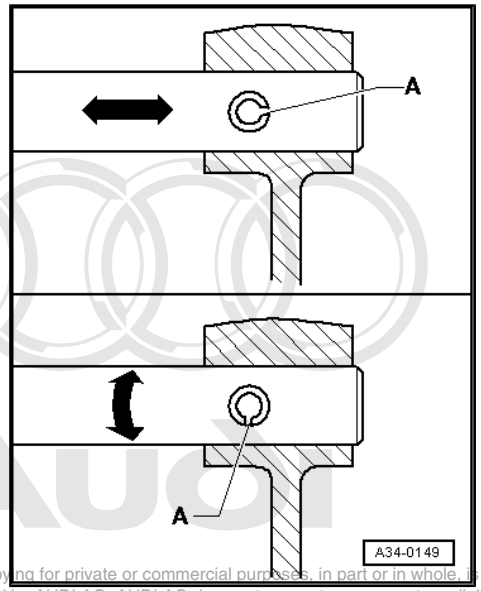
Locking elements

- Do not over-stretch circlips.
- Renew circlips which have been damaged or over-tensioned.
- 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.
- Renew self-locking nuts and bolts.
- The tightening torques stated apply to non-oiled nuts and bolts.
- 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.

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Bearings

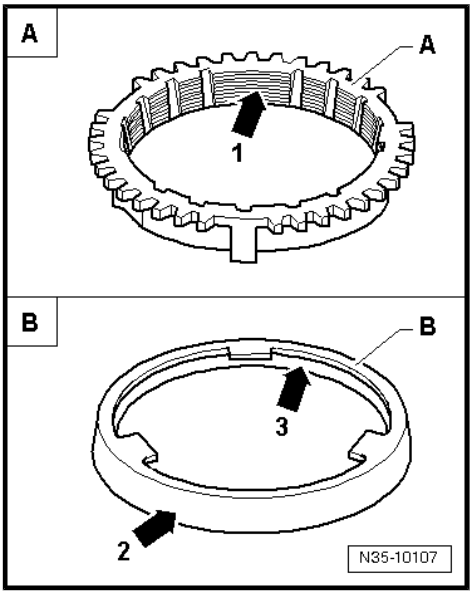
- Install new tapered roller bearings as supplied; do not lubricate additionally with oil.
- Lubricate all bearings (except tapered roller bearings) with gear oil before installing in gearbox.
- Heat inner races of tapered roller bearings to approx. 100°C before installing. Press in onto stop when installing so there is no axial clearance.
- Do not interchange inner or outer races of bearings of the same size.
- 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. Tolerance variations make it possible to obtain the exact shim thickness required.
- Check for burrs and damage. Install only shims which are in perfect condition.

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 chamfer on selector gear for scoring and visible traces of wear.
- Lubricate with gear oil before installing.



Gear wheels

- Before installing, clean and heat on a hotplate to approx. 100° C.
- 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.

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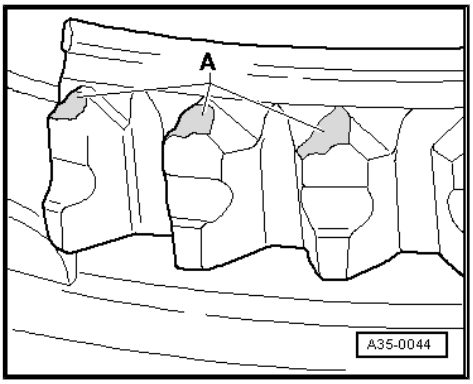
Selector gears

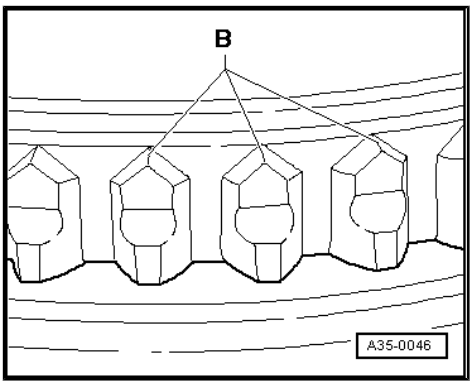
- After installing, check 1st to 6th speed selector gears for minimal axial play and freedom of movement.
- Abnormal wear on synchro-ring or selector gear:

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



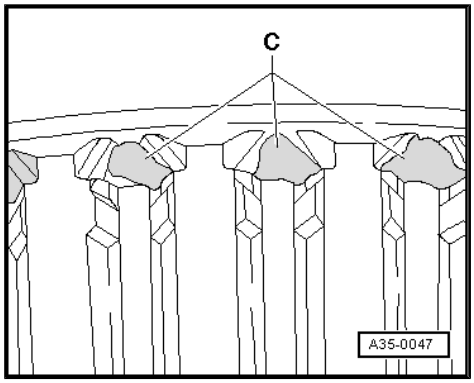
- In comparison: intact synchro-ring or selector gear:

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

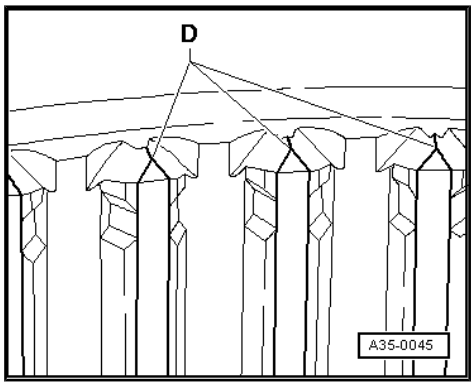


♦ Abnormal wear on locking collar:

C - Worn ends of internal splines on locking collar.



♦ In comparison: intact locking collar:



D - Intact ends of internal splines on locking collar.

Clutch actuation

♦ Ensure that the pressure plate is kept straight: loosen and tighten bolts consecutively in steps of 90°.

♦ If the clutch has burnt out, thoroughly clean the clutch housing, flywheel and parts of the engine facing the gearbox in order to prevent odour.

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

♦ Pressure plates have an anti-corrosion coating and are greased. With the exception of the friction surface for the clutch plate, the pressure plate may not be cleaned. Otherwise the service life of the clutch will be considerably reduced.

♦ The friction surface of the pressure plate and the dual-mass flywheel must be cleaned (degreased) thoroughly.

♦ If the clutch pedal does not return to its initial position after it is released (clutch pedal in rest position), you must bleed the clutch system.

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30 – Clutch

1 Overview - clutch mechanism

I -
⇒ “2 Exploded view - pedal cluster, clutch master cylinder”, page 12

⇒ “2.1 Removing and installing over-centre spring”, page 13

⇒ “2.2 Removing and installing clutch pedal”, page 15

⇒ “2.3 Removing and installing mounting bracket”, page 18

⇒ “2.4 Removing and installing clutch position sender G476 ”, page 20

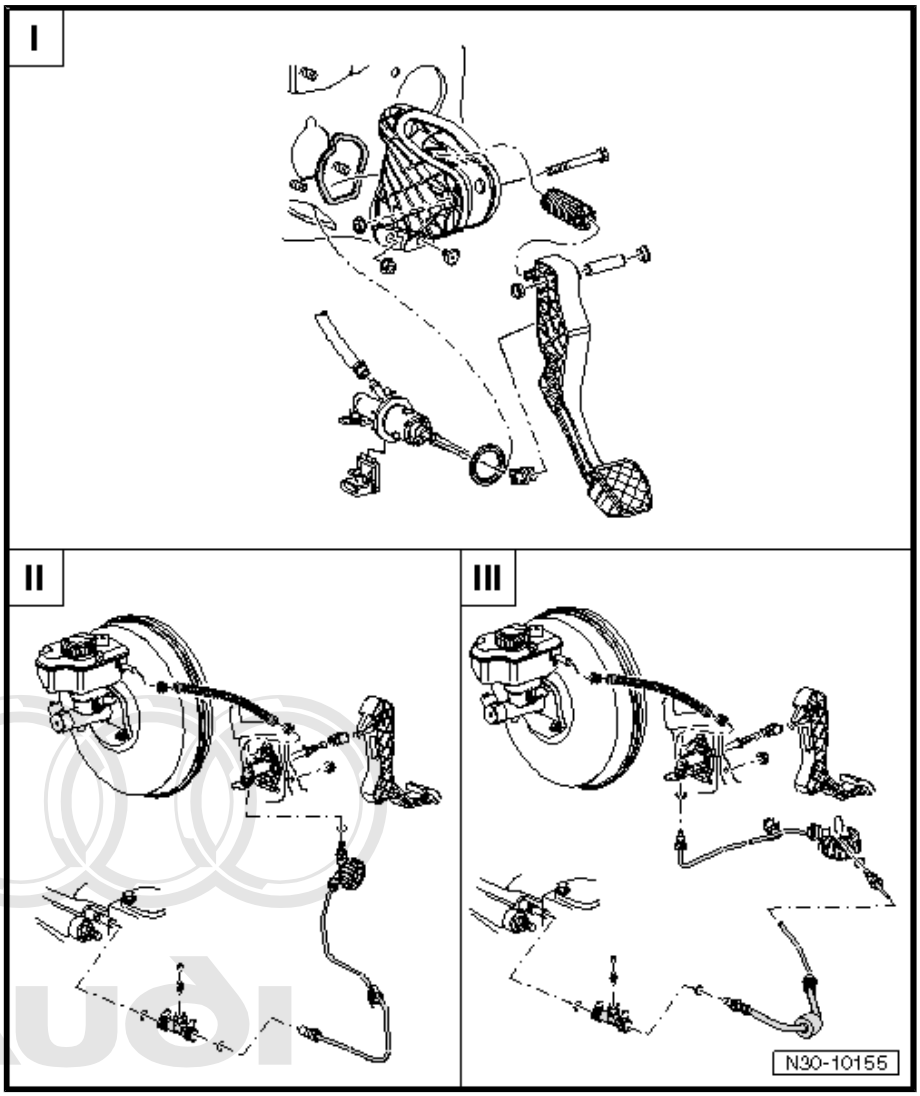
⇒ “2.5 Removing and installing clutch master cylinder”, page 21

II -
⇒ “3 Exploded view - hydraulics (LHD)”, page 24

⇒ “3.1 Removing and installing pipe/hose assembly”, page 25

III -
⇒ “3.2 Exploded view - hydraulics (RHD)”, page 27

⇒ “3.3 Bleeding clutch system”, page 28



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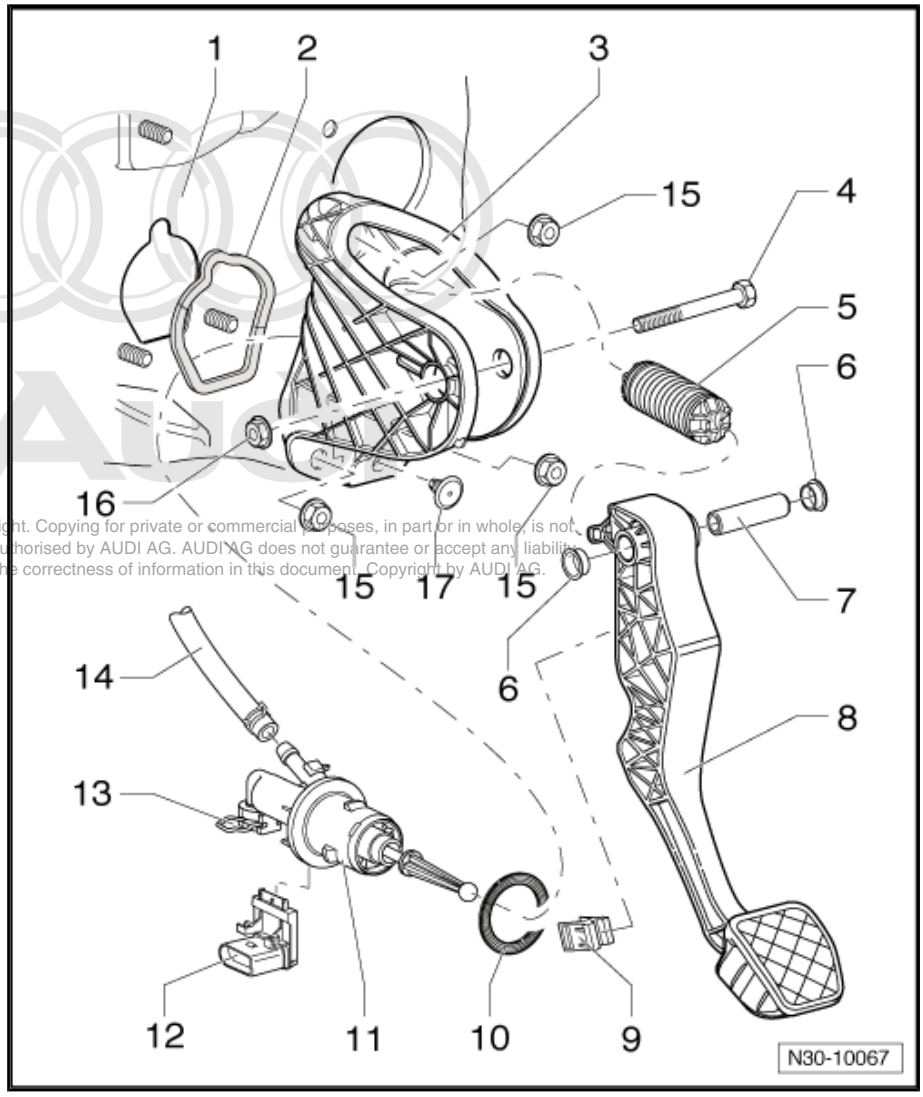
2 Exploded view - pedal cluster, clutch master cylinder



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1 - Bulkhead

- ❑ With mounting for mounting bracket

2 - Gasket

- ❑ Renew
- ❑ Between mounting bracket and bulkhead
- ❑ Self-adhesive
- ❑ Bond onto mounting bracket

3 - Mounting bracket

- ❑ For clutch pedal
- ❑ Removing and installing ⇒ page 18

4 - Bolt

5 - Over-centre spring

- ❑ Removing and installing ⇒ page 13

6 - Bearing bush

7 - Pivot pin

8 - Clutch pedal

- ❑ Removing and installing ⇒ page 15

9 - Retaining clip

- ❑ For operating rod for clutch master cylinder

10 - Seal

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

11 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 21

12 - Clutch position sender -G476-

- ❑ Removing and installing ⇒ page 20
- ❑ Can be checked in “Guided Fault Finding”, using vehicle diagnostic, testing and information system - VAS 5051-

13 - Retaining clip

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

14 - Supply hose

- ❑ To brake fluid reservoir

15 - Nut

- ❑ For securing mounting bracket to bulkhead
- ❑ 20 Nm
- ❑ 3x
- ❑ Self-locking
- ❑ Renew

16 - Nut

- ❑ 25 Nm
- ❑ Self-locking
- ❑ Renew

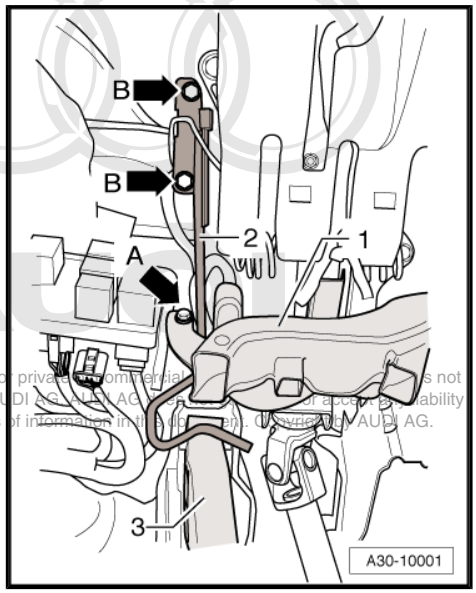
17 - Stop

- ❑ For clutch pedal

Crash bar - tightening torque

– Fit crash bar -2- and tighten 1 or 2 bolts (depending on version) -arrows B-.

- M6 10 Nm
- M8 20 Nm



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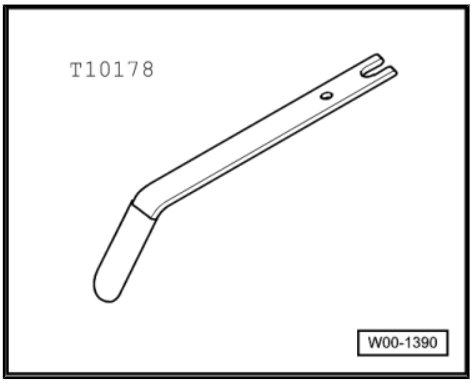
2.1 Removing and installing over-centre spring

Special tools and workshop equipment required

♦ Assembly tool -T10178-



♦ Grease -G 000 450 02-

Removing

- Clutch pedal mounting bracket fitted in vehicle

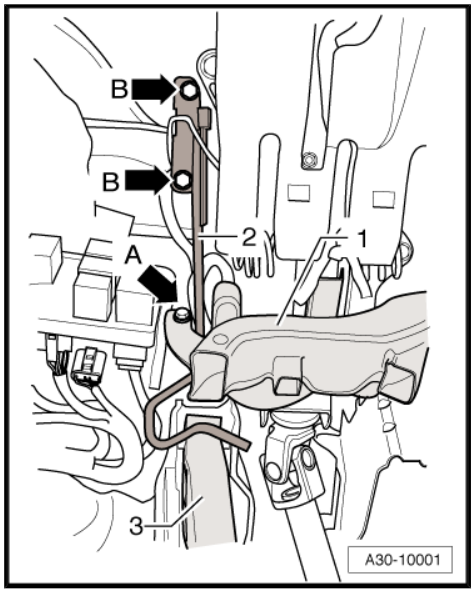
– Move driver's seat away from pedals.

– Remove storage compartment on driver's side ⇒ Rep. Gr. 68 .

– Unscrew bolt -arrow A- and remove footwell air outlet (front left) -1-.

– Unclip wiring harness at rear of footwell air outlet -1- and move clear to one side.

– Unbolt crash bar -2- (secured by one or two bolts -arrows B-, depending on version).

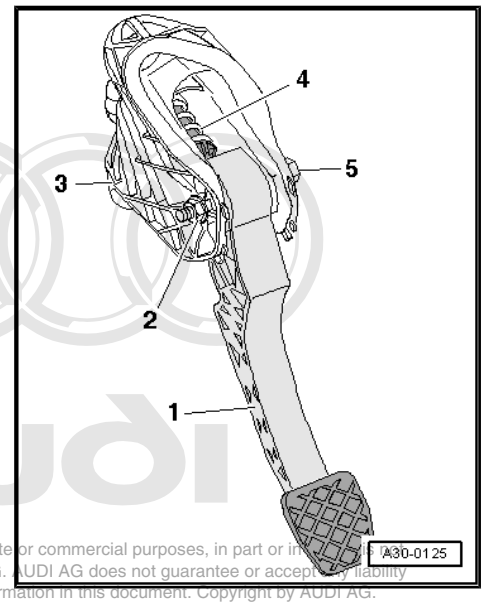


– Unbolt clutch pedal -1- from mounting bracket -3-. To do this, remove nut -2- and pull out bolt -5-.

Note

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

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



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Installing

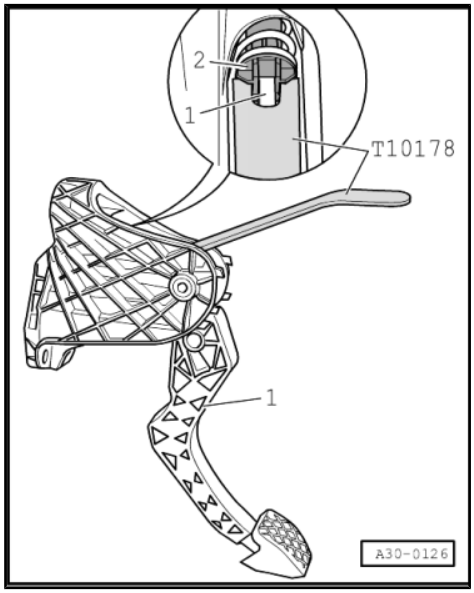
- Tightening torque ⇒ page 12

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

Note

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

– Fit over-centre spring -2- into mounting bracket from above while holding end of spring in correct position with assembly tool -T10178- .



- Socket -arrow- of over-centre spring must be in vertical position.

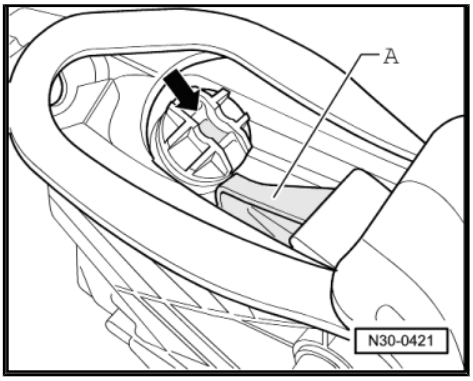
– Fit actuator on clutch pedal -A- into corresponding socket in over-centre spring -arrow-.

– Press clutch pedal slightly, push bolt through and tighten self-locking nut.

– Install crash bar ⇒ page 13 .

– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .

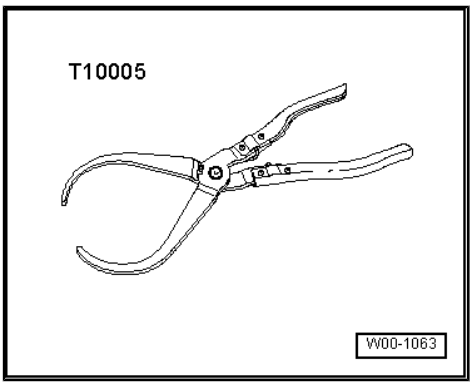
– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .



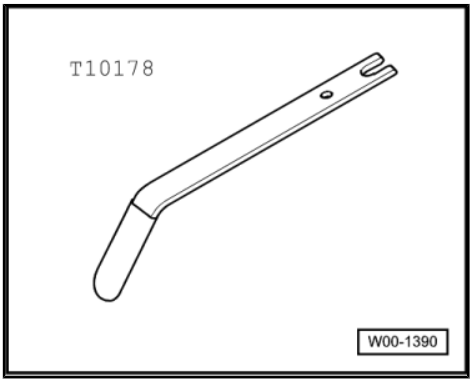
2.2 Removing and installing clutch pedal

Special tools and workshop equipment required

♦ Pliers -T10005-



♦ Assembly tool -T10178-



♦ Grease -G 000 450 02-

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Removing

- Clutch pedal mounting bracket fitted in vehicle

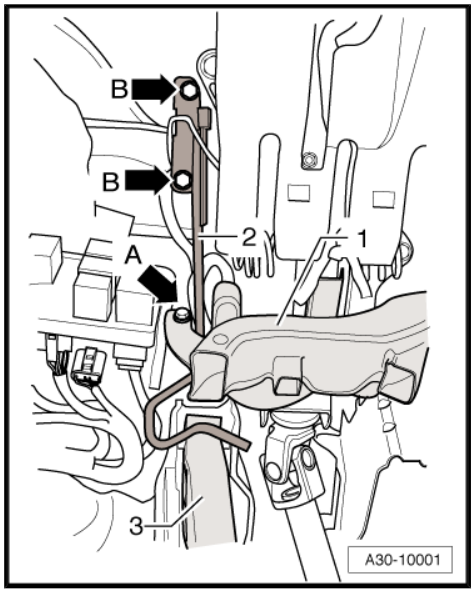
– Move driver's seat away from pedals.

– Remove storage compartment on driver's side ⇒ Rep. Gr. 68 .

– Unscrew bolt -arrow A- and remove footwell air outlet (front left) -1-.

– Unclip wiring harness at rear of footwell air outlet -1- and move clear to one side.

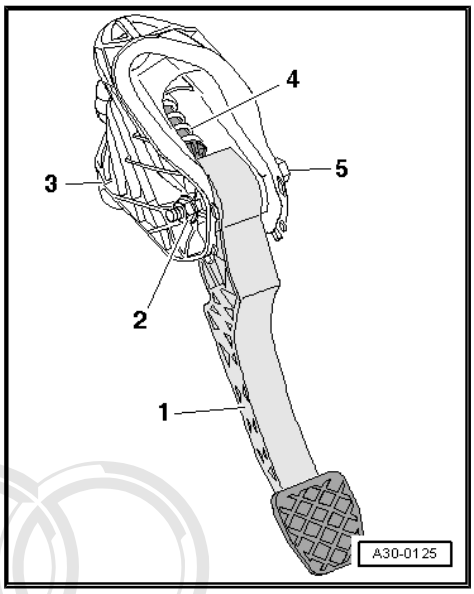
– Unbolt crash bar -2- (secured by one or two bolts -arrows B-, depending on version).



– Unbolt clutch pedal -1- from mounting bracket -3-. To do this, remove nut -2- and pull out bolt -5-.

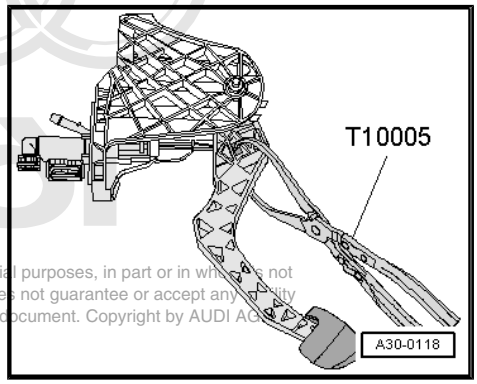
Note

-Item 4- can be disregarded.



– Release retaining clip for operating rod on clutch pedal using pliers -T10005- .

– Remove clutch pedal.



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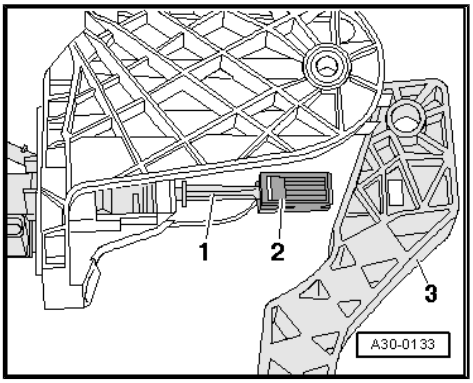
Installing

- Tightening torque ⇒ page 12

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

Note

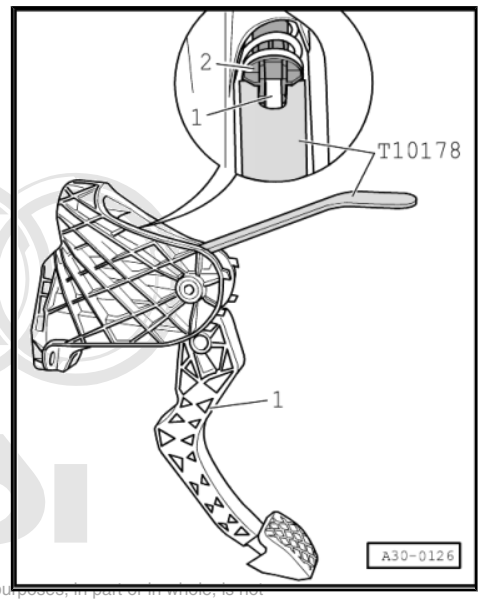
- *Renew self-locking nut.*
- *Lubricate all bearings and contact surfaces with grease -G 000 450 02- .*



– Position retaining clip -2- on operating rod -1- for clutch master cylinder.

– Press retaining clip into mounting on clutch pedal so that it snaps into place.

– Fit over-centre spring -2- into mounting bracket from above while holding end of spring in correct position with assembly tool -T10178- .



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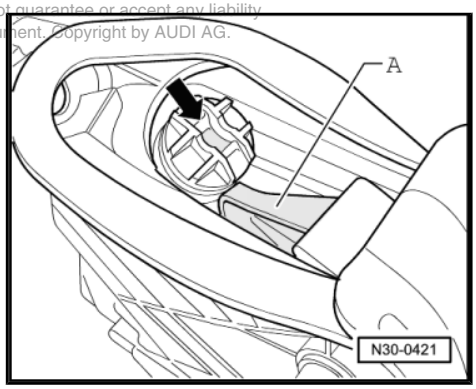
- Socket -arrow- of over-centre spring must be in vertical position.

– Fit actuator on clutch pedal -A- into corresponding socket in over-centre spring -arrow-.

– Press top of clutch pedal forwards against spring pressure of over-centre spring, push through bolt and tighten self-locking nut.



Note

It is easier to press the clutch pedal against the spring if you pull back the bottom of the pedal carefully as you bring the top of the pedal into installation position.

– Install crash bar ⇒ page 13 .

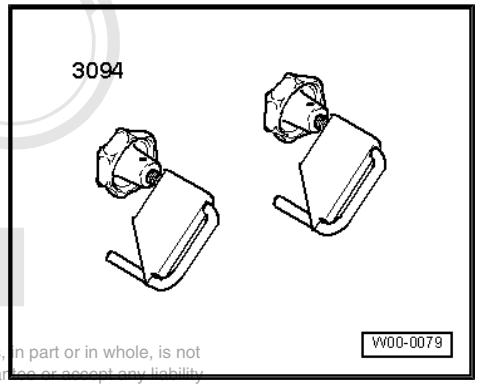
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .

– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .

2.3 Removing and installing mounting bracket

Special tools and workshop equipment required

- Hose clamps, up to Ø 25 mm -3094-



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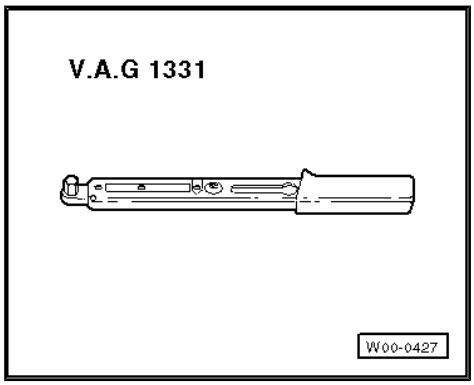
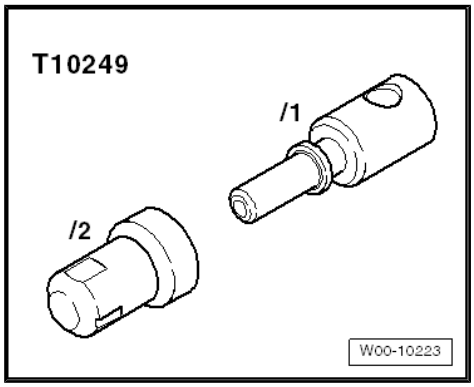
- Torque wrench -V.A.G 1331-



- Sealing tool -T10249-

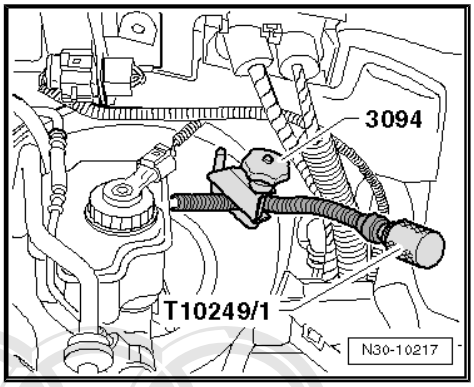


Removing

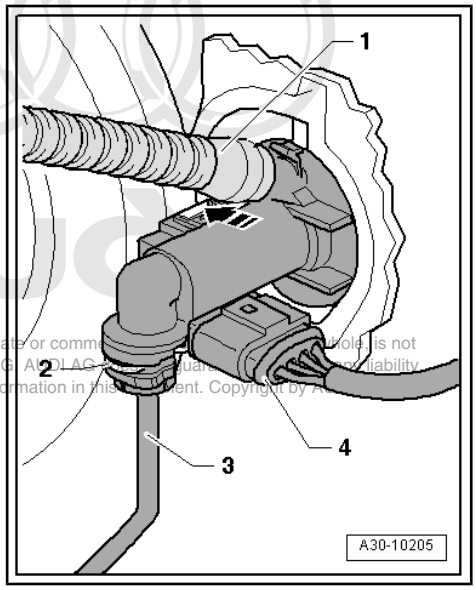
Note

- *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 a lint-free cloth under the master cylinder.*

– Use hose clamp -3094- to clamp off supply hose to clutch master cylinder.



– Pull supply hose -1- off master cylinder.
– Additionally seal off supply hose -1- using sealing tool -T10249/1- (⇒ illustration above).
– Release securing clip -2- and disconnect pipe -3-.
– Unclip and detach clutch position sender -G476- from clutch master cylinder -arrow-. Electrical connector -4- can remain connected.



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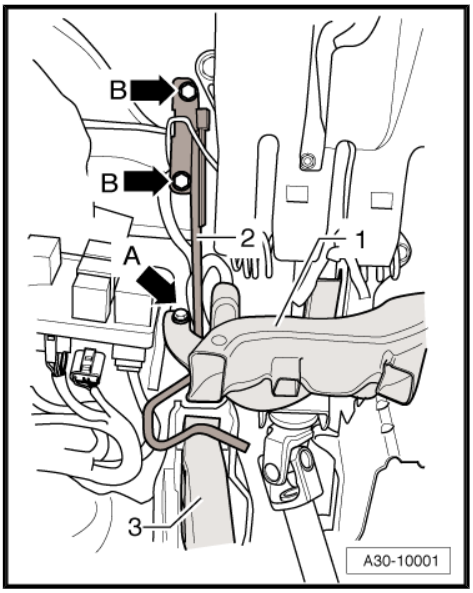
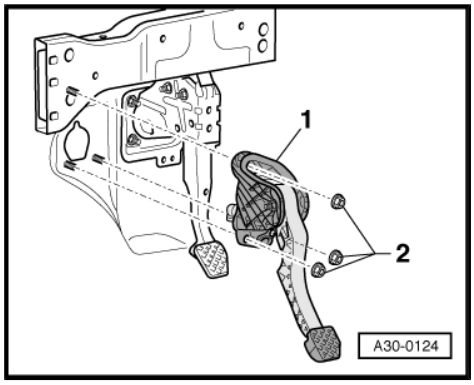
– Move driver's seat to rear as far as possible and move steering wheel into uppermost position.
– Remove storage compartment on driver's side ⇒ Rep. Gr. 68 .
– Unscrew bolt -arrow A- and remove footwell air outlet (front left) -1-.
– Unclip wiring harness at rear of footwell air outlet -1- and move clear to one side.
– Unbolt crash bar -2- (secured by one or two bolts -arrows B-, depending on version).





Note

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

– Remove nuts -2-.
– Take out mounting bracket -1-.

Installing

• Tightening torque ⇒ page 12

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

Note

♦ *Renew self-locking nuts.*
♦ *Renew O-rings*
♦ *Secure all hose connections with the correct hose clips (as original equipment); refer to ⇒ Electronic parts catalogue .*

– Fit mounting bracket -1- and tighten nuts -2-.
– Install pipe/hose assembly ⇒ page 25 .
– Bleed clutch system ⇒ page 28 .
– Install crash bar ⇒ page 13 .
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .
– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .

2.4 Removing and installing clutch position sender -G476-

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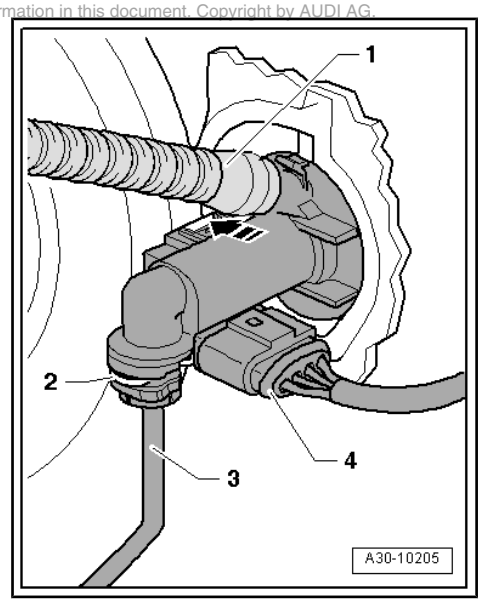
Removing

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



Note

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

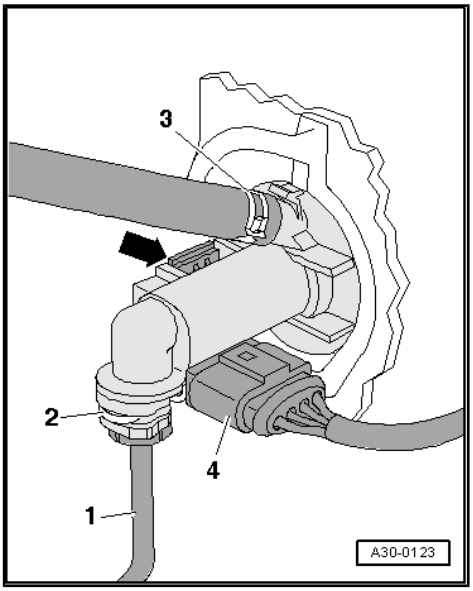
Installing

– Fit clutch position sender -G476- at clutch master cylinder and engage -arrow-.

– Attach electrical connector -4-.

Note

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



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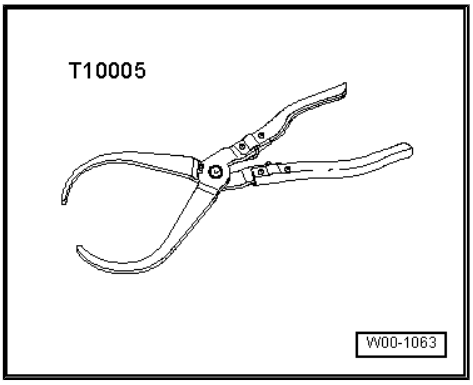
2.5 Removing and installing clutch master cylinder

Special tools and workshop equipment required

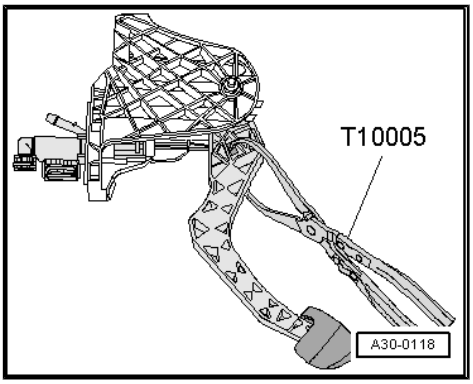
♦ Pliers -T10005-



Removing

– Remove mounting bracket ⇒ page 18 .

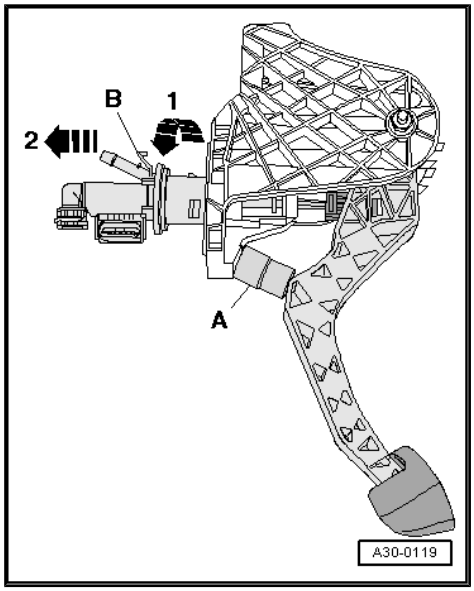
– Release retaining clip for operating rod on clutch pedal using pliers -T10005- .



– Insert a spacer -A- between clutch pedal and stop, and press clutch pedal forward.

• Length of spacer = approx. 40 mm (e.g. 1/2" socket)

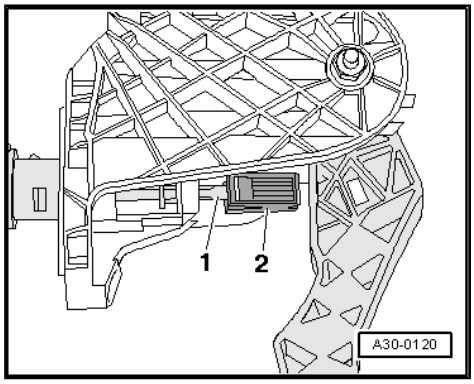
– Release retaining clip -B- and pull clutch master cylinder out of mounting bracket -arrow 1- and -arrow 2-.



Installing

• Move clutch pedal back as far as stop until it is in normal position.

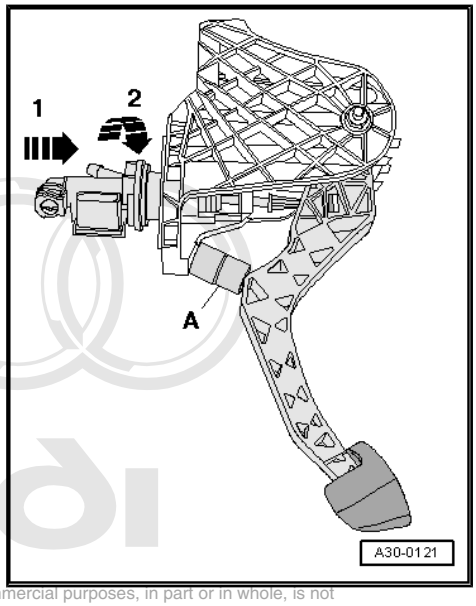
– Install retaining clip -2- on operating rod -1- for clutch master cylinder.



– Insert a spacer -A- between clutch pedal and stop, and press clutch pedal forward.

• Length of spacer = approx. 40 mm (e.g. 1/2" socket)

– Secure clutch master cylinder on mounting bracket -arrow 1- and -arrow 2-.



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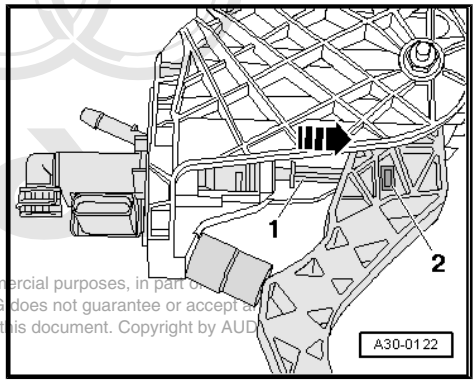
– Press operating rod -1- for clutch master cylinder in direction of -arrow- so that retaining clip -2- snaps into place in clutch pedal.

– Install mounting bracket ⇒ page 18 .



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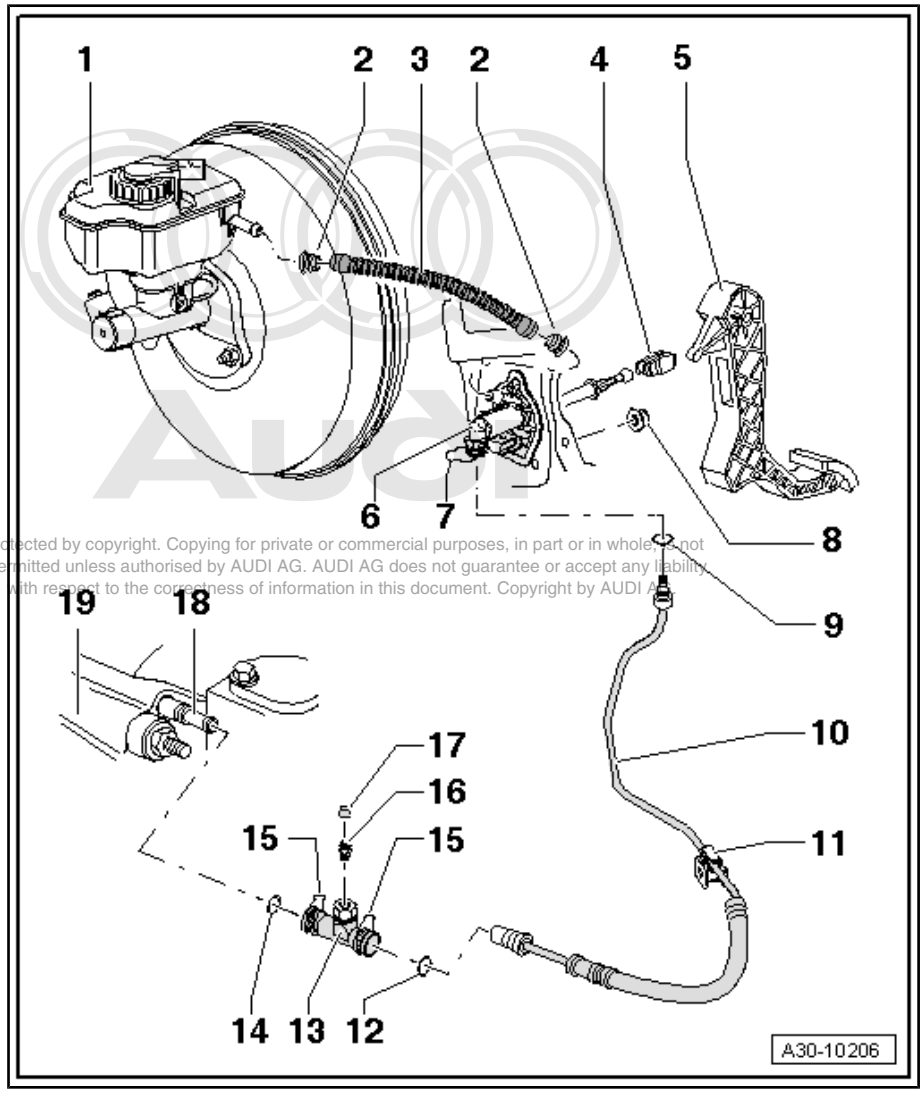
3 Exploded view - hydraulics (LHD)



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1 - Brake fluid reservoir

2 - Seal

- ❑ 2x
- ❑ Seals must be fitted in supply hose ⇒ Item 3 (page 24)

3 - Supply hose

4 - Retaining clip

- ❑ To remove and install retaining clip, first detach clutch master cylinder from clutch pedal ⇒ page 15

5 - Clutch pedal

- ❑ Removing and installing ⇒ page 15

6 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 21

7 - Clip

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

8 - Nut

- ❑ For securing mounting bracket to bulkhead
- ❑ Tightening torque ⇒ Item 15 (page 12)

9 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

10 - Pipe/hose assembly

- ❑ Removing and installing ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

11 - Bracket

- ❑ For pipe/hose assembly ⇒ Item 10 (page 24)
- ❑ Secured on body

12 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

13 - Bleeder connection

14 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

15 - Clip

- ❑ To remove and install pipe/hose assembly or bleeder connection, pull out clip as far as it will go.

16 - Bleeder screw

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

17 - Dust cap

18 - Clutch slave cylinder with release bearing

- ❑ Can only be renewed after removing gearbox
- ❑ Removing and installing ⇒ page 31

19 - Gearbox

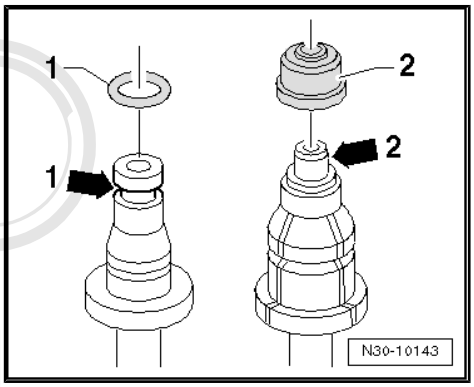
Seal/O-ring for pipe/hose assembly

1 - O-ring

- ♦ Connection with annular groove -arrow 1-

2 - Seal

- ♦ Connection with shoulder -arrow 2-



3.1 Removing and installing pipe/hose assembly

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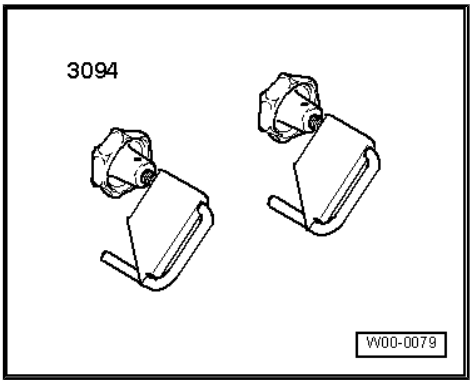
Special tools and workshop equipment required

- ♦ Hose clamps, up to Ø 25 mm -3094-



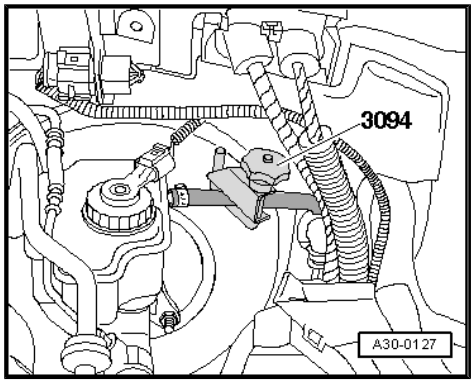
Removing

– Remove air cleaner housing completely ⇒ Rep. Gr. 24 .

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.

– Use hose clamp -3094- to clamp off supply hose to clutch master cylinder.



Note

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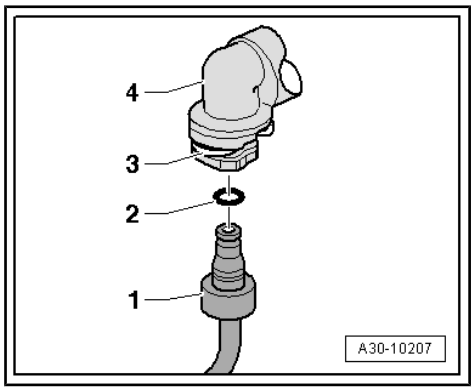
Place a cloth underneath to catch escaping brake fluid.

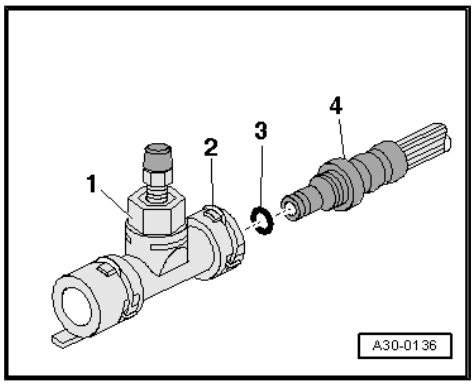
– Release retaining clip -3- on clutch master cylinder with a screwdriver.
– Disconnect pipe/hose assembly -1- and detach from bracket.



Note

Place a cloth underneath to catch escaping brake fluid.

– Release retaining clip -2- on bleeder connection -1- with a screwdriver and disconnect pipe/hose assembly -4-.



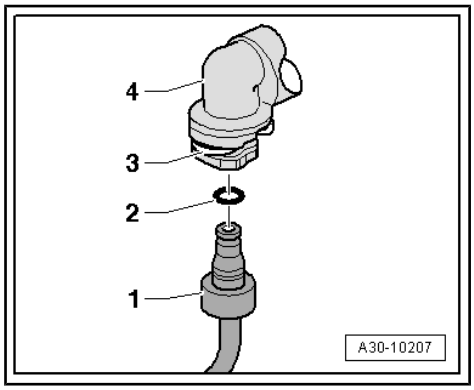
Installing

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

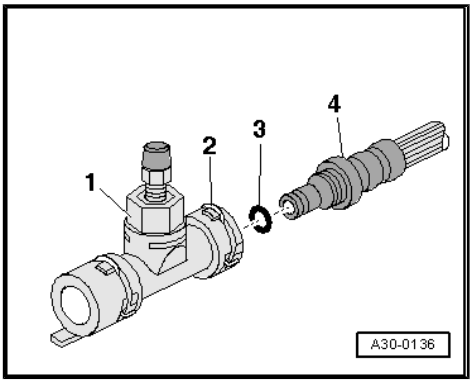
Note

For distinction between O-rings -2- and seals on different versions, refer to ⇒ page 25 .

– Check O-ring -2- for damage and renew if necessary.
– Press pipe/hose assembly -1- onto connection on clutch master cylinder -4- so that retaining clip -3- snaps into place.
– Pull on pipe to check it is secure.



– Check O-ring -3- for damage and renew if necessary.
– Push pipe/hose assembly -4- into bleeder connection -1- so that retaining clip -2- snaps into place.
– Pull on pipe to check it is secure.
– Bleed clutch system ⇒ page 28 .



3.2 Exploded view - hydraulics (RHD)

1 - Brake fluid reservoir

2 - Seal
- ❑ 2x
- ❑ Seals must be fitted in supply hose ⇒ Item 3 (page 27)

3 - Supply hose

4 - Clutch master cylinder
- ❑

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

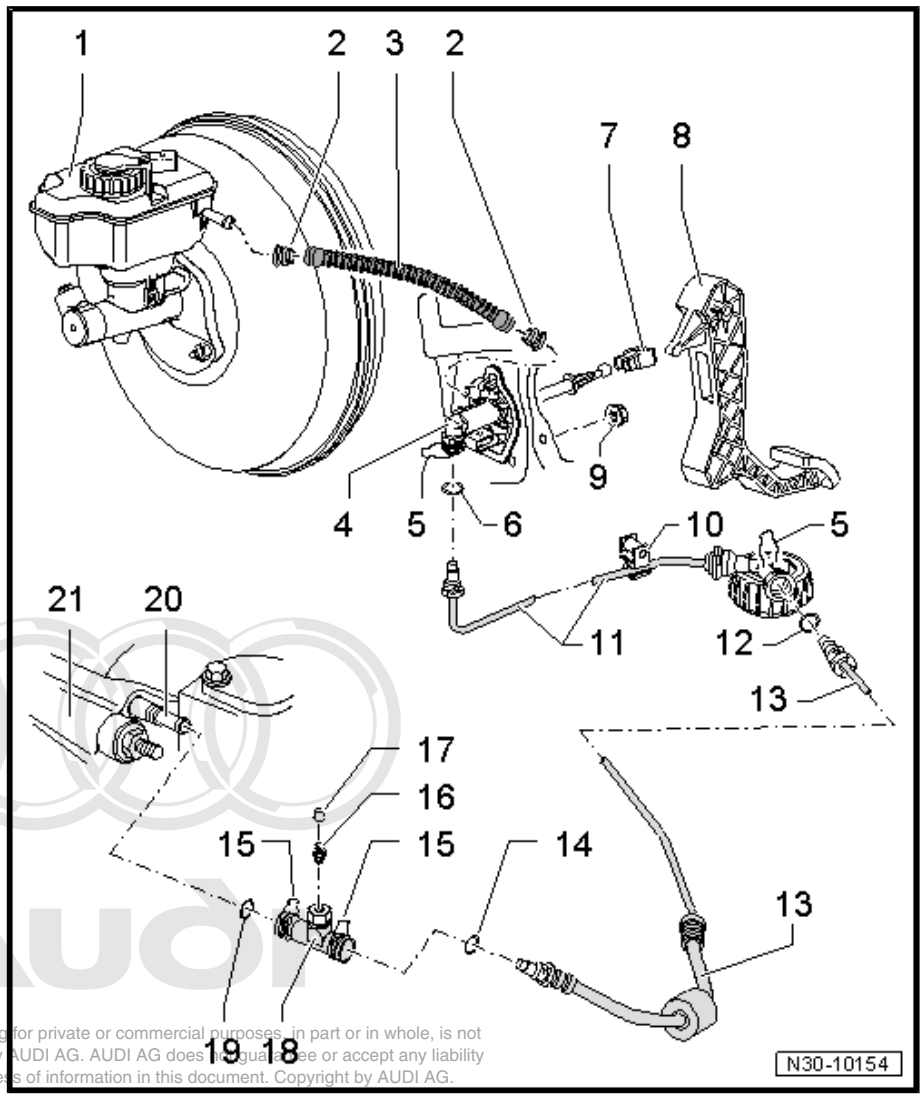
6 - Seal or O-ring
- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

7 - Retaining clip
- ❑ To remove and install retaining clip first detach master cylinder from clutch pedal ⇒ page 15

8 - Clutch pedal

9 - Nut
- ❑ For securing mounting bracket to bulkhead
- ❑ Tightening torque ⇒ Item 15 (page 12)

10 - Bracket
- ❑ Secured on body



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11 - Pipe

- ❑ Can be combined as one unit with pipe/hose assembly ⇒ Item 13 (page 28) on some versions
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

12 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

13 - Pipe/hose assembly

- ❑ Can be combined as one unit with pipe ⇒ Item 11 (page 27) on some versions
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

14 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

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15 - Clip

- ❑ To remove and install pipe/hose assembly or bleeder connection, pull out clip as far as it will go.

16 - Bleeder screw

- ❑ Bleeding clutch system ⇒ page 28

17 - Dust cap

18 - Bleeder connection

19 - Seal or O-ring

- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing
- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 25
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

20 - Clutch slave cylinder with release bearing

- ❑ Can only be renewed after removing gearbox
- ❑ Removing and installing ⇒ page 31

21 - Gearbox

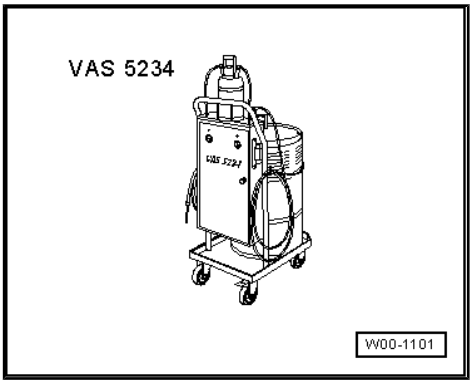
3.3 Bleeding clutch system

Note

- ♦ *The clutch system must be bled after performing work on the hydraulic clutch mechanism.*
- ♦ *In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below.*
- ♦ *Before bleeding clutch system, top up brake fluid reservoir to "max." marking with brake fluid.*

Special tools and workshop equipment required

♦ Brake filling and bleeding equipment -VAS 5234-



♦ Brake fluid specification ⇒ Rep. Gr. 47.

Procedure

– Remove air cleaner housing completely ⇒ Rep. Gr. 24 .

– Pull clutch pedal back to its normal rest position.

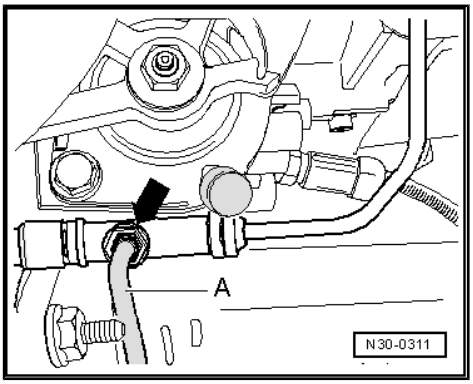
– Connect brake filling and bleeding equipment -VAS 5234- to brake fluid reservoir.

– Remove protective cap from bleeder screw -arrow- and connect hose -A- from bleeder bottle to bleeder screw.

– Switch on bleeding equipment.

• Operating pressure 2.0 bar

– Now open bleeder screw approx $^1/_4$ turn and allow 100 cm^3 of brake fluid to run out.



– With bleeder screw open, pump clutch pedal rapidly all the way in and out by hand 15 to 20 times (approx. 2 times per second).

– Close bleeder screw. Tightening torque ⇒ Item 16 (page 25)

– Switch off brake filling and bleeding equipment -VAS 5234- and release operating pressure (2.0 bar).

– Press clutch pedal slowly down with your foot 10 times and check that clutch system is functioning properly.

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– Remove brake filling and bleeding equipment -VAS 5234- from brake fluid reservoir.

– Install air cleaner housing ⇒ Rep. Gr. 24 .

4 Exploded view - clutch release mechanism, clutch slave cylinder

1 - Gearbox

2 - Input shaft oil seal

- ❑ Removing ⇒ page 116
- ❑ Driving in ⇒ page 116

3 - Clutch slave cylinder with release bearing

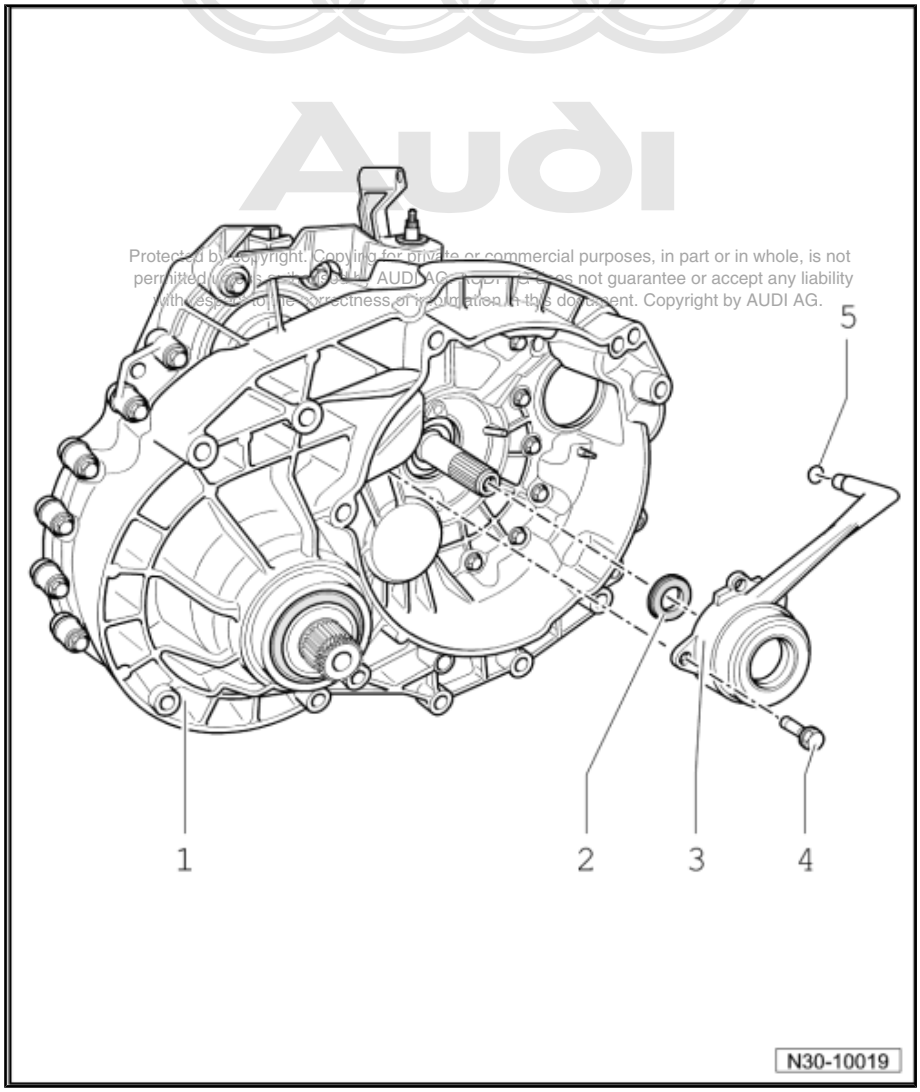
- ❑ Are one unit; can only be renewed together
- ❑ Do not wash out bearing; wipe clean only
- ❑ If bearing is noisy, renew together with clutch slave cylinder
- ❑ Tighten bolts carefully in several small steps and in diagonal sequence; make sure that mounting lugs on clutch slave cylinder do not break off
- ❑ For some slave cylinders, divided supply line ⇒ page 30
- ❑ Removing and installing ⇒ page 31

4 - Bolt

- ❑ Always renew
- ❑ 3x
- ❑ 15 Nm

5 - O-ring

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



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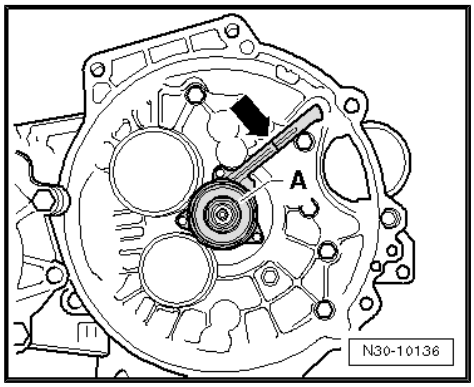
Slave cylinder -A- with divided supply line

The supply line for some slave cylinders is divided in the area of the -arrow-.

For correct version, refer to ⇒ Electronic parts catalogue



4.1 Removing and installing clutch slave cylinder with release bearing

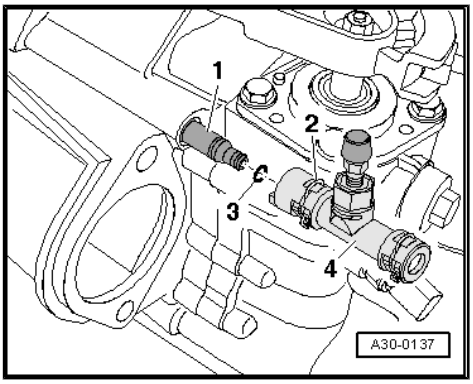
Note

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

Removing

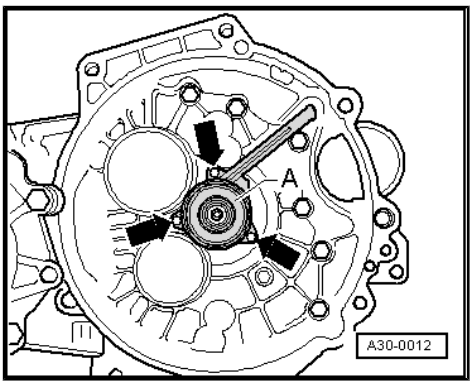
- Gearbox removed ⇒ page 61 .

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



– Remove bolts -arrows-.

– Take off clutch slave cylinder together with release bearing -A-.



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Installing

- Tightening torque ⇒ page 30

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

Caution

Tighten securing bolts for clutch slave cylinder in small steps. Otherwise mounting lugs -arrows- can be damaged.

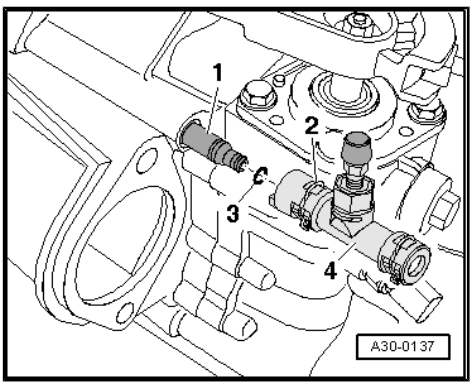
– Secure clutch slave cylinder and release bearing -arrows-.

– Check O-ring -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.

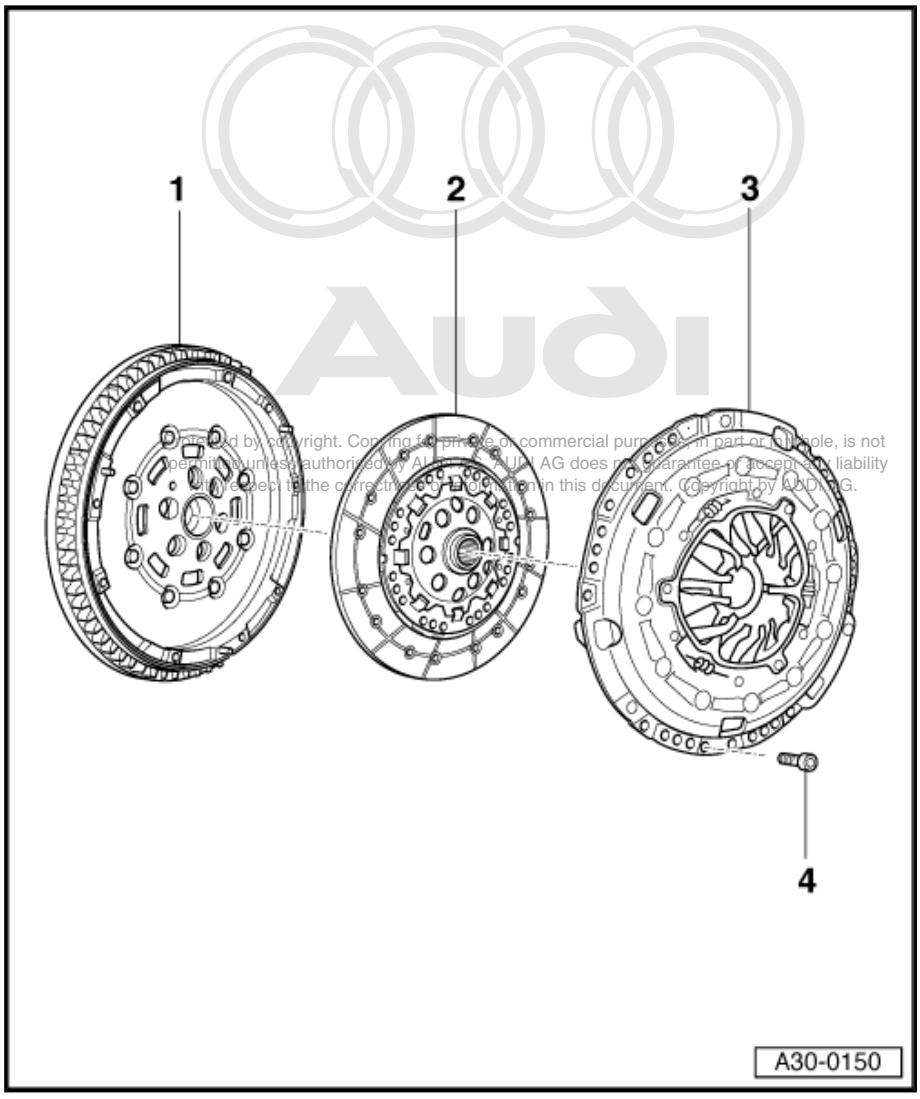
– Bleed clutch system ⇒ page 28 .



