Workshop Manual

Audi TT 2007 ➢

6-speed manual gearbox 02S, front-wheel drive

Edition 05.2008

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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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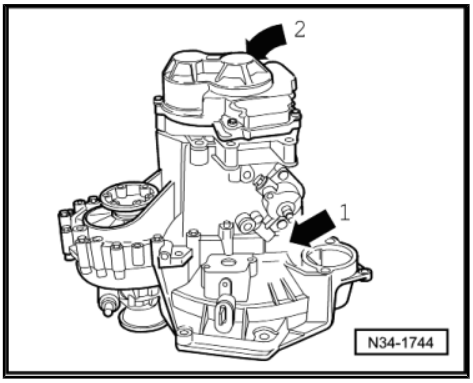
00 – Technical data

1 Gearbox identification

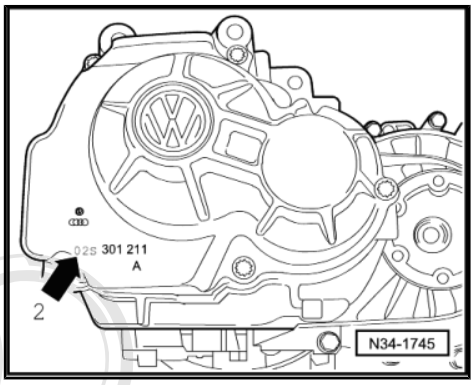
- ⇒ “1.1 Code letters, allocation, transmission ratios, capacities”, page 1

Location on gearbox

- Code letters and date of manufacture -arrow 1-
- Manual gearbox 02S -arrow 2-

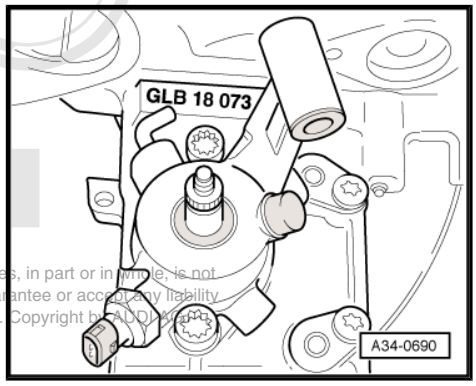


Manual gearbox 02S -arrow 2-



Code letters and date of manufacture of gearbox

Example:	GLB	18	07	3
	I	I	I	I
	Code letters	Day	Month	Year (2003) of manufacture



Additional data are production-related.

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Note

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

1.1 Code letters, allocation, transmission ratios, capacities

Manual gearbox		6-speed 02S		
Code letters		JWX	KVT	
Manufactured	from	02.08	05.08	
	to			
Allocation	Model	Audi TT 2007 ▸	Audi TT 2007 ▸	
	Engine	1.8 ltr. - 118 kW TFSI	1.8 ltr. - 118 kW TFSI	
Ratio	Final drive	62 : 17 = 3.647	62 : 17 = 3.647	
$Z_2 : Z_1 = i$	1st gear	34 : 9 = 3.778	34 : 9 = 3.778	

Manual gearbox		6-speed 02S		
	2nd gear	33 : 16 = 2.063	33 : 16 = 2.063	
	3rd gear	32 : 22 = 1.455	32 : 22 = 1.455	
	4th gear	31 : 28 = 1.107	31 : 28 = 1.107	
	5th gear	28 : 32 = 0.875	28 : 32 = 0.875	
	6th gear	29 : 40 = 0.725	29 : 40 = 0.725	
	Reverse gear	36 : 20 x 18 : 9 = 3.600	36 : 20 x 18 : 9 = 3.600	
Overall ratio $i_{ov.}$ in top gear		2.644	2.644	
Capacity		2.1 litres		
Clutch actuation		Hydraulic		
The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Allocation of drive shaft flanges ◆ Allocation of clutch type				

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2 Transmission layout

Note

-Arrows- point in direction of travel.

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

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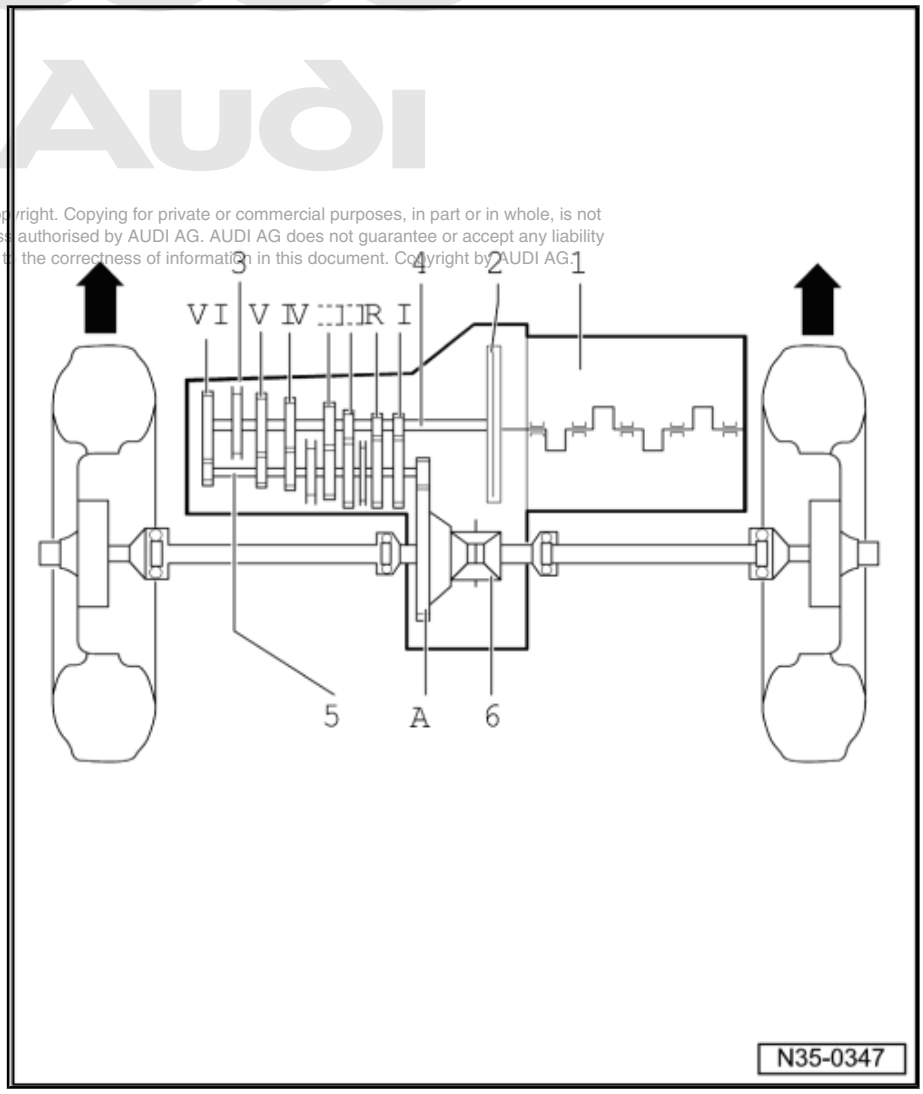

3 Calculating ratio “i”

Example:

	6th gear	Final drive
Drive gear	$ZG_1 = 38$	$ZA_1 = 17$
Driven gear	$ZG_2 = 31$	$ZA_2 = 62$

$i = Z_2 : Z_1$ 1)

i_G = gear ratio = $ZG_2 : ZG_1 = 31 : 38 = 0.816$

i_A = axle ratio = $ZA_2 : ZA_1 = 62 : 17 = 3.647$

i_{ov} = overall ratio

$i_{ov} = i_G \times i_A = 0.816 \times 3.647 = 2.975$

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

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4 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.

Special tools

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

Gearbox

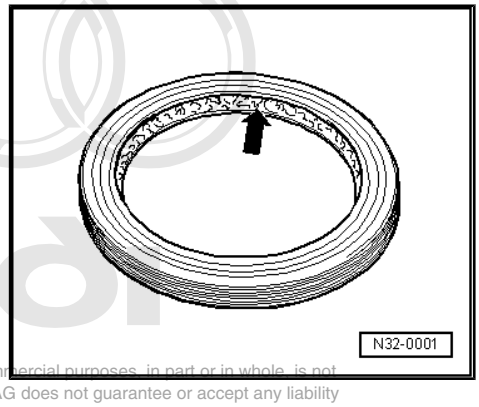
- Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- When installing, ensure that the dowel sleeves between the engine and gearbox are correctly located.
- For allocation of bolts and other components, refer to ⇒ Electronic parts catalogue .
- Clean contact surfaces 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 ⇒ page 95 .
- Capacities and specifications ⇒ page 1

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.

Oil seals, seals, O-rings and gaskets

- Always renew seals, O-rings and gaskets.
- After removing gaskets and seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- Before installing oil seals, lightly oil the outer circumference of the seal and fill the space between the sealing lips -arrow- about half full with grease -G 052 128 A1- .
- The open side of the oil seal should face the side containing the fluid.
- When installing a new oil seal, position the seal in the housing so that the sealing lip does not contact the shaft in the same place as the old seal (make use of installation depth tolerances).
- Lightly lubricate O-rings with oil before installation to prevent them being trapped during assembly.
- Check oil level after installing new gaskets, O-rings and oil seals ⇒ page 95 .



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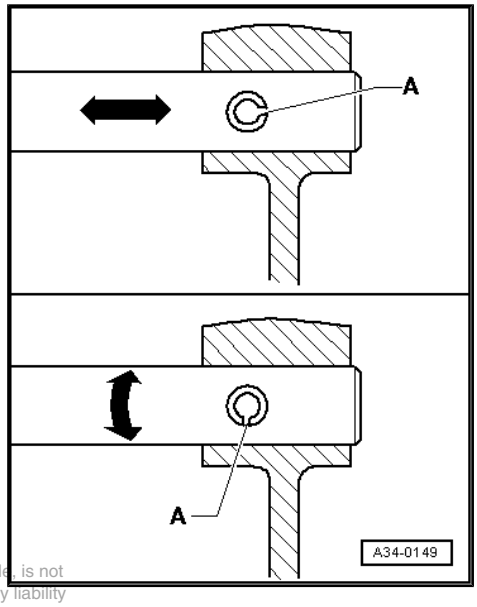
Locking elements

- Do not over-stretch circlips.
- Always renew circlips which have been damaged or over-stretched.
- Circlips must be properly seated in the base of the groove.
- Renew spring pins. Position: the slit -A- should be in line with the line of force -arrow-.



Nuts, bolts

- Loosen the nuts and bolts in reverse sequence to the specified tightening sequence.
- Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- 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

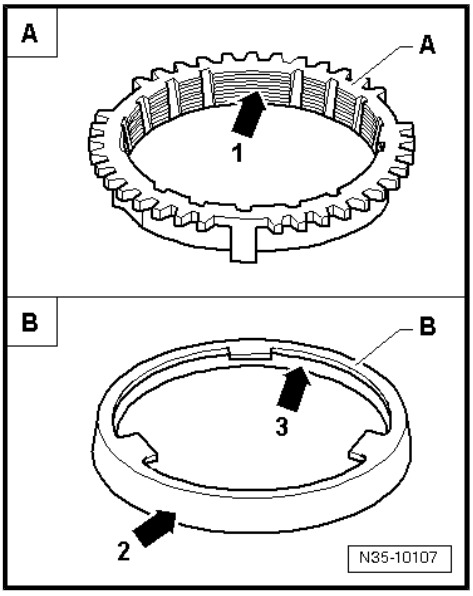
- Install new tapered roller bearings as supplied; do not lubricate additionally with oil.
- Lubricate all bearings (except tapered roller bearings) with gear oil before installing in gearbox.
- Use inductive heater -VAS 6414- to heat inner races of tapered roller bearings to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.
- Do not interchange 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 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

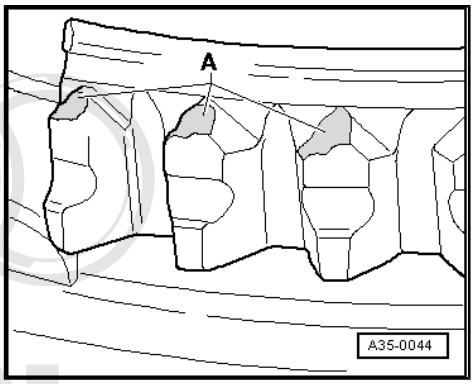
- Clean before pressing on.
- Use inductive heater -VAS 6414- to heat to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.

Selector gears and locking collars

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

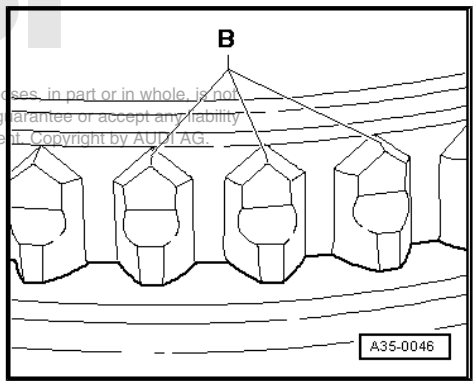
- Abnormal wear on synchro-ring or selector gear:

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.



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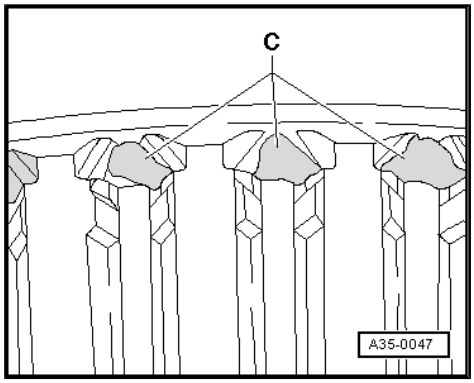
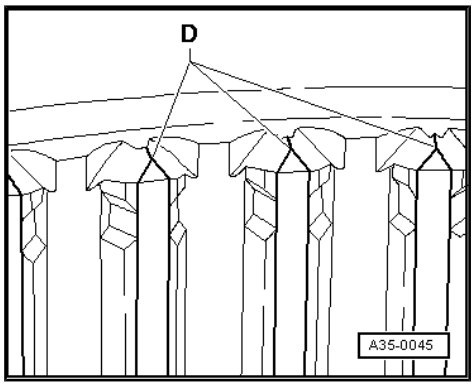
♦ Abnormal wear on locking collar:

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

♦ When removing gearbox, remove clutch slave cylinder without disconnecting pipes.

♦ Do not depress the clutch pedal after removing the slave cylinder if the hydraulic pipe is still connected. Otherwise the piston will be pressed out of the slave cylinder.

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

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

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30 – Clutch

1 Overview - clutch mechanism

Note

If you suspect that a clutch master cylinder or clutch slave cylinder is defective, observe and perform the following prior to renewing.

- ⇒ “2 Notes on removing and installing clutch master cylinder and slave cylinder”, page 10
- ⇒ “2.1 Function check for clutch master cylinder and slave cylinder”, page 10

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I -
⇒ “3 Exploded view - pedal cluster, clutch master cylinder”, page 12

⇒ “3.1 Removing and installing over-centre spring”, page 13

⇒ “3.2 Removing and installing clutch pedal”, page 15

⇒ “3.3 Removing and installing mounting bracket”, page 18

⇒ “3.4 Removing and installing clutch position sender G476 ”, page 20

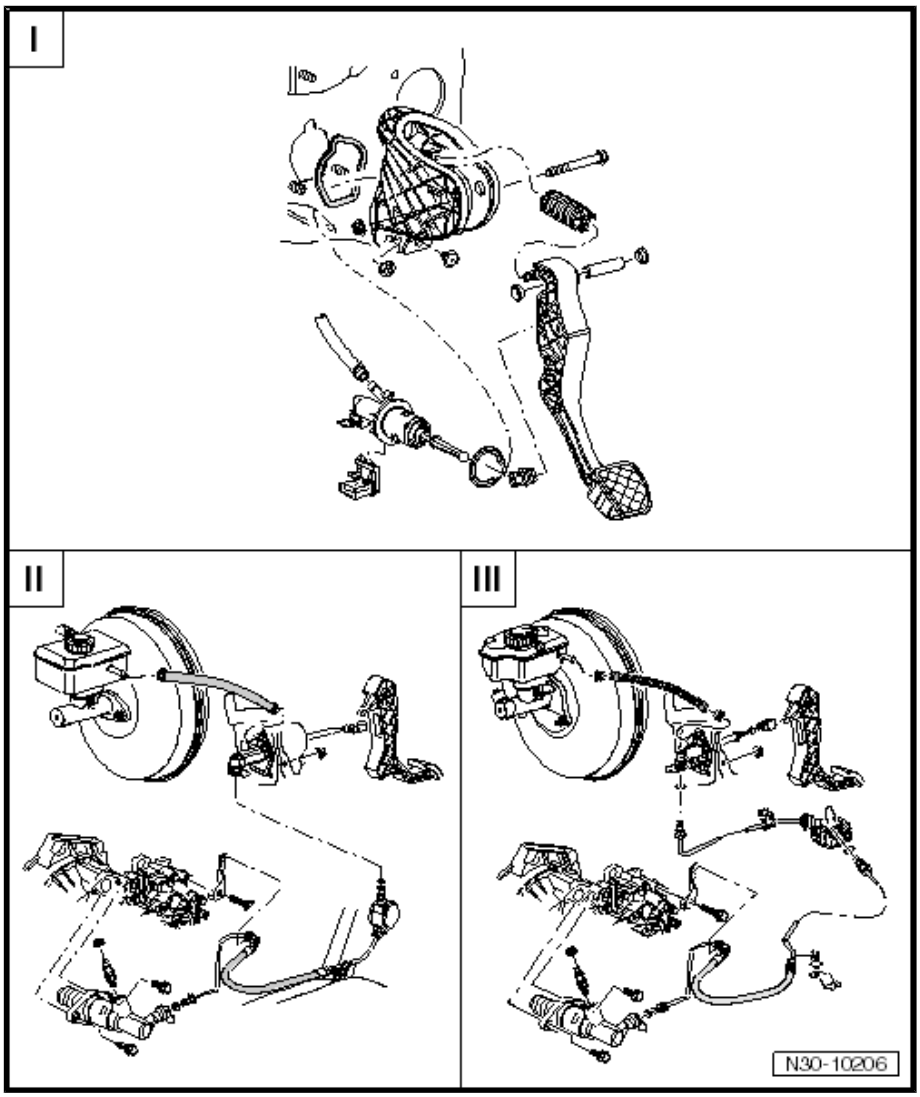
⇒ “3.5 Removing and installing clutch master cylinder”, page 21

II -
⇒ “4 Exploded view - hydraulic system (LHD vehicles)”, page 23

⇒ “4.1 Removing and installing clutch slave cylinder”, page 25

⇒ “4.3 Bleeding clutch system”, page 29

III -
⇒ “5 Exploded view - hydraulic system (RHD vehicles)”, page 31



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

- Before renewing the clutch master cylinder or slave cylinder on the assumption that it is defective you must first carry out a function check
⇒ “2.1 Function check for clutch master cylinder and slave cylinder”, page 10 .
- If slave cylinder is removed from gearbox with pipe/hose assembly still attached, make sure you do not press clutch pedal. Otherwise, the piston will be pressed out of the slave cylinder and be destroyed.
- After installing the slave cylinder, carefully press the clutch pedal. If you feel an unusually strong point of resistance when depressing the clutch pedal, you must not press it down further. The plunger of the slave cylinder is likely to have been guided past the clutch release lever. The slave cylinder would then be destroyed once pedal force exceeds approx. 300 N.

2.1 Function check for clutch master cylinder and slave cylinder

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

Noises when operating the clutch:

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

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

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

Check the complete hydraulic system for leaks.

- Check brake fluid level in brake fluid reservoir.
- Check clutch master cylinder and slave cylinder as well as the pipe/hose assembly including connections for external leaks (visual inspection).

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- If you identify any leaks you must renew the leaking component.
- Bleed clutch system ⇒ page 29 .

Pedal forces:

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

High pedal force:

- Mechanically defective pressure plate/clutch plate ⇒ page 35 .

Clutch does not disengage or does not disengage fully:

- Air in hydraulic system: bleed clutch system ⇒ page 29 and check hydraulic system for external and internal leaks.
- Clutch plate does not move smoothly on input shaft splines (due to corrosion or dirt, etc.)
- Foreign body in clutch system
- Mechanically defective pressure plate/clutch plate ⇒ page 35 .
- Wrong components used or components forgotten when carrying out repair work (e.g. intermediate plate or dowel sleeves).

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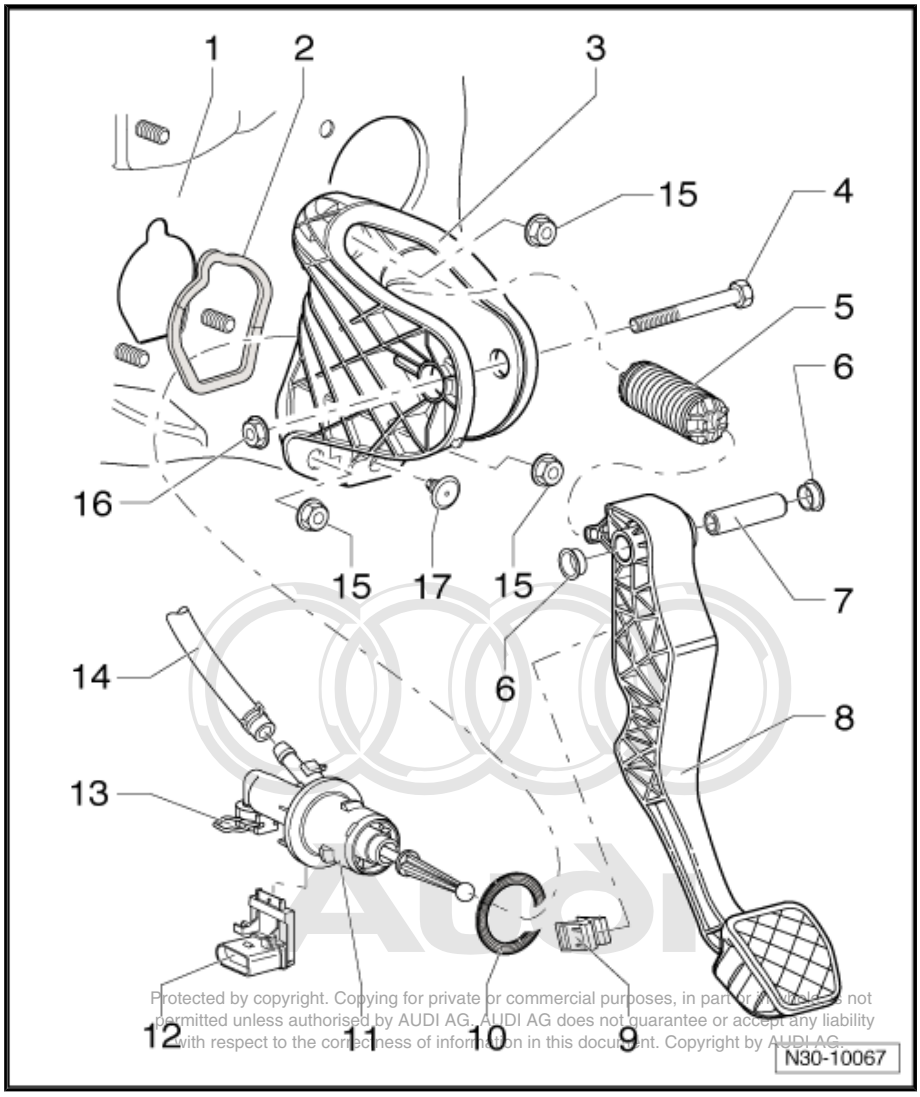
3 Exploded view - pedal cluster, clutch master cylinder



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1 - Bulkhead

- ❑ With mounting for mounting bracket

2 - Gasket

- ❑ Always 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 on master cylinder

10 - Seal

- ❑ Always 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

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

16 - Nut

- ❑ 25 Nm
- ❑ Self-locking
- ❑ Always renew

17 - Stop

- ❑ For clutch pedal

Crash bar - tightening torque

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

- M6 10 Nm
- M8 20 Nm

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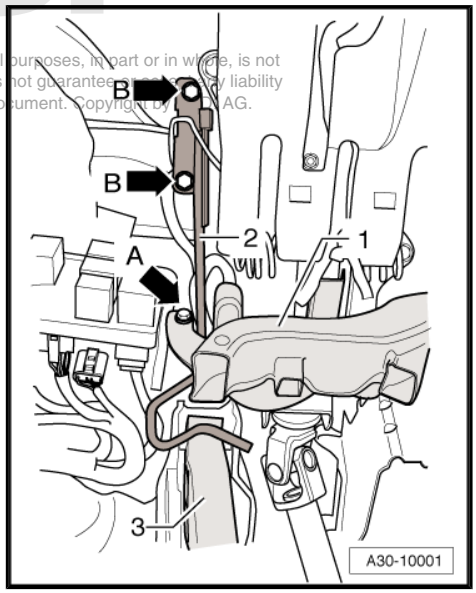
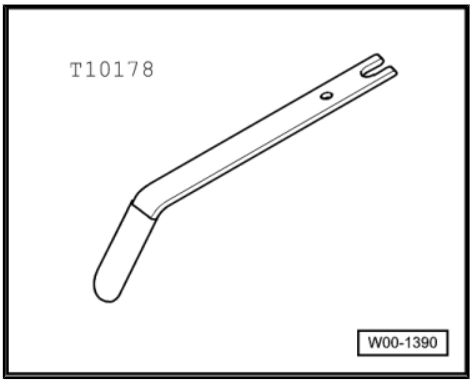


3.1 Removing and installing over-centre spring

Special tools and workshop equipment required

♦ Lever -T10178-



Removing

- Clutch pedal mounting bracket fitted in vehicle

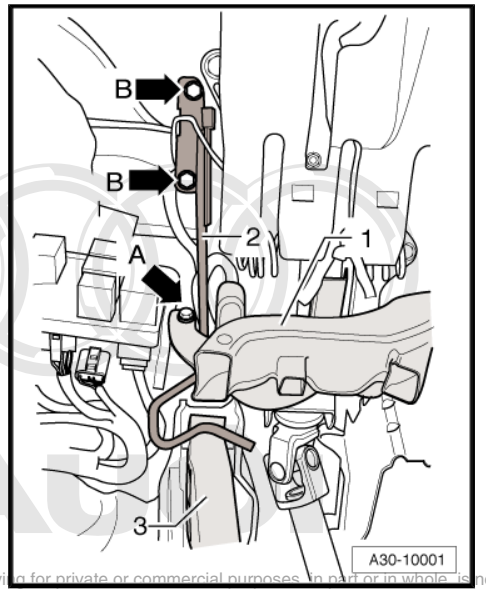
– Move driver's seat away from pedals.

– 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).



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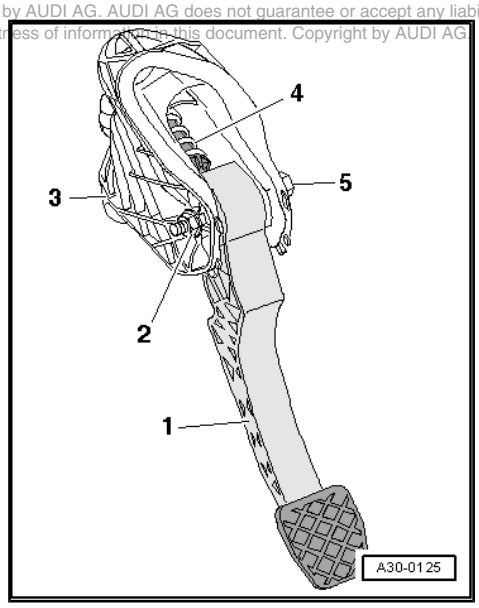
– Unbolt clutch pedal -1- from mounting bracket -3-. To do this, remove nut -2- and pull out bolt -5-.



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.

Installing

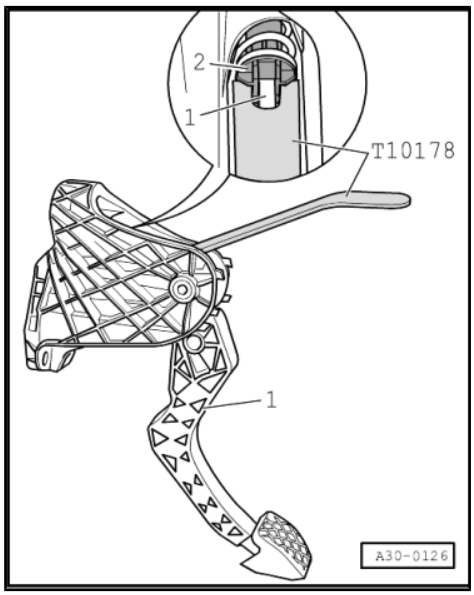
- Tightening torques ⇒ page 12

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.

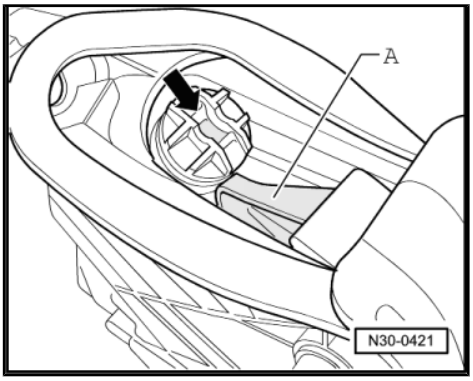
– Fit actuator on clutch pedal -A- into corresponding socket in over-centre spring -arrow-.

– 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 .

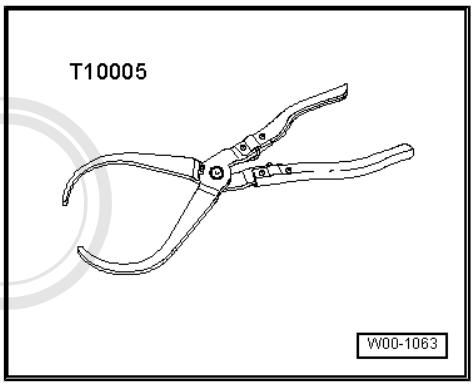
– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .



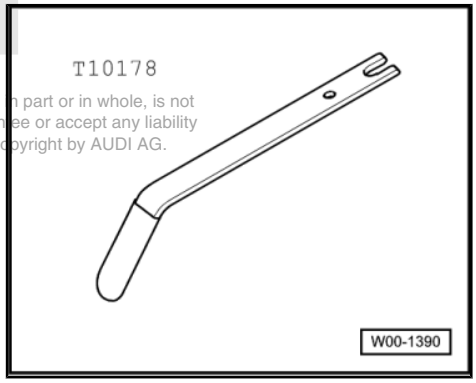
3.2 Removing and installing clutch pedal

Special tools and workshop equipment required

♦ Pliers -T10005-



♦ Lever -T10178-



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Removing

- Clutch pedal mounting bracket fitted in vehicle

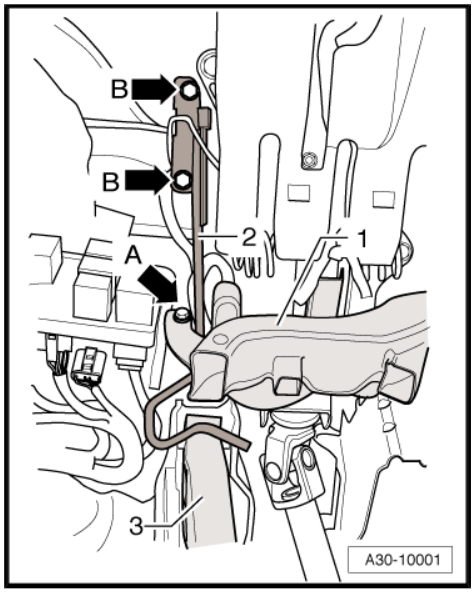
– Move driver's seat away from pedals.

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

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

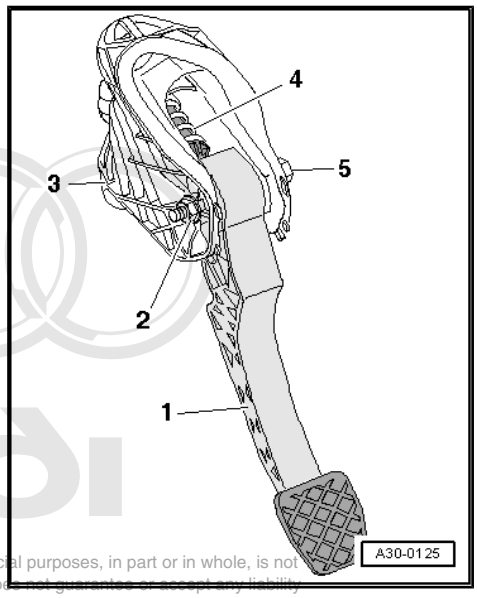
– Unclip wiring harness at rear of footwell air outlet -1- and move clear to one side.

– 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-.

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



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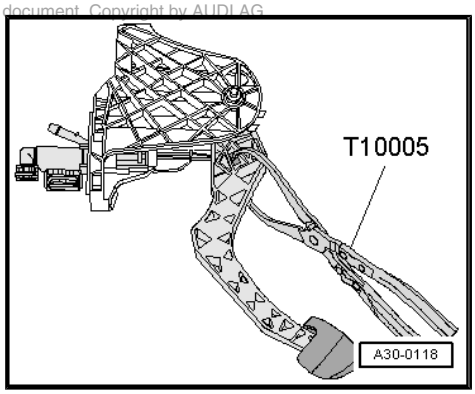
– Release retaining clip for operating rod on clutch master cylinder using pliers -T10005- .

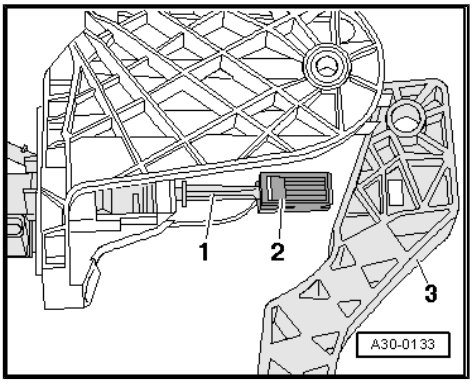
– Remove clutch pedal.



Installing

- Tightening torques ⇒ page 12

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



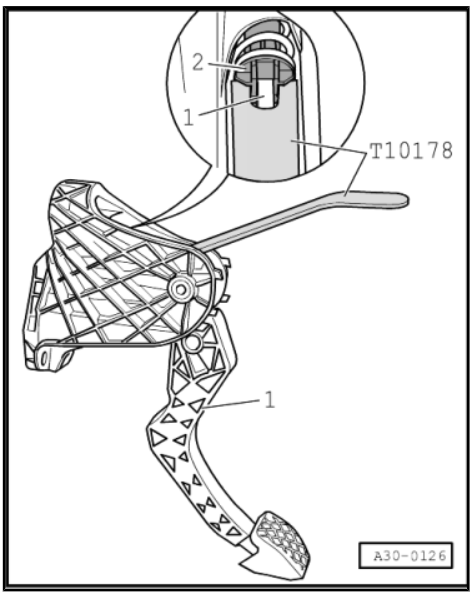
Note

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

– Fit 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 audibly.

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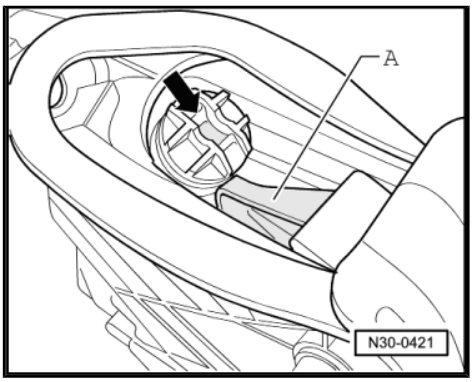
- Socket -arrow- of over-centre spring must be in vertical position.

– 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 pedal against the spring if you pull back the bottom of the pedal carefully as you bring the top of the pedal into position.

– Install crash bar ⇒ page 13 .

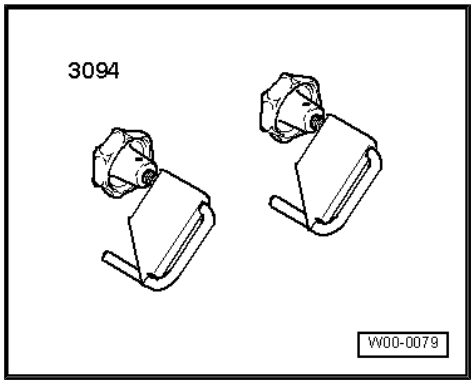
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .

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

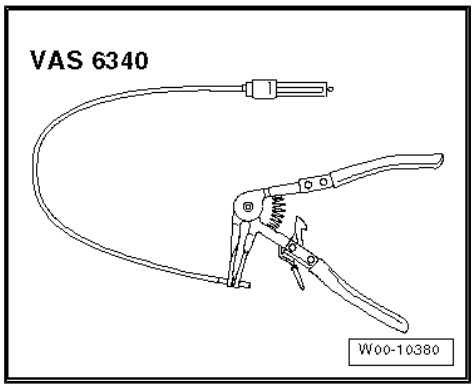
3.3 Removing and installing mounting bracket

Special tools and workshop equipment required

- Hose clamps, up to Ø 25 mm -3094-



Hose clip pliers -VAS 6340-



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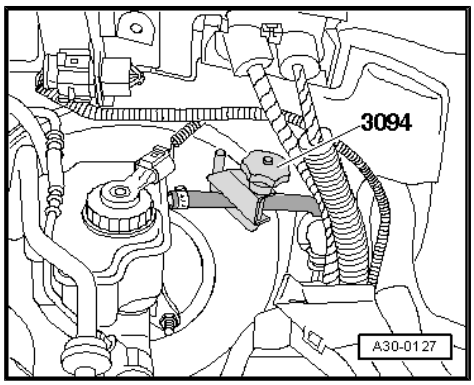
Removing

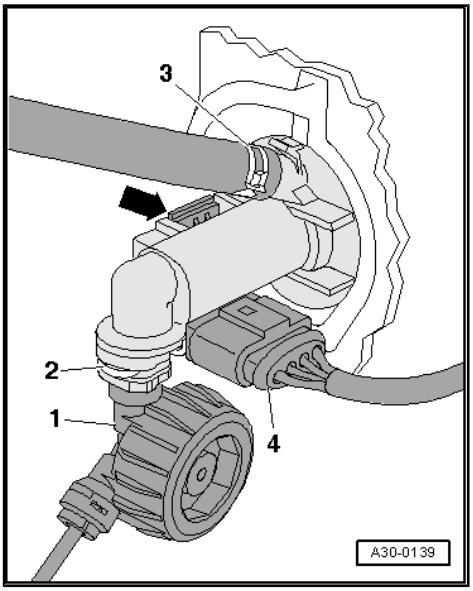
Note

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.

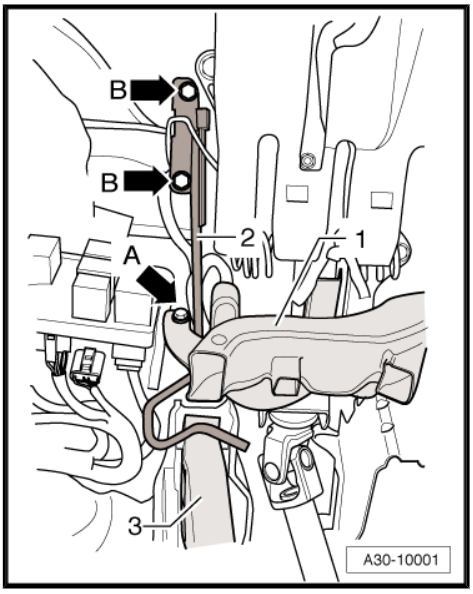
– Using hose clamp -3094- , clamp off supply hose to master cylinder.



– Disconnect supply hose at clutch master cylinder (if necessary, release spring-type clip -3- using hose clip pliers -VAS 6340-).
– Release retaining clip -2- with a screwdriver and disconnect pipe/hose assembly -1- from master cylinder.
– Unclip and detach clutch pedal position sender -G476- from master cylinder -arrow-. Electrical connector -4- can remain connected.



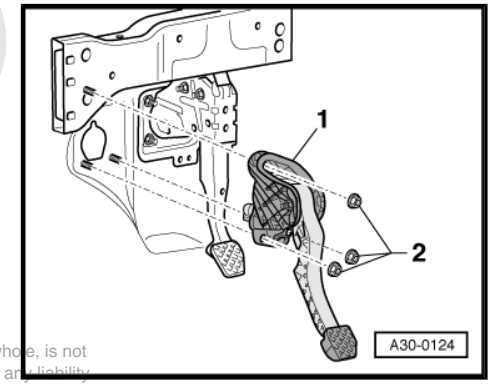
– Move driver's seat to rear as far as possible and move steering wheel into uppermost position.
– Remove storage compartment on driver's side ⇒ Rep. Gr. 68 .
– Unscrew bolt -arrow A- and remove footwell air outlet (front left) -1-.
– Unclip wiring harness at rear of footwell air outlet -1- and move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



Note

When performing work in the footwell, put cloths on the carpet to protect it from possible brake fluid spills.

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



Installing

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

- Tightening torques ⇒ page 12

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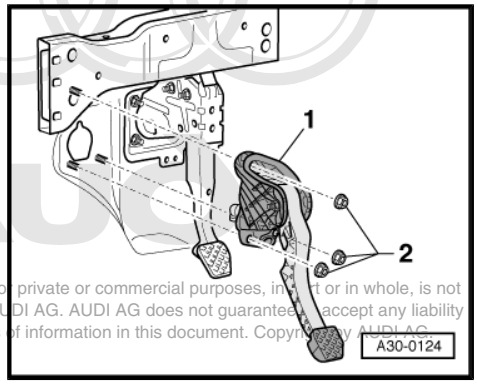
Note

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

– Fit mounting bracket -1- and tighten nuts -2-. Tightening torque ⇒ Item 15 (page 12) .
– Connect pipe/hose assembly ⇒ page 25 .
– Bleed clutch system ⇒ page 29 .
– Install crash bar ⇒ page 13 .
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .
– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .



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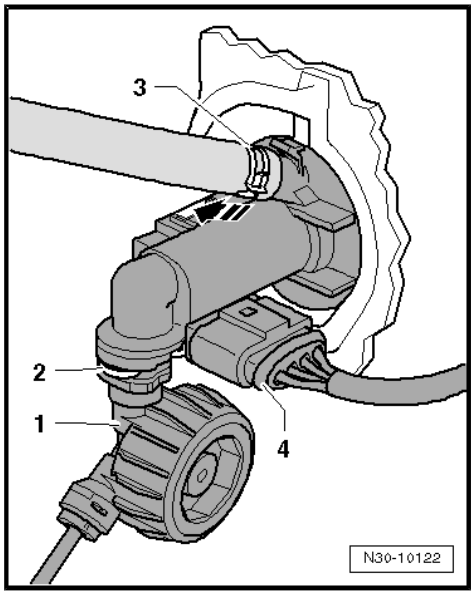
3.4 Removing and installing clutch position sender -G476-

Removing

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

Note

Items -1 ... 3- can be disregarded.



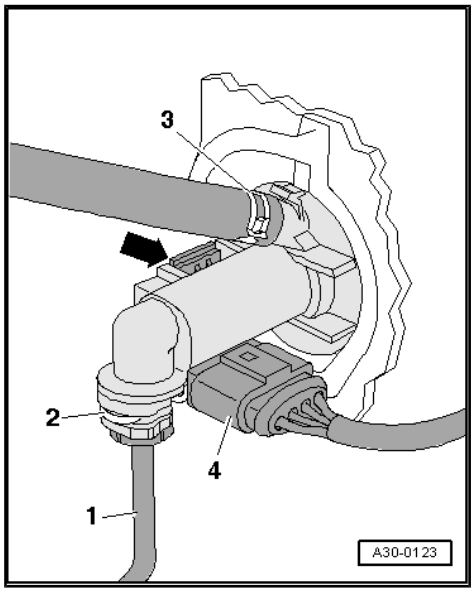
Installing

Perform installation in reverse sequence of removal.

– Fit clutch position sender -G476- at clutch master cylinder and engage -arrow-.
– Attach electrical connector -4-.

Note

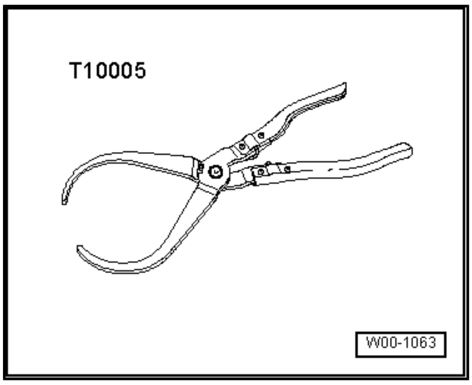
Items -1 ... 3- can be disregarded.



3.5 Removing and installing clutch master cylinder

Special tools and workshop equipment required

- ♦ Pliers -T10005-



Removing

– Remove mounting bracket ⇒ page 18 .

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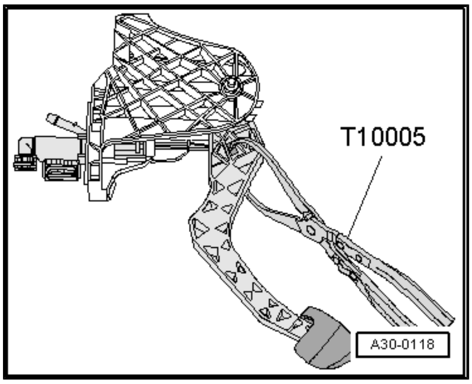
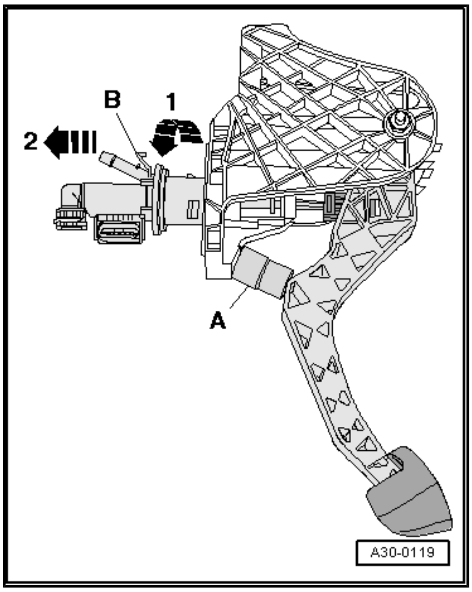
– Release retaining clip for operating rod on clutch pedal using pliers -T10005- .



– 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)

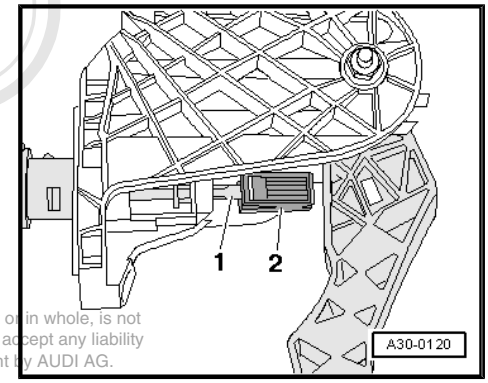
– Release retaining clip -B- and pull clutch master cylinder out of mounting bracket -arrows 1 and 2-.



Installing

- Clutch pedal in “released” position.

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



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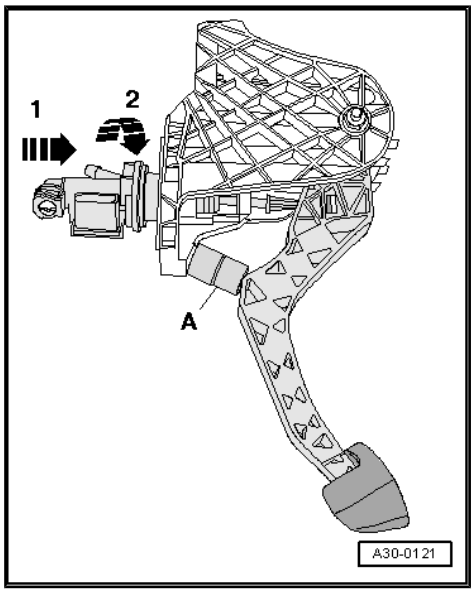
– Insert a spacer -A- between clutch pedal and stop, and press clutch pedal forward.