5 Exploded view - LuK version clutch

Note

- *The dual-mass flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.*
- *Select the correct clutch plate and pressure plate according to engine code ⇒ Electronic parts catalogue .*



1 - Dual-mass flywheel

- ❑ Removing and installing ⇒ 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 33

2 - Clutch plate

- ❑ Removing and installing ⇒ page 33
- ❑ Always renew SAC pressure plate as well
- ❑ Installation position: marking “Getriebeseite” (gearbox side) faces towards gearbox
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

3 - SAC pressure plate

- ❑ “SAC” = self adjusting clutch
- ❑ Always renew clutch plate as well
- ❑ Removing and installing ⇒ page 33
- ❑ Checking position of adjuster ring on new SAC pressure plate ⇒ page 35
- ❑ Checking ends of diaphragm spring ⇒ page 35
- ❑ Checking spring connection and rivets ⇒ page 35

4 - Bolt

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

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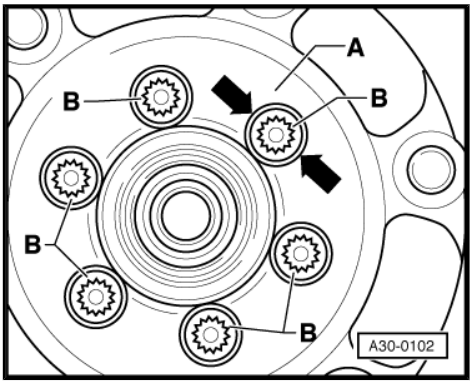
Instructions for removing dual-mass flywheel



Note

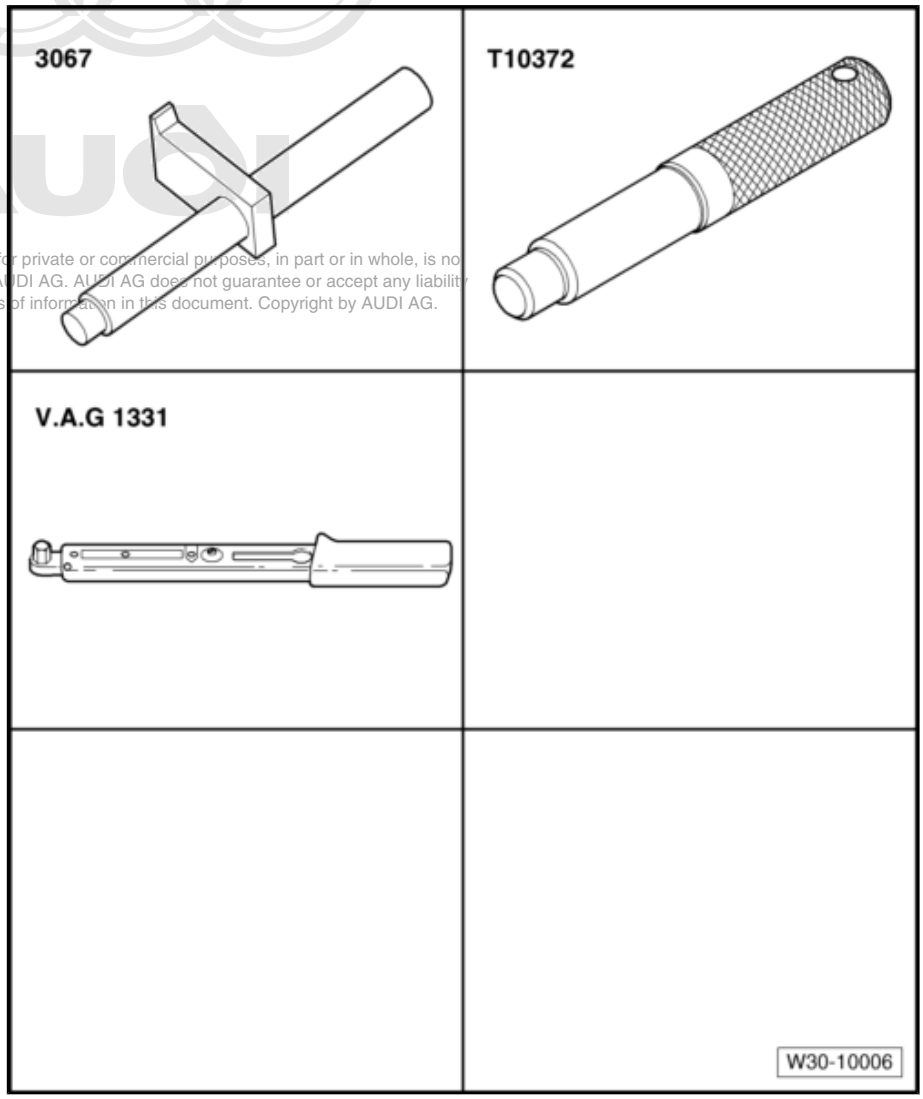
Do not use an impact wrench or pneumatic wrench to remove bolts -B-: this would severely damage the dual-mass flywheel. The bolts must always be removed by hand.

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

5.1 Removing and installing clutch

Special tools and workshop equipment required

- Counterhold tool -3067-
- Centring mandrel -T10372-
- Torque wrench -V.A.G 1331-
- Grease for clutch plate splines -G 000 100-



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Removing

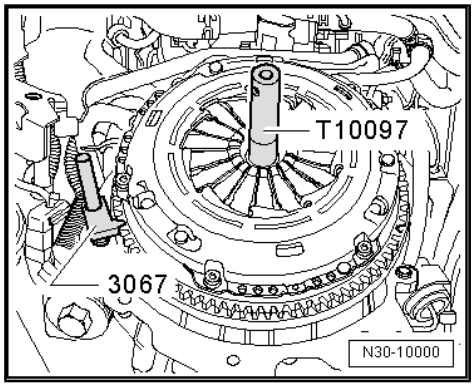
- Gearbox removed ⇒ page 61 .

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

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

– Working clockwise, loosen all six bolts consecutively in steps of 90° ($^1/_4$ turn) until the pressure plate is released.

– Take off pressure plate and clutch plate.



Installing

- Tightening torque ⇒ page 32

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

Note

- *The dual-mass flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.*
- *Always renew clutch plate and pressure plate together and select the correct parts according to engine code ⇒ Electronic parts catalogue .*
- *Checking position of adjuster ring on new pressure plate ⇒ page 35*
- *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.*
- *Clean input shaft splines and (in the case of a used clutch plate) the hub splines. Remove corrosion and apply only a very thin coating of grease -G 000 100- to the splines. Then move clutch plate backwards and forwards on input shaft until hub moves freely on shaft. It is important to remove excess grease.*
- *Pressure plates have an anti-corrosion coating and are greased. Only the contact surface may be cleaned, otherwise the service life of the clutch will be considerably reduced.*
- *Pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then insert bolts.*
- *Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.*
- *If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).*

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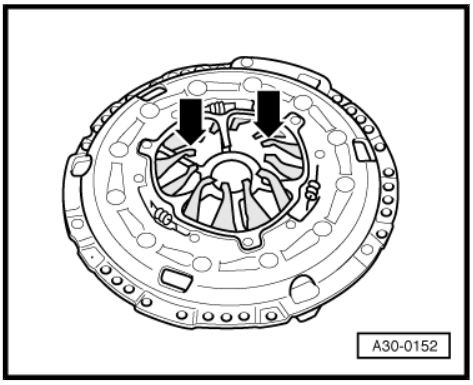
Checking ends of diaphragm spring

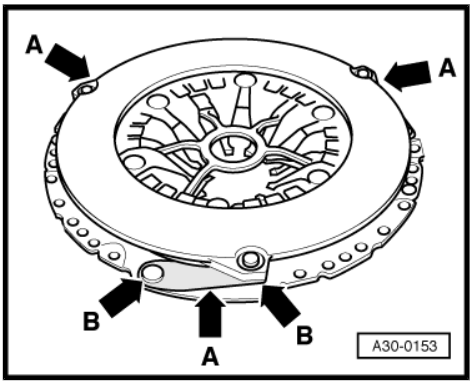
- Wear up to half the thickness of the diaphragm spring -arrows- is permissible.



Checking spring connections and rivets

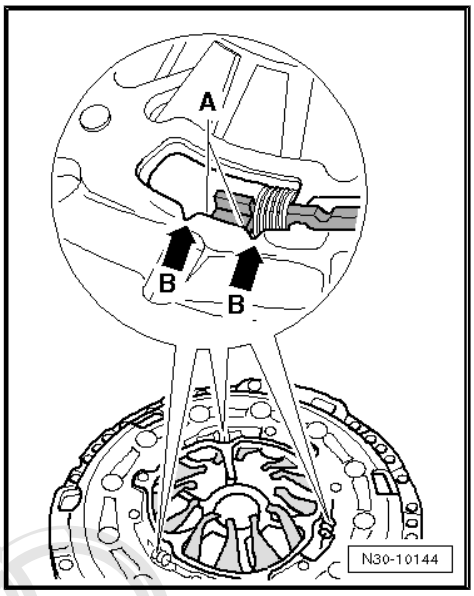
– Check spring connections -arrows A- for damage and make sure riveted joints -arrows B- are seated tightly.

- Renew pressure plate if spring connections are broken or badly bent, or if riveted joints are loose.



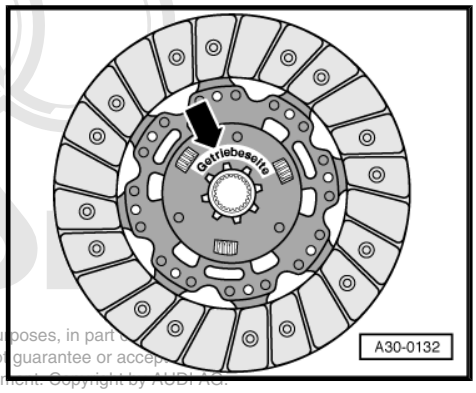
Checking position of adjustment mechanism (new SAC pressure plates only)

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



Installation position of clutch plate:

- The marking “Getriebeseite” (gearbox side) faces towards the gearbox



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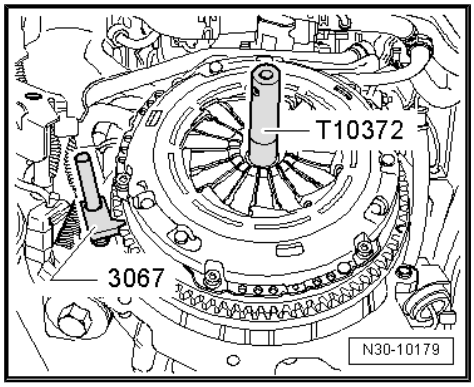
– Use counter-hold tool -3067- .
– Fit pressure plate onto dowel pins.
– Use centring mandrel -T10097- to centralise clutch plate.

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

– Screw in all 6 bolts evenly by hand until bolt heads make contact with pressure plate.
– Working clockwise, tighten all six bolts consecutively in steps of 90° ($^1/_4$ turn) until the housing makes contact with the flywheel.
– Working clockwise, tighten all 6 bolts to final torque consecutively. Tightening torque ⇒ Item 4 (page 32)



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34 – Controls, housing

1 Overview - selector mechanism

-Arrow A- gear selection movement

-Arrow B- gate selection movement

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A - Gear selector cable (gear selection movement)

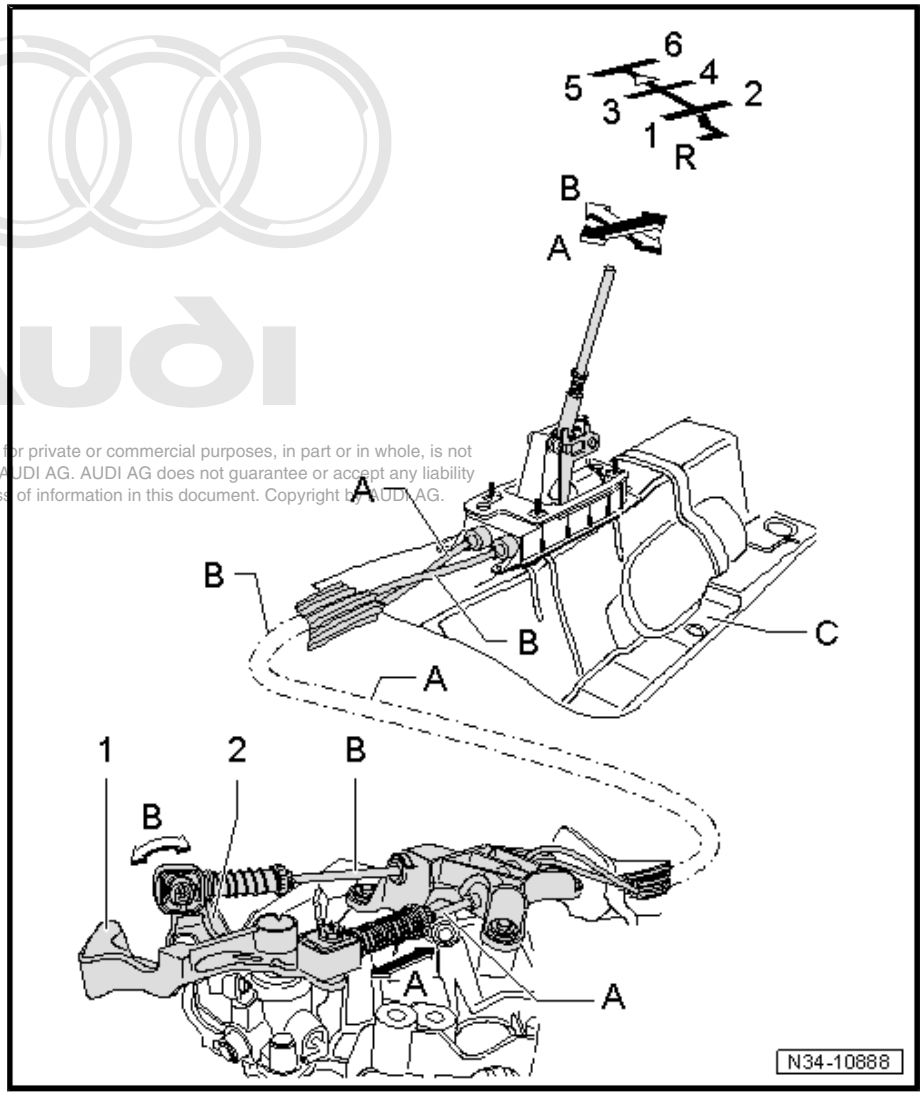
B - Gate selector cable (gate selection movement)

C - Heat shield

- ❑ Remove before removing selector mechanism

1 - Gearbox selector lever

2 - Gate relay lever



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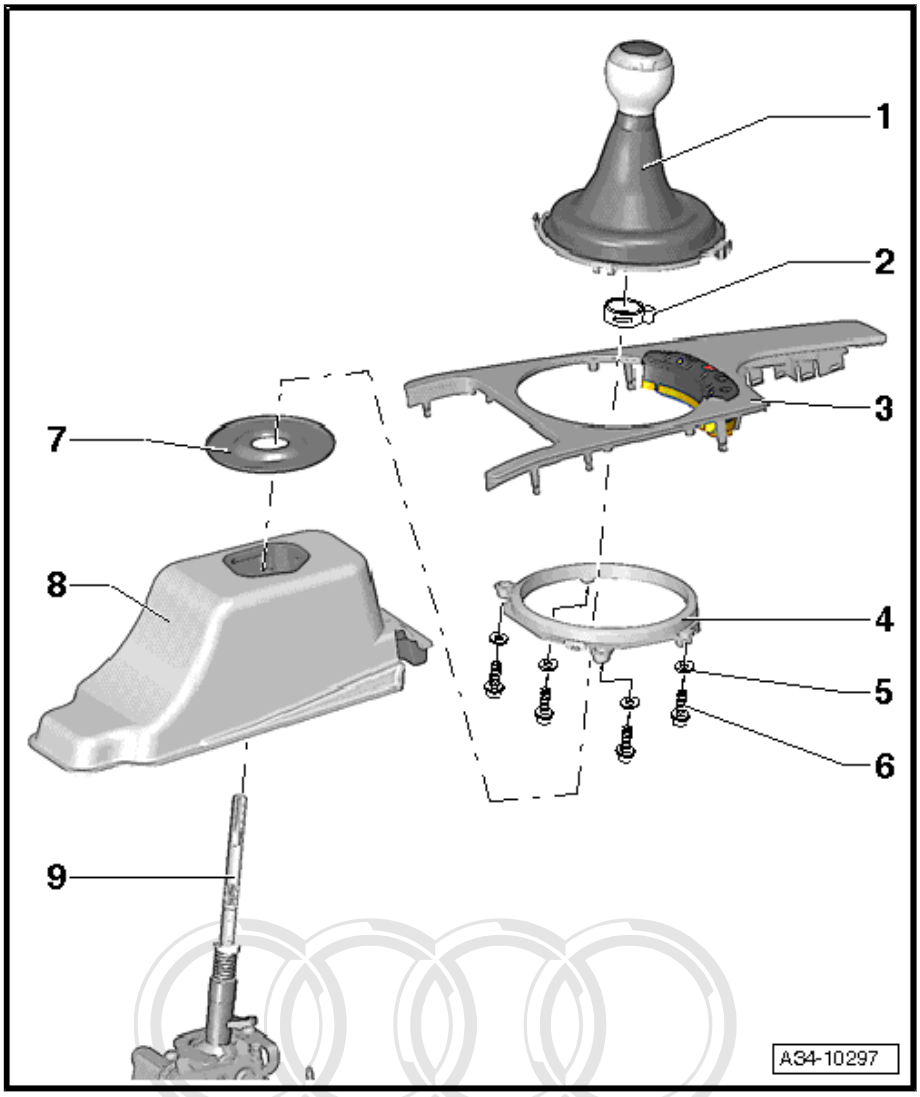
2 Exploded view - gear knob and covers



1 - Gear knob with gear lever boot

- ❑ Cannot be separated from each other
- ❑ Renew together
- ❑ Removing and installing ⇒ page 40
- ❑ Detaching from trim panel for centre console ⇒ page 40
- ❑ Disconnecting from securing frame ⇒ page 40

2 - Clip

- ❑ Secures gear knob to gear lever
- ❑ Secure with hose clip pliers -V.A.G 1275-

3 - Trim panel for centre console

- ❑ Remove and install together with gear knob ⇒ page 40
- ❑ Detaching from gear lever boot ⇒ page 40

4 - Securing frame

- ❑ Detaching from trim panel for centre console ⇒ page 40
- ❑ Detaching from gear lever boot ⇒ page 40

5 - Washer

- ❑ 4x

6 - Bolt

- ❑ 4x
- ❑ 1.5 Nm

7 - Noise insulation cover (upper)

8 - Noise insulation cover (lower)

9 - Gear lever

- ❑ Adjusting selector mechanism ⇒ page 58

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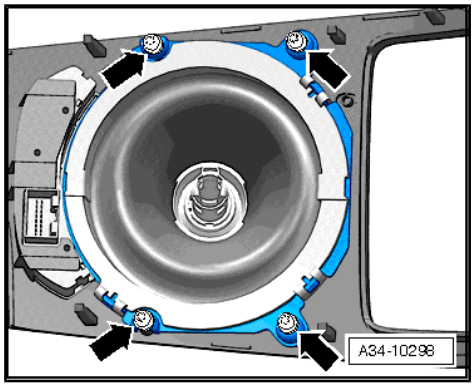
Detaching trim panel for centre console and securing frame for gear lever boot

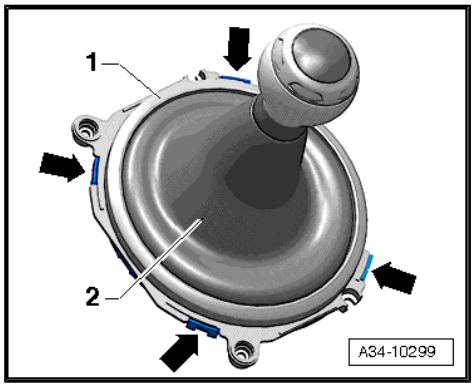
– Remove bolts -arrows-.

– Detach trim panel from securing frame.



Detaching securing frame and gear lever boot

– Carefully release tabs -arrows- and lift securing frame -1- off gear lever boot -2-.



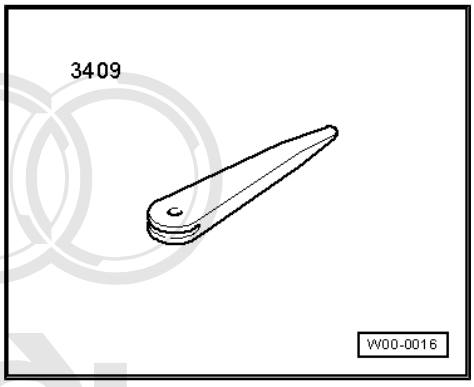
2.1 Removing and installing gear knob with gear lever boot

Note

The gear knob is removed together with the gear lever boot and the trim panel for the centre console.

Special tools and workshop equipment required

♦ Removal wedge -3409-



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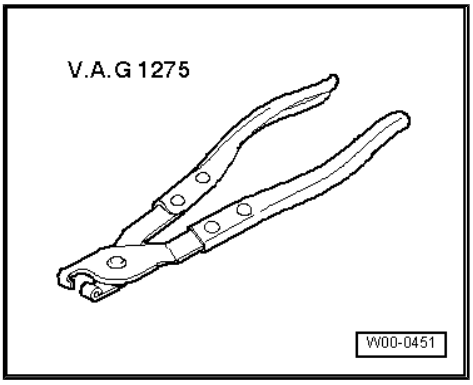
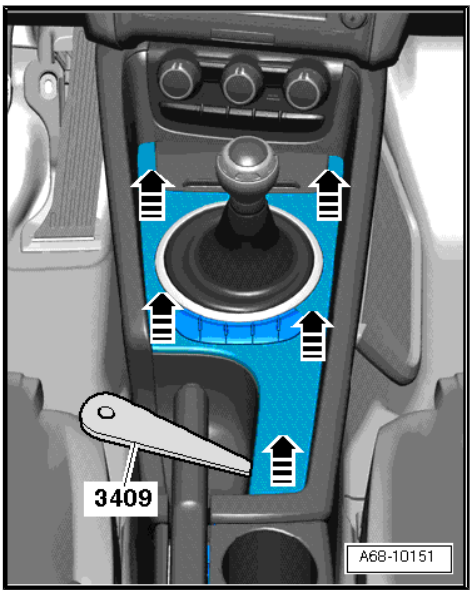
♦ Hose clip pliers -V.A.G 1275-



Removing

– Open ashtray.

– Carefully lever off trim panel from centre console -arrows-.



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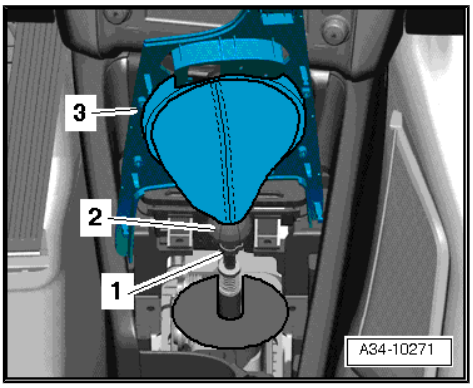
– Unplug electrical connector at trim panel.

– Pull trim panel -3- up and over gear knob -2-.

– Open clip -1- and pull off gear knob together with gear lever boot and trim panel -3-.

– Detach gear lever boot and trim panel for centre console -3- ⇒ page 40 .



Installing

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

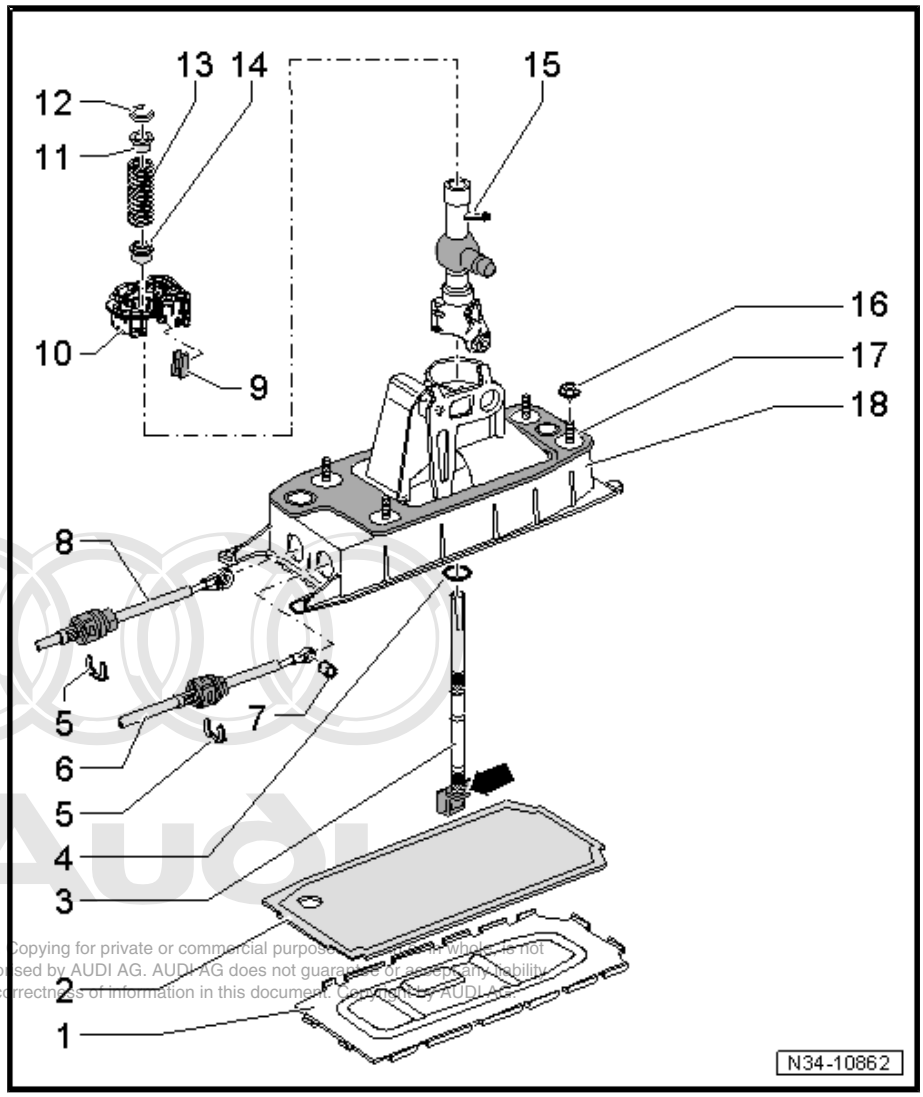
– Push gear knob onto gear lever until it contacts stop.

– Secure gear knob to gear lever with a new clip -1-, using hose clip pliers -V.A.G 1275- .

3 Assembly overview - gear lever and selector housing

Note

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



1 - Floor plate

- ❑ Bend tabs open to remove
- ❑ Renew

2 - Gasket

- ❑ Renew

3 - Gear lever

- ❑ Can be removed and installed without removing gear lever guide -item 15-

4 - Damping washer

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

5 - Securing clip

- ❑ Renew

6 - Gate selector cable

- ❑ Lever off gate selector lever
- ❑ Press onto gate selector lever inside selector mechanism
- ❑ Installation position ⇒ page 37

7 - Bush

8 - Gear selector cable

- ❑ Lever off gear lever guide
- ❑ Press onto gear lever guide inside selector mechanism
- ❑ Installation position ⇒ page 37

9 - Damper

10 - Ball socket

- ❑ Will be damaged during removal
- ❑ Renew

11 - Bush

12 - Securing clip

- ❑ Removing and installing ⇒ page 43

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13 - Spring

14 - Bush

15 - Gear lever guide

16 - Nut

- ❑ 8 Nm

17 - Gasket

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

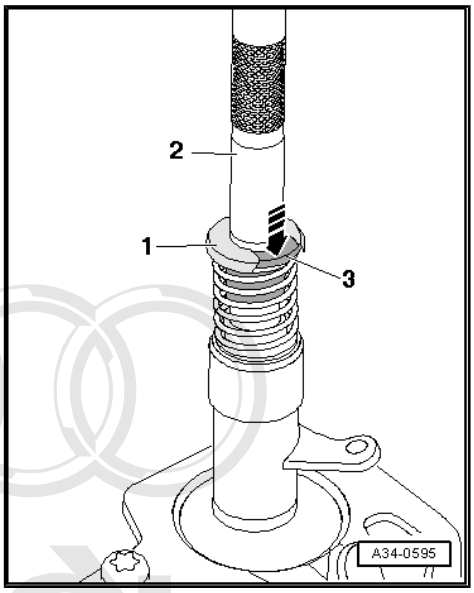
18 - Selector housing

- ❑ With spring and gate selector lever
- ❑ Spring and gate selector lever cannot be detached

Removing securing clip

– Hold gear lever -2- firmly.

– Press spacer bush -3- in direction of -arrow- and remove securing clip -1-.



3.1 Removing and installing selector mechanism

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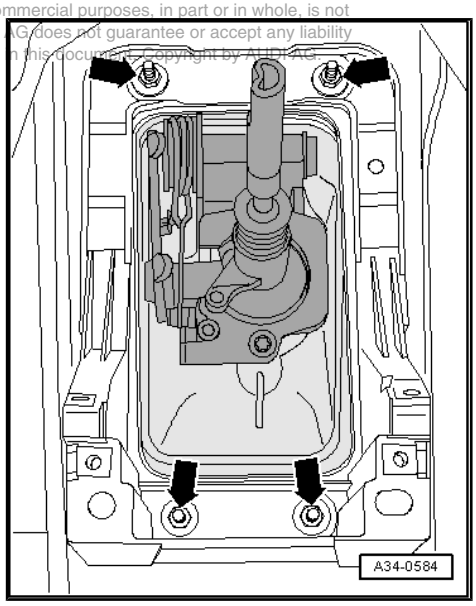
Removing

– Remove gear knob together with trim panel for centre console ⇒ page 40 .

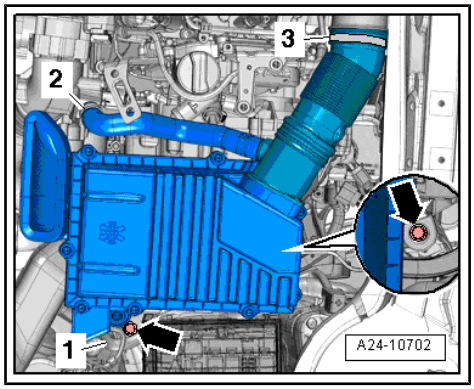
– Remove centre console ⇒ Rep. Gr. 68 .

– Remove noise insulation covers above selector mechanism.

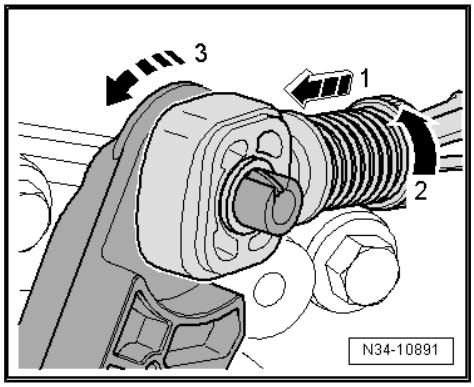
– Remove nuts -arrows-.



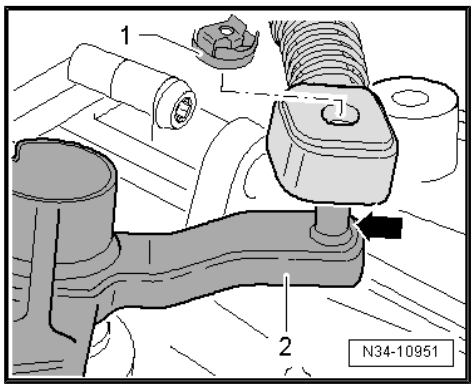
– Remove air cleaner housing ⇒ Rep. Gr. 24 .



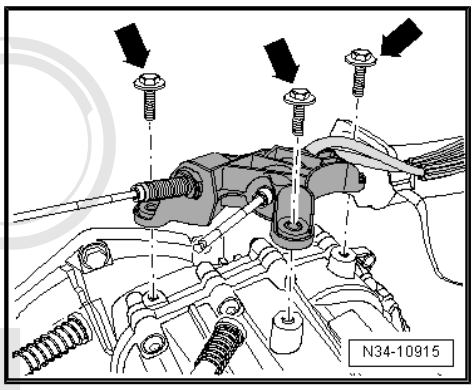
– Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
– Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.



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



– Unscrew bolts -arrows-, remove cable support bracket from gearbox and tie up on left side.
– Remove propshaft ⇒ Rear final drive 0BY; Rep. Gr. 39 .



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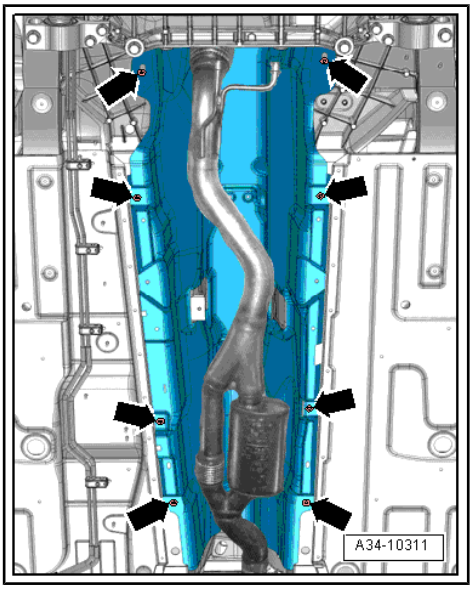
– Remove bolts and nuts -arrows- and detach heat shield towards rear.
– Swing selector mechanism down and remove together with selector cables.



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Installing

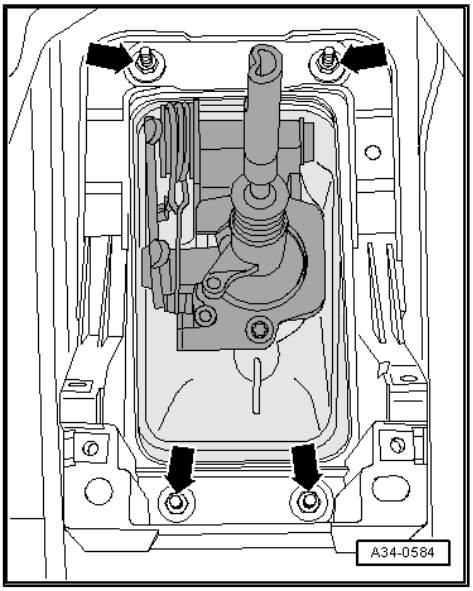
Installation is carried out in reverse sequence; note the following:

- Tightening torques ⇒ page 42 , ⇒ page 51

Note

Renew securing clip for gear selector cable.

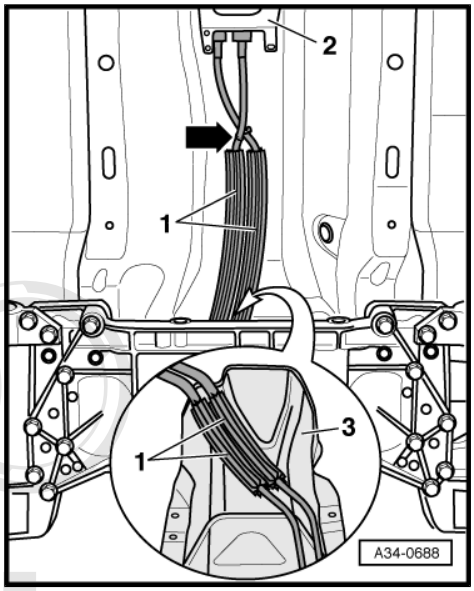
– Fit selector mechanism and align parallel to body. Tighten nuts -arrows-.
– Secure gear selector cable to gearbox selector lever ⇒ page 56 .



– Route cables -1- from selector mechanism -2- to gearbox as follows:

• After the point where they cross over, the cables must run parallel as far as the cable support bracket.

• The cables must be routed in the slot provided in heat shield -3-.



Note

The enlargement shows the heat shield from above.

– Secure gear selector cable and gate selector cable with cable tie -arrow- ⇒ page 52 .

– Adjust selector mechanism ⇒ page 58 .

– Fit noise insulation covers above selector mechanism and install centre console ⇒ Rep. Gr. 68 .

– Install gear knob with gear lever boot ⇒ page 40 .

– Install air cleaner housing ⇒ Rep. Gr. 24 .

– Install propshaft ⇒ Rear final drive 0BY; Rep. Gr. 39 .

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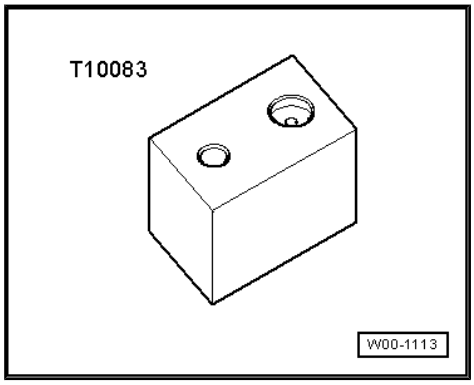
3.2 Dismantling and assembling selector mechanism

Special tools and workshop equipment required

♦ Thrust block -T10083-



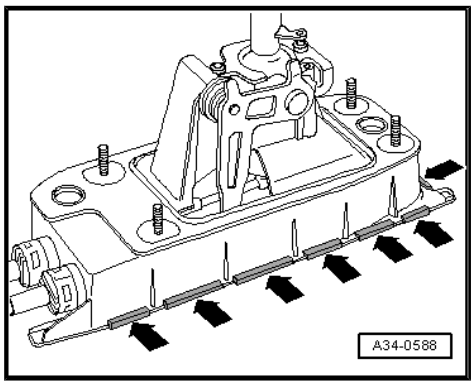
Dismantling

– Remove selector mechanism ⇒ page 43 .

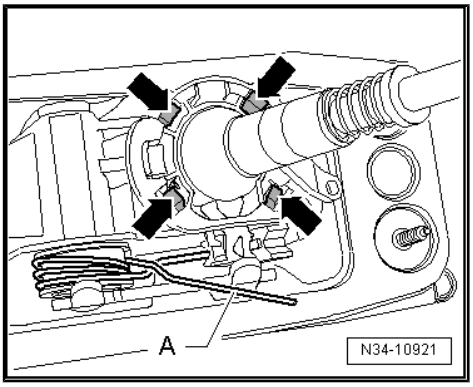
– Open out tabs -arrows- all round with screwdriver and remove floor plate.

– Detach gasket from selector mechanism.

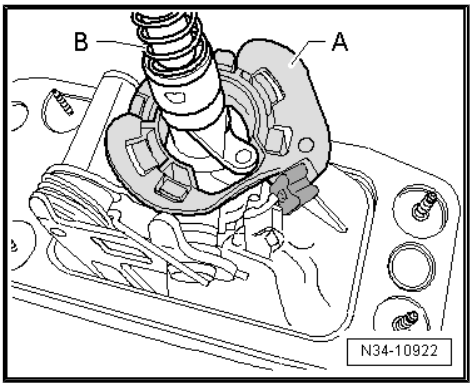
– Remove gear selector cable and gate selector cable from selector housing ⇒ page 42 .



– 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.



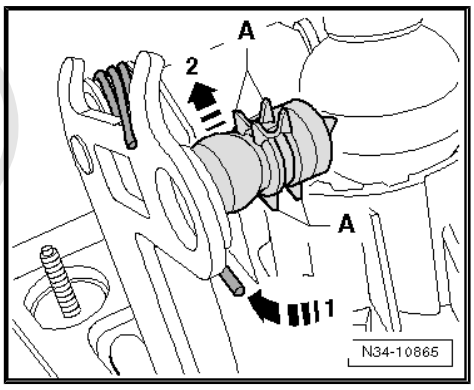
– Prise ball socket -A- out of selector housing together with gear lever guide and gear lever -B-.
– Press ball socket off ball on gear lever guide and remove.



Note

Note guides -A- when performing the following steps; they must not be broken off.

– Lift bottom spring arm -arrow 1- onto stop on shoulder of gate selector lever.
– Pull gear lever guide upwards as far as stop and pull ball-head pin out of gate selector lever in direction of -arrow 2-.



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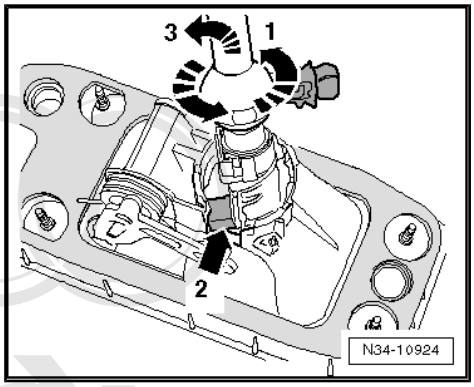
– Turn gear lever guide anti-clockwise -arrow 1-.

• The pin -arrow 2- must be in the recess in the selector housing.

– Then swivel gear lever guide out in direction of -arrow 3- together with gear lever.



Assembling

• Tightening torques ⇒ page 42

Note

Renew ball socket ⇒ Item 10 (page 42) .

Caution

Risk of accident.

- ***During the following steps, the bottom spring arm (-arrow 1- ⇒ page 47) can become dislodged and snap suddenly down off the shoulder of the gate selector lever.***

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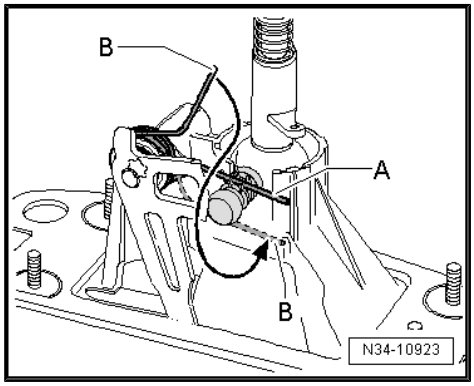
– Carefully press bottom spring arm off shoulder of gate selector lever.

• The spring arms will then compress “diagonally” (this will be accompanied by a loud noise).

– Release the tension on spring arms -A- and -B- by turning them both clockwise.

• Spring arms must point in opposite directions.



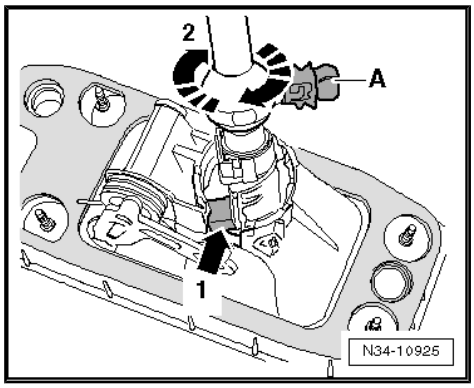
Note

The installation position is shown with the gear lever guide installed.

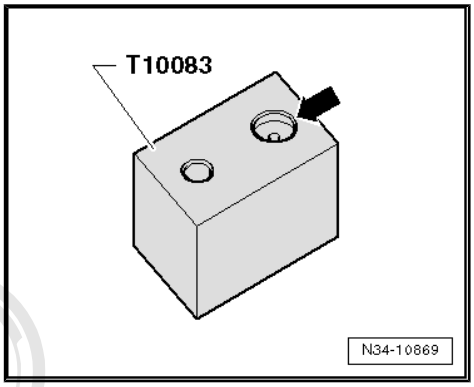
– Insert gear lever guide into selector housing together with gear lever.

• Pin -arrow 1- should be positioned just inside recess on selector housing.

– Turn gear lever guide clockwise -arrow 2- until ball-head pin -A- is above recess on selector housing.



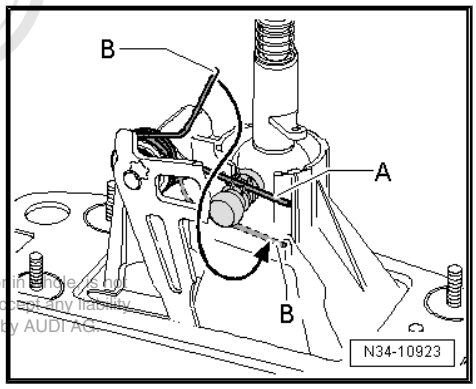
– Insert selector housing with gear lever guide in larger recess -arrow- in thrust block -T10083- .



- The gear lever guide should protrude out of the selector housing as far as the stop.

– Insert arm -A- of spring in guide from above.

– Pull arm -B- of spring downwards and insert it next to the guide (towards ball head).



Note

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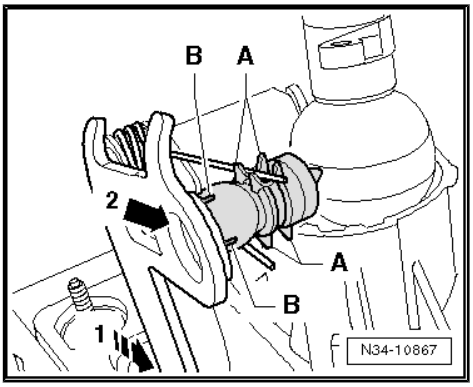
For illustration purposes, only part of the gate selector lever is shown.

– Carefully take selector housing off thrust block -T10083- together with gear lever guide.

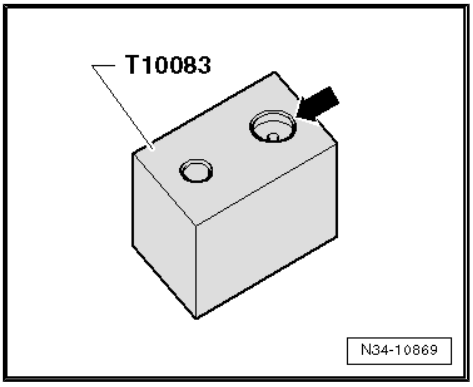
– Move gate selector lever back as far as stop (away from mounting holes for gear selector cable and gate selector cable) -arrow 1-.

– Grease ball-head pin and press it into 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 protrude out of the selector housing as far as the stop.

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

– Grease ball socket -B- and ball of gear lever guide.

– Press ball socket onto ball of gear lever guide as far as stop.

– Remove selector housing from thrust block -T10083- .

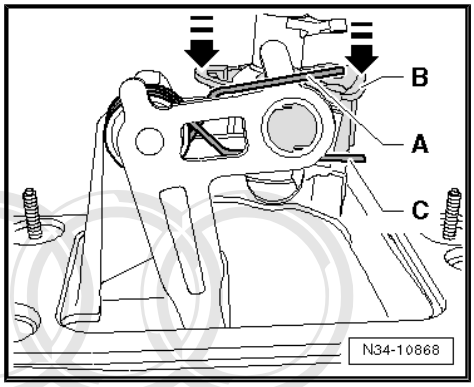
– Press ball socket into selector housing in direction of -arrows-.

- All four lugs must engage.

– Insert bottom spring arm -C- into guide.

– Lift top spring arm -A- over tab on gate selector lever and into guide.

– Install selector mechanism ⇒ page 43 .



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4 Exploded view - gear selector cable and gate selector cable

Note

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

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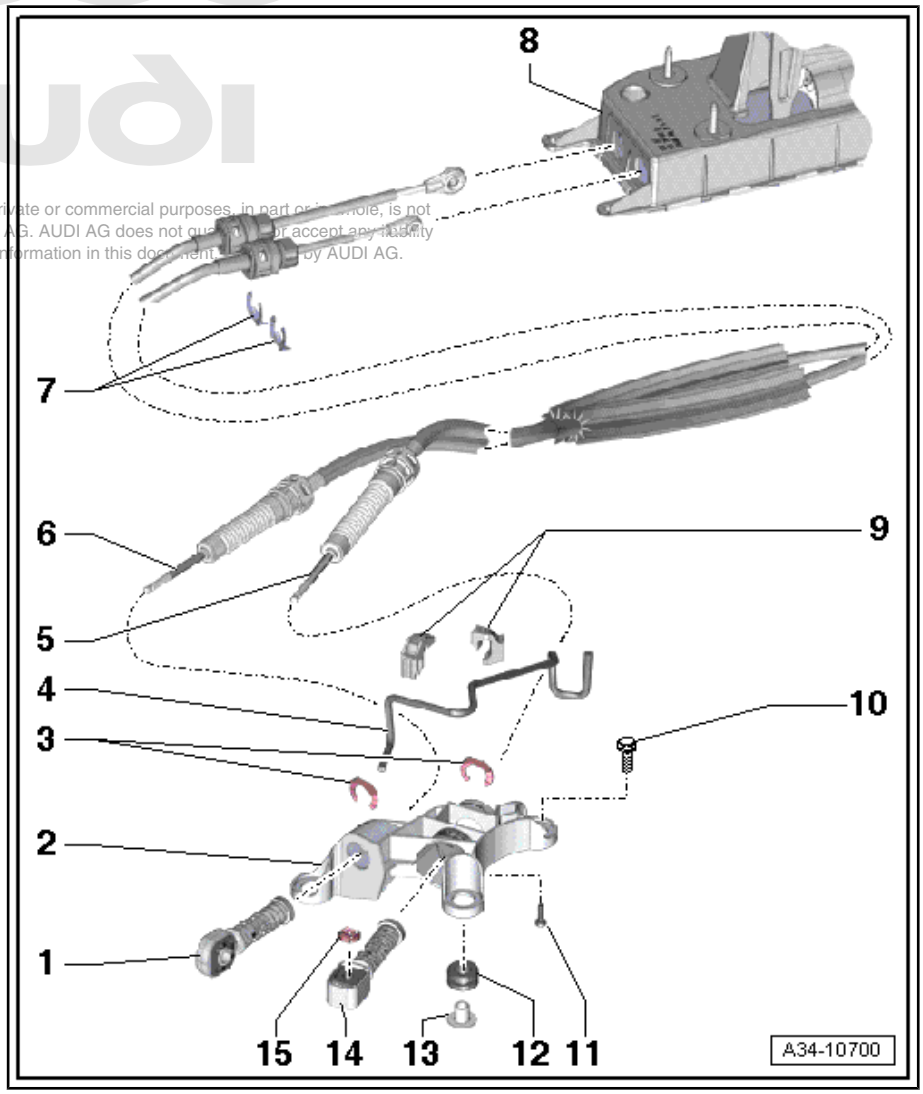


1 - Cable end-piece
- ❑ Secures gate selector cable to gate relay lever
- ❑ Allocation ⇒ page 55
- ❑ Release to adjust selector mechanism ⇒ page 59

2 - Cable support bracket

3 - Retaining clips
- ❑ Renew

4 - Retainer

5 - Gear selector cable
- ❑ Removing and installing ⇒ page 52
- ❑ Adjusting ⇒ page 58

6 - Gate selector cable
- ❑ Removing and installing ⇒ page 52
- ❑ Adjusting ⇒ page 58

7 - Retaining clips
- ❑ Renew

8 - Selector housing

9 - Clip

10 - Bolt
- ❑ 20 Nm

11 - Bolt
- ❑ 3.5 Nm

12 - Grommet

13 - Bush

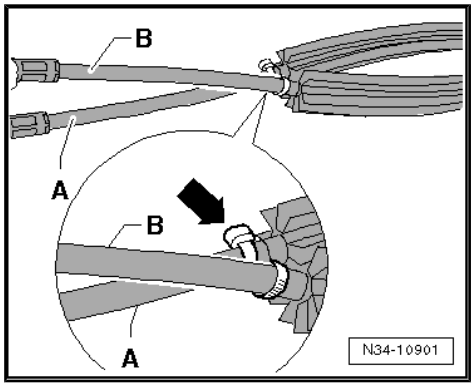
14 - Cable end-piece
- ❑ Secures gear selector cable to gearbox selector lever
- ❑ Allocation ⇒ page 55
- ❑ Release to adjust selector mechanism ⇒ page 59

15 - Securing clip

Securing gear selector cable and gate selector cable with cable tie

– Wrap cable tie -arrow- in a figure-of-eight round gear selector cable -A- and gate selector cable -B-.

– Secure cables as shown in illustration.



4.1 Removing and installing gear selector cable and gate selector cable

Removing

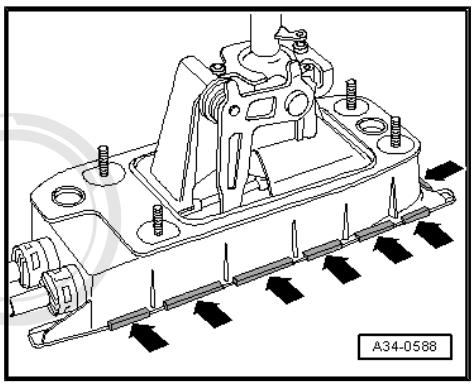
– Remove selector mechanism ⇒ page 43 .

– Open out tabs -arrows- on floor plate all round with screwdriver and remove floor plate.

– Detach gasket from selector mechanism.

– Prise gear selector cable and gate selector cable off pins.

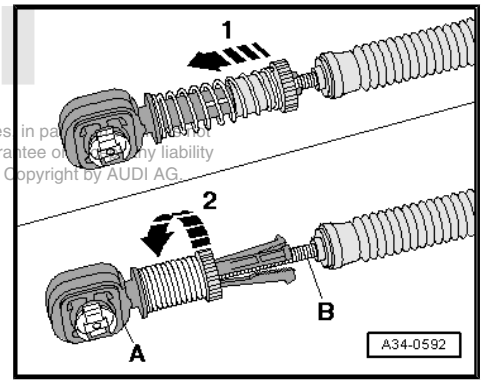
– Detach securing clips and remove gear selector cable and gate selector cable from selector mechanism.



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

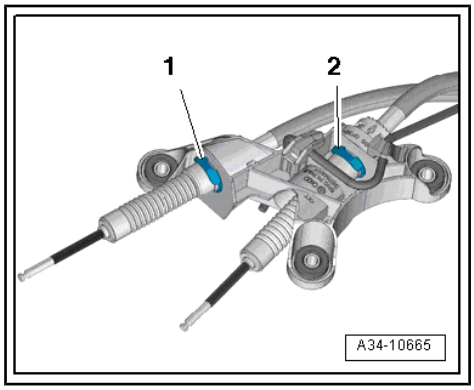
– Push locking sleeve forwards onto stop -arrow 1- and turn fully clockwise -arrow 2- so that it engages.

– Detach cable end-pieces from selector cables.



– Remove securing clips -1- and -2-.

– Detach cable support bracket from selector cables.



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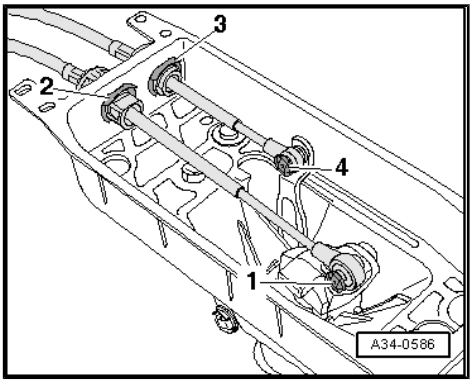
Installing



Note

Renew gasket and floor plate for selector housing.

– Secure gear selector cable and gate selector cable to selector housing with securing clips -1 ... 4-.

– Secure gear selector cable and gate selector cable with cable tie ⇒ page 52 .

– Press gear selector cable and gate selector cable onto pins.

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

– Install selector mechanism ⇒ page 43 .

– Adjust selector mechanism ⇒ page 58 .

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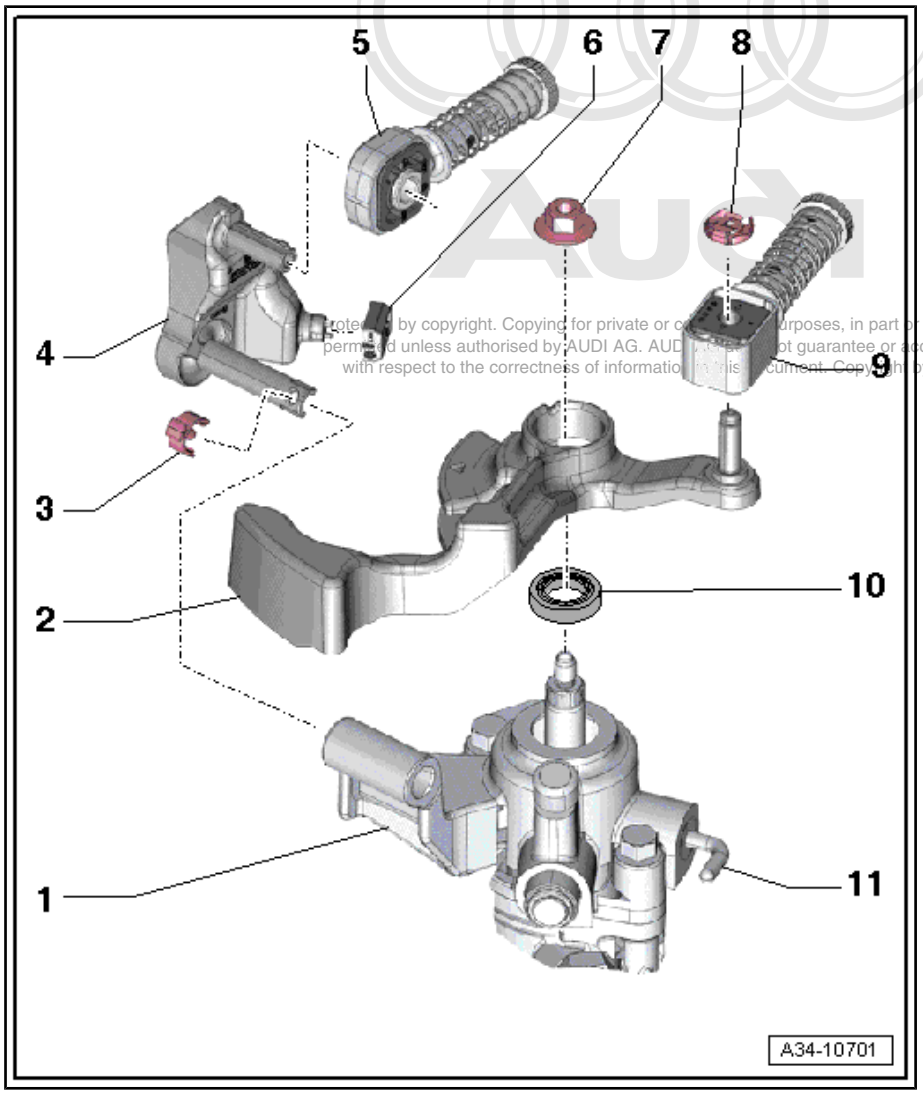
5 Exploded view - gearbox selector lever and gate relay lever

Note

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



1 - Selector unit
- ❑ Servicing ⇒ page 117

2 - Gearbox selector lever
- ❑ With damper weight
- ❑ Fitting ⇒ page 55
- ❑ Installation position ⇒ page 55
- ❑ After installing, adjust selector mechanism ⇒ page 58

3 - Clip

4 - Gate relay lever
- ❑ Installation position ⇒ page 55
- ❑ Detaching and securing gate relay lever at gearbox selector lever ⇒ page 56

5 - Cable end-piece
- ❑ Secures gate selector cable to gate relay lever
- ❑ Allocation ⇒ page 55
- ❑ Lever off to remove ⇒ page 57
- ❑ Pressing on ⇒ page 57
- ❑ Release to adjust selector mechanism ⇒ page 59

6 - Slide block

7 - Nut
- ❑ 23 Nm
- ❑ Self-locking
- ❑ Renew

8 - Securing clip
- ❑ Renew

9 - Cable end-piece
- ❑ Secures gear selector cable to gearbox selector lever
- ❑ Allocation ⇒ page 55
- ❑ Release to adjust selector mechanism ⇒ page 59

10 - Oil seal
- ❑ Renewing ⇒ page 118

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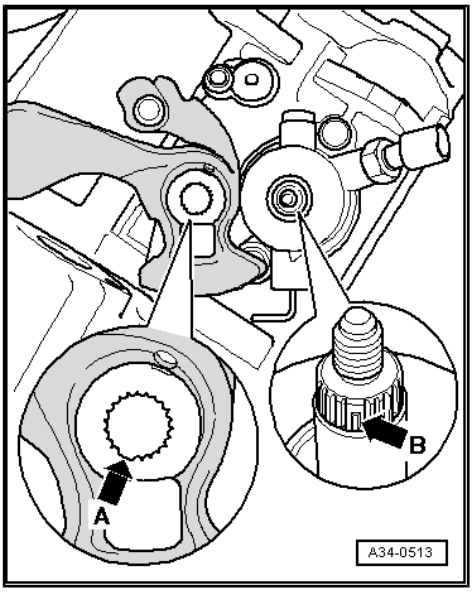
11 - Locking pin

❑ For adjusting selector mechanism ⇒ page 58

Installing gearbox selector lever

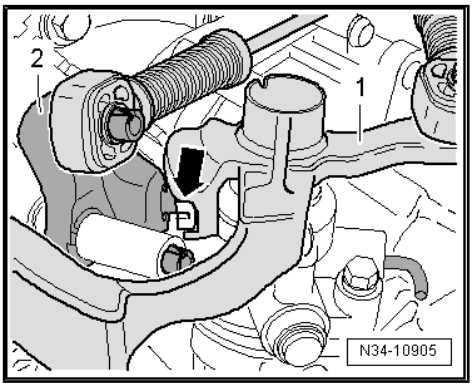
– When installing gearbox selector lever, make sure that the gap in the splines -arrow A- aligns with the wider spline -arrow B- on the selector shaft.



Installation position: gearbox selector lever/gate relay lever

1 - Gearbox selector lever with damper weight

2 - Gate relay lever locates in guide rail of gearbox selector lever via slide block -arrow-



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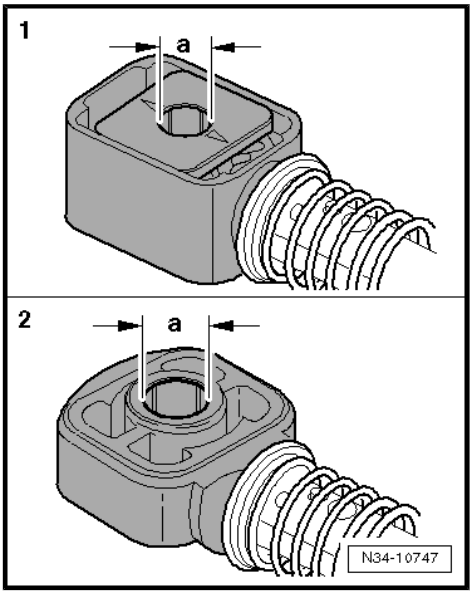
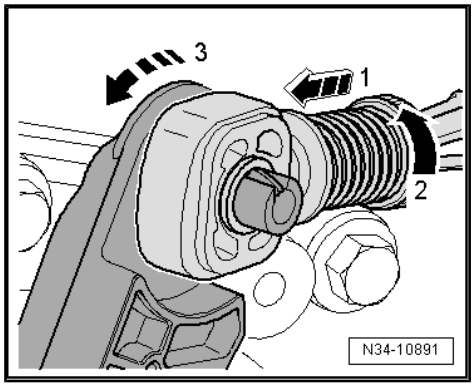
Identification of cable end-pieces

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



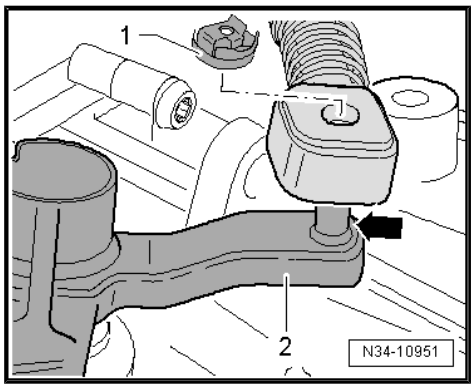
Releasing cable end-piece from gate selector cable



– Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.

– Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.

Detaching and securing gear selector cable at gearbox selector lever



Detaching

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

– Pull gear selector cable off pin -arrow-.

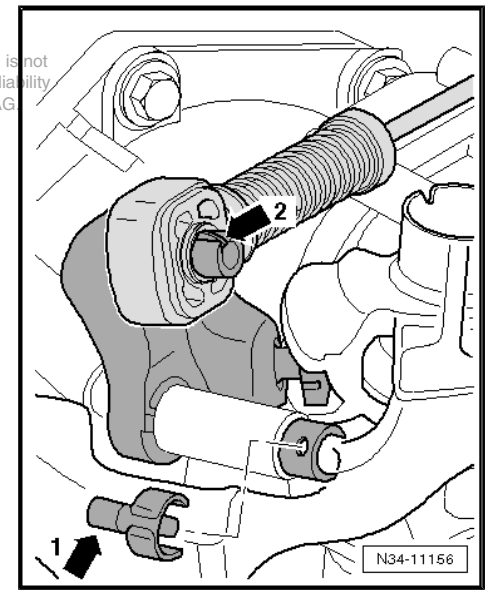
Securing

Note

- *Renew securing clip for gear selector cable.*
- *Apply a small quantity of grease -G 000 450 02- to the pin -arrow-.*

– Push gear selector cable onto gearbox selector lever -2- and secure with securing clip -1-.

Detaching and securing gate relay lever at gearbox selector lever



Detaching

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

Securing

Note

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

– Insert gate relay lever with cable end-piece as far as stop.

– Press on clip -arrow 1-, making sure it engages securely.

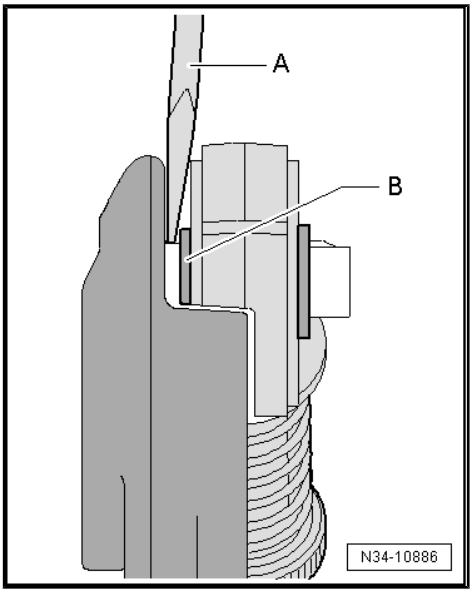
Note

-Arrow 2- can be disregarded.

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

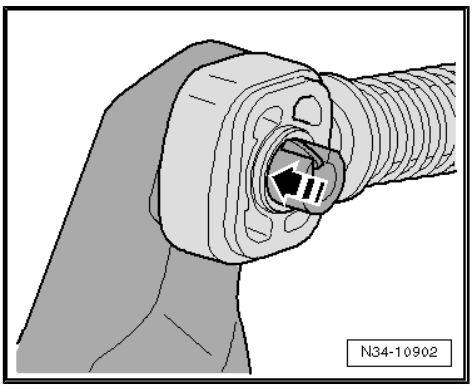
- Gate relay lever removed

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



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

- Gate relay lever removed
- Press on cable end-piece only at bush -arrow-.

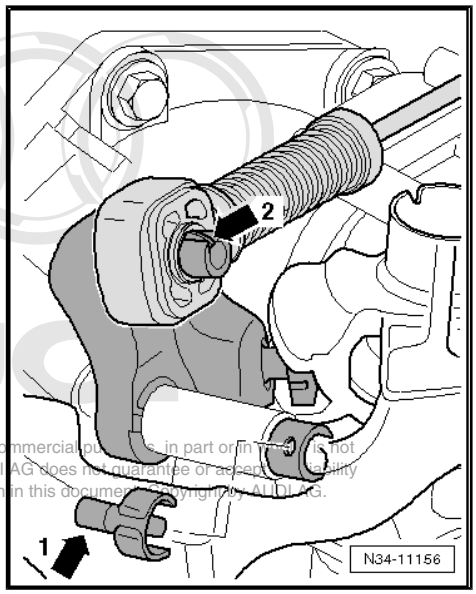


- Cable end-piece must move freely on gate relay lever.
- Cable end-piece must be behind detent -arrow 2-.

– Ensure that components engage securely.

Note

-Arrow 1- can be disregarded.



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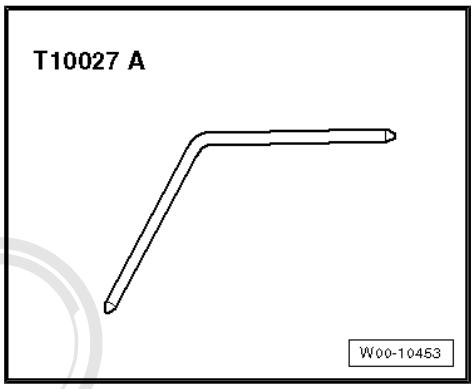
6 Adjusting selector mechanism

Special tools and workshop equipment required

♦ Locking pin -T10027 A-



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.

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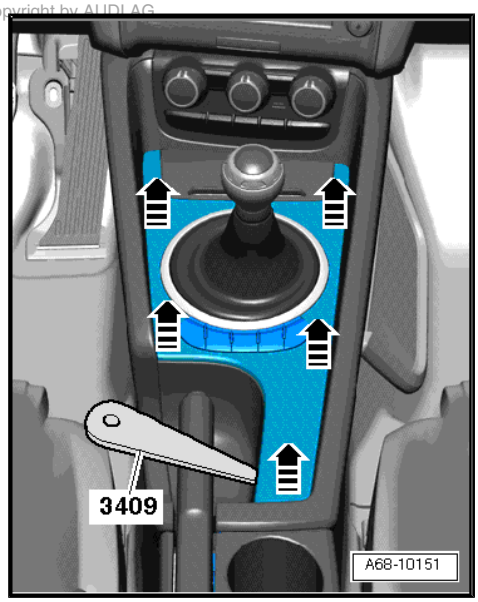
Adjusting

– Open ashtray.

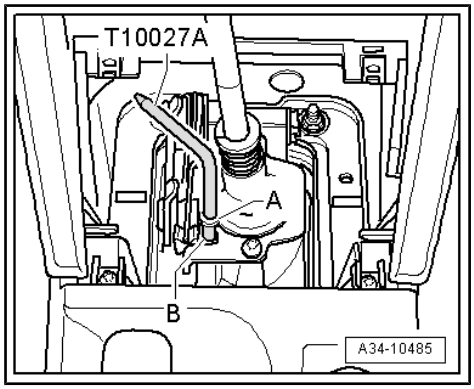
– Carefully lever off trim panel from centre console -arrows-.

– Pull trim panel up and over gear knob.



– With gearbox in neutral, move gear lever to the left into 1st/ 2nd gear gate.

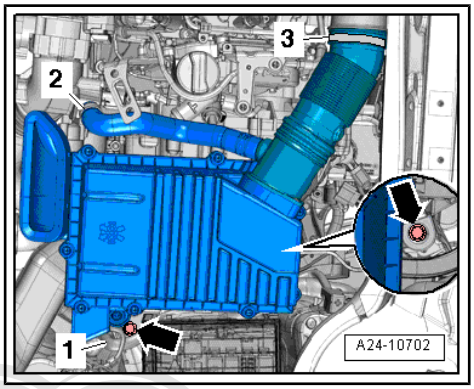
– Lift noise insulation plate and lock gear lever in position with locking pin -T10027 A- .



Note

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

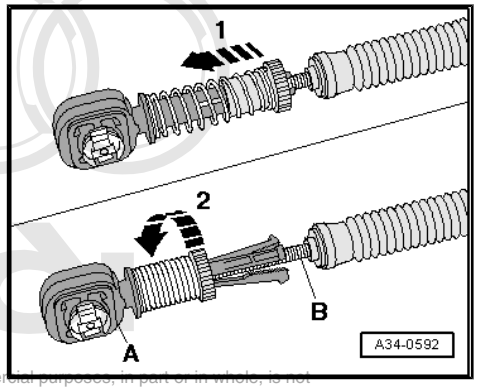
– Remove air cleaner housing ⇒ Rep. Gr. 24 .



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

– Push locking sleeve forwards onto stop -arrow 1- and turn fully clockwise -arrow 2- so that it engages.

• It should now be possible to move the selector cable in the cable end-piece.



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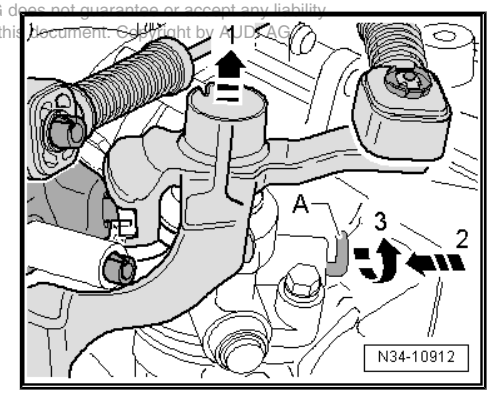
Lock selector shaft as follows:

– Pull up selector shaft -arrow 1-.

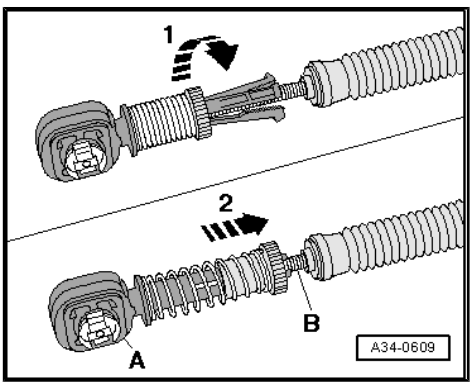
– Press locking pin -A- inwards towards selector shaft -arrow 2- and at the same time turn upwards -arrow 3- so it engages in selector shaft.



– Check that gear selector cable and gate selector cable -B- are located in cable end-pieces -A- without tension.

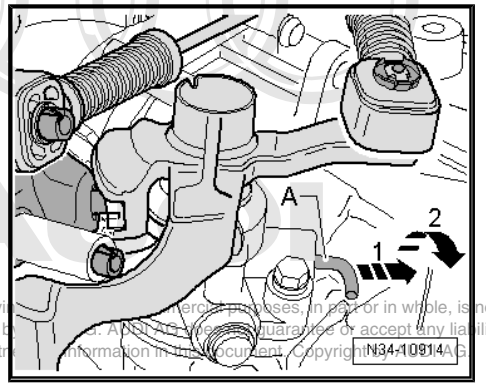
– Release locking sleeve -arrow 1- and let it slide onto stop -arrow 2-.

• Cable adjustment is now complete.



– Turn locking pin -A- back to initial position -arrow 2- and pull out of gearbox -arrow 1-.

– Pull locking pin -T10027 A- out of selector mechanism.



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Checking gear lever setting

- With the gearbox in neutral, the gear lever should rest in the 3rd/4th gear gate.

– Depress clutch.

– Select all gears several times. Pay particular attention to the operation of the reverse gear locking mechanism.

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

– Fit gear lever boot and trim panel for centre console.

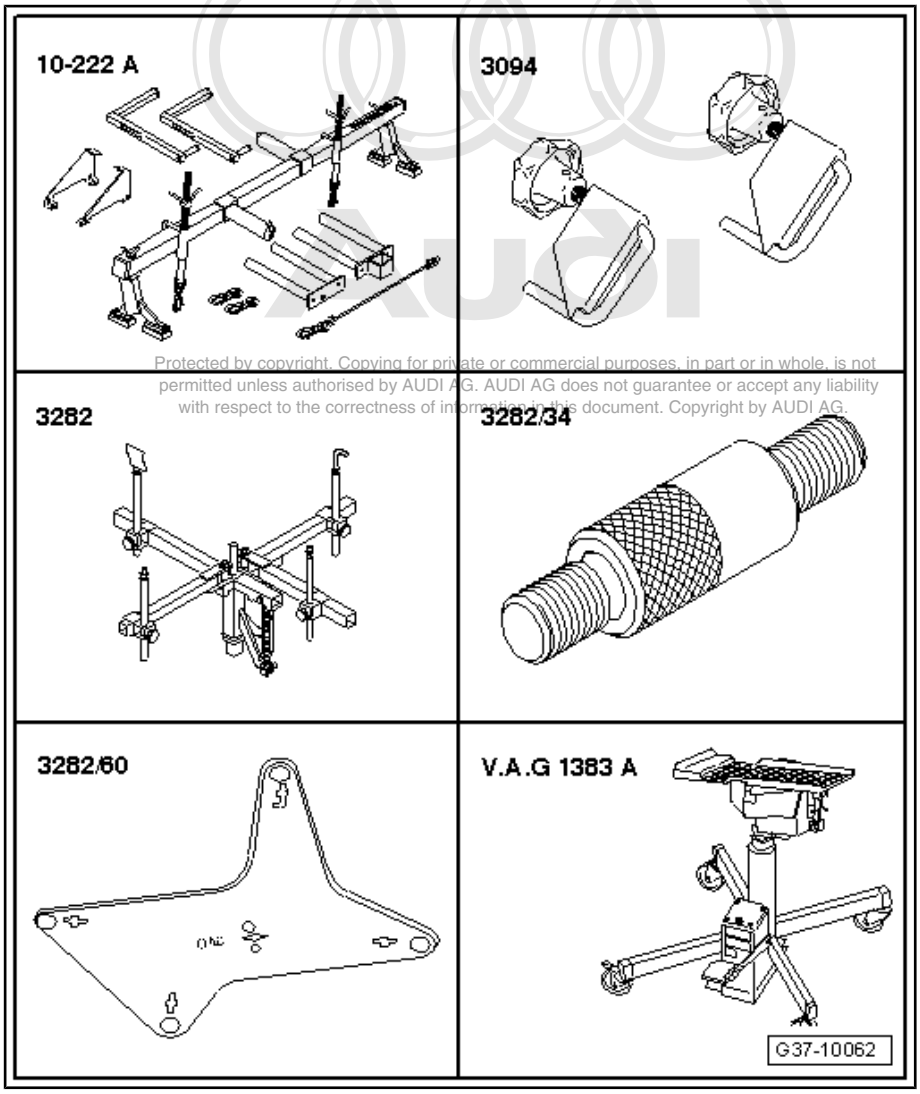
– Install air cleaner housing ⇒ Rep. Gr. 24 .

7 Removing and installing gearbox

General view

- ⇒ “7.1 Removing gearbox - vehicles with 2.5 ltr. TFSI engine”, page 61
- ⇒ “7.2 Installing gearbox”, page 70

7.1 Removing gearbox - vehicles with 2.5 ltr. TFSI engine



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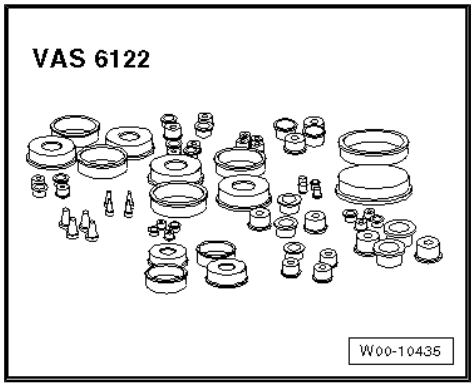
Special tools and workshop equipment required

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

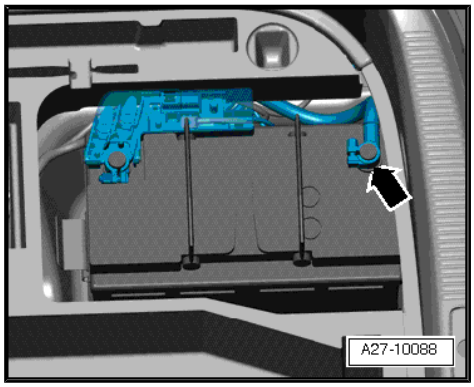
- Engine bung set -VAS 6122-



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

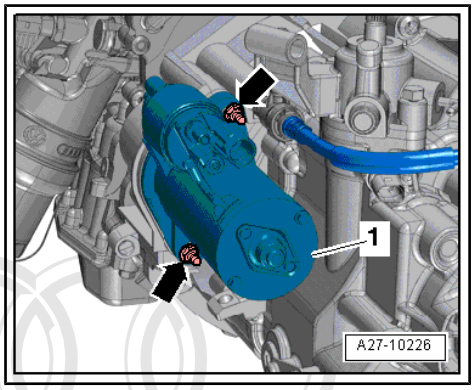
Procedure

> **Caution**
>
> *When disconnecting the battery there is a risk of serious damage to electronic components:*
>
> - *Observe the correct procedure for disconnecting the battery.*



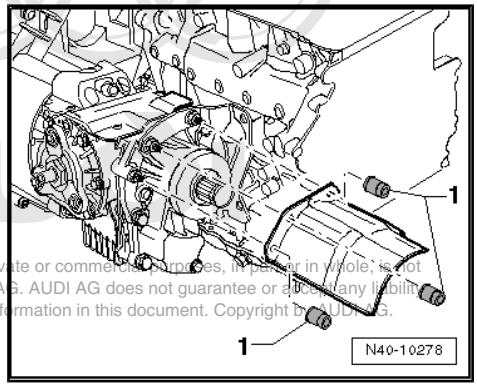
– With ignition switched off, disconnect battery earth cable -arrow- ⇒ Rep. Gr. 27 .

– Remove starter ⇒ Rep. Gr. 27 .



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

– Remove drive shafts on both sides ⇒ Rep. Gr. 40 .



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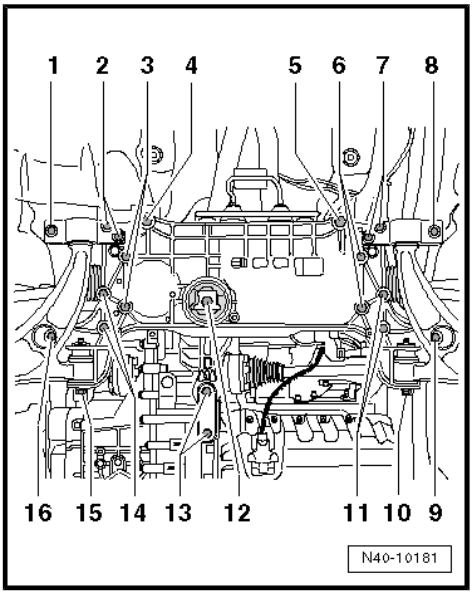
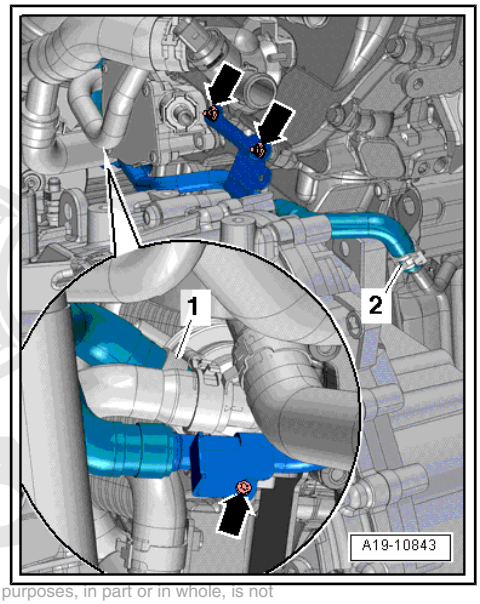
– Remove steering box with subframe ⇒ Rep. Gr. 48 .



– Remove coolant pipe (left-side) ⇒ Rep. Gr. 19 .



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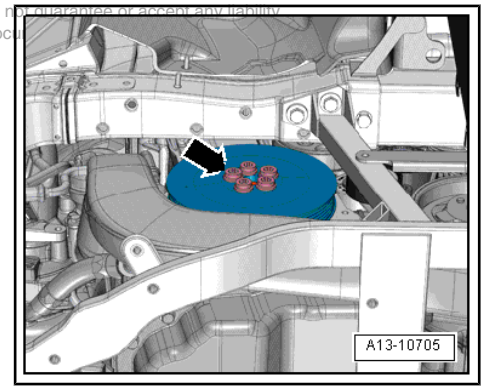
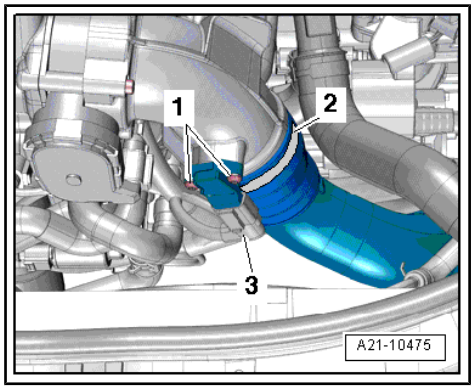
– Remove vibration damper ⇒ Rep. Gr. 13 .



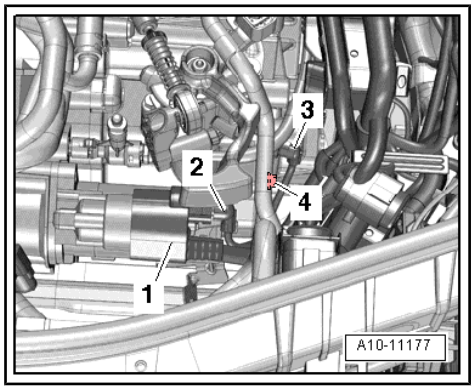
– Release hose clip -2-.



Note

-Items 1 and 3- can be disregarded.

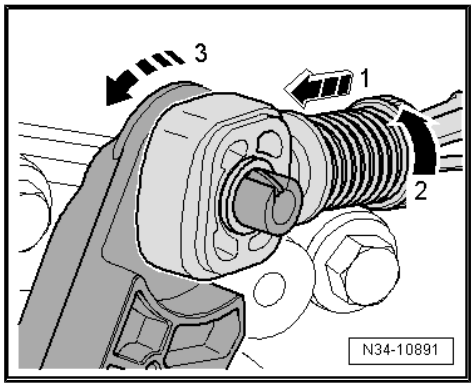
– Remove bolt -4- for earth wire.
– Unplug electrical connector -3- for reversing light switch -F4- .



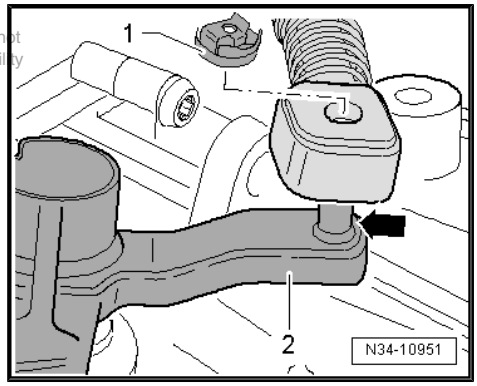
Note

-Items 1 and 2- can be disregarded.

- To avoid damage to the gate selector cable, the cable end-piece must be separated from the gate selector cable before removal.
– Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
– Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.



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



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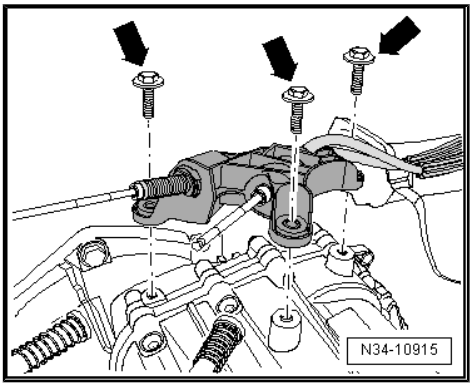
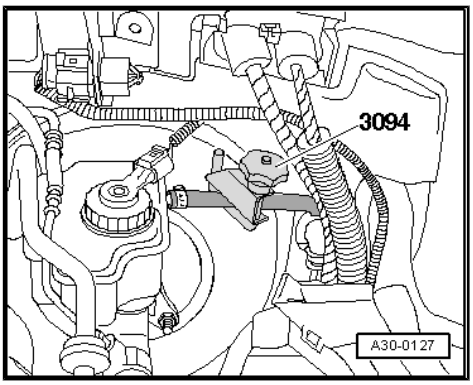
– Unscrew bolts -arrows-, remove cable support bracket from gearbox and tie up on left side.



– If a plastic pipe is installed between clutch master cylinder and slave cylinder, clamp off supply hose to clutch master cylinder using hose clamp -3094- .



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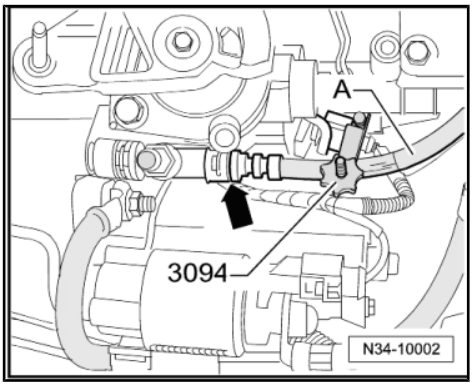
– If a pipe/hose assembly is installed between clutch master cylinder and slave cylinder, clamp off hose -A- using hose clamp -3094- .



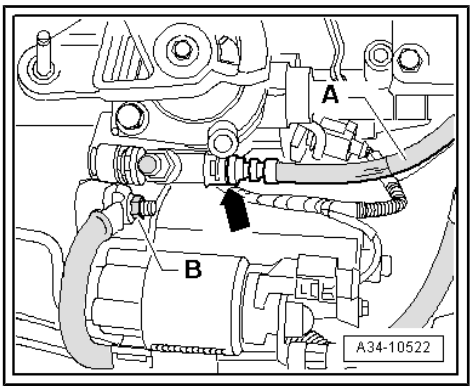
Note

- *-Arrow- can be disregarded.*
- *In the following steps make sure that no brake fluid escapes onto the starter or onto the gearbox below. If this does happen, clean the affected area thoroughly.*

– Pull clip -arrow- out as far as stop.

– Pull plastic pipe or pipe/hose assembly -A- out of bleeder connection for clutch slave cylinder.

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



Note

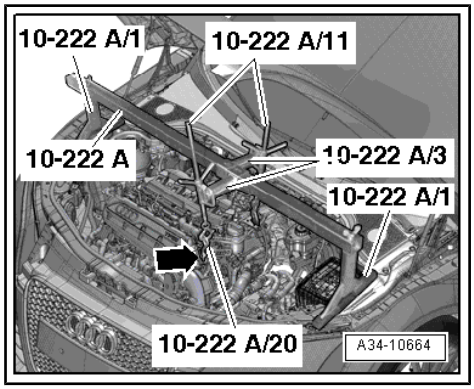
-Item B- can be disregarded.

Caution

Catch escaping brake fluid.

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

– Set up support bracket -10 - 222 A- on body flanges using the following equipment:



- ♦ Rack -10 - 222 A /1- (2x)
- ♦ Adapter -10 - 222 A /3-
- ♦ 2x spindle -10 - 222 A /11-
- ♦ Adapter -10 - 222 A /20-
- • One spindle -10 - 222 A /11- faces forward, the other to the rear.

WARNING

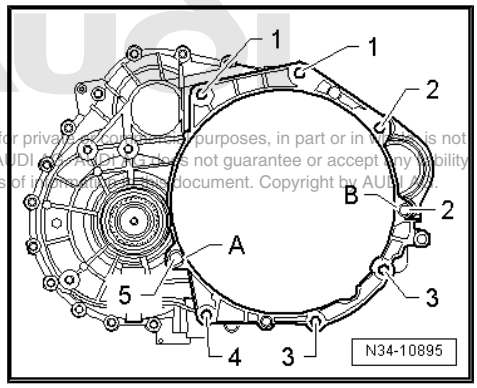
Risk of accident.

- ♦ *The hook attachment and locating pin on the lifting tackle must be secured with a locking pin -arrows-.*

– Hook front spindle -10 - 222 A /11- with adapter -10 - 222 A / 20- onto engine lifting eye (front left).

– Hook rear spindle -10 - 222 A /11- onto engine lifting eye (rear left).

– Remove bolts -1- securing gearbox to engine.



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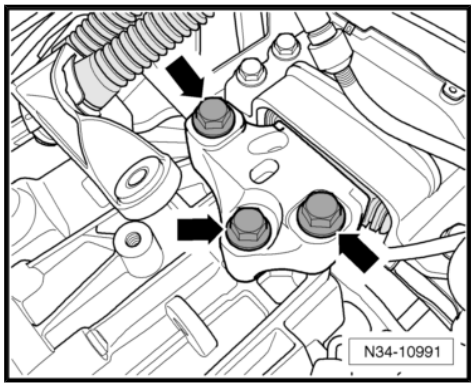
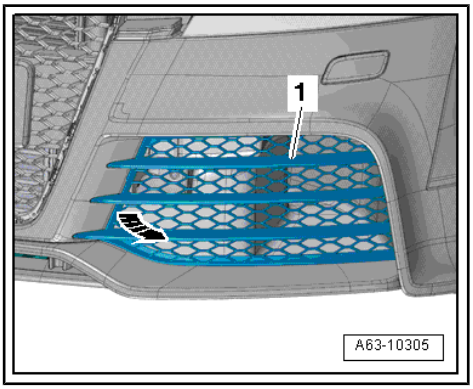
– Remove bolts -arrows- from gearbox mounting.



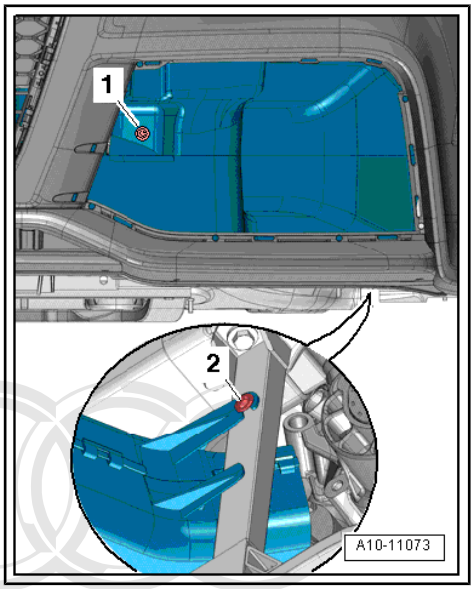
– Detach air intake grille -1- from bumper cover in direction of -arrow-.



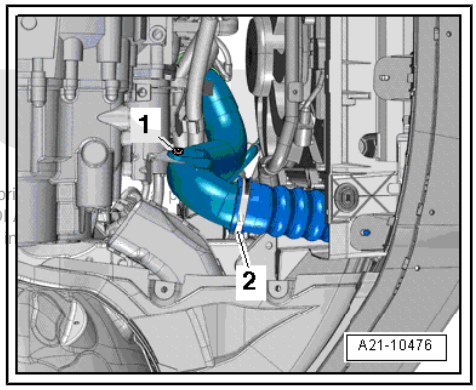
– Unscrew bolt -1- and detach air duct.

Note

-Item 2- can be disregarded.



– Remove bolt -1-.
– Release hose clip -2- and detach air pipe.



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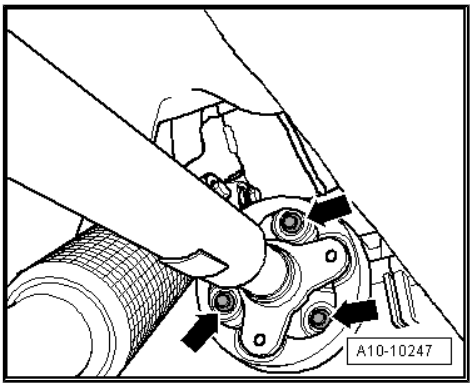
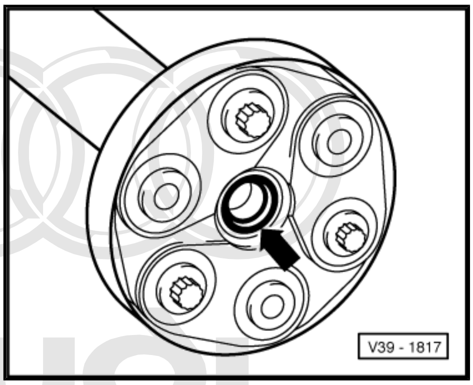
– Mark position of flexible coupling relative to bevel box flange for re-installation.
– Engage a gear and remove bolts -arrow- for flexible coupling on propshaft.





⚠ Caution

Risk of damage to seal -arrow- in propshaft flange.

- ♦ *Push propshaft as far back as possible, while keeping it horizontal.*

ℹ Note

If seal is damaged propshaft must be renewed.

– Remove bolts -1- and -2- and detach bracket for starter catalytic converter.

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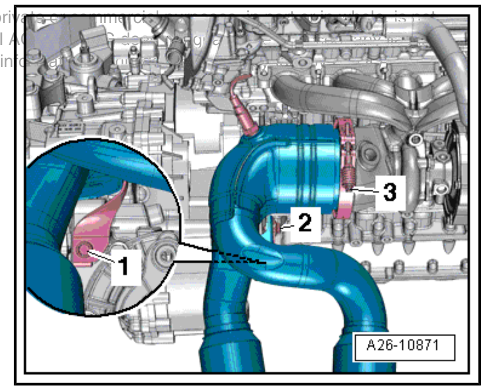
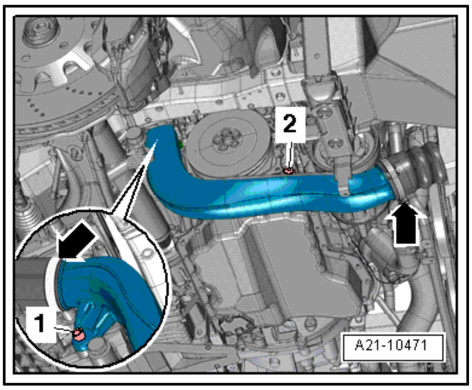


ℹ Note

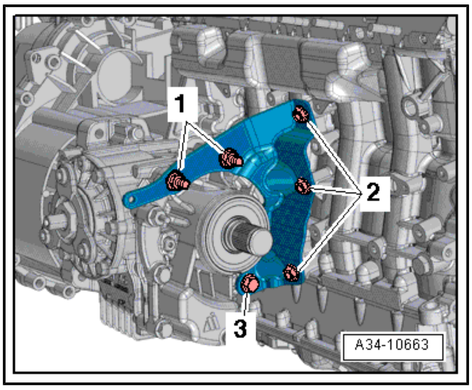
-Item 3- can be disregarded.

– Remove bolts -1- and -2-.

– Release hose clips -arrows- and detach air pipe.

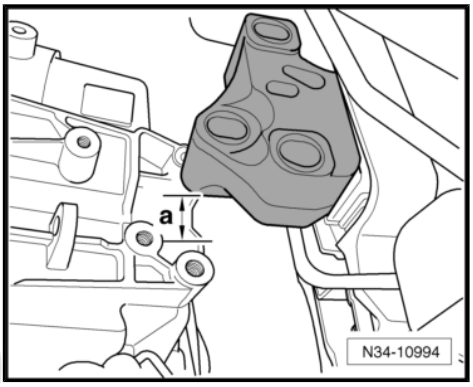


– Remove bolts -1, 2, 3- and detach bracket for bevel box.



– Adjust spindles of support bracket -10 - 222 A- to lower gearbox by distance -a-.

• Dimension -a- = 80 mm



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

– Insert gearbox support -3282- in engine and gearbox jack -V.A.G 1383 A- .

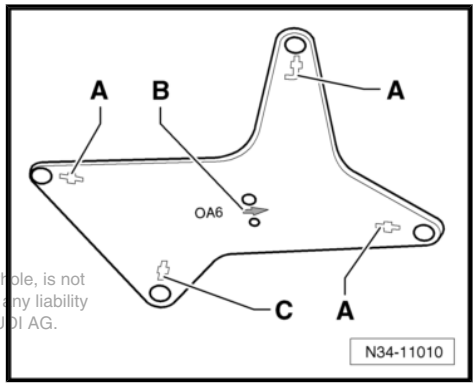
– Align arms of gearbox support according to holes in adjustment plate.

– Screw in support elements -A-, as illustrated on adjustment plate -3282/60- .

– In place of support element -C-, screw in bolt -3282/34- .

– Place engine and gearbox jack -V.A.G 1383 A- underneath vehicle.

• Arrow symbol -B- on adjustment plate points to front of vehicle.



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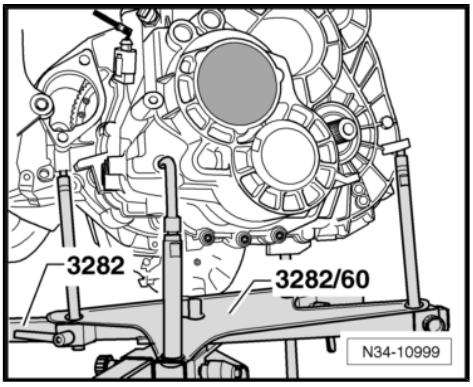
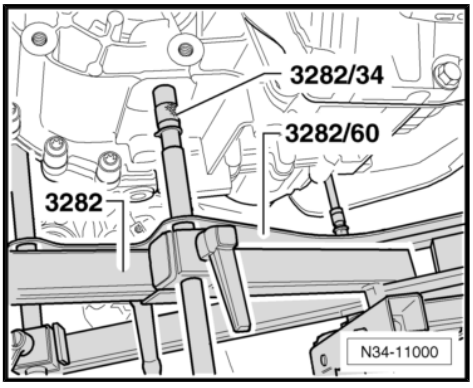
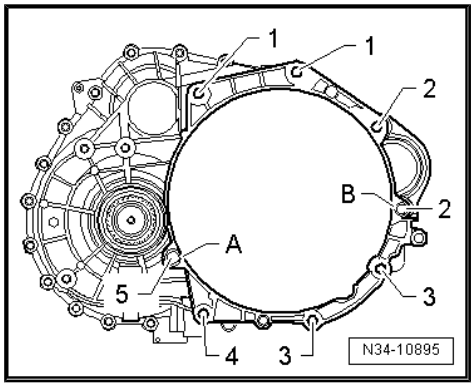
– Align adjustment plate and gearbox parallel to one another.



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



– Remove remaining engine/gearbox securing bolts.
– Push gearbox off dowel sleeves -A, B-.
– Tilt gearbox to left using spindles of gearbox support -3282- .
– Lower gearbox carefully, observing longitudinal member.



Note

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

7.2 Installing gearbox

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

Note

- *Renew self-locking nuts and bolts when performing assembly work.*
- *Renew oil seals, gaskets, O-rings and bolts which are tightened by turning through a specified angle.*
- *All cable ties which are released or cut open during removal must be fitted in the same position when installing.*
- *Clean input shaft splines and (in the case of a used clutch plate) the hub splines. Remove corrosion and apply only a very thin coating of grease for clutch plate splines -G 000 100- to the splines. Then move clutch plate backwards and forwards on input shaft until hub moves freely on shaft. It is important to remove excess grease.*
- *When installing a new gearbox, the gear selector lever and gate relay lever must be transferred to the new unit.*

– Use thread tap to remove any remaining locking fluid from all threaded holes which will accommodate self-locking bolts.
– If no dowel sleeves -A, B- for centralising engine/gearbox are in the cylinder block, install dowel sleeves.
– Check centring of clutch plate ⇒ page 33 .
– Check release bearing for wear; if necessary, renew clutch slave cylinder with release bearing ⇒ page 30 .
– Raise gearbox carefully using gearbox support -3282- .
– Align gearbox with engine and install.

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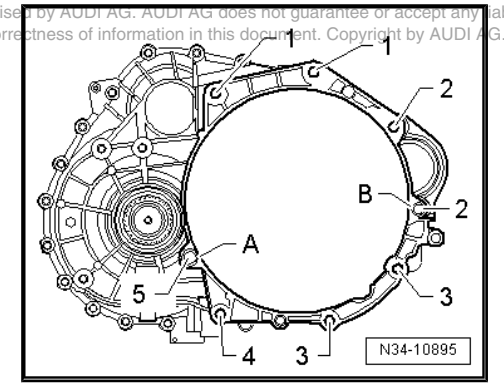
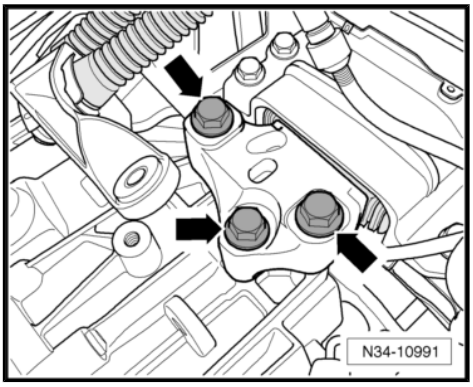


Note

Pay attention to all pipes/hoses/wiring when installing the gearbox.

– Screw in and tighten bottom engine/gearbox securing bolts -1 … 5- first, then remaining securing bolts ⇒ page 72 .

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



Note

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

– Install gearbox mounting ⇒ page 75 .

Note

When installing gearbox ensure engine/gearbox mountings are installed stress-free ⇒ Rep. Gr. 10 .

Caution

Risk of accident.

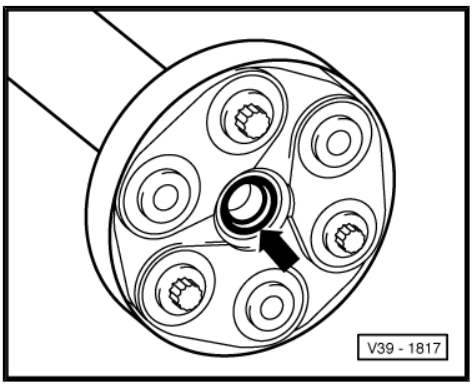
- ***Do not remove support bracket -10 - 222 A- until all bolts securing the left-hand engine/gearbox mounting have been tightened to the specified torque.***

– Install bracket for bevel box ⇒ page 73 .
– Install drive shafts (left and right) ⇒ Rep. Gr. 40 .
– Install heat shield for drive shaft (right-side) ⇒ page 73 .

Caution

Risk of damage to seal -arrow- in propshaft flange.

- ***Push propshaft as far back as possible, while keeping it horizontal.***



Note

If seal is damaged propshaft must be renewed.

– Press engine/gearbox assembly towards bulkhead, guiding pin on bevel box carefully into propshaft flange.

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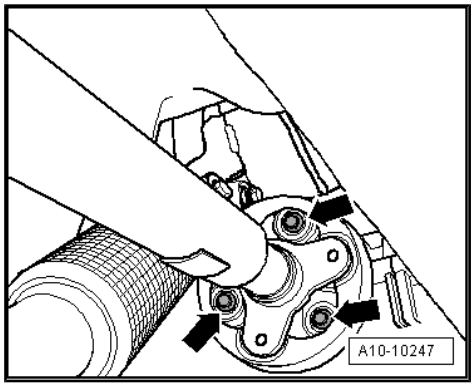

- Bolt flexible coupling on propshaft onto bevel box flange -arrows- ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .
- Install pendulum support ⇒ page 75 .
- Install vibration damper ⇒ Rep. Gr. 13 .
- Install coolant pipe (left-side) ⇒ Rep. Gr. 19 .
- Install steering box with subframe ⇒ Rep. Gr. 48 .
- Install drive shafts ⇒ Rep. Gr. 40 .
- Install exhaust system and cross piece ⇒ Rep. Gr. 26 .
- Install radiator cowl ⇒ Rep. Gr. 19 .
- Install starter ⇒ Rep. Gr. 27 .
- Install pipe/hose assembly or plastic pipe ⇒ page 25 .
- Bleed clutch system ⇒ page 28 .
- Install cable support bracket ⇒ page 51 .
- Secure gear selector cable to gearbox selector lever ⇒ page 56 .
- Insert gate selector cable in cable end-piece.
- Adjust selector mechanism ⇒ page 58 .
- Install air cleaner housing ⇒ Rep. Gr. 24 .
- Observe correct procedure after connecting battery ⇒ Rep. Gr. 27 .
- Install front sections of wheel housing liners ⇒ Rep. Gr. 66 .
- Install noise insulation frame ⇒ Rep. Gr. 50 .
- Install noise insulation ⇒ Rep. Gr. 66 .
- Fit wheels ⇒ Rep. Gr. 44 .
- Check gear oil level in gearbox ⇒ page 85 .
- Check gear oil level in bevel box ⇒ page 86 .

Tightening torques (installing gearbox)

Note

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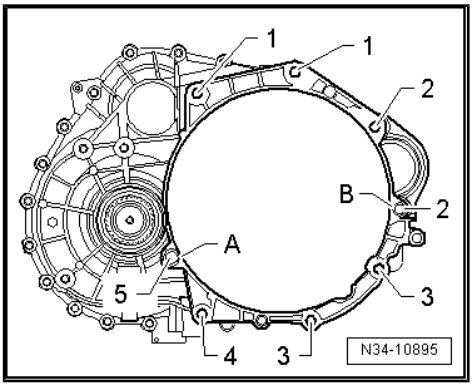
- *Tightening torques apply only to lightly greased, oiled, phosphated or black-finished nuts and bolts.*
- *Additional lubricant such as engine or gear oil may be used, but do not use graphite lubricant.*
- *Do not use parts which have been degreased.*
- *Tolerance for tightening torques ±15%.*

Engine/gearbox securing bolts

Item	Bolt	Nm
1	M12x65	80
2 [1)]	M12x180	80
3	M10x65	40
4	M10x75	40
5 [2)]	M12x95	80
A, B	Dowel sleeves for centralising	

- [1)] Bolt with stud M8.
- [2)] Screwed into gearbox from engine side.



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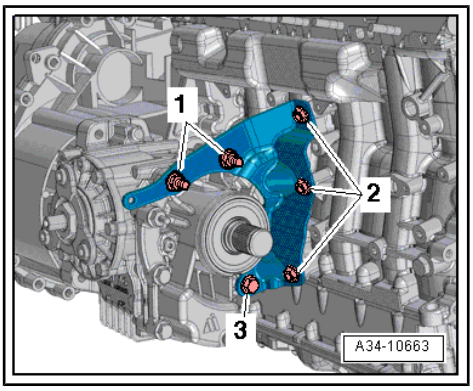
Bracket for bevel box - tightening torque and sequence

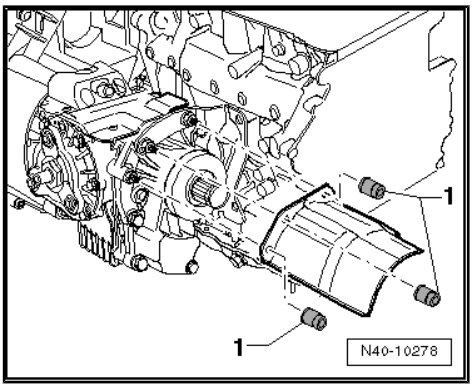
– Tighten bolts in 5 stages as follows:

1. Screw in bolts -1 ... 3- (hand-tight).
2. Pre-tighten bolts -2- to 8 Nm.
3. Tighten bolts -1- and -3- initially to 8 Nm.
4. Tighten bolts -2- to 40 Nm.
5. Tighten bolts -1- and -3- to 40 Nm.



Heat shield for drive shaft (right-side) - tightening torque

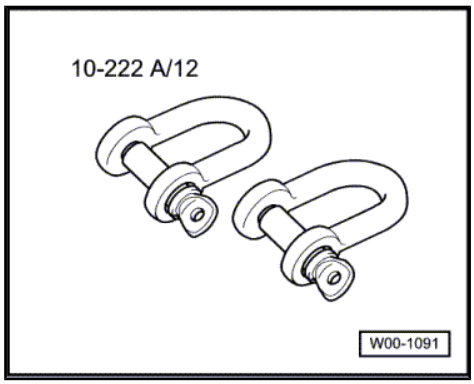
– Tighten nuts -1- to 25 Nm.



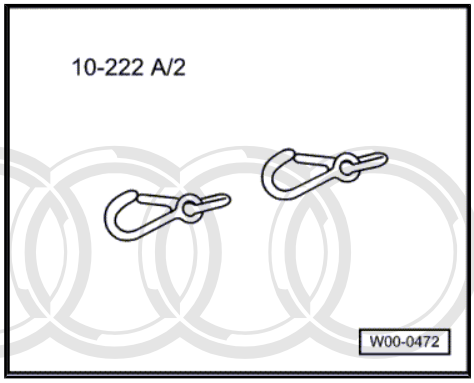
8 Transporting gearbox

Special tools and workshop equipment required

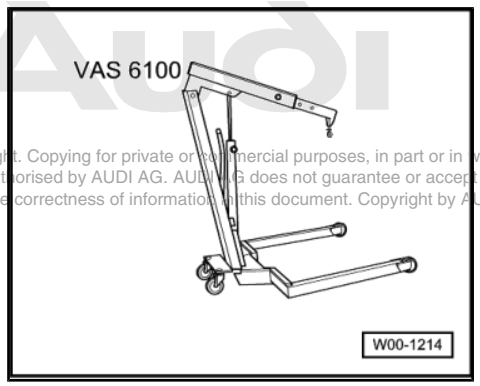
- Shackle -10-222A/12-



- Hook -10-222A/2-



- Workshop hoist -VAS 6100-



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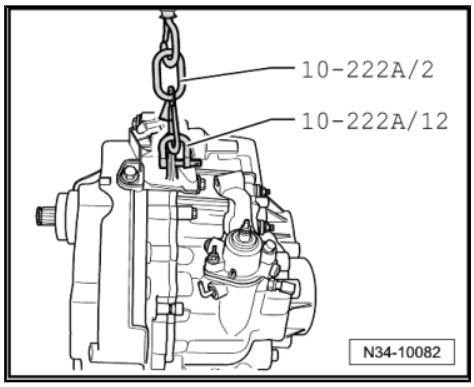
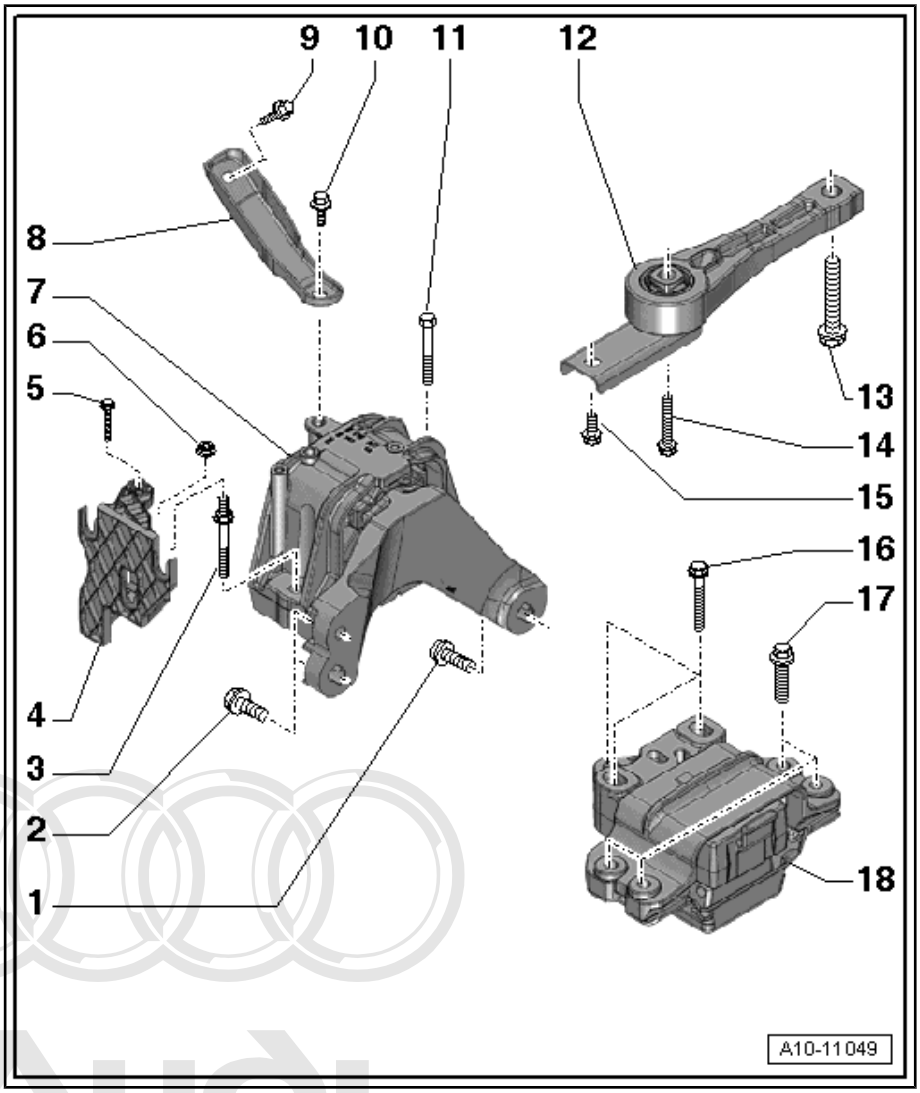
Shackle -10-222A/12- may be used in conjunction with hook -10-222A/2- and a workshop hoist to transport the gearbox and to set up gearbox support -3282- .

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



9 Exploded view - assembly mountings



1 - Bolt
- ❑ Engine mounting to engine
- ❑ Tightening torque ⇒ Rep. Gr. 10

2 - Bolt
- ❑ Engine mounting to engine
- ❑ Tightening torque ⇒ Rep. Gr. 10

3 - Bolt
- ❑ Engine mounting to body
- ❑ Tightening torque ⇒ Rep. Gr. 10

4 - Bracket
- ❑ For activated charcoal filter

5 - Bolt
- ❑ Tightening torque ⇒ Rep. Gr. 10

6 - Nut
- ❑ Tightening torque ⇒ Rep. Gr. 10

7 - Engine mounting
- ❑ Checking adjustment ⇒ Rep. Gr. 10
- ❑ Adjusting ⇒ Rep. Gr. 10
- ❑ Removing and installing ⇒ Rep. Gr. 10

8 - Connecting bracket

9 - Bolt
- ❑ Connecting bracket to body
- ❑ Tightening torque ⇒ Rep. Gr. 10

10 - Bolt
- ❑ Connecting bracket to engine mounting
- ❑ Tightening torque ⇒ Rep. Gr. 10

11 - Bolt
- ❑ Engine mounting to body
- ❑ Tightening torque ⇒ Rep. Gr. 10

12 - Pendulum support
- ❑ Removing and installing ⇒ page 79

13 - Bolt
- ❑ Pendulum support to subframe
- ❑ 100 Nm + 90°
- ❑ Always renew

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14 - Bolt

- ❑ Pendulum support to gearbox
- ❑ 60 Nm +90°
- ❑ Always renew

15 - Bolt

- ❑ Pendulum support to gearbox
- ❑ 60 Nm +90°
- ❑ Always renew

16 - Bolt

- ❑ Gearbox mounting to gearbox
- ❑ 60 Nm +90°
- ❑ Always renew

17 - Bolt

- ❑ Gearbox mounting to body
- ❑ 40 Nm +90°
- ❑ Always renew

18 - Gearbox mounting

- ❑ Checking adjustment ⇒ Rep. Gr. 10
- ❑ Adjusting ⇒ Rep. Gr. 10
- ❑ Removing and installing ⇒ page 76

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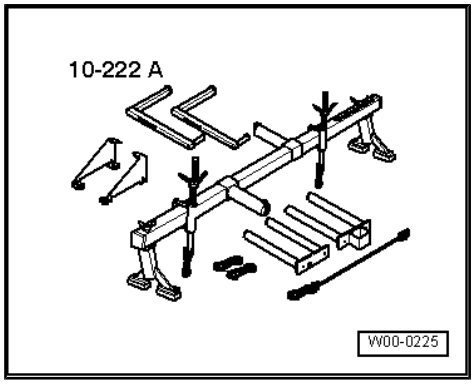
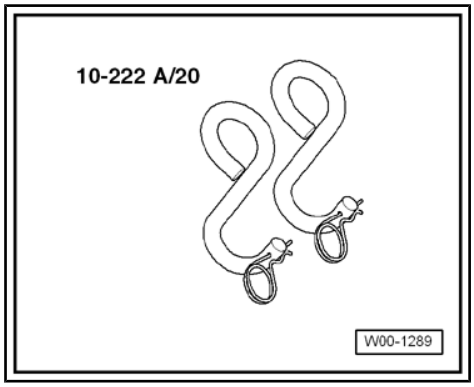
9.1 Removing and installing gearbox mounting

Special tools and workshop equipment required

- ♦ Support bracket -10-222 A-

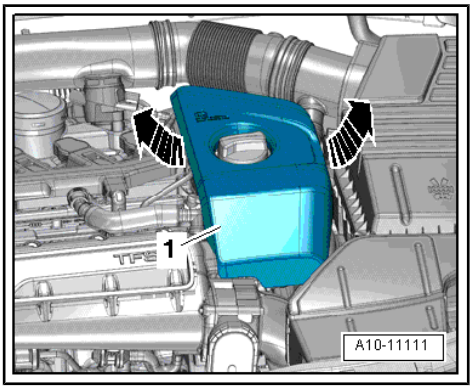


- ♦ Hooks -10 - 222 A /20-

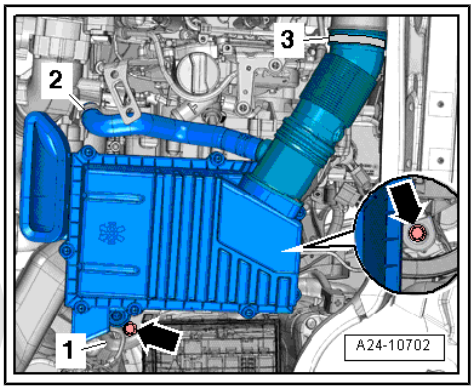


Removing

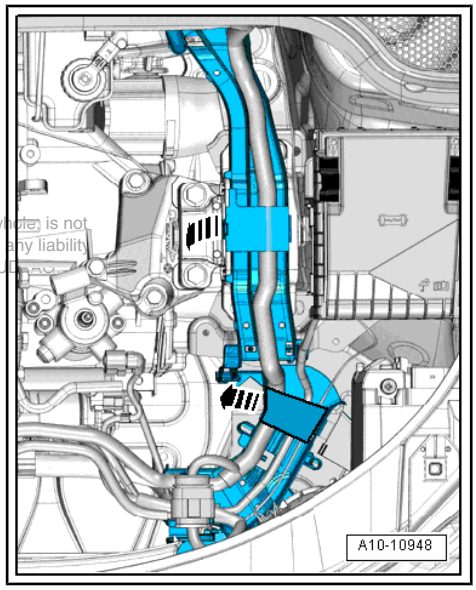
– Lift off engine cover panel -1- -arrows-.



– Remove air cleaner housing ⇒ Rep. Gr. 24 .



– Open retainers for wiring duct -arrows-.
– Cut through cable tie and press electrical wiring to one side.
– Unclip wiring duct.



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– Set up support bracket -10 - 222 A- on body flanges using the following equipment:

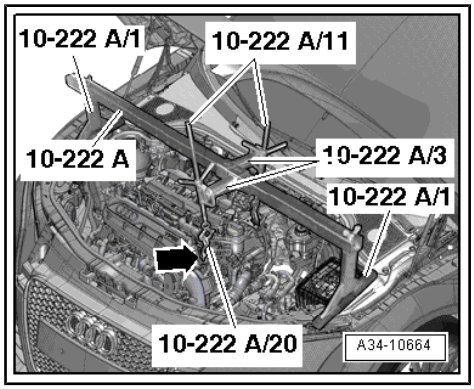
♦ Rack -10 - 222 A /1- (2x)

♦ Adapter -10 - 222 A /3-

♦ 2x spindle -10 - 222 A /11-

♦ Hooks -10 - 222 A /20-

• One spindle -10 - 222 A /11- faces forward, the other to the rear.



WARNING

Risk of accident.

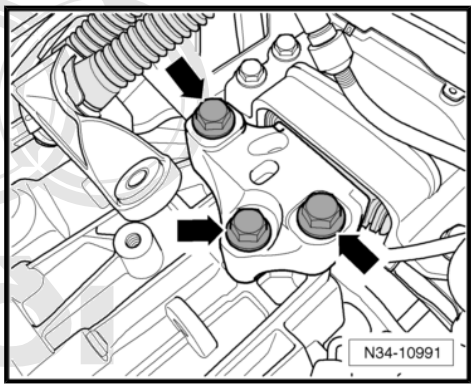
♦ *The hook attachments and locating pins on the lifting tackle must be secured with a locking pin -arrows-.*

– Hook front spindle -10 - 222 A /11- with hook -10 - 222 A /20- onto engine lifting eye (front left).

– Hook rear spindle -10 - 222 A /11- onto engine lifting eye (rear left).

– Apply light tension to spindles.

– Remove bolts -arrows- from gearbox mounting.



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

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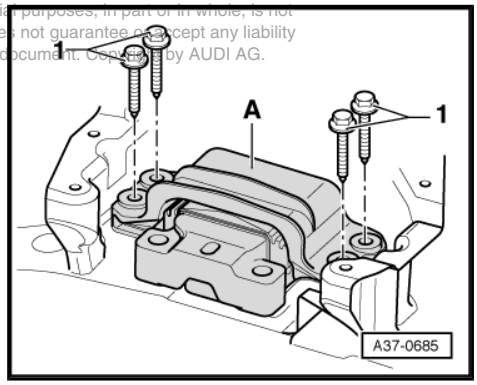


Installing

• Tightening torques
⇒ “9 Exploded view - assembly mountings”, page 75

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

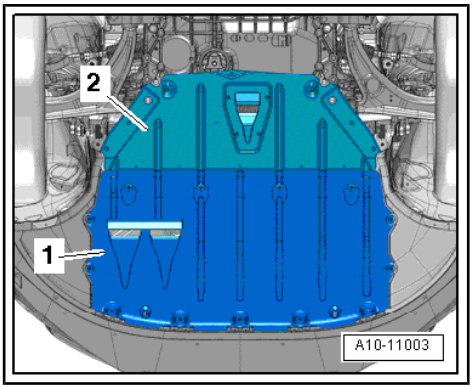
– Adjust assembly mountings ⇒ Rep. Gr. 10 .

– Install air cleaner housing ⇒ Rep. Gr. 24 .

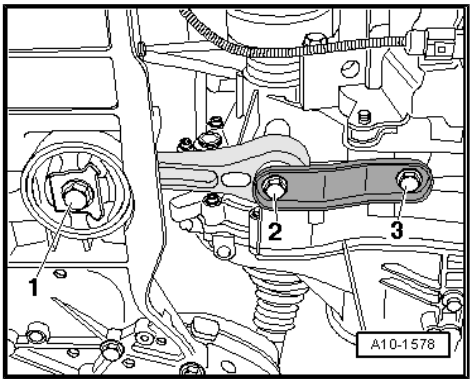
9.2 Removing and installing pendulum support

Removing

– Remove noise insulation panels -1- and -2- ⇒ Rep. Gr. 66 .



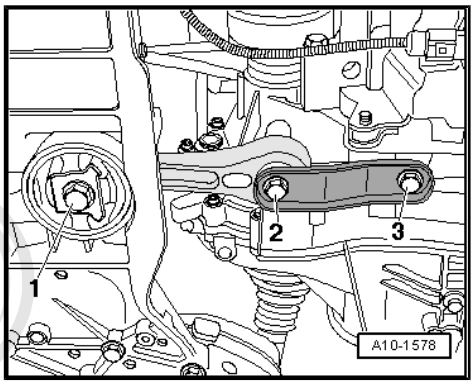
– Remove bolts -1, 2, 3- and detach pendulum support.



Installing

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

- Tightening torques
  ⇒ “9 Exploded view - assembly mountings”, page 75



Note

Renew securing bolts for pendulum support.

– First tighten bolts -2, 3- securing pendulum support to gearbox, then bolt -1- at subframe.

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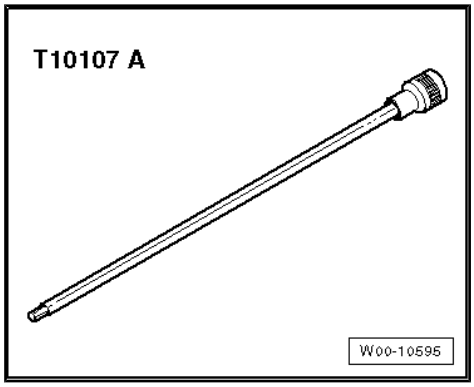
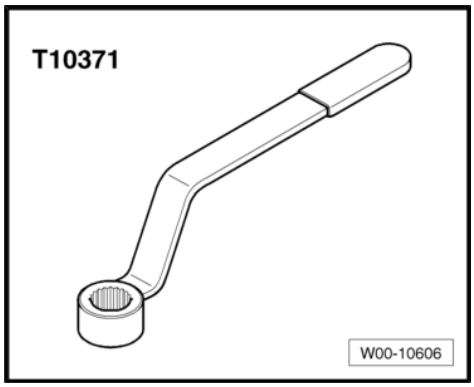
10 Removing and installing bevel box (gearbox installed)

Special tools and workshop equipment required

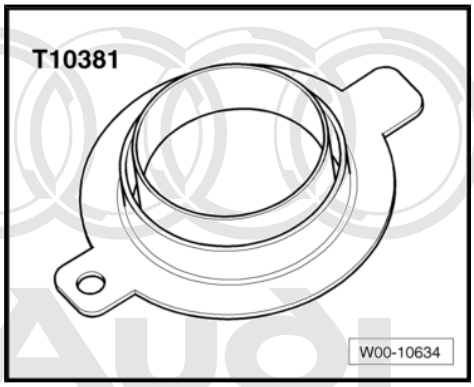
- Socket and extended bit -T10107 A-



- Counterhold tool -T10371-



- Cap -T10381-

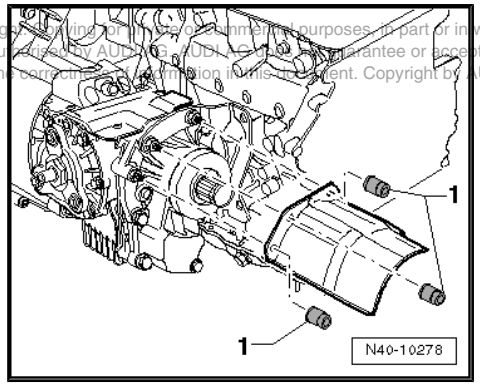


Removing

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

– Remove drive shaft (right-side) ⇒ Rep. Gr. 40 .

– Remove catalytic converters ⇒ Rep. Gr. 26 .



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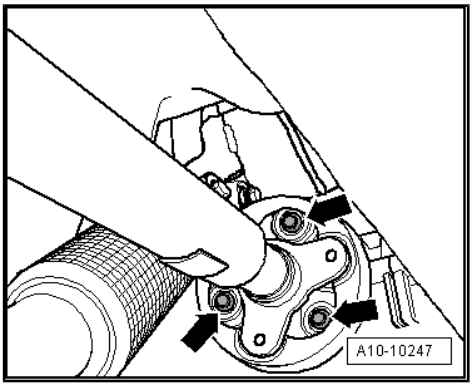
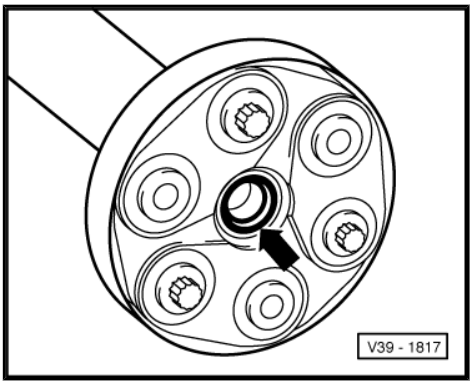
– Mark position of flexible coupling relative to bevel box flange for re-installation.
– Engage a gear and remove bolts -arrows- securung propshaft flexible coupling to bevel box.



Caution

Risk of damage to seal -arrow- in propshaft flange.

- ***Push propshaft as far back as possible, while keeping it horizontal.***



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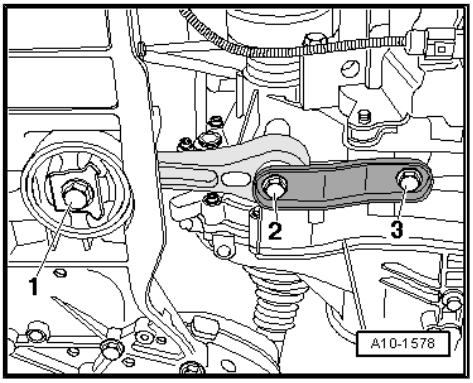
Note

If seal is damaged propshaft must be renewed.

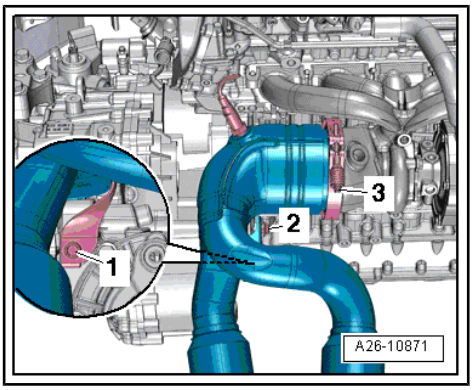
– Remove bolts -2, 3- for pendulum support.



Note

-Item 1- can be disregarded.

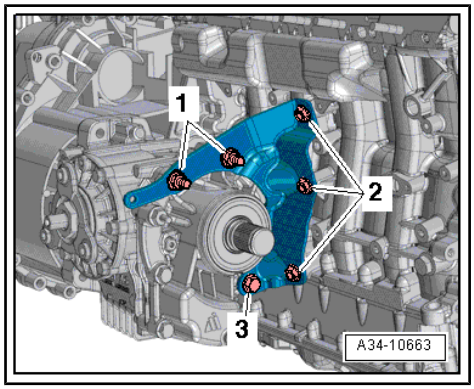
– Remove bolts -1- and -2- and detach bracket for starter catalytic converter.



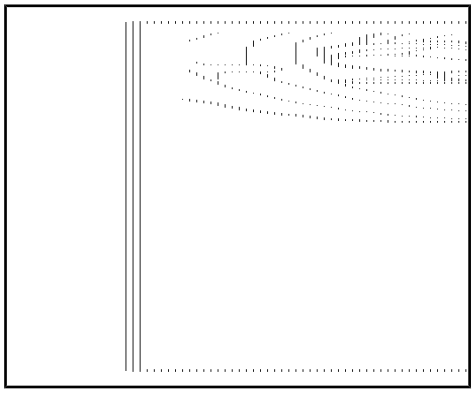
Note

-Item 3- can be disregarded.

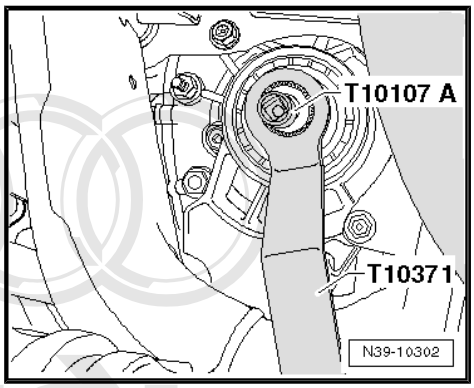
– Remove bolts -1, 2, 3- and detach bracket for bevel box.