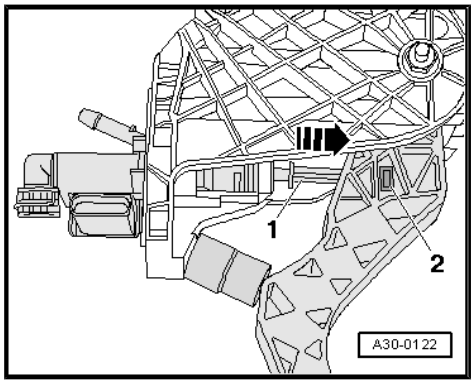
♦ Length of spacer = approx. 40 mm (e.g. $^{1}/_{2}$” socket)

– Lock clutch master cylinder on mounting bracket -arrows 1 and 2-.

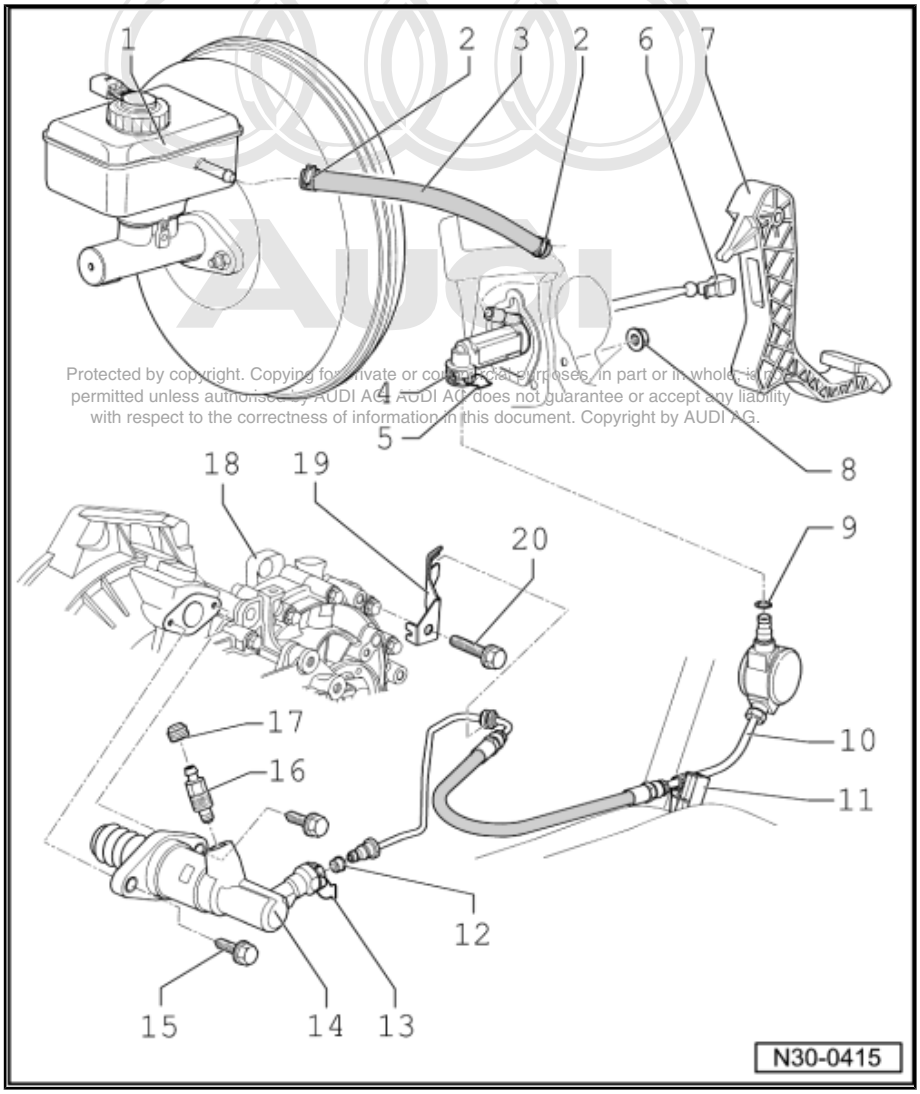


– Press operating rod -1- for clutch master cylinder in direction of -arrow- so that retaining clip -2- snaps into place in clutch pedal.

– Install mounting bracket ⇒ page 18 .



4 Exploded view - hydraulic system (LHD vehicles)



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1 - Brake fluid reservoir

2 - Hose clip (spring-type clip)

- ❑ Not fitted in all vehicles

3 - Supply hose

- ❑ Made of rubber or plastic, depending on version
- ❑ Plastic supply hose with additional seals ⇒ page 24

4 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 21

5 - Clip

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

6 - Retaining clip

- ❑ For operating rod for clutch master cylinder
- ❑ To remove and install retaining clip first detach clutch master cylinder from clutch pedal ⇒ page 15

7 - Clutch pedal

- ❑ Removing and installing ⇒ page 15

8 - Nut

- ❑ Tightening torque ⇒ Item 15 (page 12)
- ❑ Secures mounting bracket to body
- ❑ Always renew

9 - Seal or O-ring

- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 24
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate O-rings with brake fluid

10 - Pipe/hose assembly

- ❑ With frequency modulator
- ❑ Removing and installing ⇒ page 27
- ❑ Disconnecting from clutch master cylinder and slave cylinder ⇒ page 25

11 - Bracket

- ❑ For pipe/hose assembly ⇒ Item 10 (page 23)
- ❑ Secured on body

12 - Seal or O-ring

- ❑ Whether a seal or an O-ring is used depends on the type of connection ⇒ page 24

- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renew damaged O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate O-rings with brake fluid

13 - Clip

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

14 - Clutch slave cylinder

- ❑ Removing and installing ⇒ page 25

15 - Bolt

- ❑ 20 Nm
- ❑ 2x

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16 - Bleeder valve

- ❑ 6 Nm
- ❑ Bleeding clutch system ⇒ page 29

17 - Dust cap

18 - Gearbox

19 - Bracket

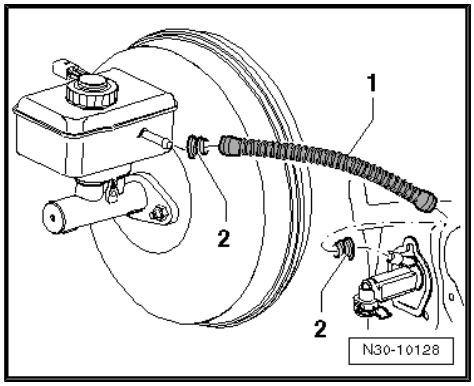
- ❑ For pipe/hose assembly

20 - Bolt

- ❑ 20 Nm

Vehicles with plastic supply hose -1-

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



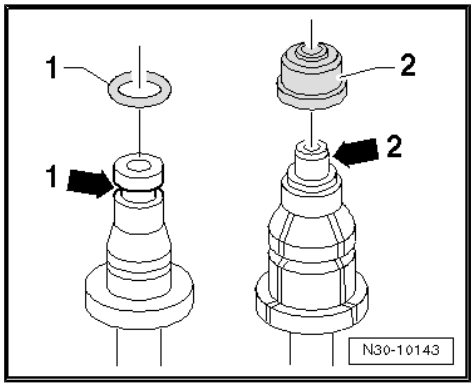
Seal/O-ring for pipe/hose assembly

1 - O-ring

- ♦ Connection with annular groove -arrow 1-
- ♦ Check O-ring for damage and renew if necessary

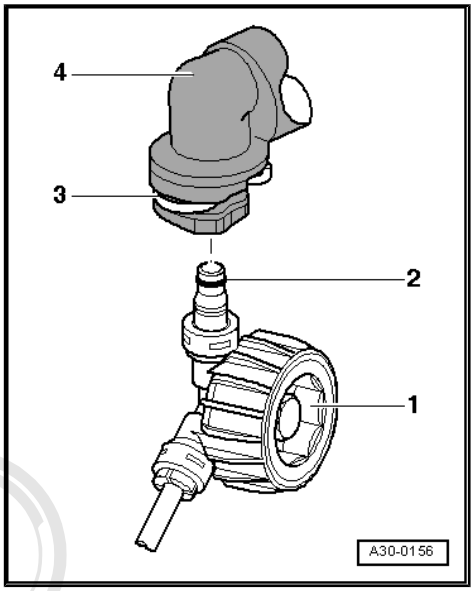
2 - Seal

- ♦ Connection with shoulder -arrow 2-
- ♦ Position seal -2- onto connection -arrow 2- before fitting



Disconnecting/connecting pipe/hose assembly from/to clutch master cylinder or clutch slave cylinder

– To remove, release clip -3- with a screwdriver and disconnect pipe/hose assembly -1- from clutch master cylinder or clutch slave cylinder -4-.



Installing

Note

Observe distinction between seals -2- and O-rings ⇒ *page 24*

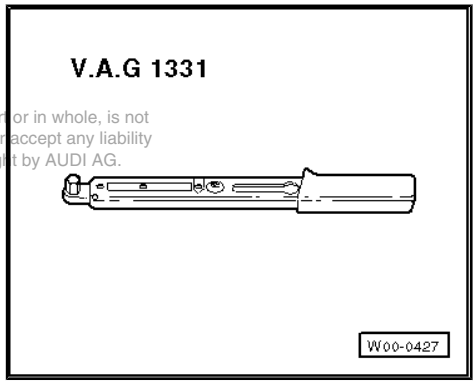
– Press pipe/hose assembly -1- into connection on clutch slave cylinder or clutch master cylinder -4- until clip -3- snaps into place.

– Pull on pipe to check it is secure.

4.1 Removing and installing clutch slave cylinder

Special tools and workshop equipment required

♦ -V.A.G 1331- Torque wrench



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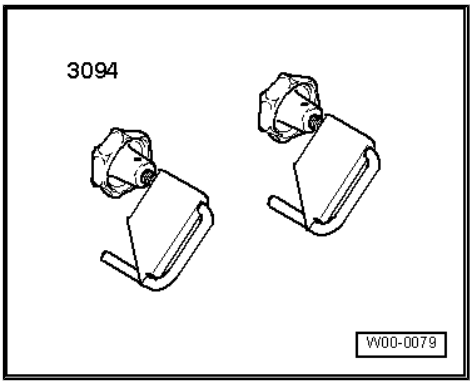
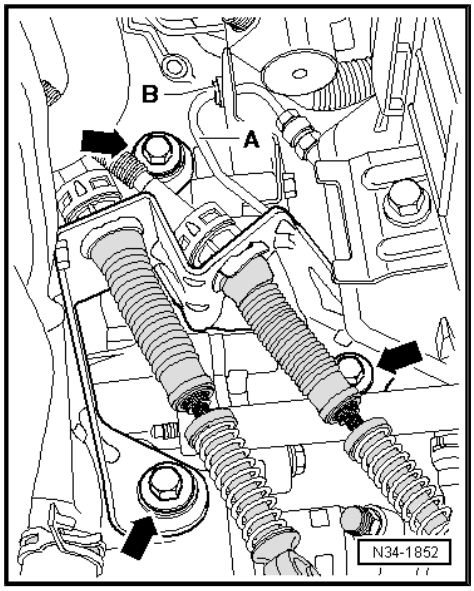
♦ Hose clamps, up to Ø 25 mm -3094-

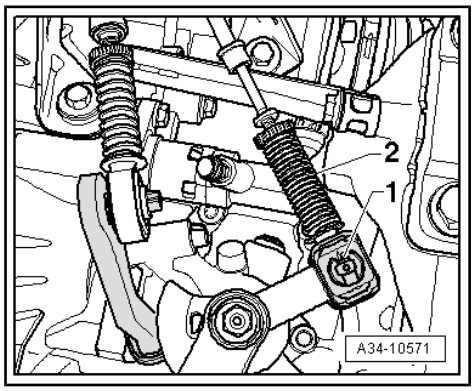


Removing

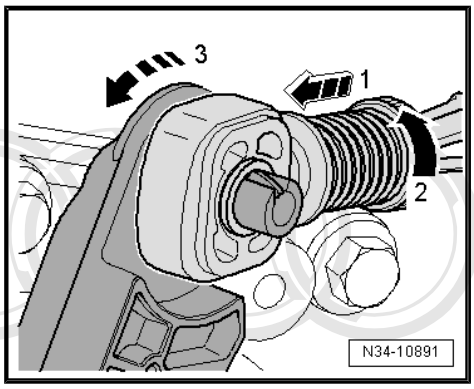
– Detach cable support bracket from gearbox -arrows-.



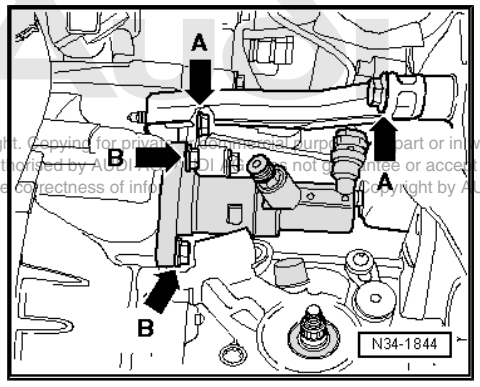
– Remove securing clip -1-.
– Pull gear selector cable -2- off pin.



– Pull locking mechanism forwards in direction of -arrow 1- onto stop and then turn to left in direction of -arrow 2- to lock.
– Press relay lever forwards (in direction of -arrow 3-) and pull out gate selector cable.
– Tie back gear selector cable and gate selector cable.



– Detach gearbox support -arrows A-.
– Remove clutch slave cylinder -arrows B-.



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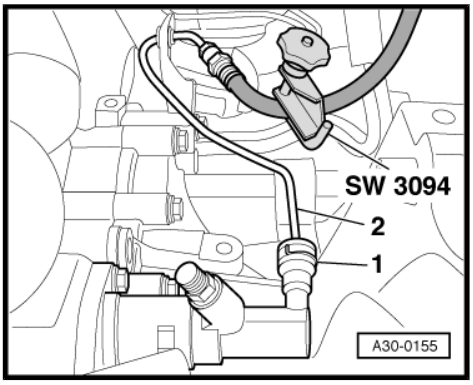
Note

Make sure that no brake fluid escapes onto the gearbox. If this does happen, clean the affected area thoroughly.



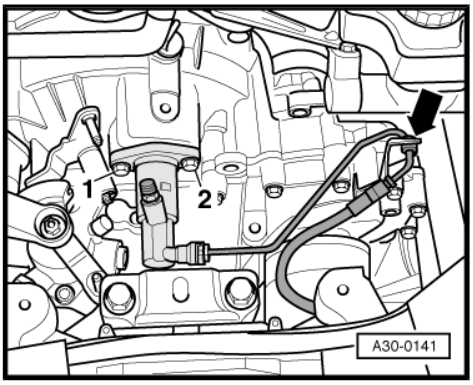
- Place a lint-free cloth under the clutch slave cylinder.
- Using hose clamps, up to Ø 25 mm -3094- , clamp off pipe/hose assembly to clutch master cylinder.
- Pull out clip -1- as far as it will go, move pipe/hose assembly -2- clear at bracket and disconnect from clutch slave cylinder.

Caution

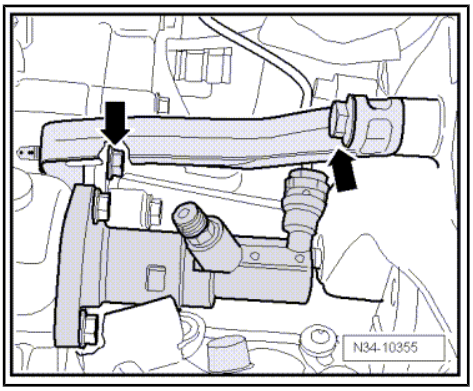
Do not operate clutch pedal after disconnecting pipe/hose assembly.

Installing

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



- Connect pipe/hose assembly to clutch slave cylinder ⇒ page 25 .
- Lubricate end of plunger with MoS_2 grease.
- Fit clutch slave cylinder and tighten bolts -1- and -2-. Tightening torque ⇒ Item 15 (page 24) .
- Clip pipe/hose assembly into bracket -arrow-.
- Remove hose clamp 3094.



- Fit gearbox support and tighten bolts -arrows-. Tightening torques ⇒ Item 1 (page 90)
- Bleed clutch system ⇒ page 29 .
- Assemble selector mechanism ⇒ page 62 .
- Adjust selector mechanism ⇒ page 68 .

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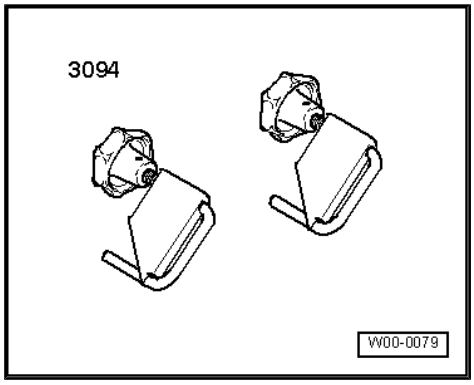
4.2 Removing and installing pipe/hose assembly

Special tools and workshop equipment required

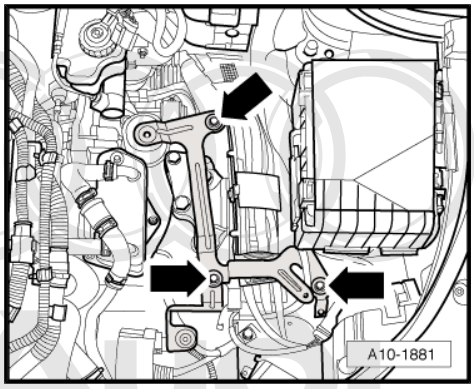
♦ Hose clamps, up to Ø 25 mm -3094-



Removing

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

– Remove bolts -arrows- and detach bracket for air cleaner housing.



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 cloth underneath to catch escaping brake fluid.*

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

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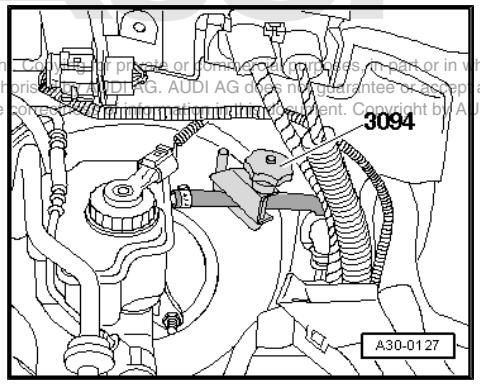
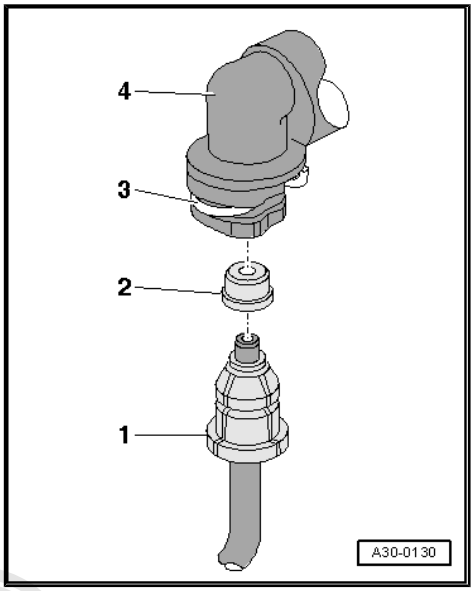


– Release clip -3- with a screwdriver and disconnect pipe/hose assembly -1- from clutch master cylinder and clutch slave cylinder.
– Detach pipe/hose assembly -1- from bracket and remove.



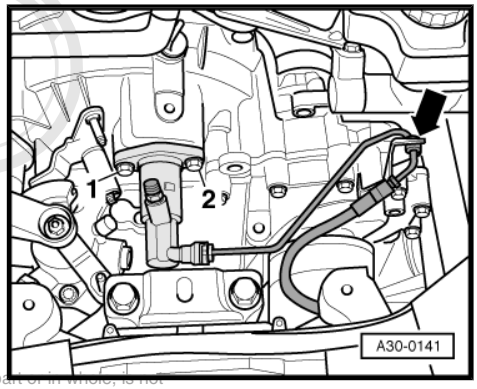
Installing

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

Note

Observe distinction between seals -2- and O-rings *⇒ page 24*

– Press pipe/hose assembly -1- into connection on clutch slave cylinder and master cylinder -4- so that clip -3- snaps into place.
– Pull on pipe to check it is secure.



– Clip pipe/hose assembly into bracket -arrow-.
– Remove hose clamp 3094.
– Bleed clutch system ⇒ page 29 .
– Install complete air cleaner housing ⇒ Rep. Gr. 24 .

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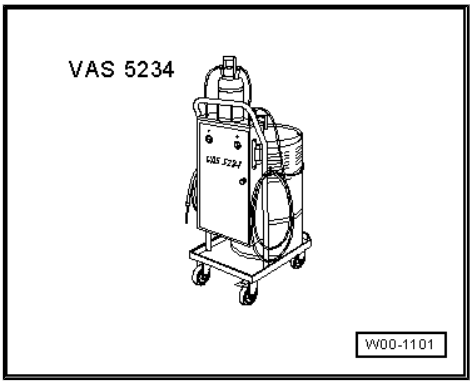
4.3 Bleeding clutch system

Special tools and workshop equipment required

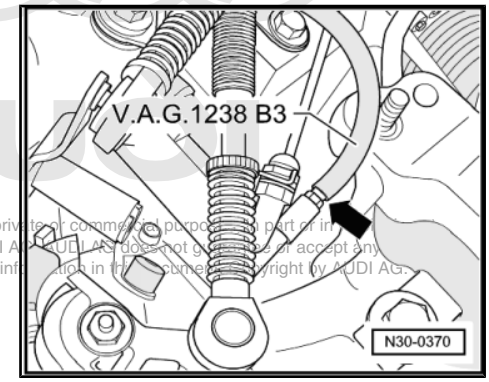
♦ -VAS 5234- Brake filling and bleeding equipment



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.*
♦ *Prefilling the system is not necessary.*
♦ *Brake fluid specification ⇒ Rep. Gr. 47 .*

– Pull clutch pedal back to its normal rest position.
– Connect brake filling and bleeding equipment -VAS 5234- or -V.A.G 1869- .
– To bleed system, use bleed hose -V.A.G 1238/B- 3 - 670 mm long, if necessary.
– Then connect bleeder hose to collector bottle of brake bleeding unit.
– Connect bleed hose to bleeder -arrow-.
– Now switch on bleeding equipment.
♦ Operating pressure 2.0 bar
– Open bleeder valve.
– Bleed off about 100 cm^3 of brake fluid.
– Close bleeder valve.
– Rapidly operate pedal from stop to stop 10 to 15 times.
– Open bleeder valve once again.
– Bleed off an additional 50 cm^3 of brake fluid.
– Tighten bleeder valve ⇒ Item 16 (page 24) .
– Disconnect bleeder hose and fit protective cap.
– Detach bleeder unit from brake fluid reservoir.
– Depress clutch pedal several times after bleeding process is completed.
– Repeat bleeding procedure if necessary.



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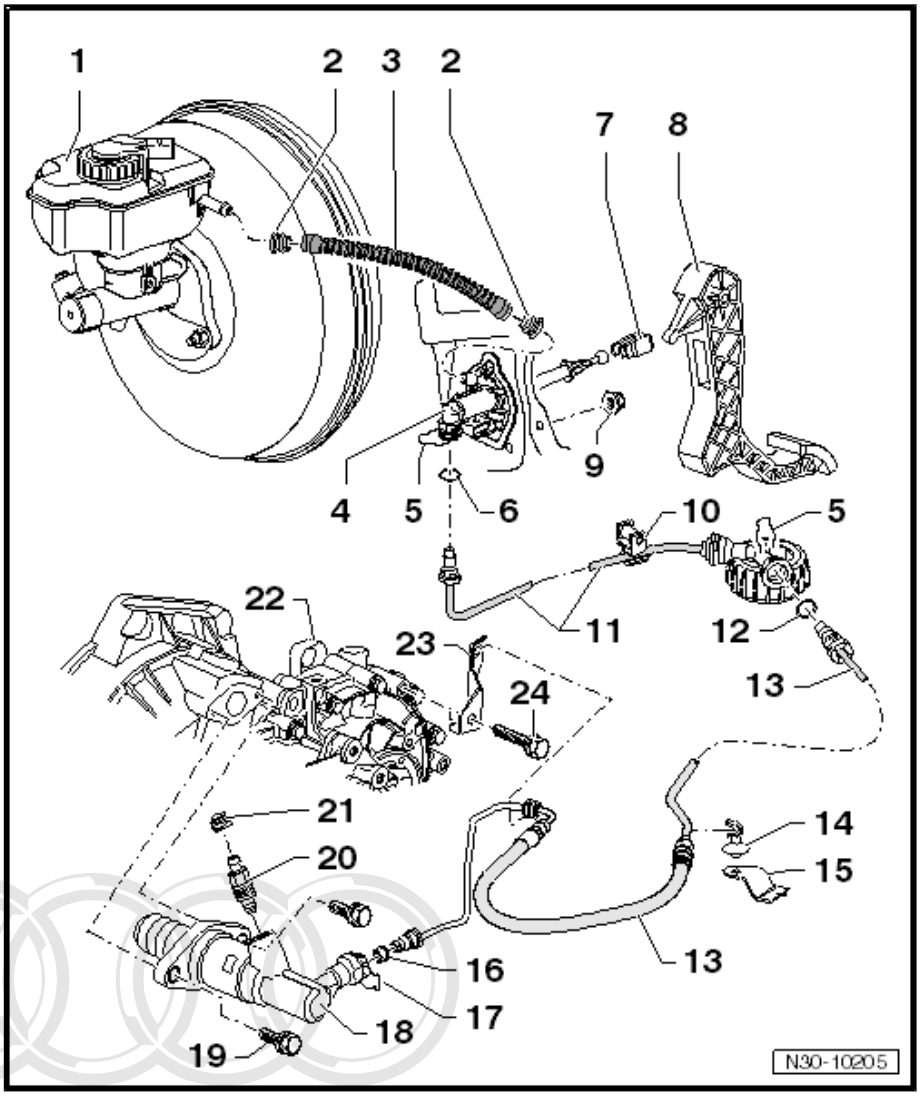
5 Exploded view - hydraulic system (RHD vehicles)



1 - Brake fluid reservoir

2 - Seal

- ❑ For plastic supply hose
- ❑ Seals must be fitted in supply hose.

3 - Supply hose

- ❑ Made of rubber or plastic, depending on version
- ❑ Plastic supply hose with additional seals ⇒ Item 2 (page 31)

4 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 21

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 24
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

7 - Retaining clip

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

8 - Clutch pedal

9 - Nut

- ❑ 20 Nm
- ❑ For securing mounting bracket to bulkhead

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10 - Retainer

- ❑ Secured on body

11 - Pipe

- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Prior to removal, remove battery and battery tray ⇒ Rep. Gr. 27

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 24
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

13 - Pipe/hose assembly

- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Prior to removal, remove battery and battery tray ⇒ Rep. Gr. 27

14 - Retainer

- ❑ Secured to bracket for ABS/EDL

15 - Bracket

- ❑ For ABS/EDL

16 - 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 24
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

17 - Clip

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

18 - Clutch slave cylinder

- ❑ Removing and installing ⇒ page 25

19 - Bolt

- ❑ Tightening torque ⇒ Item 15 (page 24)

20 - Bleeder valve

- ❑ Tightening torque ⇒ Item 16 (page 24)
- ❑ Bleeding clutch system ⇒ page 29

21 - Dust cap

22 - Gearbox

23 - Bracket

24 - Bolt

- ❑ ⇒ Item 20 (page 24)

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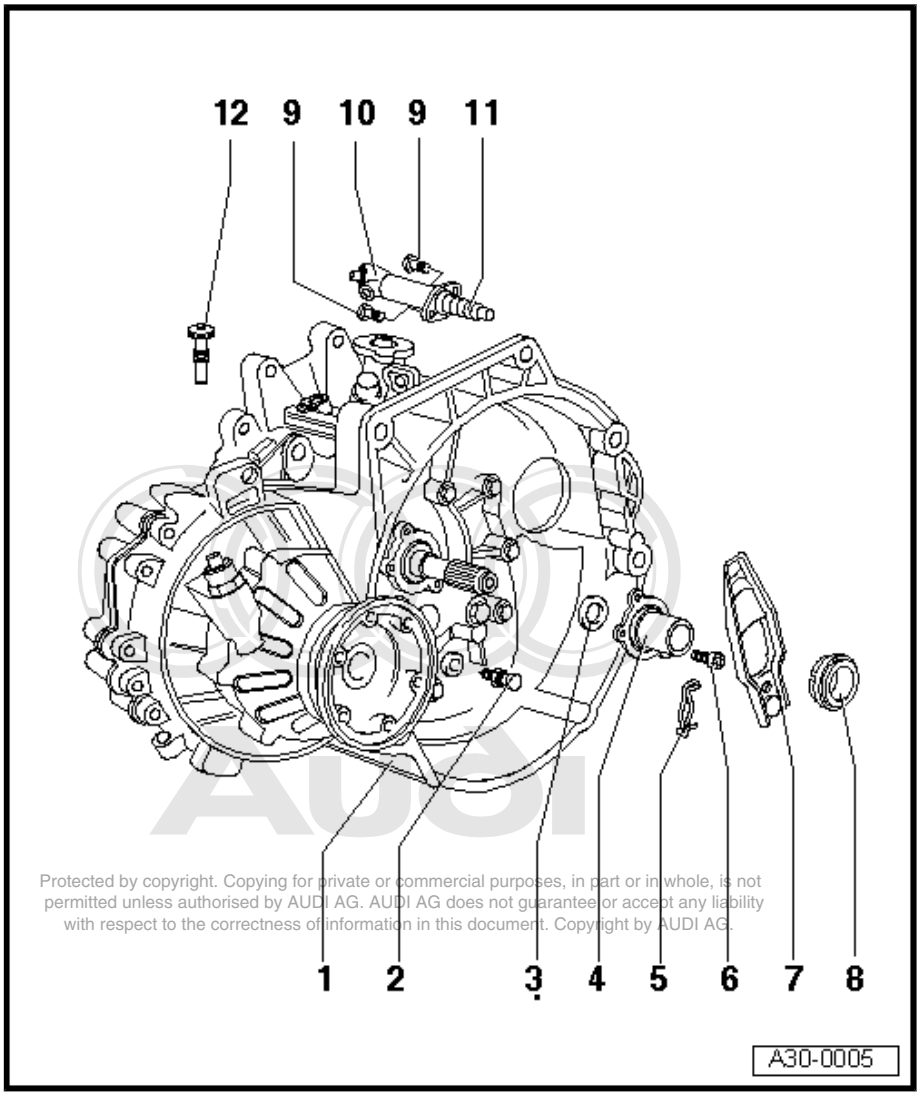
6 Exploded view - clutch release mechanism



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1 - Gearbox

2 - Ball head stud

- ❑ 25 Nm
- ❑ Remove existing grease from contact surface of release lever
- ❑ Lubricate with grease - G 000 100-

3 - Input shaft oil seal

- ❑ Pressed into guide sleeve
- ❑ Removing ⇒ page 34
- ❑ Installing ⇒ page 34

4 - Guide sleeve

- ❑ With vulcanised O-ring and oil seal for input shaft ⇒ Item 3 (page 33)
- ❑ Renew guide sleeve if O-ring is damaged
- ❑ Lubricate guide sleeve in area of release bearing with MoS_2 grease

5 - Retaining spring

- ❑ Secure to clutch release lever

6 - Socket head bolt

- ❑ 20 Nm

7 - Clutch release lever

- ❑ Remove and install together with release bearing ⇒ page 34 and ⇒ page 34
- ❑ Remove existing grease
- ❑ Lubricate surface which contacts ball head stud with MoS_2 grease

8 - Release bearing

- ❑ Do not wash out bearing; wipe clean only
- ❑ Renew bearing if noisy
- ❑ Lubricate surfaces which contact release lever with MoS_2 grease

9 - Bolt

- ❑ Tightening torque ⇒ Item 15 (page 24)
- ❑ 2x

10 - Clutch slave cylinder

- ❑ Removing and installing ⇒ page 25

11 - Plunger

- ❑ Lubricate end of plunger with MoS_2 grease

12 - Assembly bolt

- ❑ Secures the clutch release lever while installing gearbox

❑ Unscrew after gearbox has been installed

Note

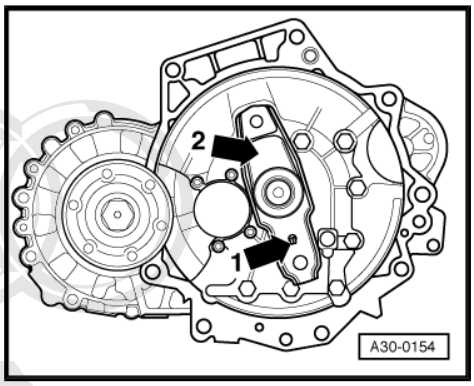
If the assembly bolt (⇒ Item 12 (page 33)) is not available, an M8 x 35 bolt can be used instead.

Removing and installing clutch release lever together with release bearing

– Unhook spring -arrow 1-.

– Pull off clutch release lever -arrow 2- and clutch release bearing.

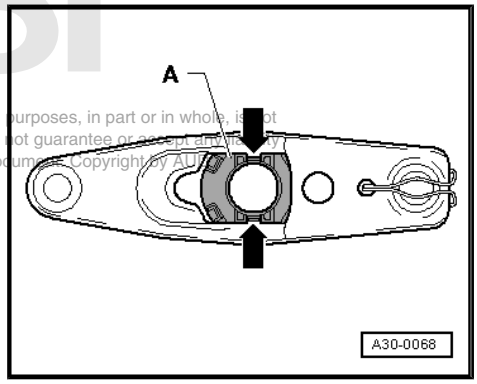
Perform installation in reverse sequence of removal.



Removing and installing release bearing

– Press locking lugs -arrows- together on reverse side of clutch release lever and remove release bearing -A- from clutch release lever.

– To install, press release bearing -A- into clutch release lever until locking lugs -arrows- engage.



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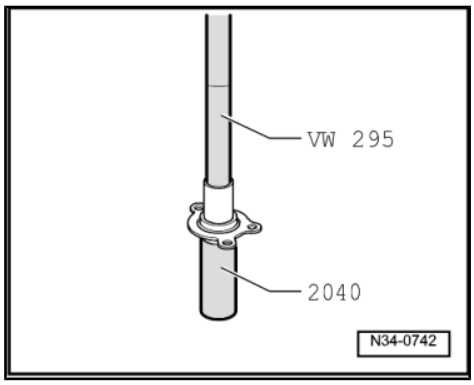
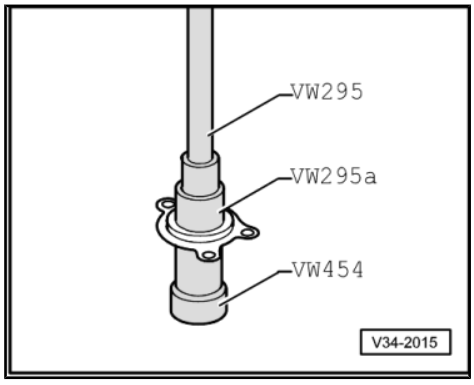
Driving oil seal out of guide sleeve



Driving oil seal into guide sleeve (drive in onto stop)



7 Overview - servicing clutch

7.1 Clutch identification

Note

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

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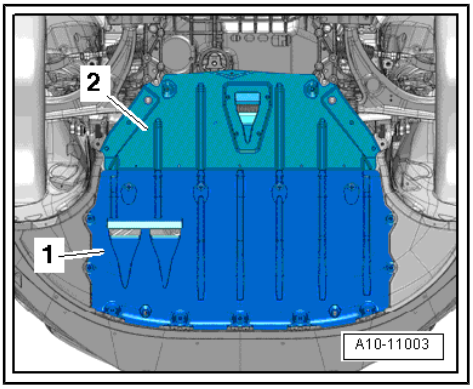
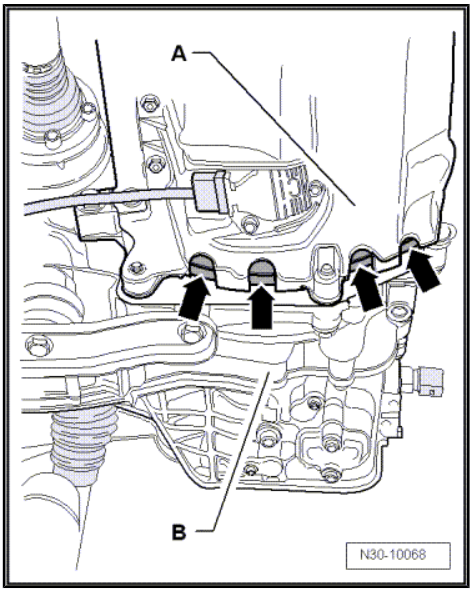
With gearbox installed, the clutch version fitted can be distinguished as follows:

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



A number of recesses -arrows- are located in lower area of sump between engine -A- and gearbox -B-.

– Check the contour of the flywheel visible through the recesses.

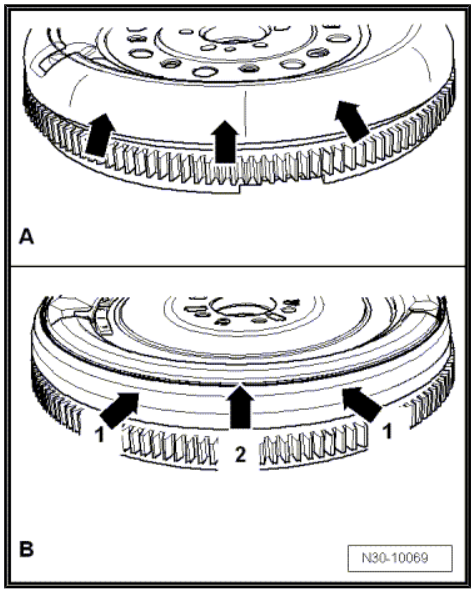


A - round contour -arrows- = Sachs version clutch

Exploded view - Sachs version clutch ⇒ page 37

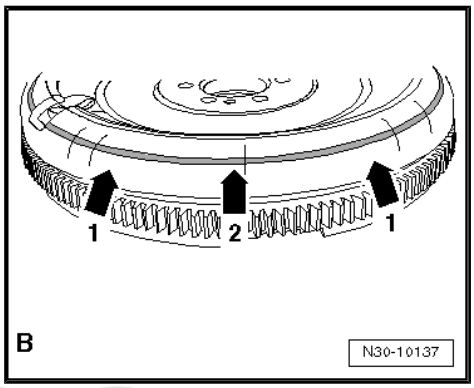
B - square contour -arrows 1- and annular groove -arrow 2- = LuK version clutch

Exploded view - LuK version clutch ⇒ page 43



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

Exploded view - LuK version clutch ⇒ page 44



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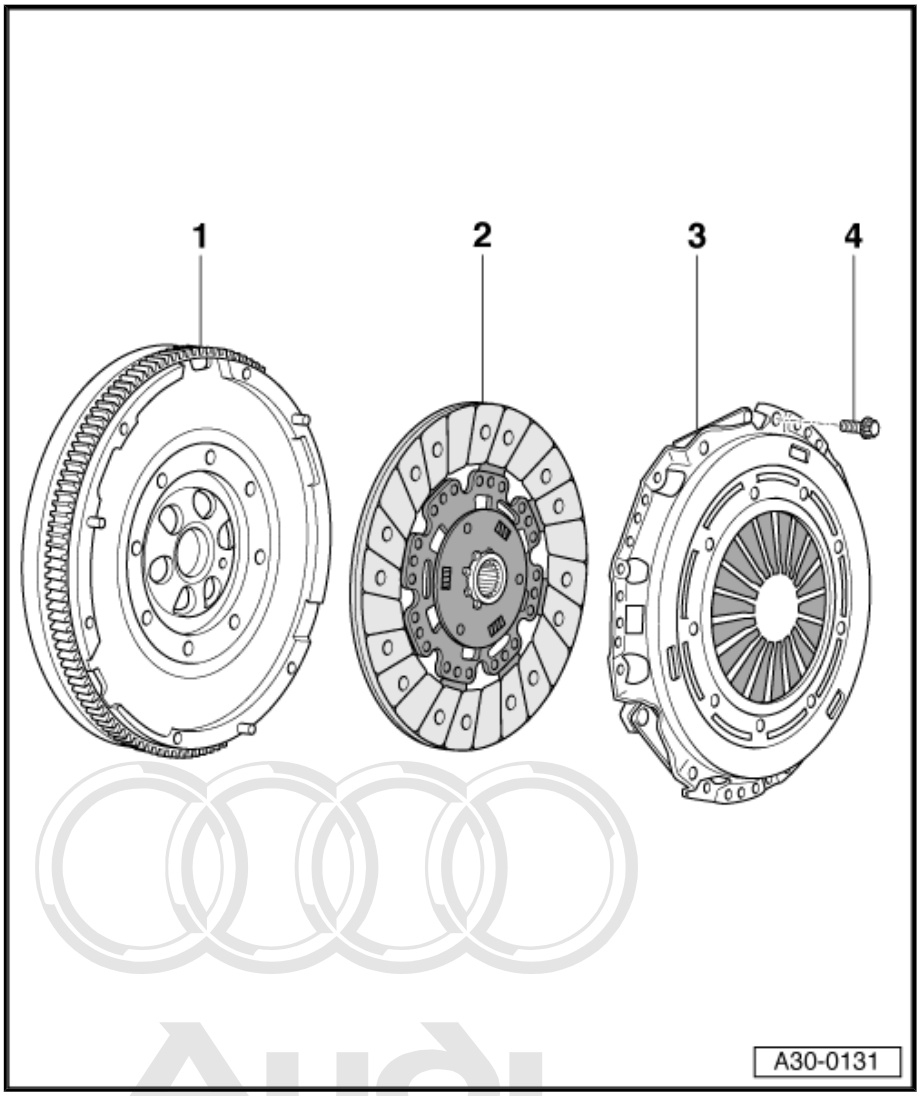
7.2 Exploded view - Sachs version clutch

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.



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 38

2 - Clutch plate

- ❑ Removing and installing ⇒ page 38
- ❑ Always renew pressure plate as well
- ❑ Installation position ⇒ page 41
- ❑ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

3 - Pressure plate

- ❑ With adjustment mechanism
- ❑ Identification ⇒ page 38
- ❑ Removing and installing ⇒ page 38
- ❑ Checking ends of diaphragm spring ⇒ page 41
- ❑ Checking spring connections and rivets ⇒ page 41
- ❑ Always renew clutch plate as well
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

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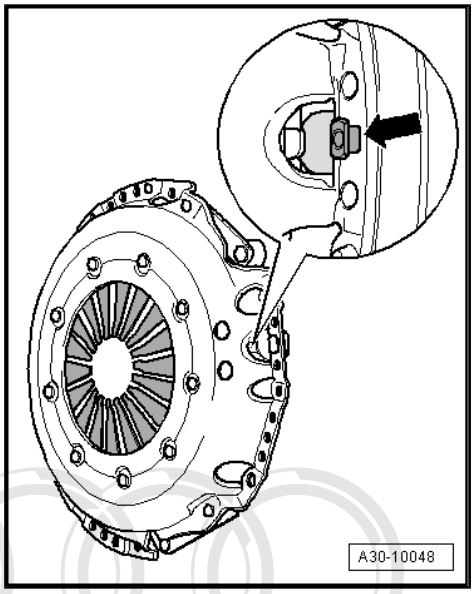
4 - Bolt

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

Identification of self-adjusting Sachs version clutch

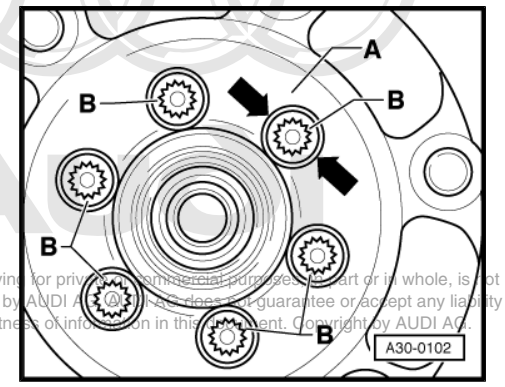
- Pressure plate with stop mechanism (position sensor) -arrow-.



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.



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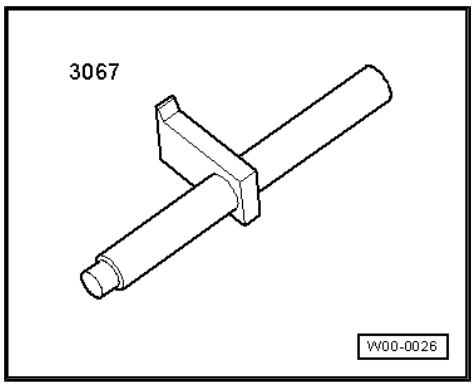
– Rotate dual-mass flywheel -A- so that the bolts are aligned centrally behind the holes -arrows-.
– When removing the bolts, make sure that none of the bolt heads contacts the dual-mass flywheel, as this would damage the flywheel when the bolts are unscrewed further.

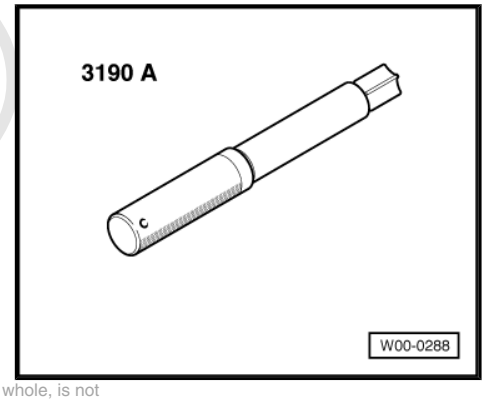
7.3 Removing and installing clutch (Sachs version)

Special tools and workshop equipment required

- Counterhold tool -3067-



- Centring mandrel -3190 A-



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- Grease for clutch plate splines -G 000 100-

Removing

- Gearbox removed
  ⇒ “2 Removing and installing gearbox”, page 71 .

– Remove gearbox.

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

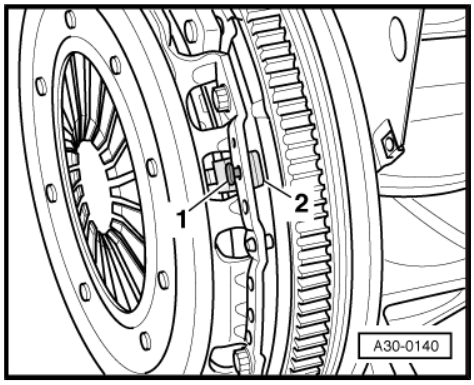
– Apply counter-hold tool -3067- in order to loosen bolts.

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

- Stop -2- with pin -1- should come loose when the bolts are slackened.

– If the stop does not come loose, push the pin towards the dual-mass flywheel.

– Take off pressure plate and clutch plate.



Installing

- Tightening torque ⇒ page 37 .