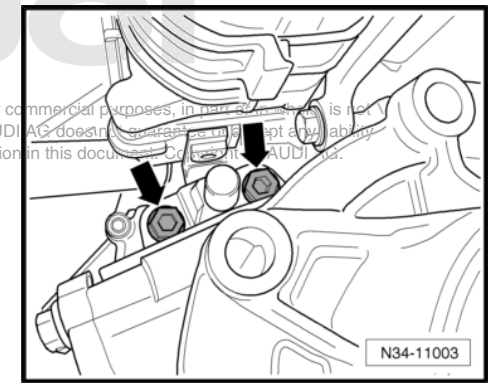
– Remove circlip -arrow A- and O-ring -arrow B- from stub shaft (right-side).



– Remove countersunk bolt for stub shaft (right-side).



– Remove top bolts -arrows- for bevel box.



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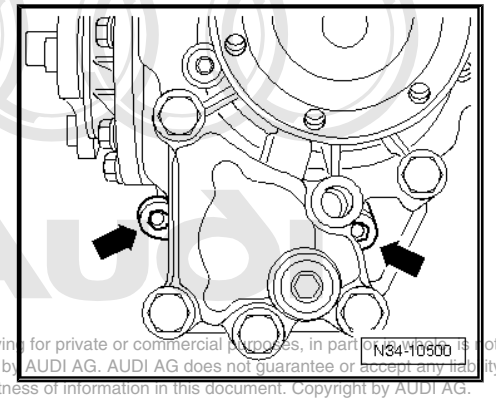
– Remove bottom bolts -arrows- for bevel box.
– Press bevel box carefully off gearbox.
– Push engine/gearbox assembly forwards in order to remove bevel box.



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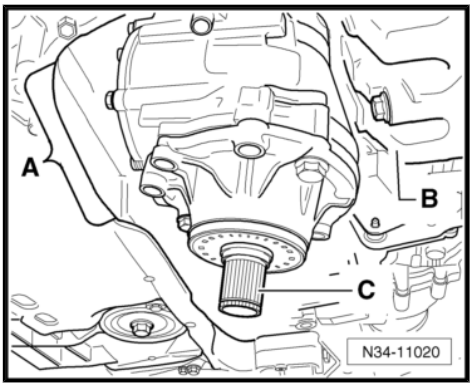
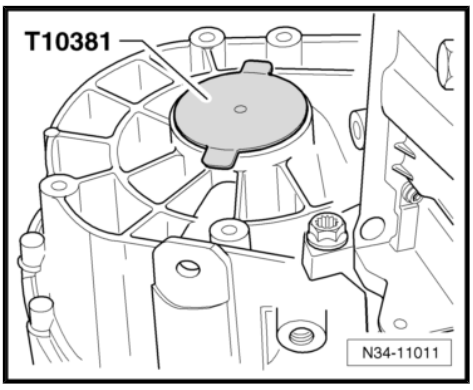
– Guide bevel box past engine -B- using recess -A- in subframe.
• Stub shaft -C- faces downwards.



– Fit cap -T10381- in gearbox.



Installing bevel box

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

Note

Renew O-rings and circlip.

Caution

The oil seal between the bevel box and the gearbox can be damaged.

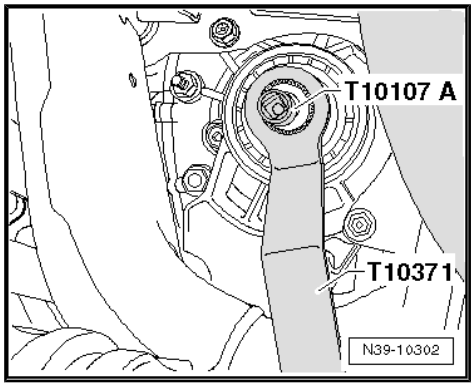
- ***Turn stub shaft clockwise when fitting bevel box onto gearbox.***

– Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.
– If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.
– Bolt bevel box to gearbox. Tightening torque
⇒ Item 15 (page 186)

Note

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

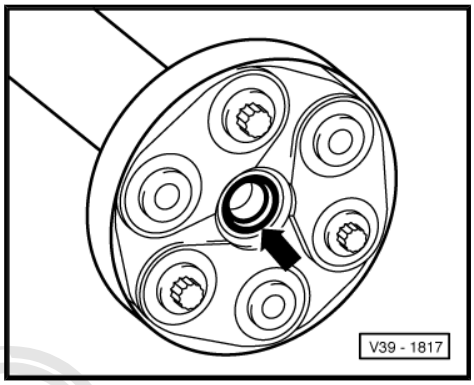
– Tighten countersunk bolt for stub shaft (right-side). Tightening torque ⇒ Item 12 (page 185)
– Install bracket for bevel box ⇒ page 73 .
– Install oil return line for turbocharger ⇒ Rep. Gr. 21 .
– Install catalytic converters ⇒ Rep. Gr. 26 .
– Install drive shaft (right-side) ⇒ Rep. Gr. 40 .
– Install heat shield for drive shaft (right-side) ⇒ page 73 .



Caution

Risk of damage to seal -arrow- in propshaft flange.

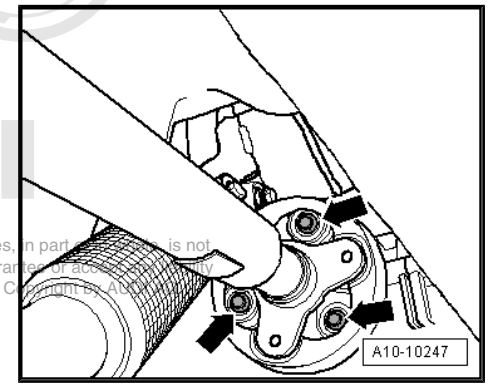
- *Push propshaft as far back as possible, while keeping it horizontal.*



Note

If seal is damaged propshaft must be renewed.

– Press engine/gearbox assembly towards bulkhead, guiding pin on bevel box carefully into propshaft flange.
– Bolt flexible coupling on propshaft onto bevel box flange -arrows- ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .
– Install pendulum support ⇒ page 79 .
– Check gear oil level in bevel box ⇒ page 86 .
– Check gear oil level in gearbox ⇒ page 85 .



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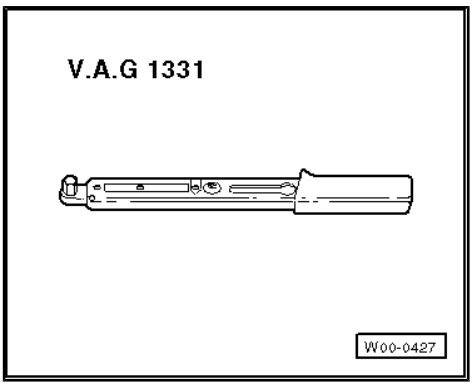
11 Checking oil level in manual gearbox

Note

- *The manual gearbox and bevel box have separate oil fillings.*
- *Checking gear oil level in bevel box ⇒ page 86*
- *For gear oil specification, refer to ⇒ Electronic parts catalogue .*

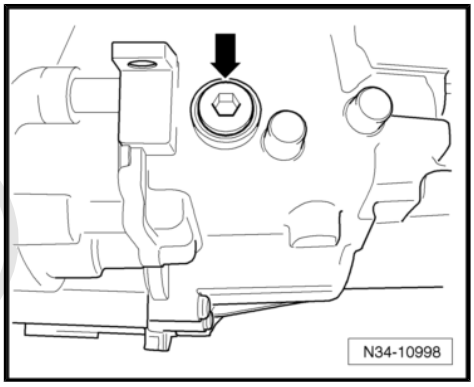
Special tools and workshop equipment required

- Torque wrench -V.A.G 1331-



Procedure

– Remove noise insulation panel (centre) ⇒ Rep. Gr. 66 .
– Remove gear oil inspection plug -arrow-.
• Specification: oil level up to bottom lip of filler hole
– Top up gear oil if necessary.
– Screw in plug -arrow- with new seal. Tightening torque ⇒ Item 3 (page 110)
– Install noise insulation ⇒ Rep. Gr. 66 .



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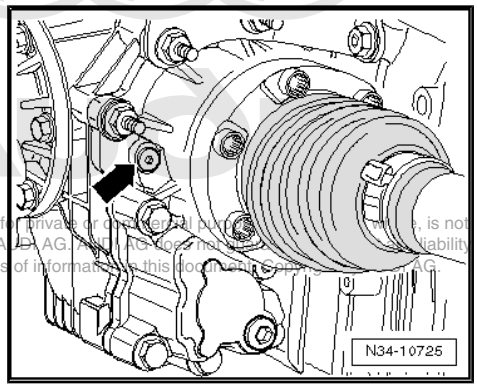
12 Overview - gear oil in bevel box



Note

- *The bevel box is bolted to the side of the gearbox and has its own oil supply.*
- *Checking gear oil level ⇒ page 85*
- *For gear oil specification, refer to ⇒ Electronic parts catalogue .*

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Oil filler plug - tightening torque

Note

Renew oil filler plug -arrow-.

– Tighten oil filler plug to 15 Nm.

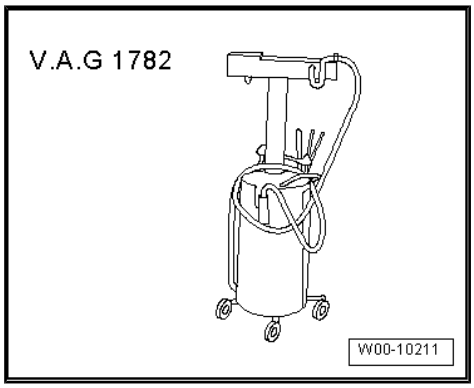
12.1 Checking gear oil level in bevel box

Note

- *The bevel box is secured to the side of the gearbox and has a separate oil filling.*
- *For gear oil specifications, refer to ⇒ Electronic parts catalogue .*

Special tools and workshop equipment required

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



Procedure

- Vehicle must be standing on level surface.
- Bevel box must be in installation position.

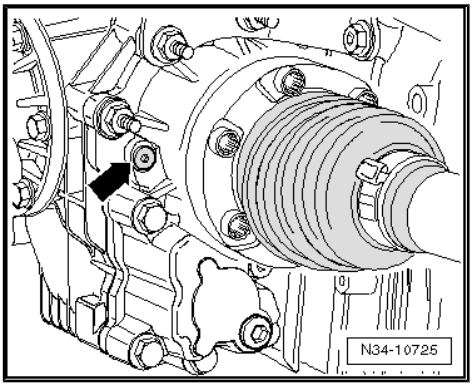
– Remove noise insulation panel (centre) ⇒ Rep. Gr. 66 .

– Place used oil collection and extraction unit -V.A.G 1782- below bevel box.

– Remove oil filler plug -arrow- in bevel box.

• Specification: oil level up to bottom lip of filler hole

– Top up gear oil if necessary
⇒ “12.2 Topping up gear oil in bevel box”, page 87



Note

Carefully remove any traces of escaped oil on bevel box.

– Tighten new oil filler plug. Tightening torque ⇒ page 86

– Install noise insulation ⇒ Rep. Gr. 66 .

12.2 Topping up gear oil in bevel box

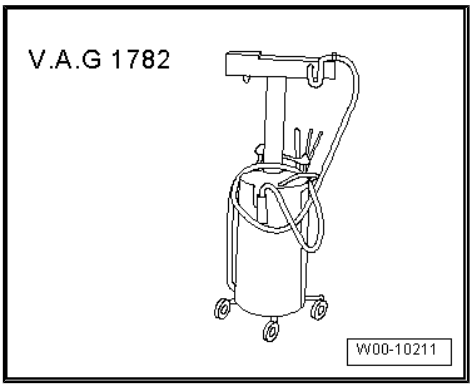
• The bevel box is secured to the side of the gearbox and has a separate oil filling.

• Vehicle must be standing on level surface.

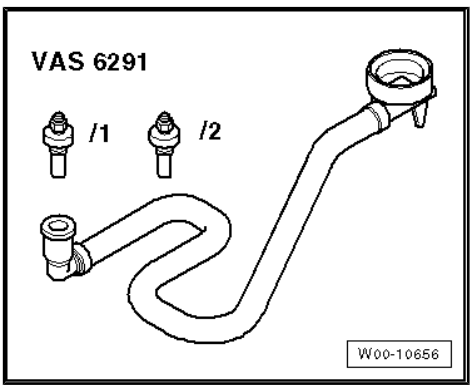
• Bevel box must be in installation position.

Special tools and workshop equipment required

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



♦ Charging device for Haldex coupling -VAS 6291-



♦ Adapter -VAS 6291/2-

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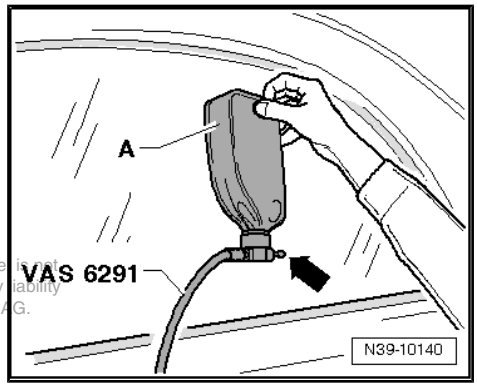
Procedure

– Run hose of charging device -VAS 6291- behind right drive shaft and through right wheel housing to outside.

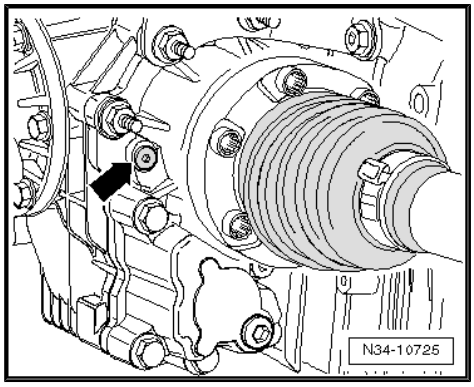


Note

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

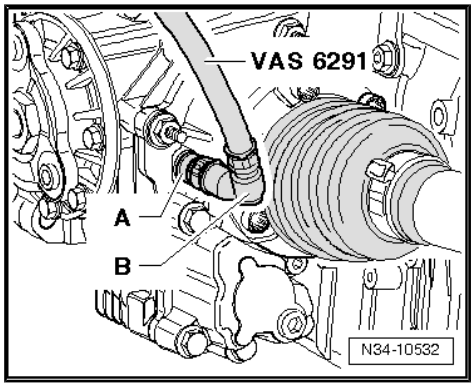
– Place used oil collection and extraction unit -V.A.G 1782- below bevel box.

– Remove oil filler plug -arrow- in bevel box.



– Disconnect adapter -A- and elbow joint -B-.

– Screw adapter -A- in onto stop.

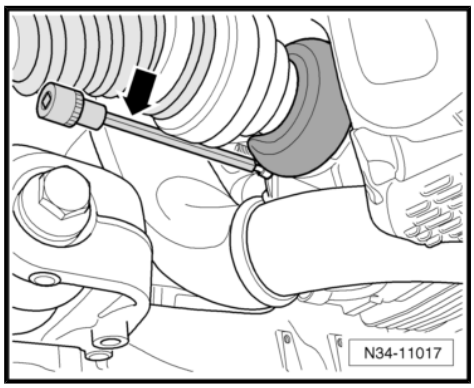


– A hexagon key can be used for this.

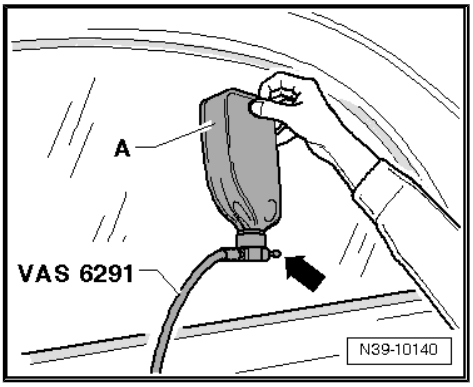
-Arrow- = hexagon key, 5 mm, commercially available.

– Engage elbow joint -B- in adapter -A- (⇒ previous illustration).

• The hose must not hang down.



– Please make sure that valve -arrow- is closed.
– Screw oil reservoir -A- onto charging device -VAS 6291- .
– Now open valve -arrow- and hold oil reservoir as shown in illustration.



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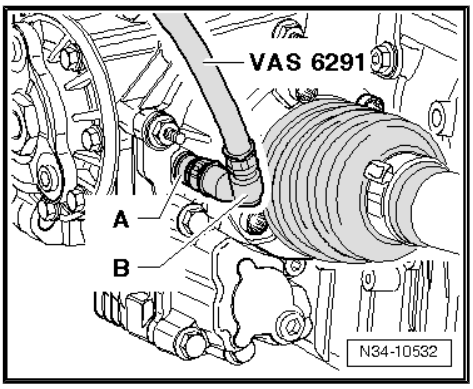
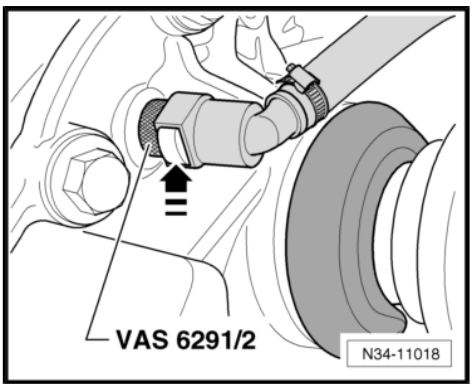
The bevel box will now be filled.

- When bevel box is filled correctly oil will emerge at adapter -A-.
- If no oil has emerged, continue filling procedure.

– After oil has escaped from adapter -A-, place the reservoir at a lower position to enable part of the excess oil to drain back from the hose into the reservoir.



– As soon as oil stops flowing back into the reservoir, remove charging device by pressing catch in direction of -arrow-.
– Unscrew adapter -VAS 6291/2- .
– Fit new oil filler plug and tighten. Tightening torque ⇒ page 86



Note

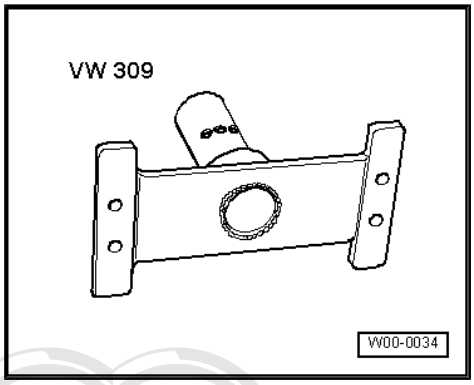
Carefully remove any traces of escaped oil on bevel box.

– Install noise insulation ⇒ Rep. Gr. 66 .

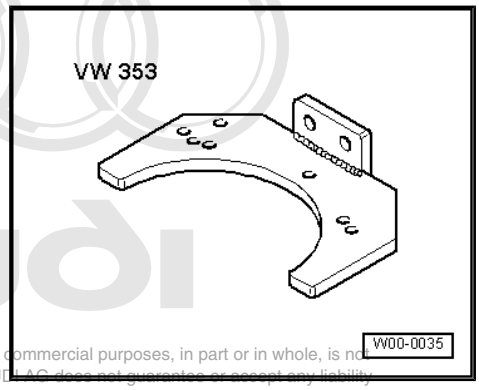
13 Securing gearbox to engine and gearbox support

Special tools and workshop equipment required

- Support plate -VW 309-



- Gearbox support -VW 353-



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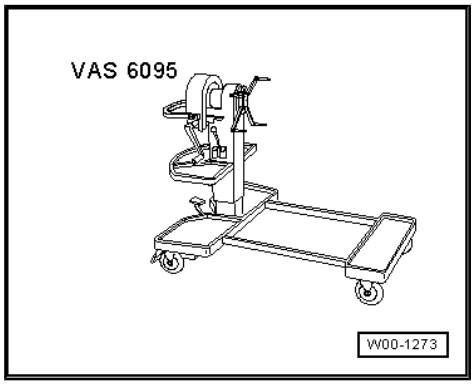
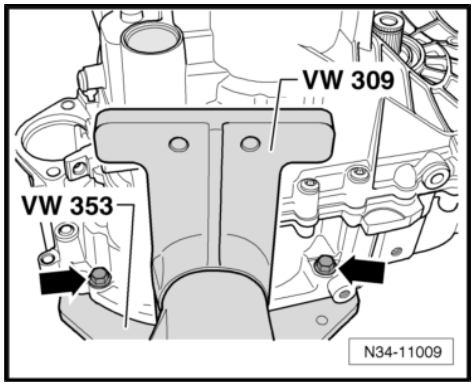
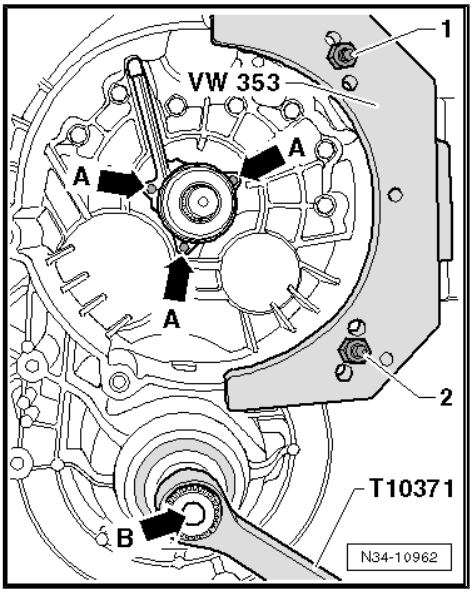
- Engine and gearbox support -VAS 6095-



– Secure gearbox to gearbox support -VW 353- with bolts -arrows-.



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



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14 Dismantling and assembling gearbox

14.1 General layout of gearbox

1 - Clutch housing

2 - Output shaft for reverse gear

3 - Output shaft for 1st/2nd gear

4 - Slave cylinder with release bearing

5 - Input shaft

- ❑ With 5th and 6th speed selector gears

6 - Output shaft for 3rd – 6th gear

7 - Differential

8 - Bevel box

9 - Stub shaft (right-side)

10 - Bevel gear with input shaft

11 - Shaft bevel gear

12 - Output flange

13 - Stub shaft (left-side)

14 - Gearbox housing

15 - 4th speed selector gear

16 - 3rd speed selector gear

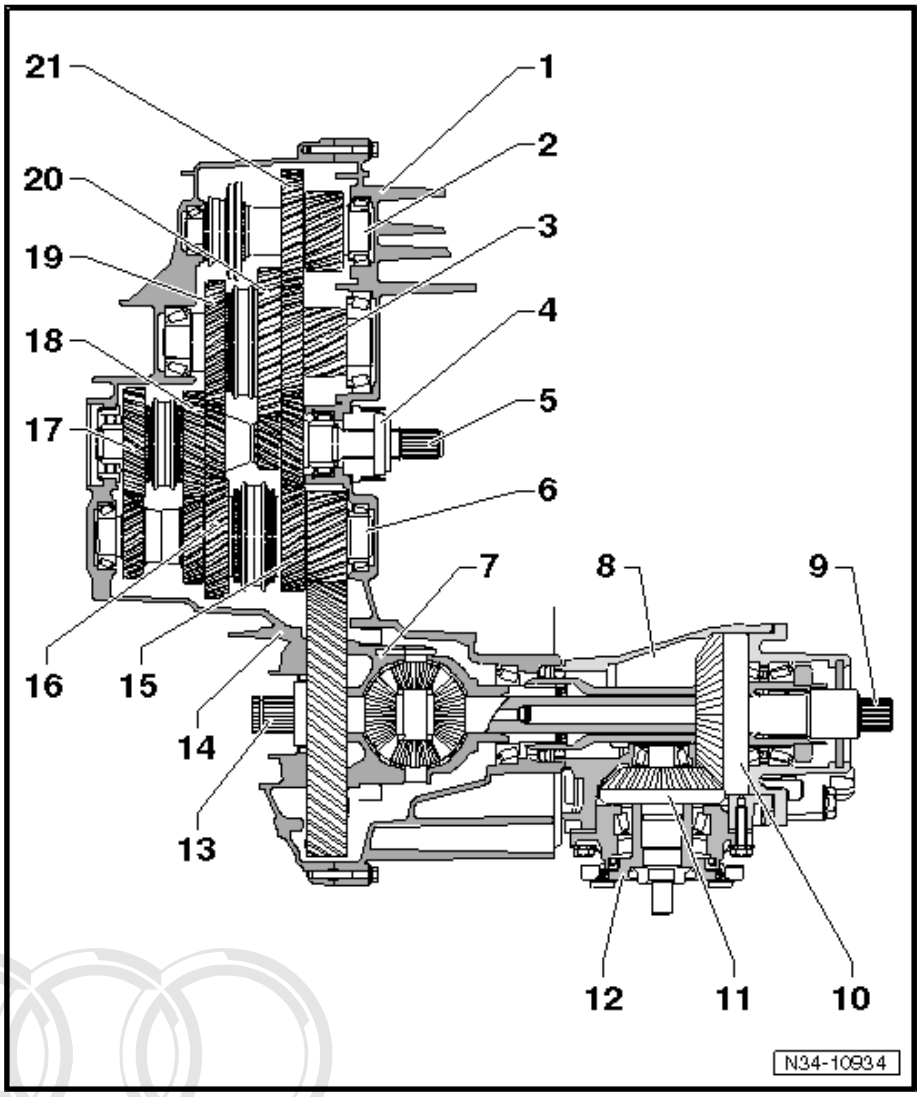
17 - 6th speed selector gear

18 - 5th speed selector gear

19 - 2nd speed selector gear

20 - 1st speed selector gear

21 - Reverse selector gear



14.2 Exploded view

Sequence for dismantling and assembling ⇒ page 97

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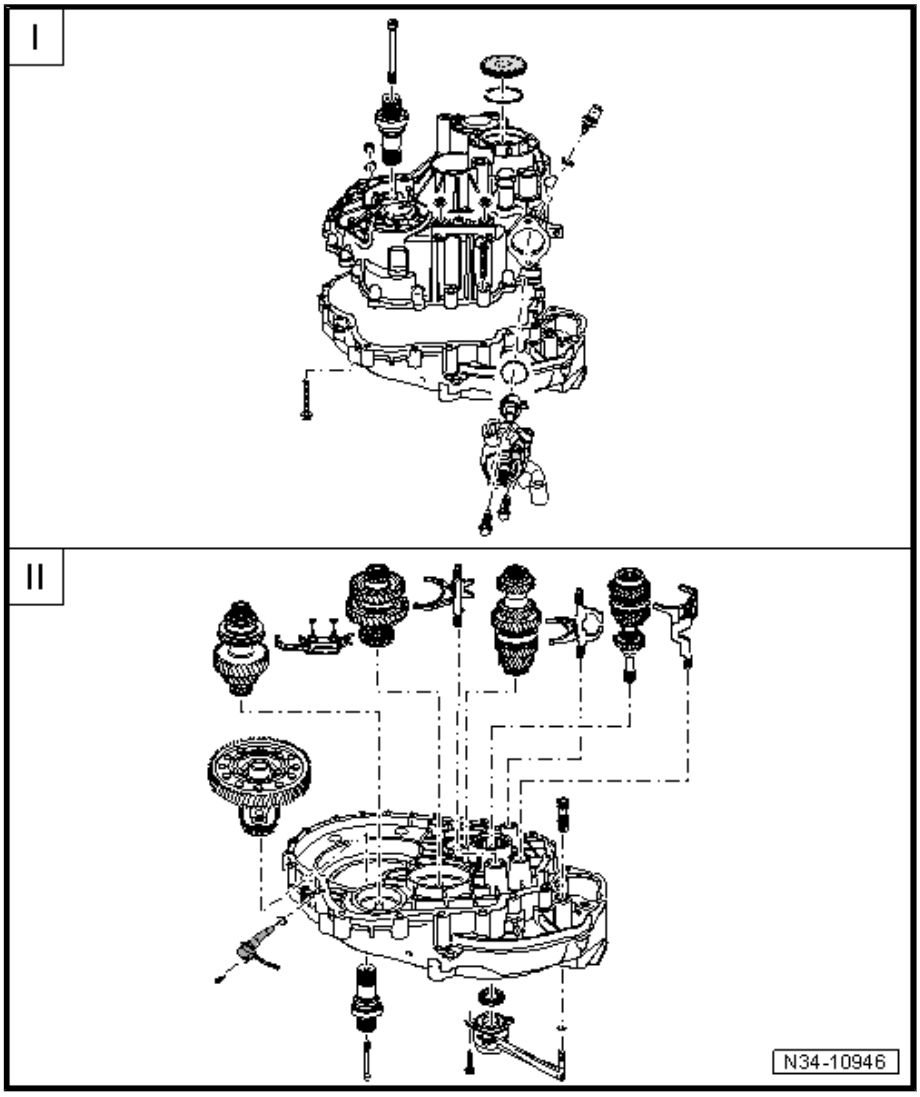
I - Removing and installing gearbox housing and selector unit ⇒ page 94

II - Removing and installing input shaft, output shafts, differential, selector rods and bevel box ⇒ page 95



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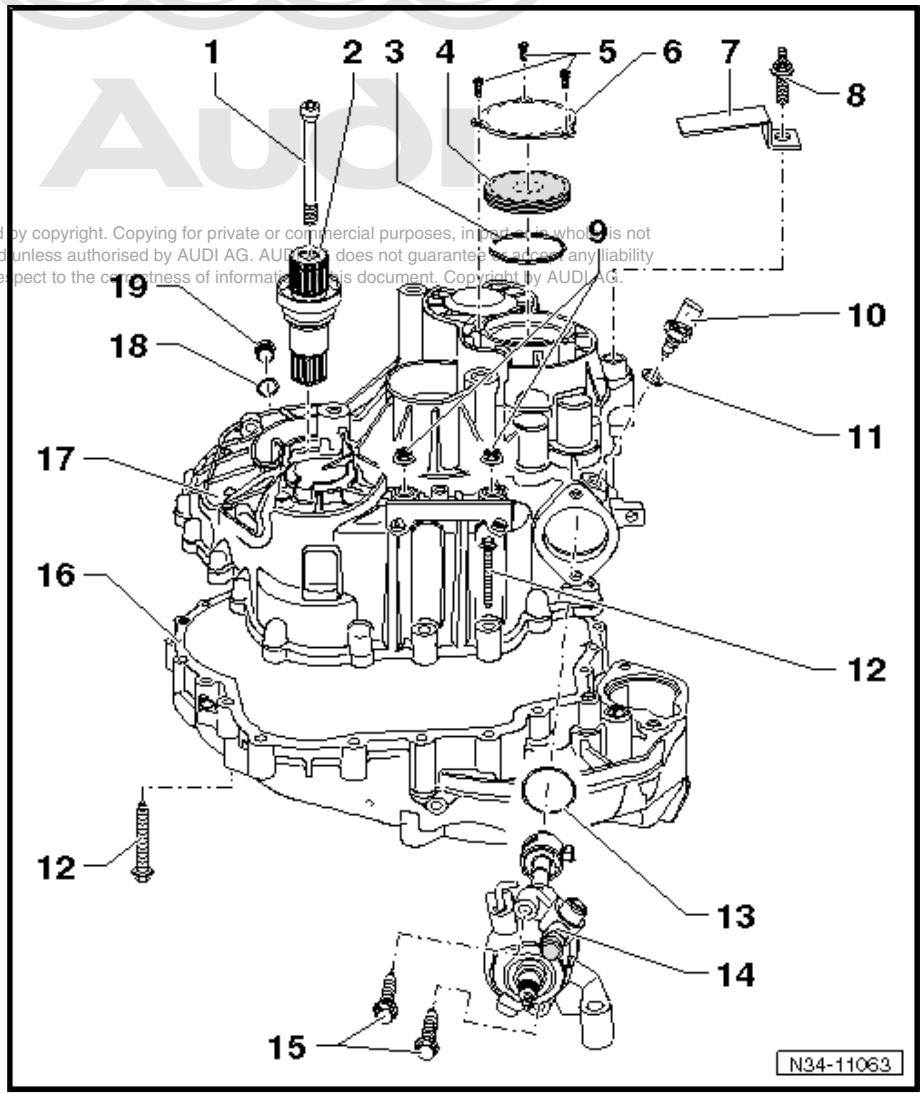
14.3 Exploded view - removing and installing gearbox housing and selector unit



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1 - Countersunk bolt

- ❑ Tightening torque ⇒ Item 30 (page 187)

2 - Stub shaft (left-side) with spring

- ❑ Removing and installing ⇒ page 162
- ❑ Assembling ⇒ page 185

3 - Circlip

- ❑ For grooved ball bearing on input shaft

4 - Sealing cap

5 - Bolt

- ❑ 5 Nm

6 - Locking plate

- ❑ Depending on version, sealing cap is secured with either locking plate or retainer ⇒ Item 7 (page 94) ⇒ page 108

7 - Retainer

- ❑ Depending on version, sealing cap is secured with either retainer or locking plate ⇒ Item 6 (page 94) ⇒ page 108

8 - Bolt

- ❑ 20 Nm

9 - Hexagon nut

- ❑ 20 Nm and turn 90° further

10 - Reversing light switch -F4-

- ❑ 20 Nm
- ❑ With captive seal ⇒ Item 11 (page 94)

11 - Seal

12 - Hexagon bolt

- ❑ 8 Nm and turn 120° further
- ❑ Always renew

13 - O-ring

- ❑ Always renew

14 - Selector unit

- ❑ Servicing ⇒ page 117

15 - Bolt

- ❑ 25 Nm
- ❑ Always renew

16 - Clutch housing

- ❑ Servicing ⇒ page 113

17 - Gearbox housing

- ❑ Servicing ⇒ page 109

18 - Seal

- ❑ Always renew

19 - Oil drain plug

- ❑ 45 Nm

14.4 Exploded view - removing and installing input shaft, output shafts, differential, selector rods and bevel box

1 - Output shaft for reverse gear ⇒ page 151

- ❑ Installation position ⇒ page 96

2 - Selector fork for reverse gear

- ❑ Installation position ⇒ page 96

3 - Output shaft for 1st and 2nd gears ⇒ page 128

- ❑ Installation position ⇒ page 96

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

- ❑ Installation position ⇒ page 96

5 - Output shaft for 3rd – 6th gear ⇒ page 140

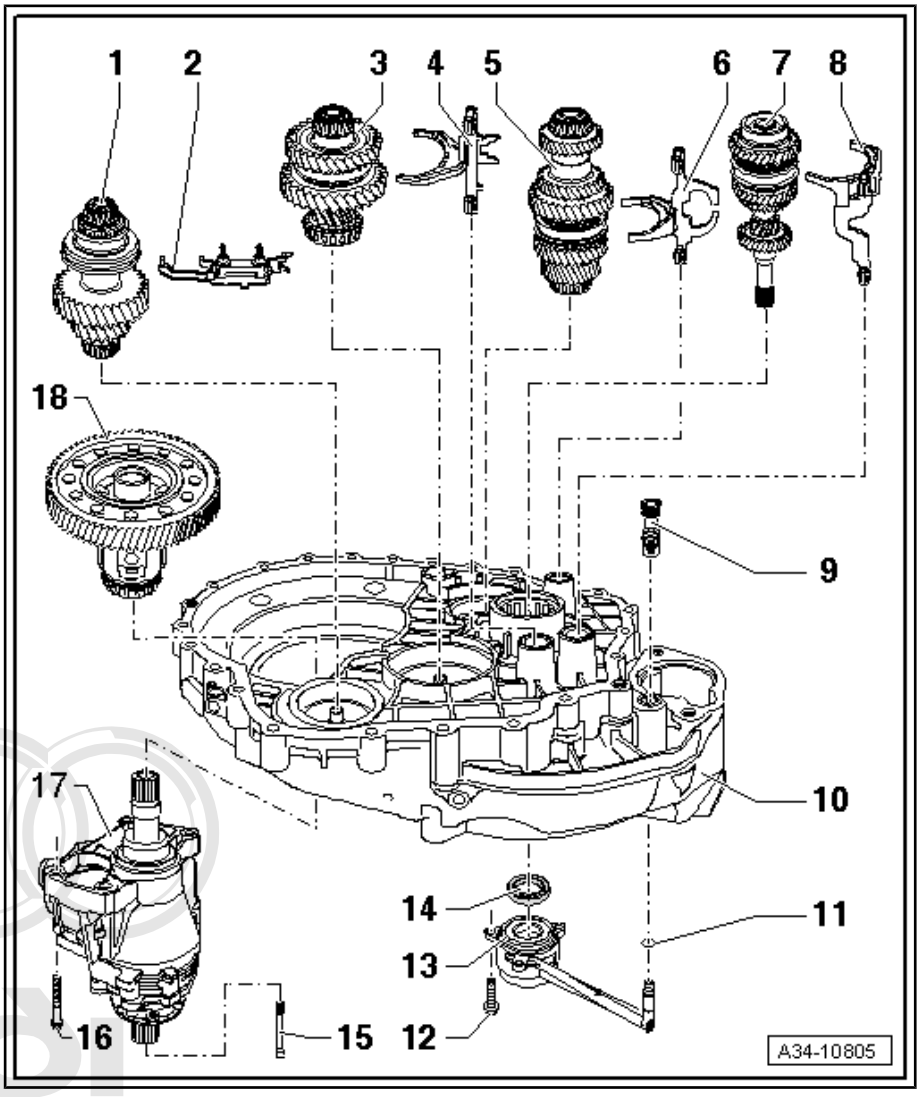
- ❑ Installation position ⇒ page 96

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

- ❑ Note installation position ⇒ page 105

7 - Input shaft ⇒ page 121

- ❑ With 5th and 6th speed selector gears
- ❑ Installation position ⇒ page 96
- ❑ Always renew grooved ball bearing on input shaft ⇒ Item 16 (page 122)



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

- ❑ Installation position ⇒ page 96

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9 - Bleeder connection

- ❑ Connect to slave cylinder ⇒ Item 13 (page 96)

10 - Clutch housing

- ❑ Servicing ⇒ page 113

11 - O-ring

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

12 - Bolt

- ❑ 3x
- ❑ Tightening torque ⇒ Item 4 (page 30)
- ❑ Removing and installing ⇒ page 31

13 - Slave cylinder with release bearing

- ❑ Removing and installing ⇒ page 31

14 - Input shaft oil seal

- ❑ Removing ⇒ page 116
- ❑ Driving in ⇒ page 116

15 - Countersunk bolt

- ❑ Tightening torque ⇒ Item 12 (page 185)

16 - Bolt

- ❑ Tightening torque ⇒ Item 15 (page 186)
- ❑ 4x
- ❑ Always renew

17 - Bevel box

- ❑ Removing and installing (with gearbox installed) ⇒ page 80
- ❑ Removing and installing (with gearbox removed) ⇒ page 97

18 - Differential ⇒ page 185

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Installation position of shafts and selector rods in gearbox

1 - Output shaft for reverse gear

2 - Output shaft for 1st/2nd gear

3 - Input shaft

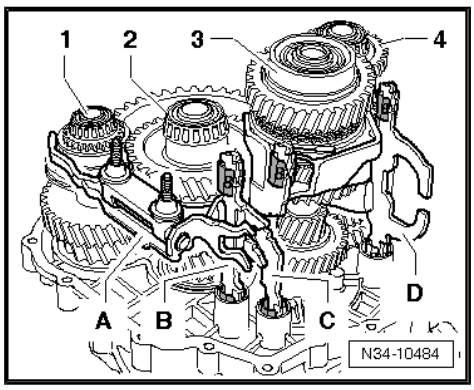
4 - Output shaft for 3rd – 6th gear

A - Reverse gear selector fork

B - Selector rod for 1st and 2nd gear

C - Selector rod for 5th and 6th gear

D - Selector rod for 3rd and 4th gear

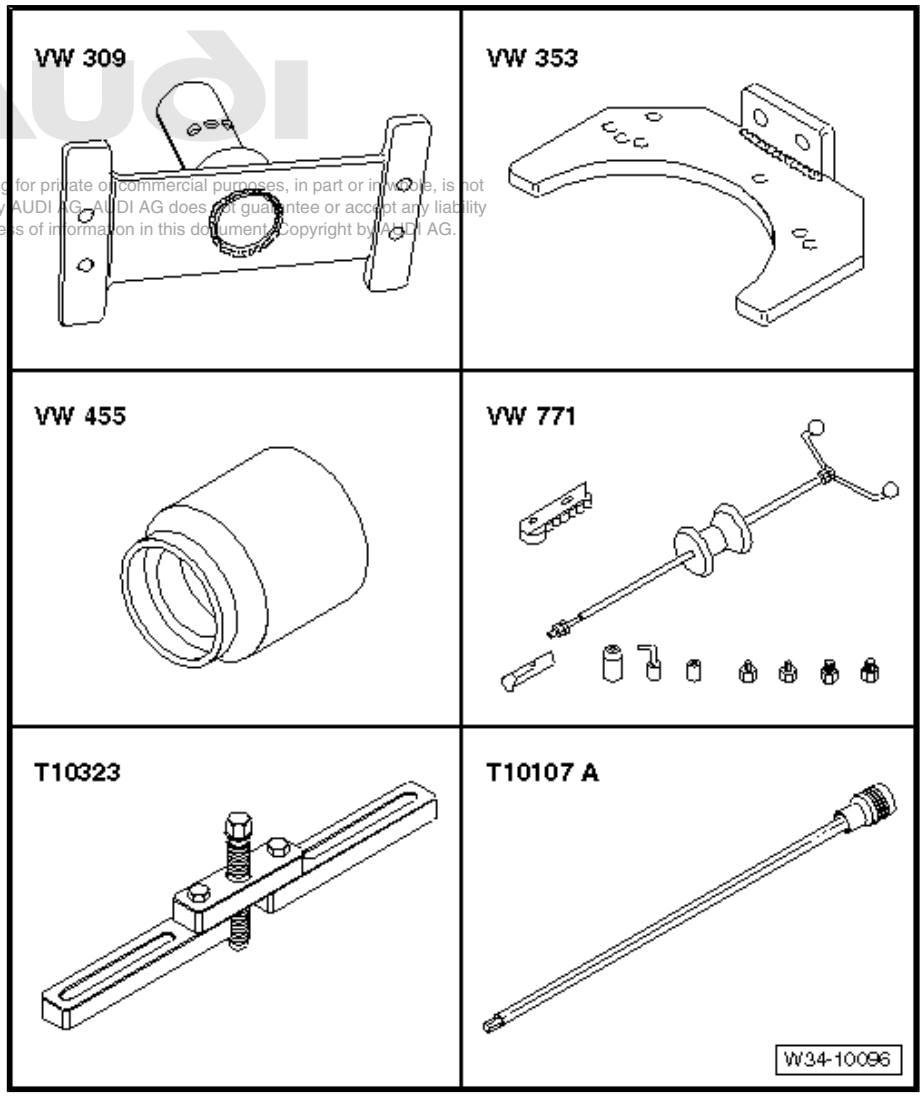


14.5 Dismantling and assembling sequence

Dismantling and assembling gearbox housing, selector unit, input shaft, output shafts, selector rods, differential and bevel box

Special tools and workshop equipment required

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



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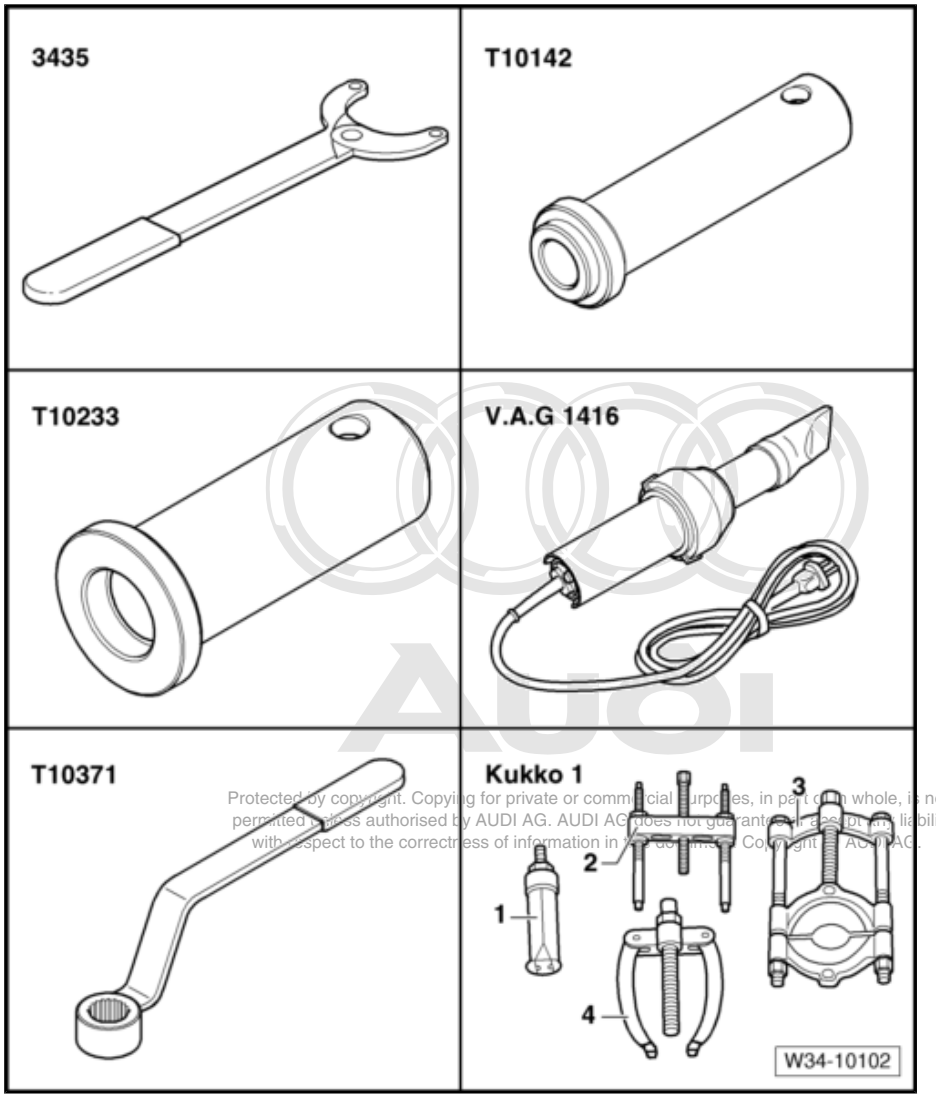
- Counterhold tool -3435-
- Thrust piece -T10042-
- Counterhold tool -T10371-
- Thrust piece -T10233-
- Hot air blower -V.A.G 1416-
- -1- Internal puller 14.5… 18.5 mm , e.g. -Kukko 21/02-
- -3- Splitter 5...60 mm , e.g. -Kukko 17/0-
- -4- Counter-support -Kukko 22/1-



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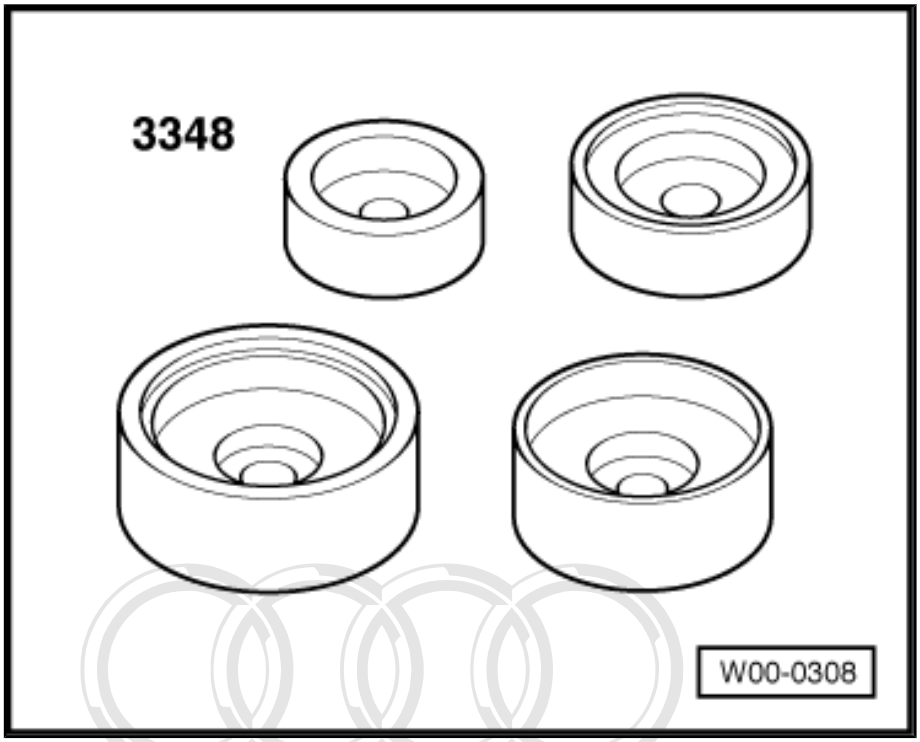
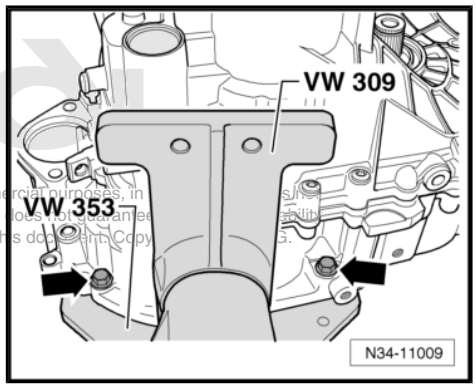
- Assembly tool -3348/2-
- Sealing paste -AMV 188 200 03-
- Grease -G 060 735 A2-



Removing

– Secure gearbox to gearbox support -VW 353- with bolts -arrows-.



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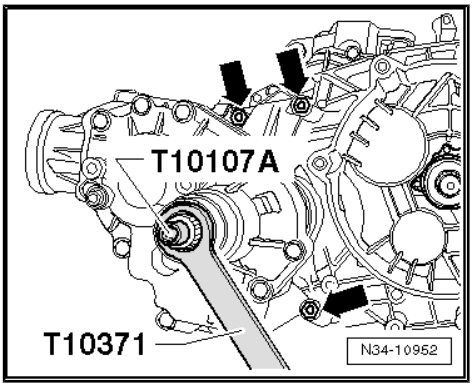
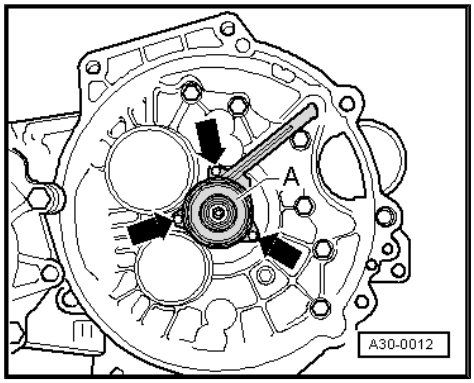
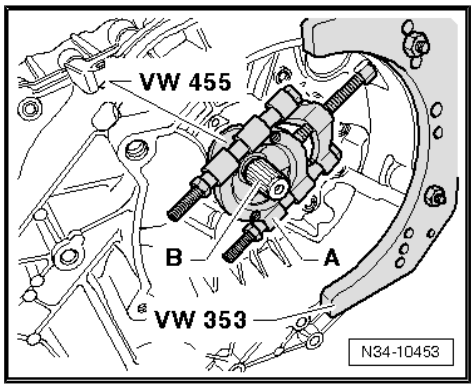
– Remove securing bolt for stub shaft (right-side) using socket -T10107 A- , counterholding on stub shaft.
– Remove 4 bolts -arrows- securing bevel box to gearbox (only 3 visible in illustration).
– Carefully press bevel box off gearbox and remove.



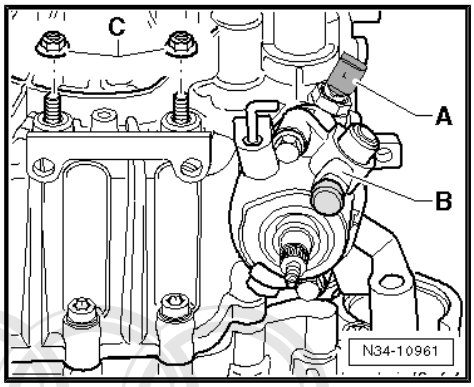
– Remove bolts -arrows-.
– Take off clutch slave cylinder together with release bearing -A-.
– Place drip tray below gearbox.
– Drain off gear oil.
– Remove bolts securing clutch housing to gearbox housing.



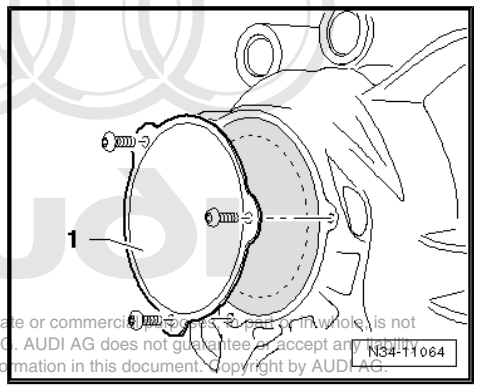
– Lock input shaft -B- by fitting installing sleeve -VW 455- over input shaft on clutch housing.
– Clamp splitter 5...60 mm -A-, e.g. -Kukko 17/0- , behind splines of input shaft.
• The rear side of the splitter must be in contact with installing sleeve (zero play).



– Place selector shaft of selector unit in neutral.
– Remove reversing light switch -F4- -A-.
– Remove bolts for selector unit -B- from gearbox housing.
– Pull selector unit out of gearbox housing, at the same time turning selector unit 180°.
• The selector fingers of the selector unit must be guided through the selector rods.



– If fitted, remove locking plate -1-.



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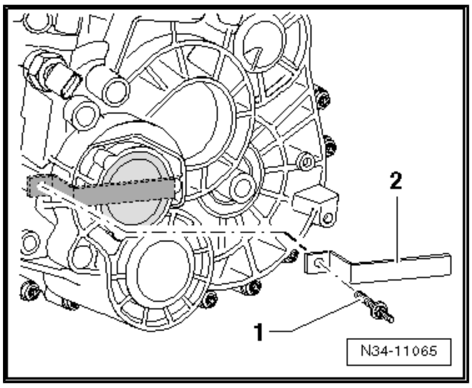
– If fitted, remove retainer -2-.



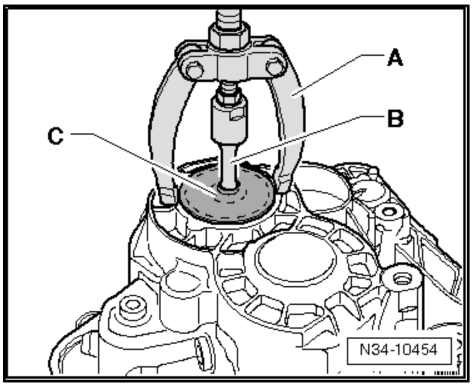
– Pierce rubber in centre of sealing cap -C- with a screwdriver.

– Lever sealing cap out of gearbox housing.

– If necessary, pull sealing cap out of gearbox housing.

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

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

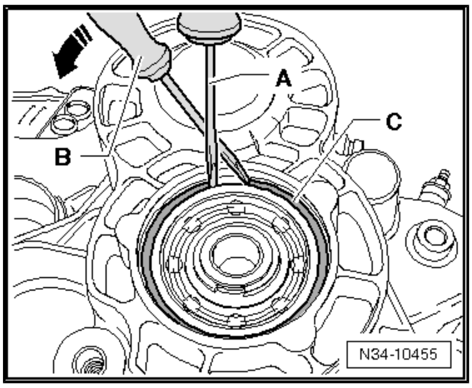


Remove circlip -C- from grooved ball bearing of input shaft as follows:

– Hold one end of circlip with screwdriver -A-.

– Lever other end of circlip out of slot in ball bearing -arrow- with 2nd screwdriver -B-.

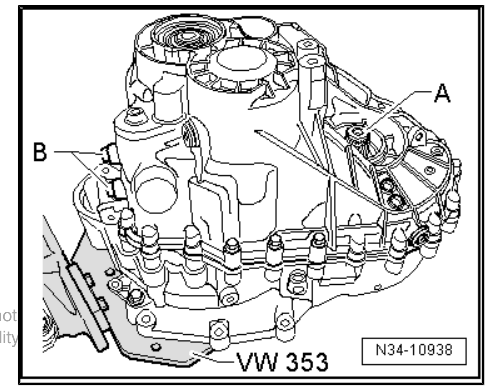
– Lever out circlip further by re-applying screwdriver -B-.



– Remove securing bolt for stub shaft (left-side) -A-, counter-holding on stub shaft with counterhold tool -T10371- .

– Pull out stub shaft.

– Remove all bolts securing gearbox housing to clutch housing.



Note

If bolts -B- are present, they do not need to be removed in order to remove the gearbox housing.

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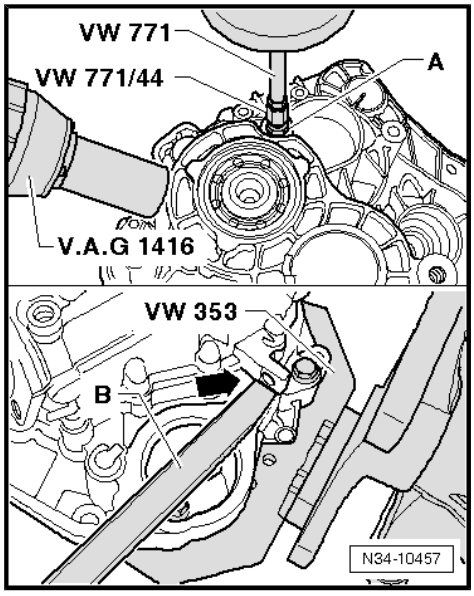
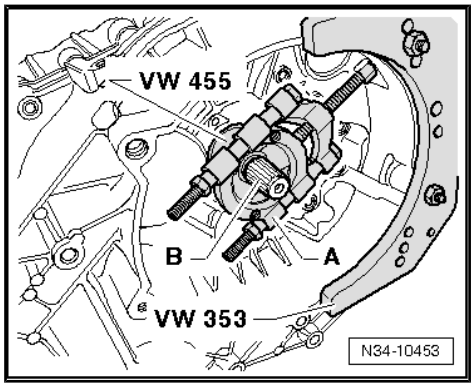
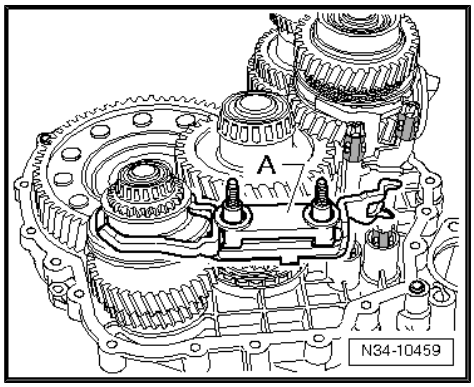
– Screw adapter -VW 771/44- into threaded hole in gearbox housing as far as stop and secure with lock nut -A-.
– Heat gearbox housing using e.g. hot air blower -V.A.G 1416- in vicinity of bearing seat for grooved ball bearing for input shaft for approx. 10 minutes to approx. 100° C.
– Using multi-purpose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



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



– Remove reverse gear selector fork -A-.



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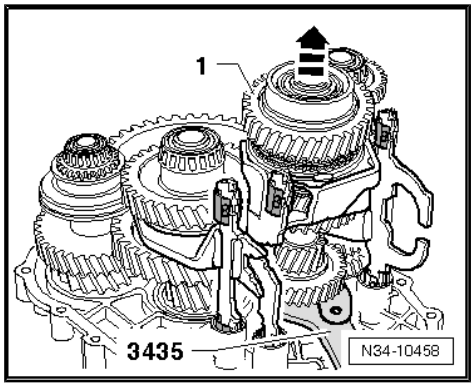
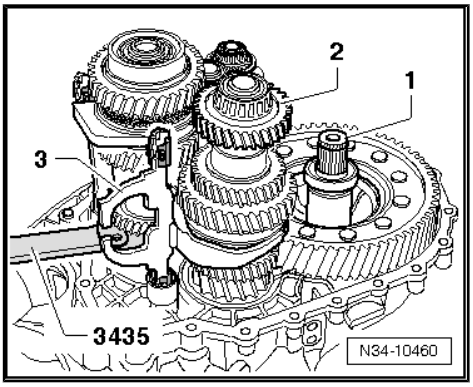
– If necessary, carefully tilt gearbox slightly to side.
– Lift input shaft -1- in direction of -arrow- far enough to insert counterhold tool -3435- .
– Swing gearbox back to original horizontal position.



– Secure stub shaft -1- to differential so that differential can be lifted during the following steps.
– Remove output shaft for 3rd – 6th gear -2- together with selector rod -3-.

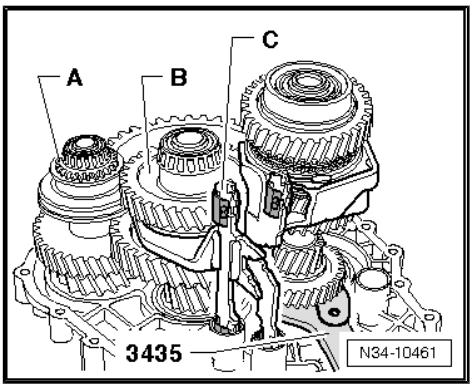


– Carefully tilt gearbox slightly to the side.
– Press output shaft for 1st and 2nd gears -B- up as far as stop.
– Then swing reverse gear output shaft -A- out.

Caution

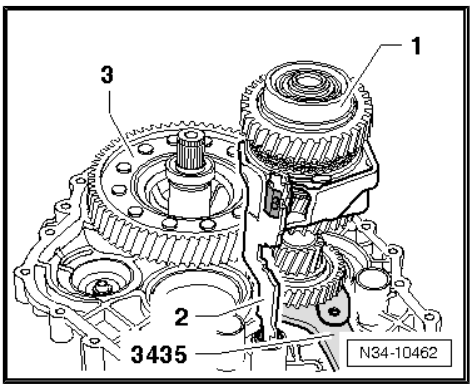
Gearbox components might come loose inadvertently when the unit is tilted.

To prevent this happening, swing the gearbox back to its original horizontal position.



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

– Remove input shaft -1- together with selector rod -2-.
– Pull out differential -3- by taking hold of stub shaft.
– Remove input shaft oil seal ⇒ Item 11 (page 114) .



Note

Always renew grooved ball bearing on input shaft ⇒ Input shaft - exploded view ⇒ Item 16 (page 122) .

14.5.1 Installing

- A new grooved ball bearing has been pressed onto the input shaft ⇒ Input shaft - exploded view ⇒ Item 16 (page 122) .
- Tightening torques ⇒ "14.3 Exploded view - removing and installing gearbox housing and selector unit", page 94

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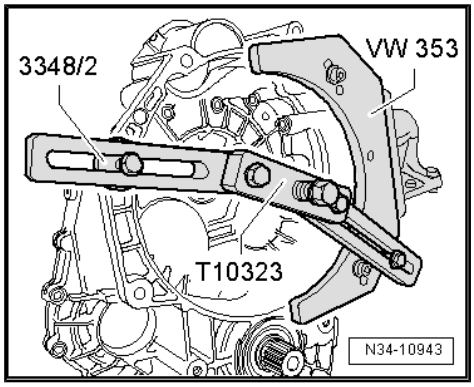
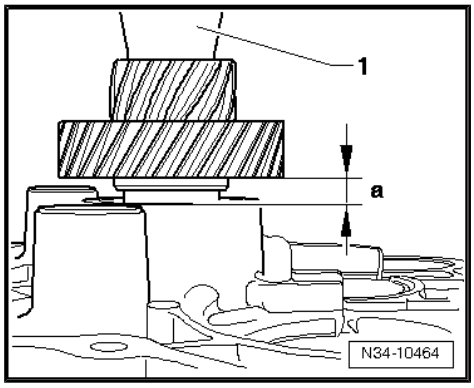
– Secure support bridge -T10323- as shown.



– Now install input shaft -1- in clutch housing together with selector rod for 5th and 6th gears.

Lift input shaft -1- to dimension -a- by turning spindle of support bridge -T10323- .

• Dimension -a- = 15 mm.



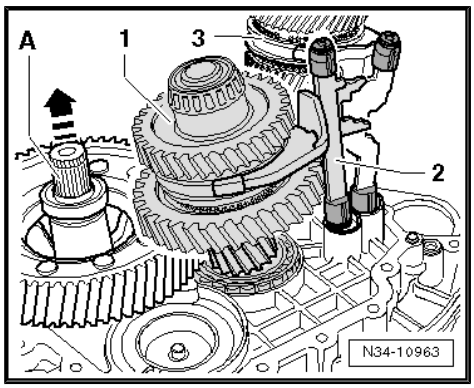
– Secure stub shaft (left-side) -A- to differential so that differential can be lifted during the following steps.

– Fit differential.

A second mechanic is required for the next steps.

– Have 2nd mechanic lift differential in direction of -arrow-.

– First set output shaft for 1st and 2nd gears -1- together with selector rod -2- in bearing seat and then swing towards input shaft -3-.

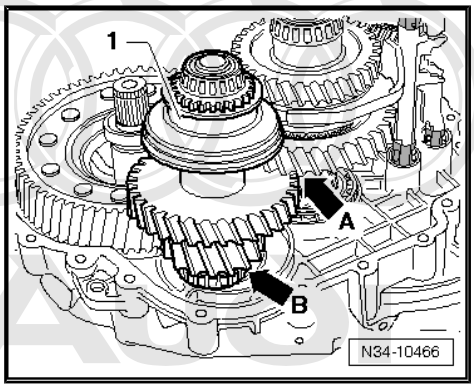


– Lift output shaft for 1st and 2nd gears at selector gear -arrow A- and swing towards input shaft (2nd mechanic).

– Guide reverse gear output shaft -1- under teeth of selector gear -arrow A- and then set in bearing seat -arrow B-.

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

– Insert output shaft for 3rd – 6th gear -2- together with selector rod for 3rd and 4th gear -1-.



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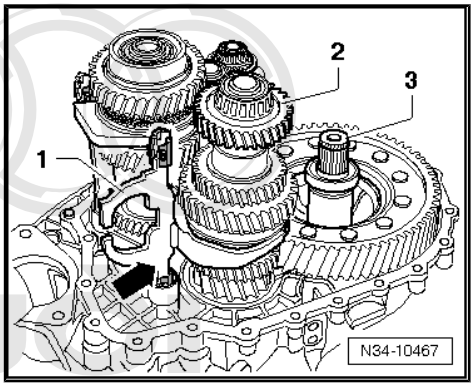
Installation position of selector rod for 3rd and 4th gear:

Shorter arm -arrow- faces clutch housing.

– Detach stub shaft (left-side) -3- from differential.



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

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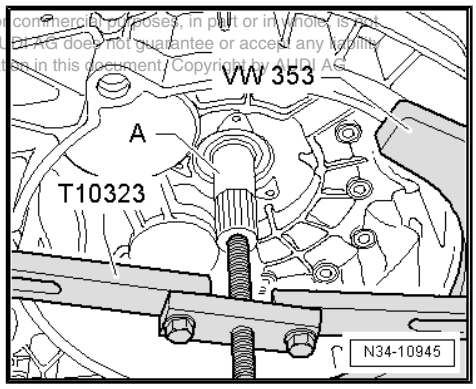
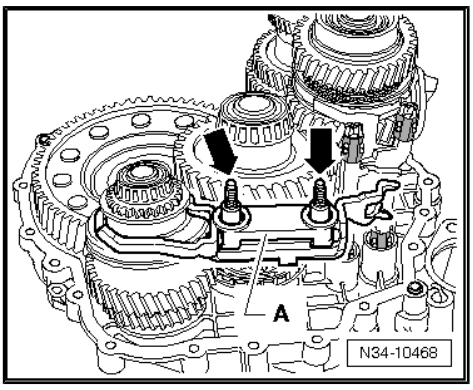


– Fit reverse gear selector fork -A- in locking collar of reverse gear output shaft.

• Studs -arrows- must be vertical before gearbox housing is set in place.



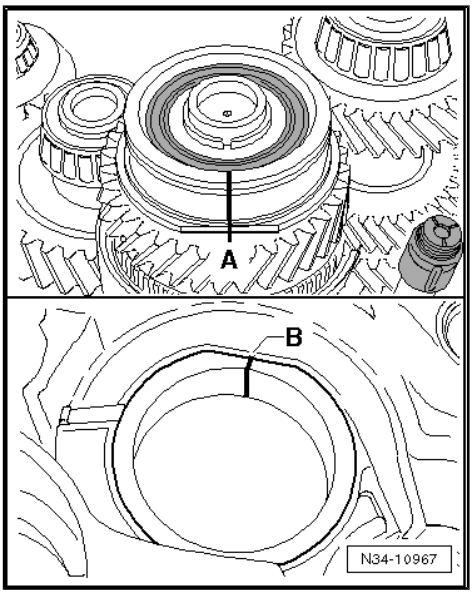
Grooved ball bearing for input shaft will fit into gearbox housing in one position only.

• Flattened sides -A- on grooved ball bearing and bearing mounting -B- in gearbox housing must be aligned.

– Mark flattened sides with paint.

– 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.

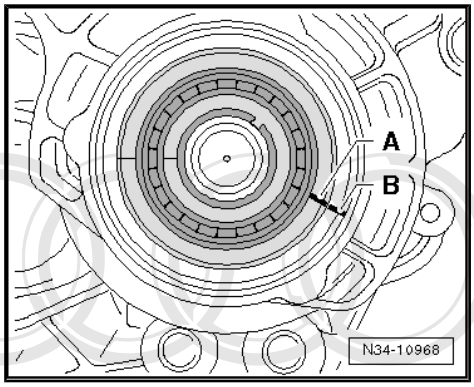


Note

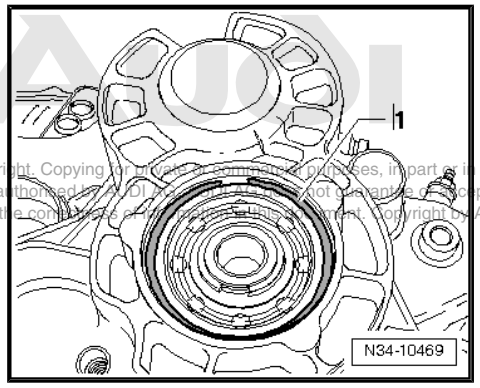
Heating is necessary to ensure that grooved ball bearing is not damaged when installing gearbox housing.

– 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.
– Observe studs for reverse gear selector fork ⇒ page 105 .
• Make sure the gearbox housing remains straight when fitting it in place; guide it parallel to the clutch housing.



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



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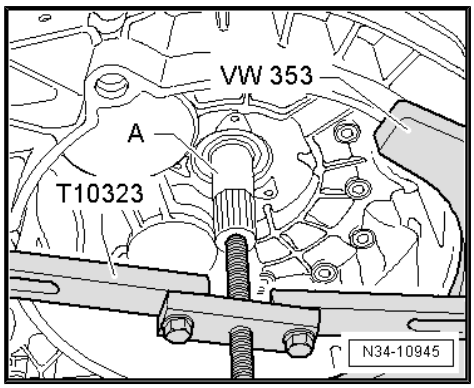
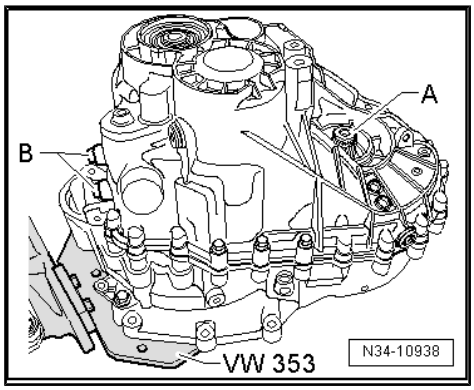
– Remove support bridge -T10323- for input shaft -A-.



– Bolt gearbox housing and clutch housing together.



Note

Bolts -item B- can be disregarded.

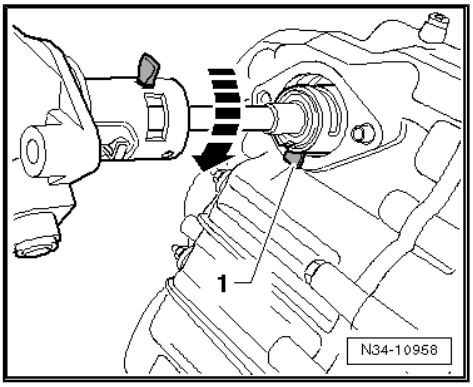
– Insert stub shaft -A- together with spring, thrust washer and tapered ring.
– Tighten securing bolt for stub shaft, counterholding on stub shaft with counterhold tool -T10371- .

Install selector unit as follows:

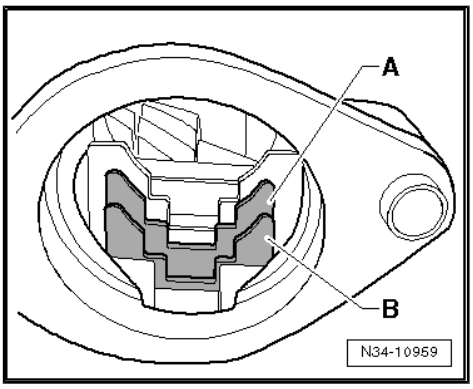
– Turn gearbox in assembly stand so that opening for selector unit faces upwards.

– Bring selector rods into neutral.

– Guide selector finger of selector unit -1- through gear selector forks -A- and -B- (gear selector forks ⇒ next illustration).



Gear selector forks -A- and -B-

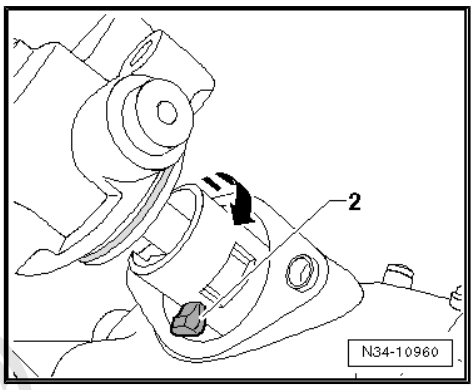


– Turn selector unit in direction of -arrow- (⇒ previous illustration) until it can be guided into gearbox housing.

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

– Insert selector finger of selector unit into gear selector forks -A- and -B- (⇒ previous illustration) and, at the same time, insert into gearbox housing as far as stop.

• Selector shaft should move up and down easily (gate selector movement).



– Tighten selector unit -B-.

– Screw in reversing light switch -F4- -A-.

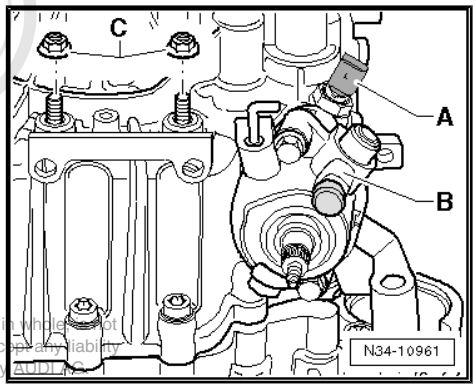
– Tighten hexagon nuts -C-.

– Drive in input shaft oil seal ⇒ page 116 .

– Install slave cylinder with release bearing ⇒ page 31 .

– Tighten countersunk bolt for stub shaft (right-side) using socket -T10107 A- , counterholding on stub shaft using counterhold tool -T10371- .

– Select all gears.



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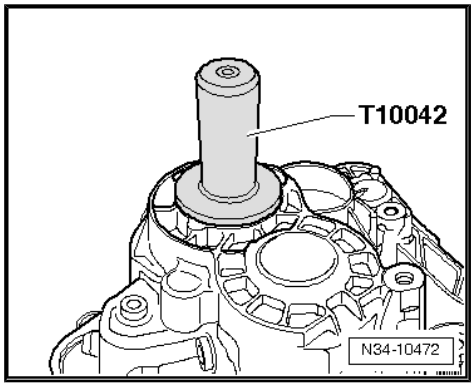
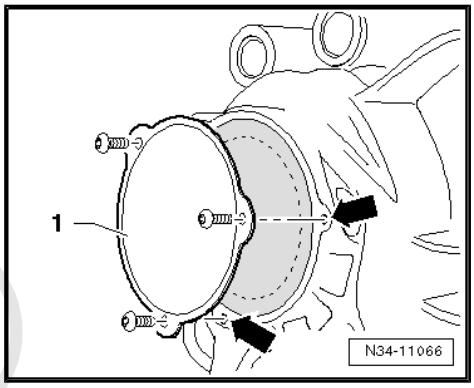
– Drive sealing cap into gearbox housing as far as stop of thrust piece -T10042- .



Securing sealing cap:

Version with threaded holes -arrows- near sealing cap:

– Secure locking plate -1- with 3 bolts.



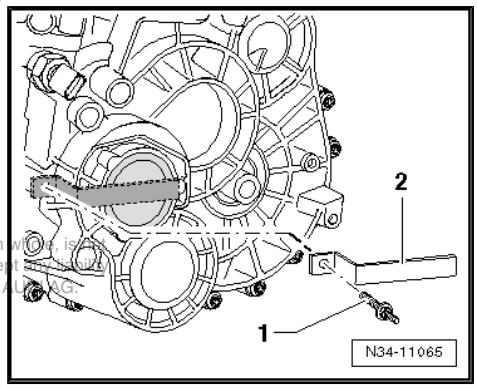
Version with no threaded holes near sealing cap:

– Attach retainer -2- with centre hex stud -1-.

Installation position:

- The retainer must be positioned over the centre of the sealing cap.

Allocate bolts and other components according to ⇒ Electronic parts catalogue .



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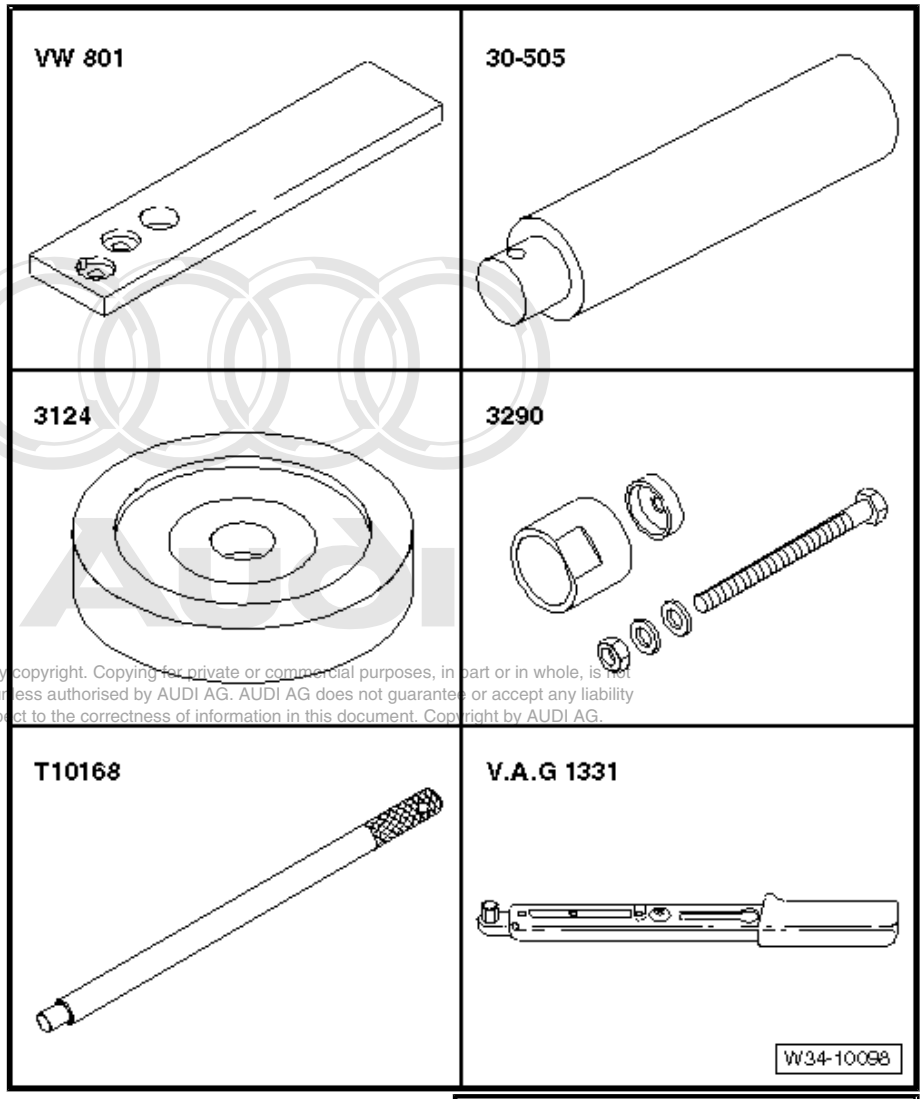
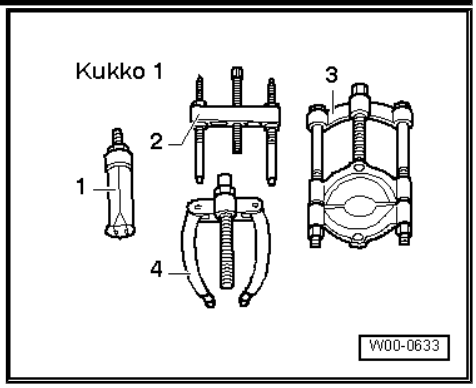
15 Servicing gearbox housing

Special tools and workshop equipment required

- Support plate -VW 801-
- Mandrel -30-505-
- Thrust piece -3124-
- Assembly tool -3290-
- Drift -T10168-
- Torque wrench -V.A.G 1331-
- -1- Internal puller -Kukko 21/3-
- Thread adapter of counter-support -Kukko 22/1-
- -4- Counter-support -Kukko 22/2-
- Sealing paste -AMV 188 200 03-
- For other special tools, please refer to descriptions for repairing input shaft(s).





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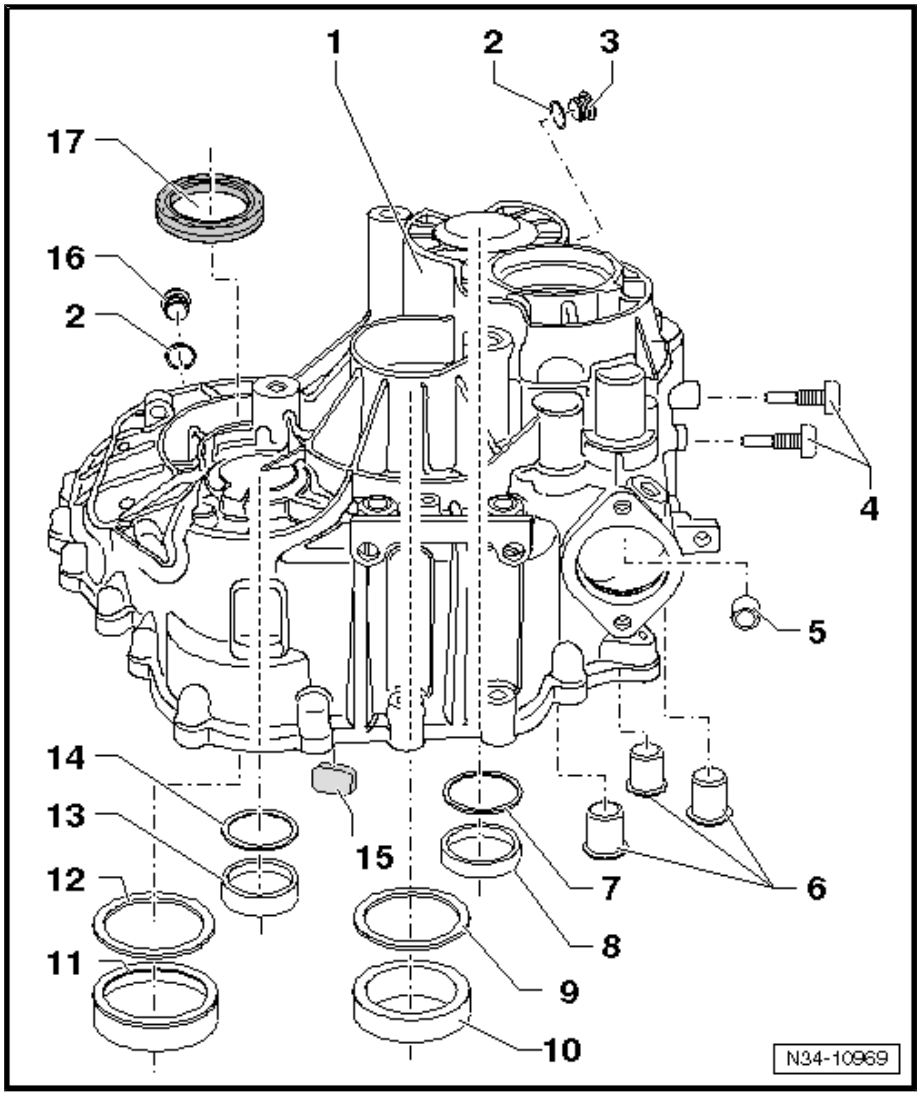
Note

If tapered roller bearings are renewed, install new shims of the same thickness as the old ones.



1 - Gearbox housing

2 - Seal

- ❑ Always renew

3 - Oil filler plug

- ❑ 45 Nm

4 - Bolt

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

5 - Bearing bush

- ❑ For selector shaft
- ❑ Pulling out ⇒ page 111
- ❑ Driving in ⇒ page 111

6 - Bearing bush

- ❑ For selector rod
- ❑ Pulling out ⇒ page 112
- ❑ Driving in ⇒ page 112

7 - Shim

- ❑ For output shaft for 3rd – 6th gear
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

8 - Tapered roller bearing outer race

- ❑ For output shaft for 3rd – 6th gear
- ❑ Removing and installing ⇒ Item 22 (page 141)
- ❑ When renewing, install with shim ⇒ Item 7 (page 110) of same thickness

9 - Shim

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

10 - Tapered roller bearing outer race

- ❑ For output shaft for 1st and 2nd gear
- ❑ Removing and installing ⇒ Item 25 (page 129)
- ❑ When renewing, install with shim ⇒ Item 9 (page 110) of same thickness

11 - Tapered roller bearing outer race

- ❑ For differential
- ❑ Removing and installing ⇒ Item 3 (page 185)
- ❑ If renewed: adjust differential ⇒ page 191

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12 - Shim

- ❑ For differential
- ❑ Adjusting differential ⇒ page 191

13 - Tapered roller bearing outer race

- ❑ For reverse gear output shaft

- ❑ Removing and installing ⇒ Item 15 (page 152)
- ❑ When renewing, install with shim of same thickness

14 - Shim

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

15 - Magnet

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

16 - Oil drain plug

- ❑ 45 Nm

17 - Oil seal

- ❑ Renewing with manual gearbox installed ⇒ page 162

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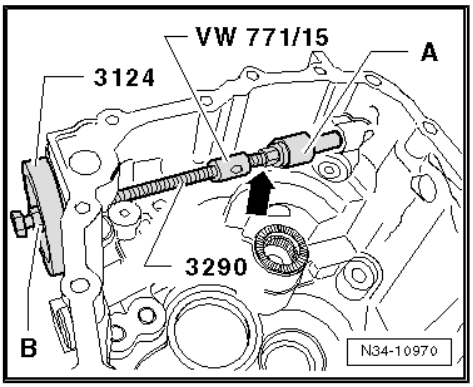
Pulling out selector shaft bearing bush

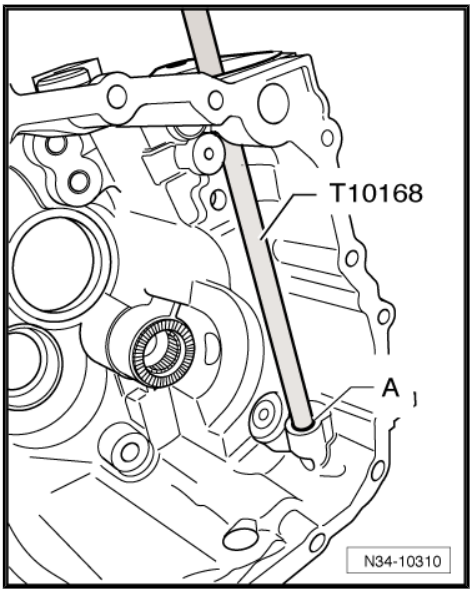
– Use thread adapter -arrow- from counter-support -Kukko 22/1-

– Hold spindle of assembly tool -3290- tight and turn nut -B-.

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



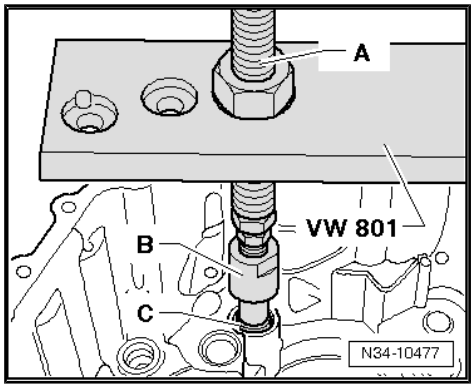
Driving in selector shaft bearing bush -A- to stop of tool



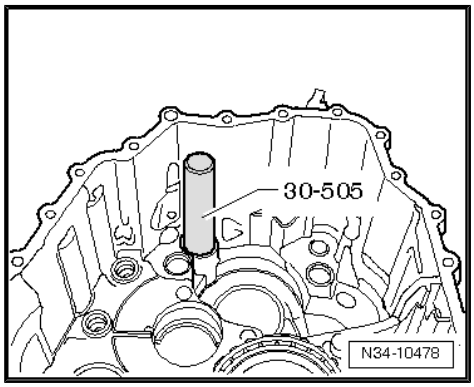
Pulling out selector rod bearing bush -C-

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

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



Driving in selector rod bearing bush to stop



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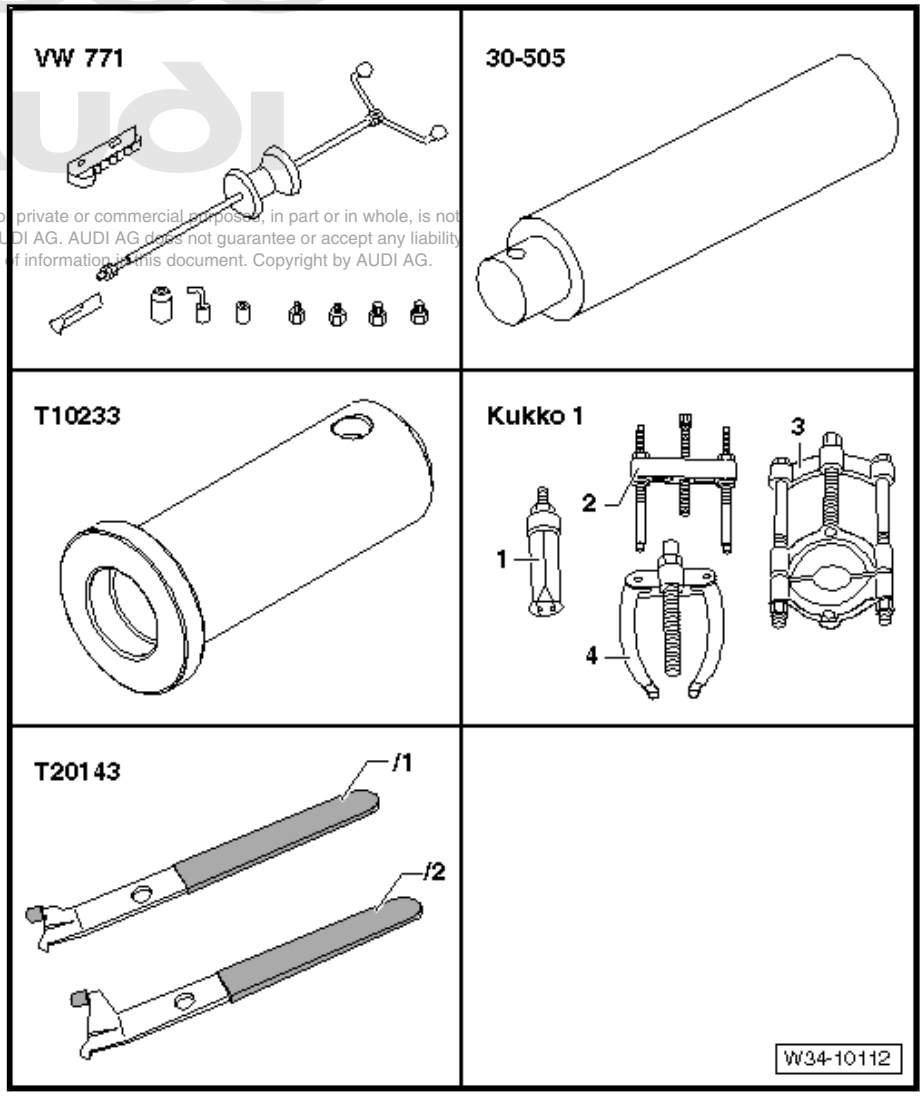
16 Servicing clutch housing

Special tools and workshop equipment required

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



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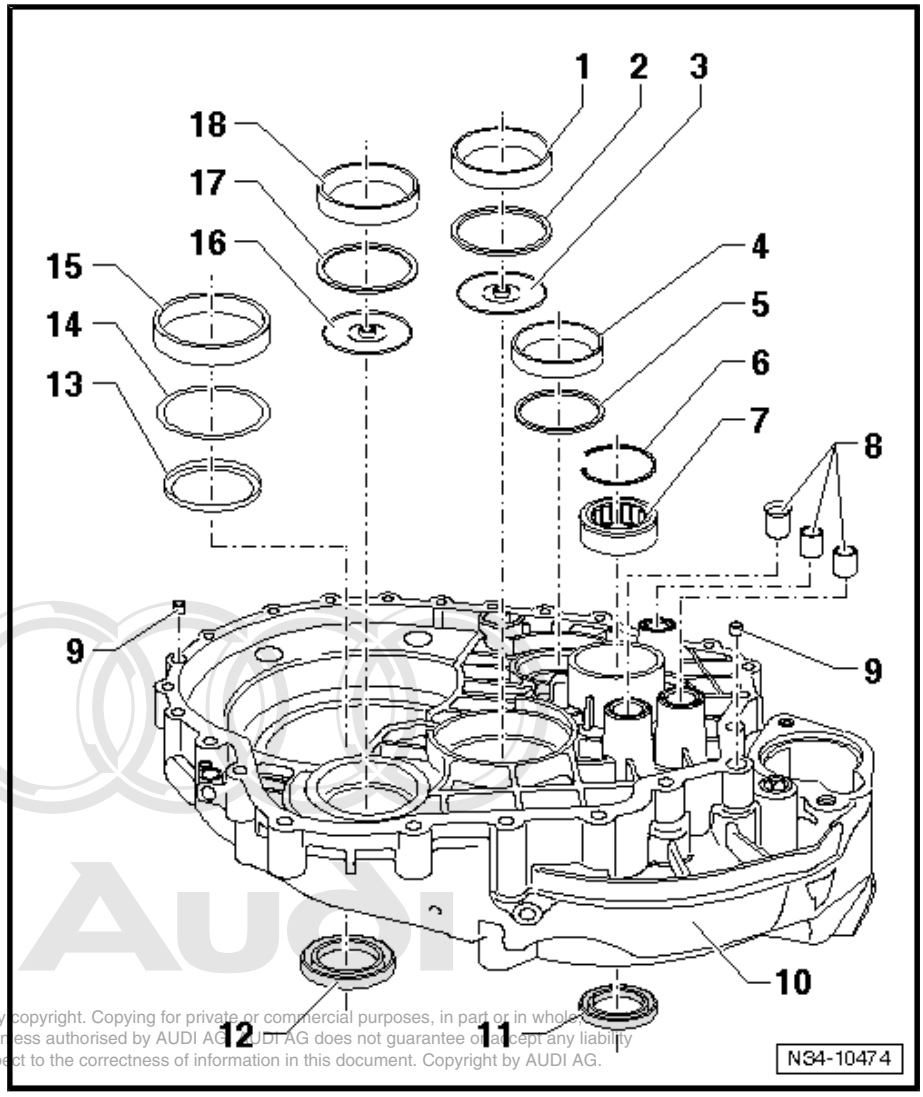
Note

If tapered roller bearings are renewed, install new shims of the same thickness as the old ones.



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1 - Tapered roller bearing outer race

- ❑ For output shaft for 1st and 2nd gear
- ❑ Removing and installing ⇒ Item 4 (page 128)
- ❑ When renewing, install with shim ⇒ Item 2 (page 114) of same thickness

2 - Shim

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

3 - Oil deflector plate

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

4 - Tapered roller bearing outer race

- ❑ For output shaft for 3rd – 6th gear
- ❑ Removing and installing ⇒ Item 4 (page 140)
- ❑ When renewing, install with shim ⇒ Item 5 (page 114) of same thickness

5 - Shim

- ❑ For output shaft for 3rd – 6th gear
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

6 - Circlip

- ❑ Insert in annular groove in clutch housing

7 - Roller bearing

- ❑ For input shaft
- ❑ Removing and installing ⇒ Item 2 (page 121)

8 - Bearing bush

- ❑ For selector rod
- ❑ Pulling out ⇒ page 115
- ❑ Installing ⇒ page 115

9 - Dowel sleeve

- ❑ 2x

10 - Clutch housing

11 - Input shaft oil seal

- ❑ Removing with input shaft installed ⇒ page 116
- ❑ With input shaft removed, use extractor lever -VW 681- to remove
- ❑ Driving in ⇒ page 116

12 - Oil seal

- ❑ Renewing with manual gearbox installed ⇒ page 168

13 - Washer

- ❑ For differential
- ❑ Installation position: Shoulder on inside diameter faces towards oil seal ⇒ Item 12 (page 114)

14 - Shim

- ❑ For differential
- ❑ Adjusting differential ⇒ page 191

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15 - Tapered roller bearing outer race

- ❑ For differential
- ❑ Removing and installing ⇒ Item 7 (page 185)
- ❑ When renewing, install with shim ⇒ Item 14 (page 115) of same thickness

16 - Oil deflector plate

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

17 - Shim

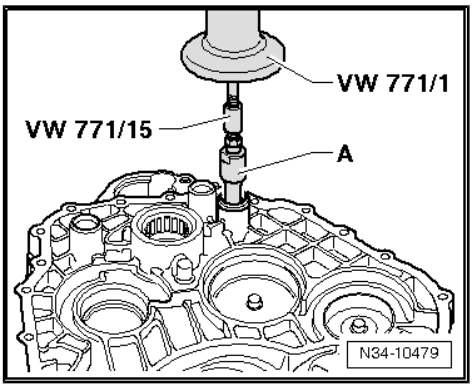
- ❑ For reverse gear output shaft
- ❑ Note thickness

18 - Tapered roller bearing outer race

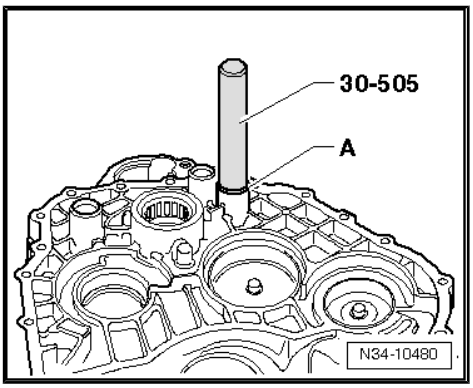
- ❑ For reverse gear output shaft
- ❑ Removing and installing ⇒ Item 4 (page 151)
- ❑ When renewing, install with shim ⇒ Item 17 (page 115) of same thickness

Pulling out selector rod bearing bush

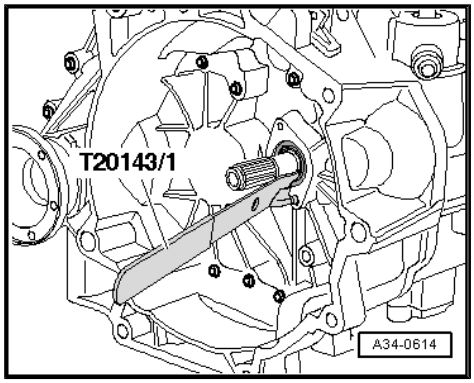
A - e. g. Internal puller -Kukko 21/3- 18.5 … 23.5 mm



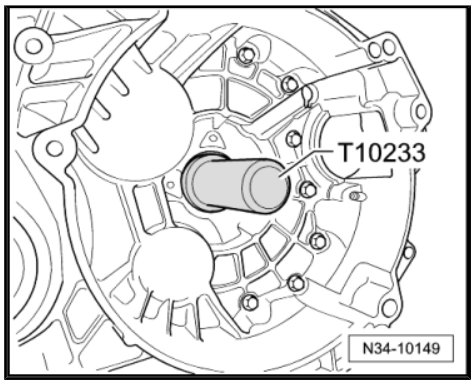
Driving in selector rod bearing bush -A- to stop



Removing input shaft oil seal



Drive in input shaft oil seal so it is flush.



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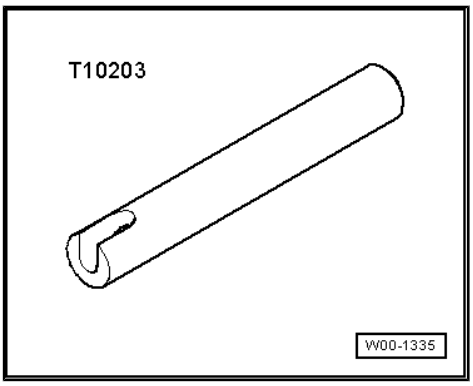
17 Servicing selector unit

Special tools and workshop equipment required

- Tube -T10203-



1 - Selector unit

- Consists of selector shaft and selector mechanism cover
- Components cannot be separated from each other

2 - O-ring

- Fit in circular slot on selector mechanism cover
- Lubricate with gear oil before installing
- Always renew

3 - Dowel sleeve

- For centring selector unit on gearbox housing.

4 - Oil seal for selector shaft

- Renewing ⇒ page 118

5 - Cap

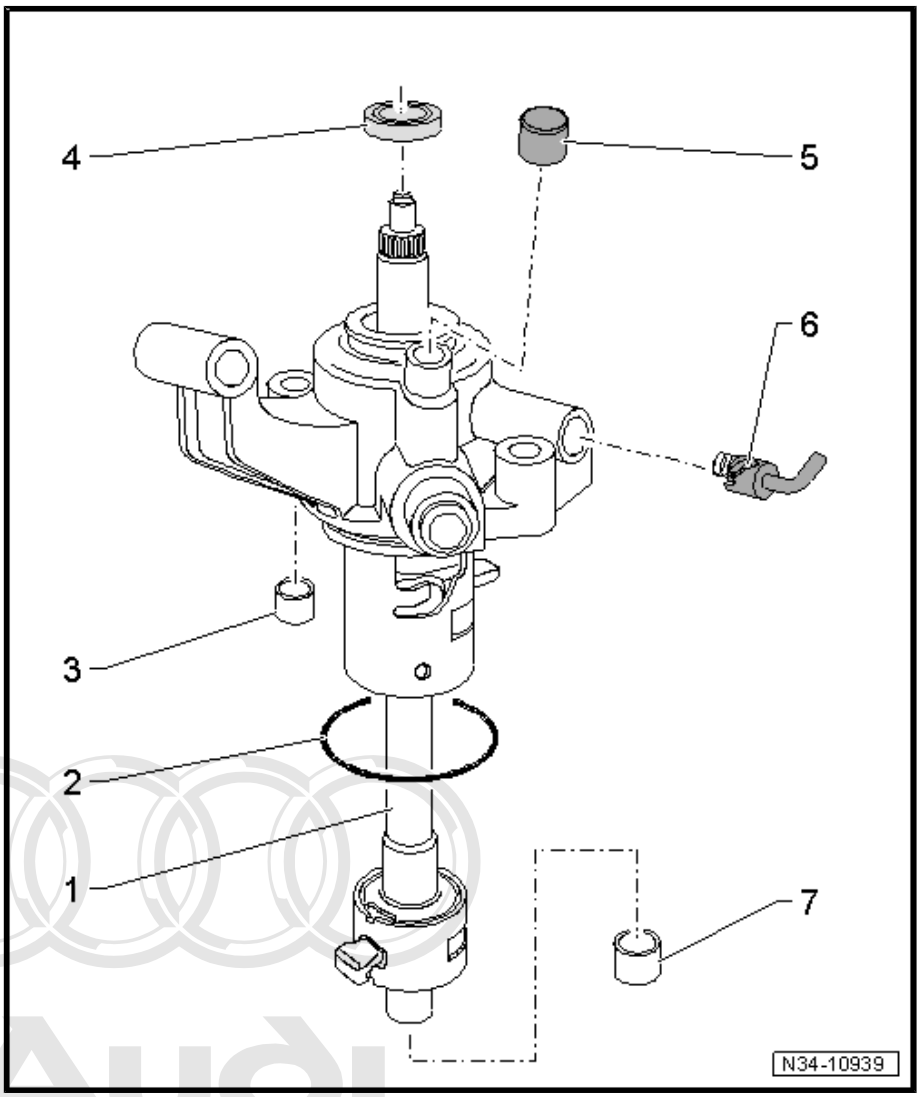
- For gearbox breather

6 - Locking pin

- For adjusting selector mechanism ⇒ page 58
- Removing ⇒ page 118
- Pressing in ⇒ page 118

7 - Bearing bush

- For selector shaft
- Renewing ⇒ Item 5 (page 110)



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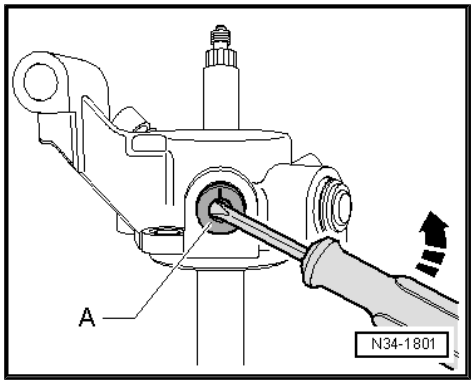
Removing locking pin -A- from selector mechanism cover

– Remove outer part of locking pin.

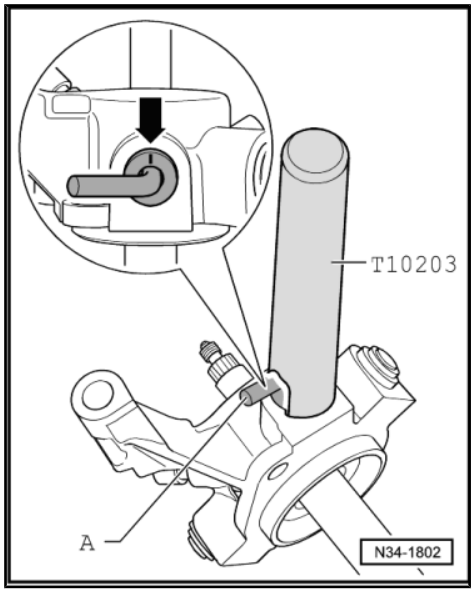
– Then lever out locking pin carefully using a screwdriver.



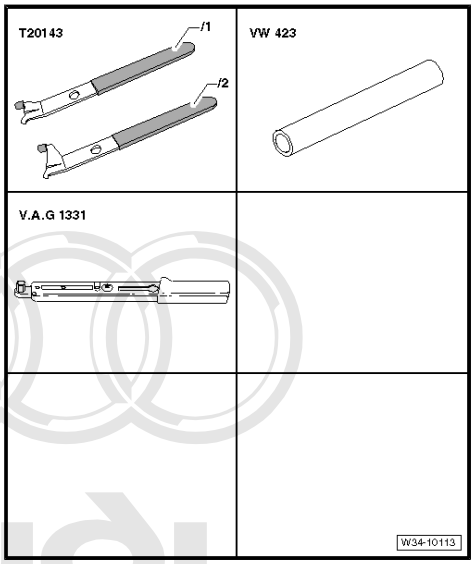
Pressing locking pin -A- into selector mechanism cover

Installation position:

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



17.1 Renewing selector shaft oil seal



Special tools and workshop equipment required

- Extractor tool -T20143/2-
- Tube -VW 423-
- Torque wrench -V.A.G 1331-

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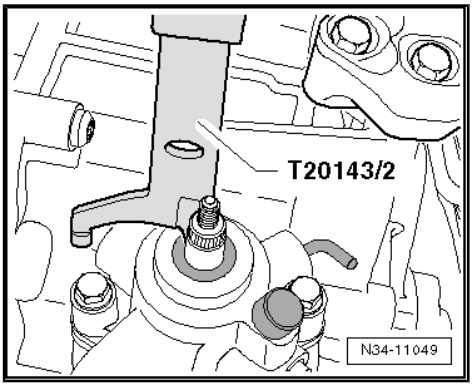
Removing

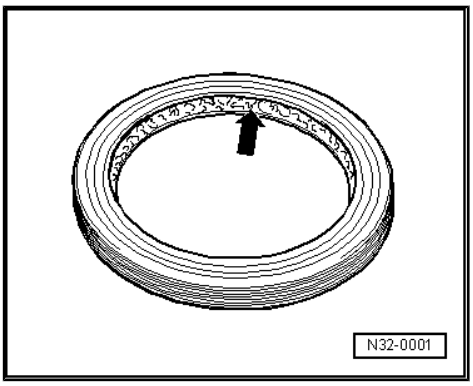
– Detach gate relay lever together with cable end-piece ⇒ page 56 .

– Remove gearbox selector lever ⇒ Item 2 (page 54) .
– Carefully lever out selector shaft oil seal.



Installing

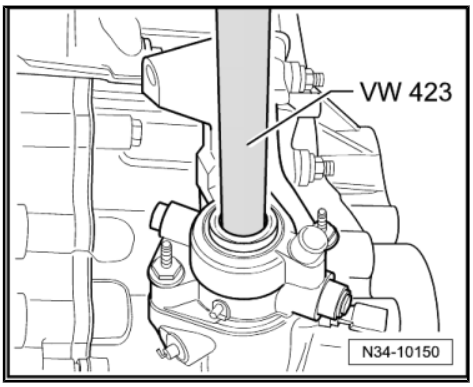
– Lightly oil outer circumference of new oil seal and half-fill space between sealing lips -arrow- with grease for radial oil seals -G 052 128 A1- .



– Drive in new oil seal to stop, taking care to keep oil seal straight.

• Lettering on seal must face outwards (to pressing tool).

– Install gearbox selector lever ⇒ Item 2 (page 54) .
– Install gate relay lever together with cable end-piece ⇒ page 56 .
– Check gearbox oil ⇒ page 85 .



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18 Exploded view - dismantling and assembling selector forks

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

2 - Bearing bush

- ❑ For selector rod
- ❑ Removing from and installing in gearbox housing ⇒ page 109
- ❑ Removing from and installing in clutch housing ⇒ page 113

3 - Damper rubber

- ❑ Installation position ⇒ page 120

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

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

6 - O-ring

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

7 - Mounting bracket

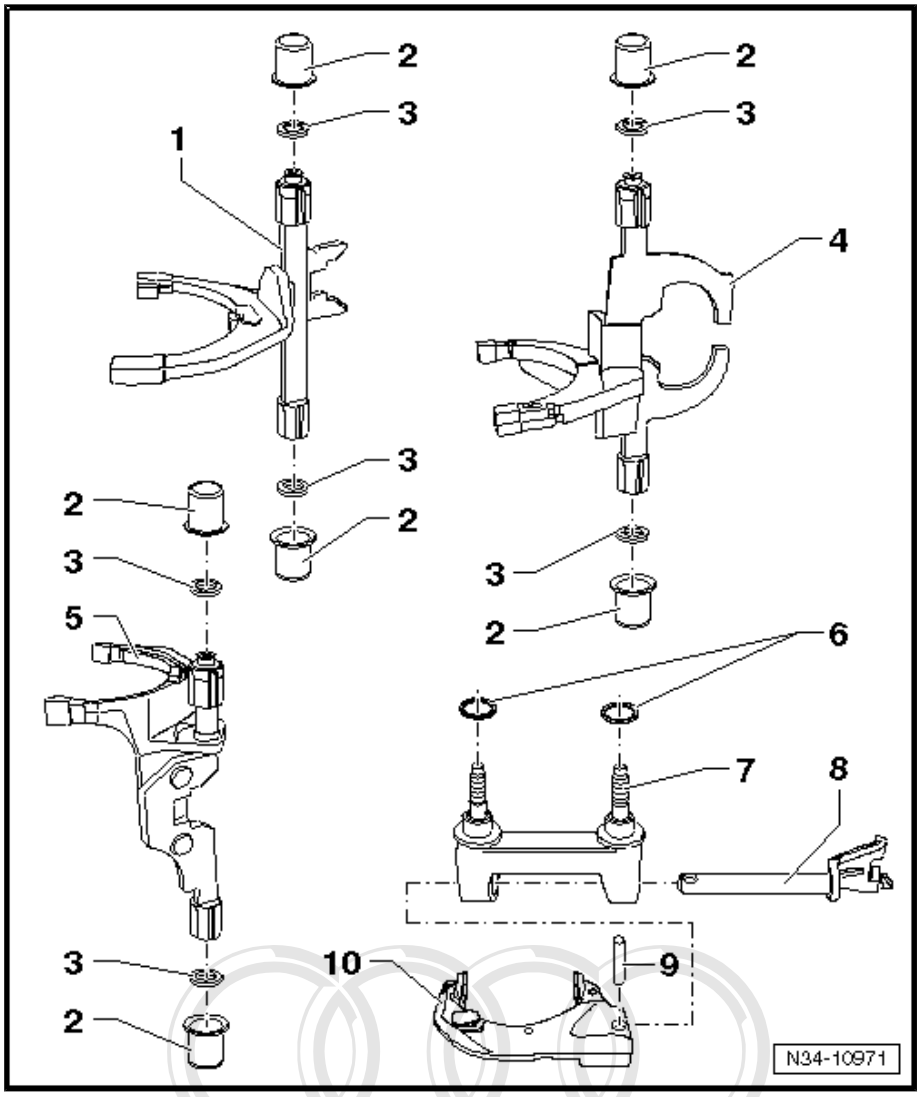
- ❑ For reverse gear selector fork

8 - Pivot pin

9 - Roll pin

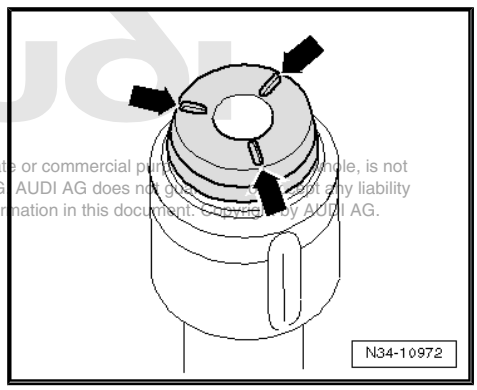
- ❑ Always renew
- ❑ Drive out and in with a drift

10 - Reverse gear selector fork



Installation position of damper rubber

Recesses -arrows- point away from selector fork



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35 – Gears, shafts

1 Exploded view - input shaft

Dismantling and assembling input shaft ⇒ page 122

Note

- *Lubricate all bearings on input shaft with gear oil before installing.*
- *Always renew grooved ball bearing* ⇒ *Item 16 (page 122).*

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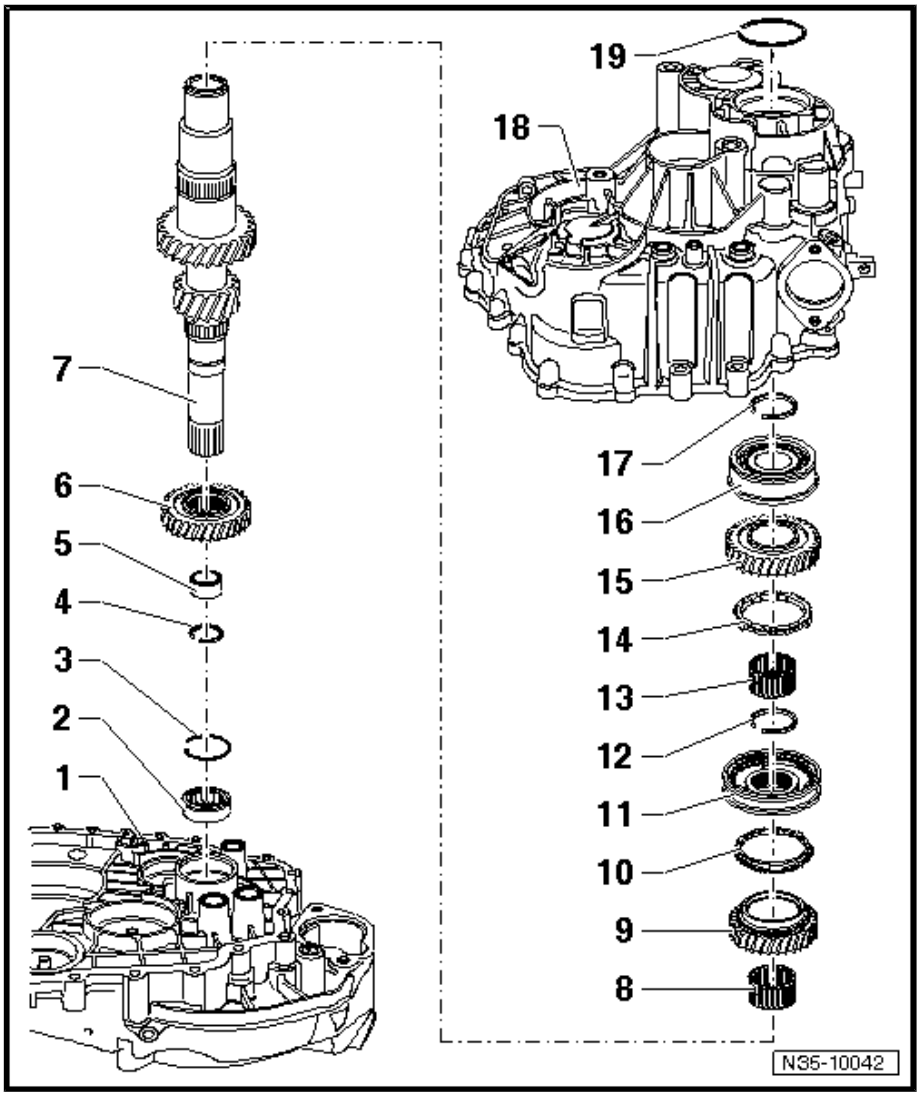

1 - Clutch housing

2 - Roller bearing

- ❑ Pulling out ⇒ page 123
- ❑ Pressing in ⇒ page 124
- ❑ Renewing together with roller bearing inner race ⇒ Item 5 (page 121)

3 - Circlip

- ❑ Insert in annular groove in clutch housing

4 - Circlip

- ❑ Secures roller bearing inner race

5 - Roller bearing inner race

- ❑ Pulling off ⇒ page 124
- ❑ Pressing on ⇒ page 125
- ❑ Renewing together with roller bearing ⇒ Item 2 (page 121)

6 - 4th gear wheel

- ❑ Pressing off ⇒ page 124
- ❑ Pressing on ⇒ page 125

7 - Input shaft

8 - Needle bearing

- ❑ For 5th gear

9 - 5th speed selector gear

10 - 5th gear synchro-ring

- ❑ Checking for wear ⇒ page 126

11 - Locking collar with synchronising hub for 5th and 6th gear

- ❑ After removing circlip, press off with 5th speed selector gear ⇒ page 126 .
- ❑ Dismantling ⇒ page 126
- ❑ Assembling locking collar/synchronising hub ⇒ page 126
- ❑ Installation position ⇒ page 127
- ❑ Pressing on ⇒ page 127

12 - Circlip

13 - Needle bearing

- ❑ For 6th gear

14 - 6th gear synchro-ring

- ❑ Checking for wear ⇒ page 126

15 - 6th speed selector gear

16 - Grooved ball bearing

- ❑ Always renew
- ❑ After removing circlip, press off with 6th speed selector gear ⇒ page 125
- ❑ Installation position ⇒ page 127
- ❑ Pressing on ⇒ page 127

17 - Circlip

18 - Gearbox housing

19 - Circlip

- ❑ For grooved ball bearing on input shaft

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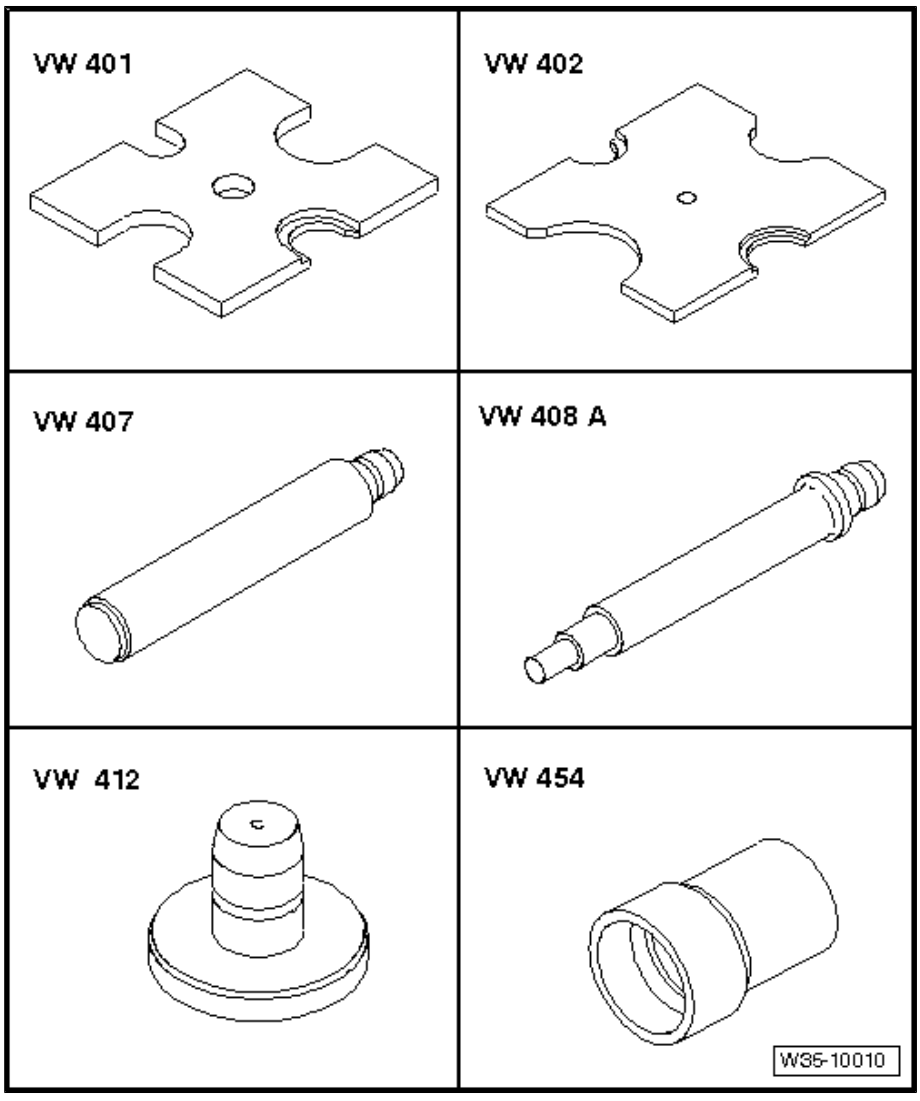
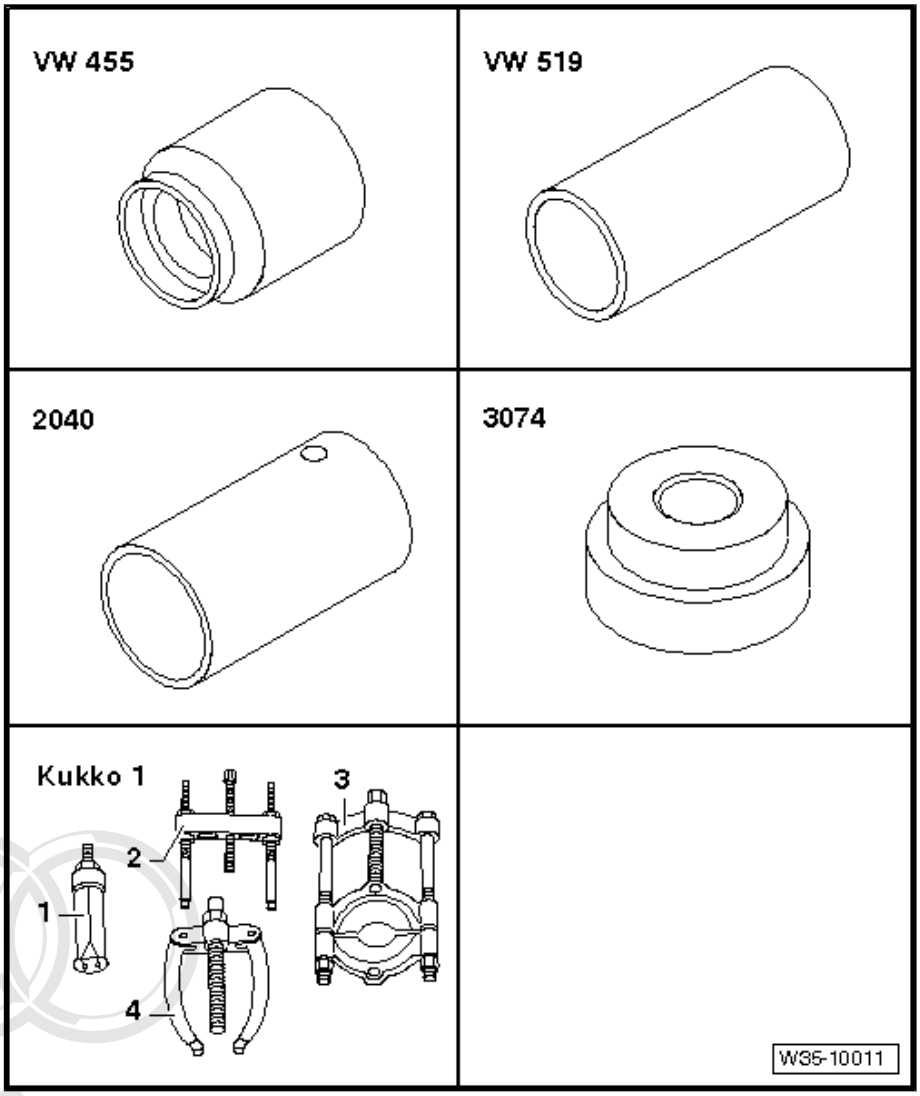
1.1 Dismantling and assembling input shaft

Special tools and workshop equipment required

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



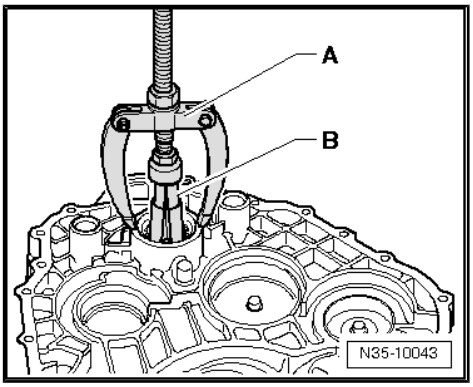
- Installing sleeve -VW 455-
- Tube -VW 519-
- Tube -2040-
- Thrust plate -3074-
- -1- Internal puller 37...46 mm , e.g. -Kukko 21/6-
- -2- Puller , e.g. -Kukko 18/1-
- -3- Splitter 22...75 mm , e.g. -Kukko 17/1-
- -3- Splitter 22...115 mm , e.g. -Kukko 17/2-
- -4- Counter support , e.g. -Kukko 22/2-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



Removing circlip and pulling roller bearing out of clutch housing.

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

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



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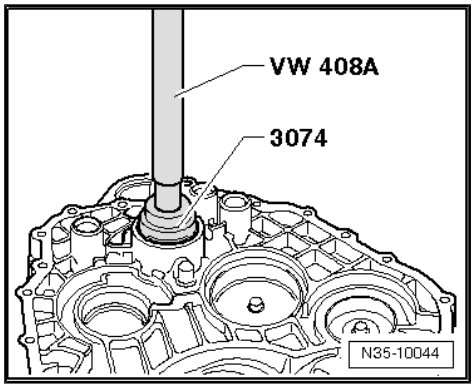
Pressing roller bearing into clutch housing

– Install circlip for roller bearing.

–



Pulling off inner race -D- for roller bearing.

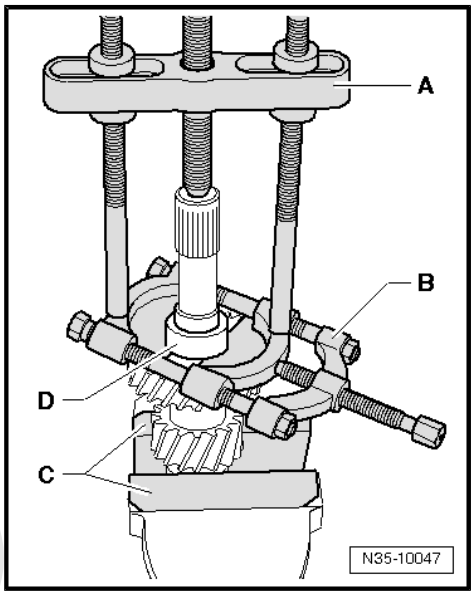
– Clamp input shaft in vice with protective jaw covers -C-.

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

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

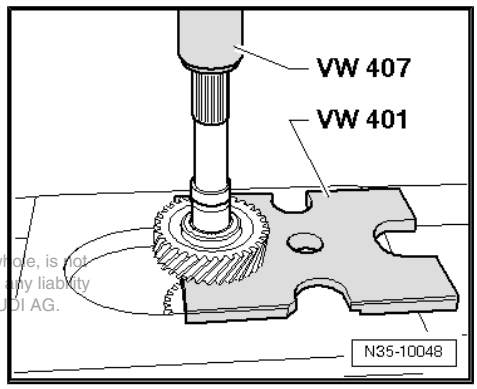
Note

Inner race for roller bearing can also be pressed off together with 4th gear wheel *⇒ page 124* *.*



Pressing off 4th gear wheel

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



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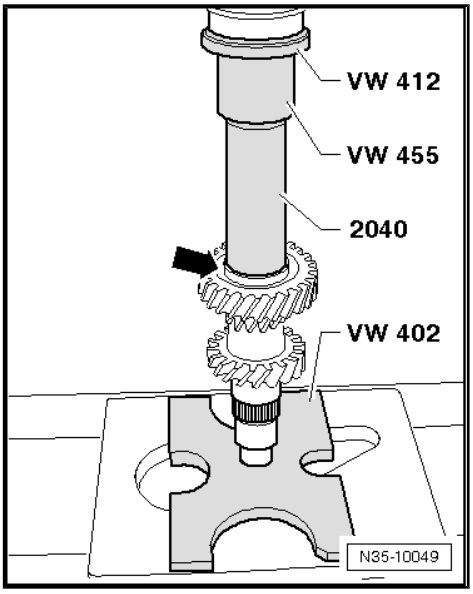
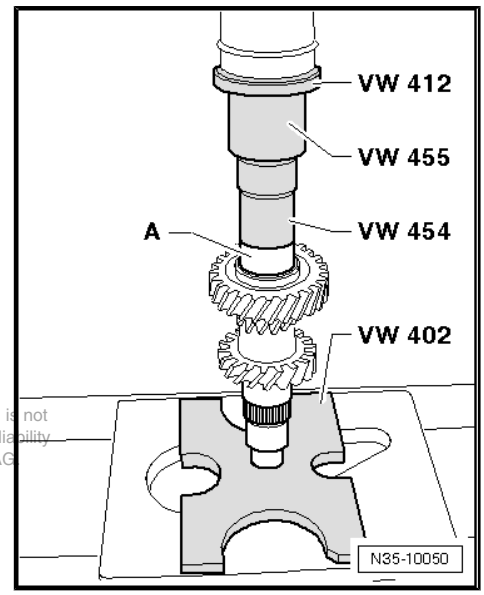
Pressing on 4th gear wheel



Pressing on inner race -A- for roller bearing

– Fit circlip.



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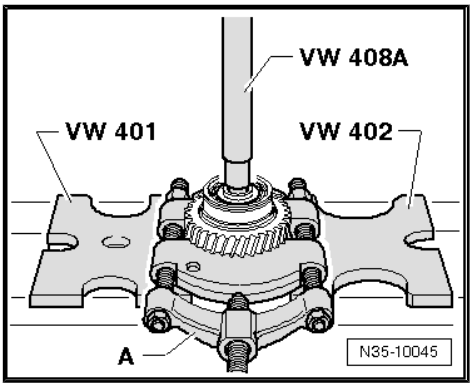
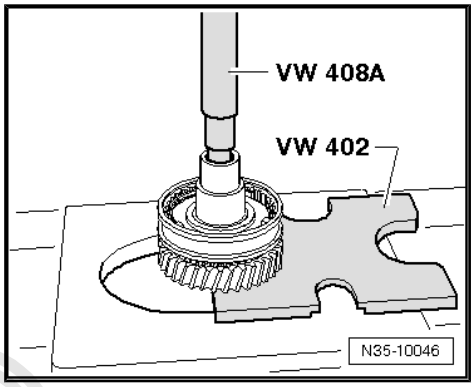
Removing circlip and pressing off grooved ball bearing with 6th speed selector gear

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

– Remove circlip.



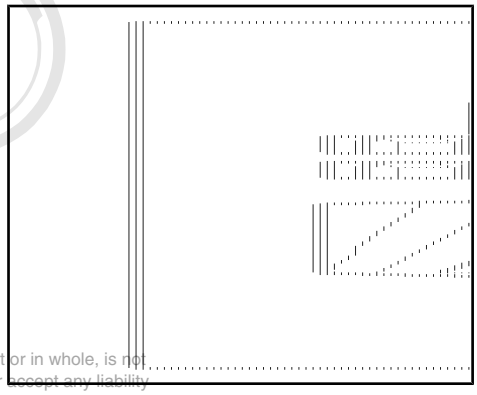
Pressing off synchronising hub and locking collar for 5th and 6th gears with 5th speed selector gear



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

– Press synchro-ring onto tapered seat on selector gear and measure gap -a- with a feeler gauge.

Gap -a-	Installation depth	Wear limit
5th and 6th gear	1.0 ... 1.9 mm	0.5 mm



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Dismantling and assembling locking collar and synchronising hub for 5th and 6th gears

1 - Spring

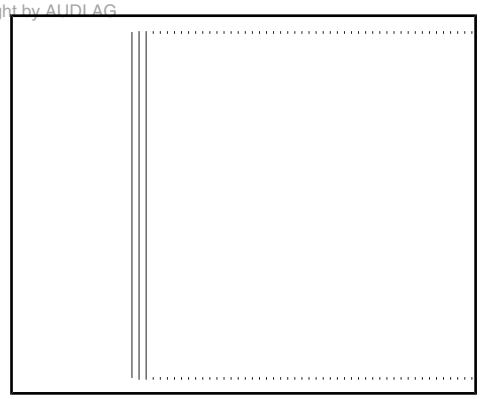
2 - Locking piece

3 - Locking collar

4 - Synchronising hub

– Push locking collar over synchronising hub.