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 .*
- *If the clutch has burnt out, thoroughly clean the bell housing, flywheel and parts of the engine facing the gearbox in order to prevent odours.*
- *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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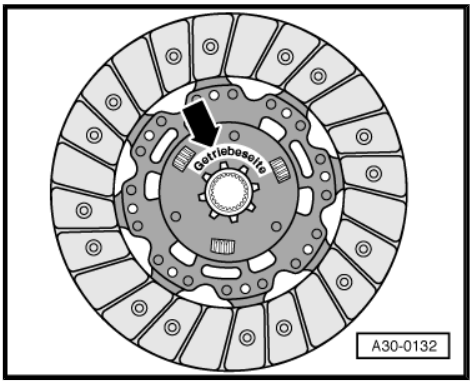
Installation position of clutch plate

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



Checking ends of diaphragm spring

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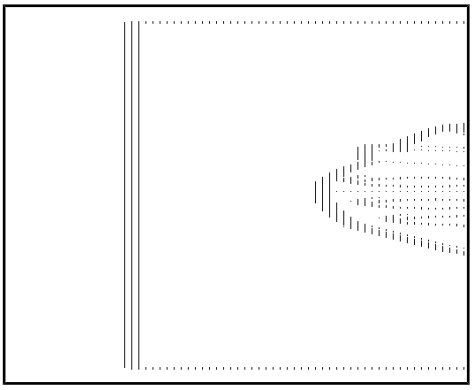
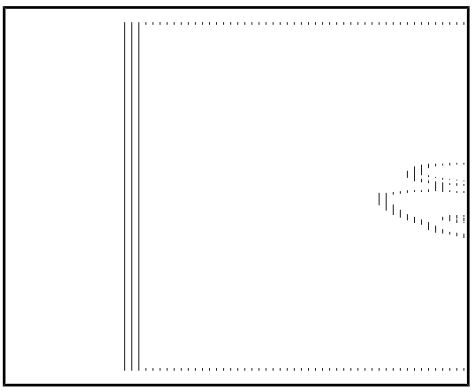
- Wear up to half the thickness of the diaphragm spring -arrows- is permissible.



Checking spring connections and rivets

– Check spring connections between pressure plate and cover for cracks and make sure rivets are seated tightly.

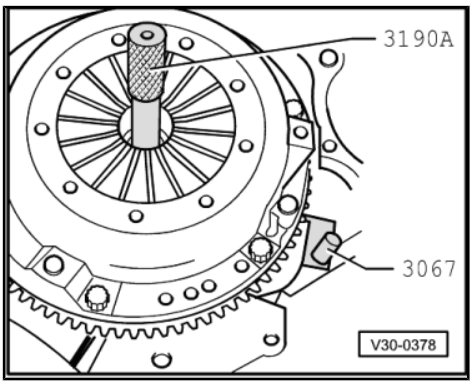
- Renew pressure plate if spring connections are damaged or rivets are loose -arrows-.



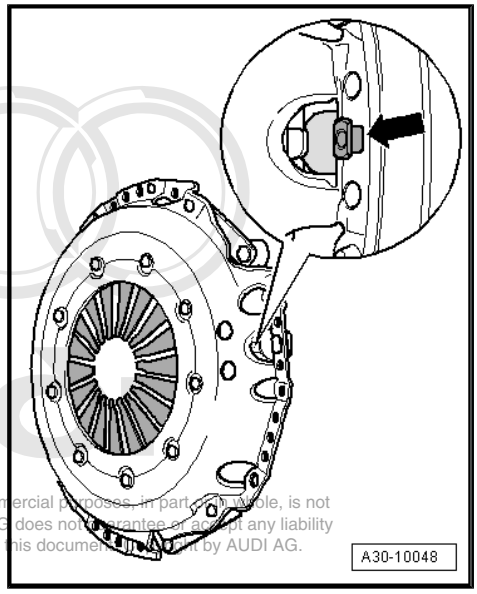
– Use counter-hold tool -3067- .

– Fit pressure plate onto dowel pins.

– Use centring mandrel -3190 A- to centralise clutch plate.



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



– Make sure that the stop pin (position sensor) -arrow- is free to move.

– Screw in all 6 bolts evenly by hand until bolt heads make contact with pressure plate.

– Working clockwise, tighten all six bolts consecutively in steps of 90° ($^1/_4$ turn) until the housing makes contact with the flywheel.

• The stop pin -arrow- should then lift away from the pressure plate.

– Working clockwise, tighten all 6 bolts to final torque consecutively. Tightening torque ⇒ Item 4 (page 37) .

– Install gearbox ⇒ page 71 .

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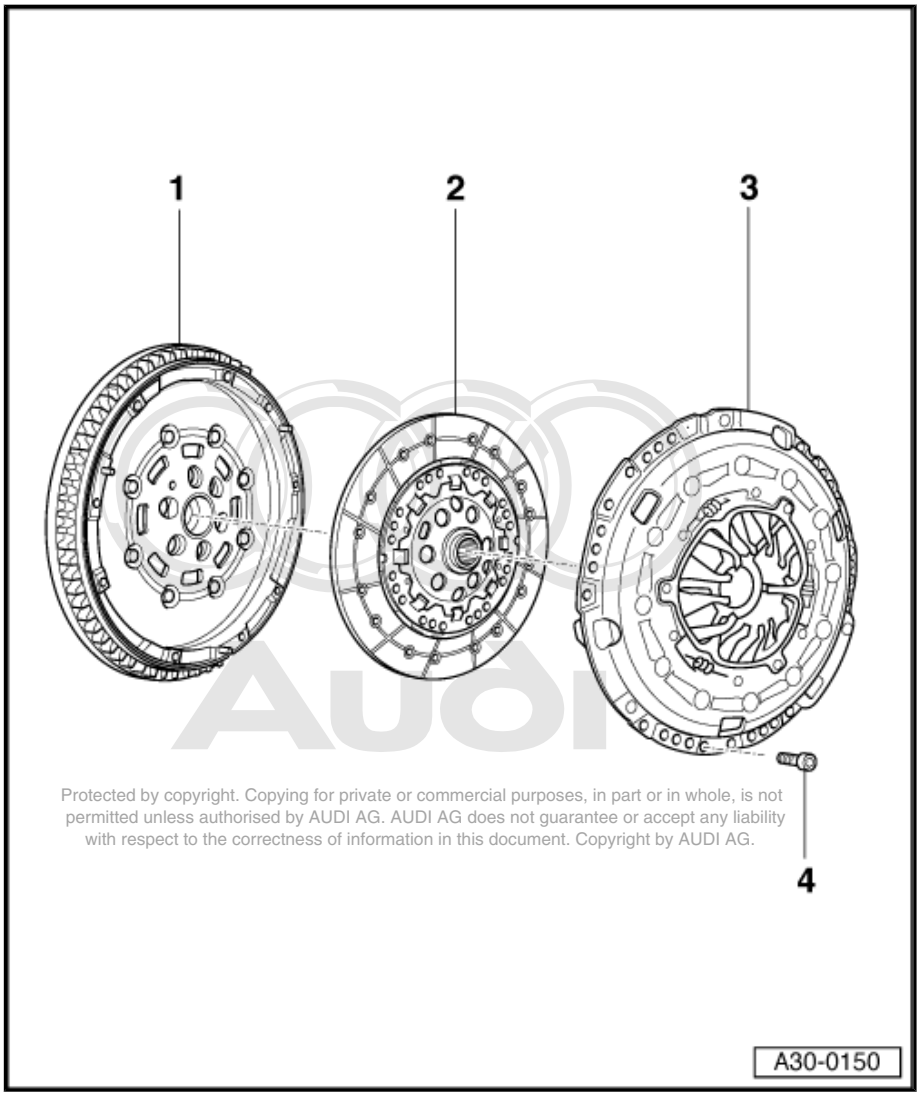
7.4 Exploded view - LuK version clutch

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.



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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 scoring, oil and grease
- ❑ Observe instructions for removal ⇒ page 44

2 - Clutch plate

- ❑ Removing and installing ⇒ page 44
- ❑ Always renew SAC pressure plate as well
- ❑ Installation position: marking “Getriebeseite” (gearbox side) faces towards gearbox
- ❑ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

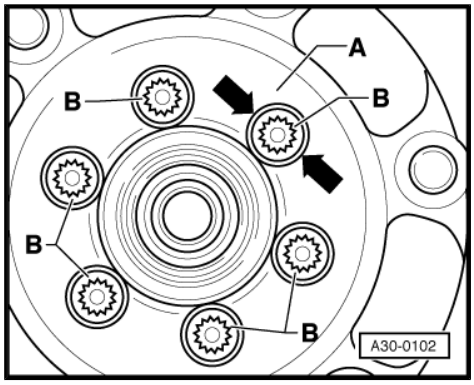
3 - SAC pressure plate

- ❑ “SAC” = self adjusting clutch
- ❑ Always renew clutch plate as well
- ❑ Removing and installing ⇒ page 44
- ❑ Checking position of adjuster ring on new SAC pressure plate ⇒ page 46
- ❑ Only fits on flywheel in one position
- ❑ Checking ends of diaphragm spring ⇒ page 45
- ❑ Checking spring connection and rivets ⇒ page 46

4 - Bolt

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

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. Bolts -B- must always be removed by hand.

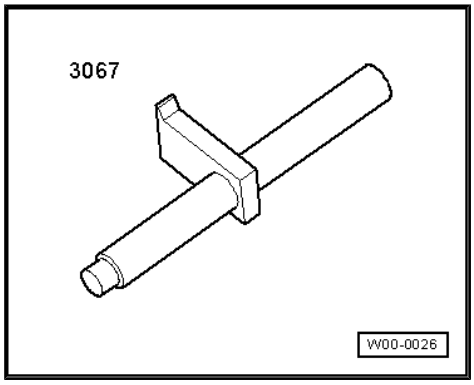
– Rotate flywheel -A- so that bolts -B- are aligned centrally behind the holes -arrows-.

– When unscrewing bolts -B-, make sure the bolt heads do not contact the flywheel -arrows- because this would damage the flywheel when the bolts are turned further.

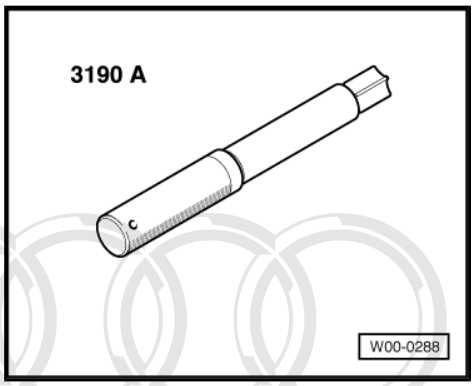
7.5 Removing and installing clutch (LuK version)

Special tools and workshop equipment required

♦ Counterhold tool -3067-



♦ Centring mandrel -3190 A-



♦ Grease G 000 100

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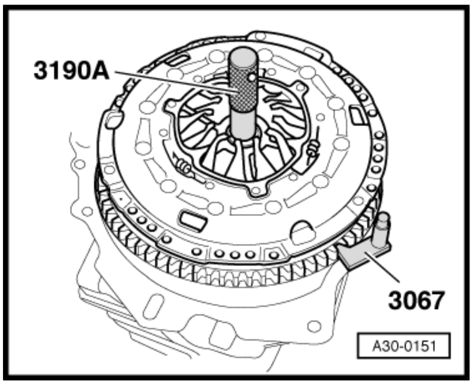
Removing

– Remove gearbox
⇒ "2 Removing and installing gearbox", page 71 .

– Attach counterhold tool -3067- before loosening bolts.



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

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

– Take off pressure plate and clutch plate.

Installing

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

Note

- *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 46*
- *If the clutch has burnt out, thoroughly clean the bell housing, flywheel and parts of the engine facing the gearbox in order to prevent odours.*
- *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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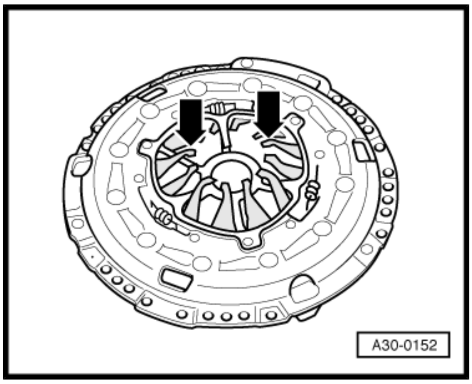
Checking ends of diaphragm spring

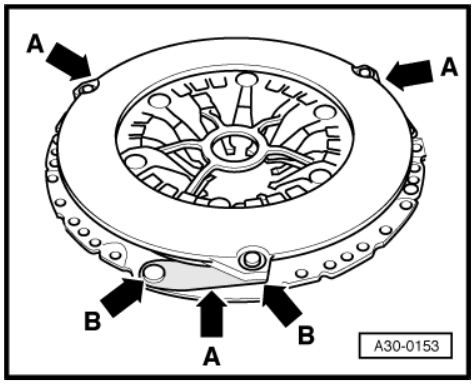
- Wear up to half the thickness of the diaphragm spring -arrows- is permissible.



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.

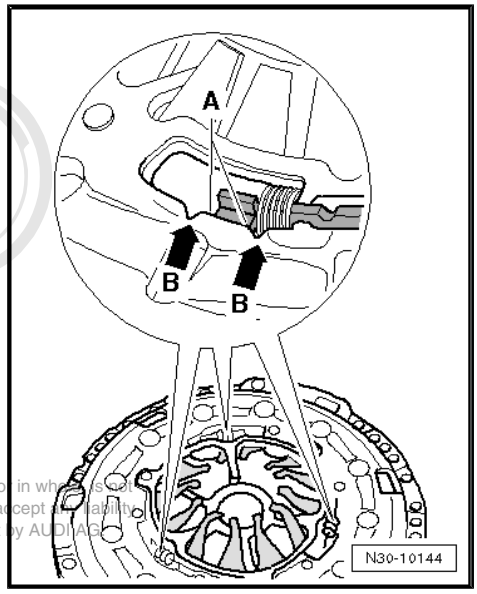


Checking position of adjustment mechanism (new SAC pressure plates only)

• 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.



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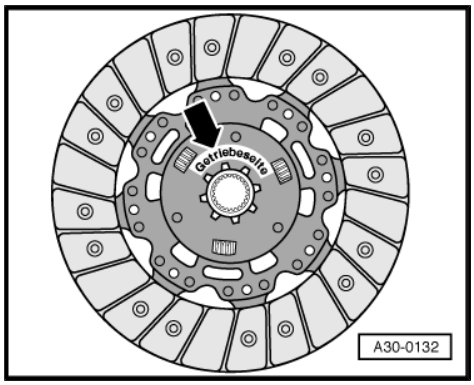
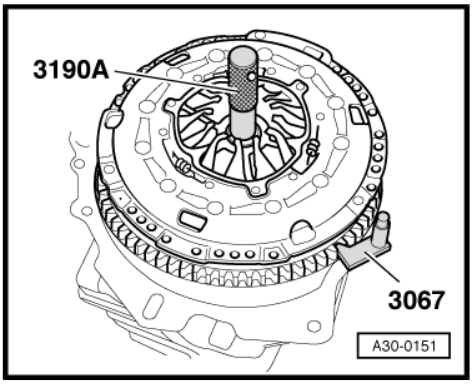
Installation position of clutch plate:

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



– Use counter-hold tool -3067- .
– Position pressure plate on dowel pins.
– Use centring mandrel -3190 A- to centre clutch plate.



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

– 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 43) .
– Install gearbox ⇒ page 71 .

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34 – Controls, housing

1 Overview - selector mechanism

A - Gear selector cable (gear selection movement)

B - Gate selector cable (gate selection movement)

C - Heat shield

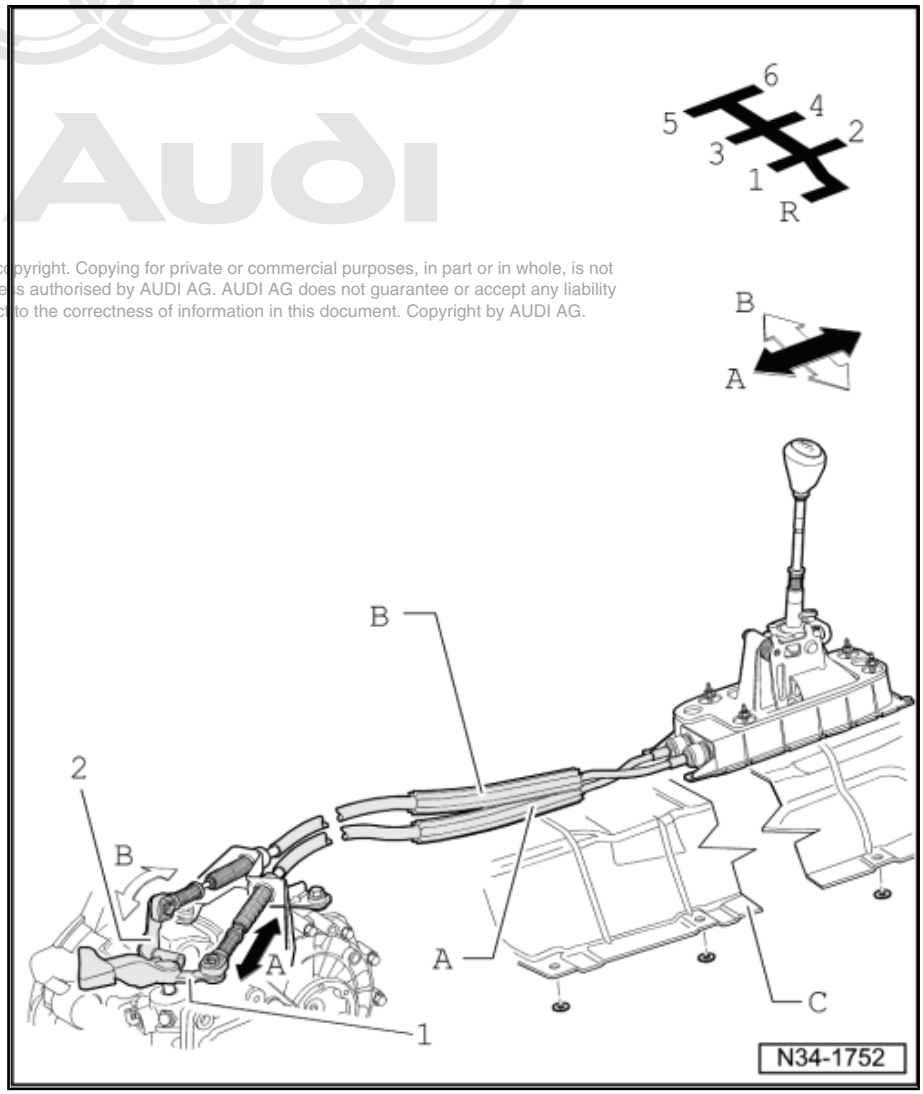
- ❑ Detach before removing selector mechanism.

-Arrow A- gear selection movement

-Arrow B- gate selection movement

1 - Gearbox selector lever

2 - Relay lever



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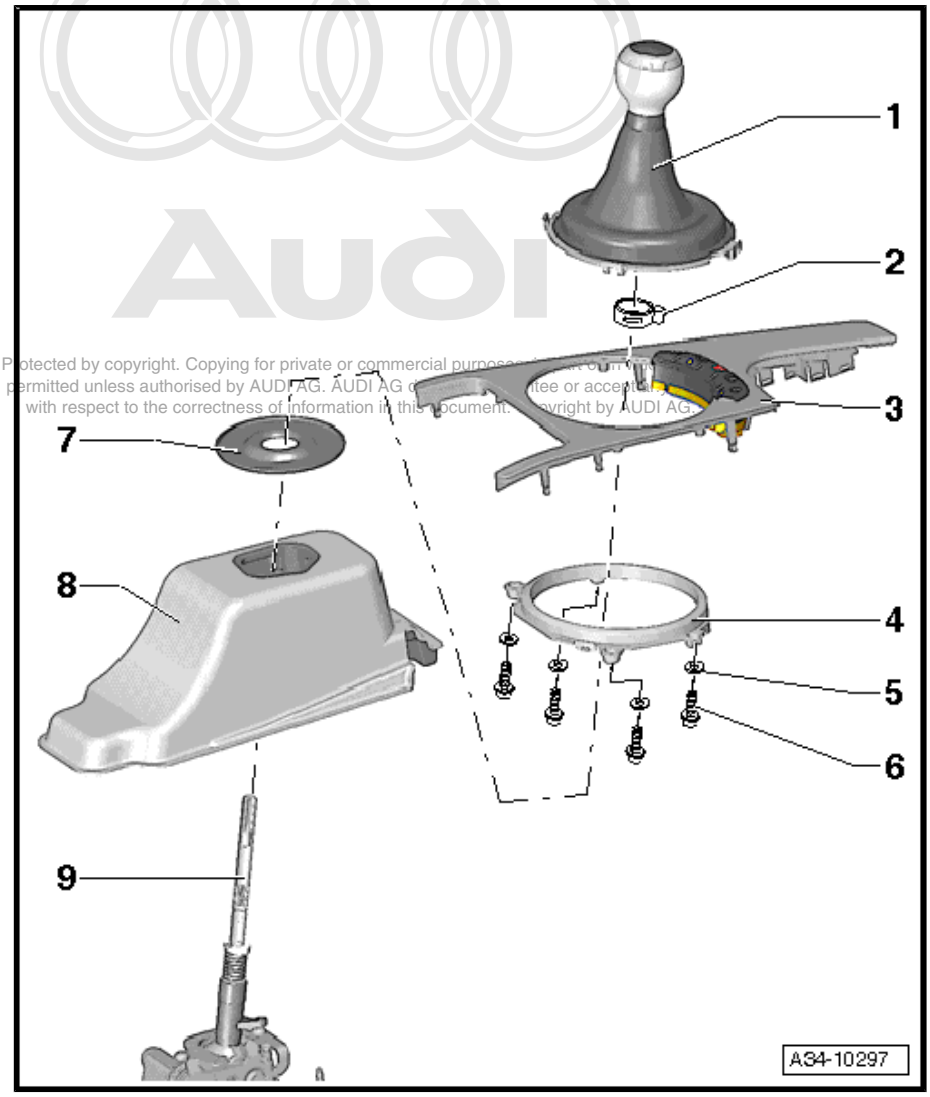
1.1 Gear knob and covers - exploded view



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1 - Gear knob with gear lever boot

- ❑ Cannot be separated from each other
- ❑ Always renew as one unit
- ❑ Removing and installing ⇒ page 50
- ❑ Detaching from cover for centre console ⇒ page 50
- ❑ Disconnecting from securing frame ⇒ page 50

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 50
- ❑ Detaching from gear lever boot ⇒ page 50

4 - Securing frame

- ❑ Detaching from trim panel for centre console ⇒ page 50
- ❑ Detaching from gear lever boot ⇒ page 50

5 - Washer

- ❑ 4x

6 - Bolt

- ❑ 1.5 Nm
- ❑ 4x

7 - Noise insulation plate

8 - Noise insulation

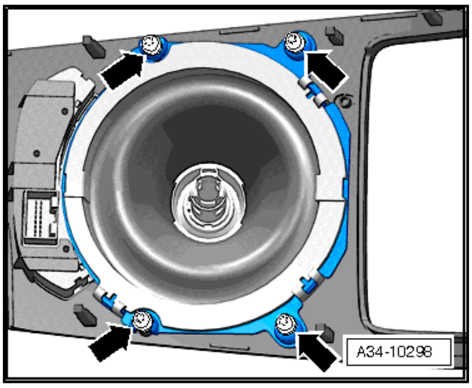
9 - Gear lever

- ❑ Adjusting selector mechanism ⇒ page 68

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

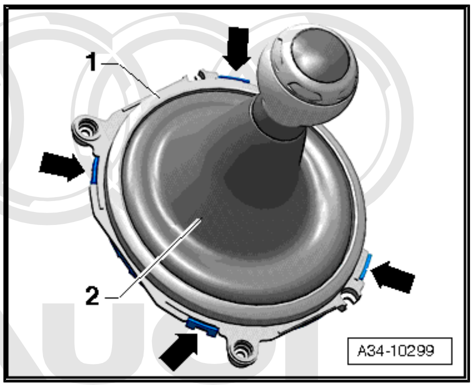
– Remove bolts -arrows-.

– Detach trim panel from securing frame



Detaching securing frame and gear lever boot

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



1.2 Removing and installing gear knob with gear lever boot

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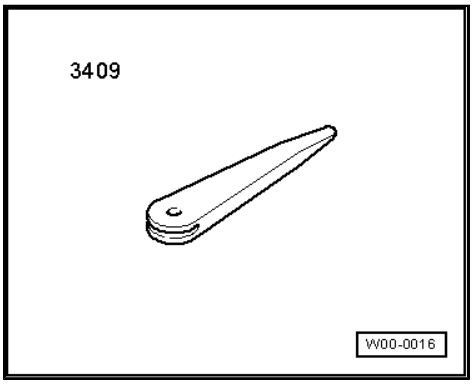
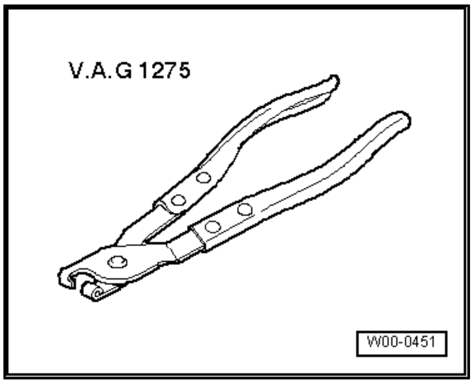
Special tools and workshop equipment required

♦ Removal wedge -3409-



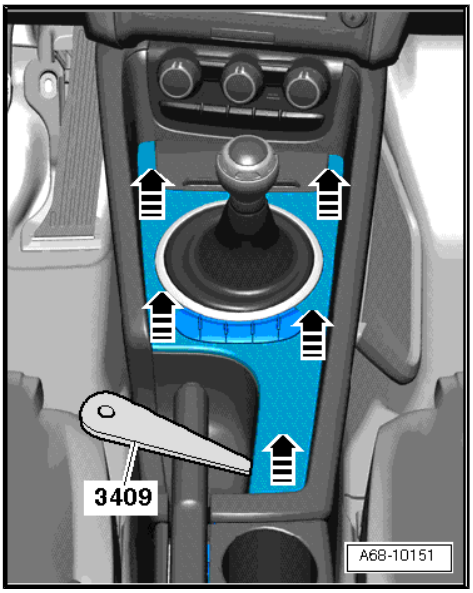
♦ Hose clip pliers -V.A.G 1275-



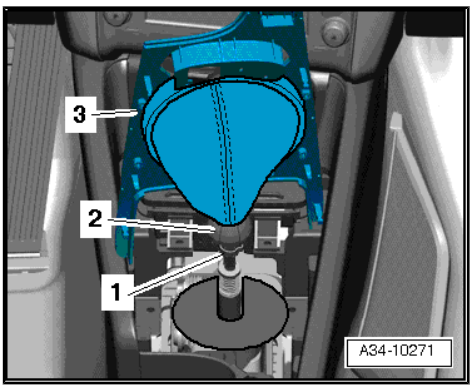
Removing

• The gear knob is removed together with the gear lever boot and the cover for the centre console.

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



– Unplug electrical connector on trim panel.
– Pull trim panel -3- up and over gear knob.
– Open clip -1- and pull off gear knob -2- together with gear lever boot and trim panel -3-.
– Detach gear lever boot and trim panel for centre console -3- ⇒ page 50 .



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- .

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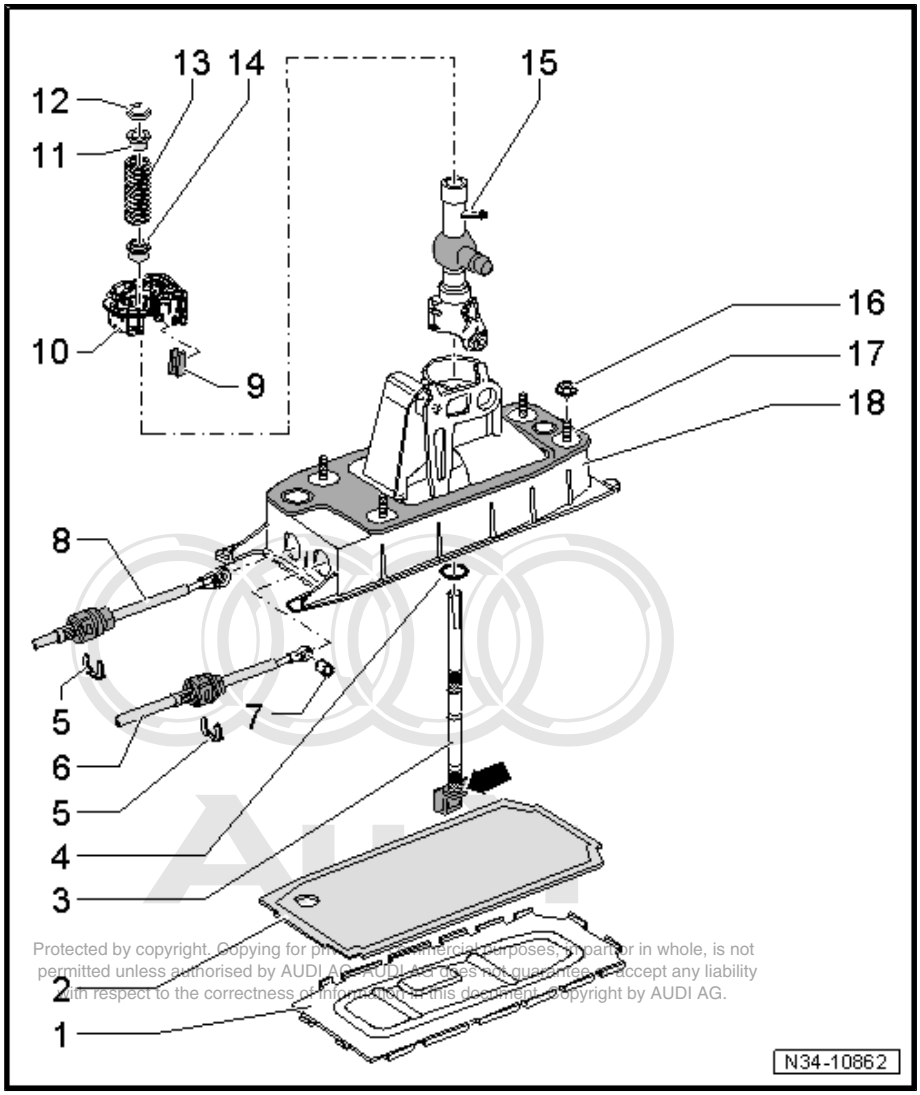
1.3 Exploded view - selector mechanism

Note

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



1 - Floor plate
- ❑ Bend tabs open to remove
- ❑ Always renew

2 - Gasket
- ❑ Always renew

3 - Gear lever
- ❑ Can be removed and installed without removing gear lever guide ⇒ Item 15 (page 53)

4 - Damping washer
- ❑ Push onto gear lever as far as stop -arrow-

5 - Securing clip
- ❑ Take care not to damage selector cables when removing.
- ❑ Always renew

6 - Gate selector cable
- ❑ Lever off gate selector lever
- ❑ Press onto gate selector lever inside selector mechanism
- ❑ Installation position ⇒ page 48
- ❑ Removing and installing ⇒ page 66

7 - Bush

8 - Gear selector cable
- ❑ Lever off gear lever guide
- ❑ Press onto gear lever guide inside selector mechanism
- ❑ Installation position ⇒ page 48
- ❑ Removing and installing ⇒ page 66

9 - Damper

10 - Bearing shell
- ❑ Will be damaged during removal
- ❑ Always renew

11 - Bush

12 - Securing clip
- ❑ Removing and installing ⇒ page 53

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13 - Spring

14 - Bush

15 - Gear lever guide

16 - Nut

- M6 - 8 Nm
- M8 - 25 Nm
  - ❑ 4x

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

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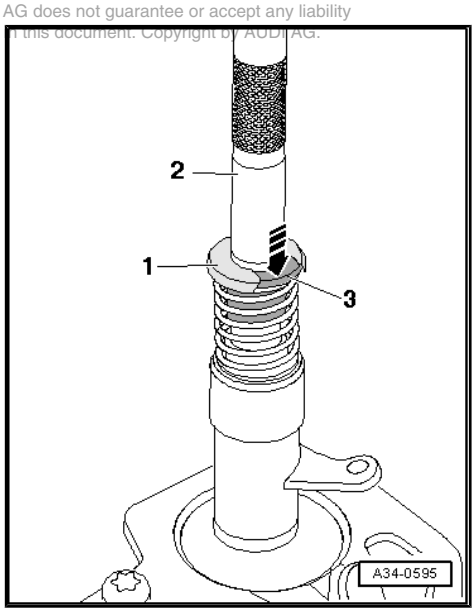
Removing and installing securing clip

– Hold gear lever -2- in position.

– Press spacer bush -3- in direction indicated (arrow).

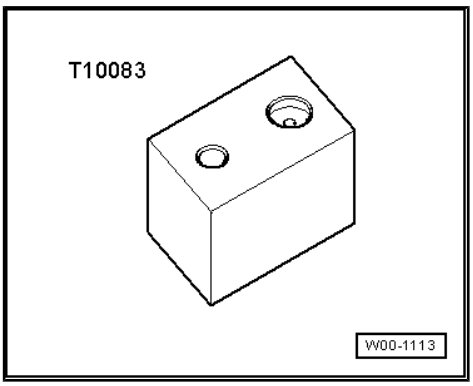
– Take off securing clip -1-.



1.4 Dismantling and assembling selector mechanism

Special tools and workshop equipment required

♦ Thrust block -T10083-



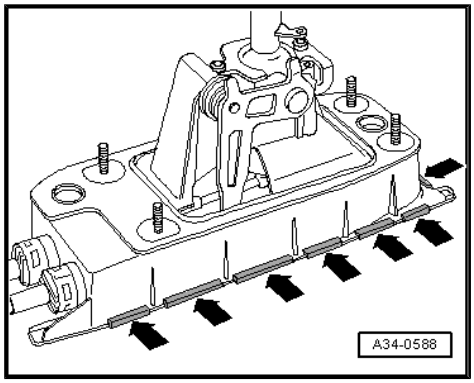
Dismantling

– Remove selector mechanism ⇒ page 57

– Using a screwdriver, bend open tabs -arrows- on all sides of floor plate and remove floor plate.

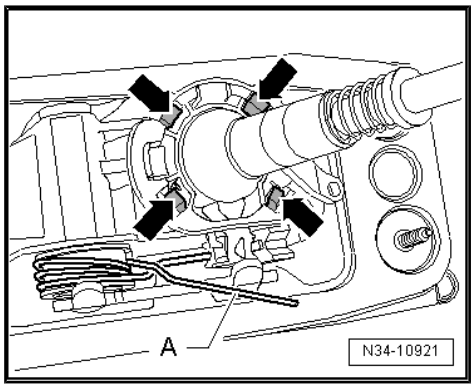
– Remove gasket from selector housing.

– Remove gear selector cable and gate selector cable from selector housing ⇒ page 66 .



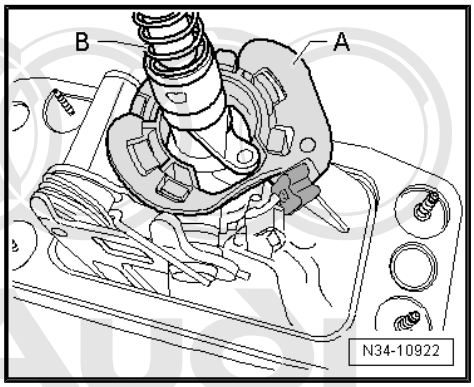
– Lift top spring arm -A- over tab on gate selector lever.

– 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-.

– Then press ball socket -A- off ball on gear lever guide and remove.



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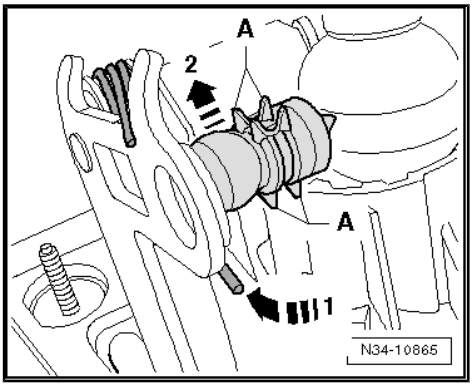
Note

- *Note guides -A- when performing the following steps.*
- *They must not break off.*

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



Caution

During the following steps, the bottom spring arm (-arrow 1-) can become dislodged and snap downwards off the shoulder of the gate selector lever.

– Pull gear lever guide upwards as far as stop and at the same time pull ball-head pin -arrow 2- out of gate selector lever.

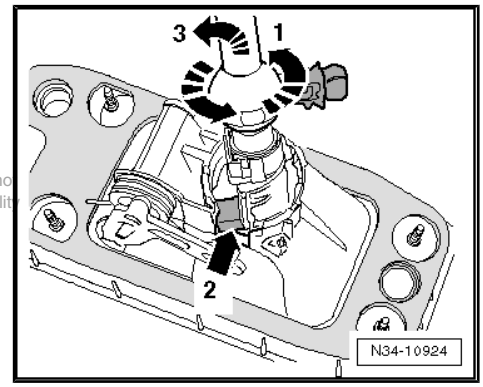
– Press spring -arrow 1- carefully off the shoulder of the gate selector lever.

The spring arms will then compress “diagonally”.

– Then turn gear lever guide in direction of -arrow 1-.

• The pin -arrow 2- should be positioned in the recess on the selector housing.

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



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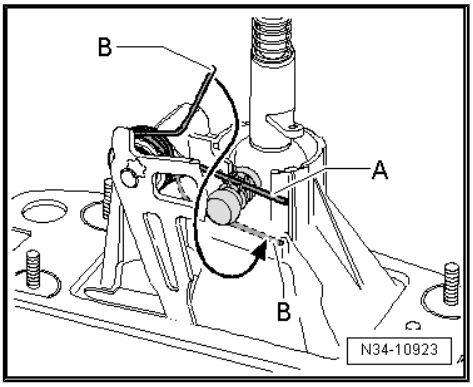
Assembling selector mechanism

– Release spring arms -A- and -B-.

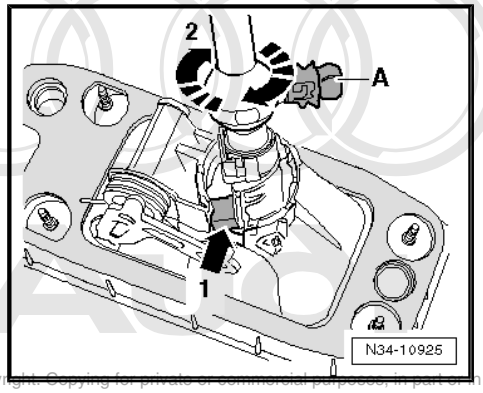
• Spring arms -A- and -B- must point in opposite directions. (Shown here with gear lever guide installed.)



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

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

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



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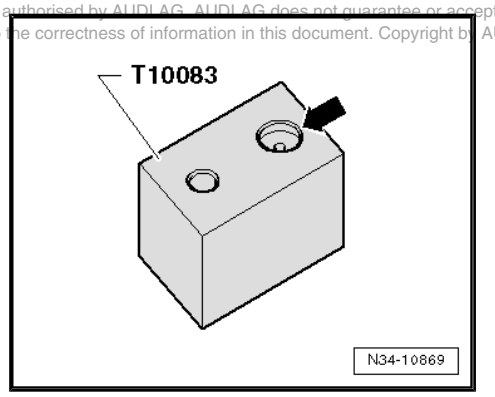
– Position selector housing with gear lever guide onto thrust block -T10083- .

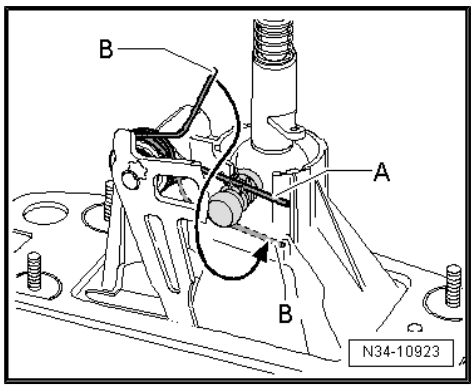
• The gear lever guide rests in the larger recess -arrow- in the thrust block -T10083- .

• Gear lever guide should protrude out of selector housing as far as 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

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

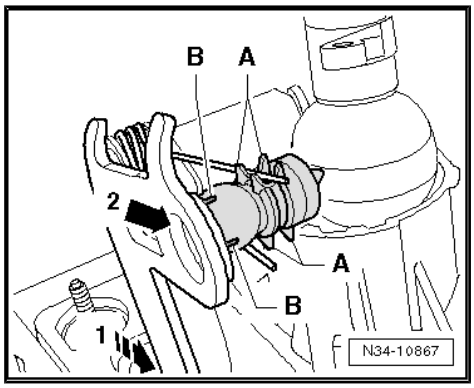
– Carefully take selector housing off thrust block -T10083- together with gear lever guide.

– Move gate selector lever rearwards as far as stop in direction of -arrow 1-.

– Grease ball-head pin.

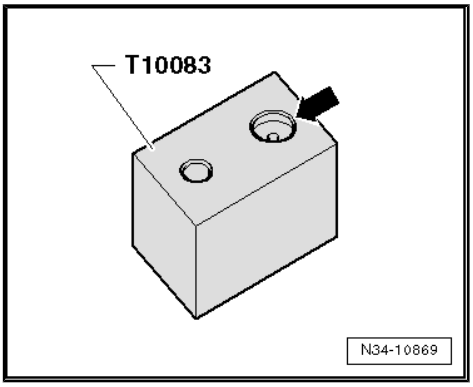
– Press ball-head pin into hole in gate selector lever -arrow 2-.

• Guides -A- and tabs -B- must not be damaged.



– Now insert gear lever guide (which is now fitted in selector housing) into larger recess -arrow- in thrust block -T10083- again.

• Gear lever guide should now protrude out of selector housing as far as stop.



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

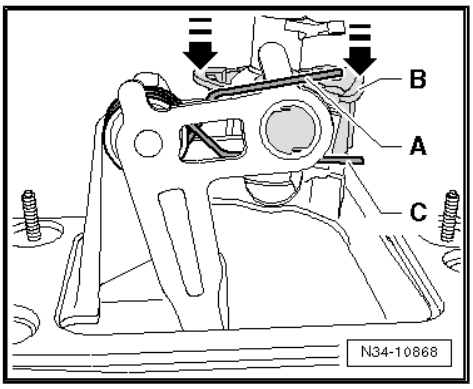
• Use a new ball socket -B-.

– Grease ball socket and ball of gear lever guide.

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

– Remove selector housing from thrust block -T10083- .

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



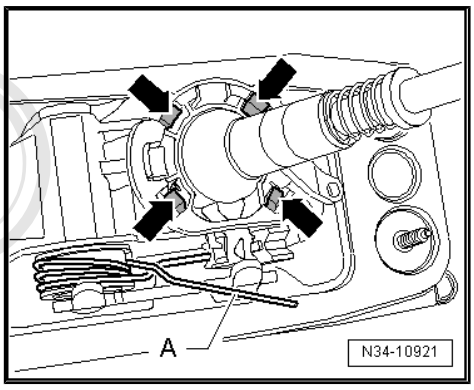
• All four lugs -arrows- must engage.

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

– Insert bottom spring arm into guide.

– Fit gear lever, gear selector cable, gate selector cable and floor plate.

– Install selector mechanism ⇒ page 60 .



1.5 Removing and installing selector mechanism

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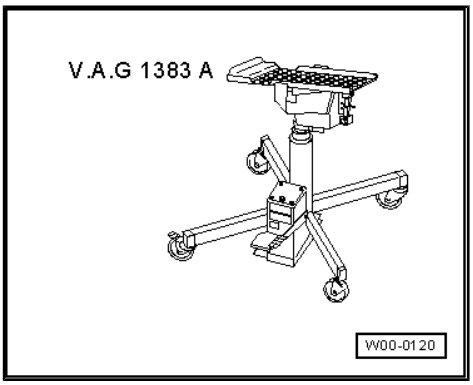
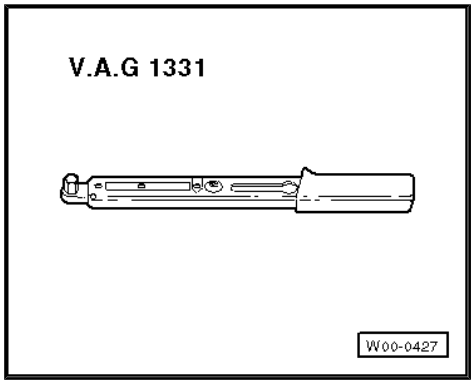
Special tools and workshop equipment required

♦ Engine and gearbox jack -V.A.G 1383 A-



♦ Torque wrench -V.A.G 1331-



♦ Grease -G 000 450 02-

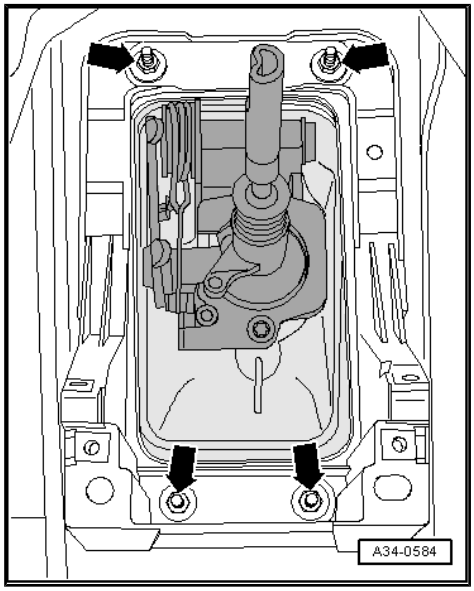
Removing

– Remove gear knob together with trim panel for centre console ⇒ page 50 .

– Remove centre console ⇒ Rep. Gr. 68 .

– Remove noise insulation above selector mechanism.

– Remove nuts -arrows-.



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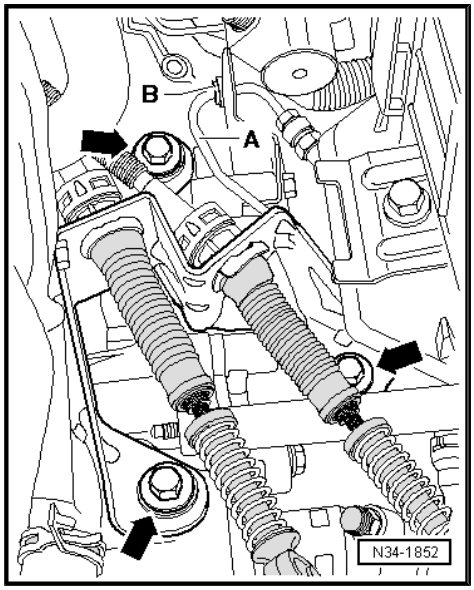
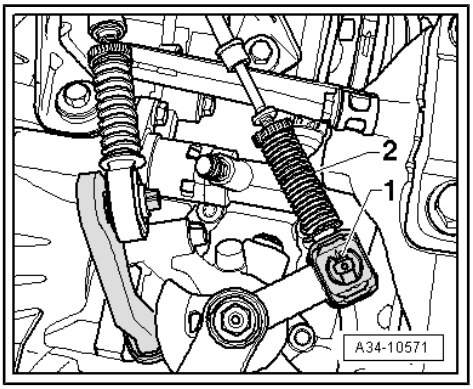
– Detach cable support bracket from gearbox -arrows-.



– Remove securing clip -1-.
– Pull gear selector cable -2- off pin.



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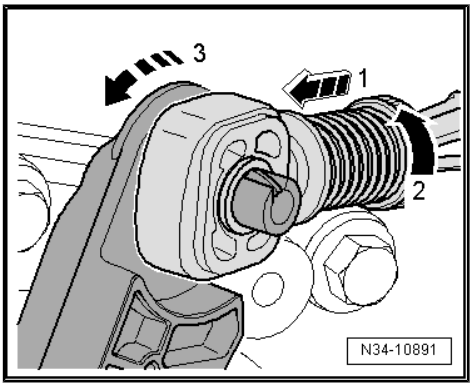
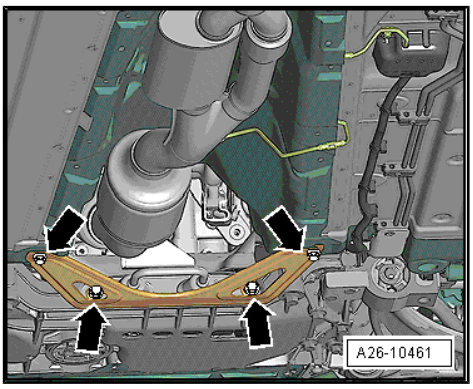
Release gate selector cable as follows:

– Pull locking mechanism forwards in direction of -arrow 1- onto stop and then turn in direction of -arrow 2- to lock.
– Press relay lever forwards (in direction of -arrow 3-) and pull out gate selector cable.



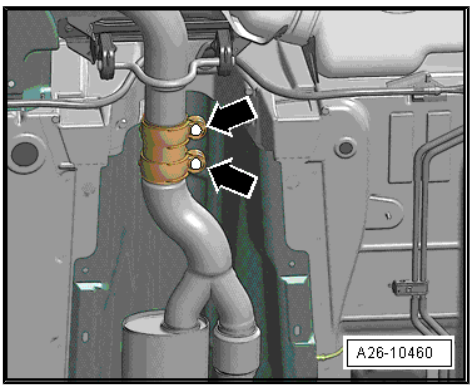
– Unbolt bracket for exhaust system and tunnel brace -arrows-.



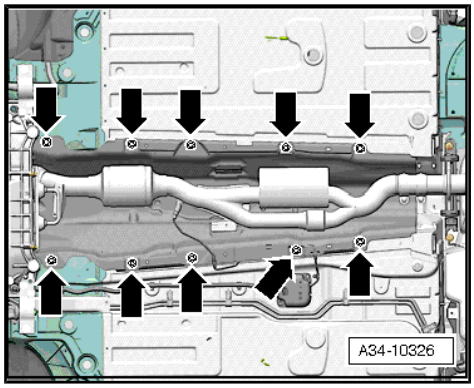
Note

To prevent damage, the flexible joints in the front exhaust pipe must not be bent further than 10°.

– Support front exhaust pipe and catalytic converter with engine and gearbox jack -V.A.G 1383 A- .
– Disconnect exhaust system at clamp -arrows-.



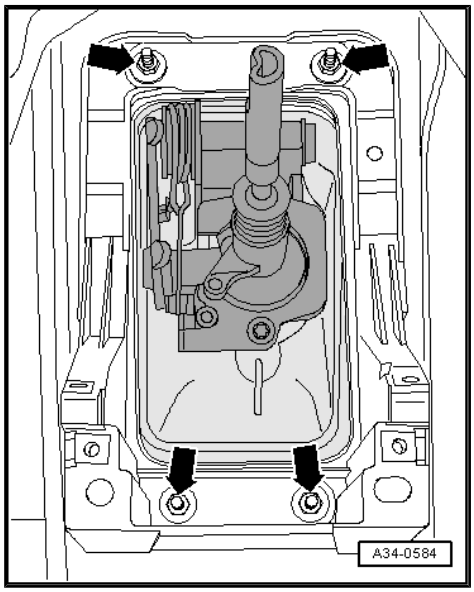
– Remove bolts -arrows-.
– Lower front exhaust pipe with catalytic converter slightly.
– Unclip Lambda probe wire and remove heat shield towards rear.
– Remove selector housing with selector cables.



Installing selector mechanism

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

Fit and secure selector housing ⇒ Item 16 (page 53) .

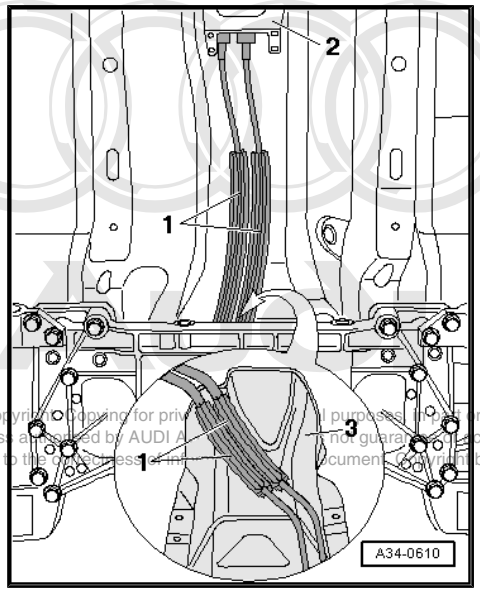


– Route cables -1- from selector mechanism -2- to gearbox as follows:

- The cables must run parallel and must not be crossed.
- The cables must be routed in the slot provided in heat shield -3-.

Note

The enlargement shows the heat shield from above.



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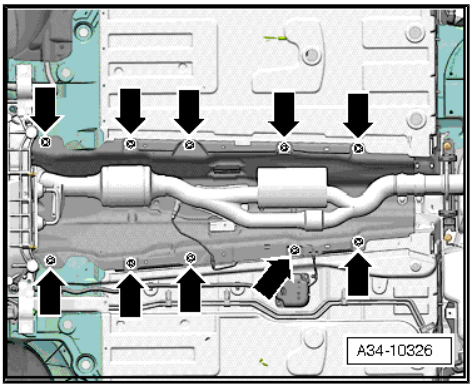
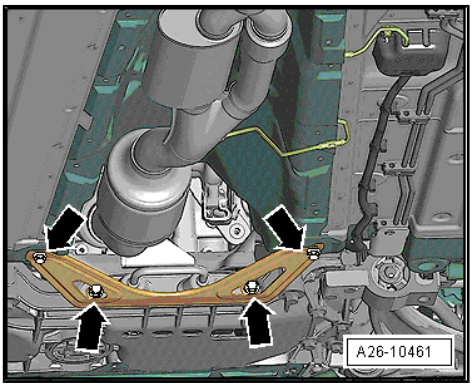
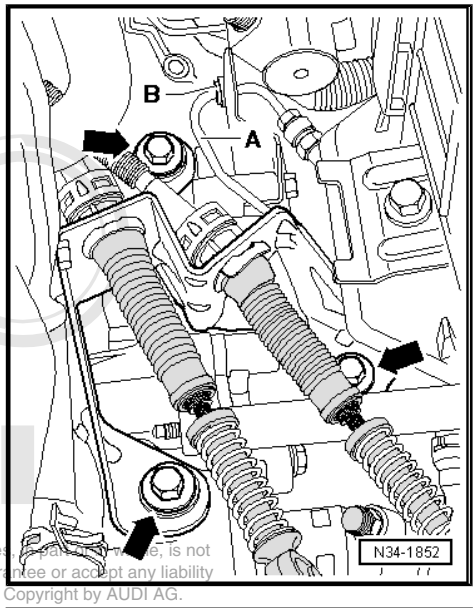
– Secure heat shield -arrows-.



– Assemble exhaust system so it is free of stress and install tunnel brace -arrows- ⇒ Rep. Gr. 26 .



– Secure cable support bracket -arrows-. Tightening torque ⇒ Item 6 (page 62) .



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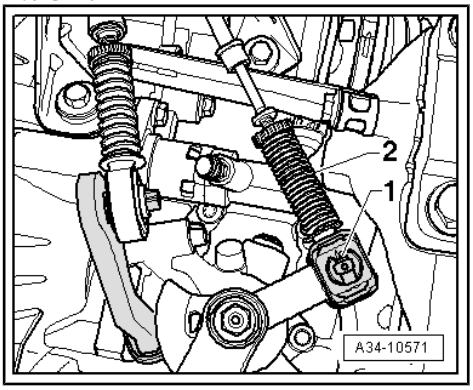
– Apply a small quantity of grease -G 000 450 02- to pin of gearbox selector lever.
– Position gear selector cable -2- on pin of gearbox selector lever and secure with new securing clip -1-.
– Insert gate selector cable in cable end-piece.
– Adjust selector mechanism ⇒ page 68 .
– Fit noise insulation above selector mechanism and install centre console ⇒ General body repairs, interior; Rep. Gr. 68 .
– Install gear knob together with boot ⇒ page 50 .



1.6 Exploded view - gear selector cable, gate selector cable and gearbox selector lever

Note

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

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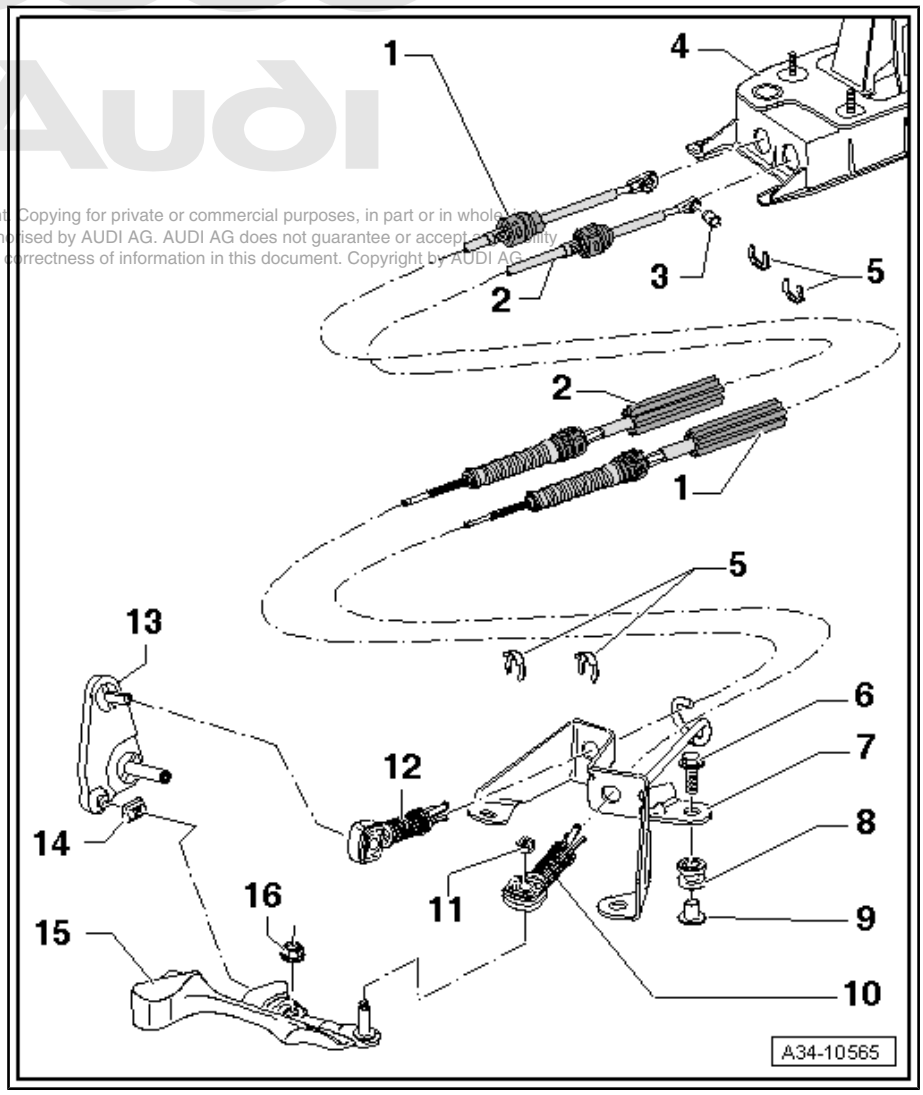

1 - Gear selector cable

- ❑ Installation position ⇒ page 48
- ❑ Removing and installing ⇒ page 66
- ❑ Adjusting ⇒ page 68
- ❑ Secure to gate selector cable with cable tie ⇒ page 64

2 - Gate selector cable

- ❑ Installation position ⇒ page 48
- ❑ Removing and installing ⇒ page 66
- ❑ Adjusting ⇒ page 68
- ❑ Secure to gear selector cable with cable tie ⇒ page 64

3 - Bush

4 - Selector housing

- ❑ Dismantling and assembling ⇒ page 52

5 - Retaining clips

- ❑ Take care not to damage selector cables when removing.
- ❑ Always renew

6 - Bolt

- ❑ 20 Nm
- ❑ 3x
- ❑ For support bracket

7 - Support bracket

- ❑ With cable guide

8 - Grommet

- ❑ For support bracket mounting on gearbox

9 - Bush

10 - Cable end-piece

- ❑ Secures gear selector cable to gearbox selector lever
- ❑ Do not interchange; cable end-pieces for gate selector cable and gear selector cable are different ⇒ Fig. “ A - Identification according to diameter of bore in cable end-piece “ , page 63
- ❑ Release to adjust selector mechanism ⇒ page 69

11 - Securing clip

12 - Cable end-piece

- ❑ Secures gate selector cable to relay lever
- ❑ Do not interchange; cable end-pieces for gate selector cable and gear selector cable are different ⇒ Fig. “ A - Identification according to diameter of bore in cable end-piece “ , page 63
- ❑ Detaching from gate selector cable ⇒ page 65
- ❑ Detaching from relay lever ⇒ page 65
- ❑ Pressing onto relay lever ⇒ page 66
- ❑ Release to adjust selector mechanism ⇒ page 69

13 - Relay lever

- ❑ Installation position ⇒ page 64
- ❑ Removing and installing ⇒ page 65

14 - Slide block

15 - Gearbox selector lever

- ❑ With damper weight
- ❑ Install so that gap in splines aligns with selector shaft ⇒ page 64
- ❑ After installing, adjust selector mechanism ⇒ page 68
- ❑ Installation position ⇒ page 64

16 - Nut

- ❑ 25 Nm
- ❑ Self-locking
- ❑ Always renew

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A - Identification according to diameter of bore in cable end-piece

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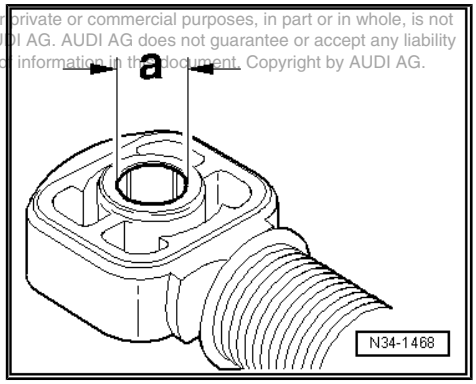
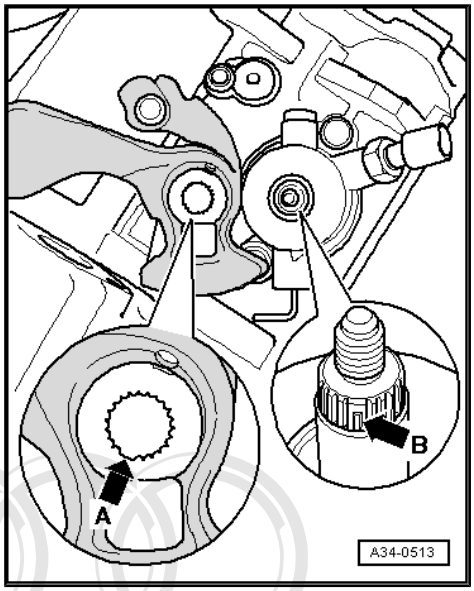
The holes in the cable end-pieces have different diameters.

Cable end-piece for:	Distance “a”
Gear selector cable to gearbox selector lever	8.5 mm
Gate selector cable to relay lever	10 mm



Installing gearbox selector lever

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



Installation position of gearbox selector lever and relay lever

1 - Gearbox selector lever with damper weight

2 - Arrow marking

- Points to pin on relay lever (in neutral position)

3 - Relay lever

- Locates in guide rail of gearbox selector lever via slide block -arrow-.

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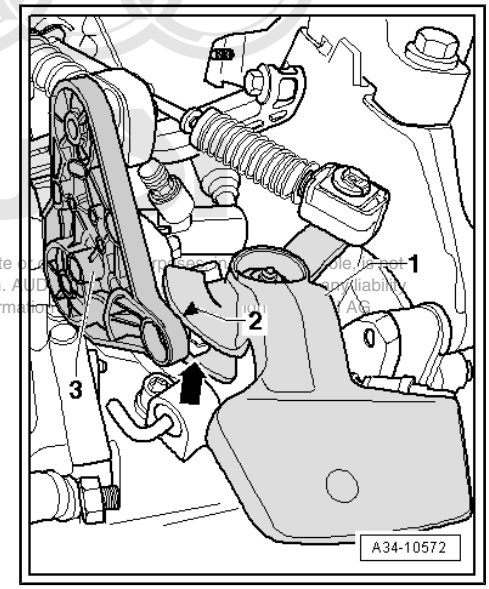
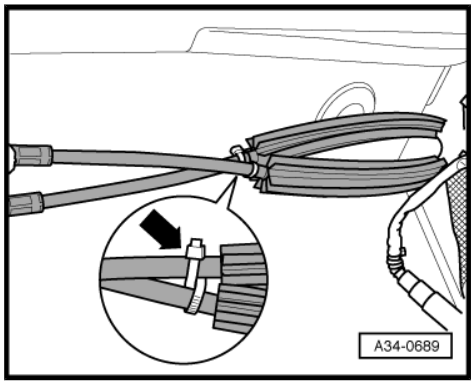
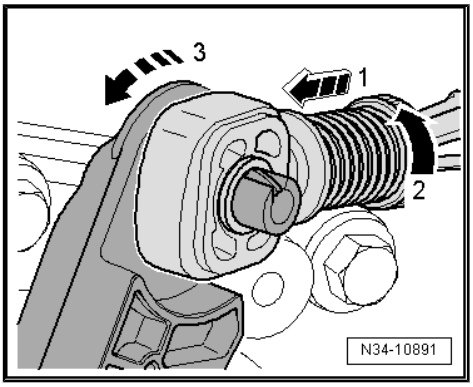


Position of cable tie securing selector cables

– Wrap cable tie round selector cables in a “figure-of-eight” -arrow- and secure cable tie as shown in illustration.



Disconnecting cable end-piece from gate selector cable



Note

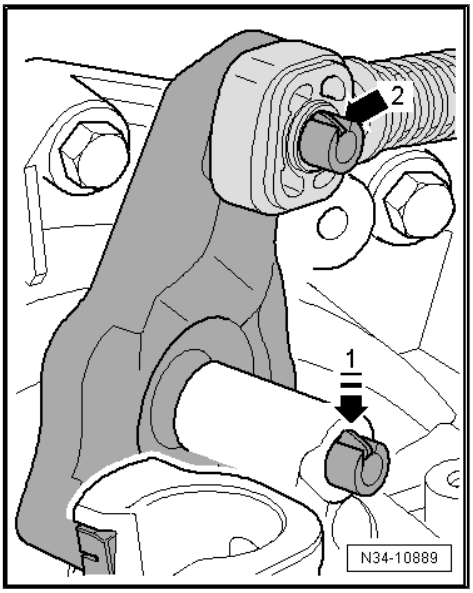
- *Cable end-piece must be detached from gate selector cable before removing relay lever.*
- *Do not detach cable end-piece from relay lever until relay lever has been removed.*

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

– Then press relay lever forwards (in direction of -arrow 3-).

Removing and installing relay lever

– Press detent -arrow 1- down onto stop and remove relay lever together with cable end-piece. Move relay lever in normal direction of operation.



Note

-Arrow 2- can be disregarded.

Installing relay lever

Note

To install, lubricate bearings and moving surfaces with grease - G 000 450 02- .

– Press cable end-piece onto relay lever ⇒ page 66 .

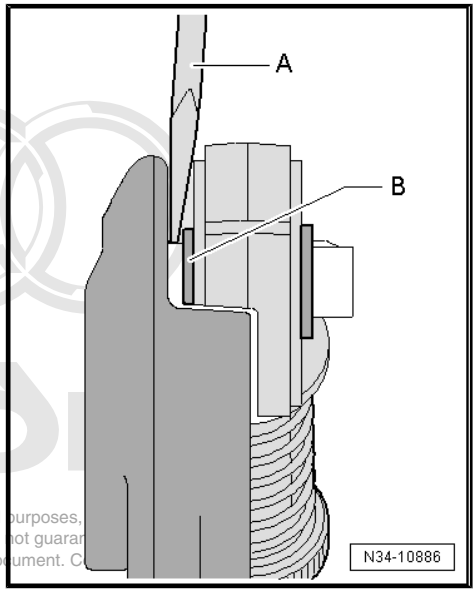
– Insert relay lever with cable end-piece as far as stop.

- Relay lever is secured by detent -arrow 1-.
- Cable end-piece is secured by detent -arrow 2-.
- Ensure that components engage securely.

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

- Relay lever is removed.

– Insert a plain slot screwdriver -A- between bush -B- and relay lever.



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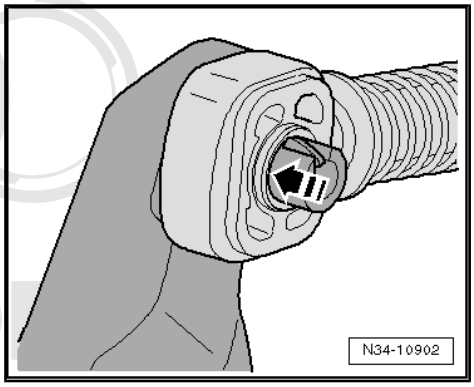
Pressing cable end-piece onto plastic relay lever

- Relay lever is removed.
- Press on cable end-piece only at bush -arrow-.



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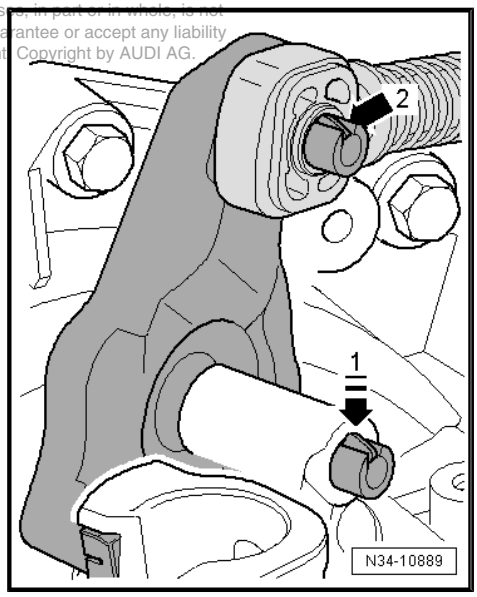
- Cable end-piece must move freely on relay lever.
- Cable end-piece must be behind detent -arrow 2-.
- Ensure that components engage securely.



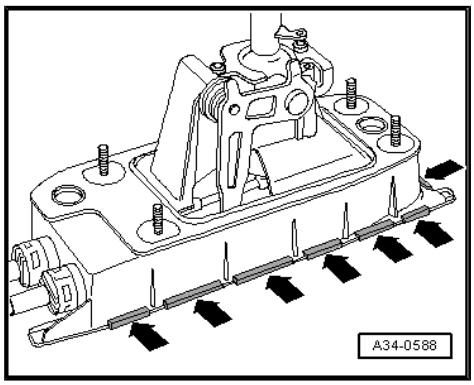
1.7 Removing and installing gear selector cable and gate selector cable

Removing

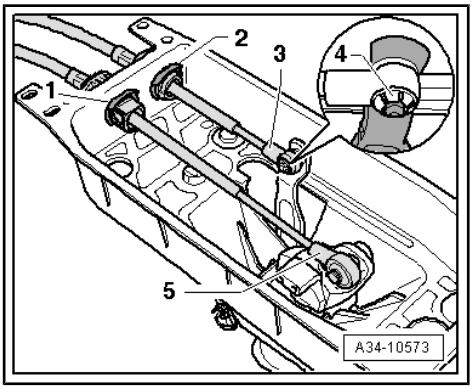
– Remove selector mechanism ⇒ page 57

– Using a screwdriver, bend open tabs -arrows- for selector mechanism on floor plate and remove floor plate.

– Remove gasket.

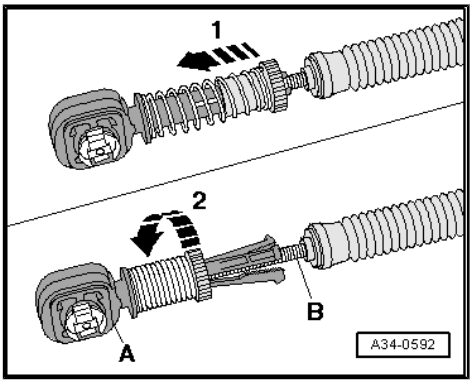


– Pull off securing clips -1 ... 2-.
– Lever off gate selector cable -3- / gear selector cable -4- with a screwdriver and pull cable out of selector housing.

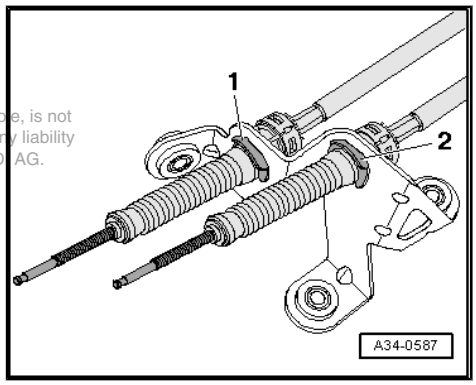


Release cable end-piece -A- as follows:

– Push sleeve forwards onto stop -arrow 1-.
– Turn sleeve clockwise onto stop -arrow 2- so that it engages.
– Detach cable end-piece -A- from cable -B-.



– Pull off securing clips -1- and -2-.
– Detach support bracket from cables.



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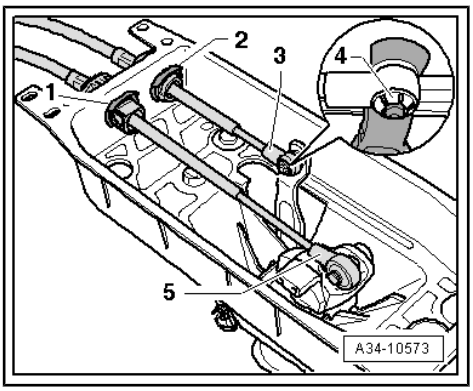
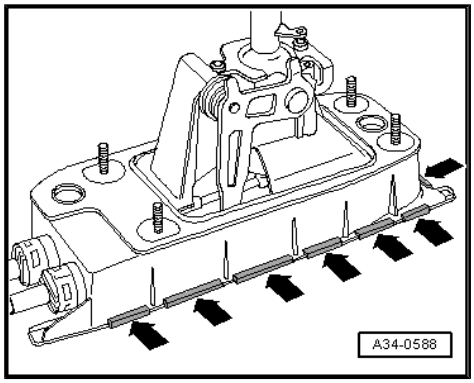
Installing

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

– Secure gear selector cable and gate selector cable to selector housing with securing clips -1 ... 2-.
– Press gate selector cable -3- onto relay lever.
– Press gear selector cable -5- onto gearbox selector lever. Make sure sleeve -4- engages securely.



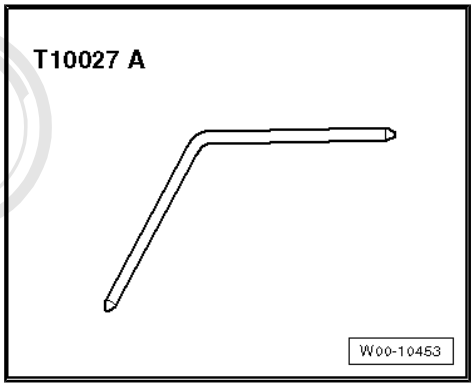
– Fit gasket and secure floor plate to selector mechanism by bending over tabs -arrows-.
– Install selector mechanism ⇒ page 60 .
– Adjust selector mechanism ⇒ page 68 .



1.8 Adjusting selector mechanism

Special tools and workshop equipment required

◆ Locking pin -T10027A-



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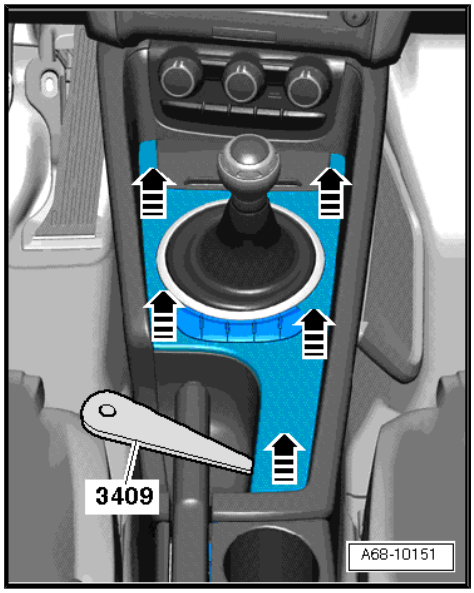
Requirements for adjustment

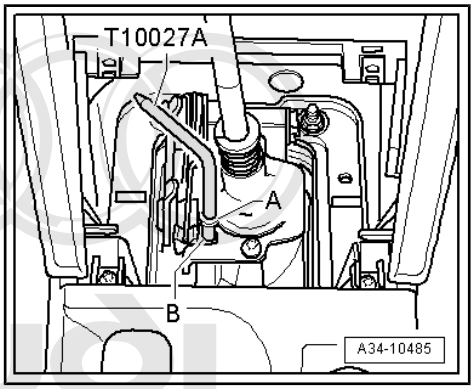
- Gear selector linkage must be in proper condition and undamaged.
- Selector mechanism must move freely.
- Gearbox, clutch and clutch mechanism must be in proper condition.
- Gearbox in neutral.

Adjusting

– Open ashtray.
– Carefully lever off trim panel from centre console -arrows-.
– Pull trim panel up and over gear knob.



– With gearbox in neutral, guide gear lever to the left into 1st/2nd gear gate.
– Lift noise insulation plate and lock gear lever in position with locking pin -T10027A- .



Note

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

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

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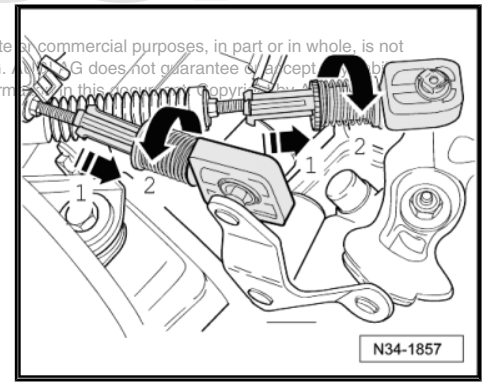
– Push locking sleeves on gear selector cable and gate selector cable forward as far as they will go -arrow 1-.
– Turn locking sleeve as far as it will go in direction of arrow -2- so that it engages.



Note

It should now be possible to move the cables in the cable end-pieces.

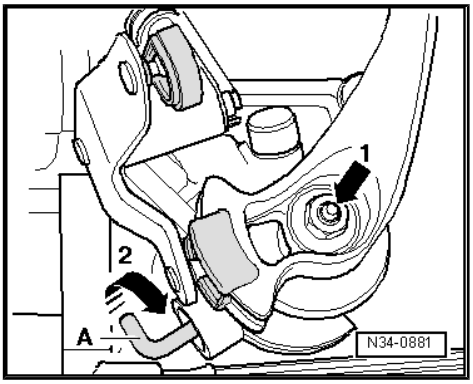
• Gearbox in neutral.

Lock the selector shaft as follows:

– Push gearbox selector lever down into 1st/2nd gear gate -arrow 1-. At the same time, turn locking pin -2- in direction of arrow -B- until it engages.

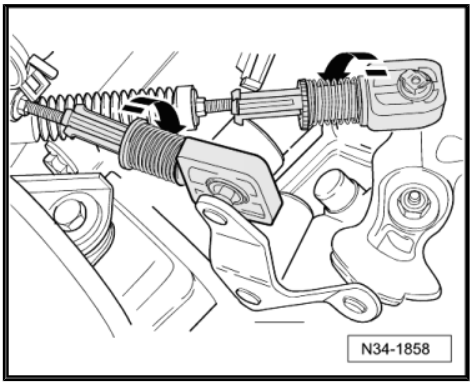
The selector shaft is then locked and can no longer be moved.

– Ensure that the gate selector cable and the gear selector cable are located free of tension in the cable end-pieces.



– Now turn locking sleeves on gear selector cable and gate selector cable as far as they will go in the direction indicated (arrow).

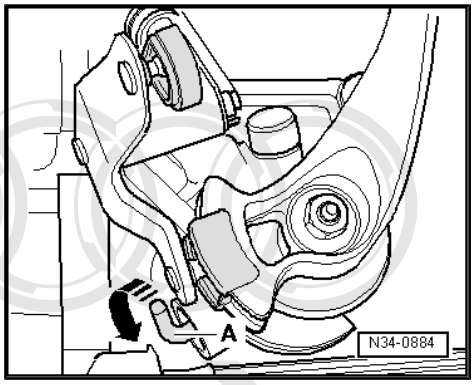
The spring presses the locking sleeve back into the original position.



Note

Cable adjustment is now complete.

– Now turn locking pin -A- back to original position (direction of arrow).
– Pull locking pin -T10027A- out of selector mechanism.



Check gear lever setting as follows:

- The gear lever should rest in the 3rd/4th gear gate when the gearbox is in neutral.

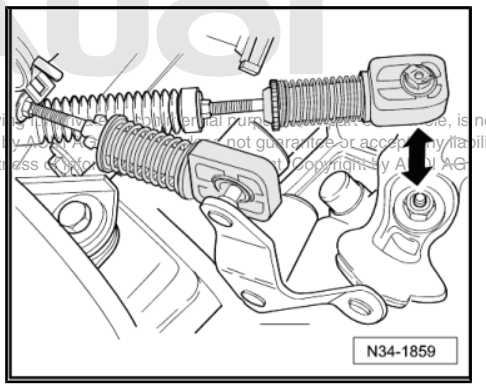
– Depress clutch.
– Select all gears several times. Pay particular attention to the operation of the reverse gear locking mechanism.

Should a gear fail to engage smoothly after repeated selection, check the play (lift movement) of the selector shaft as follows:

– Engage 1st gear.
– Push gear lever as far as it will go to the left and release.
– At the same time observe selector shaft on gearbox (2nd mechanic).
– The selector shaft should move up and down approx. 1 mm (in direction of -arrow-) when the gear lever is moved.

If this is not the case, adjust selector mechanism again ⇒ page 68 .

– Fit gear lever boot.



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2 Removing and installing gearbox

⇒ “2.1 Removing and installing gearbox on vehicles with 1.8 ltr. TFSI engine”, page 72 .

⇒ “2.2 Installing gearbox on vehicles with 1.8 ltr. FSI turbocharged engine”, page 81

⇒ “2.3 Transporting gearbox”, page 88

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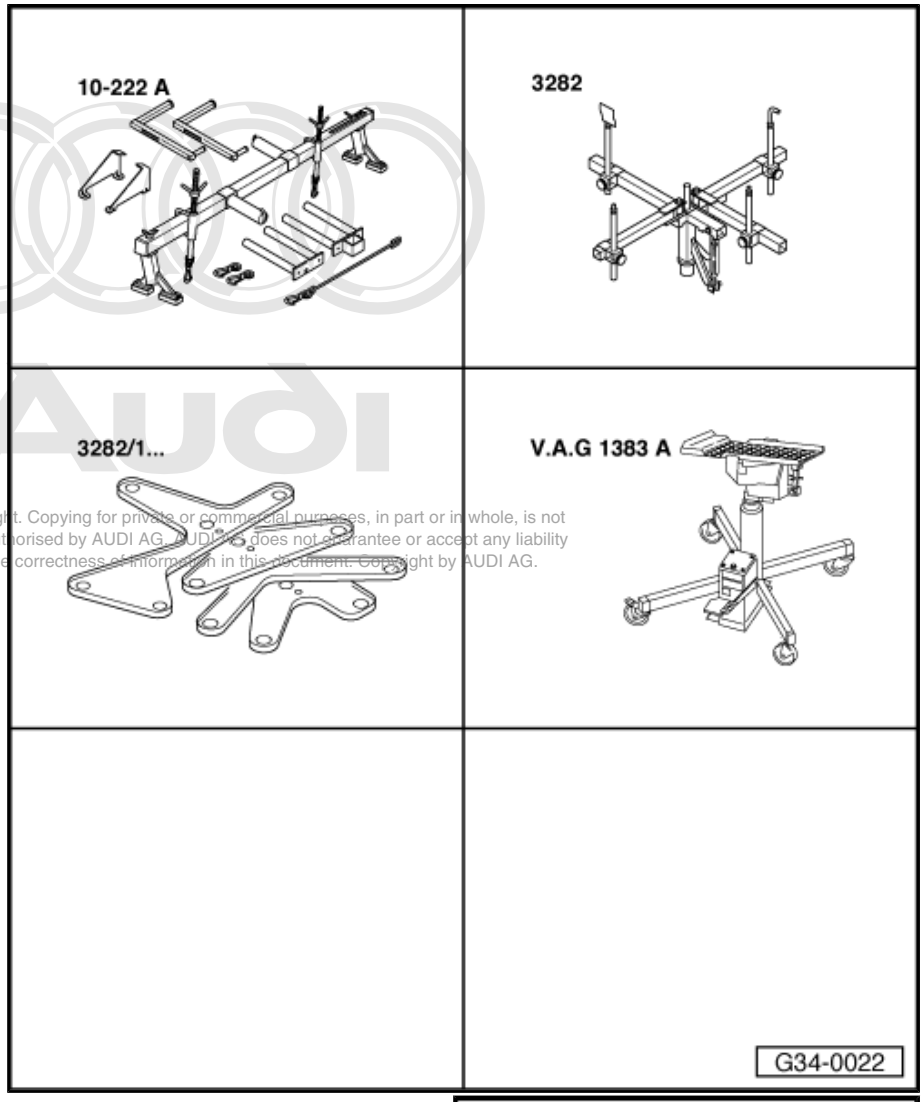
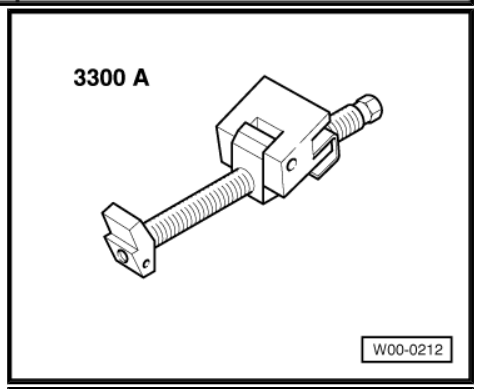
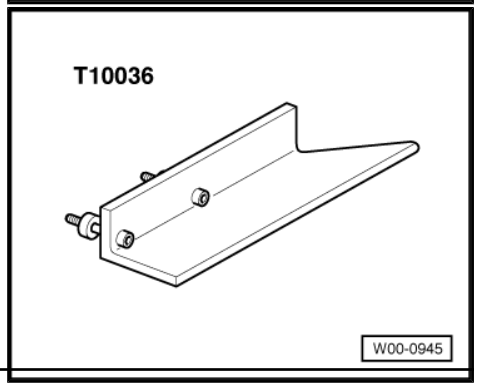
2.1 Removing and installing gearbox on vehicles with 1.8 ltr. TFSI engine

Special tools and workshop equipment required

- Support bracket -10 - 222 A-
- Gearbox support -3282-
- Adjustment plate -3282/39-
- Engine and gearbox jack - V.A.G 1383 A-
- Engine support -3300 A-
- Support -T10036-
- Bolt M6×20 (2x)
- Bolt M10×20
- Grease for clutch plate splines -G 000 100-







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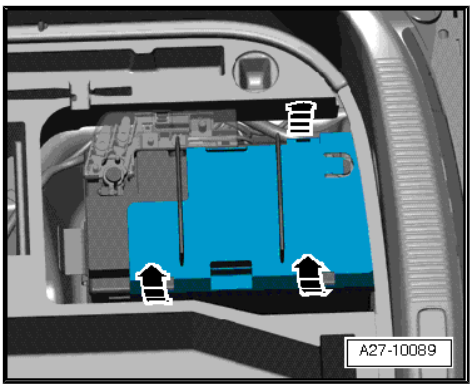
Caution

When disconnecting the battery there is a risk of serious damage to electronic components:

- *Observe the correct procedure for disconnecting the battery ⇒ Electrical system; Rep. Gr. 27 .*

– Take out luggage compartment floor cover.

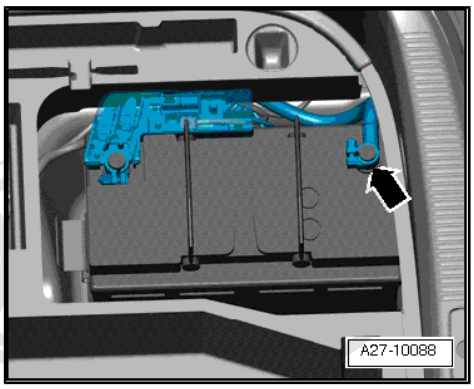
– Release retaining clips -arrows- and remove cover for negative terminal.



Note

Remove rear cross panel trim if necessary for access to negative terminal of battery ⇒ Rep. Gr. 70 .

– With ignition switched off, disconnect battery earth strap -arrow-.



– Remove engine cover panel -arrows-.

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

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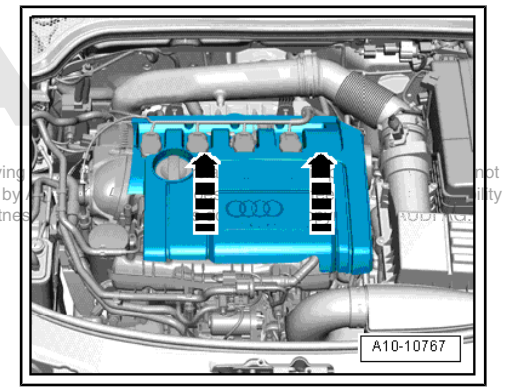
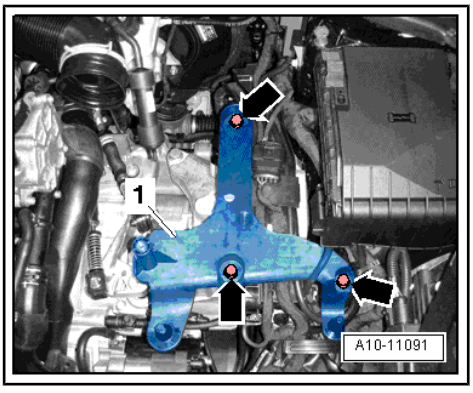
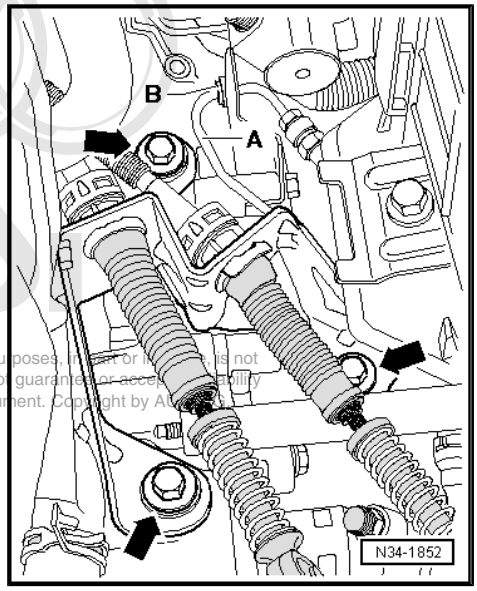


– Remove bolts -arrows- and detach bracket for air cleaner housing.



– Detach cable support bracket from gearbox -arrows-.
– Remove bracket -B- from gearbox and disconnect from pipe/ hose assembly -A-.



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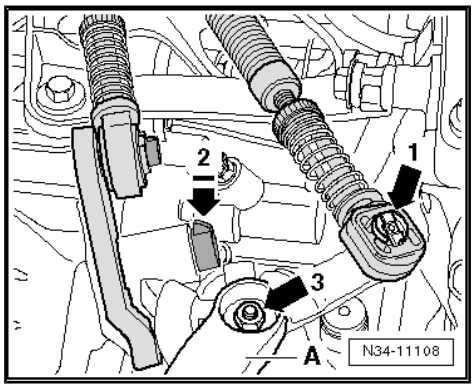
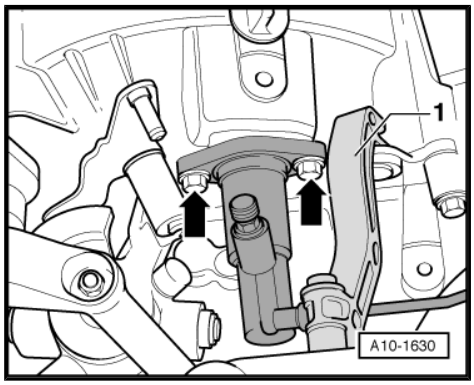
– Detach securing clip -arrow 1- and pull off gear selector cable.
– Press detent -arrow 2- down onto stop and remove relay lever together with cable end-piece. Move relay lever in normal direction of operation.
– Tie cables with cable support bracket to one side.
– Remove nut -arrow 3- and detach gearbox selector lever -A-.



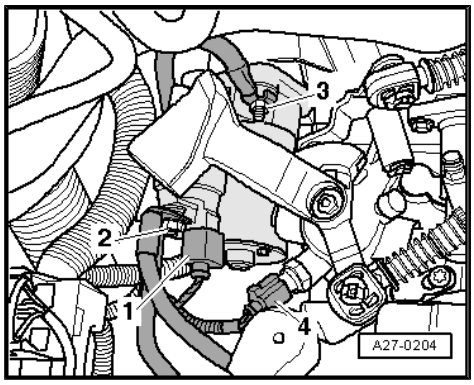
– Remove brace -1-.
– Move clear hydraulic line going to clutch slave cylinder.
– Unbolt clutch slave cylinder -arrows- and place to one side; do not disconnect pipe.

Caution

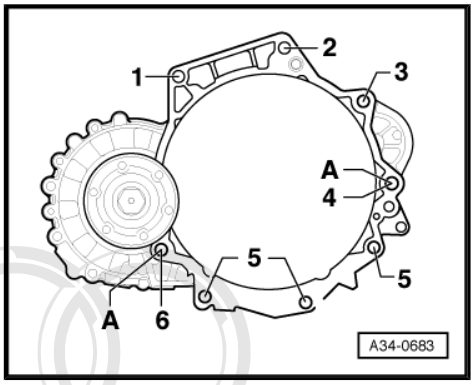
Do not depress clutch pedal after removing slave cylinder.



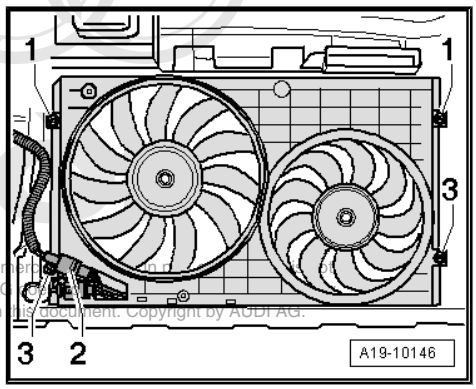
– Unplug electrical connector -1-.
– Disconnect B+ wire from starter solenoid -2-.
– Disconnect earth wire -3- and remove top bolt securing starter.
– Unplug electrical connector -4- at reversing light switch -F4- .



– Remove engine/gearbox securing bolts -1 and 2- (accessible from above).



– Remove the two bolts (top) on radiator cowl -1-.