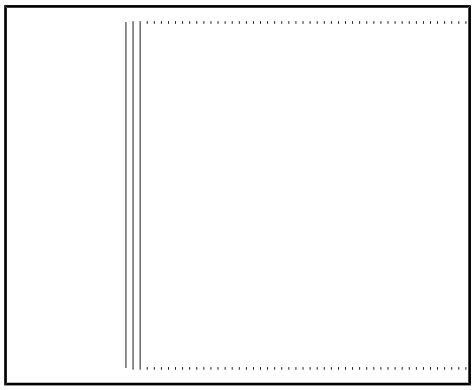
Recesses for locking pieces in synchronising hub and locking collar must align.



Assembling locking collar with synchronising hub for 5th and 6th gears

Locking collar is pushed over synchronising hub.

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

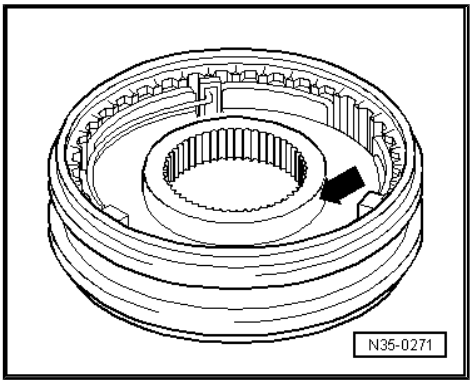


Installation position of 5th and 6th gear locking collar and synchronising hub

High shoulder of synchronising hub -arrow- faces 5th gear.

– Fit needle bearing.

– Install 5th speed selector gear with synchro-ring.



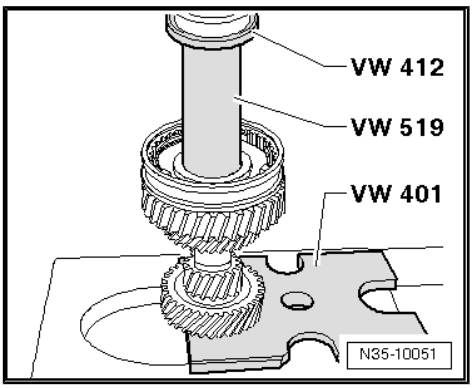
Pressing on locking collar with synchronising hub for 5th and 6th gears

– Fit circlip.

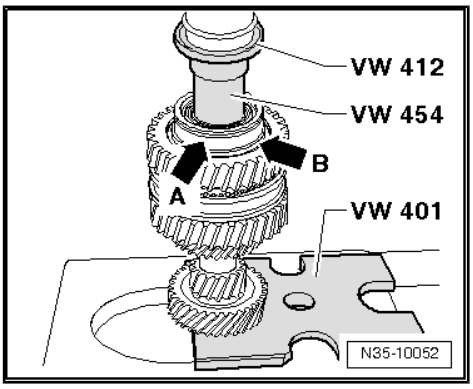
– Fit needle bearing.

– Install 6th speed selector gear with synchro-ring.

• Installation position of grooved ball bearing: groove for circlip faces upwards -arrow A- and shoulder -arrow B- must face 6th speed selector gear.



Pressing on grooved ball bearing



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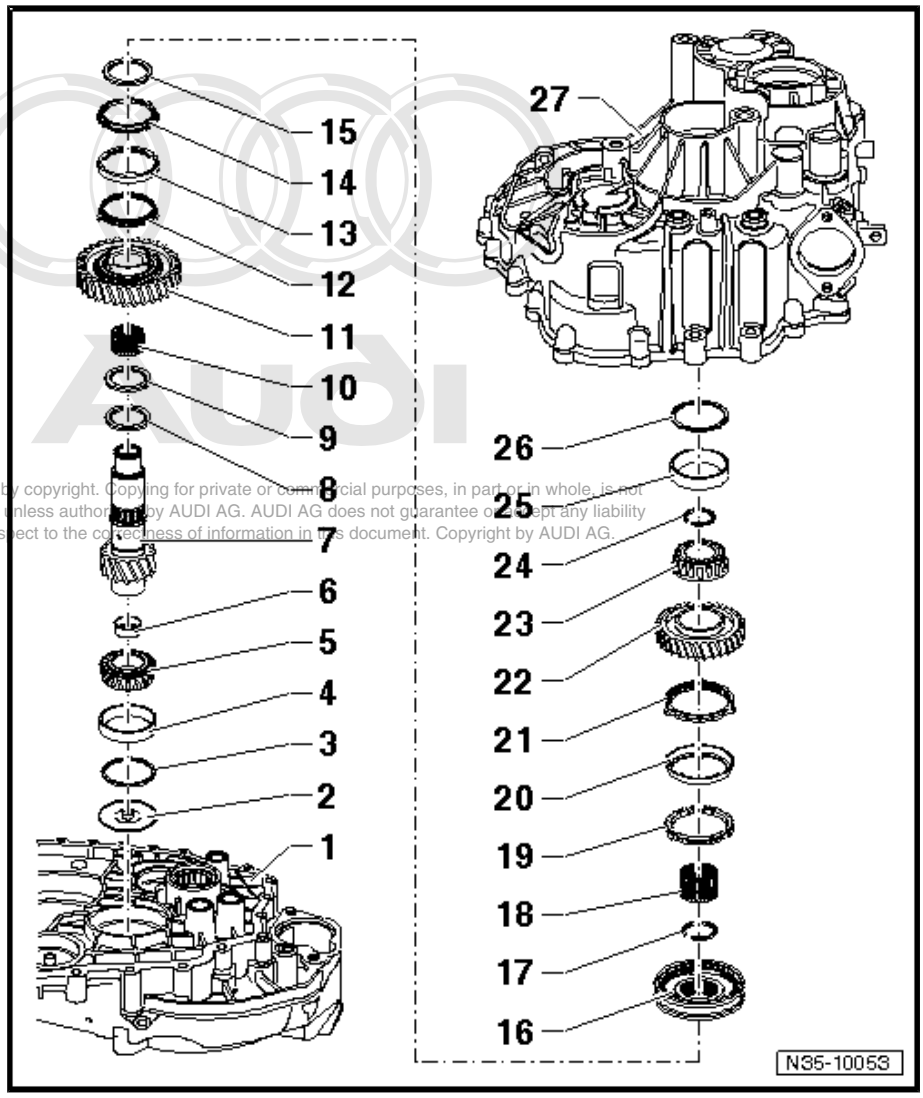
2 Exploded view - output shaft for 1st and 2nd gear

Dismantling and assembling output shaft for 1st and 2nd gear
⇒ page 130

Note

- *The output shaft is not available as a spare part.*
- *If the tapered roller bearings are renewed, install new shims of the same thickness as the old ones.*



1 - Clutch housing

2 - Oil deflector plate

3 - Shim
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

4 - Tapered roller bearing outer race
- ❑ Pulling out ⇒ page 139
- ❑ Pressing in ⇒ page 139

5 - Tapered roller bearing inner race
- ❑ Pressing off ⇒ page 138
- ❑ Pressing on ⇒ page 138

6 - Dished washer
- ❑ Pulling out ⇒ page 133
- ❑ Pressing in ⇒ page 133

7 - Output shaft
- ❑ For 1st and 2nd gear

8 - Thrust washer
- ❑ For needle bearing
- ❑ Removing from output shaft ⇒ page 134
- ❑ Pressing on ⇒ page 134

9 - Axial needle bearing
- ❑ Installation position ⇒ page 134

10 - Needle bearing
- ❑ For 1st gear

11 - 1st speed selector gear
- ❑ With idler gear for reverse gear on opposite side

12 - Synchro-ring
- ❑ (Inner ring for 1st gear)
- ❑ Checking for wear ⇒ page 135

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- ❑ Check lugs for scoring
- ❑ Installation position ⇒ page 135

13 - Outer ring for 1st gear

- ❑ Renew if scored or if there are visible traces of wear
- ❑ Installation position ⇒ page 135
- ❑ Place on synchro-ring ⇒ Item 12 (page 128)

14 - 1st gear synchro-ring

- ❑ Checking for wear ⇒ page 135
- ❑ Installation position ⇒ page 135

15 - Axial needle bearing

- ❑ Installation position ⇒ page 134

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

- ❑ Press off together with 1st speed selector gear after removing circlip ⇒ Item 17 (page 129) ⇒ page 134
- ❑ Dismantling ⇒ page 135
- ❑ Assembling locking collar/synchronising hub ⇒ page 135
- ❑ Installation position ⇒ page 136
- ❑ Pressing on ⇒ page 136

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17 - Circlip

18 - Needle bearing

- ❑ For 2nd gear

19 - 2nd gear synchro-ring

- ❑ Checking for wear ⇒ page 135
- ❑ Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ Item 16 (page 129)

20 - Outer ring for 2nd gear

- ❑ Renew if scored or if there are visible traces of wear
- ❑ Installation position ⇒ page 136
- ❑ Insert in synchro-ring ⇒ Item 19 (page 129)

21 - Synchro-ring

- ❑ (Inner ring for 2nd gear)
- ❑ Check lugs for scoring
- ❑ Checking for wear ⇒ page 135
- ❑ Installation position ⇒ page 137

22 - 2nd speed selector gear

- ❑ Installation position ⇒ page 137

23 - Tapered roller bearing inner race

- ❑ Pull off together with 2nd speed selector gear ⇒ page 133
- ❑ Pressing on ⇒ page 137

24 - Circlip

25 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 137
- ❑ Pressing in ⇒ page 138

26 - Shim

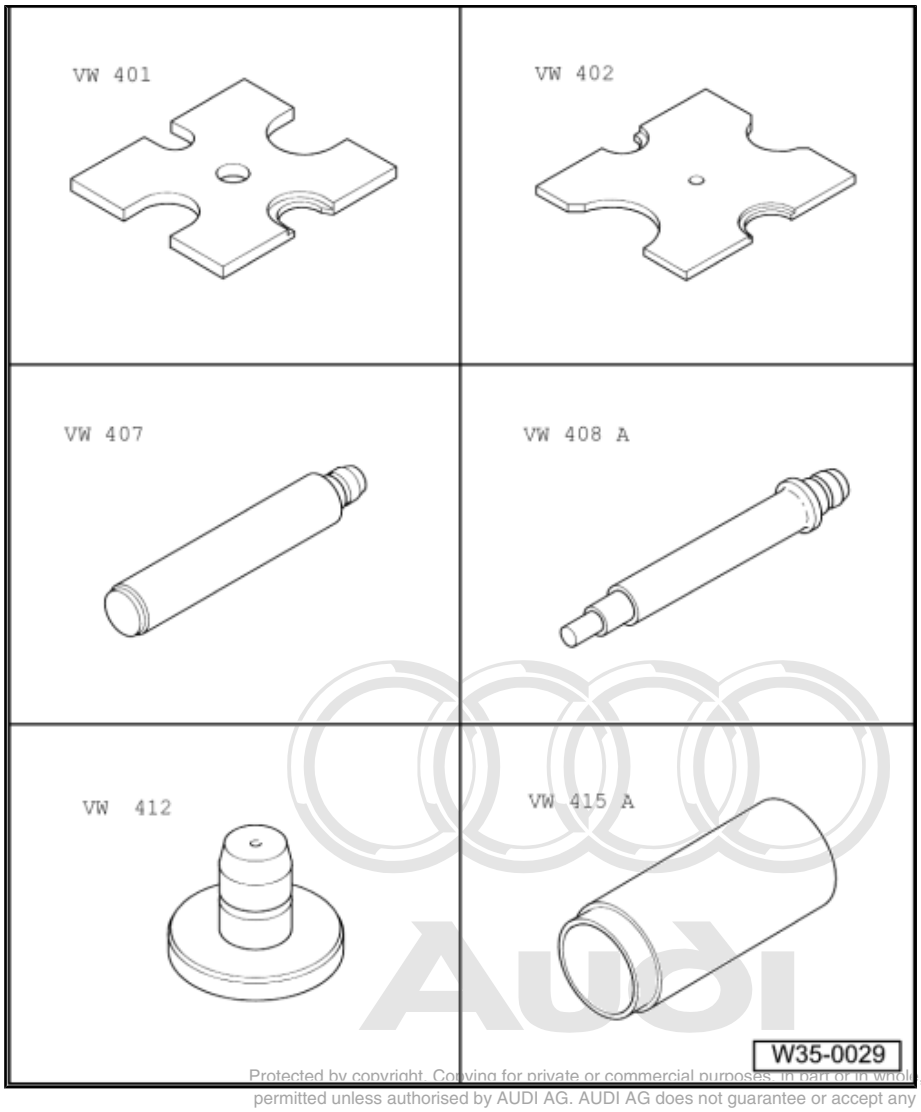
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

27 - Gearbox housing

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

Special tools and workshop equipment required

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



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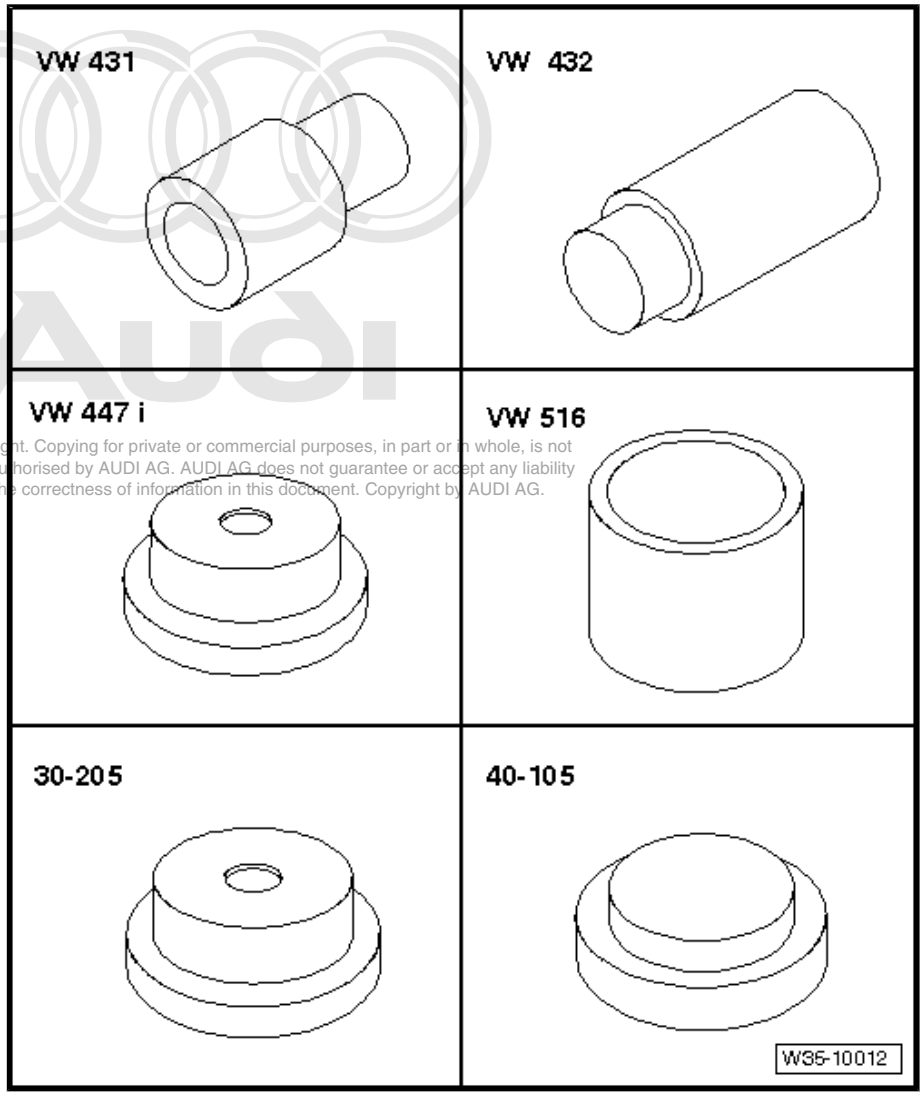
- Press tool -VW 431-
- Press tool -VW 432-
- Thrust plate -VW 447 i-
- Tube -VW 516-
- Thrust plate -30 - 205-
- Thrust plate -40 - 105-



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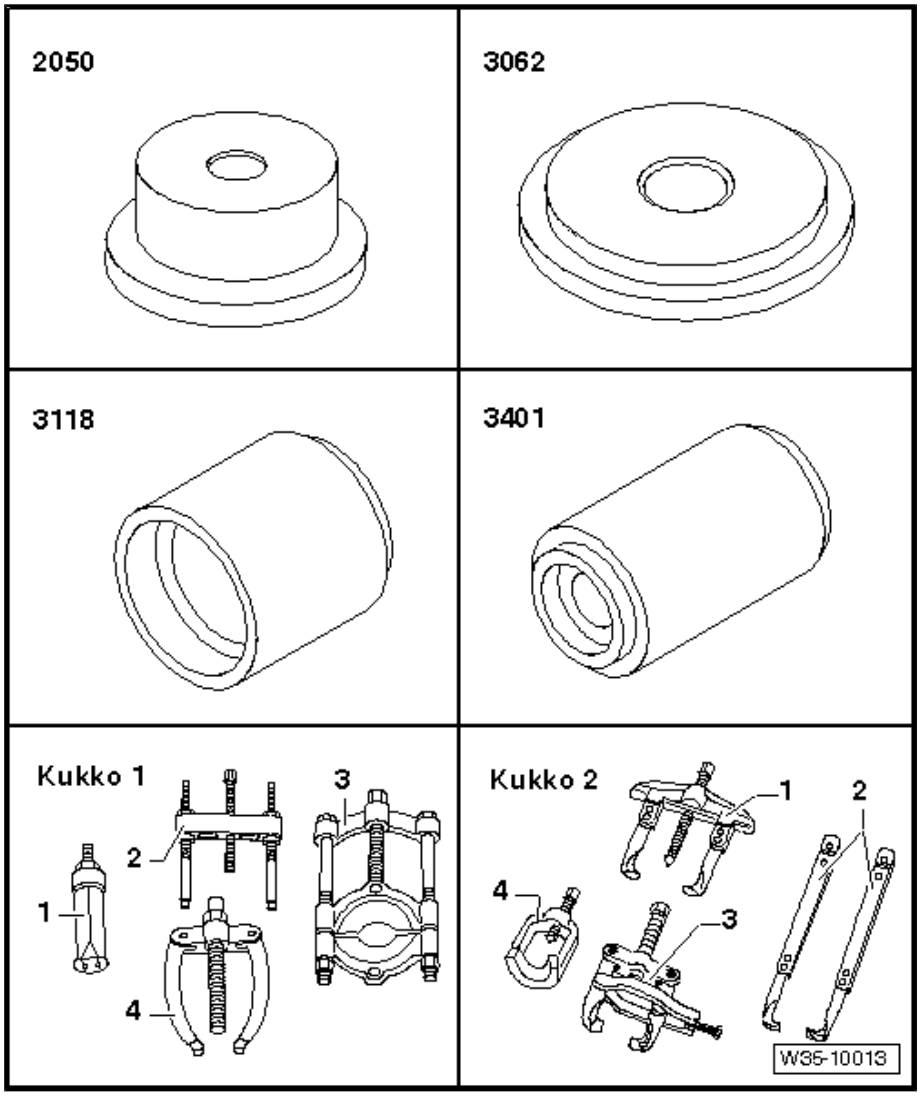
- Thrust piece -2050-
- Thrust pad -3062-
- Press tool -3118-
- Thrust piece -3401-
- -1- Internal puller 14.5...18.5 mm , e.g. -Kukko 21/2-
- -1- Internal puller 46...58 mm , e.g. -Kukko 21/7-
- -1- Internal puller 56...110 mm , e.g. -Kukko 21/89-
- -3- Splitter 22...115 mm , e.g. -Kukko 17/2-
- -4-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



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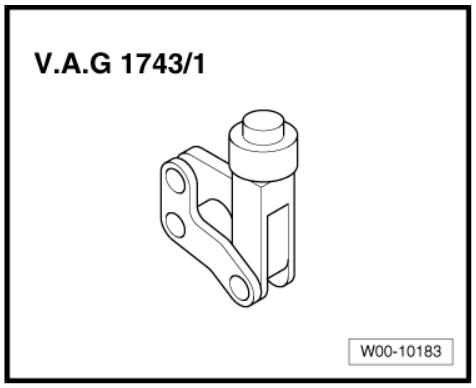
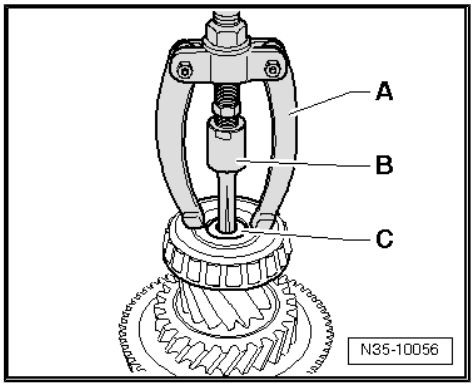
♦ Thrust piece - T10266-





Pulling dished washer -C- out of output shaft

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

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

Note

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

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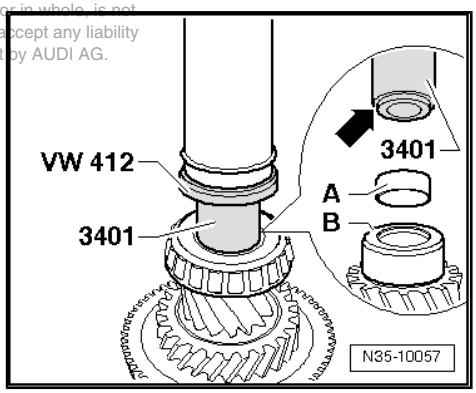
Pressing dished washer -A- into output shaft -B- as far as stop of tool

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

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

–



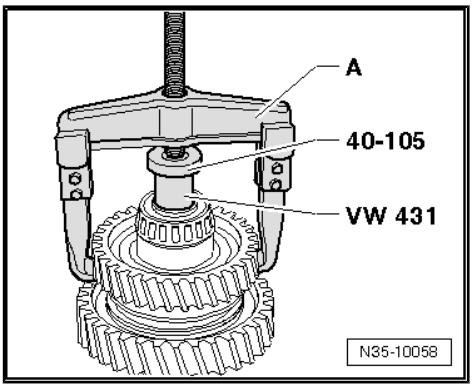
Pulling off tapered roller bearing inner race with 2nd speed selector gear

– Shift locking collar for 1st and 2nd gear to 1st gear.

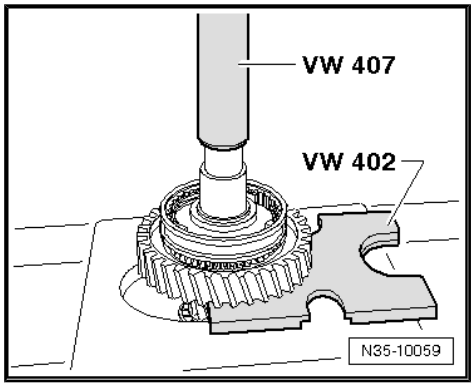
– Apply puller hooks behind constant mesh teeth of 2nd speed selector gear (not dog teeth).

A - e.g. two arm puller -Kukko 20/10-

– Remove circlip.



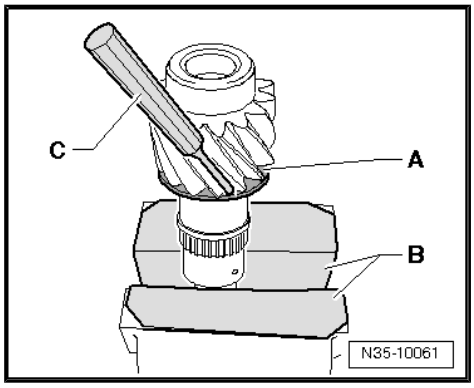
Pressing off 1st and 2nd gear synchronising hub and locking collar with 1st speed selector gear



Note

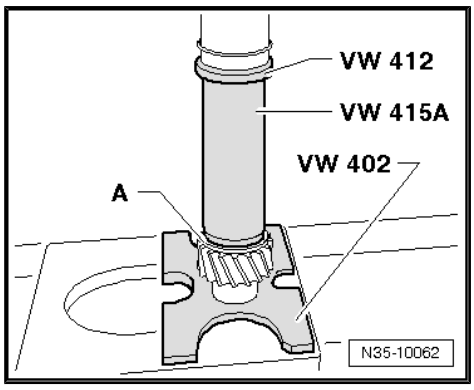
Depending on the fit between the synchronising hub and the output shaft, these parts can be removed by hand in some gearboxes.

Driving off thrust washer -A- for axial needle bearing

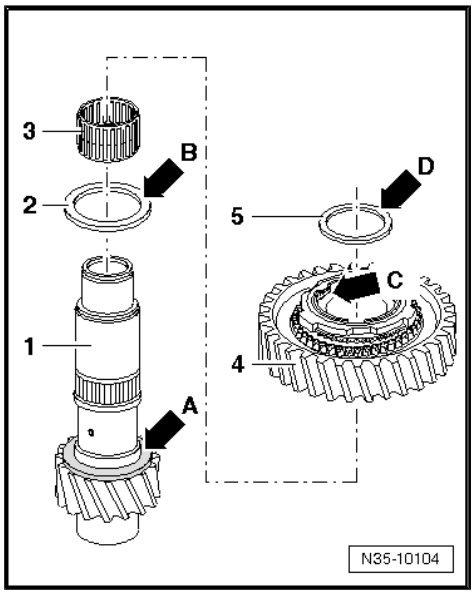


- Clamp output shaft in vice with protective jaw covers -B-.
- Applying a drift -C- on alternate sides, drive thrust washer off output shaft. Take care not to damage gear teeth.

Pressing on thrust washer -A- for axial needle bearing



Installation position of axial needle bearings



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

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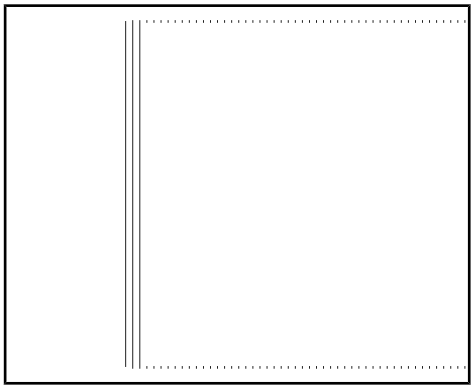
Checking 1st and 2nd gear inner ring for wear

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

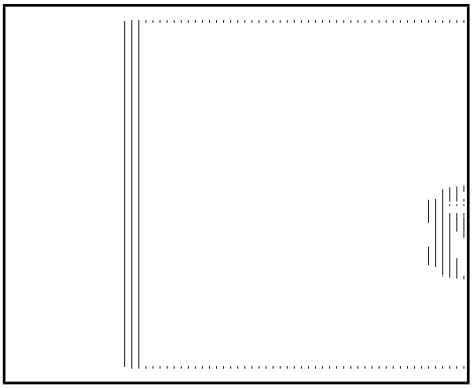
Gap -a-	Installation depth	Wear limit
1st and 2nd gear	0.75 ... 1.25 mm	0.3 mm



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

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

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



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

– Place inner ring -A- on 1st speed selector gear.

• The angled lugs -arrows 1- point towards outer ring -B-.

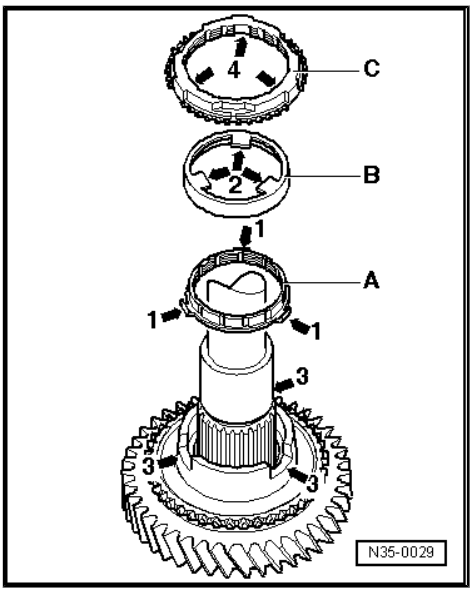
– Fit outer ring -B-.

• Lugs -arrows 2- engage in slots -arrows 3- on selector gear.

– Fit synchro-ring -C-.

• Slots -arrows 4- engage on lugs -arrows 1- on inner ring -A-.

– Fit smaller axial needle bearing (outer diameter 58.7 mm) -5- on 1st speed selector gear ⇒ page 134 .



Dismantling and assembling locking collar and synchronising hub for 1st and 2nd gears

– Take off springs -1- before dismantling.

1 - Spring

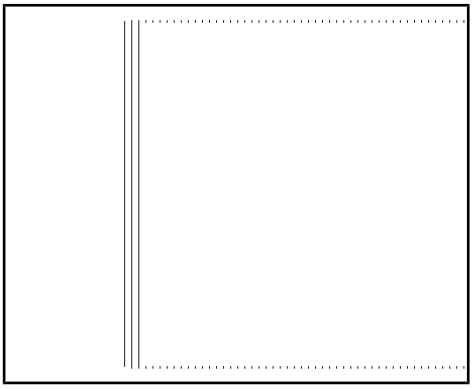
2 - Locking piece

3 - Locking collar “installation position” ⇒ page 136

4 - Synchronising hub “installation position” ⇒ page 136

– To assemble, slide locking collar over synchronising hub.

• Installation position: Narrower recesses in synchronising hub align with recesses in locking collar



Installation position of locking collar

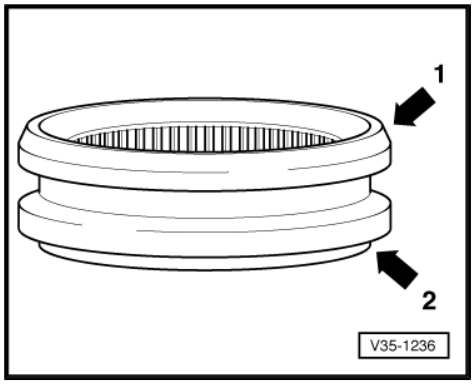
Chamfer -arrow 1- faces lower shoulder of synchronising hub.

Shoulder -arrow 2- faces higher shoulder of synchronising hub.

- Locking collar is pushed over synchronising hub.

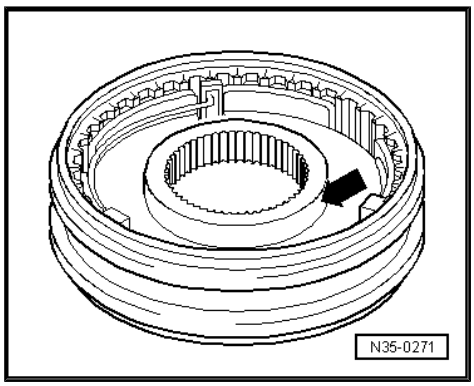
– Insert locking pieces and install springs offset at 120°.

- Angled end of spring must locate in hollow locking piece.



Installation position of 1st and 2nd gear locking collar and synchronising hub

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



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

Insert 2nd gear synchro-ring so that notches engage in locking pieces of locking collar ⇒ Item 16 (page 129)

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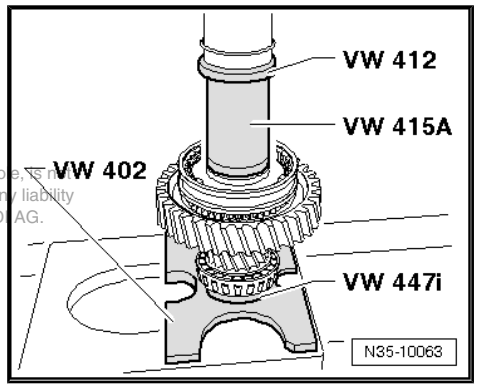
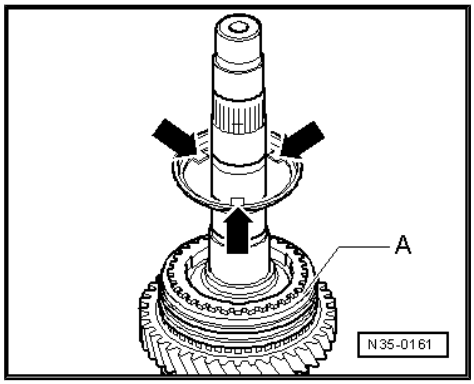


Installation position of 2nd gear outer ring

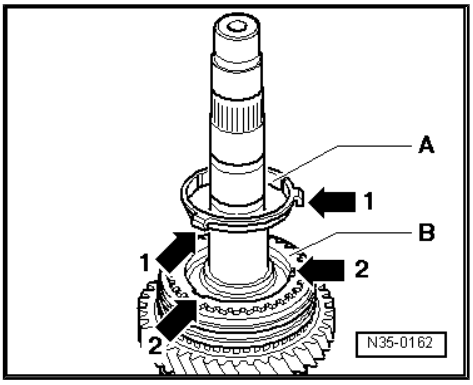
Lugs -arrows- face towards synchronising hub/locking collar -A-.



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

Lugs -arrows 1- locate in the recesses -arrows 2- in the synchro-ring -B-.

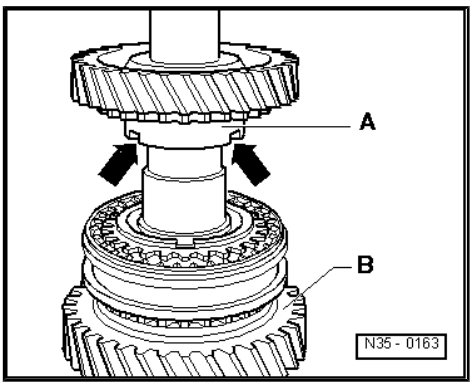
– Fit needle bearing for 2nd speed selector gear.



Installation position of 2nd speed selector gear

The higher shoulder -A- faces towards 1st gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ⇒ page 136 .

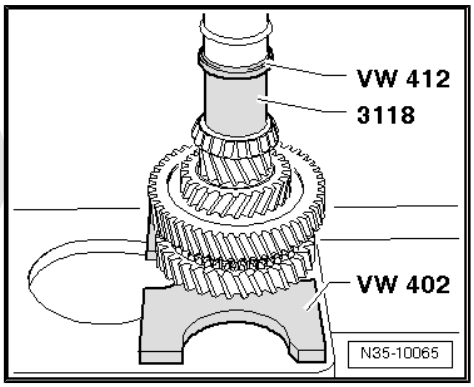
– Press on tapered roller bearing inner race for bearing in clutch housing ⇒ page 138 .



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

Note

Pulling off tapered roller bearing inner race for bearing in gearbox housing ⇒ page 133

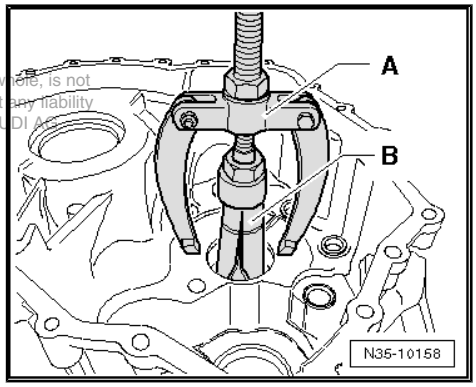


Pulling tapered roller bearing outer race out of gearbox housing

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

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

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



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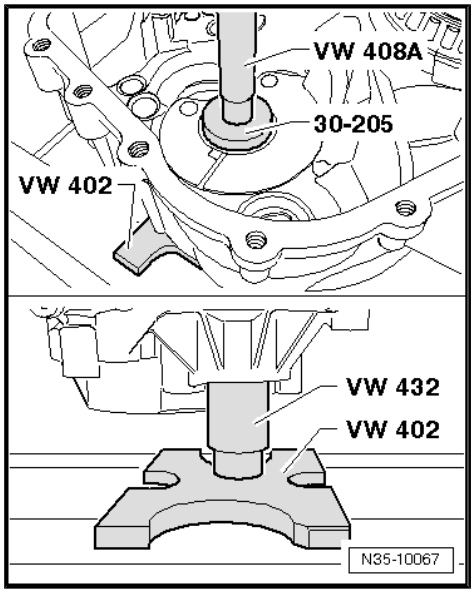
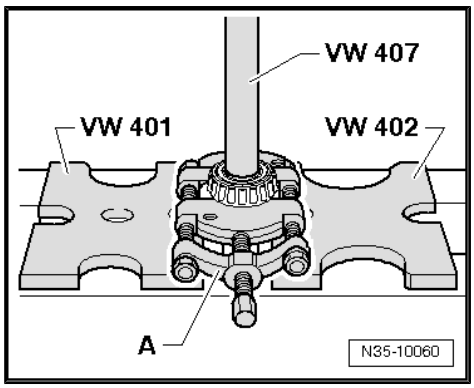
Pressing tapered roller bearing outer race into gearbox housing

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



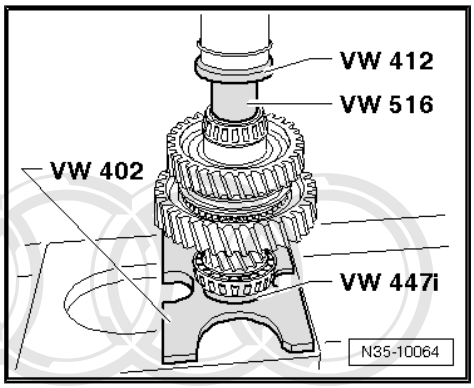
Pressing off tapered roller bearing inner race for bearing in clutch housing

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



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

– Fit circlip.



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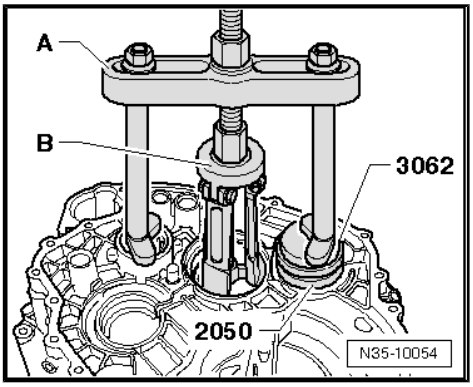
Pulling tapered roller bearing outer race out of clutch housing

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

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



Note

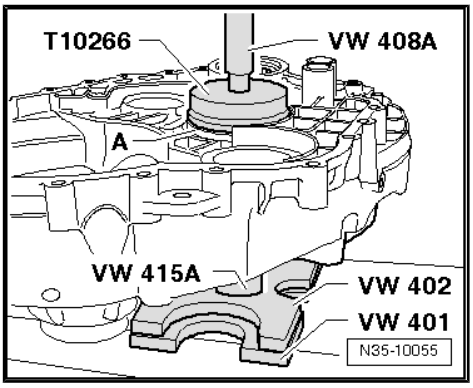
- *In order to apply internal puller -B-, collar of oil deflector must first be bent over with a drift. Renew damaged oil deflector.*
- *After pulling out, renew damaged shim.*

– Fit new oil deflector.

– Fit new shim with previous value under outer race.

Pressing tapered roller bearing outer race into clutch housing

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



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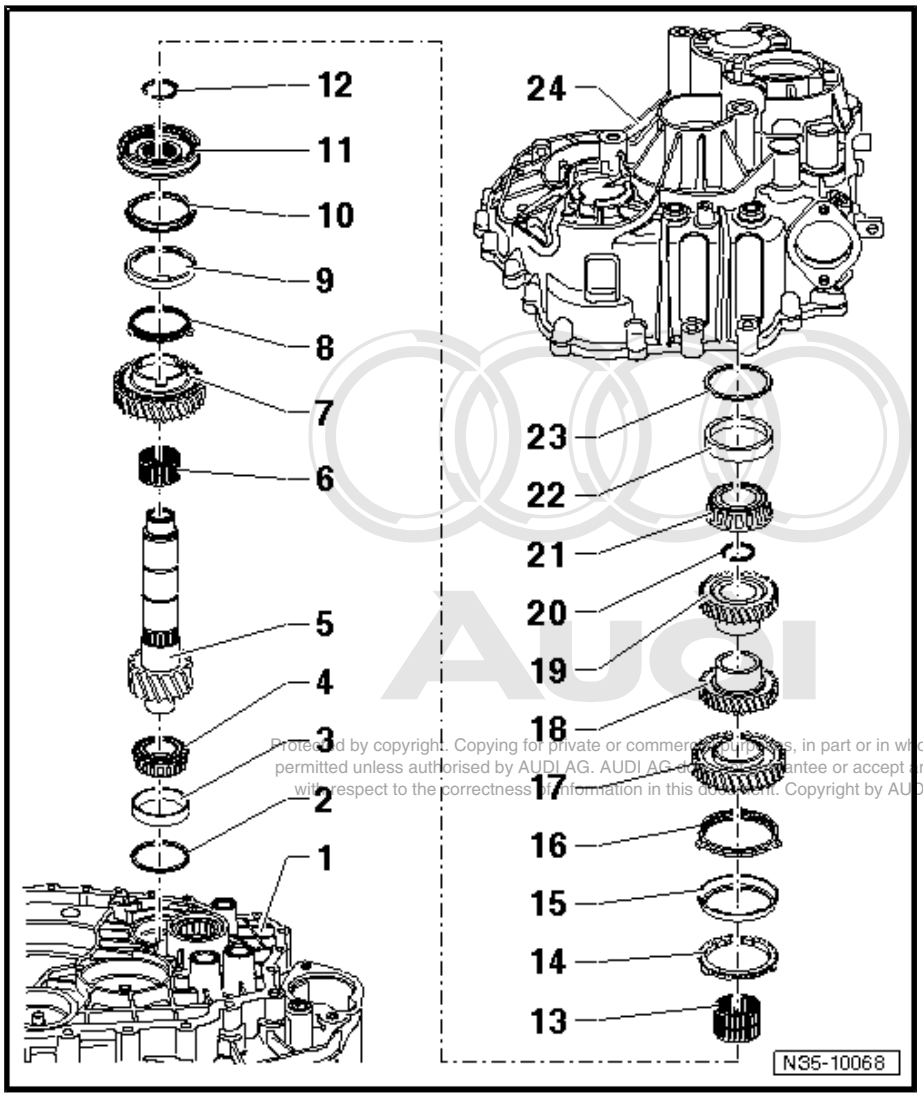
3 Exploded view - output shaft for 3rd – 6th gear

Dismantling and assembling output shaft for 3rd – 6th gear
⇒ page 142

Note

- *The output shaft is not available as a spare part.*
- *If the tapered roller bearings are renewed, install new shims of the same thickness as the old ones.*



1 - Clutch housing

2 - Shim
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

3 - Tapered roller bearing outer race
- ❑ Pulling out ⇒ page 150
- ❑ Pressing in ⇒ page 150

4 - Tapered roller bearing inner race
- ❑ Pulling off ⇒ page 150
- ❑ Pressing on ⇒ page 150

5 - Output shaft
- ❑ For 3rd and 4th gear

6 - Needle bearing
- ❑ For 4th gear

7 - 4th speed selector gear

8 - Synchro-ring
- ❑ (Inner ring for 4th gear)
- ❑ Checking for wear ⇒ page 146
- ❑ Check lugs for scoring
- ❑ Installation position ⇒ page 146

9 - Outer ring for 4th gear
- ❑ Renew if scored or if there are visible traces of wear
- ❑ Installation position ⇒ page 146
- ❑ Place on synchro-ring ⇒ Item 8 (page 140)

10 - 4th gear synchro-ring
- ❑ Checking for wear ⇒ page 146
- ❑ Installation position ⇒ page 146

11 - Locking collar with synchronising hub for 3rd and 4th gear
- ❑ Press off together with 4th speed selector gear after removing circlip ⇒ Item 12 (page 141) ⇒ page 146

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- ❑ Dismantling and assembling ⇒ page 147
- ❑ Assembling locking collar/synchronising hub ⇒ page 147
- ❑ Installation position ⇒ page 147
- ❑ Pressing on ⇒ page 147

12 - Circlip

13 - Needle bearing

- ❑ For 3rd gear

14 - 3rd gear synchro-ring

- ❑ Checking for wear ⇒ page 146
- ❑ Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ Item 11 (page 140)

15 - Outer ring for 3rd gear

- ❑ Renew if scored or if there are visible traces of wear
- ❑ Installation position ⇒ page 148
- ❑ Insert in synchro-ring ⇒ Item 14 (page 141)

16 - Synchro-ring

- ❑ (Inner ring for 3rd gear)
- ❑ Installation position ⇒ page 148
- ❑ Checking for wear ⇒ page 146
- ❑ Check lugs for scoring

17 - 3rd speed selector gear

- ❑ Installation position ⇒ page 148

18 - 5th gear wheel

- ❑ Press off with 3rd speed selector gear ⇒ page 145
- ❑ Pressing on ⇒ page 148

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19 - 6th gear wheel

- ❑ Pressing off ⇒ page 145
- ❑ Pressing on ⇒ page 149

20 - Circlip

21 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 145
- ❑ Pressing on ⇒ page 149

22 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 149
- ❑ Pressing in ⇒ page 149

23 - Shim

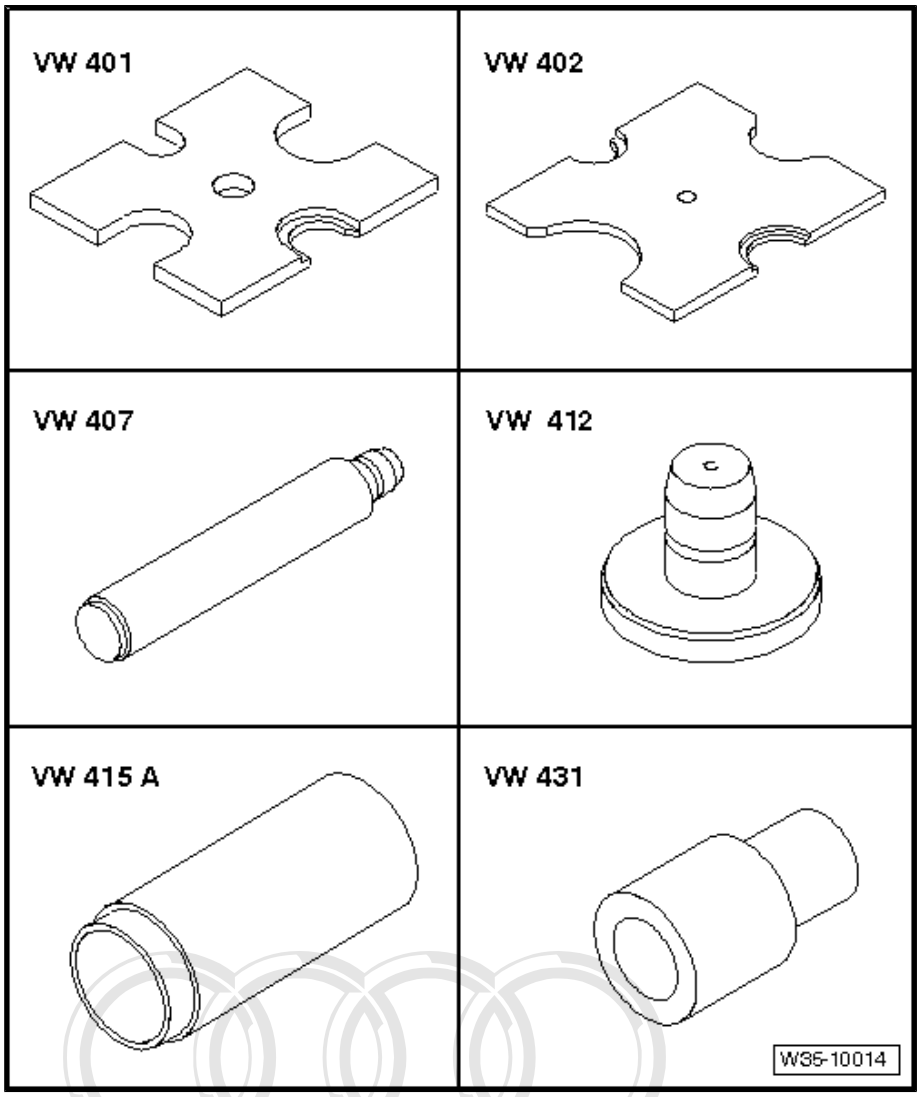
- ❑ Note thickness
- ❑ Will be damaged when removed; renew

24 - Gearbox housing

3.1 Dismantling and assembling output shaft for 3rd – 6th gear

Special tools and workshop equipment required

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



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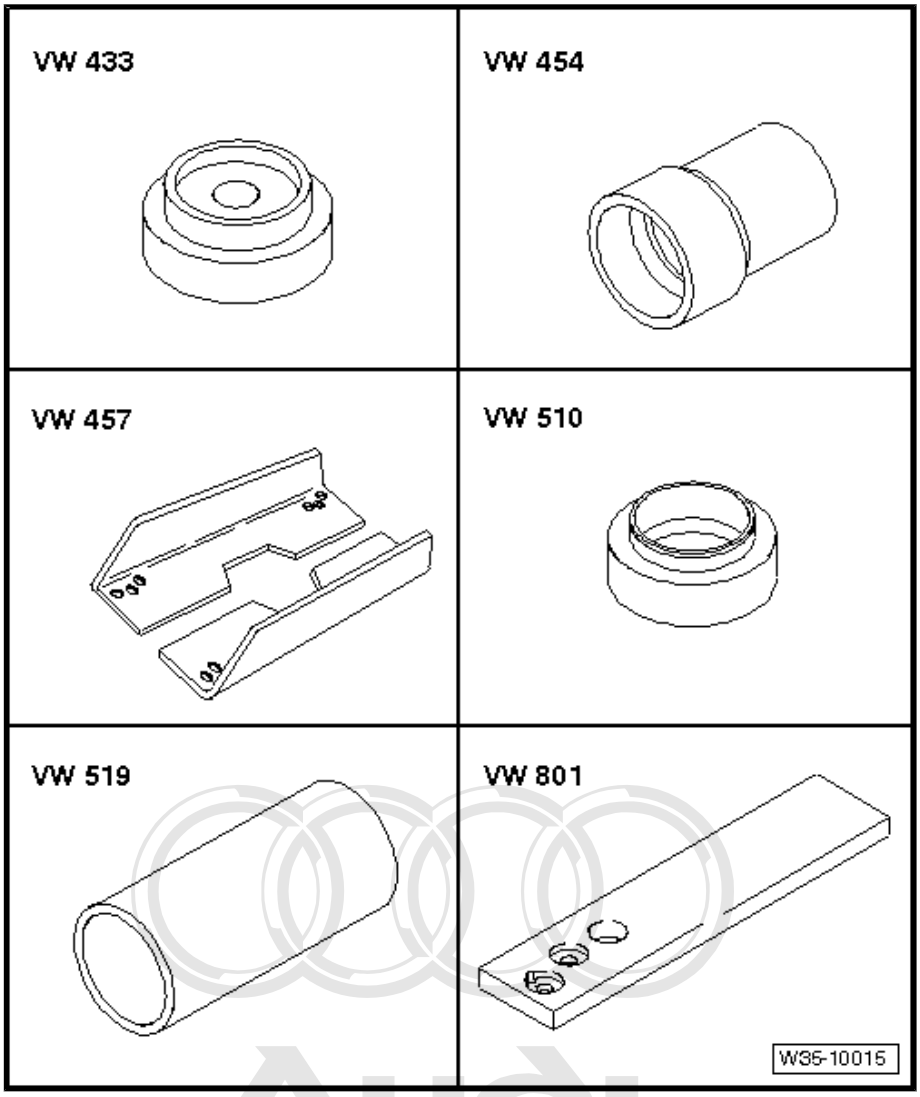
- Press tool -VW 433-
- Press tool -VW 454-
- Support rails -VW 457-
- Thrust pad -VW 510-
- Tube -VW 519-
- Support plate -VW 801-



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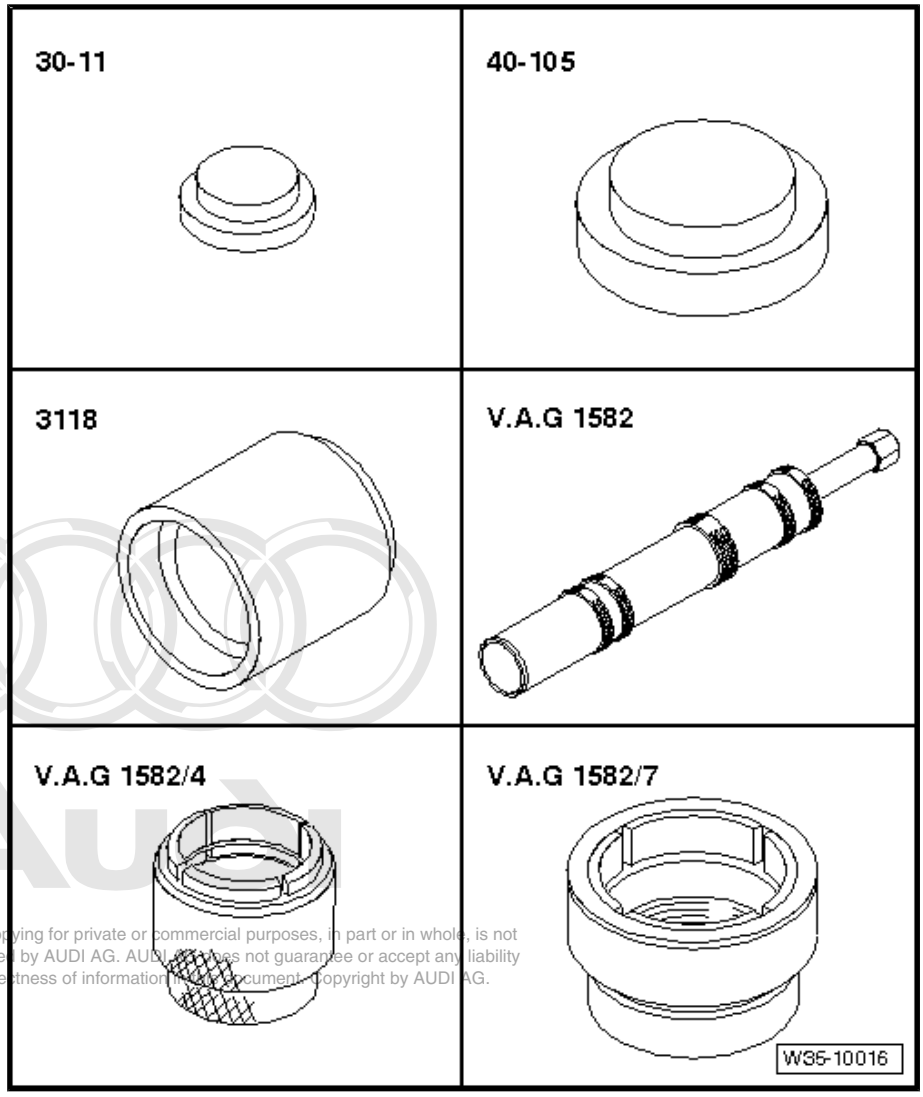
- Thrust plate -30 - 11-
- Thrust plate -40 - 105-
- Press tool -3118-
- Tapered roller bearing puller -V.A.G 1582-
- Adapter -V.A.G 1582/4-
- Adapter -V.A.G 1582/7-



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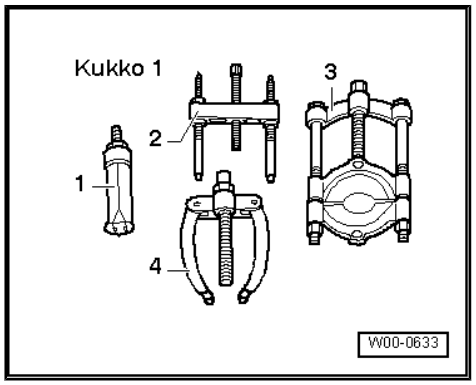
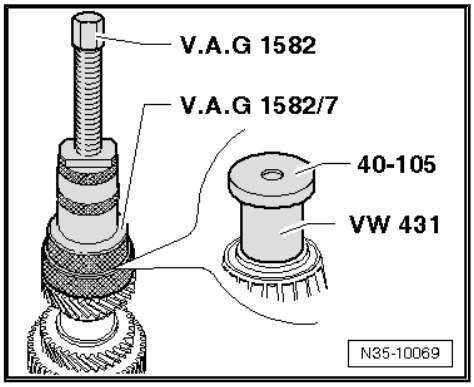
- -1- Internal puller 46...58 mm , e.g. -Kukko 21/7-





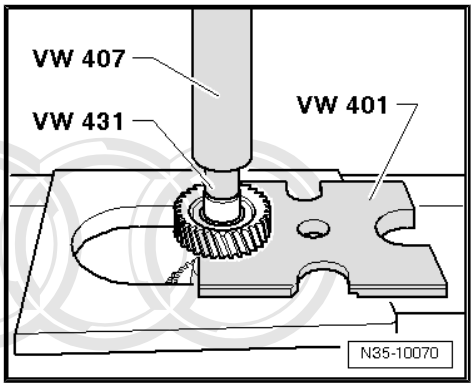
- -1- Internal puller 56...70 mm , e.g. -Kukko 21/8-
- -4- Counter support , e.g. -Kukko 22/2-
- Feeler gauge

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

– Before applying puller, fit press tool -VW 431- in output shaft and place thrust plate -40-105- on it.

– Remove circlip.

Pressing off 6th gear wheel



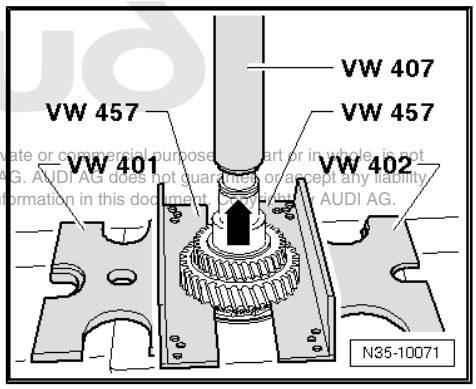
Pressing off 5th gear wheel with 3rd speed selector gear

– Place tools beneath 3rd speed selector gear so that no parts will be damaged during pressing.

Note

When 5th gear wheel comes close to annular groove for circlip -arrow- during pressing procedure, secure output shaft to prevent it from dropping out.

– Remove circlip.



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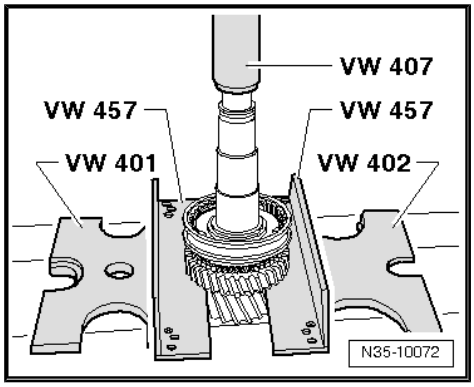
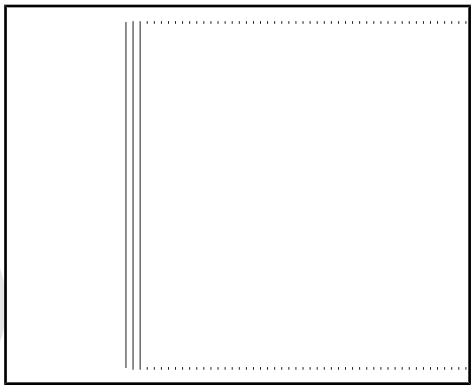
Pressing off 3rd and 4th gear locking collar and synchronising hub with 4th speed selector gear



Checking 3rd and 4th gear inner ring for wear

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

Gap -a-	Installation depth	Wear limit
3rd and 4th gear	0.75 ... 1.25 mm	0.3 mm



Checking 3rd and 4th gear synchro-rings for wear

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

Gap -a-	Installation depth	Wear limit
3rd gear	1.0 ... 1.8 mm	0.5 mm
4th gear	1.0 ... 1.9 mm	0.5 mm

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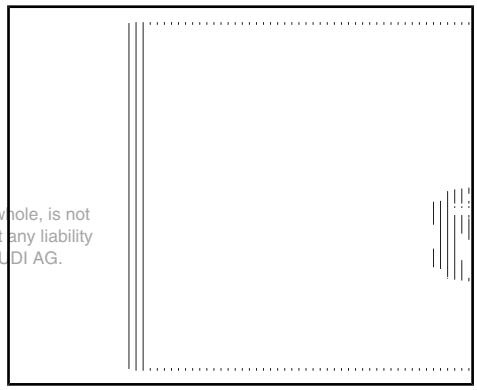
– Install 4th speed selector gear with needle bearing.



Installation position of outer ring, inner ring and synchro-ring for 4th gear

– Place inner ring -A- on 4th speed selector gear.

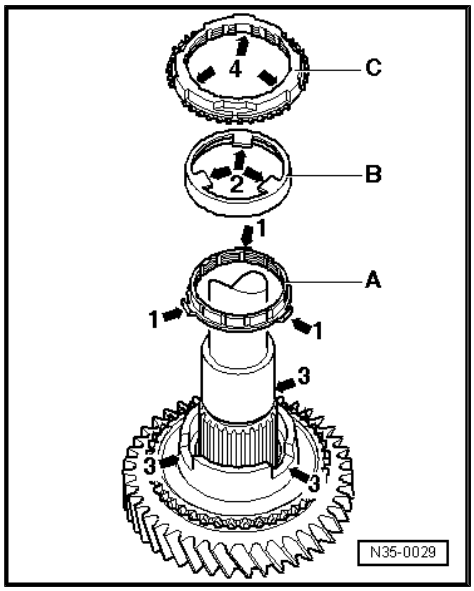
• The angled lugs -arrows 1- point towards outer ring -B-.

– Fit outer ring -B-.

• Lugs -arrows 2- engage in slots -arrows 3- on selector gear.

– Fit synchro-ring -C-.

• Slots -arrows 4- engage on lugs -arrows 1- on inner ring -A-.



Dismantling and assembling locking collar and synchronising hub for 3rd and 4th gears

– Take off springs -1- before dismantling.

1 - Spring

2 - Locking piece

3 - Locking collar

4 - Synchronising hub “installation position” ⇒ page 147

– To assemble, slide locking collar over synchronising hub.

• Installation position: Narrower recesses in synchronising hub align with recesses in locking collar

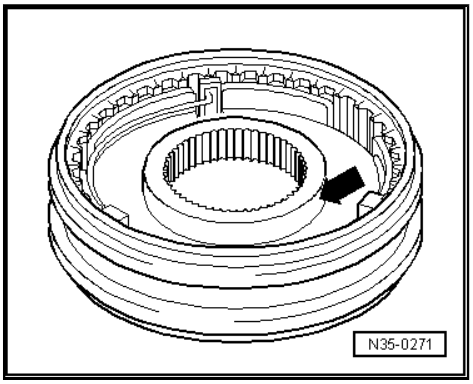
Assembling locking collar with synchronising hub for 3rd and 4th gears

• Locking collar is pushed over synchronising hub.

– Insert locking pieces and install springs offset at 120°.

• Angled end of spring must locate in hollow locking piece.

Installation position of 3rd and 4th gear locking collar and synchronising hub



Higher shoulder of synchronising hub -arrow- faces 4th gear.

• 4th speed selector gear is placed on shaft together with needle bearing and synchro-rings.

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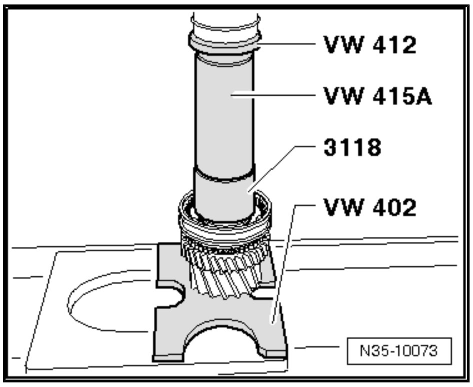
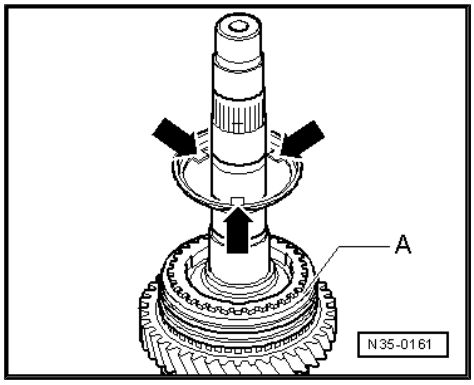
Pressing on locking collar with synchronising hub for 3rd and 4th gears



– Fit circlip.

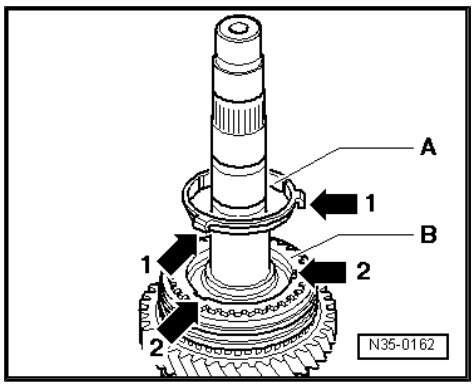
Installation position of 3rd gear outer ring

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



Installation position of synchro-ring -A- (3rd gear inner ring)

Lugs -arrows 1- locate in the recesses -arrows 2- in the synchro-ring -B-.

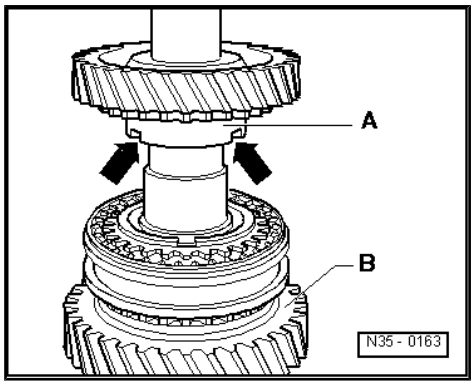


Installation position of 3rd speed selector gear

The higher shoulder -A- faces towards 4th gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ⇒ page 148 .

– Install 3rd speed selector gear with needle bearing.

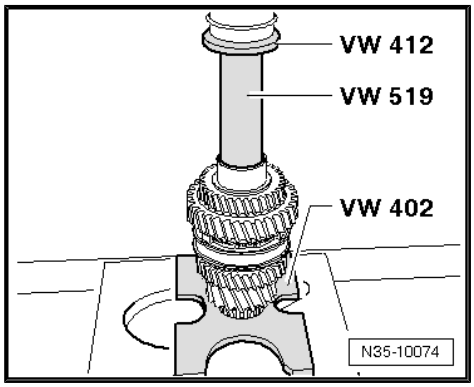
– Heat 5th gear wheel to approx. 150° C.



Pressing on 5th gear wheel

– Press on gear wheel quickly so that heat is not immediately transferred to output shaft.

– Heat 6th gear wheel to approx. 150° C.



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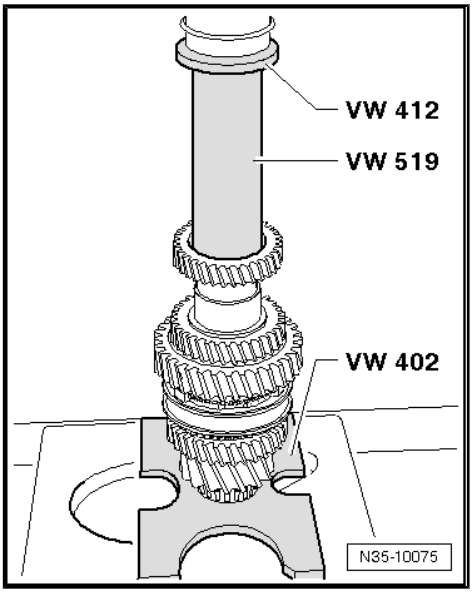
Pressing on 6th gear wheel

– Fit circlip.

Note

If 5th gear wheel has been pressed on in previous step, wait for output shaft to cool off.

– Press on gear wheel quickly so that heat is not immediately transferred to output shaft.
– Fit locking device for 6th gear wheel.



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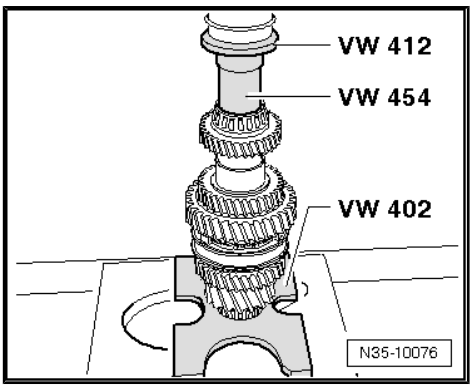
Pressing on tapered roller bearing inner race for bearing in gearbox housing

Note

Pulling off tapered roller bearing inner race for bearing in gearbox housing ⇒ page 145

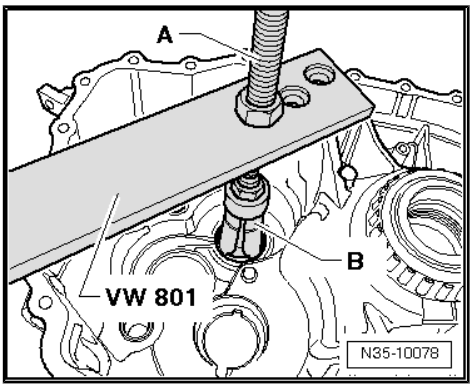


Pulling tapered roller bearing outer race out of gearbox housing

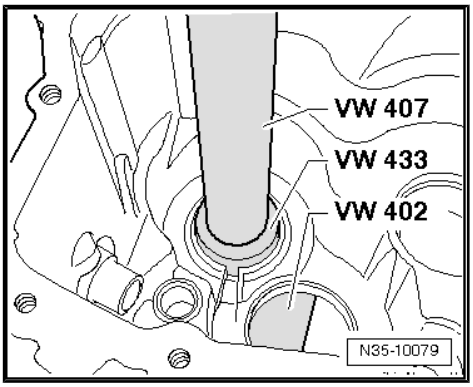
A - Spindle from counter-support , e.g. -Kukko 22/2-

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

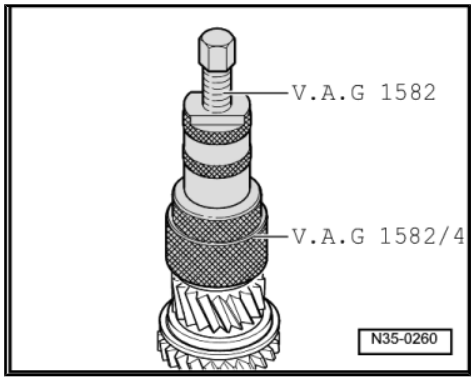
– Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into gearbox housing

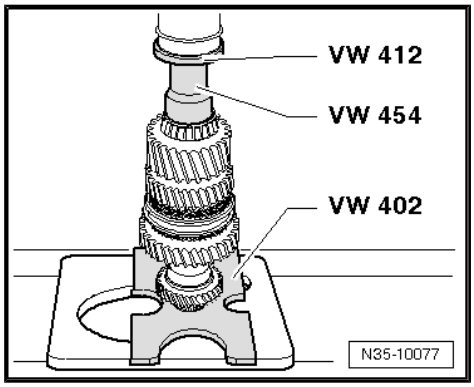


Pulling off tapered roller bearing inner race for bearing in clutch housing



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

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

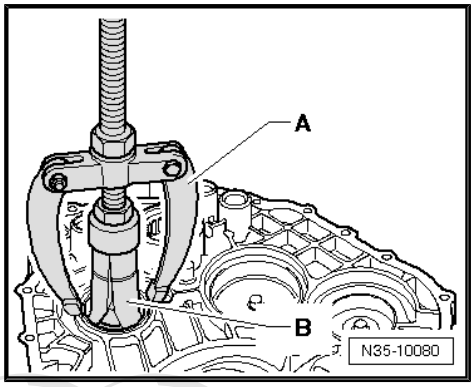


Pulling tapered roller bearing outer race out of clutch housing

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

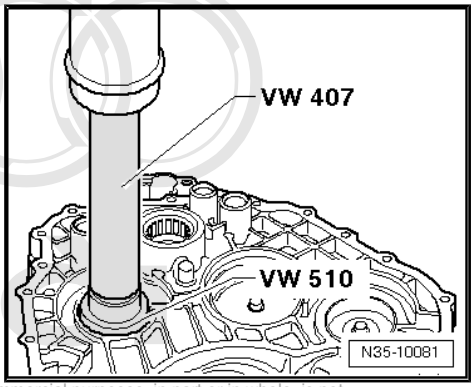
B - Internal puller 56 ... 70 mm , e.g. -Kukko 21/8-

– Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into clutch housing

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



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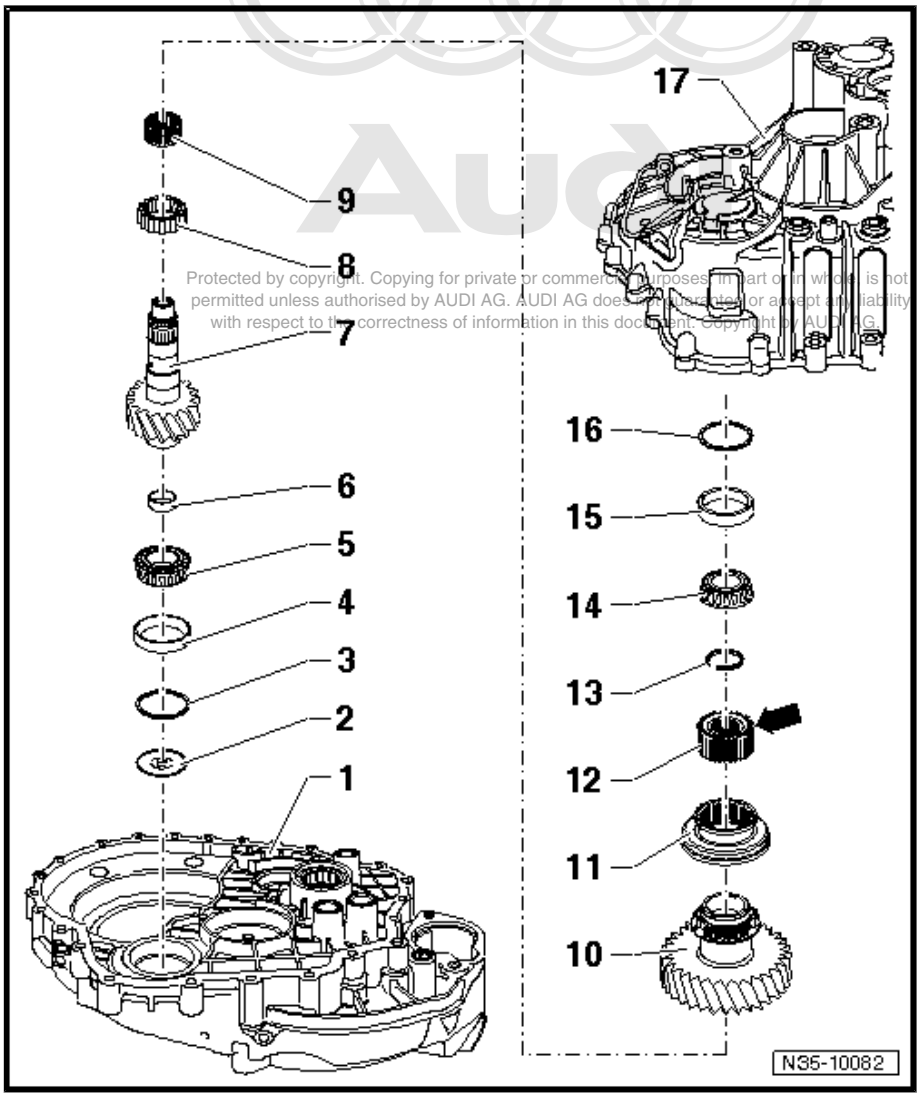
4 Exploded view - output shaft for reverse gear

Dismantling and assembling output shaft for reverse gear
⇒ page 153

Note

- *The output shaft is not available as a spare part.*
- *If the tapered roller bearings are renewed, install new shims of the same thickness as the old ones.*



1 - Clutch housing

2 - Oil deflector plate

3 - Shim

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

4 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 158
- ❑ Pressing in ⇒ page 158

5 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 158
- ❑ Pressing on ⇒ page 158

6 - Dished washer

- ❑ Pulling out ⇒ page 156
- ❑ Pressing in ⇒ page 157

7 - Output shaft

- ❑ For reverse gear
- ❑ Bearing of reverse selector gear consists of sleeve bearing or roller bearing ⇒ Item 8 (page 151) and needle bearing ⇒ Item 9 (page 151)
- ❑ Identification ⇒ page 152

8 - Roller bearing

- ❑ For reverse selector gear
- ❑ Not used with all gearboxes, in which case reverse selector gear has sleeve bearing ⇒ Item 10 (page 151)

9 - Needle bearing

- ❑ For reverse selector gear
- ❑ Not used with all gearboxes, in which case reverse selector gear has sleeve bearing ⇒ Item 10 (page 151)

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10 - Reverse selector gear

- ❑ Different internal diameter for sleeve bearing and bearing consisting of roller bearing ⇒ Item 8 (page 151) and needle bearing ⇒ Item 9 (page 151)
- ❑ Removing and installing stop ring and spring ⇒ page 160

11 - Reverse gear locking collar

- ❑ With synchro-ring

12 - Reverse gear synchronising hub

- ❑ Press off together with reverse selector gear ⇒ Item 13 (page 152) after removing circlip ⇒ page 157
- ❑ Installation position: stop -arrow- for reverse gear locking collar faces circlip
- ❑ Pressing on ⇒ page 157

13 - Circlip

14 - Tapered roller bearing inner race

- ❑ Pressing off ⇒ page 157
- ❑ Pressing on ⇒ page 159

15 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 159
- ❑ Pressing in ⇒ page 159

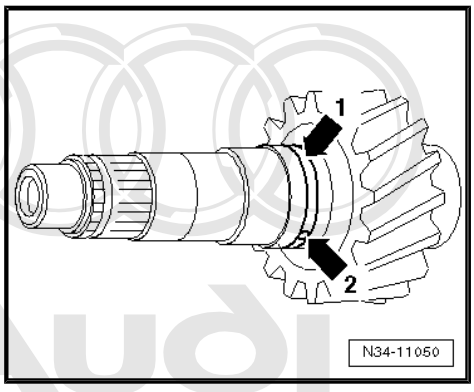
16 - Shim

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

17 - Gearbox housing

Distinguishing bearing types for reverse selector gear

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



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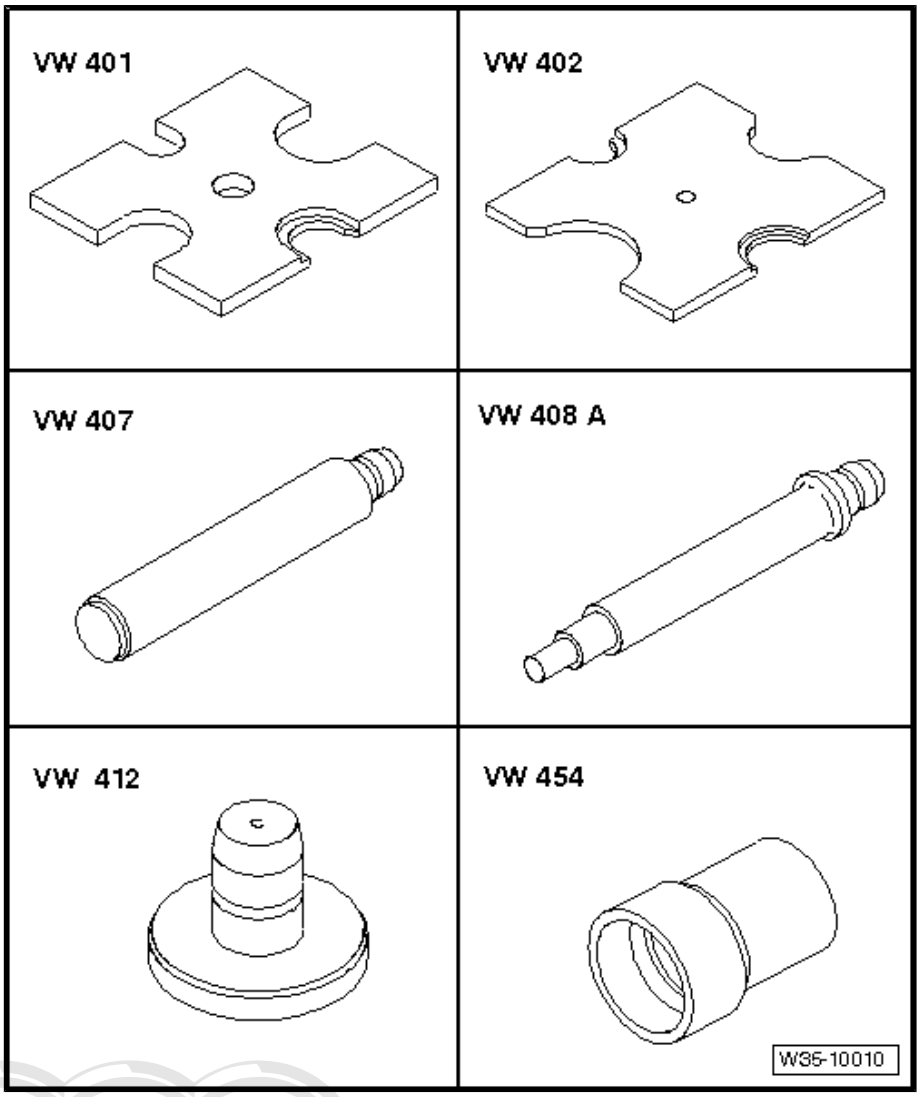
4.1 Dismantling and assembling output shaft for reverse gear

Special tools and workshop equipment required

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



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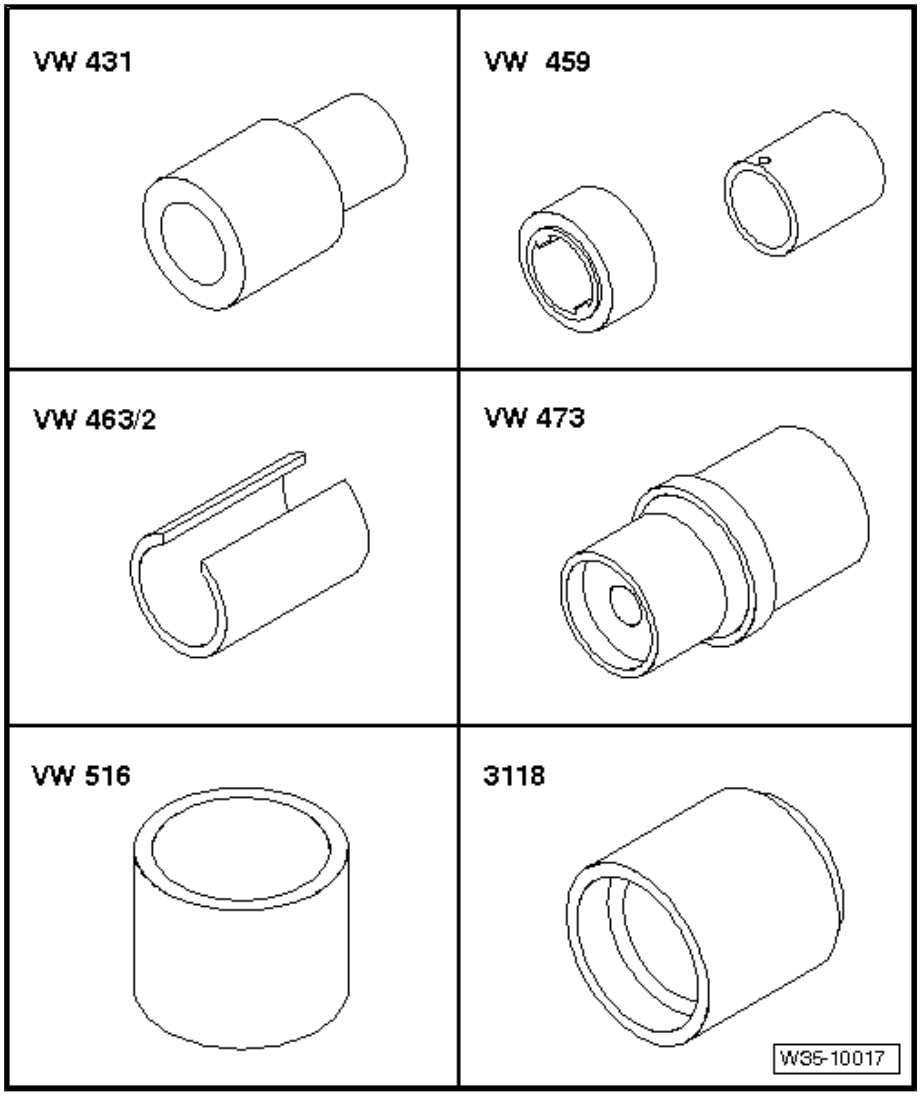
- Press tool -VW 431-
- Removal and installing tool -VW 459-
- Tube -VW 463/2-
- Press tool -VW 473-
- Tube -VW 516-
- Press tool -3118-



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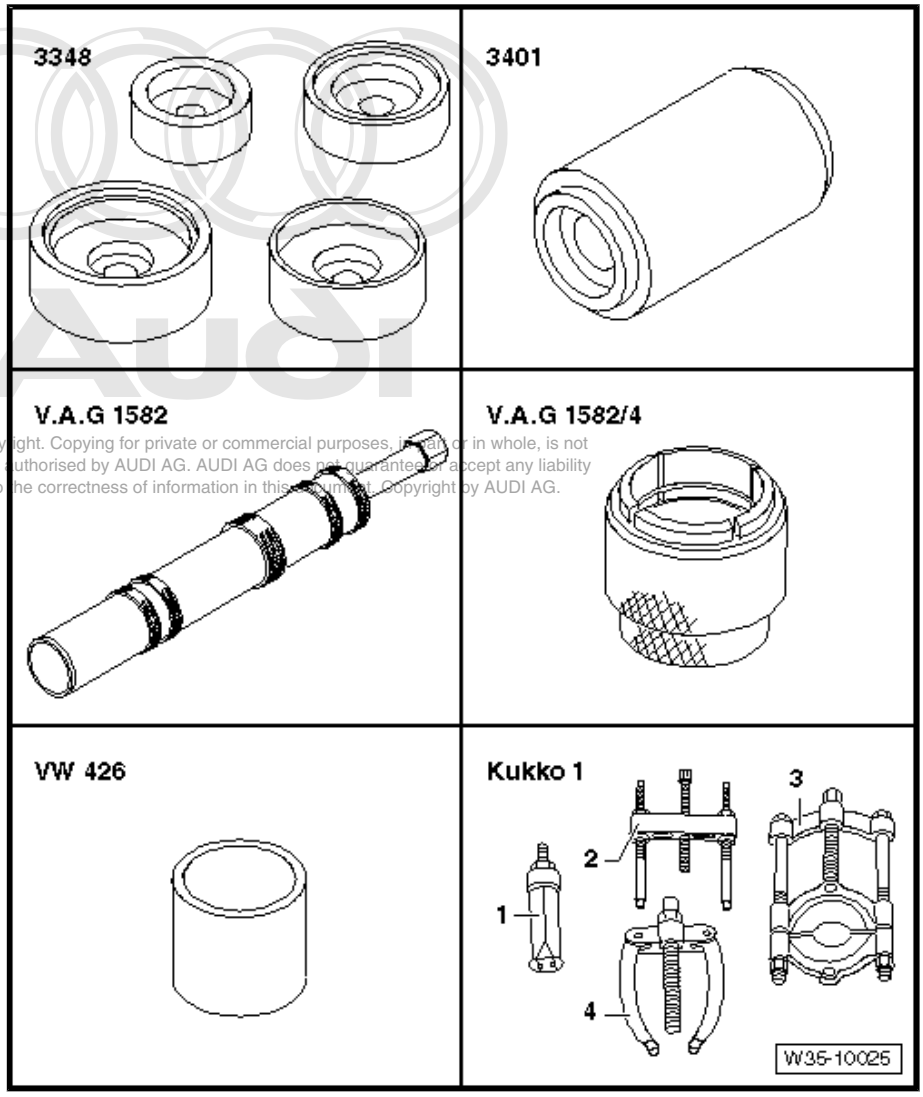
- Assembly tool -3348-
- Thrust piece -3401-
- Tapered roller bearing puller -V.A.G 1582-
- Adapter -V.A.G 1582/4-
- Tube -VW 426-
- -1- Internal puller 14.5...18.5 mm , e.g. -Kukko 21/2-
- -1- Internal puller 37...46 mm , e.g. -Kukko 21/6-
- -1- Internal puller 46...58 mm , e.g. -Kukko 21/7-
- -3- Splitter 22...115 mm , e.g. -Kukko 17/2-
- -4- Counter support , e.g. -Kukko 22/1-



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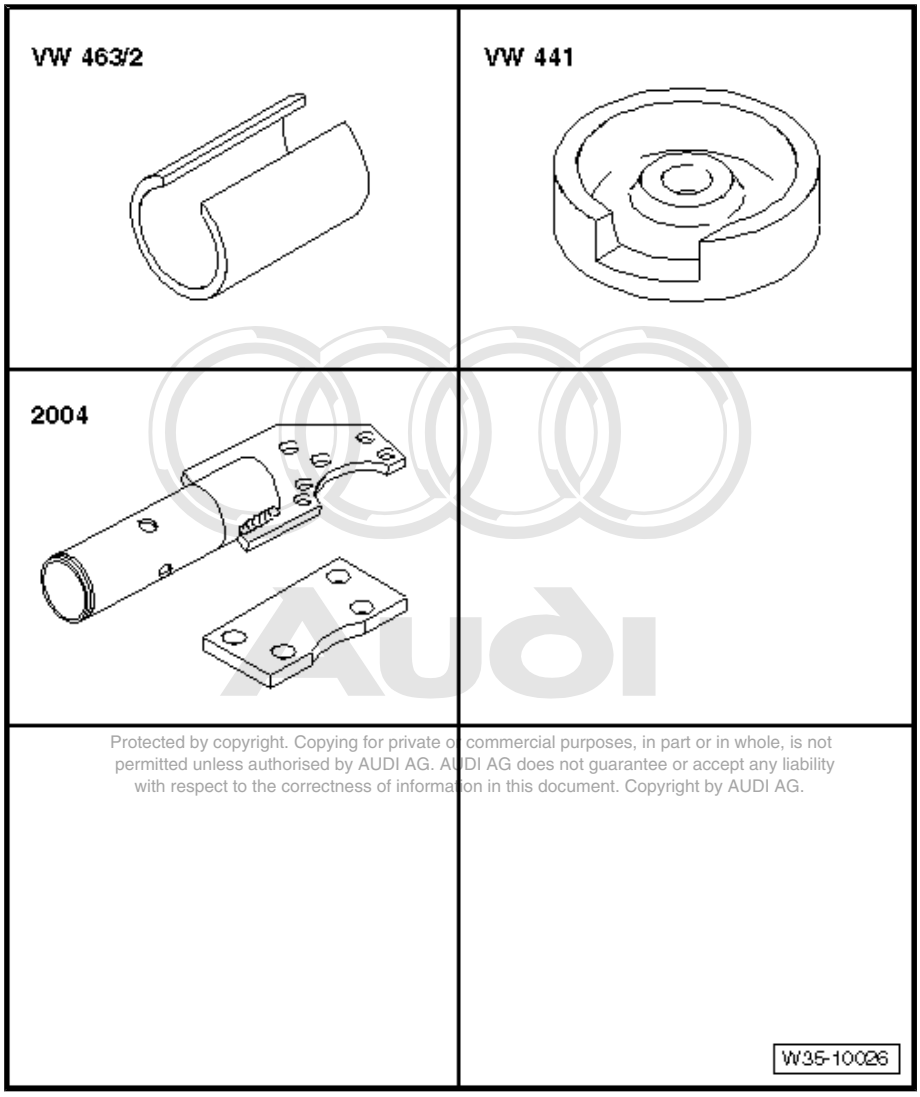
- Tube -VW 463/2-
- Base plate -VW 441-
- Gearbox bracket -2004/1-



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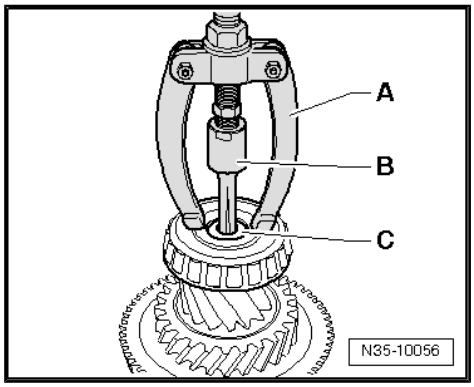
Pulling dished washer -C- out of output shaft

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

B - Internal puller 8 ... 12 mm , e.g. -Kukko 21/2-



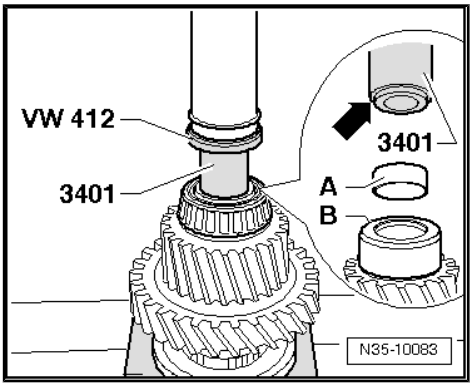
Note

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

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

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

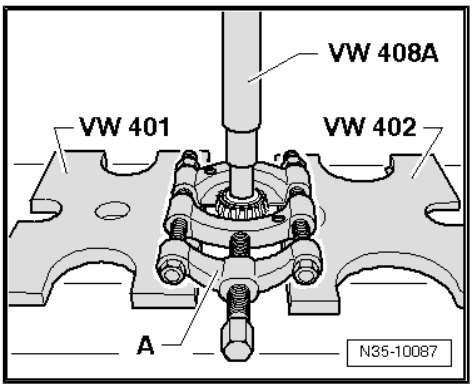
The dished washer will then be pressed in to a depth of approx. 2.20 mm.



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

A - Splitter 22...115 mm , e.g. -Kukko 17/1-

– Remove circlip.

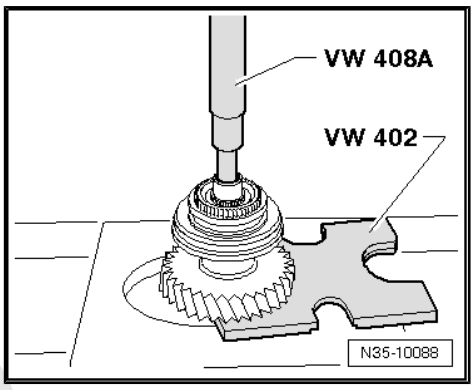


Pressing off reverse gear synchronising hub with reverse selector gear

– Fit reverse selector gear with needle bearing and roller bearing on output shaft.

Installation position of reverse gear synchronising hub

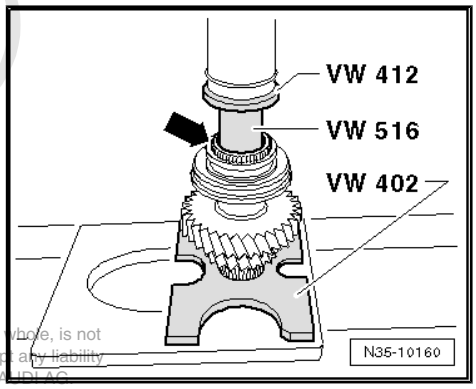
• Stop -arrow- faces pressing tool.



Pressing on reverse gear synchronising hub

– Press on reverse gear synchronising hub.

– Fit circlip.



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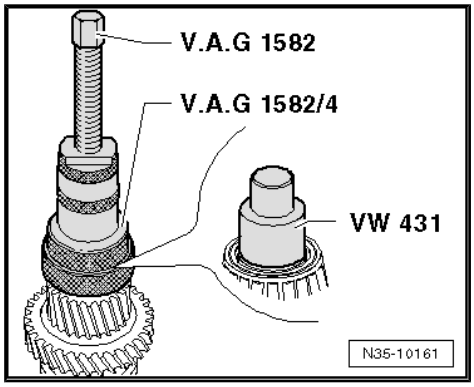
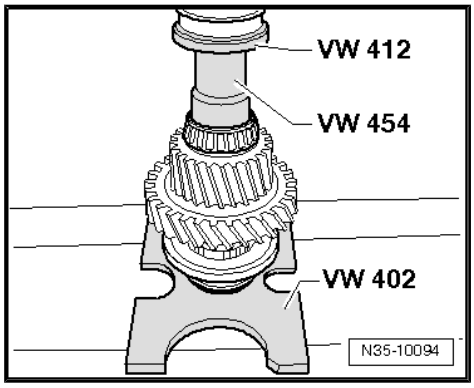
Pulling off tapered roller bearing inner race for bearing in clutch housing

– Before applying puller, place press tool -VW 431- on output shaft.



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



Pulling tapered roller bearing outer race out of clutch housing

– Place sleeve VW 459/1 over bearing seat with shoulder facing counter-support -A-.

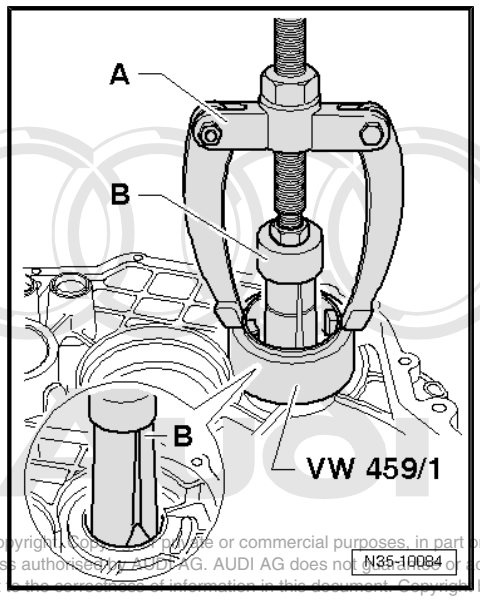
A - Counter-support , e.g. -Kukko 22/2-

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

After pulling out, renew damaged shim.

– Fit oil deflector.

– Fit new shim with previous value.



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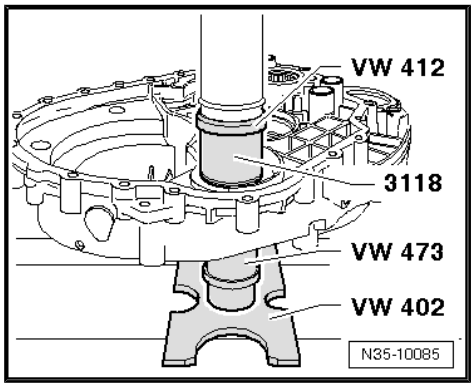
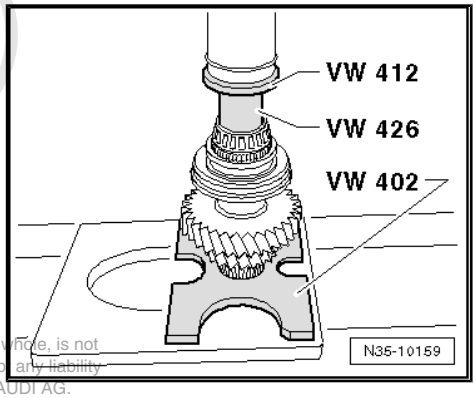
Pressing tapered roller bearing outer race into clutch housing

– Support clutch housing with press tool -VW 473- directly below bearing mounting.



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



Note

Pulling off tapered roller bearing inner race for bearing in gearbox housing ⇒ page 157

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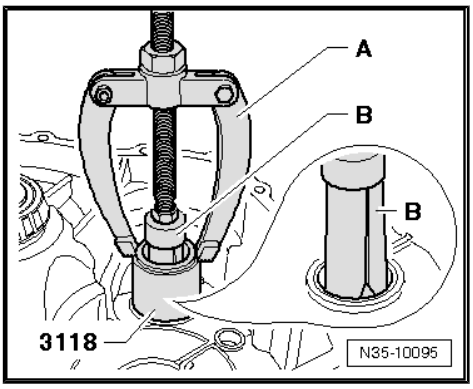
Pulling tapered roller bearing outer race out of gearbox housing



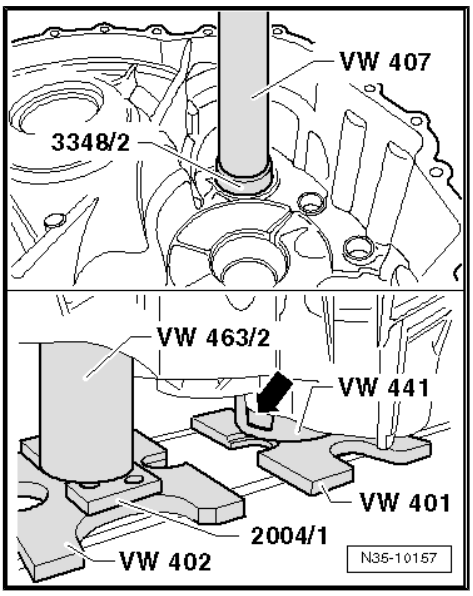
Shoulder on press tool -3118- faces towards counter-support -A-.

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

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

– Fit new shim with previous value under outer race.

Pressing tapered roller bearing outer race into gearbox housing



– Support gearbox housing with tube -VW 463/2- directly below bearing mounting.

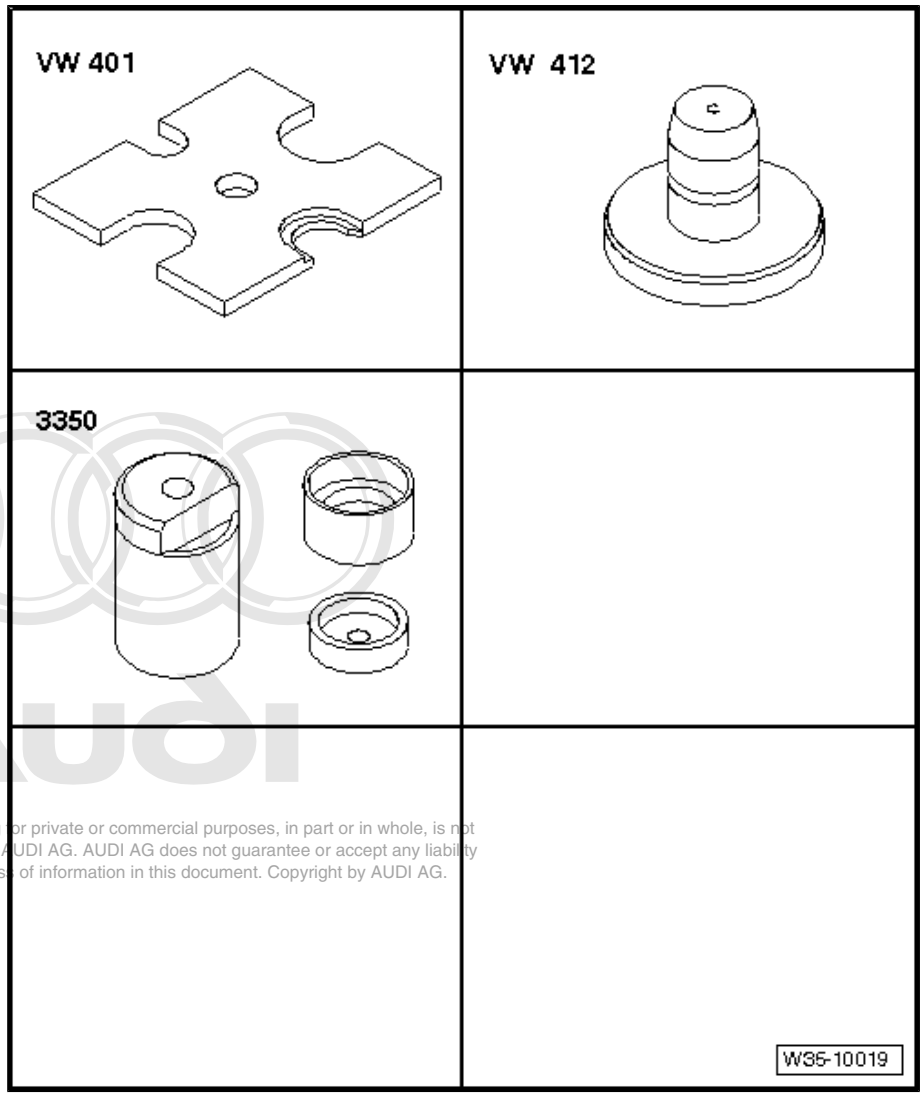
Watch out for rib on housing when positioning tube -VW 463/2- .

Opening in base plate -VW 441- -arrow- faces towards tube -VW 463/2- .

4.1.1 Removing and installing stop ring and spring on reverse selector gear

Special tools and workshop equipment required

- Thrust plate -VW 401-
- Press tool -VW 412-
- Assembly tool -3350-



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Removing

– Using a drift, carefully drive stop ring -A- off reverse selector gear -C-.

Secure spring -B- to prevent it springing away.

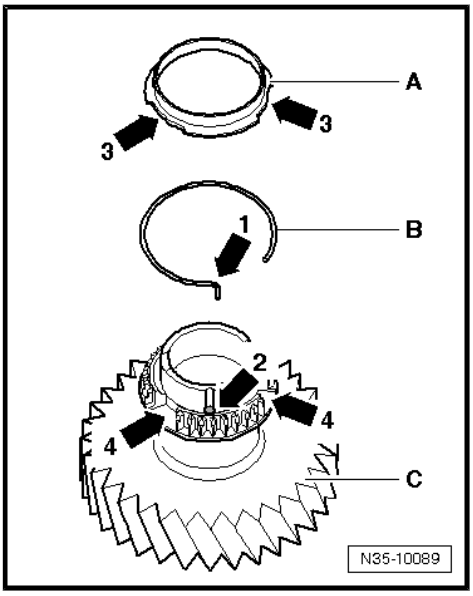
Installing

– First insert spring -B- in selector gear -C-.

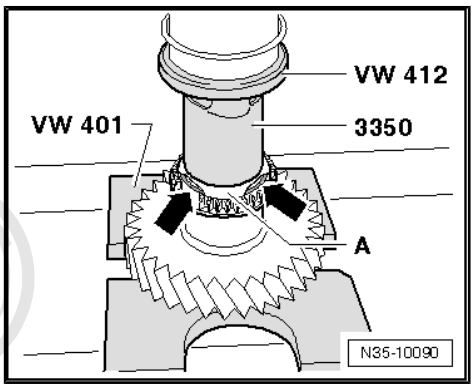
• The bent end of the spring -arrow 1- must be hooked into the hole -arrow 2- in the selector gear.

– Then fit stop ring -A- on selector gear.

• Notches in stop ring -arrows 3- and in selector gear -arrows 4- must be aligned.

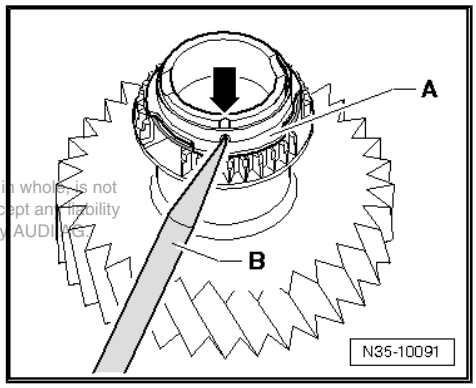


– Then carefully press stop ring -A- onto selector gear. Keep spring compressed -arrows- while pressing on stop ring.



– Finally, secure stop ring -A- on selector gear using a blunt punch -B-.

– For this step, apply punch at groove -arrow- in selector gear.



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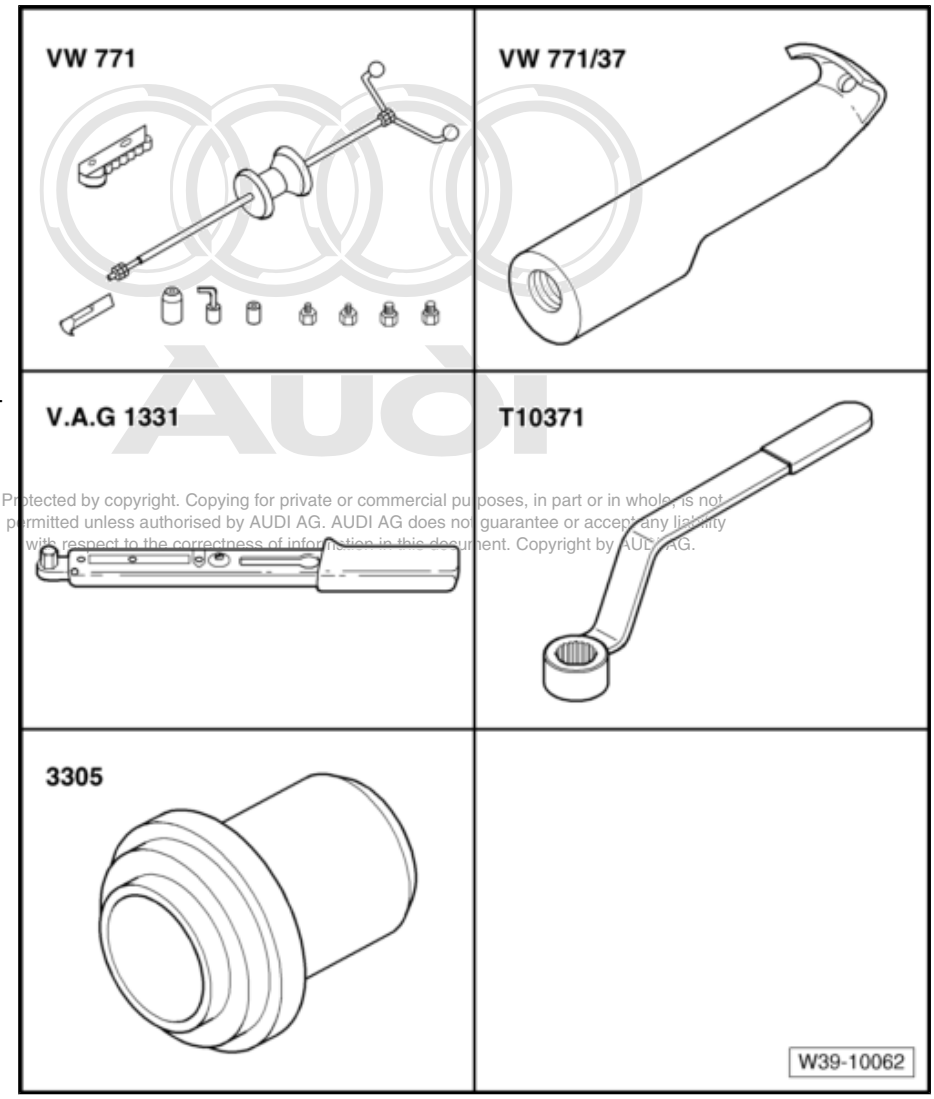
39 – Final drive - front differential

1 Renewing stub shaft oil seal (left-side) with gearbox installed

Special tools and workshop equipment required

- Multi-purpose tool -VW 771-
- Extractor hook - VW 771/37-
- Torque wrench -V.A.G 1331-
- Counterhold tool -T10371-
- Thrust piece -3305-
- Sealing grease for oil seal - G 052 128 A1-
- Grease -G 000 100-



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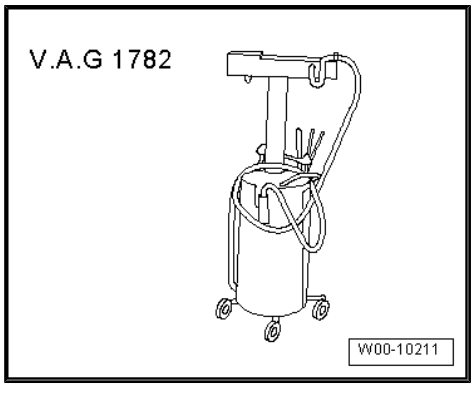
Special tools and workshop equipment required

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



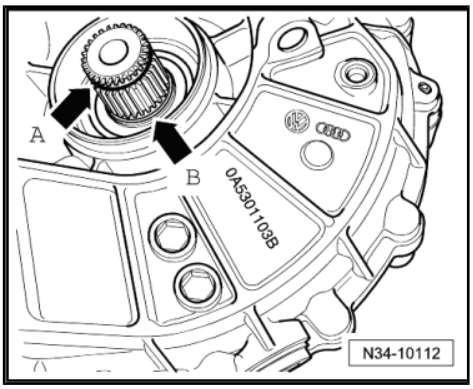
Removing

– Raise vehicle.

– Remove noise insulation ⇒ Rep. Gr. 66 below engine/gearbox.

– Remove drive shaft (left-side) ⇒ Rep. Gr. 40 .

– Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.

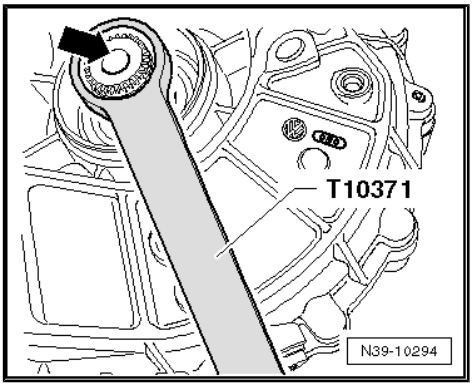


– Remove stub shaft securing bolt -arrow-, counterholding stub shaft with counterhold tool -T10371- .

– Place used oil collection and extraction unit -V.A.G 1782- below gearbox.

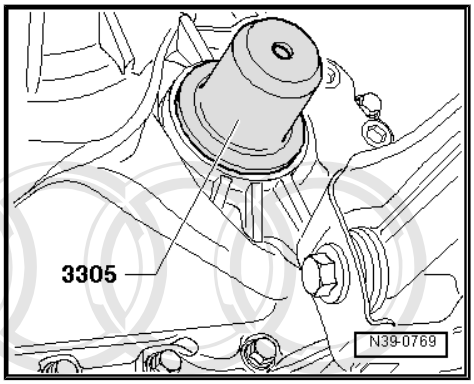
– Pull out stub shaft.

– Pull out stub shaft oil seal using multipurpose tool -VW 771- and multipurpose tool -VW 771/37- .

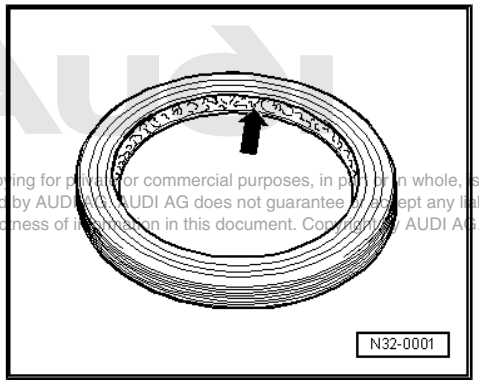


Installing

– Lightly oil new seal around outside circumference and drive in as far as stop, taking care to keep seal straight.



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



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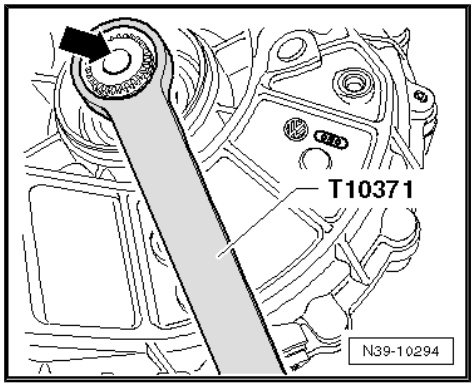
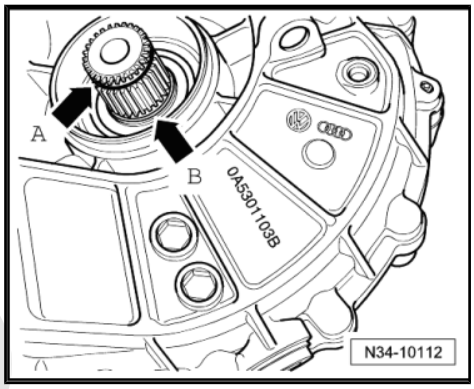
– Tighten countersunk bolt for stub shaft -arrow- to specified torque ⇒ Item 30 (page 187) , counterholding stub shaft with counterhold tool -T10371- .



– Then install new circlip -arrow A- and new O-ring -arrow B-.

Lubricate splines of stub shaft using grease -G 000 100- .

– Install drive shaft (left-side) ⇒ Rep. Gr. 40 .
– Check oil level in gearbox ⇒ page 85 .
– Install noise insulation below engine/gearbox ⇒ Rep. Gr. 66 .



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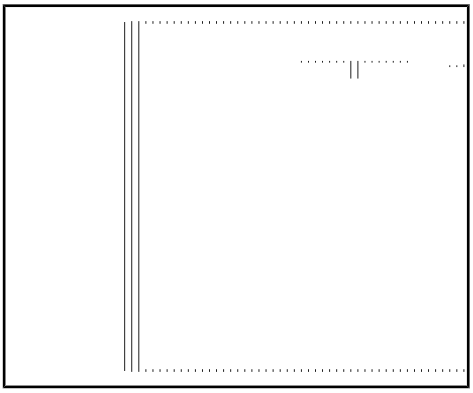
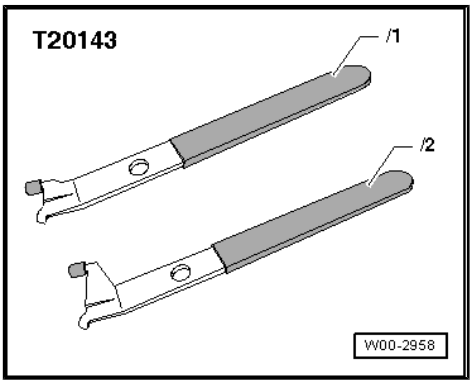
2 Renewing stub shaft oil seal (right-side) with bevel box installed

Special tools and workshop equipment required

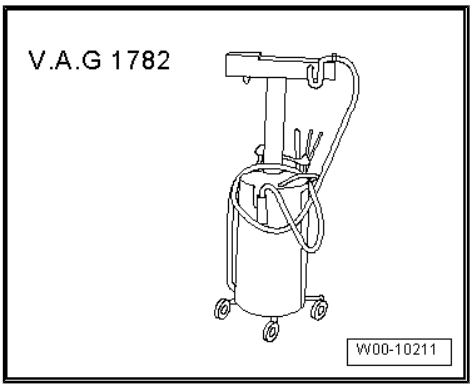
- Thrust piece -T10143-



- Extractor tool -T20143-



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



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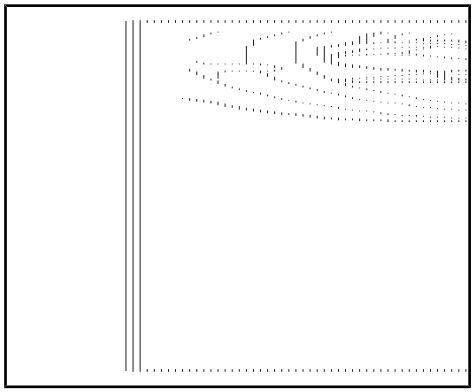
- Sealing grease for oil seal -G 052 128 A1-
- Grease -G 000 100-

Removing

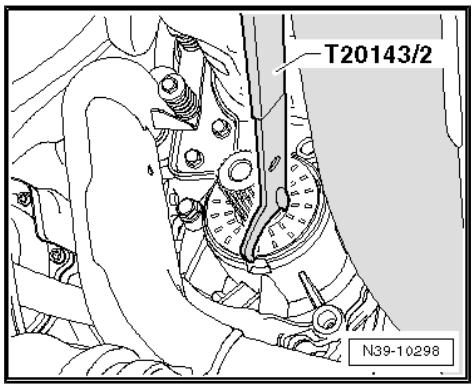
– Raise vehicle.

– Remove noise insulation ⇒ Rep. Gr. 66 below engine/gearbox.

– Remove drive shaft (right-side) ⇒ Rep. Gr. 40 .
– Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.
– Place drip tray under bevel box.

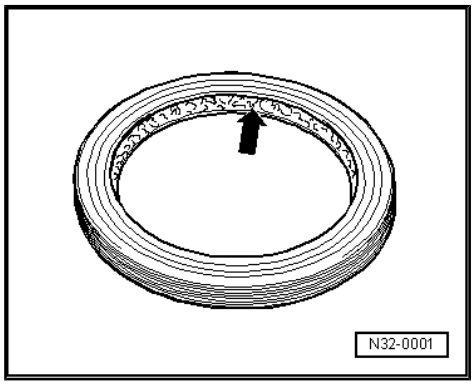


Lever out oil seal.

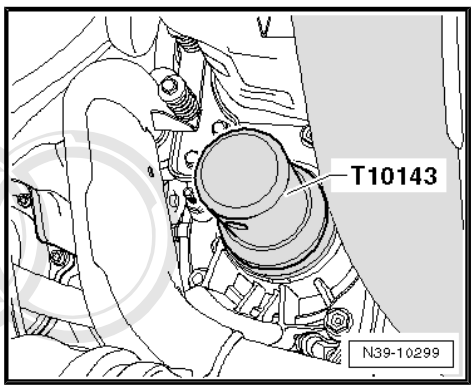


Installing

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



– Lightly oil new seal around outside circumference and drive in as far as stop, taking care to keep seal straight.
– Check oil level in bevel box ⇒ page 86 .



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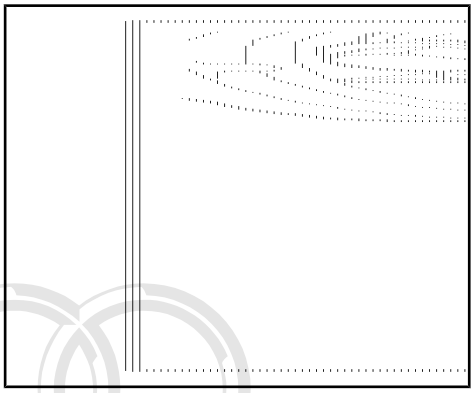
– Then install circlip -arrow A- and O-ring -arrow B-.
– Lubricate splines of stub shaft using grease -G 000 100- .
– Install drive shaft (right-side) ⇒ Rep. Gr. 40 .
– Install noise insulation below engine/gearbox ⇒ Rep. Gr. 66 .



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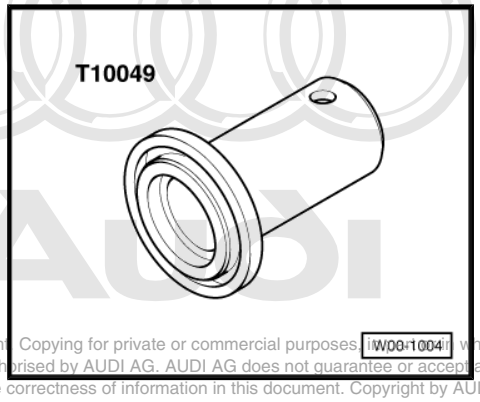
3 Renewing oil seal between gearbox and bevel box with gearbox installed

Special tools and workshop equipment required

- -T 10049- Thrust piece



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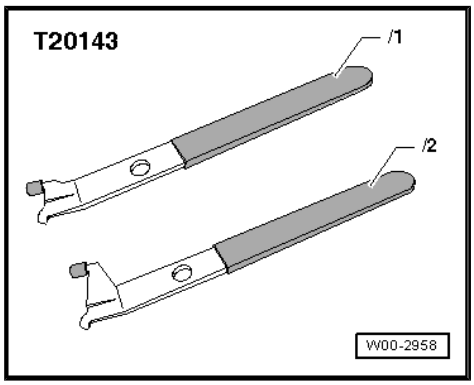
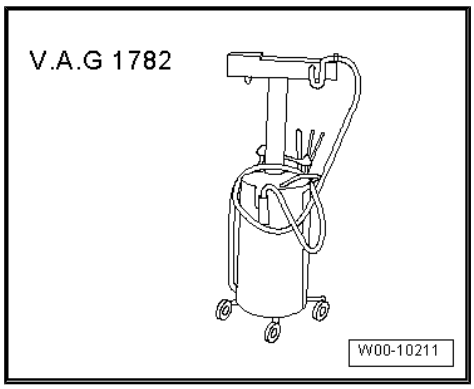
- Extractor tool -T20143-



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



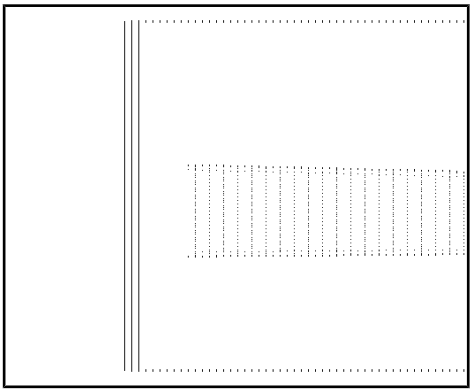
- Sealing grease for oil seal -G 052 128 A1-

Procedure

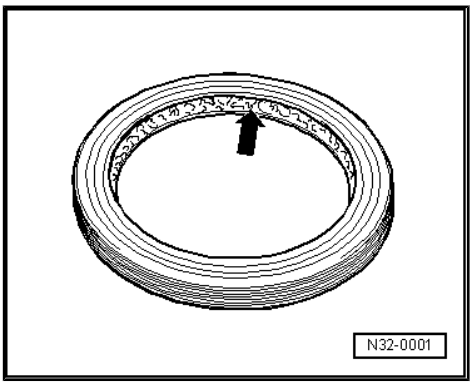
- Bevel box removed ⇒ page 80 .

– Place drip tray below gearbox.

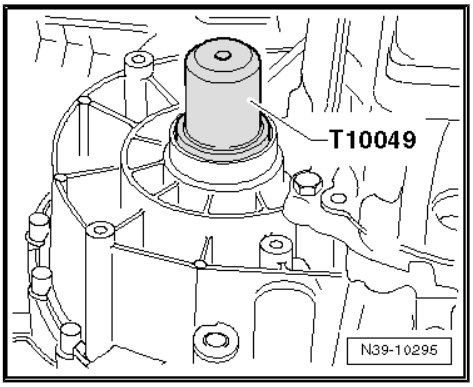
– Lever oil seal for bevel box out of clutch housing.



– Lightly oil outer circumference of oil seal and half-fill space between sealing lips -arrow- with grease for radial oil seals -G 052 128 A1- .



– Drive oil seal for bevel box into clutch housing as far as stop, being careful not to cant oil seal.
– Install bevel box ⇒ page 83 .
– Check oil level in gearbox ⇒ page 85 .
– Check oil level in bevel box ⇒ page 86 .



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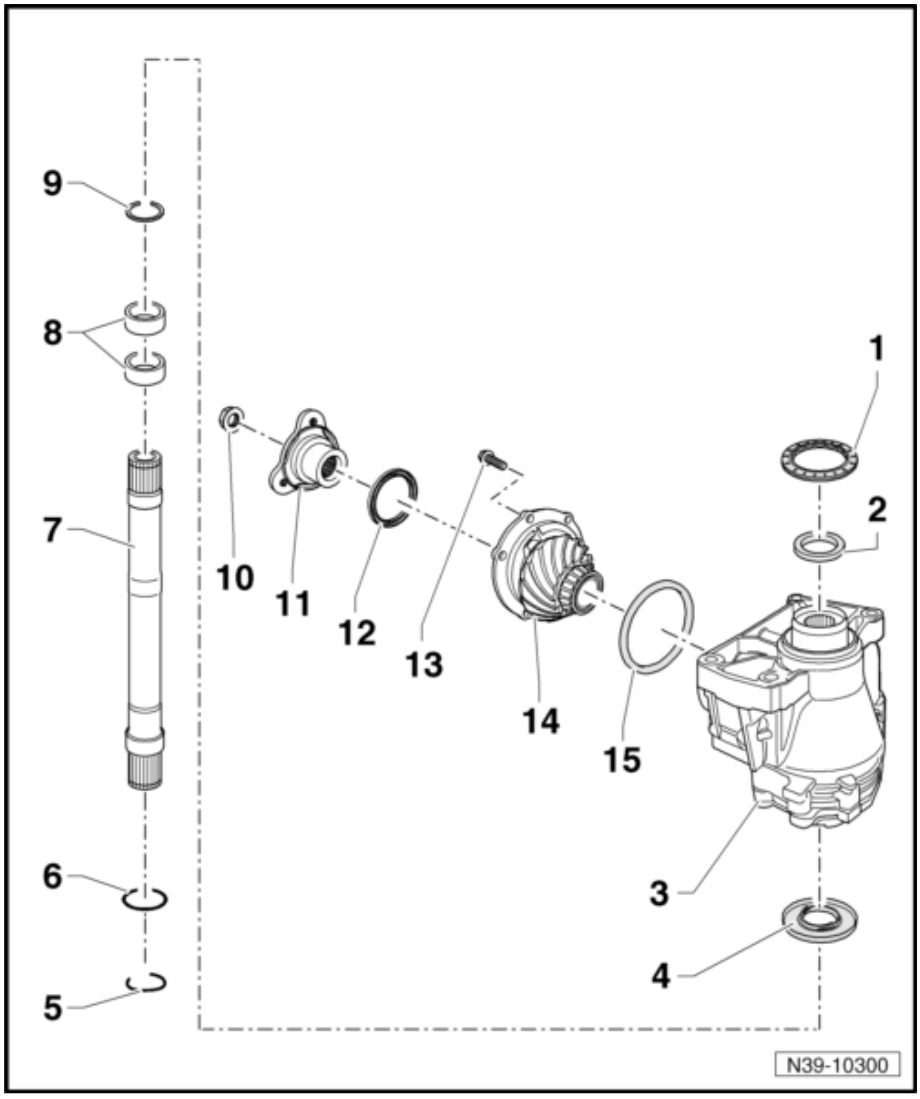
4 Exploded view - oil seals in bevel box and stub shaft bearing in bevel box



1 - Oil seal

- ❑ Between bevel box and gearbox
- ❑ Renewing (with bevel box removed) ⇒ page 171

2 - Oil seal

- ❑ For stub shaft (right-side), on gearbox side
- ❑ Renewing (with bevel box removed) ⇒ page 172

3 - Bevel box

- ❑ Removing and installing (with gearbox installed) ⇒ page 80
- ❑ Removing and installing (with gearbox removed) ⇒ page 97

4 - Oil seal

- ❑ For stub shaft (right-side), on drive shaft side
- ❑ Renewing (with bevel box installed) ⇒ page 165

5 - Circlip

- ❑ Always renew
- ❑ Fit in annular groove in stub shaft

6 - O-ring

- ❑ Always renew
- ❑ Fit in annular groove in stub shaft

7 - Stub shaft (right-side)

- ❑ Removing and installing ⇒ page 180

8 - Needle bearing (polygon bearing)

- ❑ Renewing ⇒ page 180

9 - Circlip

- ❑ Always renew

10 - Hexagon nut

- ❑ 480 Nm
- ❑ Removing ⇒ page 177
- ❑ Apply locking fluid -D 000 600- when fitting
- ❑ Installing ⇒ page 179

11 - Output flange

- ❑ Removing and installing ⇒ page 175

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12 - Oil seal

- ❑ Renewing ⇒ page 175

13 - Bolt

- ❑ 25 Nm
- ❑ Tighten diagonally

14 - Pinion housing

- ❑ With shaft bevel gear
- ❑ Drive in carefully on alternate sides
- ❑ Observe bolt holes; pinion housing fits only in one position

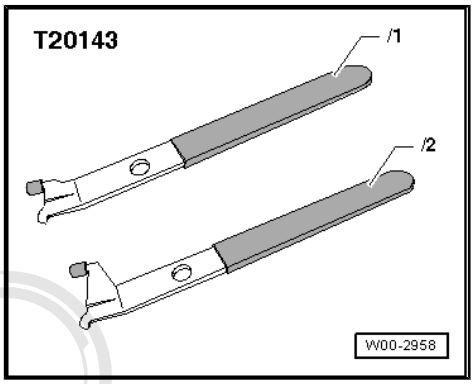
15 - O-ring

- ❑ To renew, unscrew bolts ⇒ Item 13 (page 171) and carefully lever off pinion housing at projecting webs on outside edge
- ❑ Do not remove hexagon nut ⇒ Item 10 (page 170) and output flange ⇒ Item 11 (page 170)

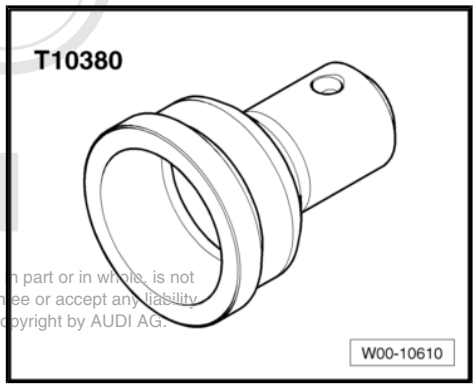
4.1 Renewing oil seal between gearbox and bevel box (on bevel box)

Special tools and workshop equipment required

- ♦ Extractor tool -T20143-



- ♦ Thrust piece -T10380-



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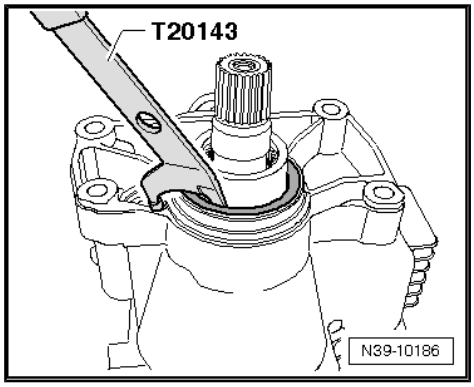
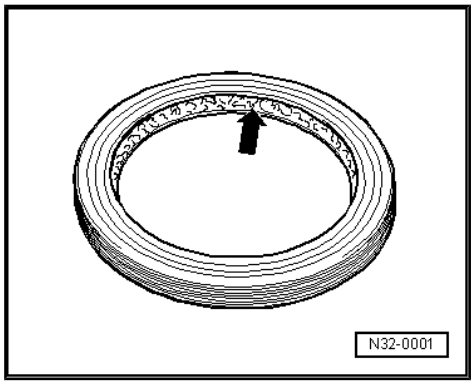
- Bevel box removed ⇒ page 80 .

– Pry out oil seal using oil seal extractor lever -T20143/2- .



– Half-fill space between sealing lip and dust lip of new oil seal -arrow- with sealing grease -G 052 128 A1- .
– Lightly oil outer circumference of new oil seal.



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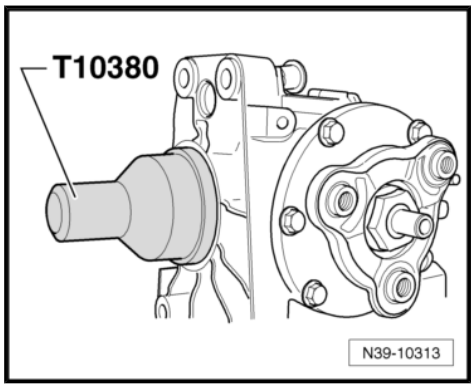
– Drive in oil seal onto stop.
– Install bevel box ⇒ page 83 .
– Check oil level in bevel box ⇒ page 86 .
– Check oil level in gearbox ⇒ page 85 .