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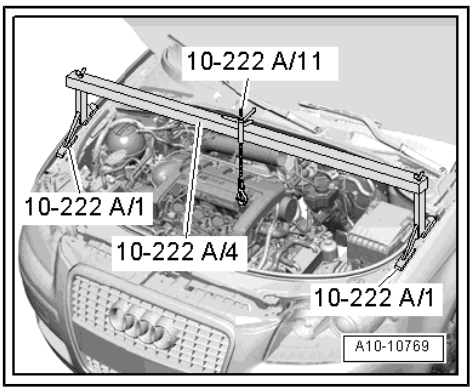
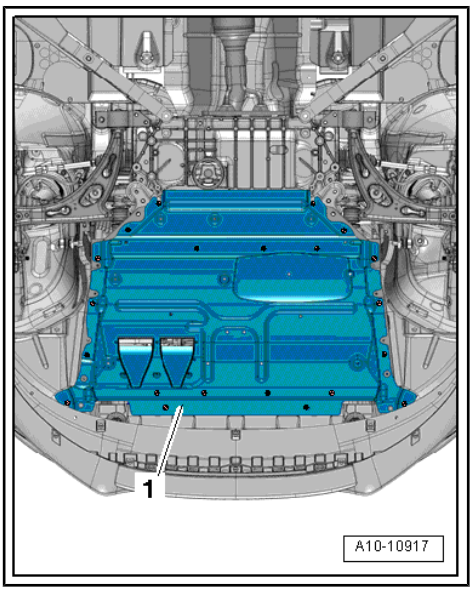
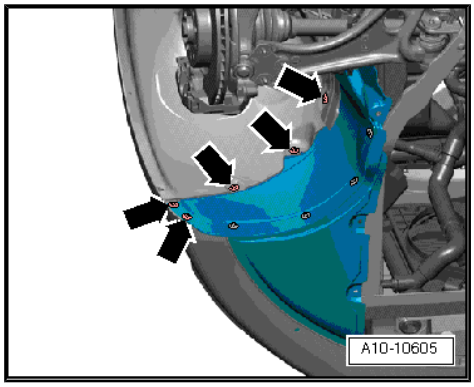
– Assemble support bracket -10 - 222 A- and place onto wing panel flange, as shown in illustration.
– Engage hook of spindle in engine lifting eye (left-side).
– Take up weight of engine/gearbox assembly with spindle; do not lift.



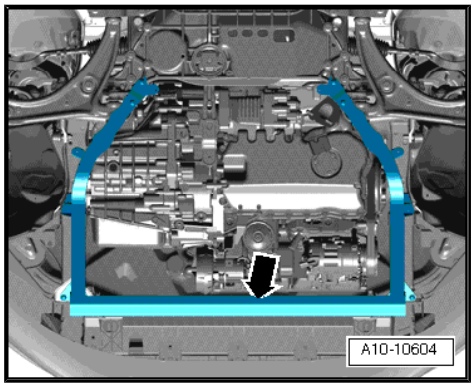
– Raise vehicle.
– Remove noise insulation (centre) -1- ⇒ Rep. Gr. 66 .



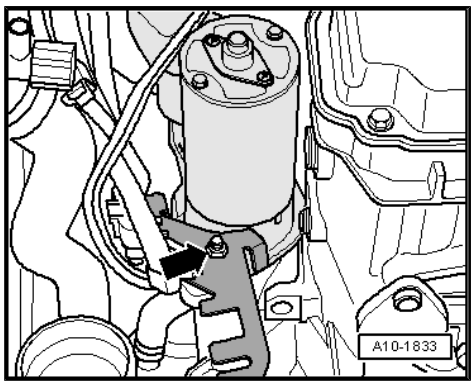
– Remove front left wheel.
– Remove left noise insulation -arrows-.



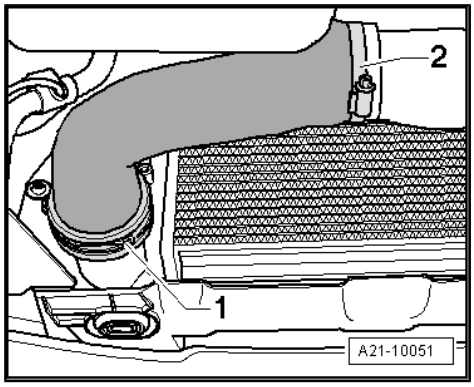
– Remove frame for noise insulation -arrow- ⇒ Rep. Gr. 50 .



– Remove nut -arrow- and detach bracket for electrical wiring.
– Remove bottom bolt securing starter and take out starter.



– Slightly lift retaining clip -1- and loosen hose clip -2- to remove air hose.



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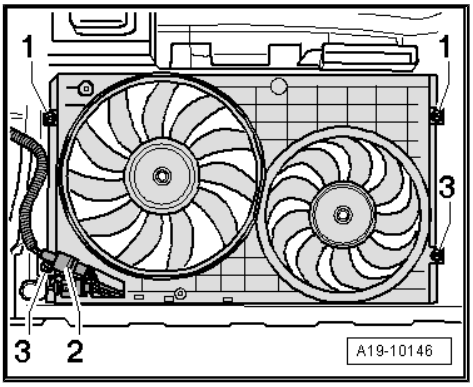
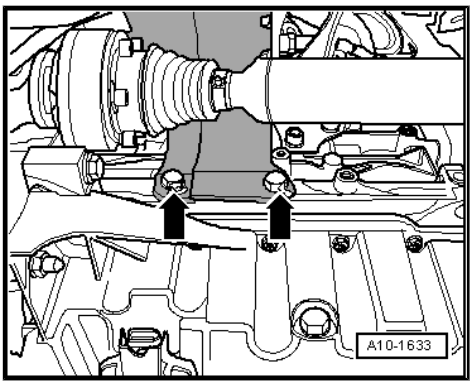
– Detach electrical connector -2-.
– Remove bolts -3- and take out radiator cowl from below.



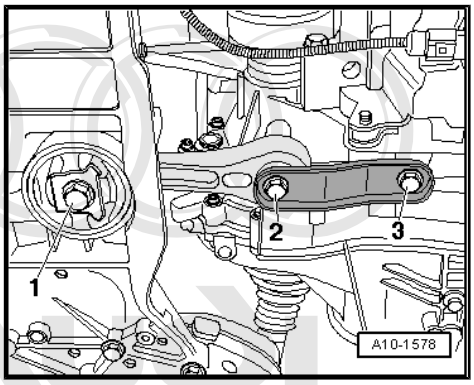
– Unbolt heat shield for drive shaft (right-side) -arrows-.
– Unbolt drive shafts (left and right) from flange shafts on gearbox.
– Lift drive shafts (left and right) up and secure with cable tie.

Note

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



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



– Spay rust remover onto studs on turbocharger -arrows-.
– Remove nuts -arrows-.
– Detach catalytic converter from turbocharger and secure catalytic converter to prevent it from falling to the ground.

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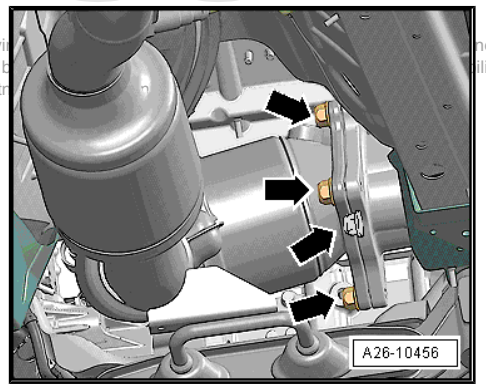
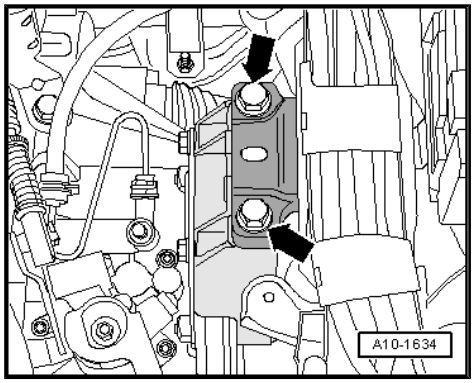


Note

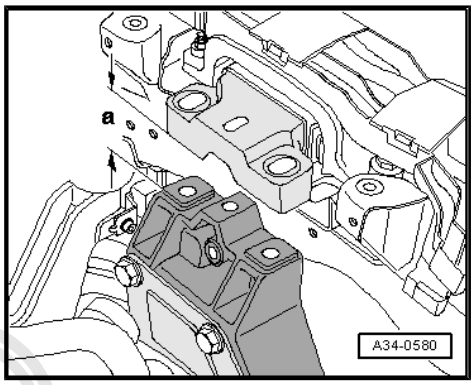
- *To prevent damage, the flexible joints in the front exhaust pipe must not be bent further than 10°.*
- *-Item 1- and -item 2- can be disregarded.*

– Remove bolts -arrows- on gearbox mounting.

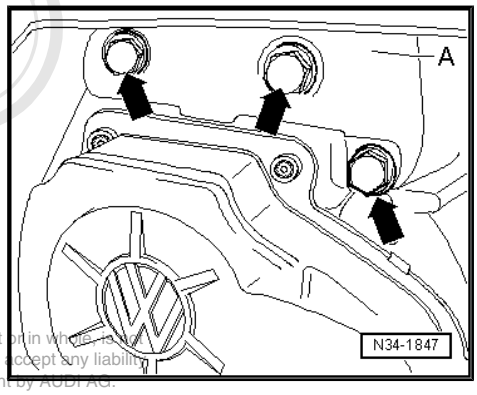


– Lower engine/gearbox assembly using spindle of support bracket -10 - 222 A- until distance -a- is obtained between gearbox housing and gearbox mounting.

• Dimension -a- = 50 mm



– Unbolt gearbox bracket -A- from gearbox -arrows-.



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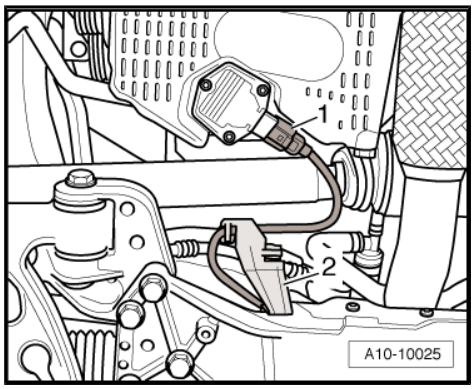
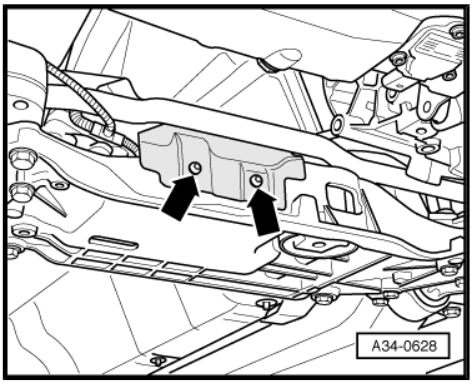
– Unplug electrical connector -1- at oil level and oil temperature sender -G266- .

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

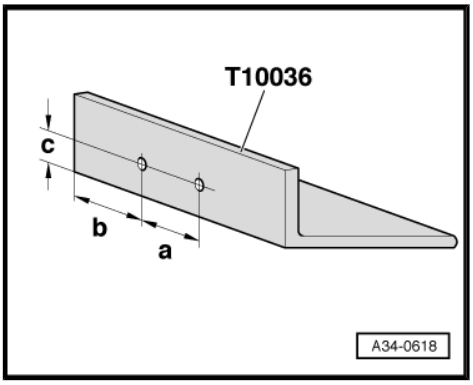


– If fitted, unbolt heat shield for power steering control unit -J500- from subframe -arrows-.

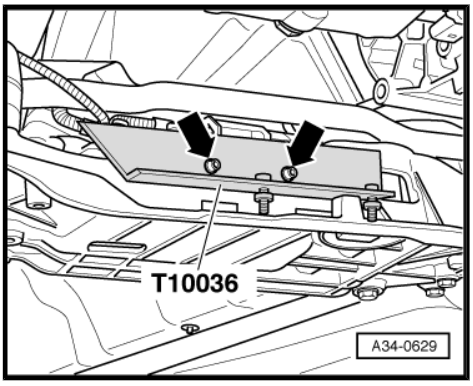


– Drill two 7 mm diameter holes in support -T10036- , as illustrated (if holes have not already been drilled).

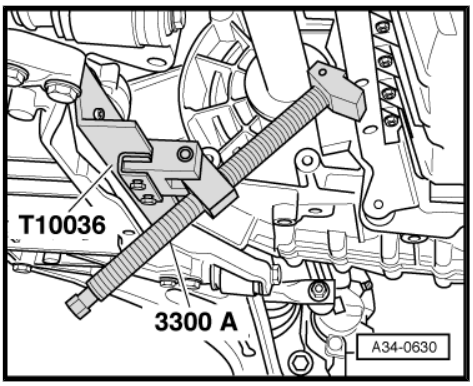
- Dimension -a- = 70 mm
- Dimension -b- = 98 mm
- Dimension -c- = 11 mm



– Bolt support -T10036- onto subframe -arrows- using two M6×20 bolts.



– Bolt engine support -3300 A- onto support -T10036- .



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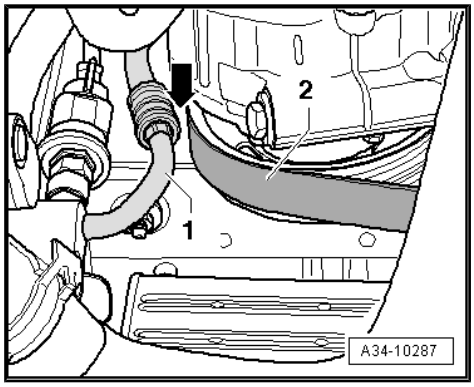
– Press engine towards front of vehicle using spindle of engine support -3300 A- . Pay special attention to the following points:

• The air conditioner compressor -2- must not contact refrigerant line -1- -arrow-.

• Alternator must not make contact with refrigerant line.

• Pressure pipe must not make contact with radiator.

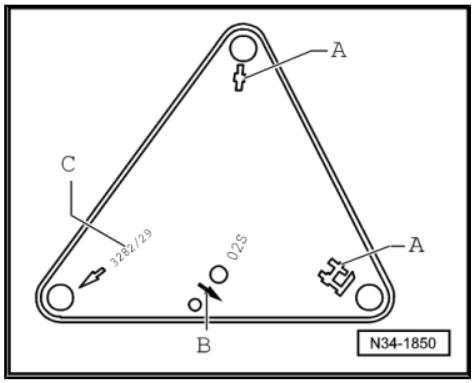


Set up gearbox support -3282- with adjustment plate -3282/39- and mount on engine and gearbox jack -V.A.G 1383 A- .

– Align arms of gearbox support according to holes in adjustment plate -3282/39- .

– Bolt on support elements -A- and -C-, as illustrated on adjustment plate .

• The arrow symbol -B- on the adjustment plate points in the direction of travel.



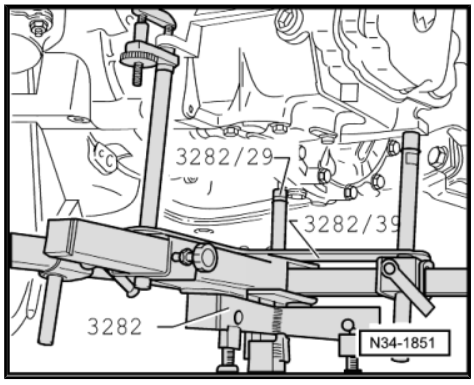
– Place engine and gearbox jack -V.A.G 1383 A- underneath vehicle.

– Align gearbox support -3282- parallel with gearbox.

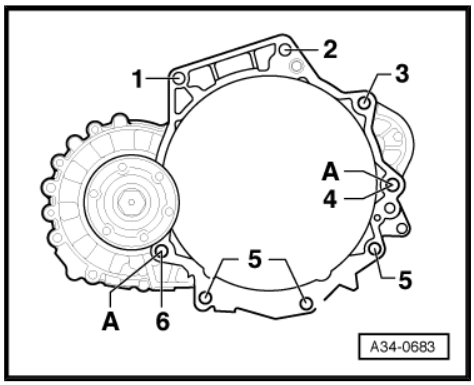
– Screw pin -3282/29- into gearbox.

– Insert the two remaining support elements in gearbox as illustrated.

– Support gearbox from underneath by raising engine and gearbox jack -V.A.G 1383 A- .



– Remove remaining engine/gearbox securing bolts -5 and 6-.



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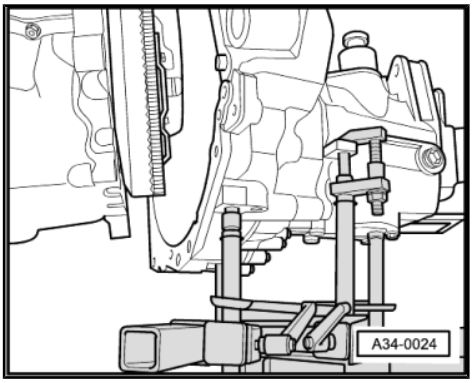
– Push the gearbox off the dowel sleeves and swing carefully towards the subframe.

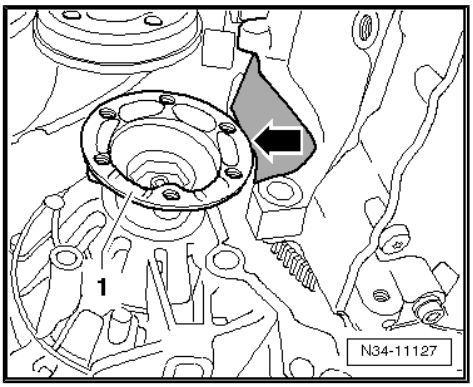


Then guide flange shaft (right-side) -1- past recess -arrow- in intermediate plate.

– Incline gearbox via spindles of gearbox support -3282- .

• The differential must face upwards.

• Pivot gearbox downwards in area of 6th gear.

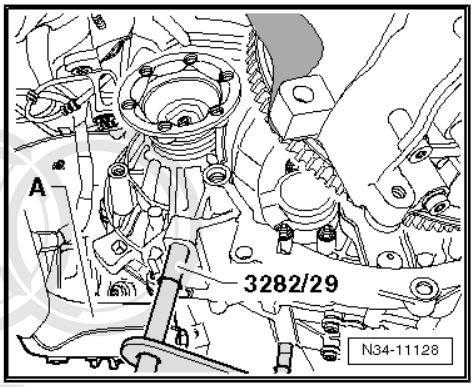


– Guide gearbox with differential past subframe -A- and swivel out.

– When lowering the gearbox, change position of gearbox using the spindles on gearbox support -3282- .

Transporting gearbox ⇒ page 88 .

Installing gearbox ⇒ page 81



2.2 Installing gearbox on vehicles with 1.8 ltr. FSI turbocharged engine

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

• Tightening torques ⇒ page 88

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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.*
- *Secure all hose connections with the correct hose clips (as original equipment); refer to ⇒ Parts catalogue .*
- *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 -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 renewing the gearbox, the gearbox selector lever must be transferred to the new assembly.*
- *Use thread tap to remove any remaining locking fluid from all threaded holes which will accommodate self-locking 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).*

– Make sure that the intermediate plate is engaged on the sealing flange and fitted on the dowel sleeves -arrows-.

– Check release bearing for wear. Renew slave cylinder and release bearing if necessary ⇒ page 25 .

– Check that clutch plate is centralised ⇒ page 44 .

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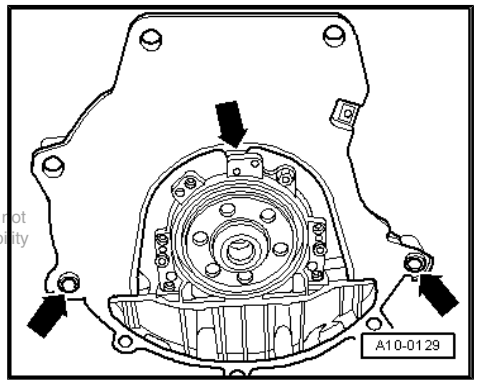


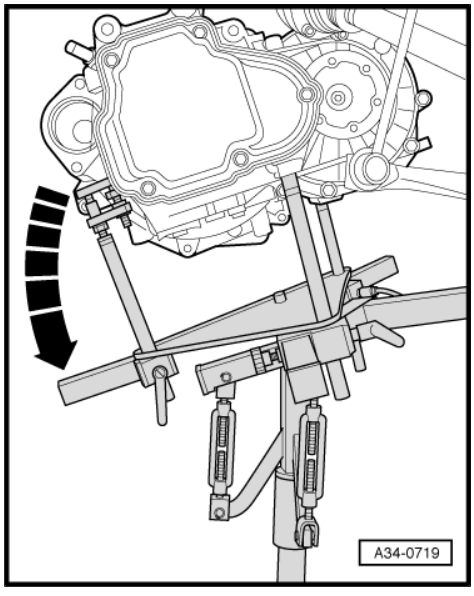
– Incline gearbox via spindles of gearbox support -3282- .

• The differential must face upwards.

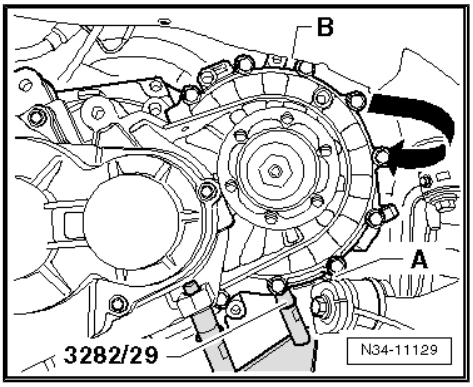
• Pivot gearbox downwards in area of 6th gear.

– Then raise gearbox carefully.

– Guide gearbox with differential past subframe -A- and swivel in direction of -arrow-.



– Make sure longitudinal member -B- is not in the way.

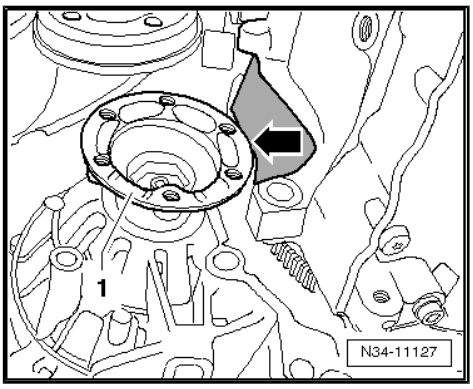


• Guide flange shaft (right-side) -1- past recess -arrow- in intermediate plate.

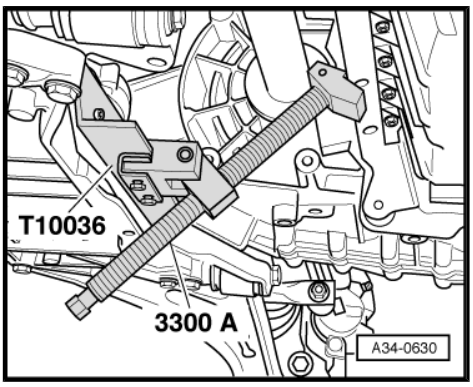
– Align gearbox with engine in installation position and install.

– Bolt gearbox onto engine. Tightening torques ⇒ page 88

– Detach gearbox jack with gearbox support -3282- from gearbox after bolting gearbox to engine.

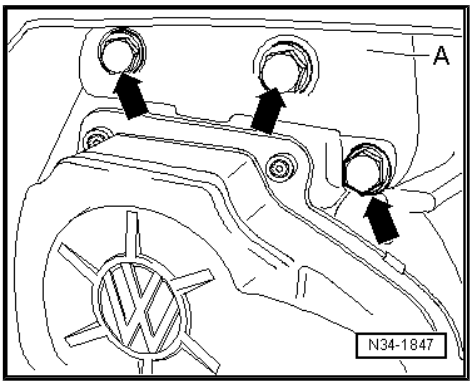


– Remove engine support -3300 A- and support -T10036- .



– Secure gearbox bracket -A- to gearbox with new bolts -arrows-. Tightening torque ⇒ Item 8 (page 90) .

– Pull gearbox up to support arm of gearbox mounting with spindle on support bracket -10 - 222 A- .



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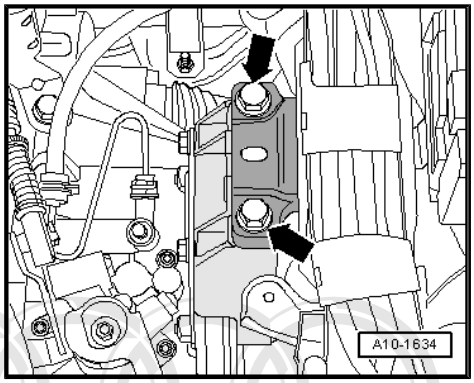
– Align engine/gearbox in installation position. To do so, raise engine/gearbox until gearbox bracket makes full contact with gearbox mounting.



Note

Gearbox mounting and gearbox bracket must be parallel to avoid causing damage to thread of gearbox bracket.

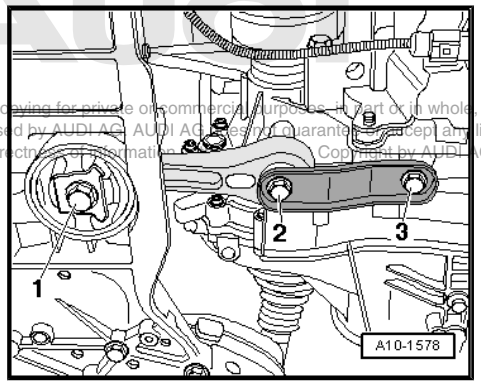
– Use new bolts -arrows- to secure gearbox mounting to gearbox bracket. Tightening torque ⇒ Item 12 (page 90) .

WARNING

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.

– Fit pendulum support with new bolts -1 … 3- in accordance with installation instructions ⇒ page 94 . Tightening torques ⇒ page 90

– Check adjustment of engine/gearbox mountings ⇒ Rep. Gr. 10 .



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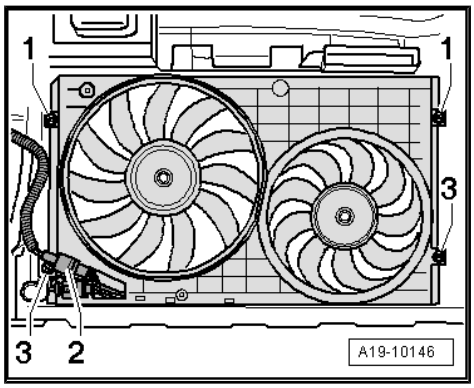
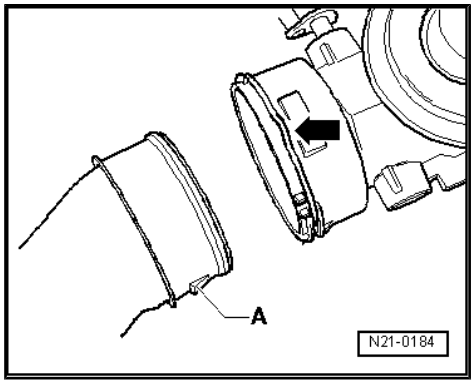
– Fit radiator cowl and and tighten bottom bolts -3-.

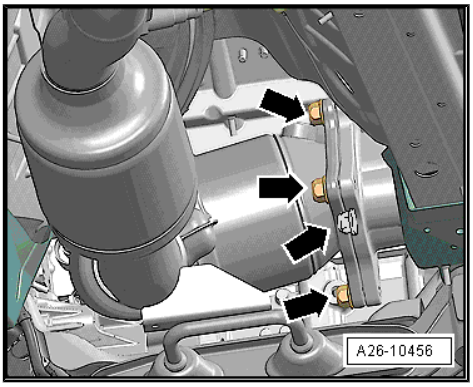
– Attach electrical connector -2-.



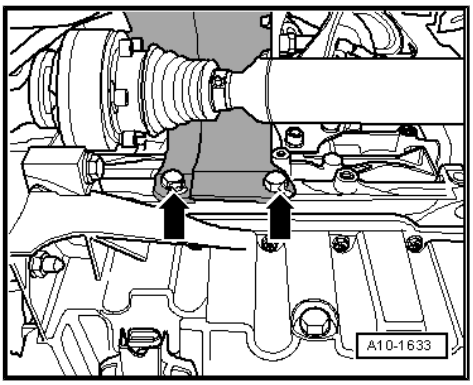
– Install air intake hose. Make sure retaining clip -arrow- snaps onto retaining lug -A-.



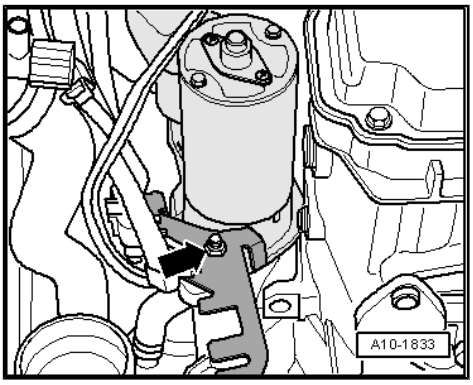
– Secure catalytic converter to turbocharger -arrows- ⇒ Engine, mechanics; Rep. Gr. 26 .



– Secure drive shafts (left and right) to gearbox ⇒ Rep. Gr. 40 .
– Secure guard plate for drive shaft (right-side) -arrows-.



– Install starter ⇒ Rep. Gr. 27 .
– Fit bracket and secure with nut -arrow-.
– Connect earth strap at upper engine/gearbox securing bolt.



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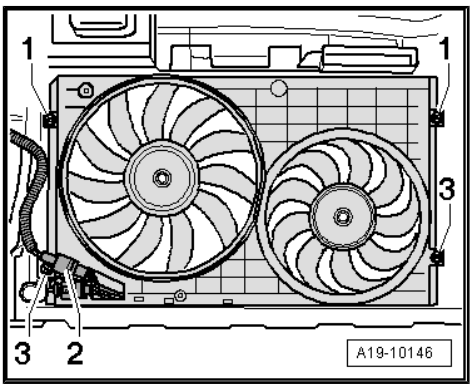
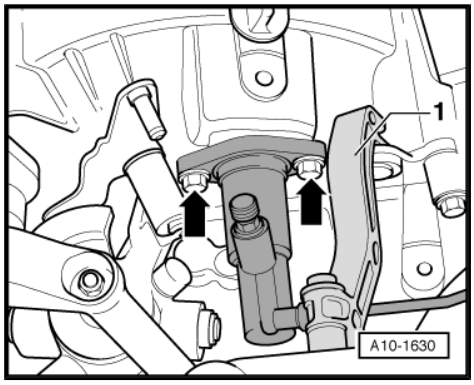
– Tighten top bolts for radiator cowl -1-.



– Install clutch slave cylinder -arrows-. Tightening torque ⇒ Item 15 (page 24) .
– Install brace -1-. Tightening torque ⇒ Item 1 (page 90) .



Note

To install, lubricate bearings and moving surfaces with grease - G 000 450 02- .

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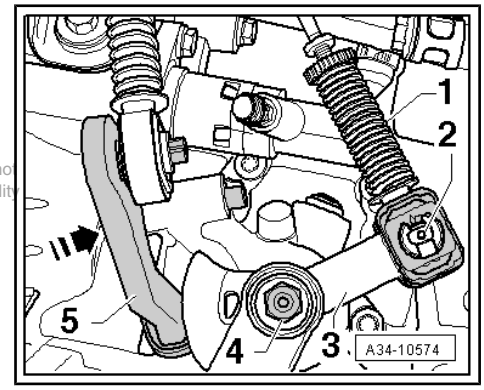
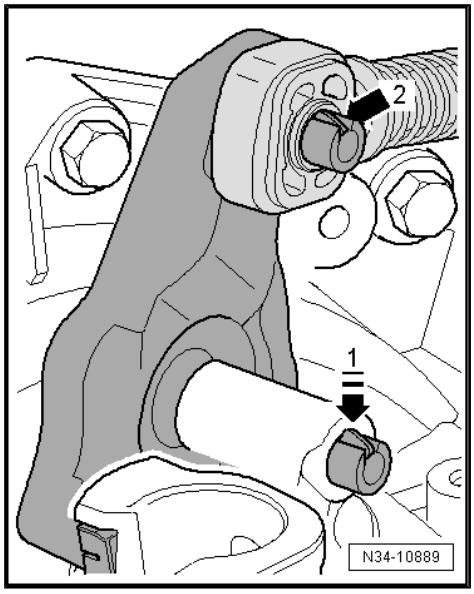
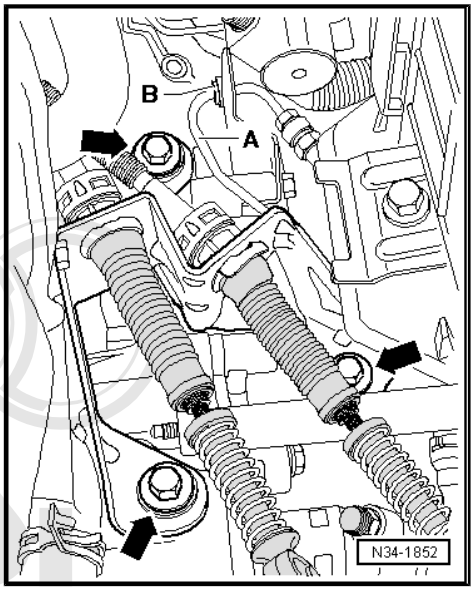
– Install gearbox selector lever -3- ⇒ page 64.
– Tighten hexagon nut -4- to specified torque ⇒ Item 16 (page 63) .
– Insert relay lever -5- with cable end-piece as far as stop. Installation position ⇒ page 64
– Attach gear selector cable -1- to gearbox selector lever and secure with securing clip -2-.



– Ensure that components engage securely.
• Cable end-piece is secured by detent -arrow 1-.
• Cable end-piece must be behind detent -arrow 1-.
• Relay lever is secured by detent -arrow 2-.



– Secure cable support bracket -arrows-. Tightening torque ⇒ Item 6 (page 62)
– Fit bracket -B- to gearbox. Tightening torque ⇒ Item 20 (page 24) .
– Push pipe/hose assembly -A- into bracket -B- on gearbox.



– Unplug electrical connector -arrow- at reversing light switch -F4- .
– Adjust selector mechanism ⇒ page 68 .

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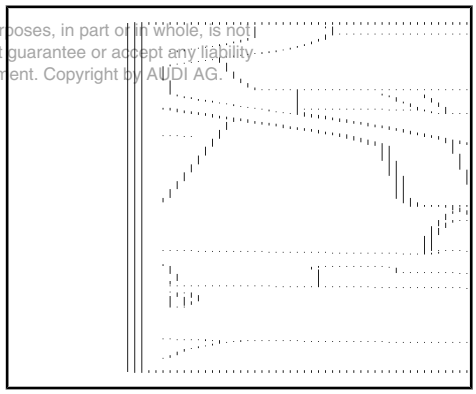
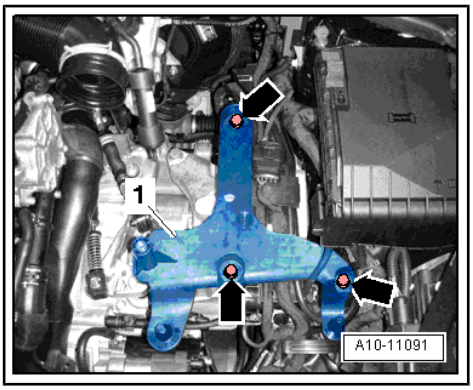
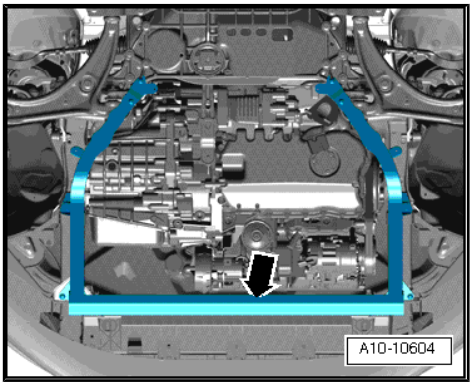


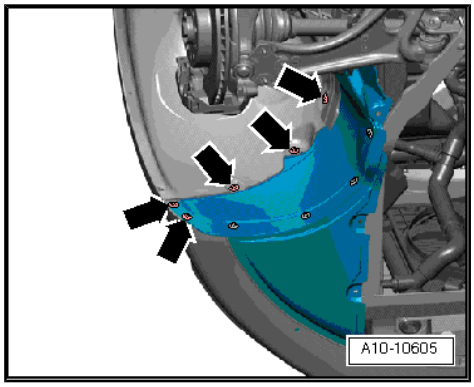
– Fit bracket -1- for air cleaner housing -arrows-.
– Install complete air cleaner housing ⇒ Rep. Gr. 24 .
– Install engine cover panel.



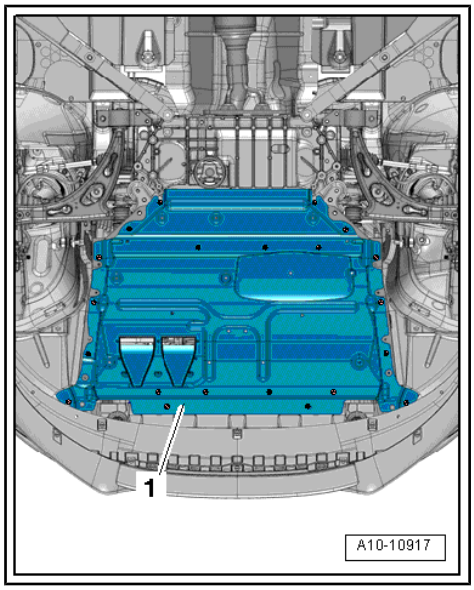
– Raise vehicle.
– Check gear oil level in gearbox ⇒ page 95 .
– Install noise insulation frame -arrow- ⇒ Rep. Gr. 50 ; Removing and installing noise insulation frame .



– Install left noise insulation -arrows-.

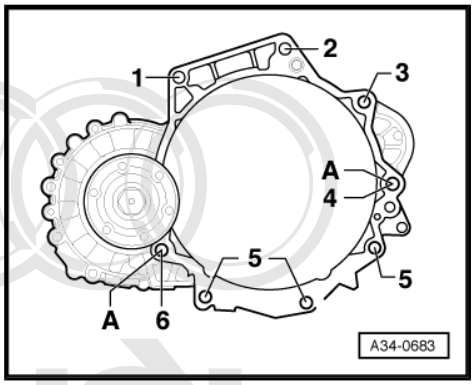


– Install noise insulation (centre) -1- ⇒ Rep. Gr. 66 .
– Connect battery ⇒ Electrical system; Rep. Gr. 27 .



Tightening torques

Securing gearbox to 1.8 ltr. TFSI engine



Item	Bolt	Nm
1, 2	M12x65	80
3 1)2)	M12x150	80
4 1)2)	M12x165	80
5	M10x50	40
6	M12x85	80
A	Dowel sleeves for centralising	

- 1) Bolt with stud M8.
- 2) Also starter to gearbox

Component	Nm
Bracket for electrical wiring at bottom starter bolt	23
Heat shield for drive shaft to cylinder block	25

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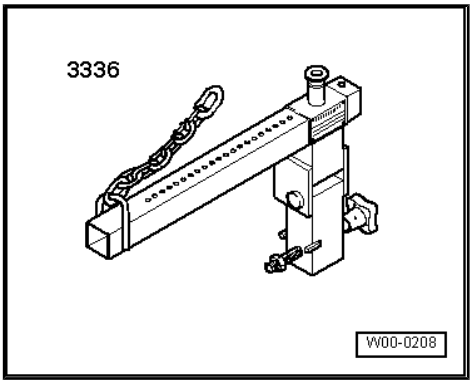
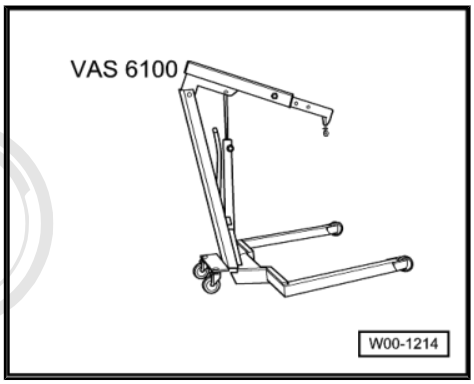
2.3 Transporting gearbox

Special tools and workshop equipment required

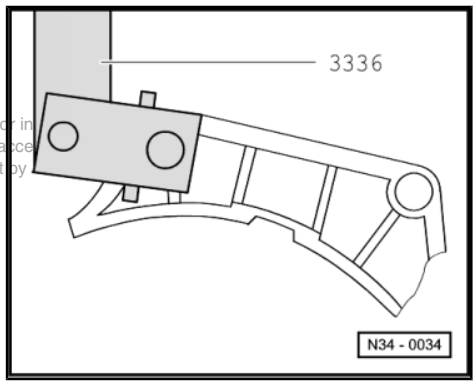
♦ Gearbox lifting tackle -3336-



♦ Workshop hoist -VAS 6100-



– Bolt gearbox lifting tackle -3336- to clutch housing.



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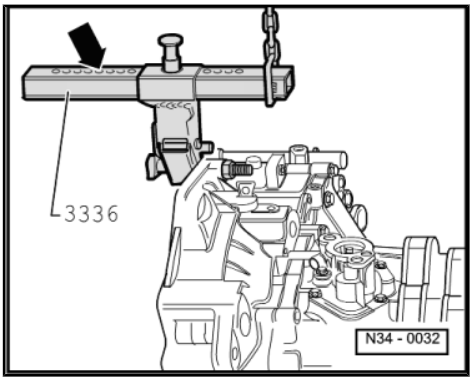
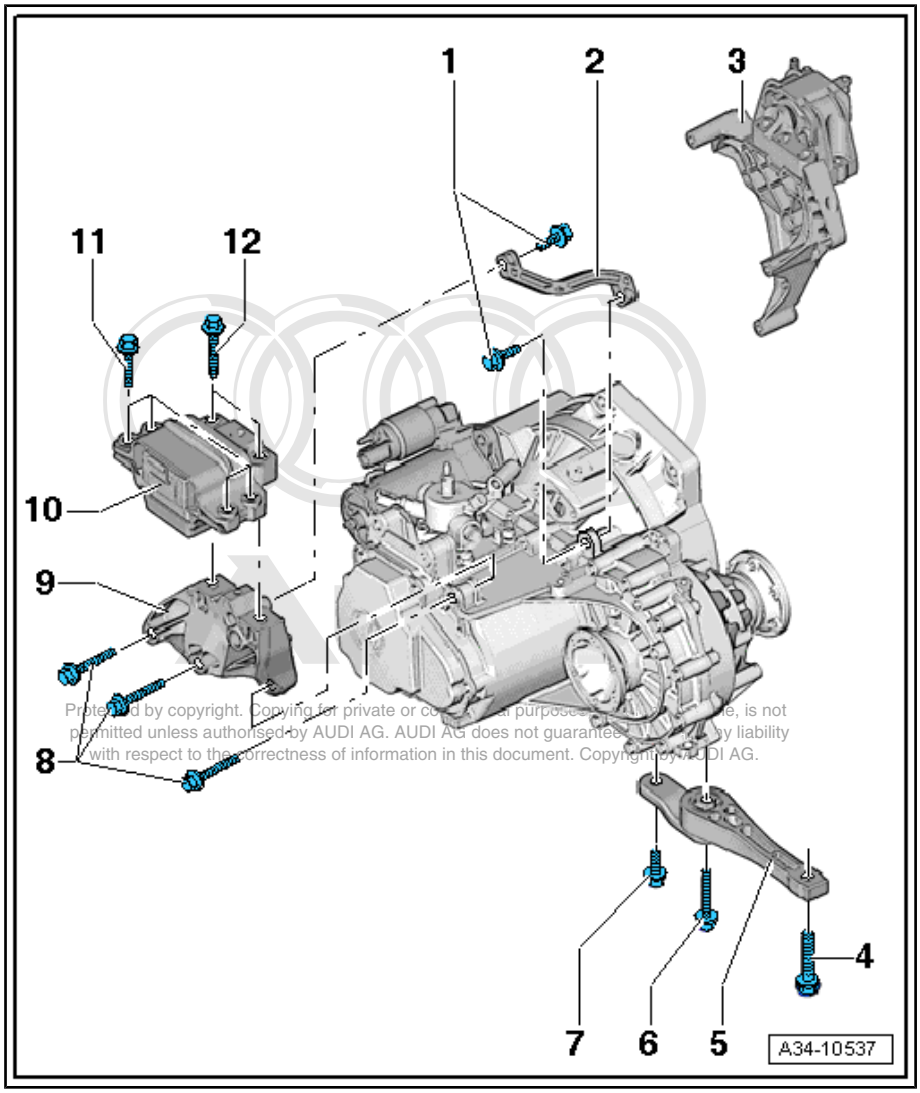
– Set support arm on sliding bracket by means of locking pin -arrow-.

Number of holes visible = 5

– Lift gearbox using workshop hoist -VAS 6100- and gearbox lifting tackle 3336.
– Set down gearbox as required (for example in transport container).



3 Exploded view - assembly mountings



1 - Bolt

- ❑ 20 Nm + 90°
- ❑ Gearbox support to gearbox and gearbox bracket
- ❑ Tightening sequence ⇒ page 91
- ❑ Always renew

2 - Gearbox support

- ❑ To gearbox bracket and gearbox

3 - Engine mounting with engine support

- ❑ Removing and installing ⇒ Rep. Gr. 10
- ❑ Tightening torques ⇒ Rep. Gr. 10

4 - Bolt

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

5 - Pendulum support

- ❑ Removing and installing ⇒ page 94

6 - Bolts

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

7 - Bolts

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

8 - Bolt

- ❑ 40 Nm + 90°
- ❑ Gearbox bracket to gearbox
- ❑ Always renew

9 - Gearbox bracket

10 - Gearbox mounting

- ❑ Removing and installing ⇒ page 91
- ❑ Fit to gearbox bracket

11 - Bolt

- ❑ 40 Nm + 90°
- ❑ Gearbox mounting to body
- ❑ Tightening sequence ⇒ page 91
- ❑ Always renew

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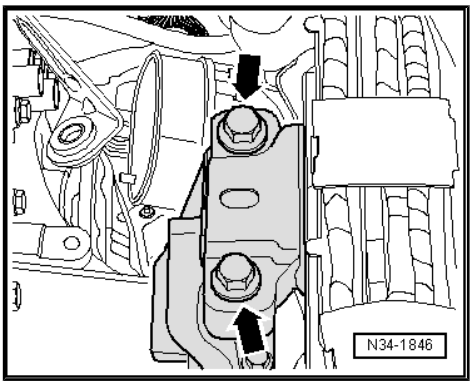
12 - Bolt

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

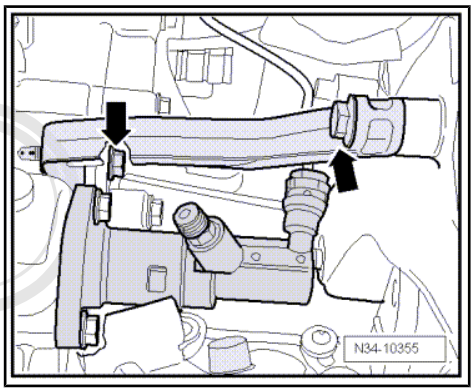
Attaching gearbox mounting to gearbox bracket

– Renew bolts.
– Tighten all bolts hand-tight.
– Tighten bolts to specified torque.



Gearbox support to gearbox bracket and gearbox

– Renew bolts.
– Initially tighten both bolts -arrows- hand-tight.
– Tighten bolts to specified torque.



3.1 Removing and installing gearbox mounting

Special tools and workshop equipment required

♦ Support bracket -10 - 222 A-

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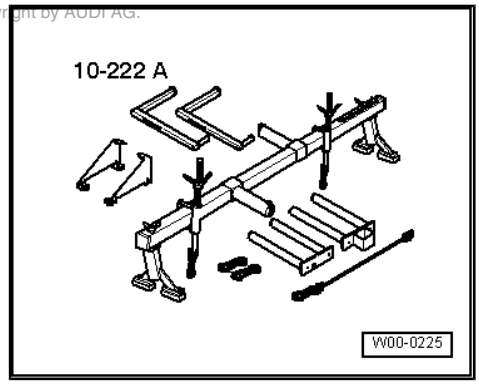
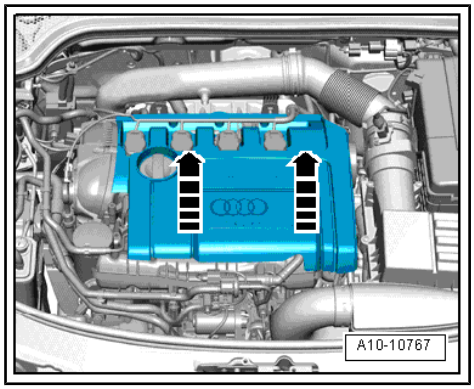


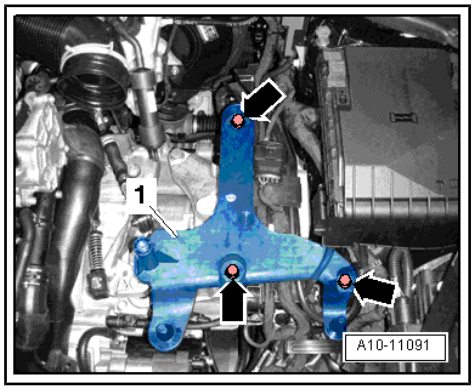
Removing

– Remove engine cover panel -arrows- ⇒ Rep. Gr. 10 .