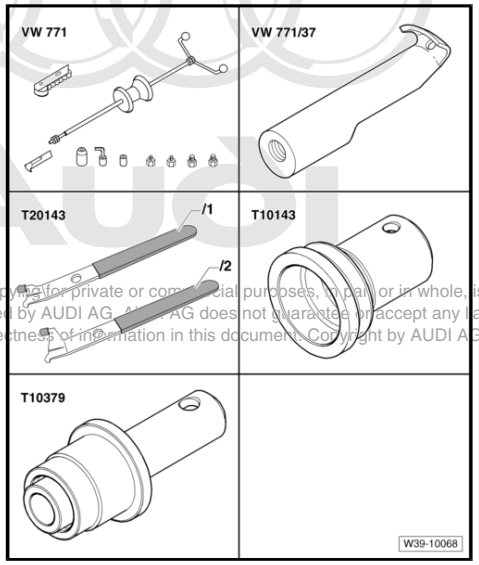


4.2 Renewing stub shaft oil seals (with bevel box removed)

Special tools and workshop equipment required

- Multi-purpose tool -VW 771- and multi-purpose tool -VW 771/37-
- Thrust piece -T10143-

♦ Thrust piece -T10379-



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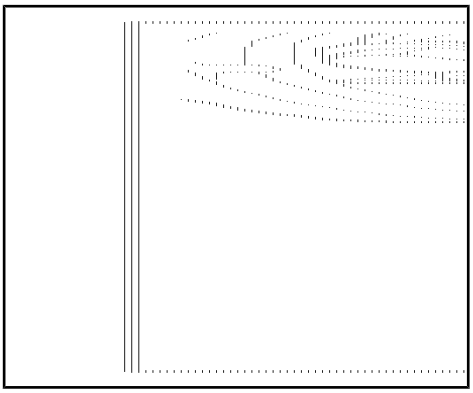
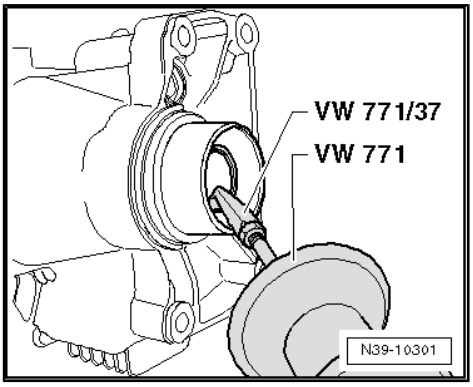
• Bevel box removed ⇒ page 80 .

– Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.

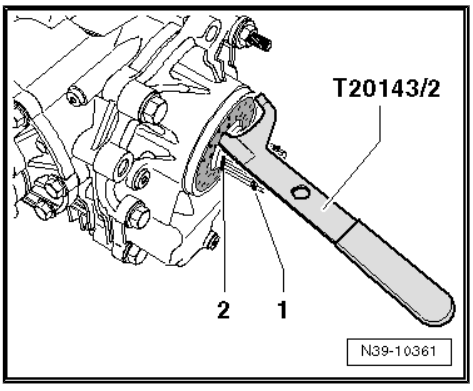
– Drive stub shaft carefully out of bevel box.



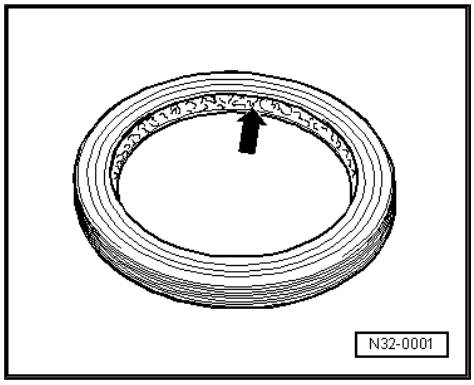
– Pull out stub shaft oil seal on gearbox side.



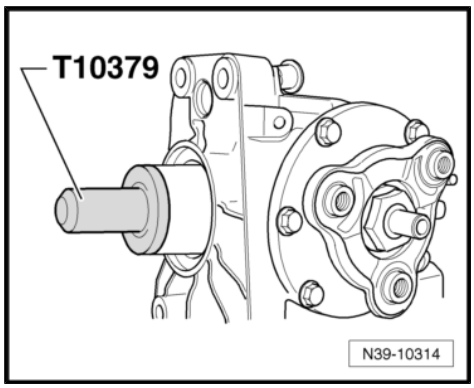
Lever out stub shaft oil seal on drive shaft side.



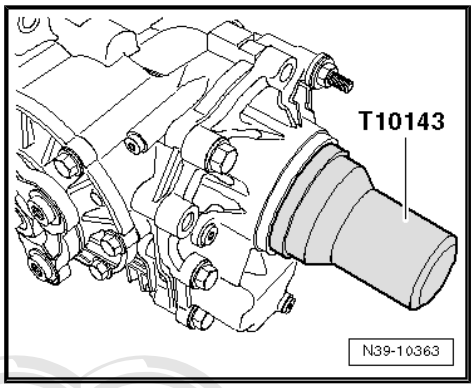
– Half-fill space between sealing lip and dust lip of new oil seals -arrow- with sealing grease -G 052 128 A1- .
– Lightly oil outer circumference of new oil seals.



– Drive in oil seal on gearbox side as far as stop.



– Drive in oil seal on drive shaft side as far as stop.
– Carefully drive stub shaft into bevel box using plastic hammer.
– Install bevel box ⇒ page 83 .
– Check oil level in bevel box ⇒ page 86 .



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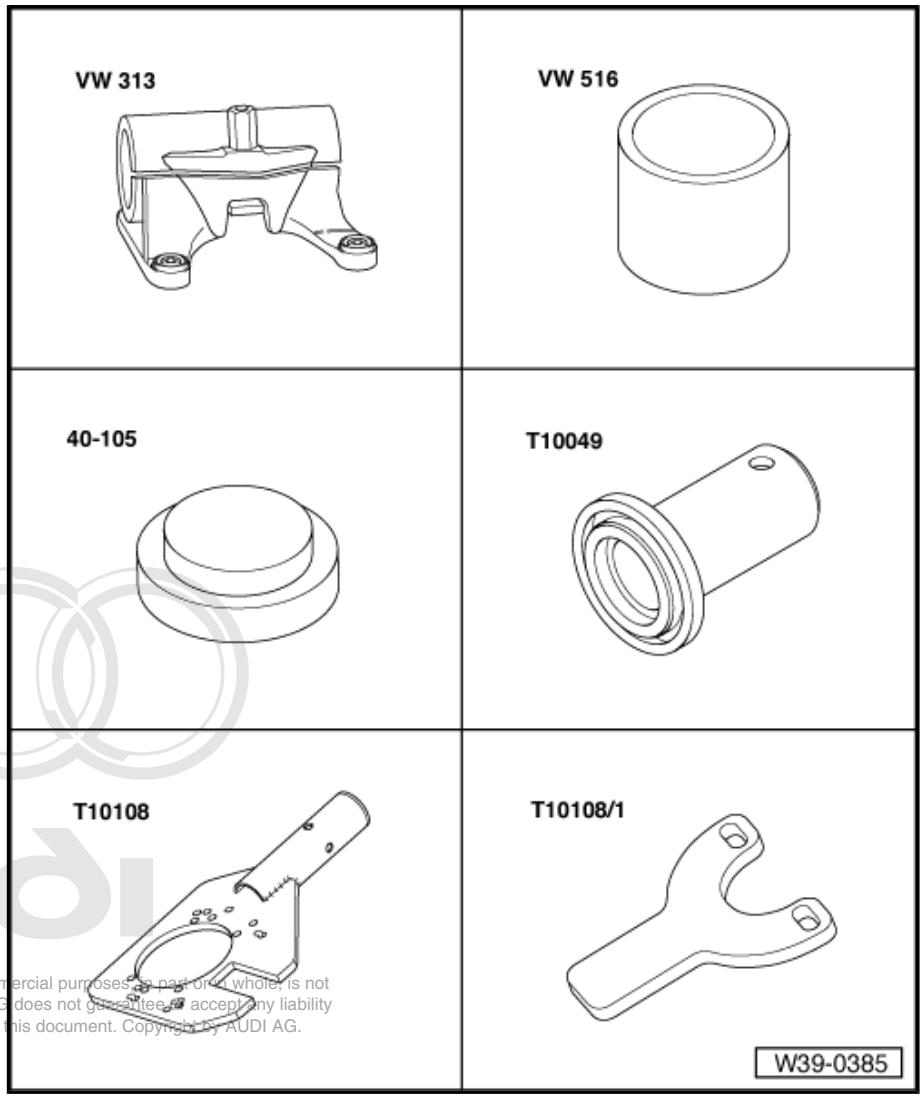
4.3 Renewing output flange oil seal on bevel box (bevel box removed)

Special tools and workshop equipment required

- Support clamp -VW 313-
- Tube -VW 516-
- Thrust plate -40-105-
- Thrust piece -T10049-
- Gearbox support -T10108-
- Support plate -T10108/1-



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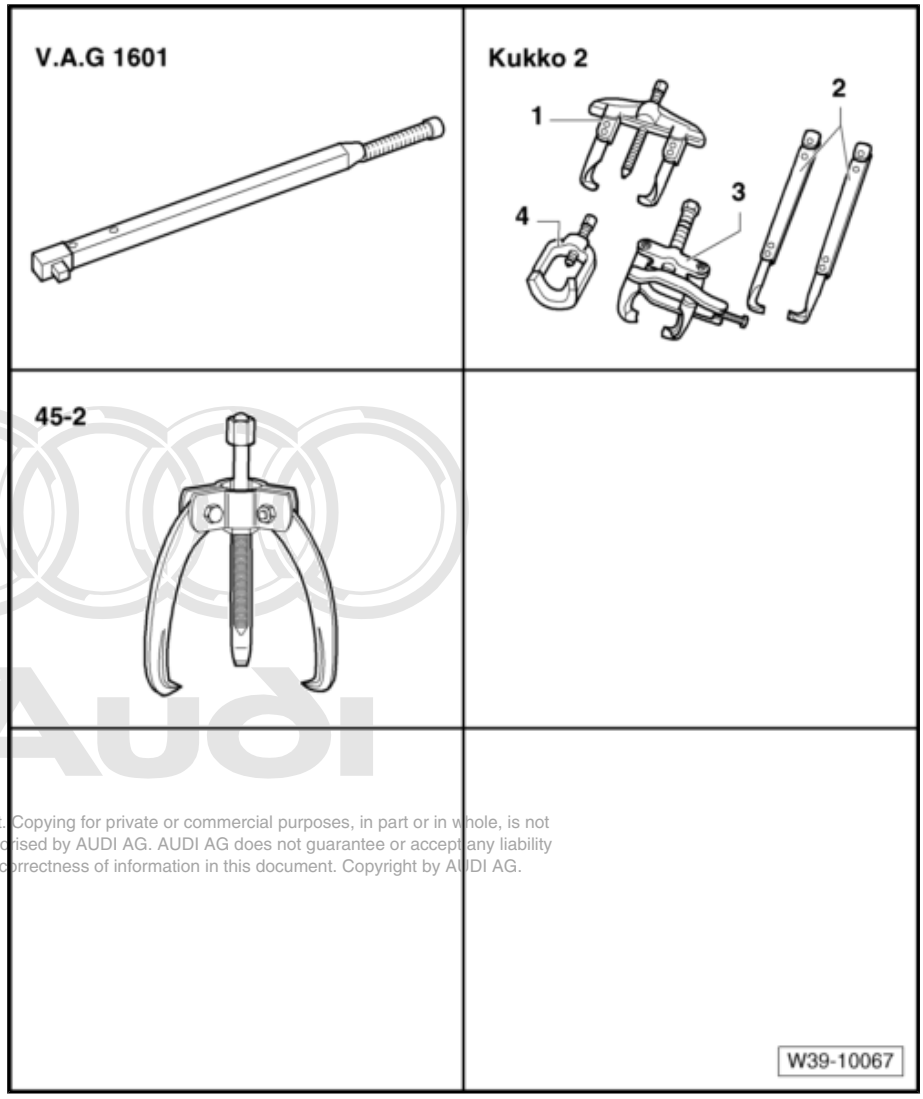
- Torque wrench -V.A.G 1601-
- -1- Two-arm puller -Kukko 20/10-
- Three-arm puller -Kukko 45-2-



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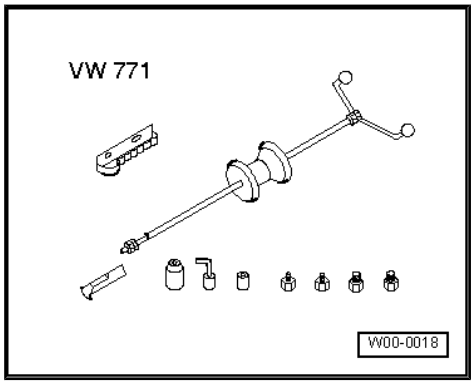
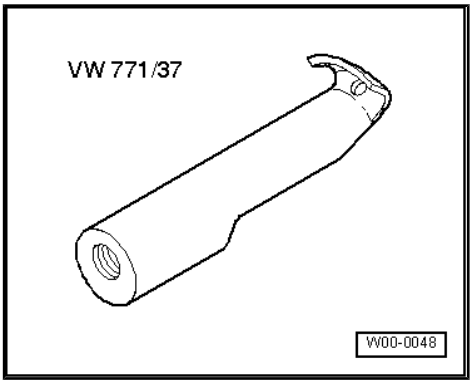
- Multi-purpose tool -VW 771-



♦ Extractor hook -VW 771/37-



♦ Sealing grease -G 052 128 A1-

♦ Bolts (2x) M10 x 30

♦ Nuts (4x) M 12 x 10

Removing

• Bevel box removed ⇒ page 80 .

Note

The bevel box output flange oil seal can only be renewed with the bevel box removed.

– Place bevel box on hole marked -5- -arrow- in gearbox support -T10108- .

A - Place nuts M 12 x 10 (4x) between bevel box and gearbox support . Nuts function as spacers.

– Then align bevel box with hole opposite and secure.

– Place drip tray underneath.

– Drain gear oil from bevel box.

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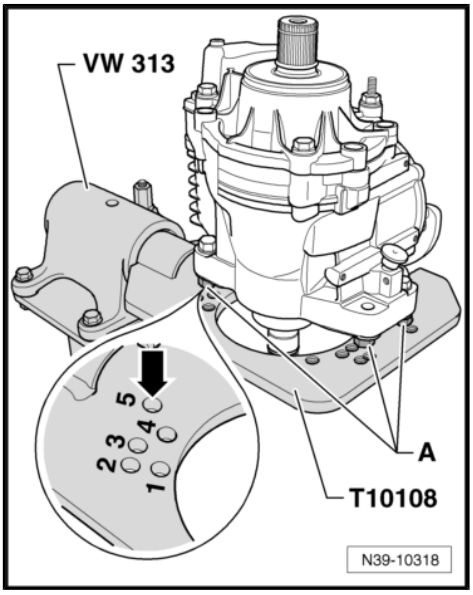
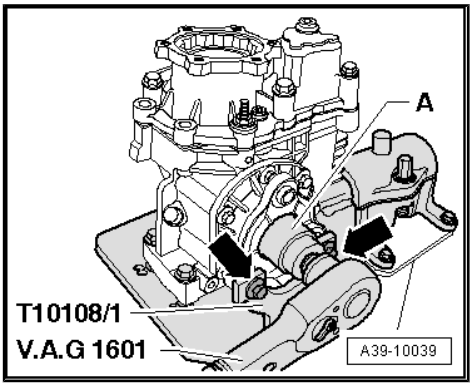


– Lock bevel box output flange with support plate -T10108/1- by screwing in M 10 x 30 bolts -arrows-.

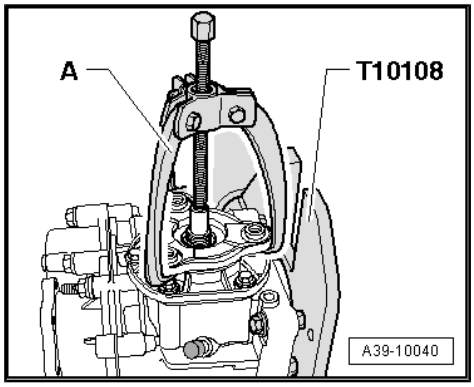
– Unscrew hexagon nut for output flange.

A - 36 mm socket for 3/4" drive

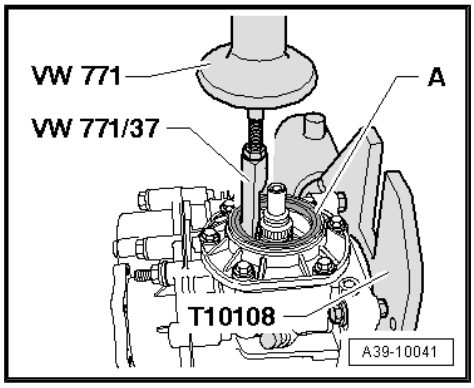


– Swing bevel box so that output flange points upwards.
– Remove output flange from shaft bevel gear of bevel box.

A - Three-arm puller , e.g. -Kukko 45-2-

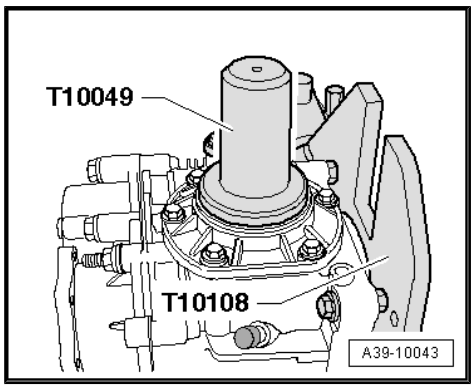


– Pull out oil seal -A- for output flange.
– Clean any residue of locking fluid from thread of shaft bevel gear.

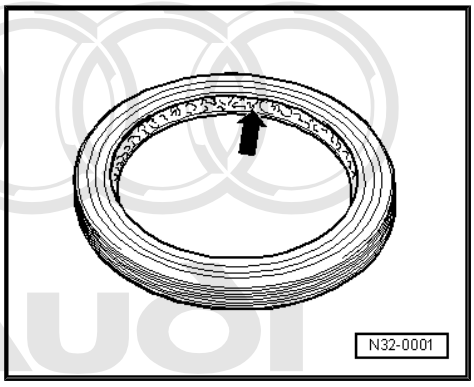


Installing

– Lightly oil outer circumference of new oil seal.
– Drive in new oil seal as far as stop using thrust piece -T10049- .



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



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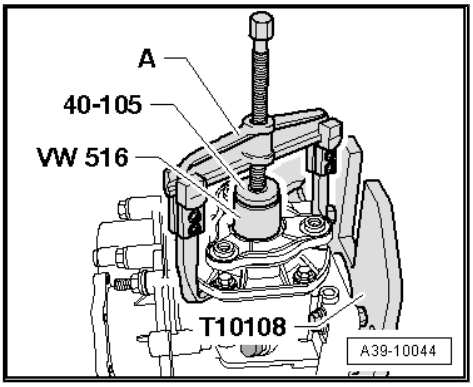
– Pull in output flange using two-arm puller -A-.

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

– Place puller hooks at bottom of pinion housing.

– Coat threads of new hexagon nut with locking fluid D 000 600.



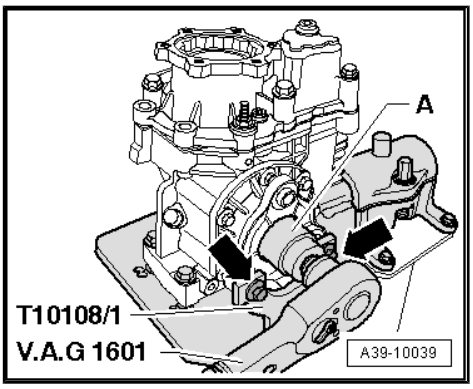
Tightening new hexagon nut for output flange to specified torque

Tightening torque ⇒ Item 10 (page 170)

A - 36 mm socket for 3/4" drive

– Install bevel box ⇒ page 83 .

– Check oil level in bevel box ⇒ page 87 .



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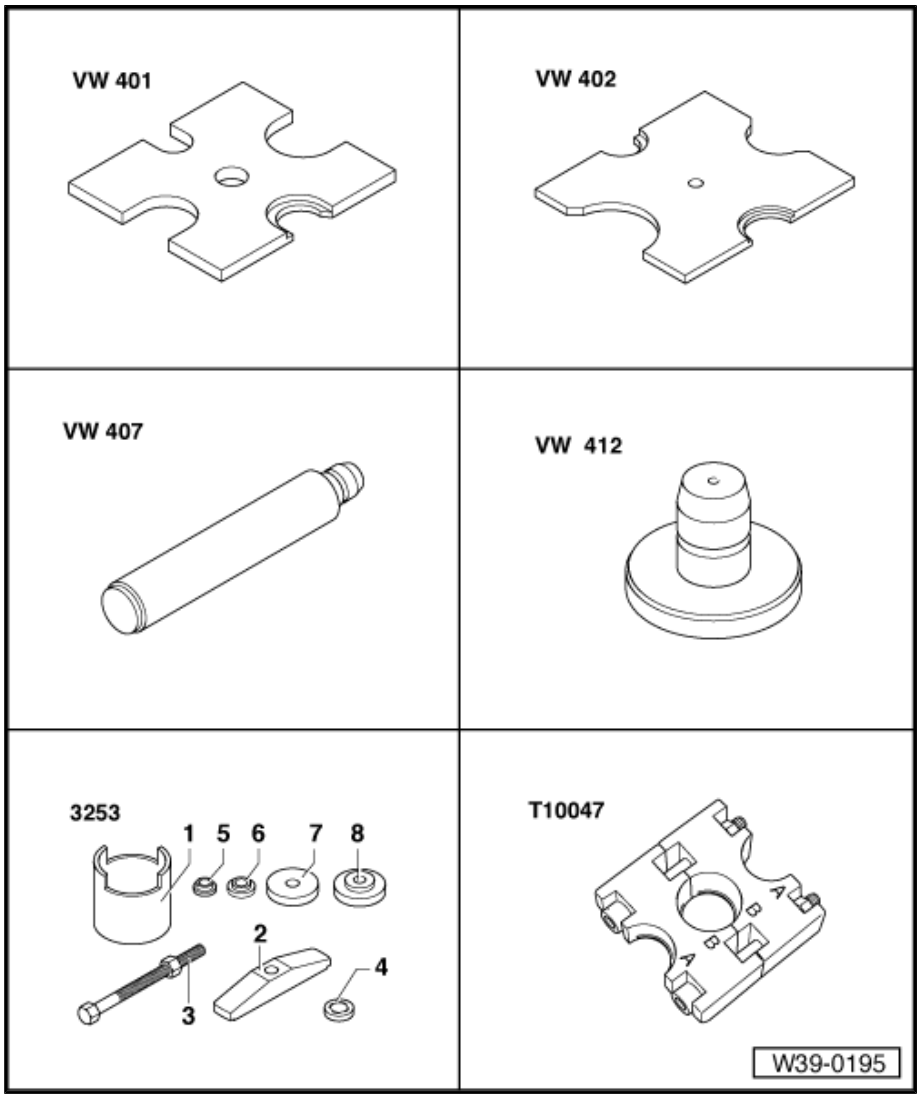
4.4 Renewing needle bearing (polygon bearing) on stub shaft of bevel box

Special tools and workshop equipment required

- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Press tool -VW 412-
- Assembly tool -3253/5-
- Clamp -T10047-



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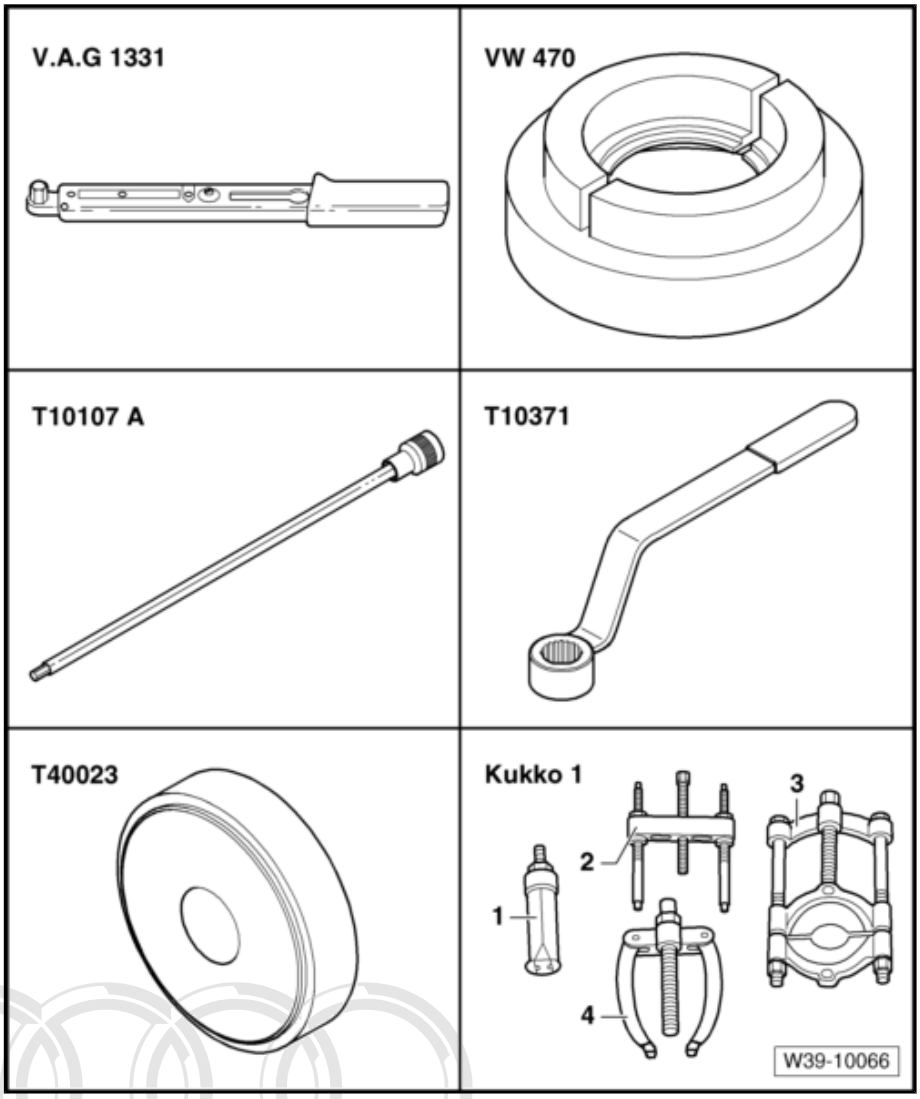
- Torque wrench -V.A.G 1331-
- Thrust pieces for pinion shaft bearing -VW 470-
- Socket and extended bit -T10107 A-
- Counterhold tool -T10371-
- Thrust piece -T40023-
- -3- Splitter 22...75 mm , e.g. -Kukko 17/1-
- Grease -G 000 100-



Removing

– Raise vehicle.

– Remove noise insulation ⇒ Rep. Gr. 66 below engine/gearbox.

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

– Remove drive shaft (right-side) ⇒ Rep. Gr. 40.

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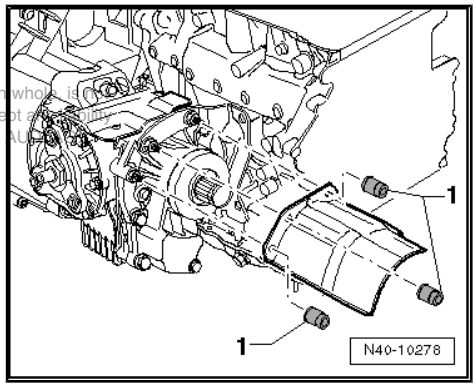
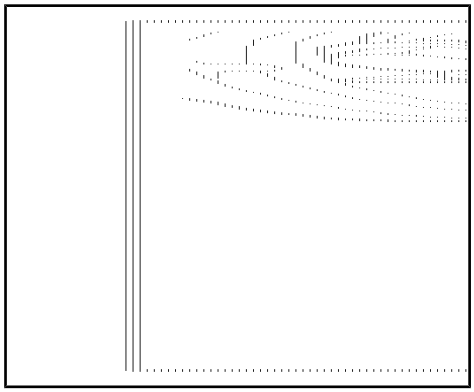
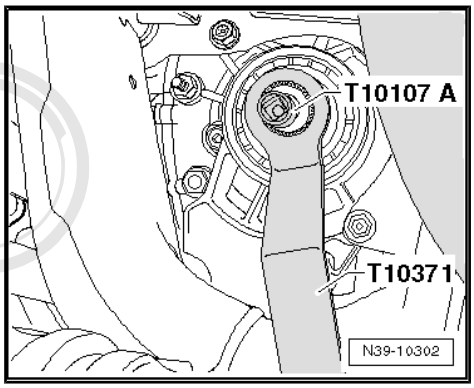


– Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.
– Place drip tray -V.A.G 1306- under the gearbox.



– Unscrew securing bolt for stub shaft (right-side).



– Remove stub shaft:

A - Half shells of a splitter 12...75 mm, e.g. -Kukko 17/1-

B - Bolts M10 x 90

C - Socket head bolts M12 X 80 with M12 nuts

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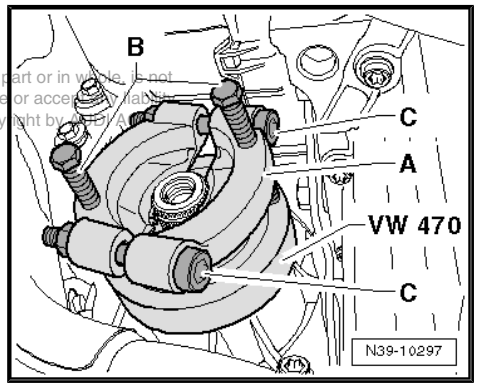
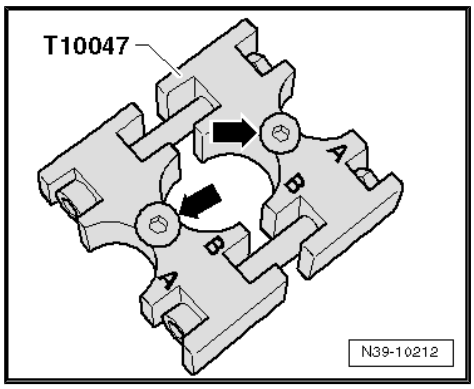
– Place thrust pieces for pinion shaft bearing -VW 470- with shoulder onto bevel box.
– Clamp half shells -A- in annular groove for circlip.
• Take care not to damage splines of stub shaft.
– Pull out stub shaft by screwing in bolts -B- alternately.



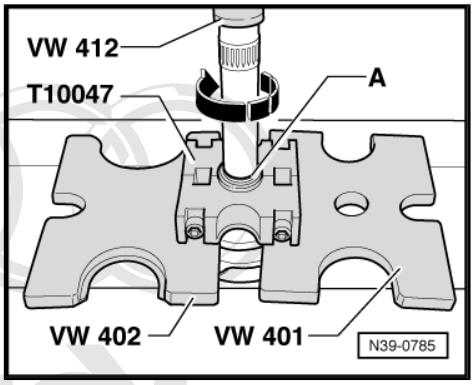
Bolts -B- bear against thrust pieces for pinion shaft bearing -VW 470- .

Now assemble clamp -T10047- as follows:

– Align both parts of tool so that marks “B” are facing together.
– The stepped shoulders -arrows- must then be below the bearing.
– Now bolt both halves together as far as stop.



– Lever off circlip -A- for needle bearing.
– To avoid damage to running surface of bearing on shaft, turn shaft while applying pressure -arrow-.



Installing

– Assemble clamp -T10047- ⇒ previous illustration (N39-10212).
– To avoid damage to running surface of bearing on shaft, turn shaft while applying pressure -arrow-.
– Secure needle bearing with a new circlip.
– Carefully drive stub shaft into bevel box using plastic hammer.

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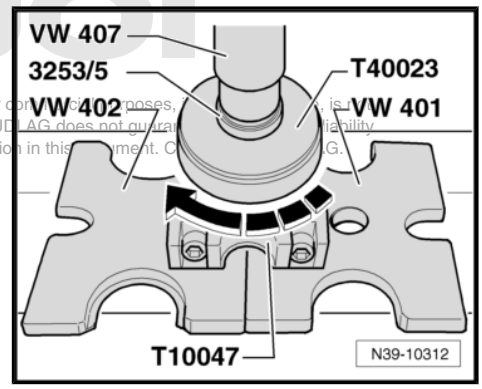
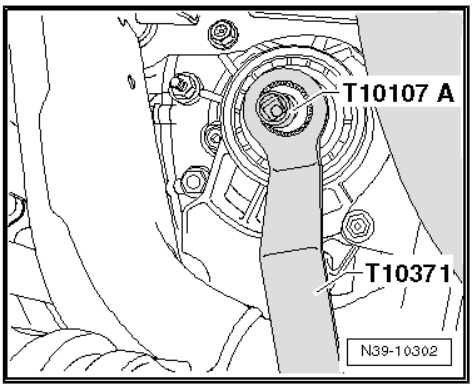


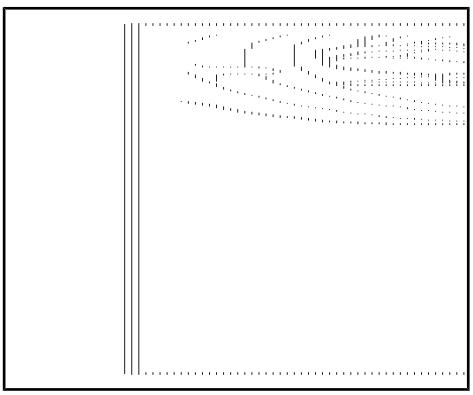
– Secure stub shaft with countersunk bolt and tighten to specified torque ⇒ Item 12 (page 185) .



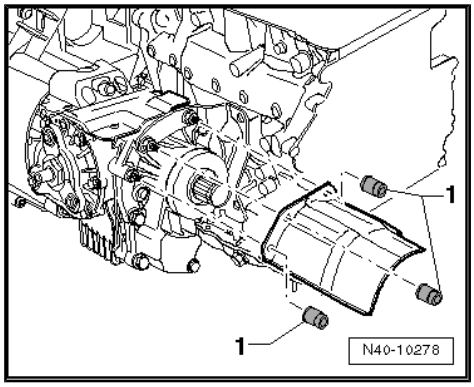
– Then install new circlip -arrow A- and new O-ring -arrow B-.

Lubricate splines of stub shaft using grease -G 000 100- .

– Install drive shaft (right-side) ⇒ Rep. Gr. 40 .



– Install heat shield for drive shaft (right-side) ⇒ page 73 .
– Check oil level in bevel box ⇒ page 87 .
– Install noise insulation ⇒ Rep. Gr. 66 .



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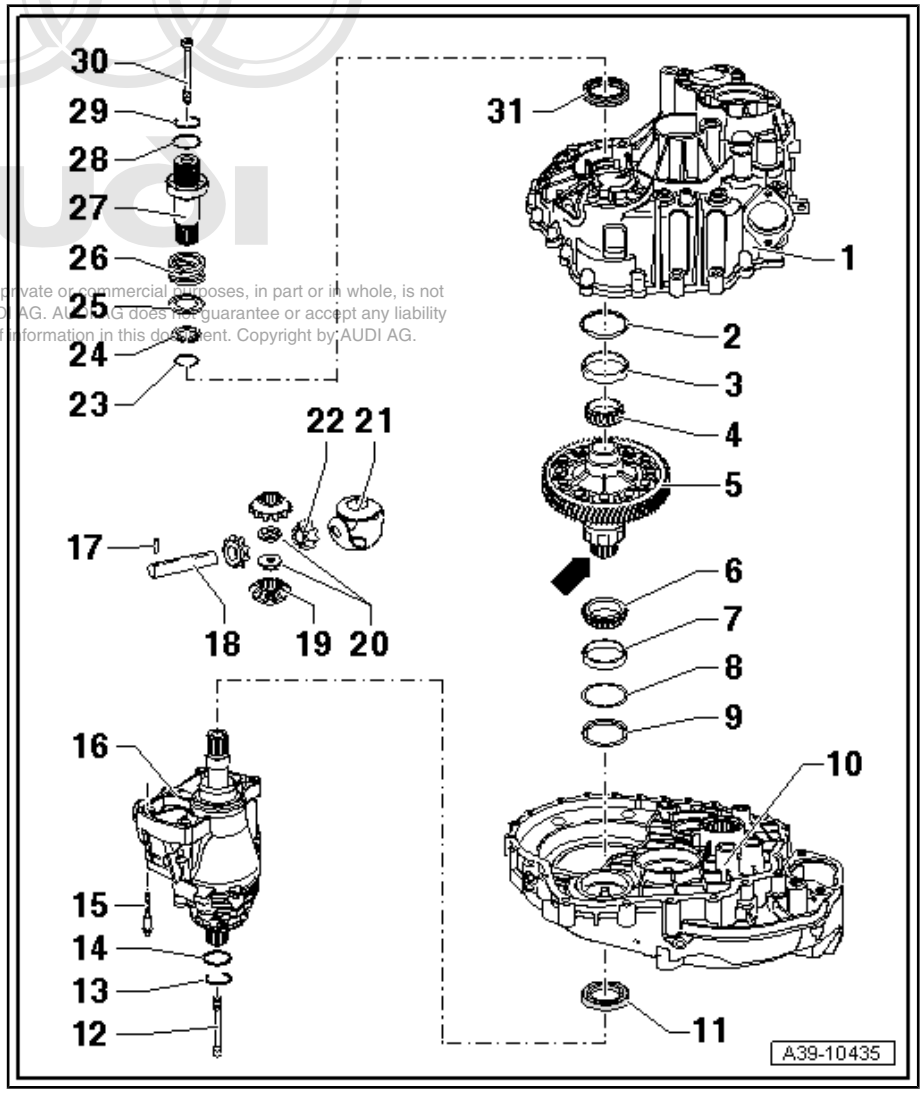
5 Exploded view - differential

Dismantling and assembling differential ⇒ page 187

Note

- *Heat tapered roller bearing inner race to 100° C before installing.*
- *Always renew both tapered roller bearings together.*
- *If differential cage is renewed, adjust differential* ⇒ page 191 .



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1 - Gearbox housing

2 - Shim

- ❑ For differential
- ❑ Always 0.65 mm thick

3 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 188
- ❑ Pressing in ⇒ page 189

4 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 189
- ❑ Pressing on ⇒ page 189

5 - Differential cage

- ❑ With splines -arrow- for bevel box in four-wheel drive vehicles

6 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 189
- ❑ Pressing on ⇒ page 189

7 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 189
- ❑ Pressing in ⇒ page 190

8 - Shim

- ❑ For differential
- ❑ Determining thickness ⇒ page 191
- ❑ Will be damaged when removed; renew

9 - Washer

- ❑ Installation position: shoulder on inside diameter faces clutch housing

10 - Clutch housing

11 - Oil seal

- ❑ Renewing with manual gearbox installed ⇒ page 168

12 - Countersunk bolt
- ❑ 35 Nm

13 - Circlip
- ❑ Fit in annular groove in stub shaft
- ❑ Always renew

14 - O-ring
- ❑ Always renew
- ❑ Fit in annular groove in stub shaft

15 - Bolt
- ❑ 40 Nm + 90°
- ❑ 4x
- ❑ Always renew

16 - Bevel box
- ❑ Removing and installing (with gearbox installed) ⇒ page 80
- ❑ Removing and installing (with gearbox removed) ⇒ assembly sequence ⇒ page 97
- ❑ Renewing oil seals on bevel box ⇒ page 170
- ❑ Renewing polygon bearing on stub shaft ⇒ page 170

17 - Spring pin
- ❑ For securing differential pinion pin
- ❑ Removing ⇒ page 190
- ❑ Installing ⇒ page 190

18 - Differential pinion pin
- ❑ Drive out with drift
- ❑ Installing ⇒ page 191

19 - Sun wheel
- ❑ Installing ⇒ page 191

20 - Threaded piece
- ❑ Installing ⇒ page 191

21 - One-piece thrust washer
- ❑ Lubricate with gear oil before installing
- ❑ Fit in differential cage ⇒ page 190

22 - Planet pinion
- ❑ Removing and installing ⇒ page 191

23 - Circlip
- ❑ Fit in annular groove in stub shaft
- ❑ Always renew

24 - Tapered ring
- ❑ Installation position: Taper towards differential cage

25 - Thrust washer
- ❑ Installation position: lip faces spring

26 - Spring for stub shaft (left-side)
- ❑ Installed behind stub shaft (left-side)

27 - Stub shaft (left-side)

28 - O-ring
- ❑ For stub shaft (left-side)
- ❑ Always renew

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- ❑ Fit in annular groove in stub shaft

29 - Circlip

- ❑ Fit in annular groove in stub shaft
- ❑ Always renew

30 - Countersunk bolt

- ❑ 35 Nm

31 - Oil seal

- ❑ For stub shaft (left-side)
- ❑ Renewing with manual gearbox installed ⇒ page 162

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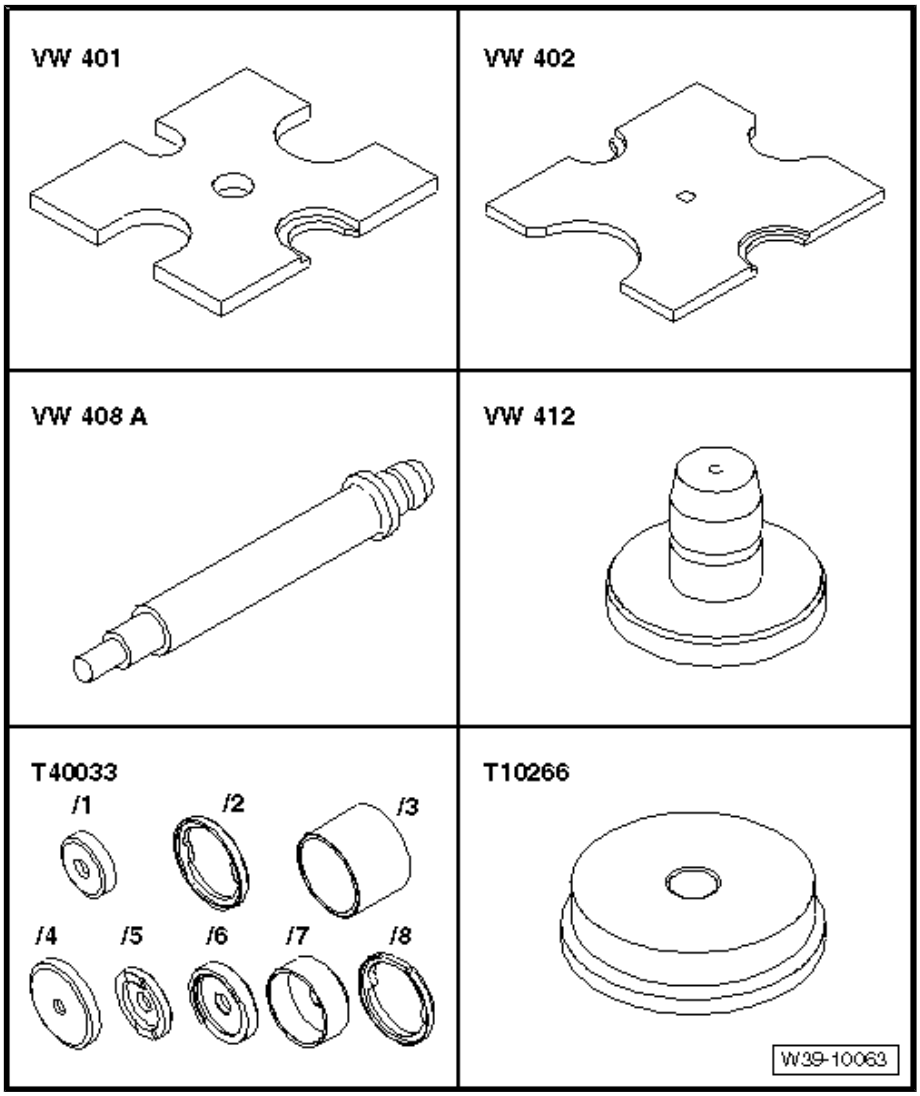
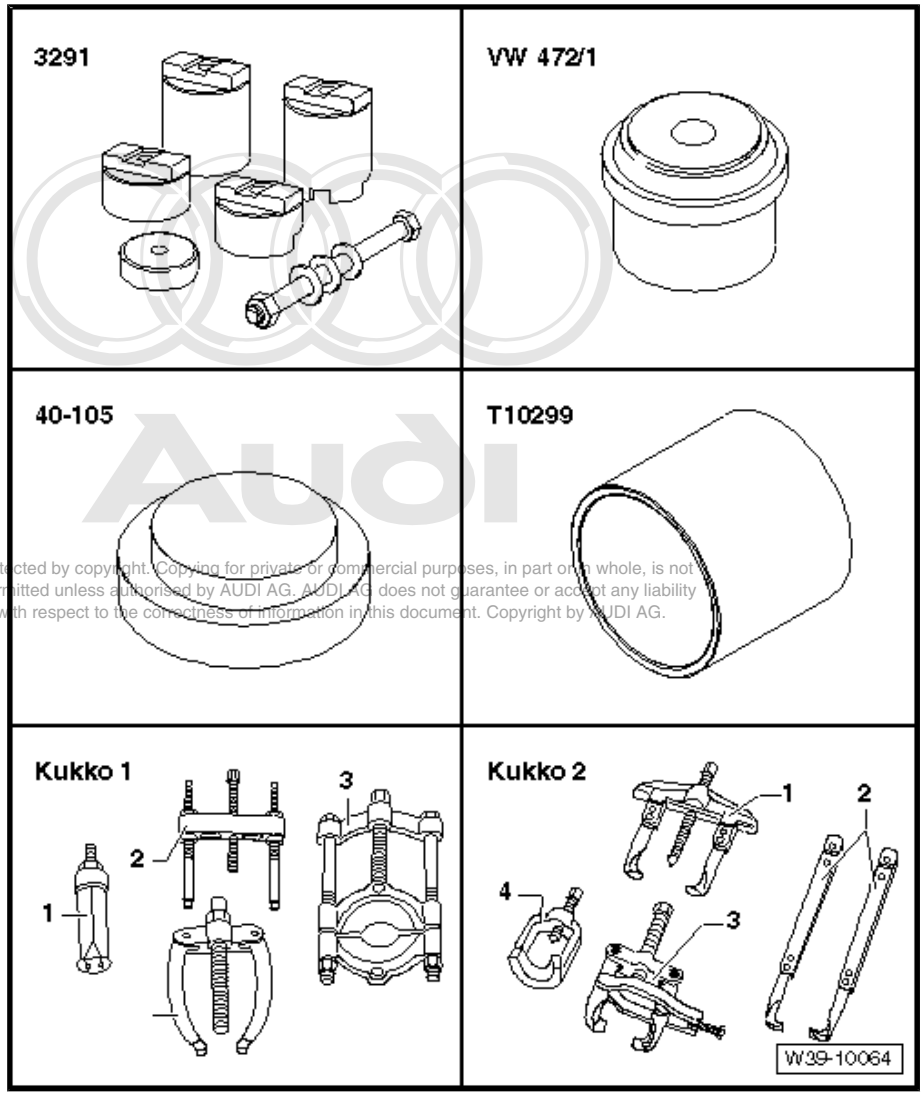
5.1 Dismantling and assembling differential

Special tools and workshop equipment required

- ♦ Thrust plate -VW 401-
- ♦ Thrust plate -VW 402-
- ♦ Press tool -VW 408 A-
- ♦ Press tool -VW 412-
- ♦ Assembly tool -T40033/3-
- ♦ Thrust piece -T10266-



- Assembly tool -3291/2-
- Press tool with spacer sleeve -VW 472/1-
- Thrust plate -40 - 105-
- Pressure sleeve -T10299-
- -1- e.g. internal puller 56… 70 mm -Kukko 21/8-
- -4- e.g. counter-support -Kukko 22/2-
- -1- e.g. two-arm puller -Kukko 20/10-



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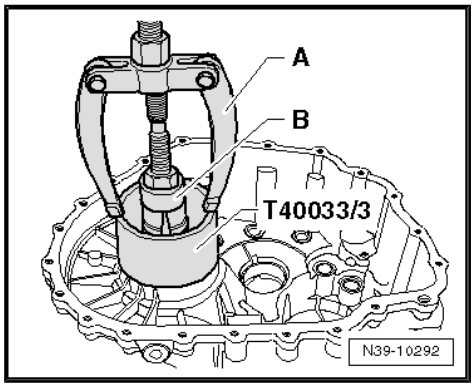
Pulling tapered roller bearing outer race out of gearbox housing

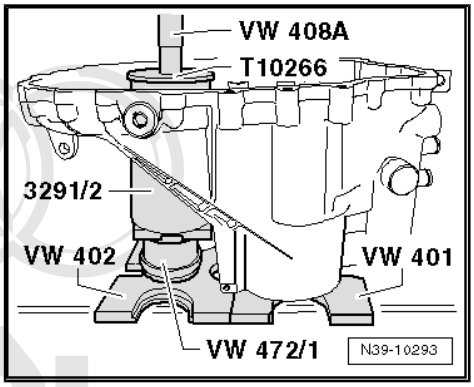
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

– Support gearbox housing with assembly tool -3291/2- directly below bearing mounting.



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

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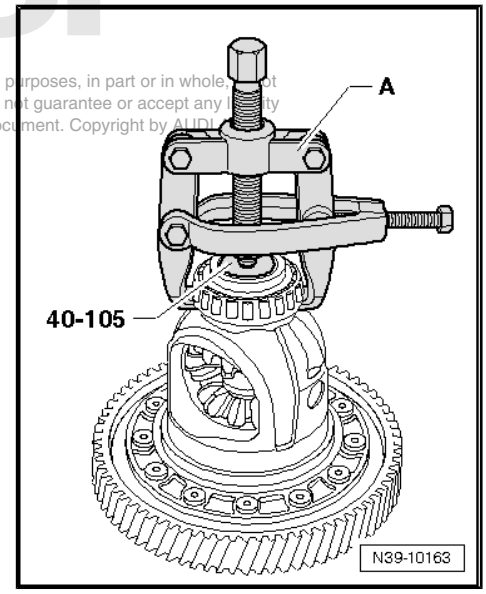
Note

The procedure for pulling the tapered roller bearing inner races off the differential cage is the same for both bearings.

– Clamp puller -A- near flat sides of differential cage behind inner race.

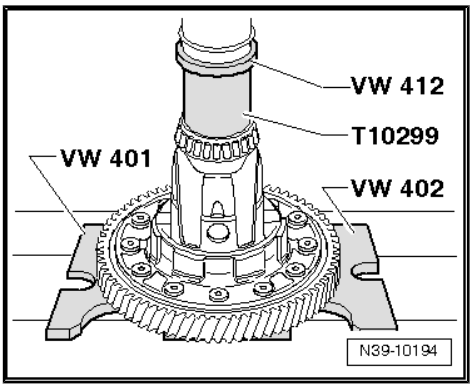
A - e.g. two arm puller -Kukko 20/10-



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

Note

The procedure for pressing the tapered roller bearing inner races onto the differential cage is the same for both bearings.



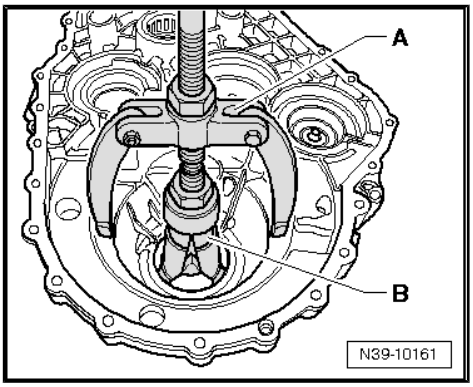
Pulling tapered roller bearing outer race out of clutch housing

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

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

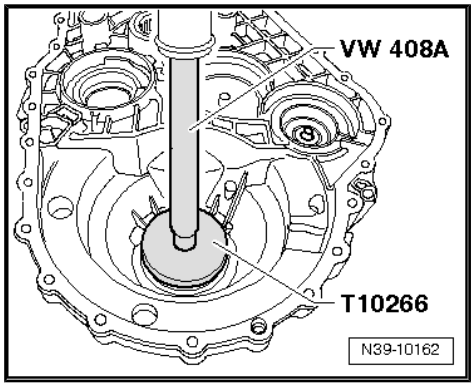
Note

After pulling out, renew damaged shim.



Pressing tapered roller bearing outer race into clutch housing

– First fit washer and shim.

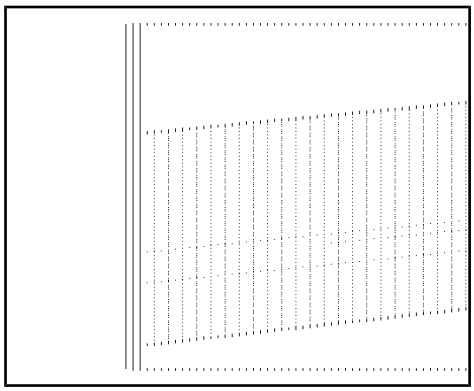


Note

Observe installation position of washer; shoulder on inner diameter faces seal.

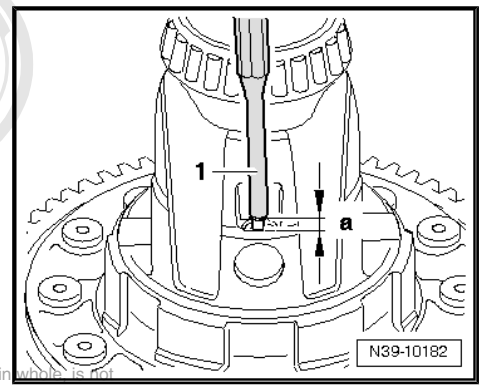
Removing spring pin for differential pinion pin

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



Installing spring pin for differential pinion pin

– Align drilling in differential pinion pin with drilling in differential cage.
– Drive in spring pin using drift -1- until dimension -a- = 3 ± 0.5 mm is attained.



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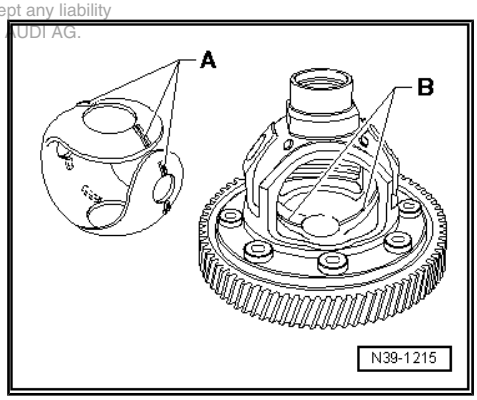
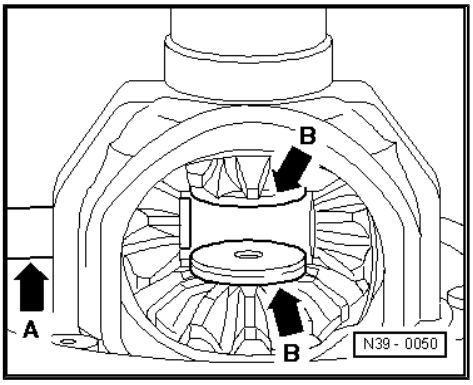
Installing one-piece thrust washer

– Lubricate one-piece thrust washer with gear oil.
– Install one-piece thrust washer so that ribs -A- engage in grooves -B- in differential cage.



Installing differential bevel gears and differential pinion pin



– Install one-piece thrust washer lubricated with gear oil ⇒ page 190 .
– Install both sun wheels and secure in position (e.g. with stub shaft).
– Fit planet pinions (180° apart) and pivot into position.
– Push differential pinion pin -arrow A- in as far as first planet pinion.
– Fit threaded pieces -arrows B- in sun wheels.

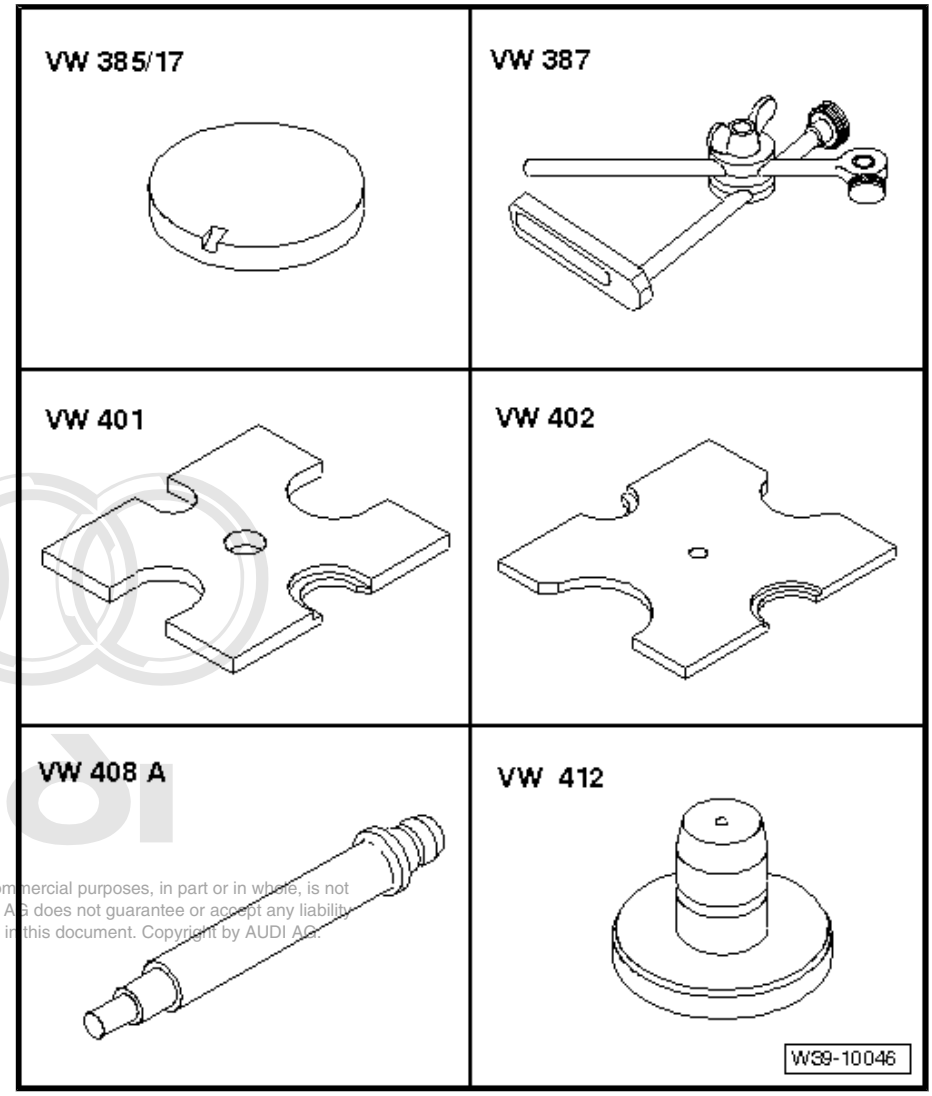
Installation position: Stepped shoulder towards sun wheel

– Drive differential pinion pin into final position and secure with spring pin ⇒ page 190 .

5.2 Adjusting differential

Special tools and workshop equipment required

- End measuring plate -385/17-
- Universal dial gauge bracket -VW 387-
- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 408 A-
- Press tool -VW 412-



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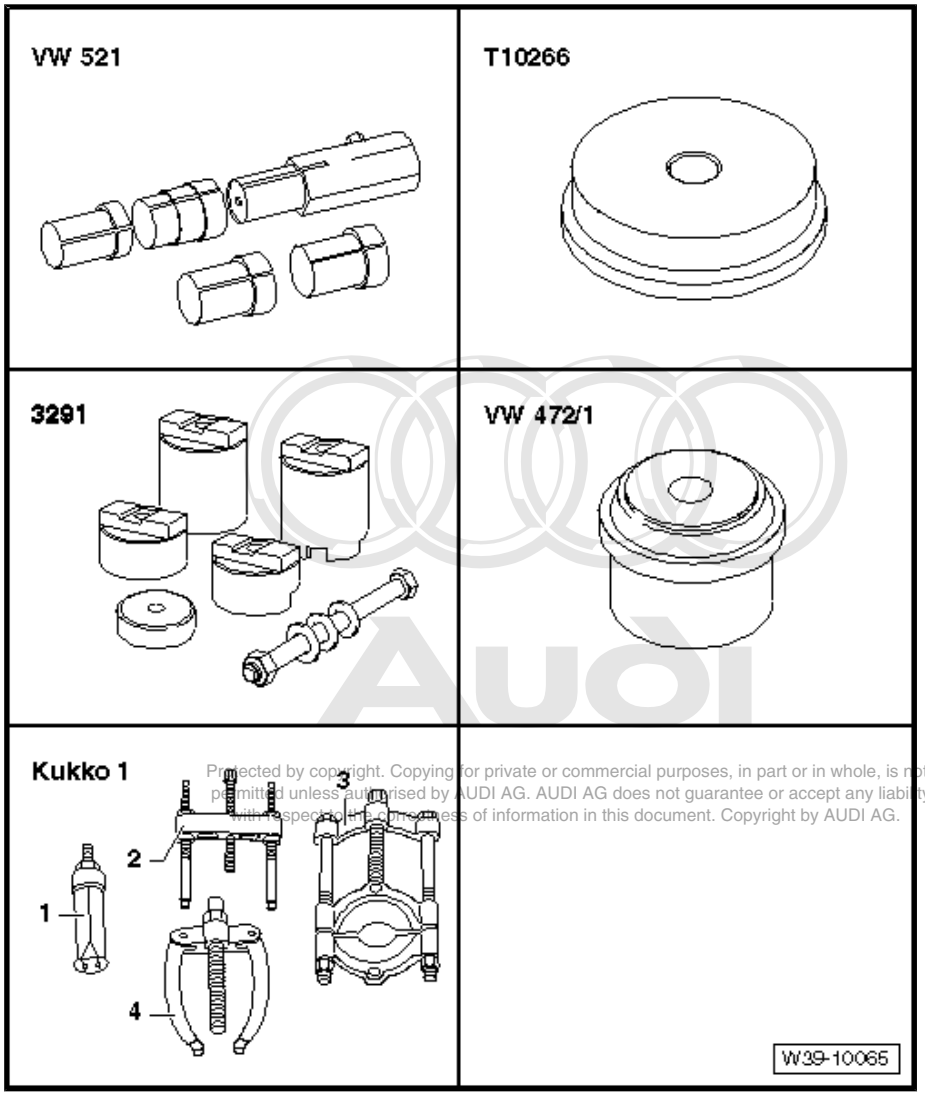
- Crown wheel adjusting tool -VW 521-
- Thrust piece -T10266-
- Assembly tool -3291/2-
- Press tool with spacer sleeve -VW 472/1-
- -1- e.g. internal puller 56… 70 mm -Kukko 21/8-
- -4- e.g. counter-support -Kukko 22/2-



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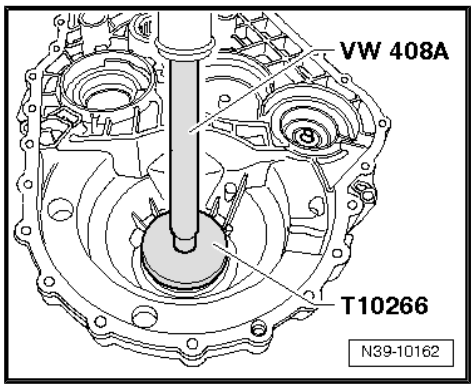
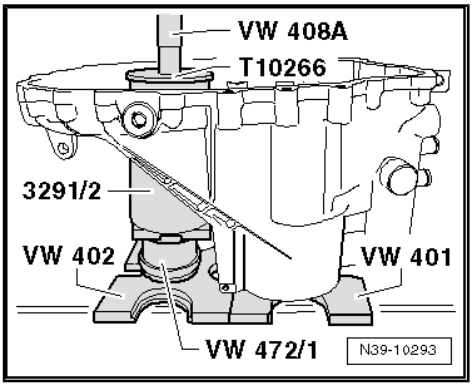
- The differential must be re-adjusted when the differential cage has been renewed.

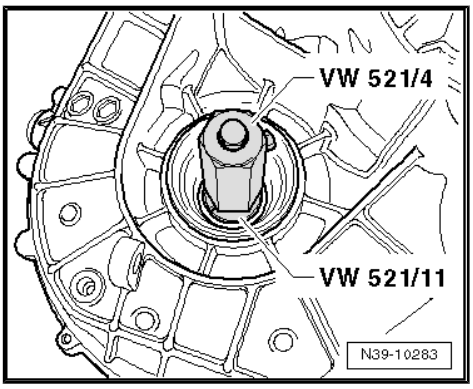
– Press tapered roller bearing outer race, without shim, into clutch housing.



– Press tapered roller bearing outer race with 0.65 mm thick shim into gearbox housing.
– Install differential in clutch housing.
– Fit gearbox housing and tighten 5 bolts to specified torque.



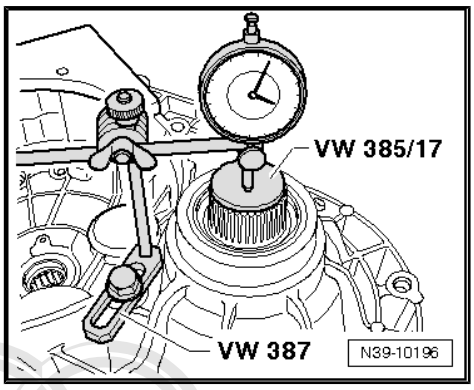
– Secure special tool crown wheel adjusting tool -VW 521/4- with crown wheel adjusting tool -VW 521/11- to differential cage on gearbox housing side.
– Secure universal dial gauge bracket -VW 387- to clutch housing and set dial gauge to “0” with 1 mm preload.
– Swing round gearbox in assembly stand so that clutch housing faces upwards.



– Press differential towards clutch housing; hold in this position and turn eight times.
– Move differential up and down using special tool -VW 521/4- and note play indicated on dial gauge (in this example: 0.70 mm).

Select required shim from table ⇒ page 194 .

• It is important to perform the measurement as shown in the illustration. Otherwise the measured value will be incorrect.



Installing shim

– Take off gearbox housing.

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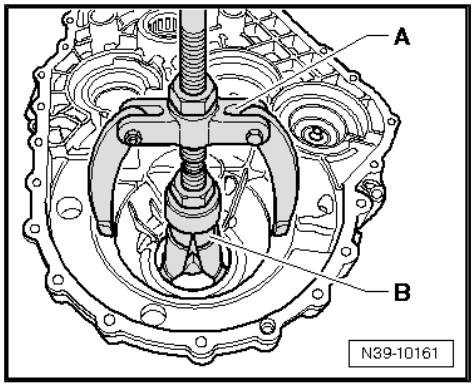
– Pull tapered roller bearing outer race out of clutch housing.



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

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

– First fit washer in clutch housing.

Note

Observe installation position of washer; shoulder on inner diameter faces seal.

– Then fit shim of determined thickness (in example, 0.95 mm).

The following shims are available:

Bearing clearance	Shim
Measured value (mm)	Thickness (mm)
0.65 … 0.675	0.65
0.676 … 0.725	0.70
0.726 … 0.775	0.75
0.776 … 0.825	0.80
0.826… 0.875	0.85
0.876… 0.925	0.90
0.926… 0.975	0.95
0.976… 1.025	1.00
1.026…1.075	1.05
1.076…1.125	1.10
1.126…1.175	1.15
1.176…1.225	1.20
1.226…1.275	1.25
1.276…1.325	1.30
1.326…1.375	1.35
1.376…1.425	1.40

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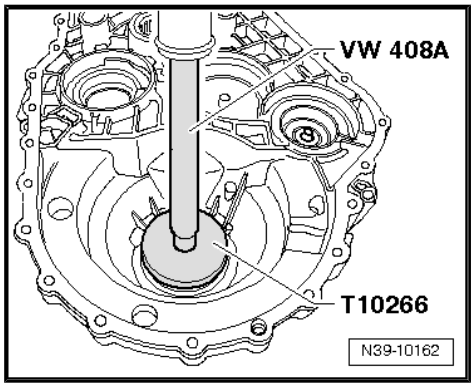
Note

Select correct shims from ⇒ Electronic parts catalogue .

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

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



– Press in outer race again and secure gearbox housing.

6 Propshaft

Description of propshaft ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

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7 Rear final drive

Description of rear final drive ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

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