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



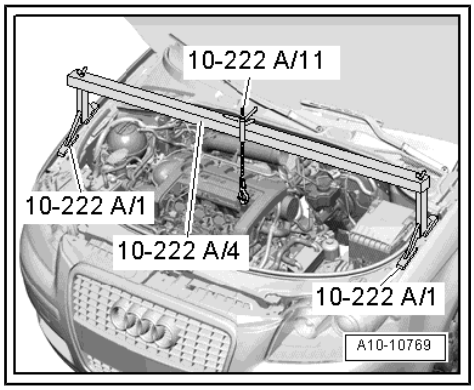
– Remove bolts -arrows- and detach bracket for air cleaner housing.



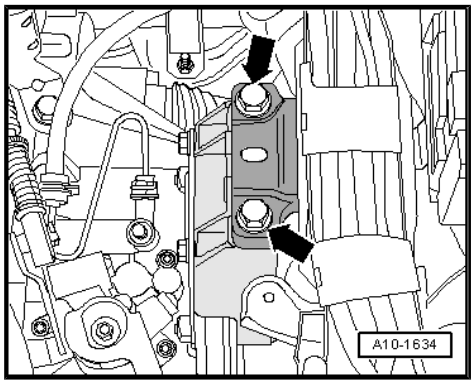
– Set up support bracket -10 - 222 A- with adapters -10 - 222 A / 1- on wing mounting flanges.

– Engage hook of spindle -10 - 222 A /11- in lifting eye.

– Take up weight of engine evenly with spindles; do not lift.



– Remove bolts -arrows-.



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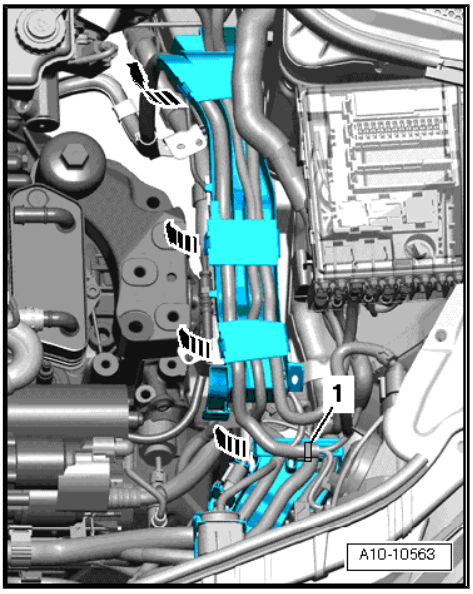
– Open retainers for wiring duct -arrows-.
– Cut open cable tie -1- and push electrical wiring to one side.
– Unclip wiring duct.



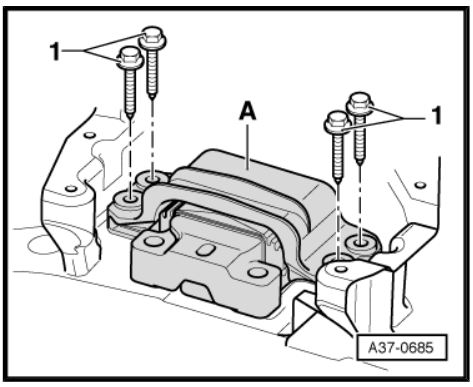
– Remove bolts -1- and detach gearbox mounting -A-.

Installing

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

• Tightening torques ⇒ page 90

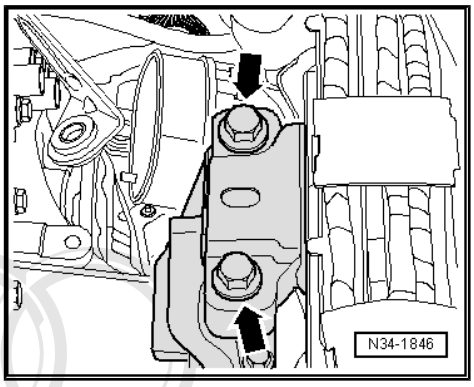
– Fit gearbox mounting -A- with new bolts -1- to longitudinal member.



Caution

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

- ***Before fitting the bolts -arrows-, the gearbox bracket and the support arm of the gearbox mounting must be aligned absolutely parallel. If necessary, push the gearbox up at the rear with a trolley jack.***



– Pull gearbox up with spindle on support bracket until gearbox bracket contacts support arm of gearbox mounting.
– Adjust assembly mountings ⇒ Rep. Gr. 10 .
– Bolt support arm of gearbox mounting to gearbox bracket -arrows-.
– Detach support bracket -10 - 222 A- from engine.
– Install engine cover panel ⇒ Rep. Gr. 10 .
– Install air cleaner housing ⇒ Rep. Gr. 24 .

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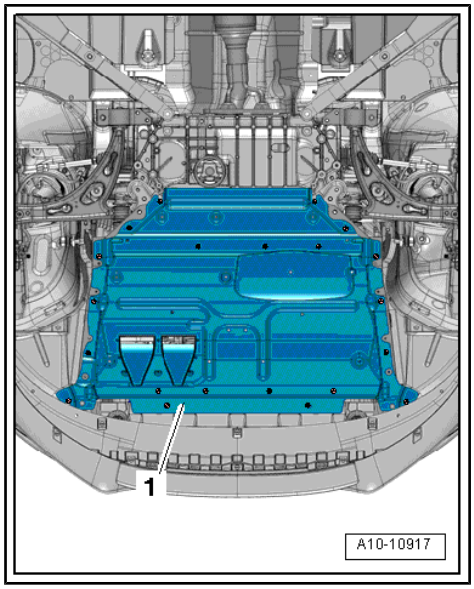
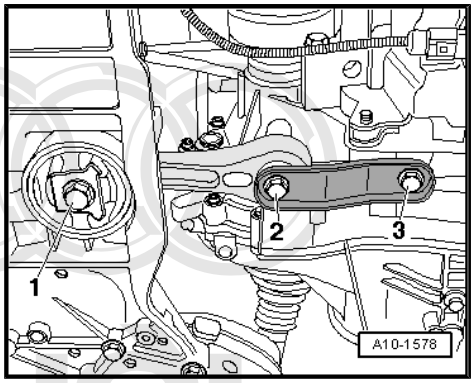
3.2 Removing and installing pendulum support

Removing

– Remove noise insulation (centre) -1- ⇒ Rep. Gr. 66 .



– Unscrew bolts -1 ... 3- and remove pendulum support.



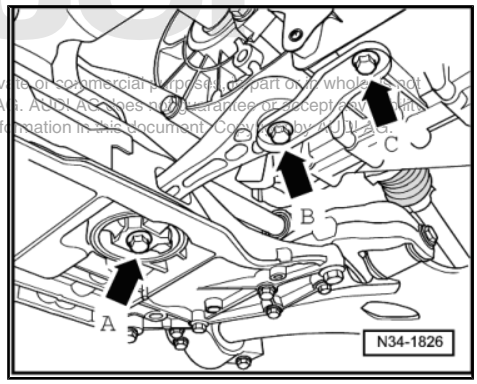
Installing pendulum support

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

- Tightening torques ⇒ page 90

– First secure pendulum support to gearbox -arrow B- and -arrow C-, then on subframe -arrow A-.

– Install noise insulation (centre) ⇒ Rep. Gr. 66 .



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4 Checking gear oil level and filling up with gear oil

Caution

It is not possible to check the gear oil level by removing the oil filler plug.

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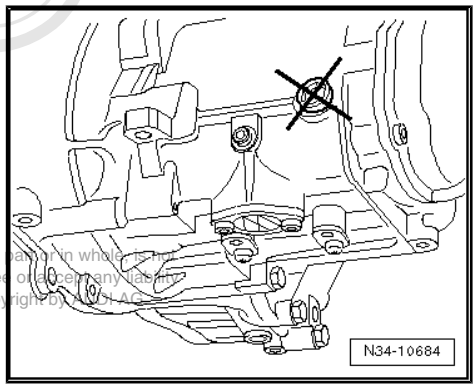
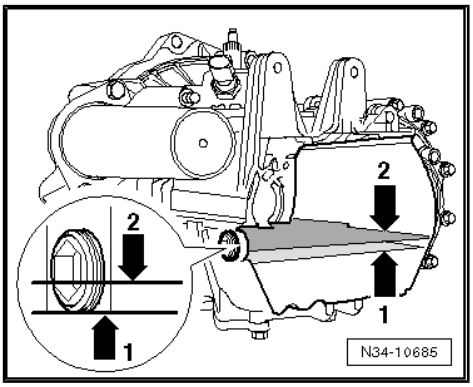


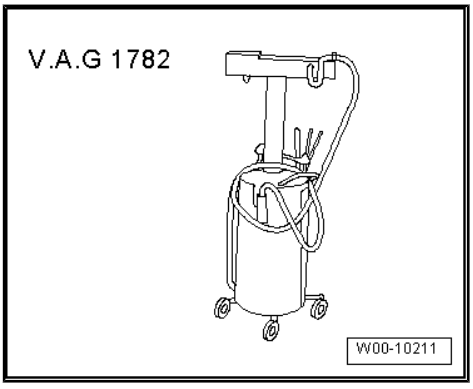
Due to the inclination of the engine/gearbox assembly, the oil level -arrow 2- will be above the lower edge of the filler hole -arrow 1-.

The gear oil level can only be checked by draining the gear oil completely and then filling up again:

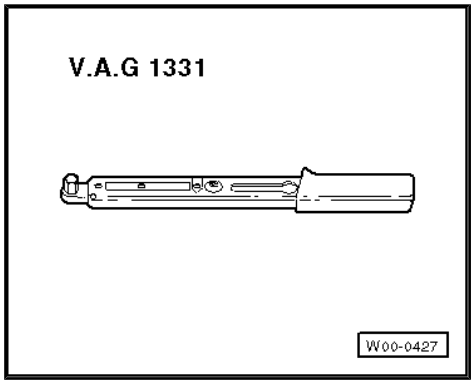


Special tools and workshop equipment required

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



♦ Torque wrench -V.A.G 1331-



♦ Hose (length approx. 600 mm, outer circumference 10 mm) with funnel (commercially available)

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4.1 Preparations

Gear oil for direct shift gearbox ⇒ Electronic parts catalogue

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

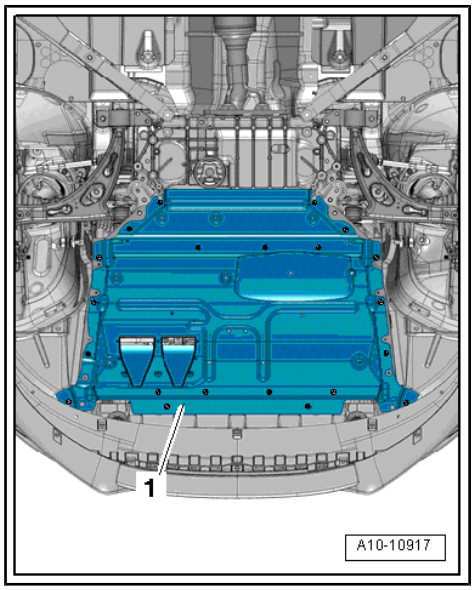
– Remove noise insulation (centre) -1- ⇒ Rep. Gr. 66 .

Clean gearbox.

Caution

A pivot pin for the selector forks in the gearbox must be removed in order to drain the gear oil.

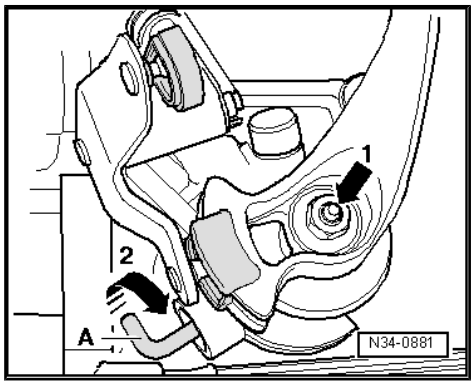
The selector shaft must be locked to prevent the position of the selector forks from being changed, e.g. due to accidental operation of the selector mechanism.



Lock the selector shaft as follows:

– Press selector shaft down (direction of -arrow 1-).

– While pressing selector shaft down, move angled rod -A- upwards in direction of -arrow 2-. At the same time press angled rod carefully into selector shaft until it engages.

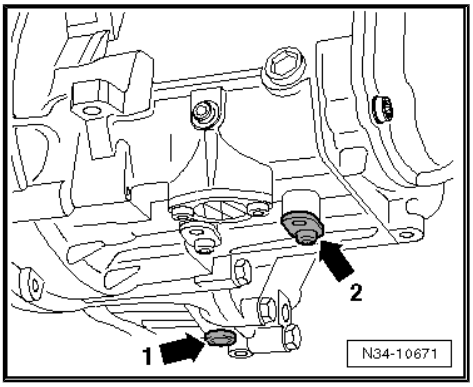


4.2 Draining off gear oil

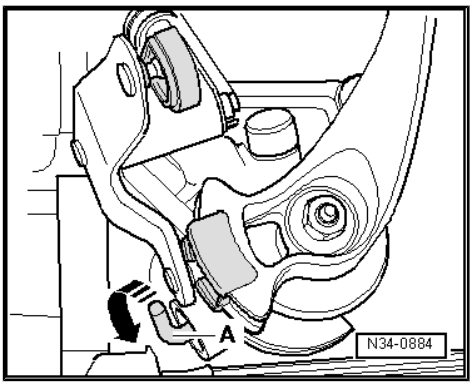
Use a clean container (capacity 3.0 ltr.) with a graduated scale to collect gear oil.

• Selector shaft must be locked ⇒ page 96

– Remove oil drain plug -arrow 1-, then remove pivot pin -arrow 2- and drain off gear oil.
– Install pivot pin -arrow 2- with a new O-ring ⇒ Item 7 (page 103) .



– Fit oil drain plug -arrow 1- ⇒ Item 17 (page 122) .
– Now turn angled rod -A- back to original position (direction of -arrow-) so that selector shaft can move freely again.

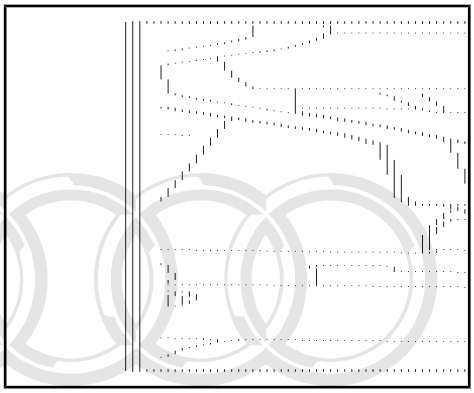


4.3 Filling up with gear oil

Add gear oil to container until amount of gear oil in container is 1.9 ltr.

For gear oil specification, refer to ⇒ Electronic parts catalogue .

– Remove reversing light switch -F4- -arrow-.
– Fit hose (length approx. 600 mm, outside diameter 10 mm) to funnel (commercially available)
– Insert hose in mounting hole of reversing light switch -F4- and fill gearbox with gear oil (2nd mechanic required).
– Re-install reversing light switch -F4- -arrow- ⇒ Item 2 (page 131) .
– Install complete air cleaner housing ⇒ Rep. Gr. 24 .
– Install noise insulation ⇒ Rep. Gr. 66 .



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5 Overview - gearbox

1 - 1st gear

2 - 2nd gear

3 - 3rd gear

4 - 4th gear

5 - 5th gear

6 - 6th gear

7 - Gearbox housing cover

8 - Gearbox housing

- ❑ Servicing ⇒ page 121

9 - Selector mechanism

- ❑ (Selector forks)
- ❑ Dismantling and assembling ⇒ page 134

10 - Reverse gear wheel

11 - Clutch housing

- ❑ Servicing ⇒ page 121

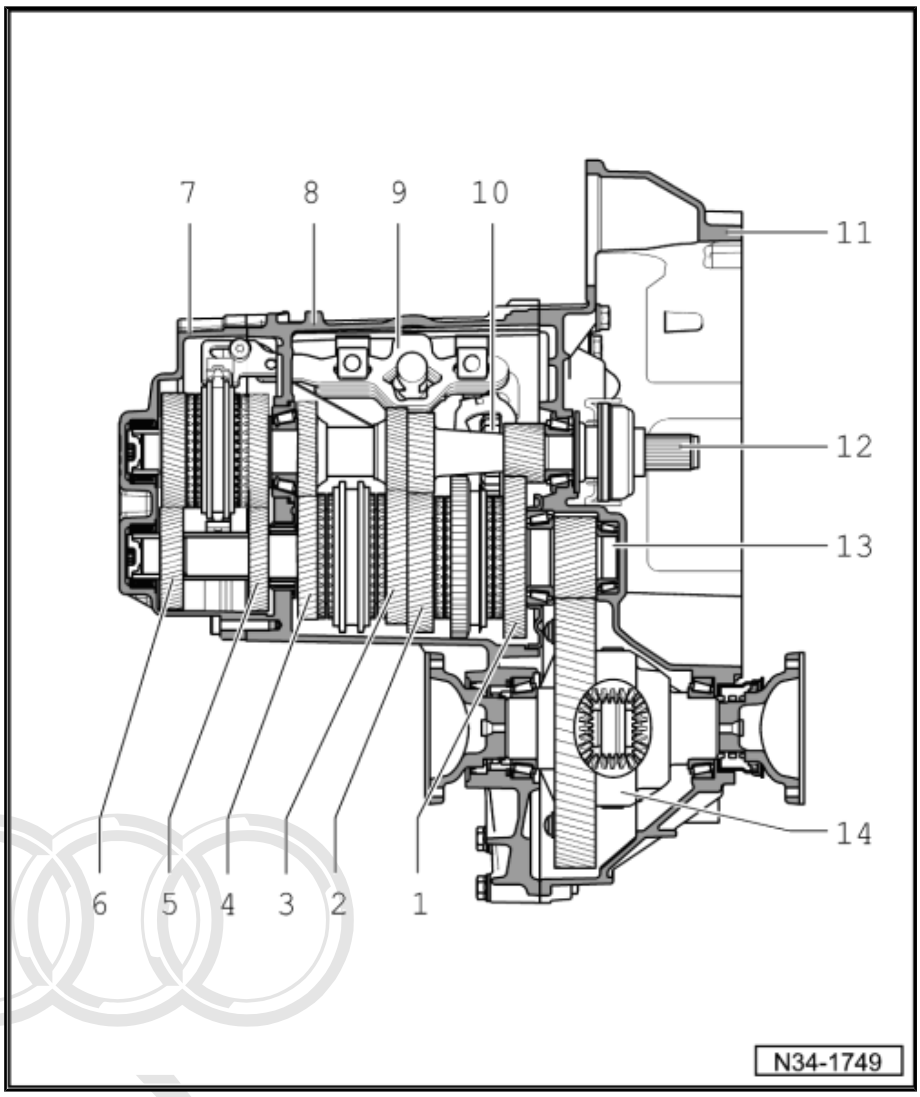
12 - Input shaft

- ❑ Dismantling and assembling ⇒ page 139

13 - Output shaft

- ❑ Dismantling and assembling ⇒ page 151

14 - Differential



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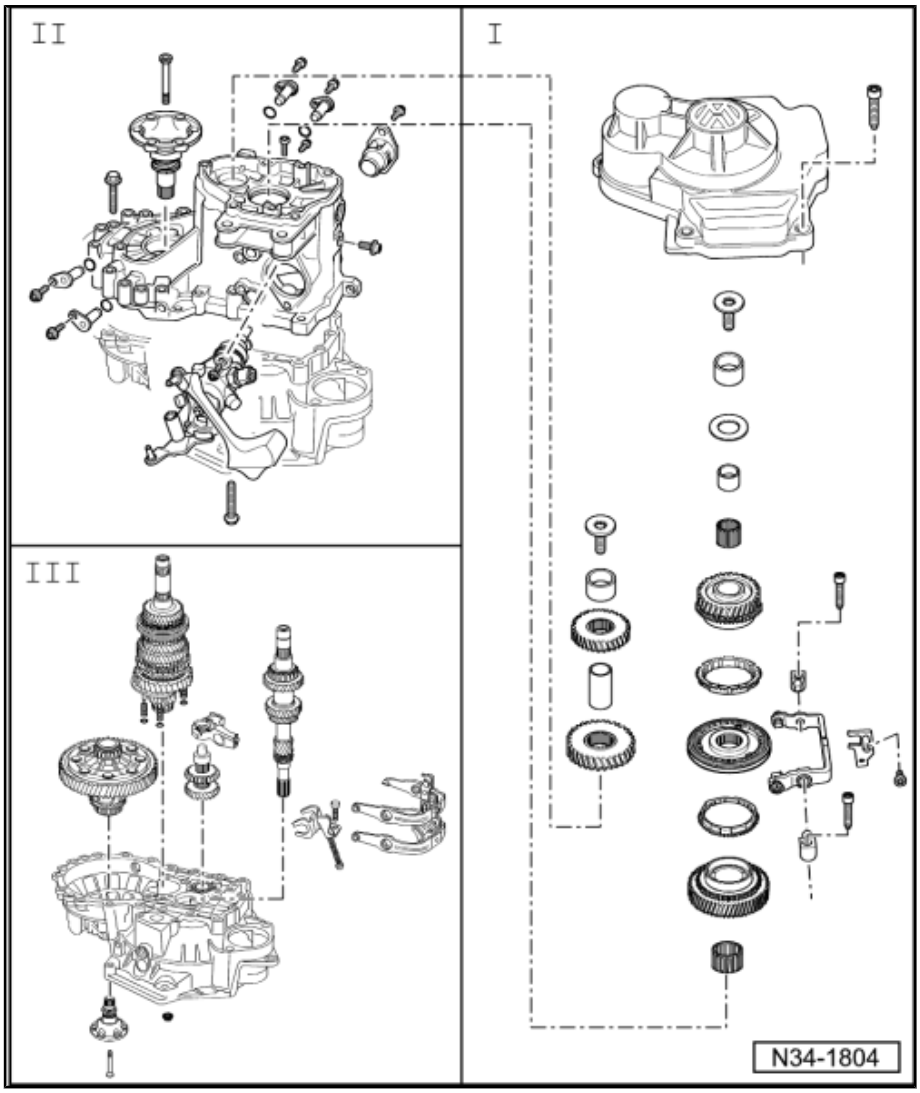
5.1 Exploded view - dismantling and assembling gearbox



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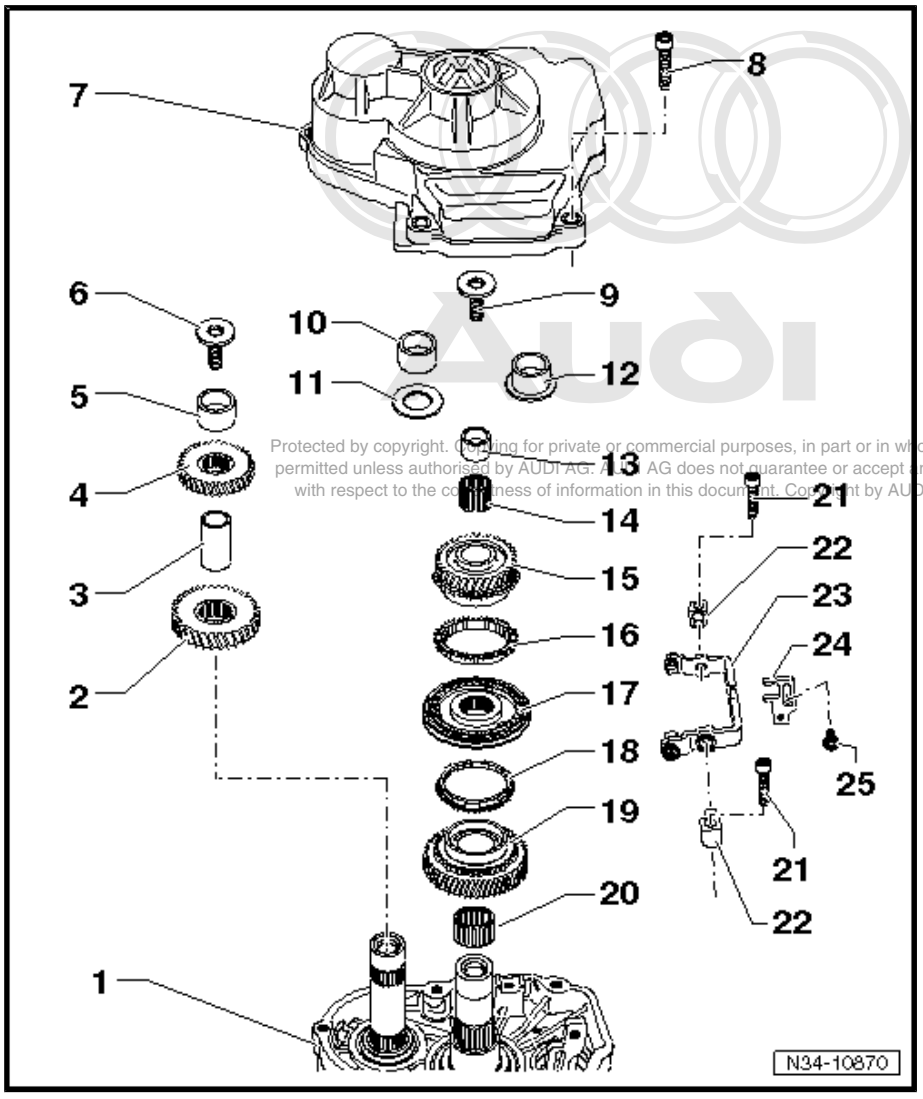
5.2 Exploded view - removing and installing gearbox housing cover and 5th/6th gear



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1 - Gearbox housing

- ❑ Servicing ⇒ page 121

2 - 5th gear wheel

- ❑ Removing and installing ⇒ page 104

3 - Sleeve

4 - 6th gear wheel

- ❑ Removing and installing ⇒ page 104

5 - Roller bearing inner race

- ❑ For output shaft
- ❑ Mark before removing
- ❑ Do not interchange with roller bearing inner race for input shaft
- ❑ Larger outer diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Allocation ⇒ page 102

6 - Bolt

- ❑ For output shaft

- Up to gearbox manufacturing date 20 08 6:
  - ❑ 40 Nm + 180°
- From gearbox manufacturing date 21 08 6:
  - ❑ 80 Nm + 90°
  - ❑ Allocation of bolts ⇒ page 102
  - ❑ Self-locking
  - ❑ Always renew
  - ❑ Use thread tap to remove any remaining locking fluid from threaded holes for bolts securing 5th/6th gear synchronising hub and 6th gear wheel. Otherwise there is a risk that the bolts will shear off

7 - Gearbox housing cover

- ❑ With roller bearings for input and output shafts
- ❑ Roller bearings for input and output shafts with larger outer diameter on gearboxes manufactured from 21 08 6 onwards ⇒ page 129
- ❑ Servicing ⇒ page 127

Note

If the gearbox housing cover is installed with the gearbox in the vehicle, check and top up oil ⇒ page 95 .

8 - Bolt

- ❑ 18 Nm
- ❑ 5x
- ❑ For gearbox housing cover

9 - Bolt

- ❑ For input shaft
- ❑ On gearboxes manufactured up to 20 08 6: tighten to 40 Nm and turn 180° further
- ❑ On gearboxes manufactured from 21 08 6 onwards: tighten to 80 Nm and turn 90° further
- ❑ Allocation of bolts ⇒ page 102
- ❑ Self-locking
- ❑ Always renew
- ❑ Use thread tap to remove any remaining locking fluid from threaded holes for bolts securing 5th/6th gear synchronising hub and 6th gear wheel. Otherwise there is a risk that the bolts will shear off

10 - Roller bearing inner race

- ❑ For input shaft
- ❑ Mark before removing
- ❑ Do not interchange with roller bearing inner race for output shaft
- ❑ On gearboxes manufactured from 21 08 6 onwards, thrust washer and roller bearing inner race are one component ⇒ Item 12 (page 101)
- ❑ Allocation of roller bearing inner race ⇒ page 102

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11 - Thrust washer

- ❑ On gearboxes manufactured up to 20 08 6

12 - Roller bearing inner race with thrust washer

- ❑ For input shaft
- ❑ On gearboxes manufactured from 21 08 6 onwards
- ❑ Allocation of roller bearing inner race ⇒ page 102

13 - Sleeve

- ❑ For 6th gear needle bearing
- ❑ Renew together with needle bearing
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

14 - Needle bearing

- ❑ For 6th gear
- ❑ Renew together with sleeve
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

15 - 6th speed selector gear

- ❑ Modified according to sleeve and needle bearing on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

16 - 6th gear synchro-ring

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

- ❑ Removing and installing ⇒ page 104
- ❑ Dismantling and assembling ⇒ page 139

- ❑ Locking collar modified on gearboxes manufactured from 12 06 6 onwards ⇒ page 145
- ❑ Adjusting on gearboxes manufactured up to 11 06 6 ⇒ page 118
- ❑ Adjusting on gearboxes manufactured from 12 06 6 onwards ⇒ page 119
- ❑ Installing offset springs for locking pieces ⇒ page 146

18 - 5th gear synchro-ring

- ❑ Will be damaged when input shaft is removed
- ❑ Always renew

19 - 5th speed selector gear

20 - Needle bearing

- ❑ For 5th gear

21 - Socket head bolt

- ❑ 25 Nm
- ❑ For pivot pin to gearbox housing

22 - Pivot pin

23 - 5th/6th gear selector fork

24 - 5th/6th gear selector jaw

25 - Bolt

- ❑ 25 Nm

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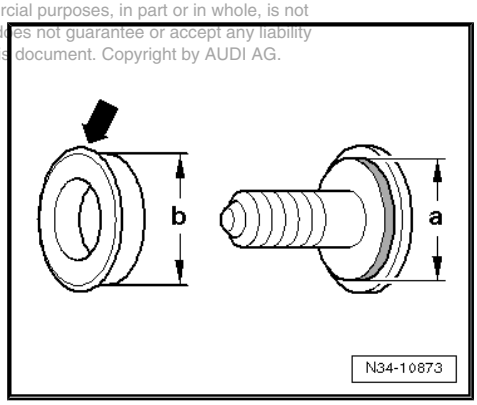
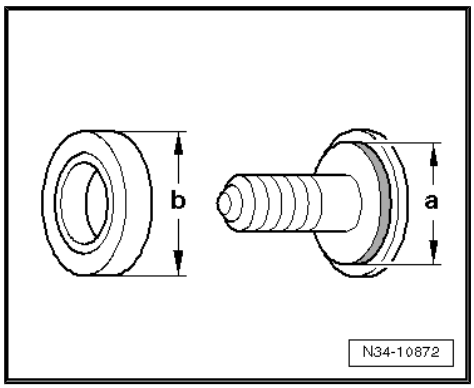
Allocation of securing bolts and roller bearing inner races for input shaft

Gearbox manufacturing date	Dimension “a” (mm)	Dimension “b” (mm)
Up to 20 08 6	21	31
From 21 08 6 onwards	23.4	37 • In addition: inner race and thrust washer are combined as one component -arrow-

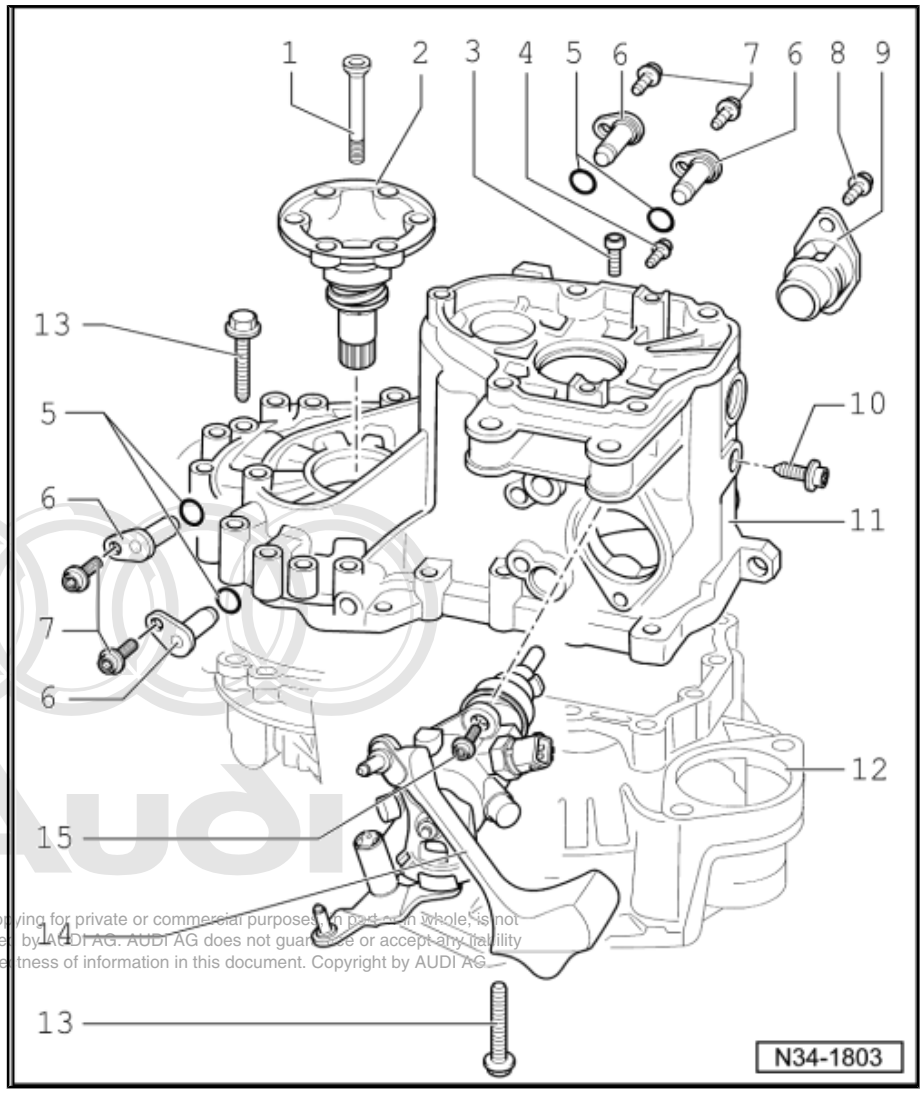


Allocation of securing bolts and roller bearing inner races for output shaft

Gearbox manufacturing date	Dimension “a” (mm)	Dimension “b” (mm)
Up to 20 08 6	21	31
From 21 08 6 onwards	23.4	37



5.3 Exploded view - removing and installing gearbox housing and selector mechanism



1 - Countersunk bolt
- ❑ 25 Nm

2 - Flange shaft (left-side) with spring
- ❑ Removing and installing ⇒ page 172
- ❑ Assembling ⇒ page 179

3 - Torx socket head bolt
- ❑ 25 Nm
- ❑ For reverse shaft support
- ❑ Self-locking
- ❑ Always renew

4 - Torx socket head bolt
- ❑ 30 Nm
- ❑ For reverse shaft support
- ❑ Self-locking
- ❑ Always renew

5 - O-ring
- ❑ Always renew

6 - Pivot pin

7 - Bolt
- ❑ 25 Nm

8 - Bolt
- ❑ 25 Nm

9 - Sealing cap

10 - Multi-point socket head bolt
- ❑ 25 Nm
- ❑ For reverse shaft support
- ❑ Always renew

11 - Gearbox housing
- ❑ Servicing ⇒ page 121

12 - Clutch housing
- ❑ Servicing ⇒ page 121

13 - Bolt
- ❑ 25 Nm + 90°
- ❑ Always renew

14 - Selector mechanism
- ❑ Servicing ⇒ page 134

15 - Multi-point socket head bolt
- ❑ 25 Nm

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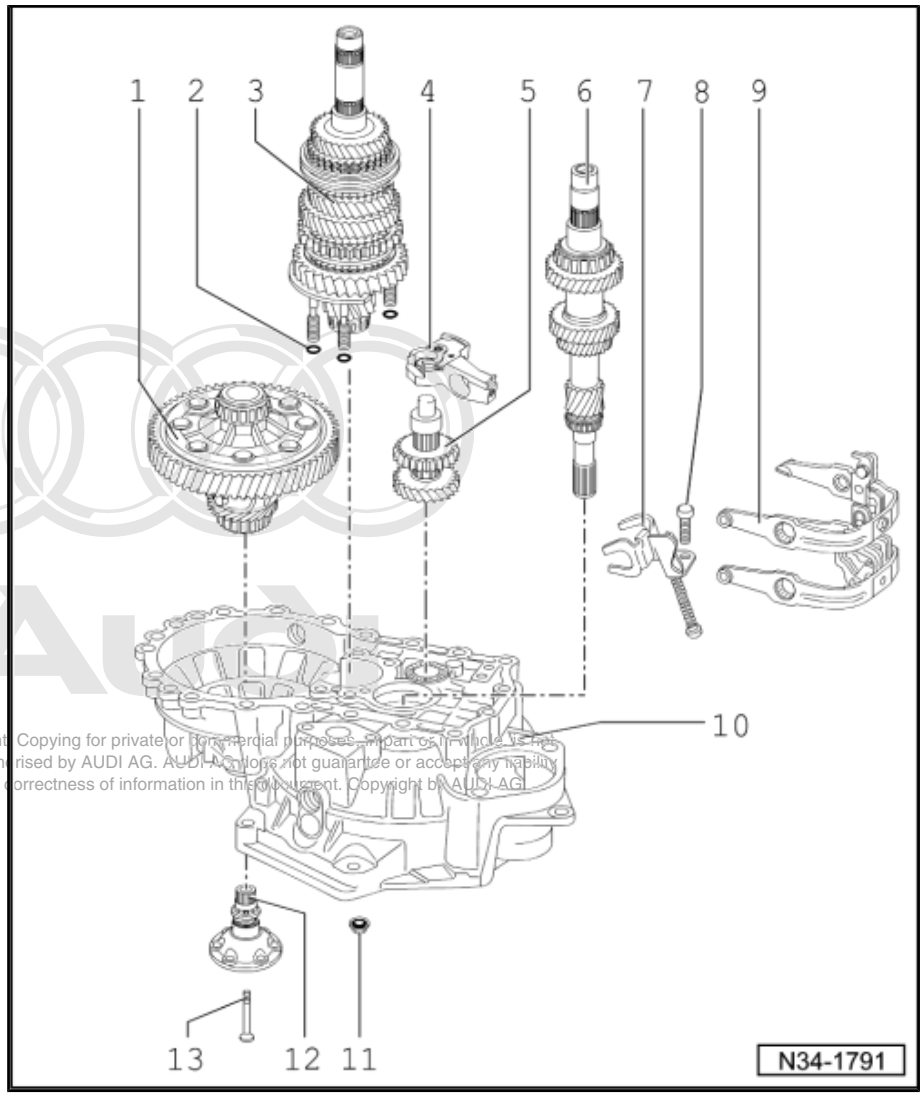
5.4 Exploded view - removing and installing input shaft, output shaft (pinion shaft), differential and selector forks



1 - Differential
- ❑ Dismantling and assembling ⇒ page 179

2 - Seal
- ❑ 4x
- ❑ Always renew

3 - Output shaft
- ❑ Dismantling and assembling ⇒ page 151

4 - Reverse shaft support
- ❑ Dismantling and assembling ⇒ Item 8 (page 168)

5 - Reverse shaft
- ❑ Dismantling and assembling ⇒ page 168

6 - Input shaft
- ❑ Dismantling and assembling ⇒ page 139

7 - Reverse gear selector fork
- ❑ Dismantling and assembling ⇒ page 134
- ❑ Installation position ⇒ page 112

8 - Torx socket head bolt
- ❑ 25 Nm

9 - Selector mechanism
- ❑ (Selector forks)
- ❑ Dismantling and assembling ⇒ page 134

10 - Clutch housing
- ❑ Servicing ⇒ page 121

11 - Nut
- ❑ 25 Nm + 90°
- ❑ 4 nuts for bearing mounting
- ❑ Always renew

12 - Flange shaft (right-side) with spring
- ❑ Removing and installing ⇒ page 175
- ❑ Assembling ⇒ page 179

13 - Countersunk bolt
- ❑ 25 Nm

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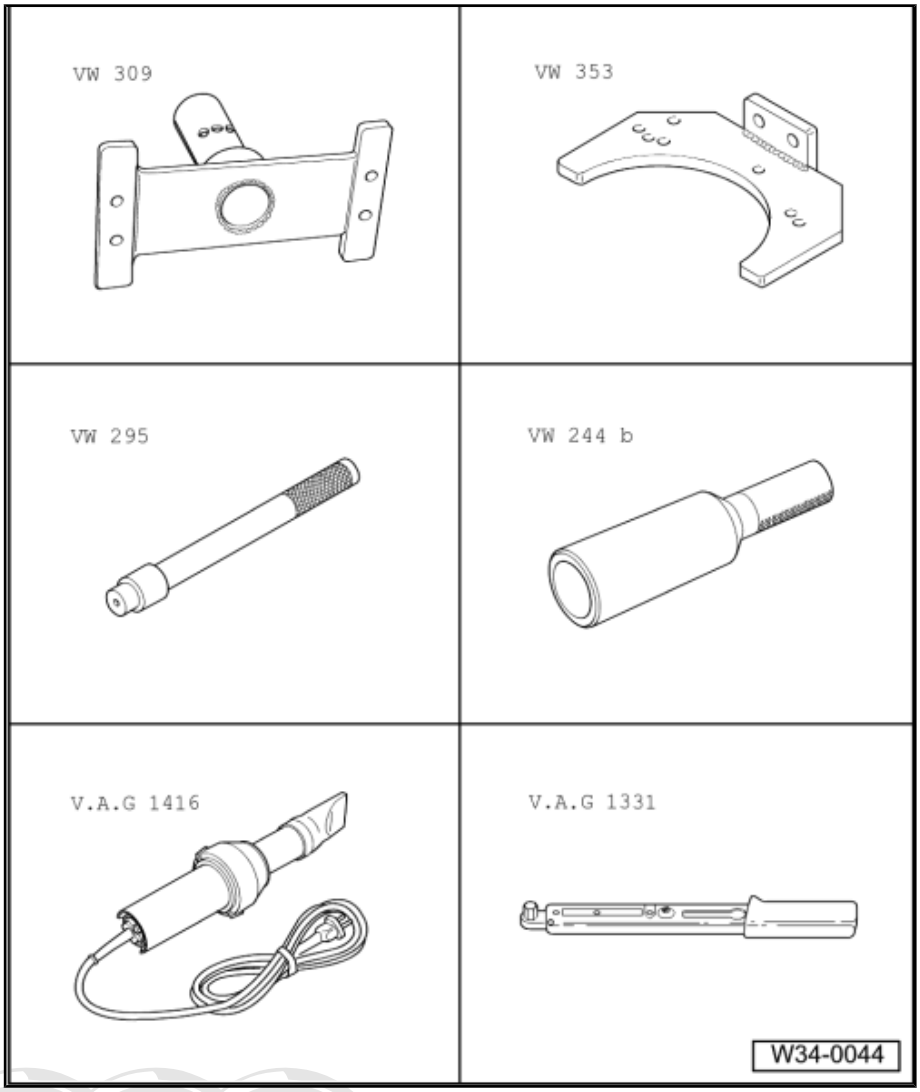
5.5 Dismantling and assembling sequence

Removing and installing cover for gearbox housing, clutch housing, selector shaft with selector cover, input shaft, output shaft (pinion shaft), differential and selector mechanism

Special tools and workshop equipment required

- Support plate -VW 309-
- Gearbox support -VW 353-
- Drift -VW 295-
- Drift sleeve -VW 244 B-
- Hot air blower -V.A.G 1416-
- Torque wrench -V.A.G 1331-
- -Stehbolzen M 8 x 100 mm-



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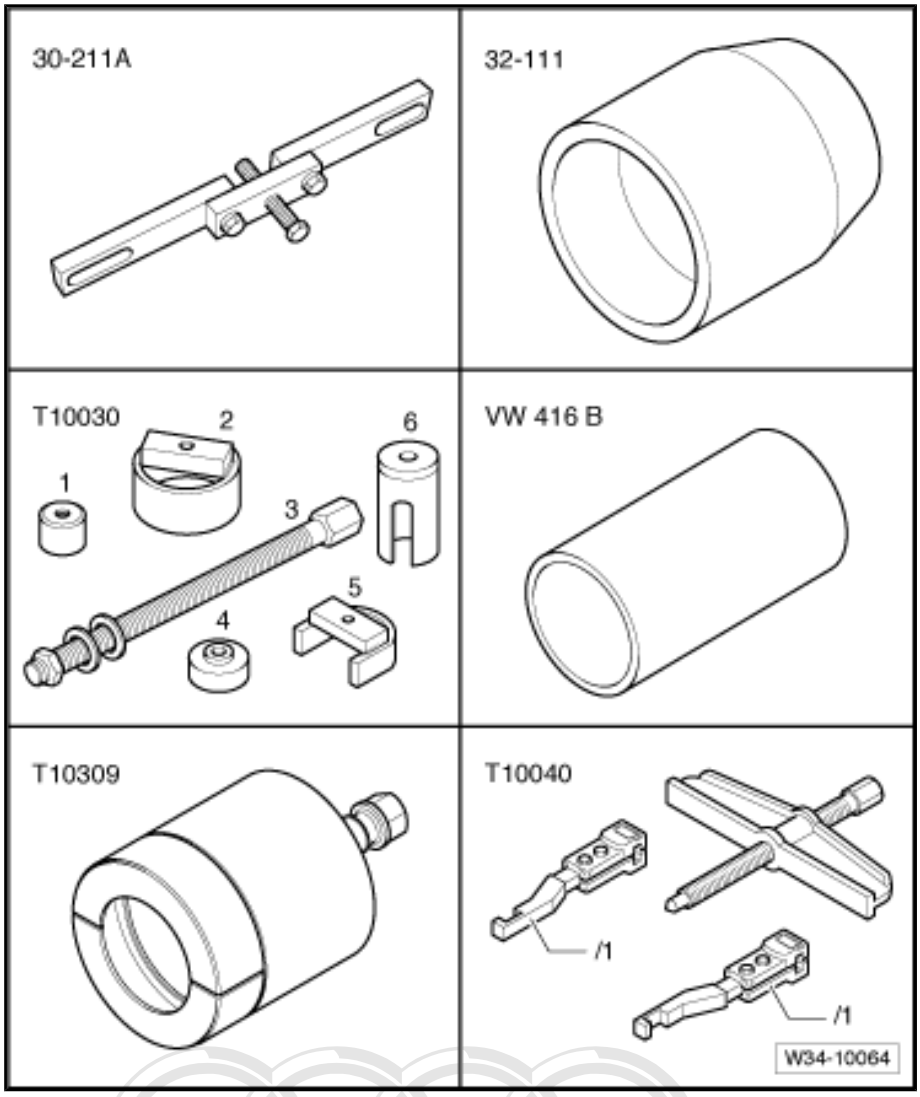
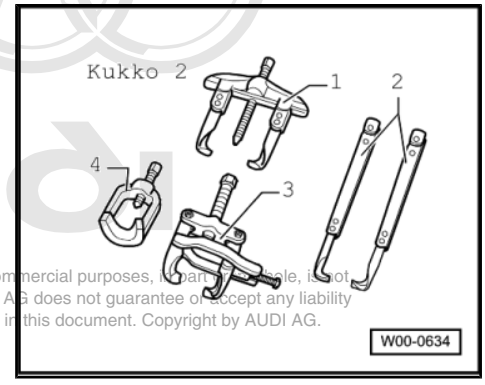
- Support bridge -30-211A-
- Thrust piece -32 - 111-
- Thrust piece of assembly tool -T10030/4-
- Tube -VW 416 B-
- Puller -T10309-
- Two-arm puller -T10040-
- With claw -T10040/2-



Special tools and workshop equipment required

- or for 6th gear wheel



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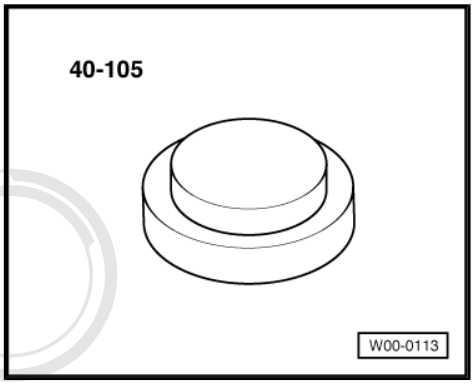
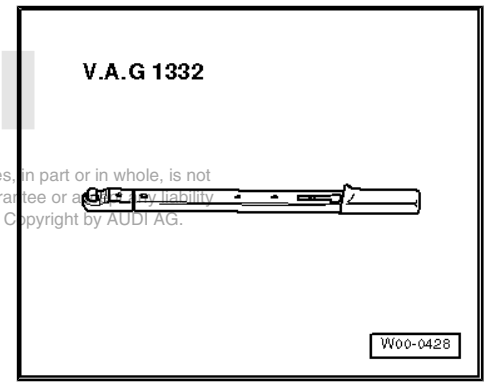
- Two-arm puller -1 Kukko 20/10-

♦ Thrust plate -40 - 105-



♦ Torque wrench -V.A.G 1332-



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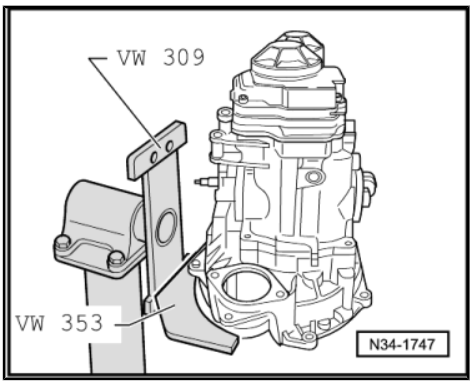
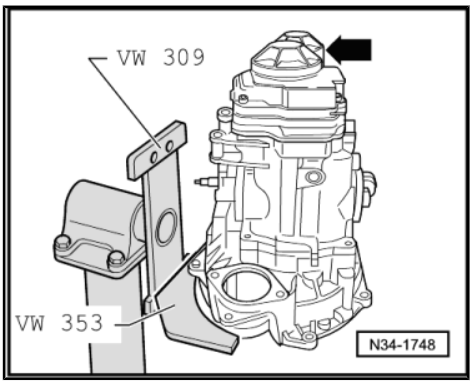
5.5.1 Dismantling

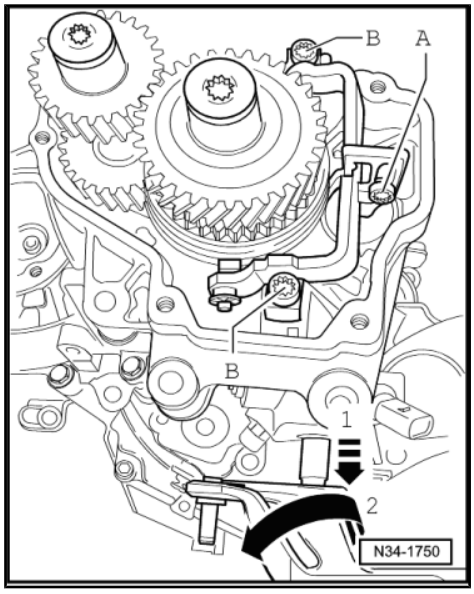
– Mount gearbox on assembly stand.
– Drain off gear oil.
– Remove clutch release lever and release bearing ⇒ page 33 .
– Remove guide sleeve ⇒ page 33 .



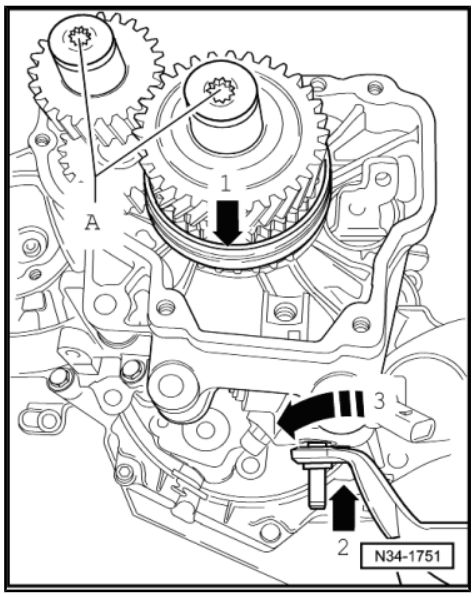
– Unbolt gearbox housing cover -arrow-.
– Take off cover. If necessary carefully lever up all round and alternating between sides on the protruding flanges, being careful not to damage sealing surfaces.



– Remove 5th/6th gear selector fork as follows:
– Cover openings in gearbox with a cloth.
– Engage 5th gear (arrows -1- and -2-).
– Remove 5th/6th gear selector jaw (bolt -A-).
– Then remove both bolts -B- for pivot pins.
– Pull out pivot pins.
– Take out 5th/6th gear selector fork.



– Remove bolts -A- for inner bearing races on input and output shafts. To do this, engage 5th gear -arrow 1- and 1st gear -arrows 2 and 3-.
– The input and output shafts are both locked when these two gears are engaged. The two bolts can now be loosened.



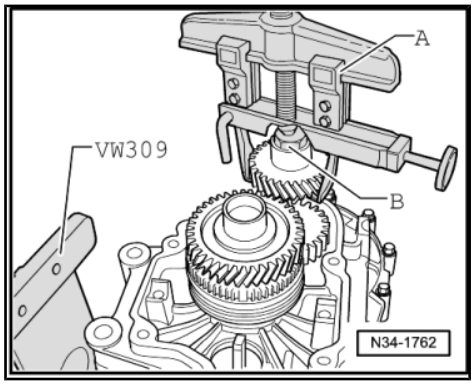
Note

If the shafts are not being renewed, clean residual locking compound out of tapped holes using a thread tap.

– Pull off 6th gear wheel and roller bearing inner race for output shaft.

A - Two-arm puller -1 Kukko 20/10-

B - Hexagon bolt M10 x 20



Note

- *6th gear wheel and roller bearing inner race can also be pulled out using two-arm puller -T10040- and claw -T10040/2- .*
- *If necessary, heat gear wheel using hot air blower - V.A.G 1416- before pulling off.*

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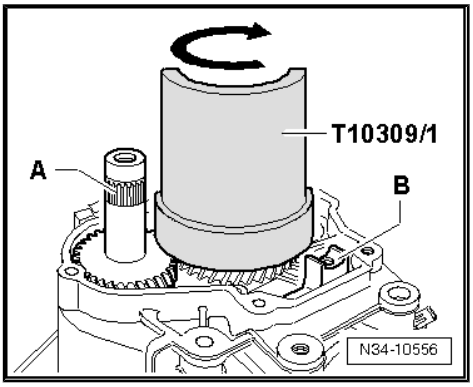
Pull off 6th speed selector gear together with roller bearing inner race for input shaft and thrust washer or pull off together with 5th/ 6th gear synchronising hub with inner race for 6th gear needle bearing and 5th gear synchro-ring.

Use puller -T10309- .

– First insert shell half -T10309/1- between output shaft -A- and mounting for 5th/6th gear selector fork -B-.

• Shell half -T10309/1- must be positioned underneath synchro-ring.

– Turn shell half -T10309/1- to opposite side in direction of -arrow-.



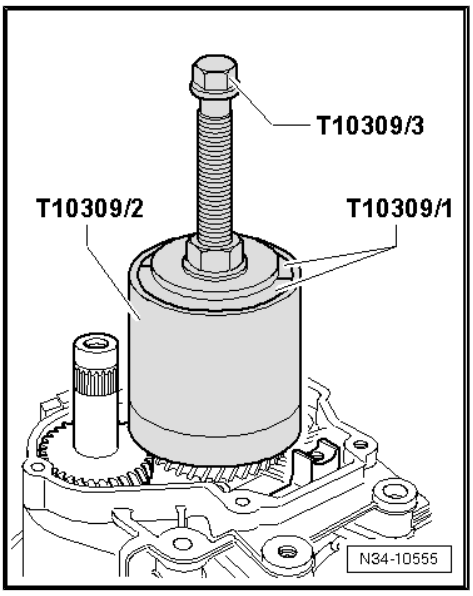
– Introduce thread insert -T10309/3- into shell half .

– Now fit second shell half -T10309/1- and slide tube -T10309/2- onto tool.

– Please check synchronising hub for damage after removal.

– Renew synchro-ring for 5th gear.

– Remove 5th speed selector gear with needle bearing.

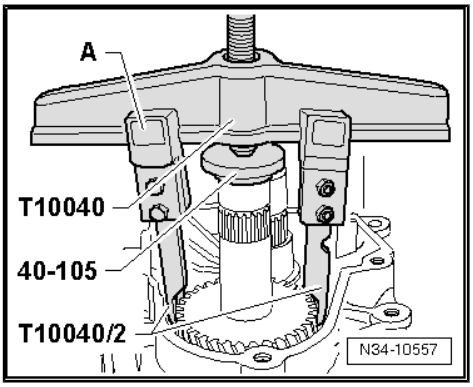


– Now take off sleeve from 5th gear wheel.

– Pull off 5th gear wheel.

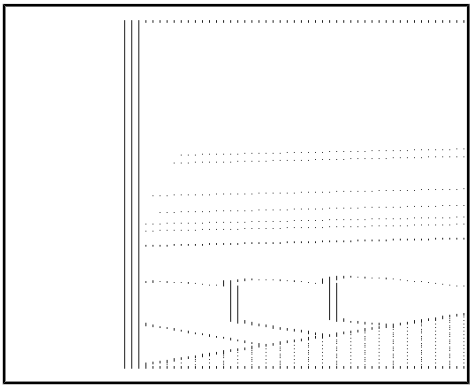
Note

Ensure that the claws -T10040/2- do not bend outwards when pulling off the gear wheel. Check 5th gear wheel for damage after removal.



– Remove both flange shafts.

– Remove flange shafts together with springs, thrust washers and tapered rings.



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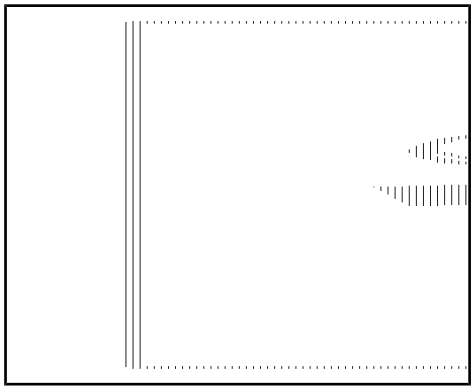
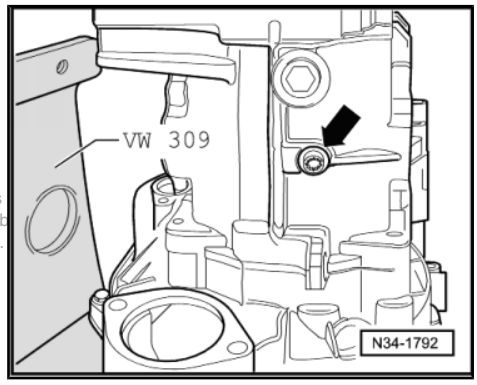
– Remove both bolts -arrows- for reverse shaft support.



– Now remove 3rd bolt -arrow- for reverse shaft support.



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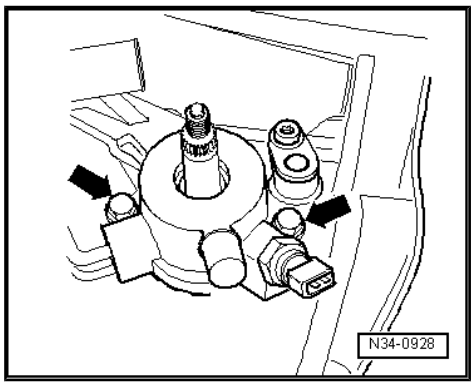
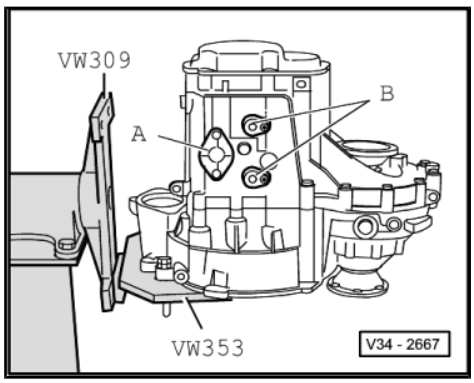
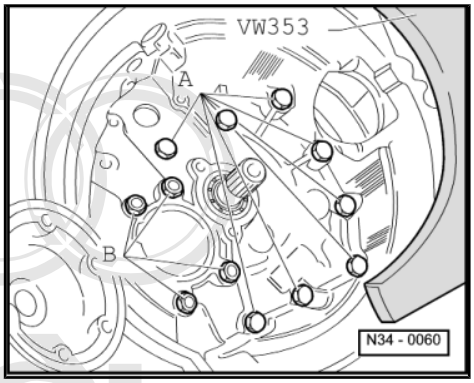
– Remove selector shaft with selector mechanism cover. To do this, set selector shaft in neutral position. Then remove bolts -arrows- and pull selector shaft out of gearbox housing.



– Remove sealing cap -A- from gearbox underside.
– Remove pivot pins -B- from top and underside of gearbox.



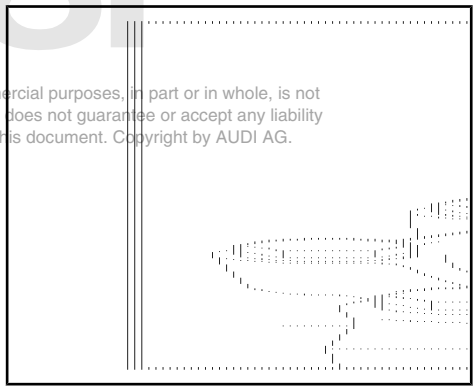
– Remove bolts -A- securing gearbox housing from inside clutch housing.



Note

Do not remove nuts -B- for output shaft bearing mounting.

– Remove pivot pins -A- on top side of gearbox and bolts -B- securing gearbox housing to clutch housing (near differential).



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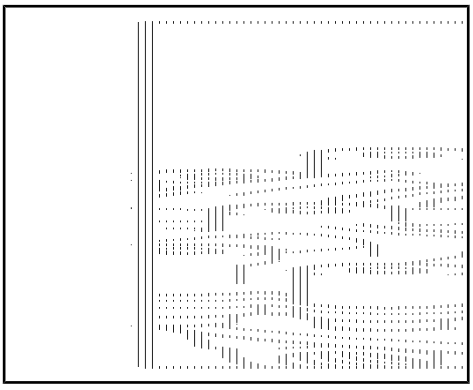
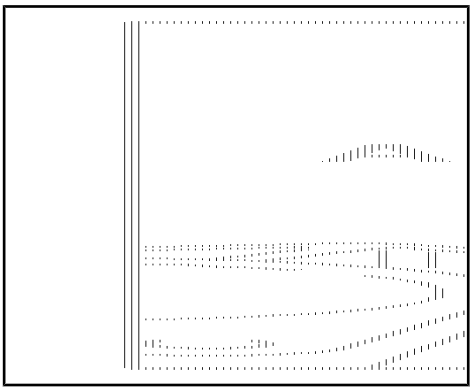
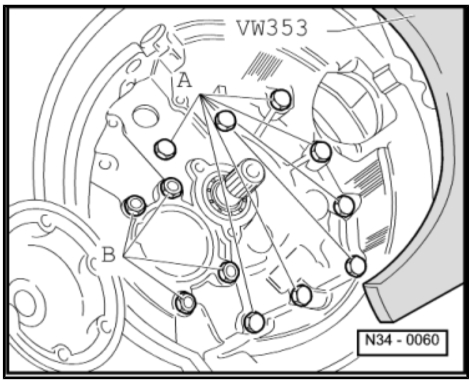
– Take off gearbox housing, if necessary carefully lever up all round and alternating between sides on the protruding housing flanges -arrows-, taking care not to damage sealing surfaces.



– Remove selector forks -A- together with selector plates.
– Unscrew bolt for reverse gear selector mechanism -B-.

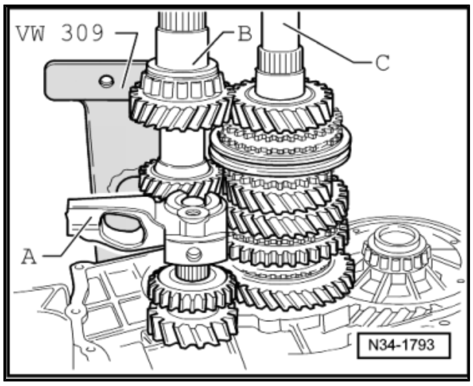


– Remove nuts -B- for output shaft bearing mounting.



– Remove reverse gear -A-, input shaft-B- and output shaft -C- one after the other from clutch housing.

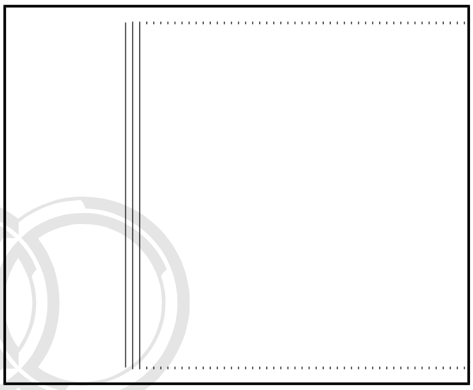
– Take out differential.



5.5.2 Assembling

– Insert differential.

– Always renew seals -arrows- for output shaft bearing mounting.



Note

The illustration only shows 3 of the 4 seals.

– Install reverse gear selector mechanism.

– Insert input shaft -1- and output shaft -2- together.

– Tighten nuts for output shaft bearing mounting to torque ⇒ Item 11 (page 104) .

– Place reverse gear wheel -3- on needle bearing in clutch housing.

Shoulder -arrow- faces away from clutch housing.

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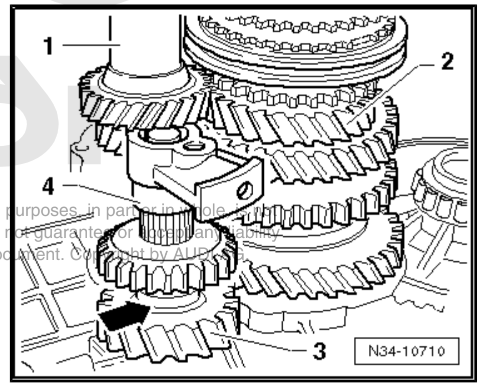
– Check that reverse shaft -4- is complete ⇒ page 168 ; do not fit reverse shaft support onto reverse shaft yet.

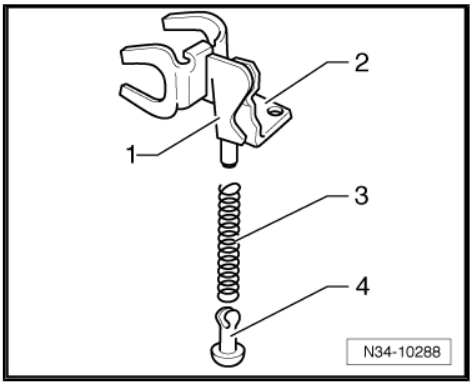


– Insert reverse shaft in clutch housing.

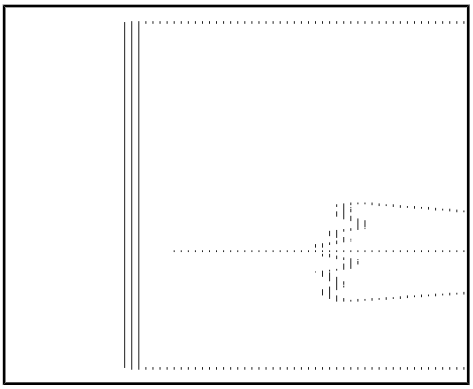
– Clean locking fluid residue from all tapped holes in reverse shaft support (residue can be removed using a tap).

– Fit reverse shaft support on reverse shaft.

– Fit reverse gear selector fork -1- with support for reverse gear selector fork -2-, spring -3- and slide -4-.

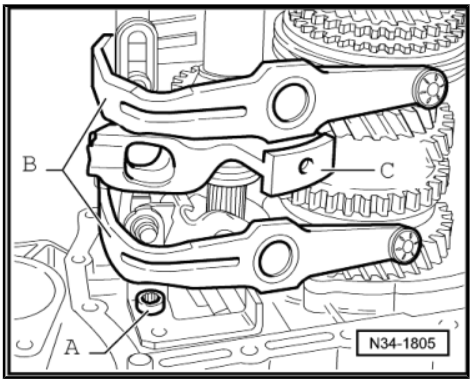


Installation position: reverse gear



– Tighten bolt for reverse gear selector mechanism -A- to torque ⇒ Item 8 (page 104) .
– Install selector forks -B- together with selector plates.

Pin -C- on reverse shaft support is located in front of selector plates.

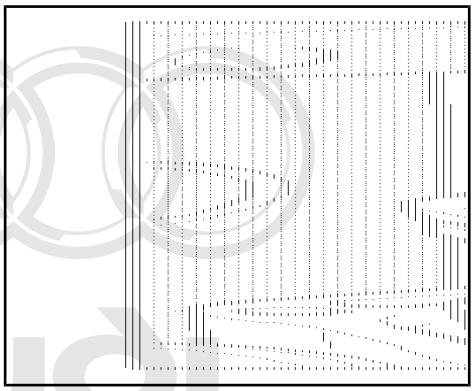


– Screw M8 x 100 mm stud -A- into reverse shaft support so that the shaft is aligned after fitting gearbox housing.
– Align selector plates.

Note

The detent segments must be positioned in the grooves on the locking collars.

– Apply sealant -AMV 188 200 03- evenly to sealing surface of clutch housing.
– Fit and secure gearbox housing.



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Install bolts for reverse shaft support -arrow- as follows:

– Fit bolt -a-.

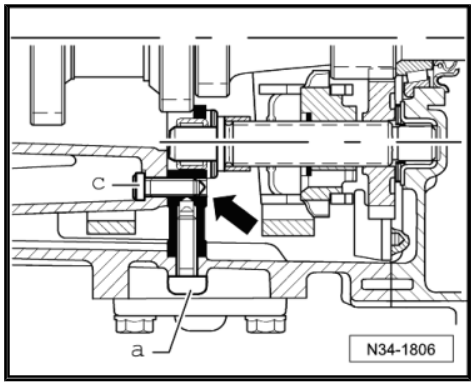
– Remove stud -A- (⇒ top illustration).

Tightening sequence:

1 - Fit bolt -c- hand-tight.

2 - Tighten bolt -a- to 30 Nm.

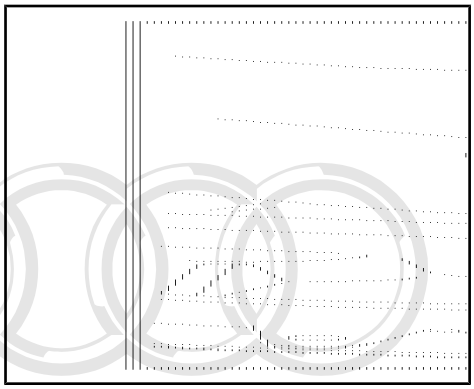
3 - Tighten bolt -c- to 25 Nm.



– Install pivot pins -arrow- for selector forks. To do this align selector mechanism using a screwdriver so that the relevant pivot pin can be inserted.

– Apply sealant -AMV 188 200 03- evenly to sealing surface of cover plate.

– Fit selector shaft cover plate.



Install selector shaft and selector mechanism cover as follows:

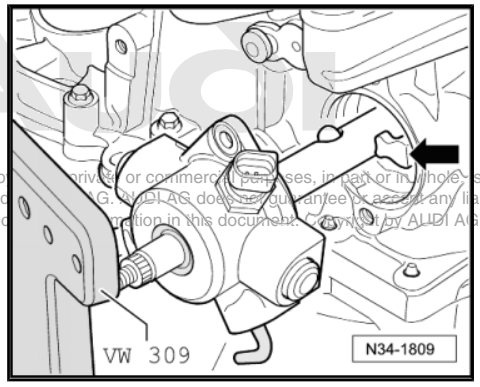
– Set selector plates in neutral position.

– Apply sealant -AMV 188 200 03- evenly to sealing surface of cover plate.

– Put selector shaft in neutral position.

– Position selector shaft so that selector finger -arrow- is engaged in selector plates.

– Tighten selector shaft cover ⇒ Item 15 (page 103) .



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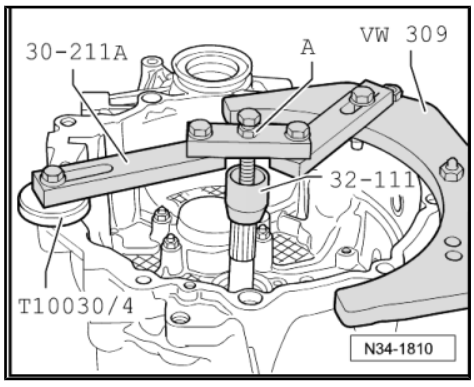
– Fit support bridge -30- 211A- .

Note

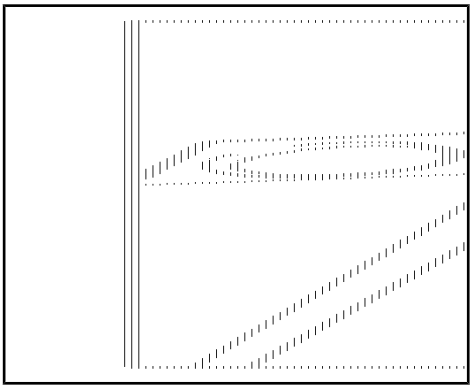
- *Support the input shaft with the thrust piece -32 - 111- to make it easier to drive on components at a later stage.*
- *Otherwise there is a risk that the input shaft bearing will be damaged.*

– Secure bolt of support bridge -30- 211A- with lock nut -A-.



Installation position of 5th gear wheel

The groove running round the gear wheel -arrow- faces to the gearbox housing.



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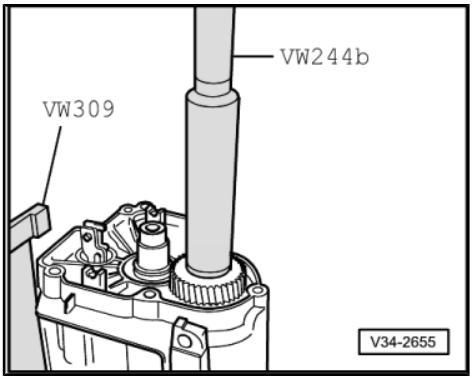
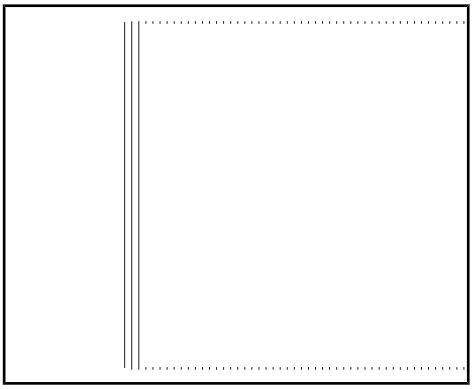
– Drive on 5th gear wheel.



Checking 5th and 6th gear synchro-rings



– Before re-installing selector gears and synchro-rings for 5th and 6th gears, press synchro-rings onto tapered seats of selector gears and measure gap -a- with a feeler gauge.

Gap -a-	Installation depth	Wear limit
5th/6th gear	1.1 ... 1.7 mm	0.5 mm

– Install 5th speed selector gear with needle bearing.

– Fit 5th gear synchro-ring on selector gear.

– If previously dismantled, assemble 5th/6th gear synchronising hub/locking collar before installing ⇒ page 146 , ⇒ page 146 and ⇒ page 146

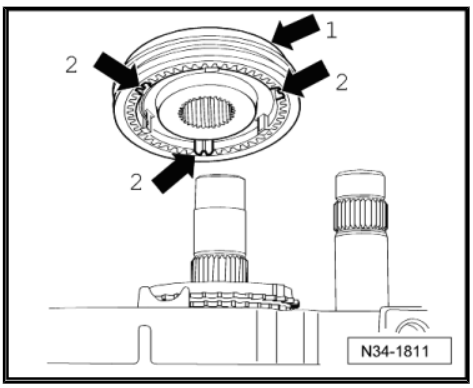
– Also pay attention to modifications on 5th/6th gear locking collar on gearboxes manufactured from12 06 6 onwards ⇒ page 145

These modifications are particularly important when adjusting 5th/6th gear at a later stage.

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

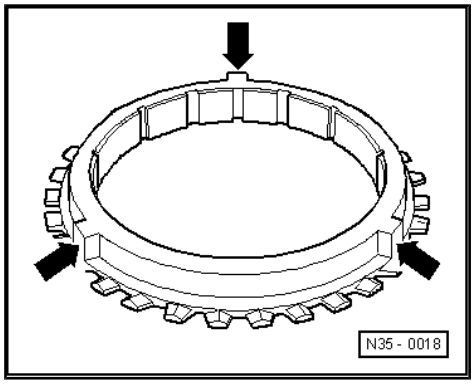
Collar -arrow 1- faces towards 6th gear.

The synchronising hub mountings -arrow 2- align with the cast locking pieces on the synchro-ring (arrows in the illustration below).



5th and 6th gear synchro-rings with cast locking pieces -arrows-

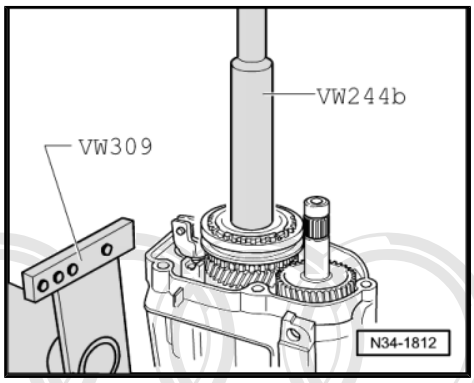
– Cover all openings with a cloth to prevent dirt etc. from entering the gearbox.



– Knock on 5th/6th gear synchronising hub.

Note

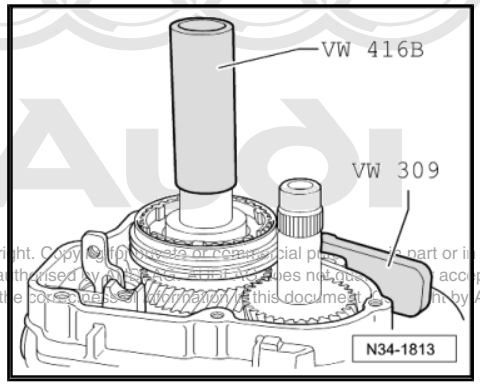
When driving on, ensure clearance for synchro-ring.



– Heat roller bearing inner race for 6th speed selector gear to 100°C (maximum) and drive onto input shaft.

WARNING

Wear protective gloves.



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

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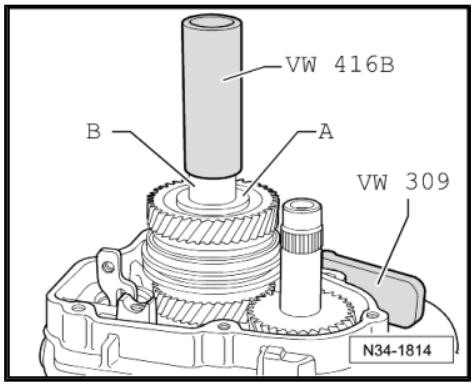
On gearboxes manufactured up to 20 08 6

– Fit thrust washer -A-.

Note

Do not interchange roller bearing inner races of input and output shafts.



– Heat roller bearing inner race -B- to 100°C (maximum) and drive onto input shaft.

WARNING

Wear protective gloves.

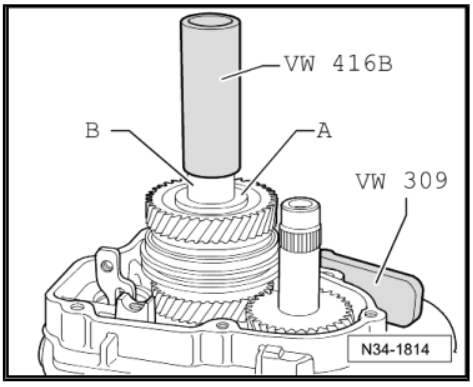
On gearboxes manufactured from 21 08 6 onwards

Roller bearing inner race -B- and thrust washer -A- are one component

– Heat roller bearing inner race to 100°C (maximum) and drive onto input shaft.

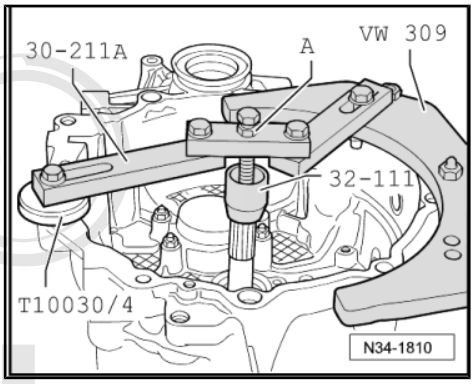
WARNING

Wear protective gloves.



Continued for all vehicles:

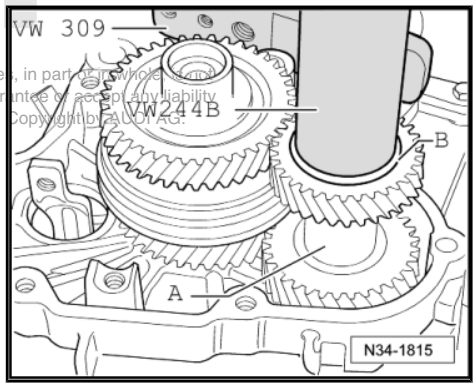
– Loosen support for input shaft (nut -A-).



Installation position of 6th gear wheel:

– Fit sleeve -A- on 5th gear wheel.

• Groove -B- points towards drift sleeve -VW 244 B-.



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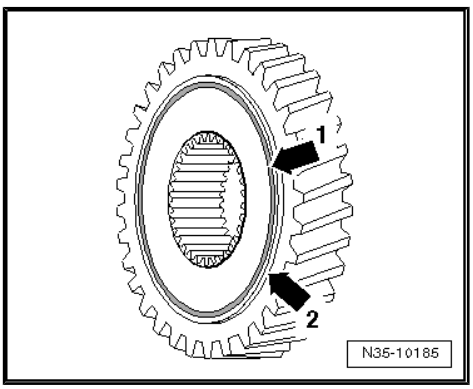
"or"

• Groove -arrow 1- in area of shoulder -arrow 2- points towards drift sleeve -VW 244 B- (see previous illustration).

– Heat 6th gear wheel to 100°C (maximum) and press on.

WARNING

Wear protective gloves.

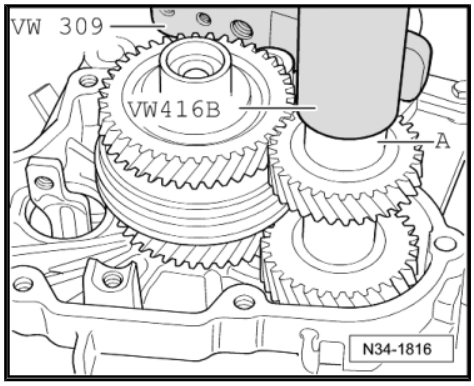


– Set locking collar for 5th/6th gear to neutral position to allow 6th speed selector gear to turn while pressing on 6th gear wheel.

– Drive on 6th gear wheel, making sure that it meshes properly with 6th speed selector gear.

– Heat roller bearing inner race -A- to 100°C (maximum) and drive onto output shaft.

> **WARNING**
>
> *Wear protective gloves.*



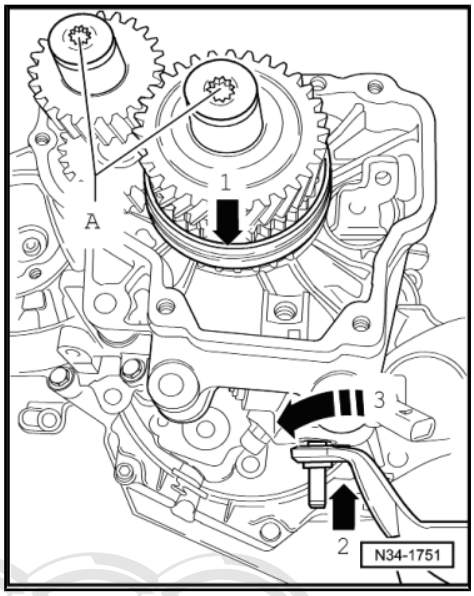
– Remove residual locking fluid from threaded holes for securing bolts -A- using a thread tap. Otherwise there is a risk that the bolts will shear off.

Note allocation of securing bolts ⇒ page 102 and ⇒ page 102

– Tighten securing bolts for synchronising hub and 5th/6th gear wheels to torque ⇒ page 100 .

– Engage 2 gears -arrows 1 ... 3- before tightening securing bolts -A-.

– Install 5th/6th gear selector fork.



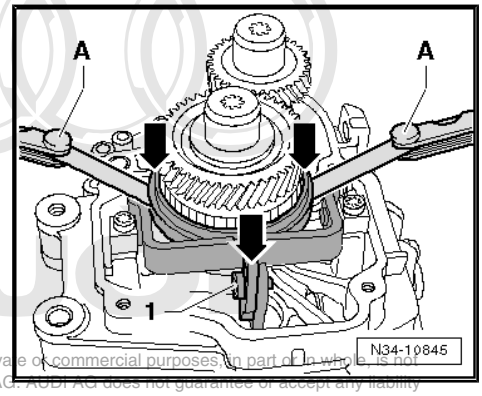
Adjusting 5th/6th gear up to gearbox manufacturing date 11 06 6

– Engage 5th gear.

– Loosen bolt -1-.

– Insert two feeler gauges -A- of 0.5 mm above the two detent segments -arrows- (for 6th gear) into locking collar.

– Press down selector jaw and locking collar -arrows- and tighten bolt -1- to 25 Nm.



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- The 5th gear is engaged.
- Checking adjustment: it must just be possible to insert one feeler gauge 0.5 mm each between locking collar and the two detent segments -arrow- for 6th gear.

– Repeat adjustment if necessary.

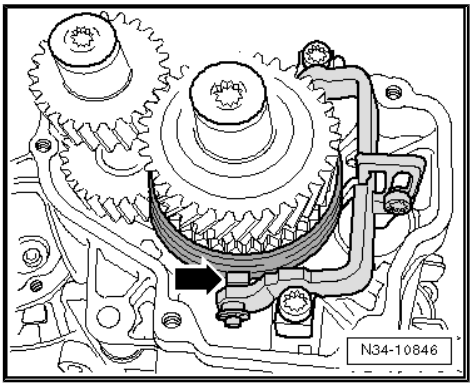
– First engage 5th and then 6th gear.

- There must be slight play between 5th/6th gear selector fork and selector jaw with 5th or 6th gear engaged.

– Disengage gear.

- Locking collar should now be in the neutral position. Synchro-ring should move freely.

– Select all gears.

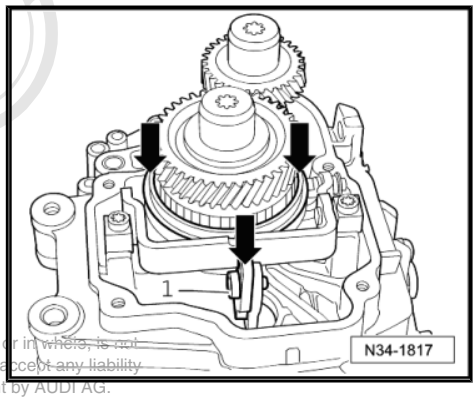


Adjusting 5th/6th gear from gearbox manufacturing date 12 06 6

– Engage 5th gear.

– Loosen bolt -1-.

– Press down selector jaw and locking collar -arrows- and tighten bolt -1- to 25 Nm.



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- The 5th gear is engaged.
- Checking adjustment: it must not be possible to insert a feeler gauge 0.2 mm between locking collar and the two detent segments -arrow- for 6th gear.

– Repeat adjustment if necessary.

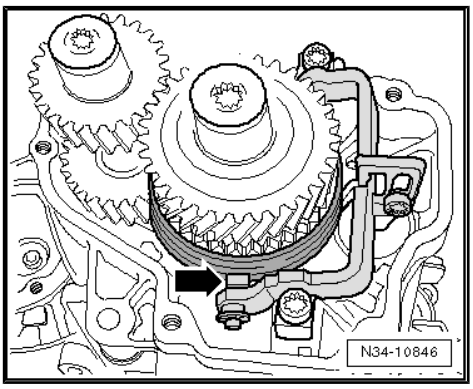
– First engage 5th and then 6th gear.

- There must be slight play between 5th/6th gear selector fork and selector jaw with 5th or 6th gear engaged.

– Disengage gear.

- Locking collar should now be in the neutral position. Synchro-ring should move freely.

– Select all gears.

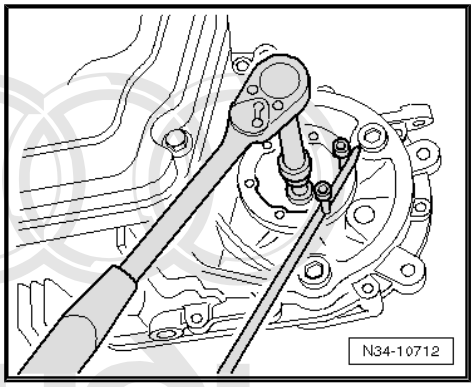


Continued for all vehicles:

– Apply sealant -AMV 188 200 03- evenly to sealing surface of cover for gearbox housing.

– Install gearbox housing cover. ⇒ page 100

– Install both flange shafts with springs, thrust washers and tapered rings.
– Install release bearing guide sleeve ⇒ page 33 .
– Install clutch release lever and release bearing ⇒ page 33 .
– Fill up with gear oil ⇒ page 95 .



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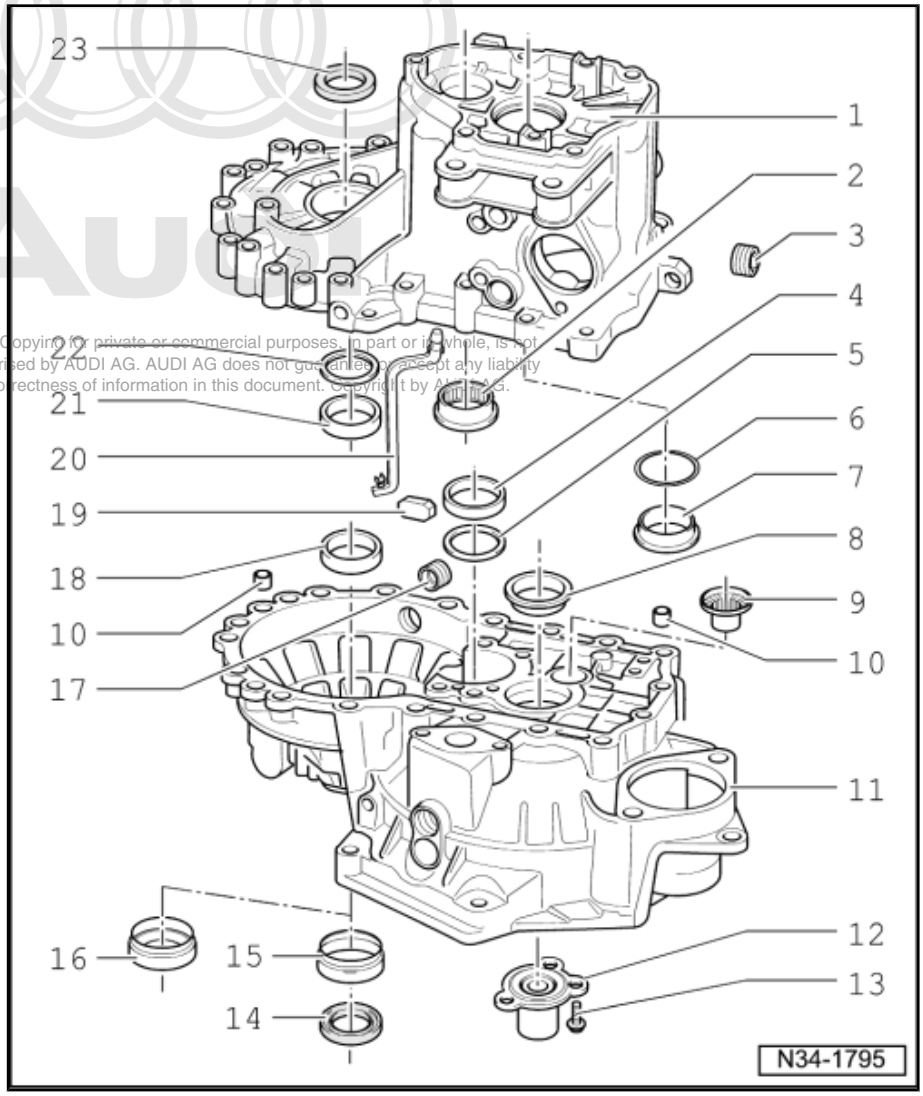
6 Exploded view - gearbox housing and clutch housing



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1 - Gearbox housing

- ❑ If renewed: Adjust input shaft and differential ⇒ page 187

2 - Needle bearing

- ❑ For output shaft
- ❑ Removing ⇒ page 124
- ❑ Installing and securing ⇒ page 125

3 - Oil filler plug

- ❑ 30 Nm
- ❑ Gear oil level cannot be checked by removing oil filler plug
- ❑ If gearbox was dismantled, fill with gear oil before installing

Capacity ⇒ page 1

4 - Tapered roller bearing outer race

- ❑ For output shaft
- ❑ Removing and installing ⇒ page 157
- ❑ If renewed: Adjust output shaft ⇒ page 165

5 - Shim

- ❑ For output shaft
- ❑ Table of adjustments ⇒ page 187

6 - Shim

- ❑ For input shaft
- ❑ Table of adjustments ⇒ page 187

7 - Tapered roller bearing outer race

- ❑ For input shaft
- ❑ Removing and installing ⇒ page 142
- ❑ If renewed: Adjust input shaft ⇒ page 147

8 - Tapered roller bearing outer race

- ❑ For input shaft
- ❑ Removing and installing ⇒ page 145
- ❑ If renewed: Adjust input shaft ⇒ page 147

9 - Needle bearing

- ❑ Removing and installing ⇒ page 170

10 - Dowel sleeve

- ❑ 2x

11 - Clutch housing

- ❑ If renewed: table of adjustments ⇒ page 187

12 - Guide sleeve

- ❑ With input shaft oil seal and vulcanised O-ring
- ❑ Knocking out oil seal ⇒ page 125
- ❑ Driving in oil seal ⇒ page 125
- ❑ Remove guide sleeve in order to renew oil seal
- ❑ Renew guide sleeve if O-ring is damaged

13 - Socket head bolt

- ❑ 20 Nm
- ❑ Self-locking
- ❑ Always renew

14 - Oil seal

- ❑ Cannot be renewed separately on this version
- ❑ One-piece oil seal and sleeve ⇒ Item 16 (page 122)

15 - Sleeve

- ❑ Cannot be renewed separately on this version
- ❑ One-piece oil seal and sleeve ⇒ Item 16 (page 122)

16 - One-piece oil seal and sleeve

- ❑ If oil seal is damaged, renew both sleeve and oil seal
- ❑ Removing ⇒ page 125
- ❑ Installing ⇒ page 126

17 - Oil drain plug

- ❑ 30 Nm
- ❑ Without magnet

18 - Tapered roller bearing outer race

- ❑ For differential
- ❑ Pressing out and pressing in ⇒ page 179
- ❑ If renewed: Adjust differential ⇒ page 188 and ⇒ page 188

19 - Magnet

- ❑ Held in place by joint surface of housing

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20 - Oil collector

- ❑ Installing oil collector in gearbox housing ⇒ page 126

21 - Tapered roller bearing outer race

- ❑ For differential
- ❑ Pressing out and pressing in ⇒ page 179
- ❑ If renewed: Adjust differential ⇒ page 188 and ⇒ page 188

22 - Shim

- ❑ For differential
- ❑ Table of adjustments ⇒ page 187

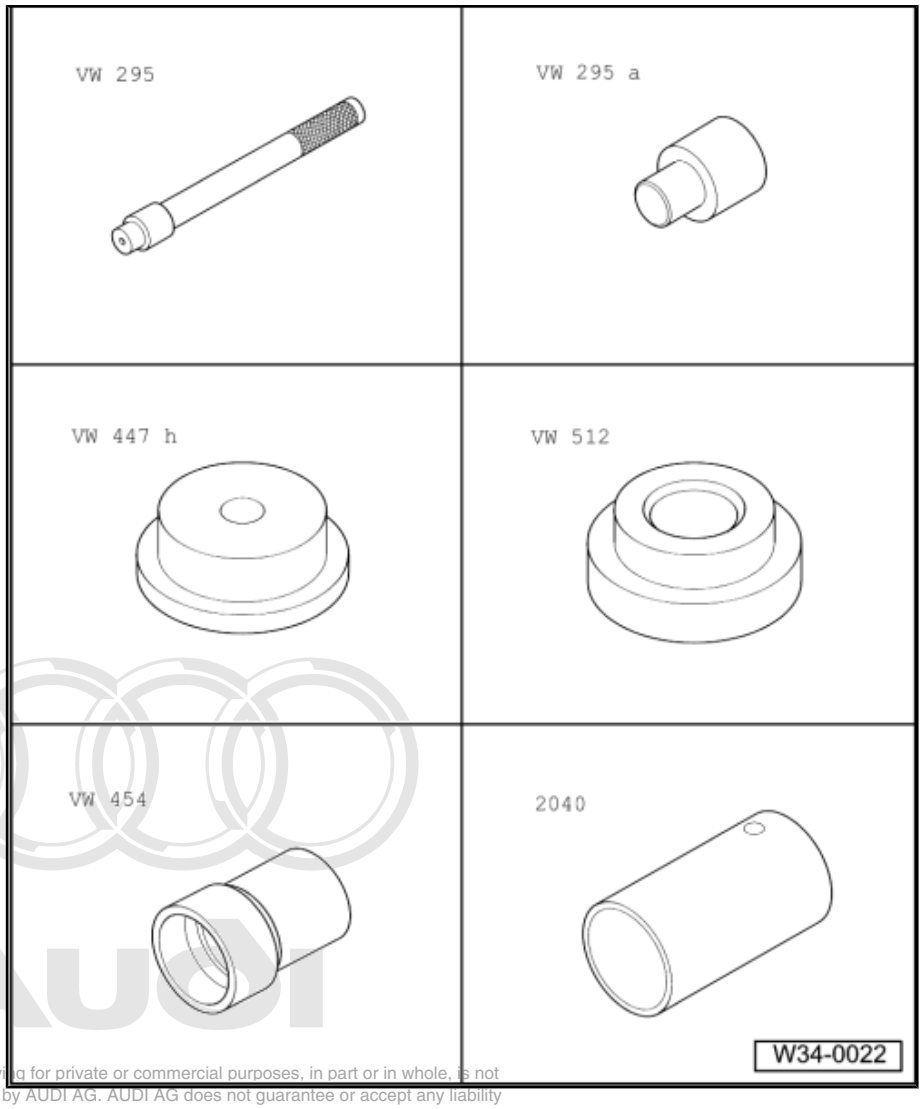
23 - Oil seal

- ❑ For flange shaft (left-side)
- ❑ Renewing ⇒ page 172

6.1 Servicing gearbox housing and clutch housing

Special tools and workshop equipment required

- Drift -VW 295-
- Adapter -VW 295 A-
- Thrust pad -VW 447 H-
- Thrust pad -VW 512-
- Tube -VW 415 A-
- Thrust piece -VW 454-



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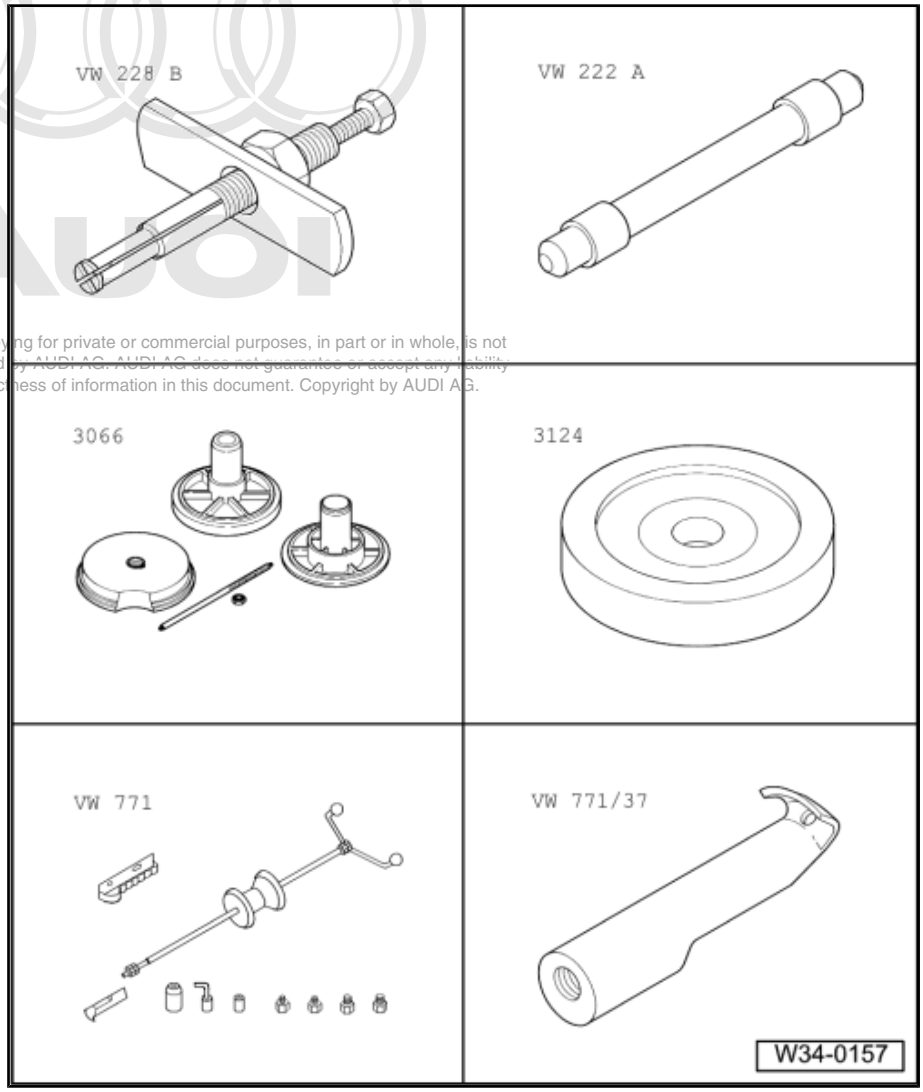
Special tools and workshop equipment required

- Puller -VW 228 B- (not used on this gearbox)
- Drift -VW 222 A- (not used on this gearbox)
- Assembly device -3066- (assembly device spindle)
- Thrust piece -3124-
- -VW 771- Multi-purpose tool
- -VW 771/37- Puller hook



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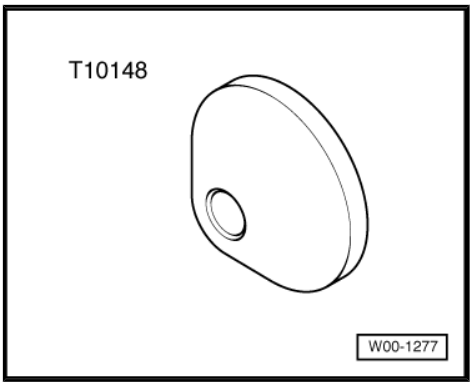
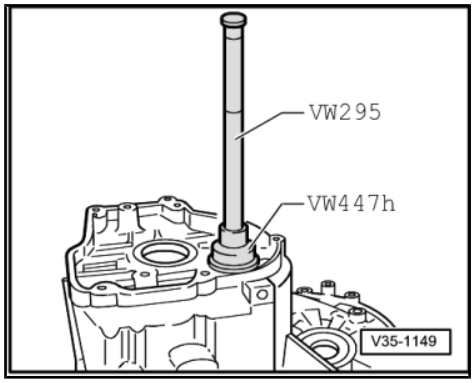
Special tools and workshop equipment required

- Thrust piece -T10148-

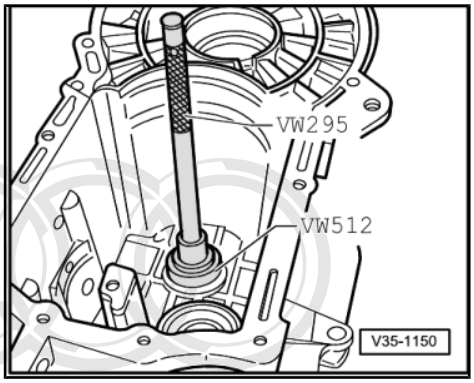




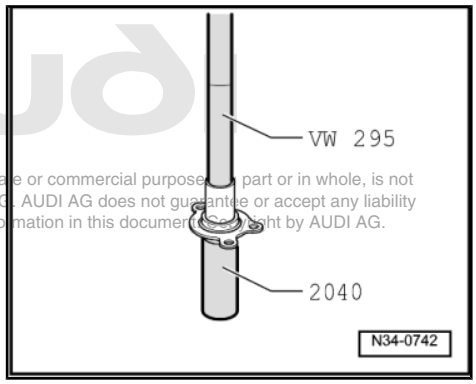
Driving out needle bearing

Driving in needle bearing onto stop

– Secure needle bearing in gearbox housing at three points (120° offset) with a punch.



Driving oil seal out of guide sleeve



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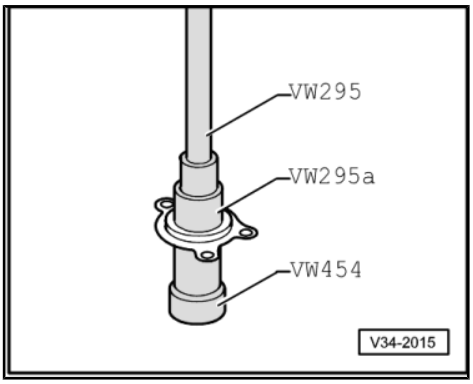
Driving oil seal into guide sleeve (drive in onto stop)

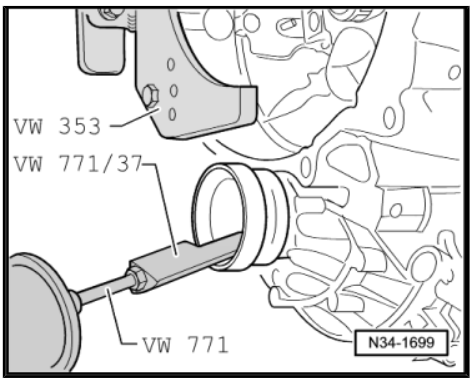


Pulling out sleeve and oil seal

A shoulder is located on inside diameter of sleeve.

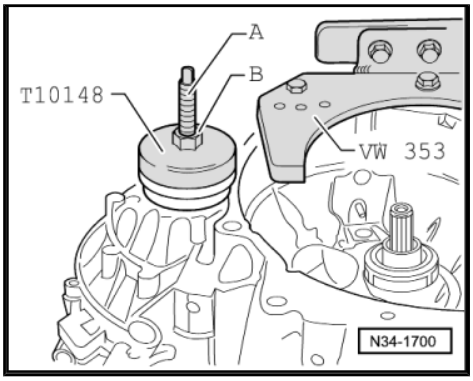
– To pull out oil seal and sleeve, apply puller hook -VW 771/37- behind shoulder inside sleeve.

– During this operation, press puller hook -VW 771/37- firmly in against sleeve.



Drawing in sleeve and oil seal

– Clean seat for oil seal in gearbox.
– Screw spindle -A- of assembly device -3066- into threaded piece in differential.
– Turn nut -B- and pull sleeve in onto stop with thrust piece -T10148- .

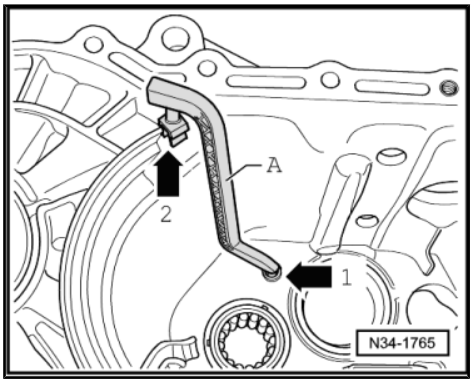


Note

If gearbox has been dismantled, press in sleeve onto stop using thrust piece -T10148- .

Installing oil collector -A- in gearbox housing

– Insert oil collector simultaneously into bore -arrow 1- and groove -arrow 2-.



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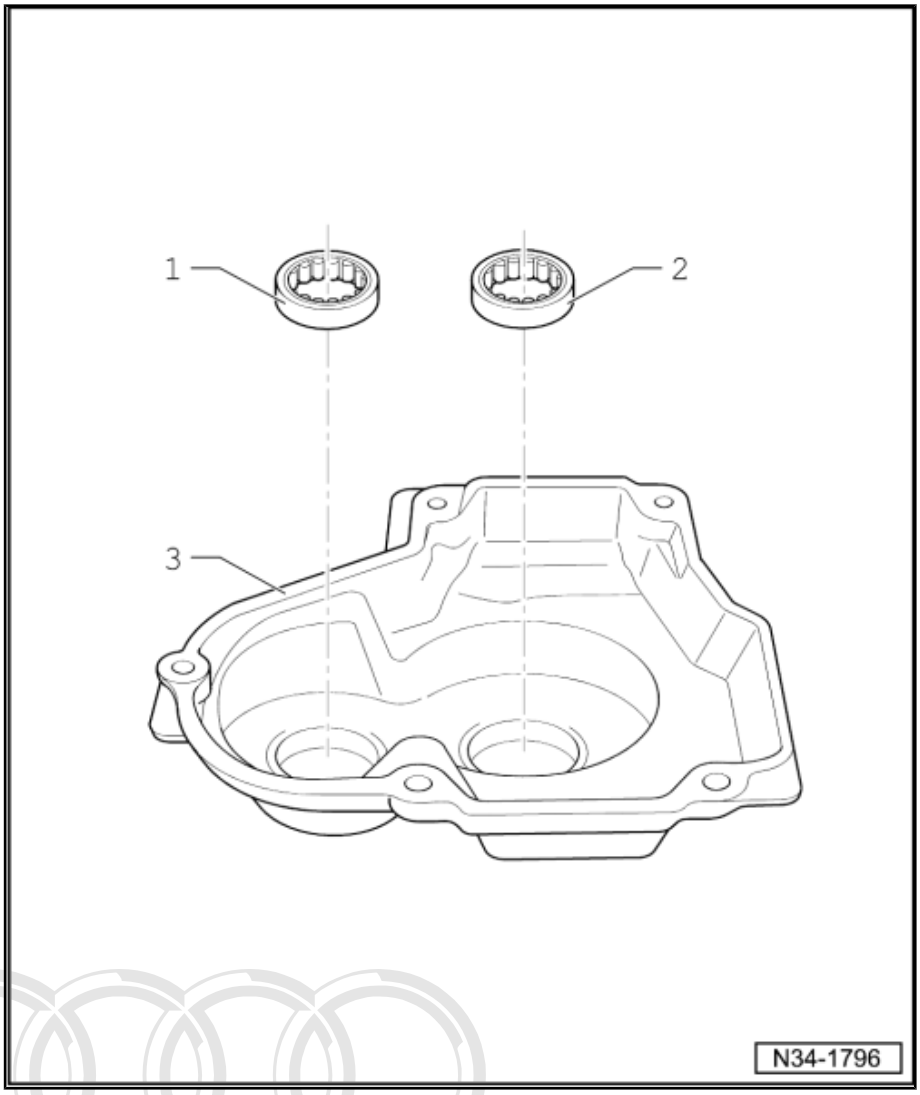
7 Exploded view - gearbox housing cover



1 - Roller bearing

- ❑ For input shaft
- ❑ Do not interchange with roller bearing for output shaft
- ❑ Pulling out ⇒ page 128
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards ⇒ page 129
- ❑ Pressing in on gearboxes manufactured up to 20 08 6: ⇒ page 129
- ❑ Pressing in on gearboxes manufactured from 21 08 6 onwards: ⇒ page 129
- ❑ Securing ⇒ page 130

2 - Roller bearing

- ❑ For output shaft
- ❑ Do not interchange with roller bearing for input shaft
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards ⇒ page 129
- ❑ Pulling out ⇒ page 129
- ❑ Pressing in on gearboxes manufactured up to 20 08 6: ⇒ page 129
- ❑ Pressing in on gearboxes manufactured from 21 08 6 onwards: ⇒ page 129
- ❑ Securing ⇒ page 130

3 - Gearbox housing cover

- ❑ Modified according to roller bearings on gearboxes manufactured from 21 08 6 onwards ⇒ page 129

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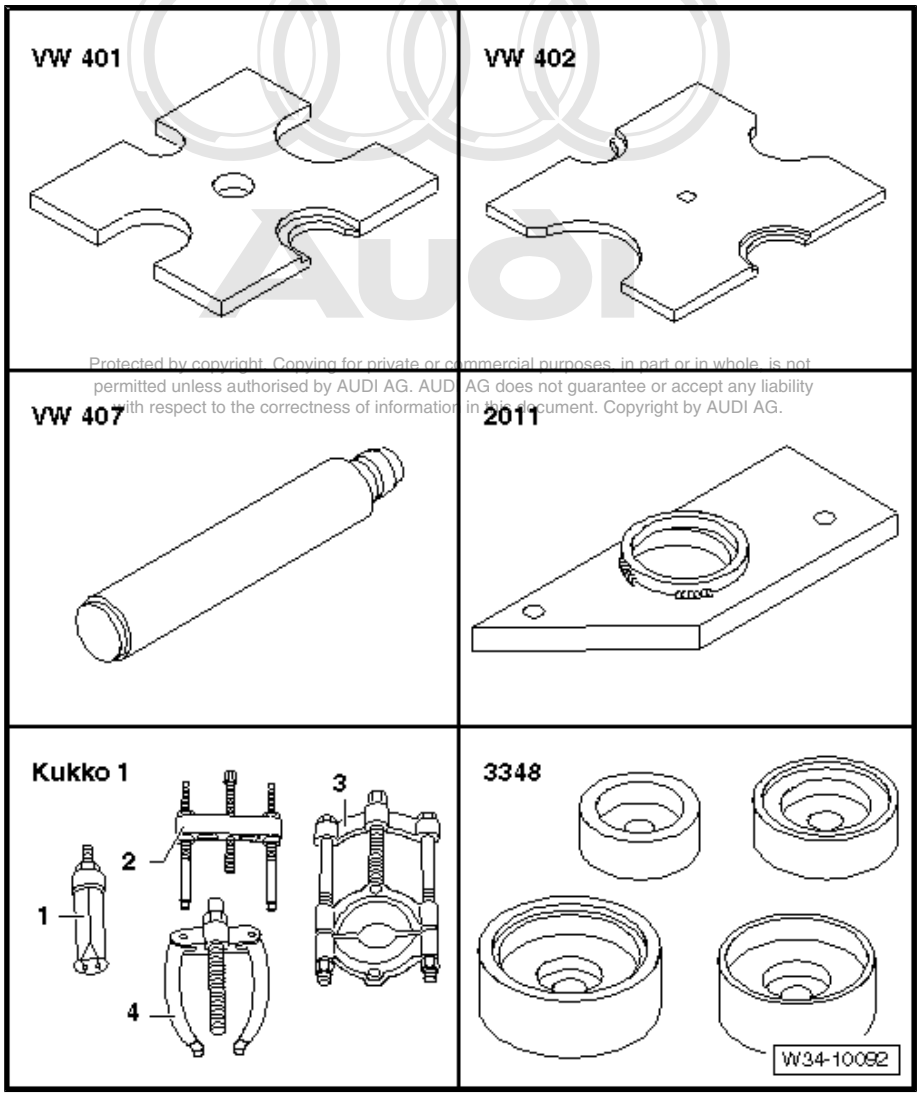
7.1 Servicing gearbox housing cover

Special tools and workshop equipment required

- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Support bridge -2011-
- Internal puller -1 - Kukko 21/5-
- Counter-support -4 - Kukko 22/1-
- In addition for gearboxes manufactured from 21 08 6 onwards: assembly tool -3348/2-



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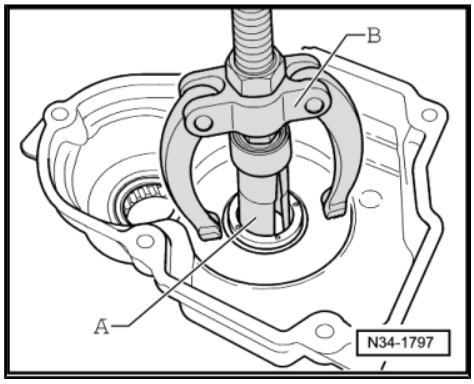
Pulling roller bearing out of gearbox housing cover

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

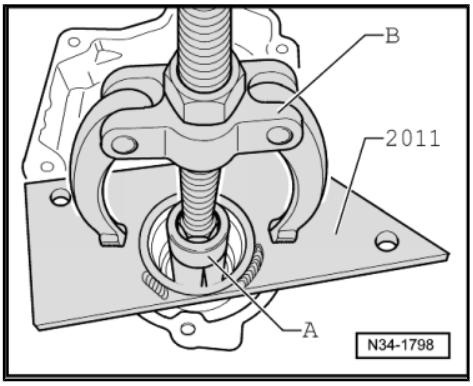
B - Counter-support , e.g. -Kukko 22/1-



Pulling roller bearing out of gearbox housing cover

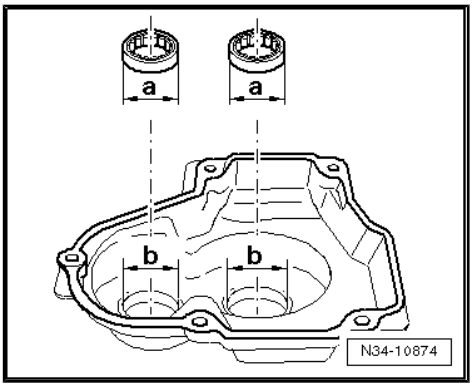
A - Internal puller 30 ... 37 mm , e.g. -Kukko 21/5-

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



Allocation of roller bearings

Gearbox manufacturing date	Dimension “a” (mm)	Dimension “b” (mm)
Up to 20 08 6	43	43
From 21 08 6 onwards	47	47



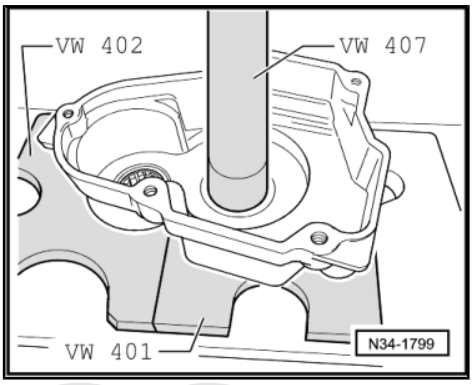
Pressing roller bearings into gearbox housing cover on gearboxes manufactured up to 20 08 6

– Heat area round bearing seats in gearbox housing cover to approx. 100°C using hot air blower -V.A.G 1416- .

– Insert roller bearing after heating housing and push into position under workshop press until heat exchange has taken place.

Note

Roller bearings must be pressed fully home into cover.



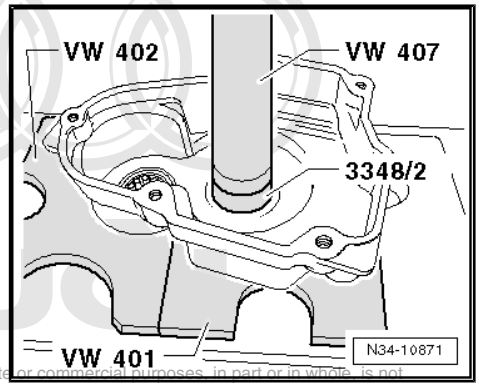
Pressing roller bearings into gearbox housing cover on gearboxes manufactured from 21 08 6 onwards

– Heat area round bearing seats in gearbox housing cover to approx. 100°C using hot air blower -V.A.G 1416- .

– Insert roller bearing after heating housing and push into position under workshop press until heat exchange has taken place.

Note

Roller bearings must be pressed fully home into cover.



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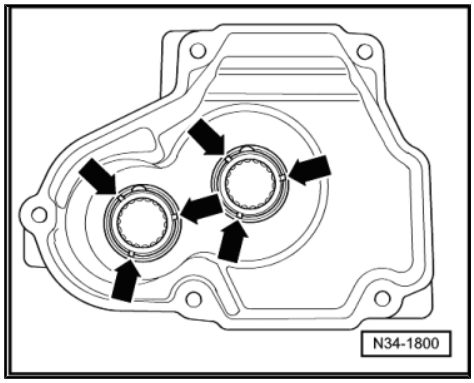
Secure roller bearings in gearbox housing cover by peening -arrows-.



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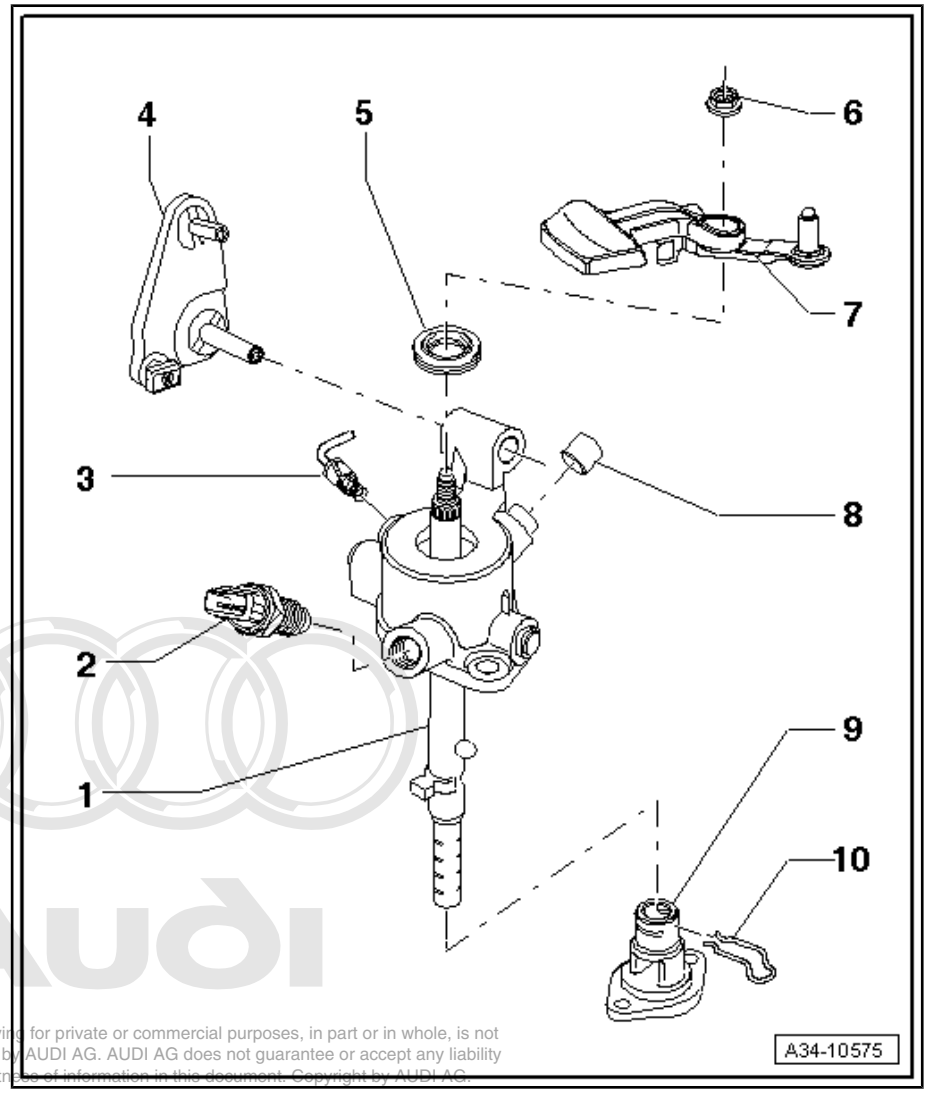
8 Exploded view - servicing selector unit



1 - Selector shaft with selector mechanism cover

- ❑ Dismantling and assembling ⇒ page 132

2 - Reversing light switch -F4-

- ❑ 20 Nm
- ❑ Lightly coat lug with MoS_2 grease

3 - Locking pin

- ❑ For adjusting selector mechanism
- ❑ Removing ⇒ page 132
- ❑ Pressing in ⇒ page 133

4 - Relay lever

- ❑ Installation position ⇒ page 64
- ❑ Removing and installing ⇒ page 65

5 - Oil seal

- ❑ Lever out using extractor tool -T20143/1-
- ❑ Installing ⇒ page 133

6 - Nut

- ❑ Tightening torque ⇒ Item 16 (page 63)
- ❑ Self-locking
- ❑ Always renew

7 - Gearbox selector lever

- ❑ Install so that gap in splines aligns with selector shaft ⇒ page 133
- ❑ Can be renewed with selector mechanism installed
- ❑ Installation position ⇒ page 64

8 - Cap

- ❑ For gearbox breather

9 - Cover plate

10 - Spring

- ❑ Not fitted on all versions

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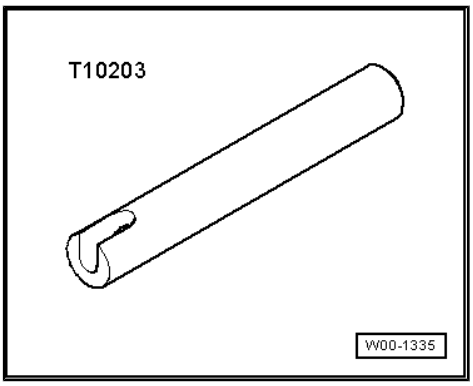
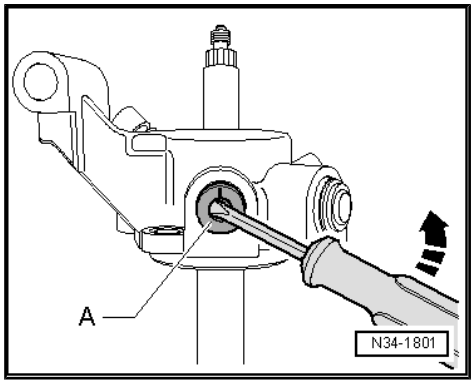
8.1 Dismantling and assembling selector unit

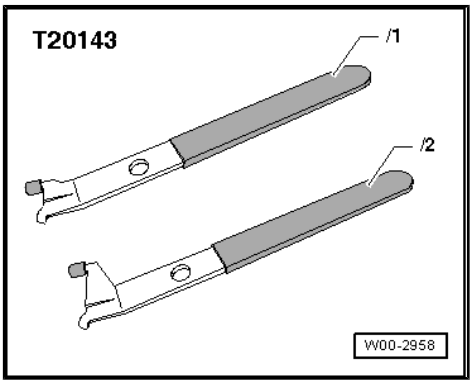
Special tools and workshop equipment required

- -T10203- Tube

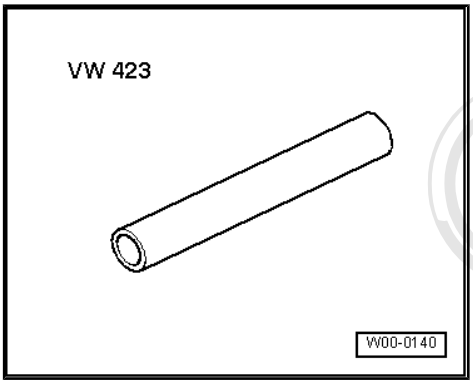




- Extractor tool - T20143/1-



- -VW 423- Tube



Removing locking pin -A- from selector mechanism cover

– Remove outer part of locking pin.

– Then lever out locking pin carefully using a screwdriver.

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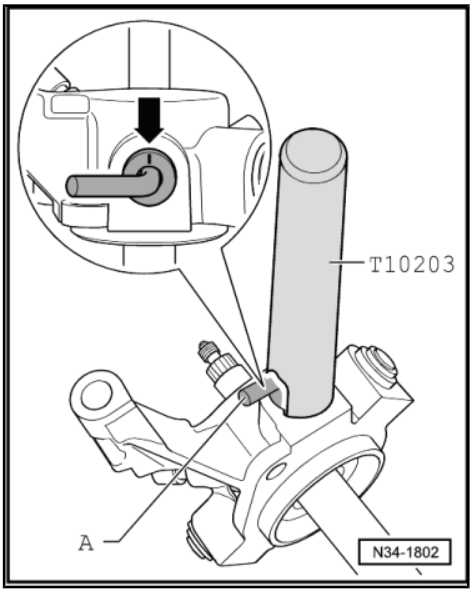
Pressing locking pin -A- into selector mechanism cover

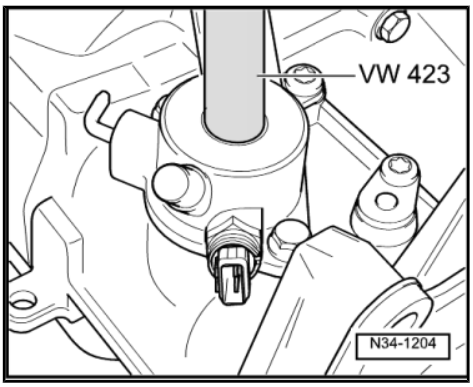
Installation position:

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



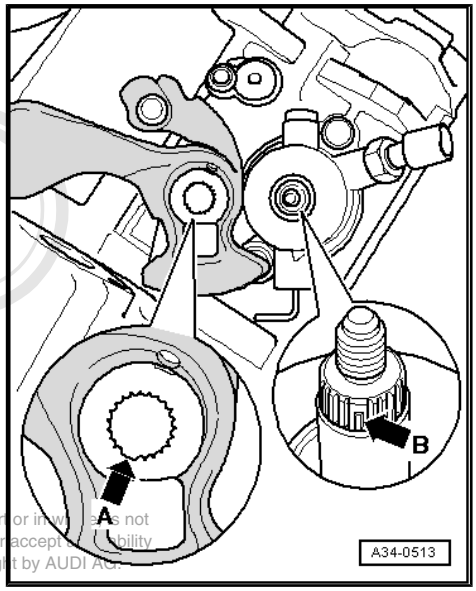
Installing oil seal (insert onto stop)

– Lever out using extractor tool -T20143/1-



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.



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9 Exploded view - selector forks

Note

The selector fork cluster (⇒ Item 7 (page 134)) does not have to be dismantled in order to remove and install detent segments, lock washers and angular contact ball bearings.

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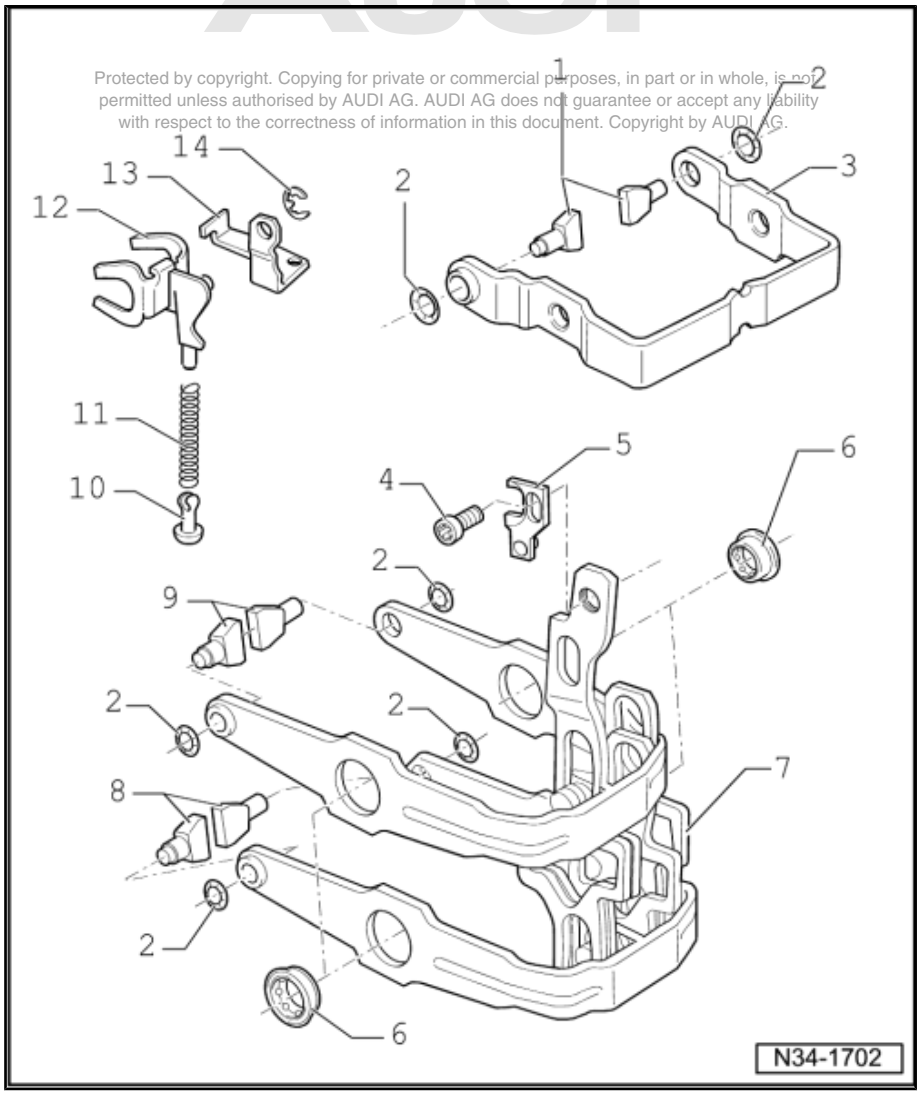


1 - 5th/6th gear detent segment

- ❑ Identification ⇒ page 136
- ❑ Detent segment should turn freely after lock washer is installed

2 - Lock washer

- ❑ Always renew
- ❑ Removing ⇒ page 137
- ❑ Installing ⇒ page 137

3 - 5th/6th gear selector fork

- ❑ Adjusting ⇒ page 119

4 - Bolt

- ❑ 25 Nm

5 - 5th/6th gear selector jaw

6 - Angular contact ball bearing

- ❑ 4x
- ❑ Removing ⇒ page 137
- ❑ Pressing inner race into outer race ⇒ page 137
- ❑ Installing ⇒ page 138

7 - Selector fork cluster with selector plates

8 - 1st/2nd gear detent segment

- ❑ Identification ⇒ page 136
- ❑ The segment must rotate freely after installing the lock washer.

9 - 3rd/4th gear detent segment

- ❑ Identification ⇒ page 136
- ❑ The segment must rotate freely after installing the lock washer.

10 - Sliding piece

11 - Spring

12 - Reverse gear selector fork

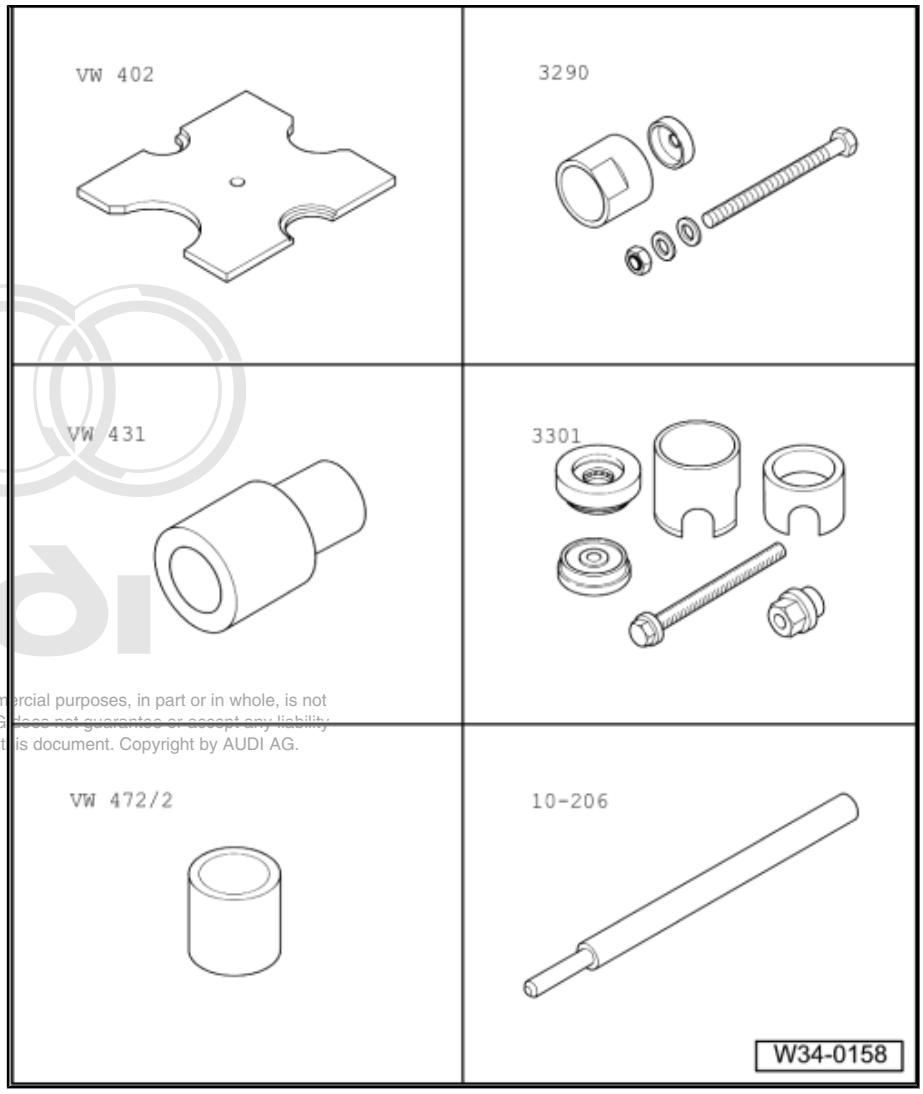
13 - Support for reverse gear selector fork

14 - Circlip

9.1 Dismantling and assembling selector forks

Special tools and workshop equipment required

- Thrust plate -VW 402-
- Assembly tool -3290/1-
- Assembly tool -3301-
- Press tool -VW 431-
- Spacer sleeve -VW 472/2-
- Assembly mandrel -10 - 206-



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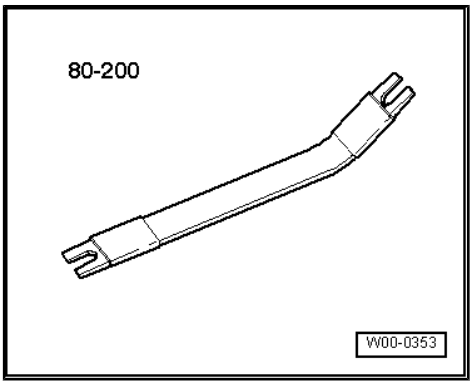
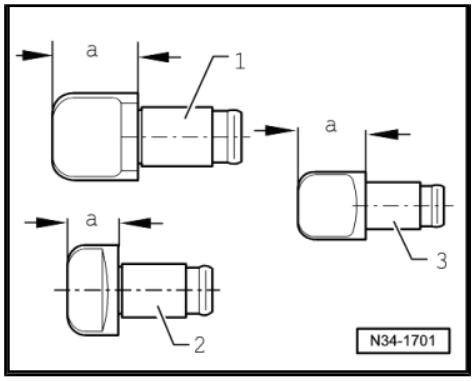
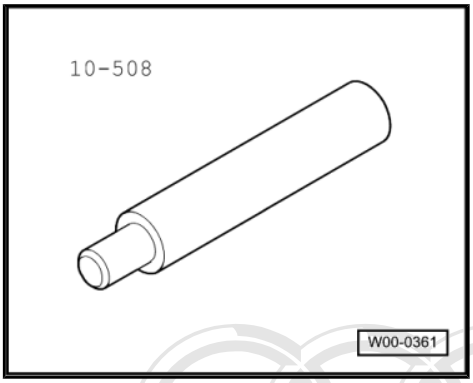
- Removal lever -80–200-

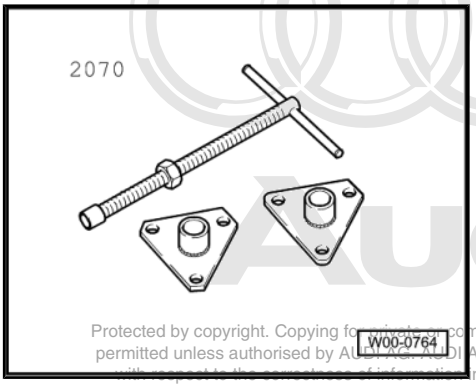




- Assembly mandrel -10 - 508-



- Tensioning device -2070-



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Identification of detent segments

Distance -a-

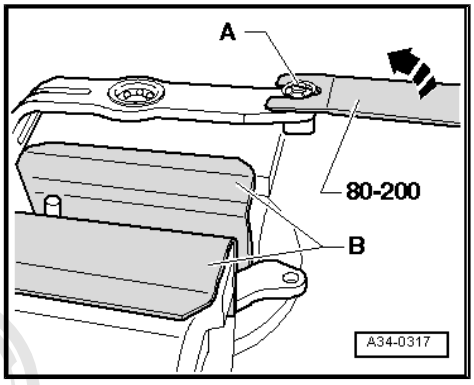
1 - Detent segments, 1st/ 2nd gear = 11.4 mm

2 - Detent segments, 3rd/4th gear = 7.7 mm

3 - 5th/6th gear detent segments = 12.1 mm

Removing lock washer

– Secure selector fork in vice with soft jaws -B-.
– Lever off lock washer -A- in direction of arrow.



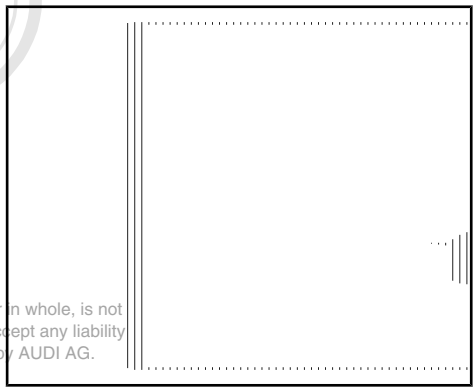
Installing lock washer

– Push lock washer into groove in detent segment using socket driver.

Note

Detent segment should turn freely after lock washer is installed.

-A-- Socket driver, 10 mm
-B-- Protective jaw covers



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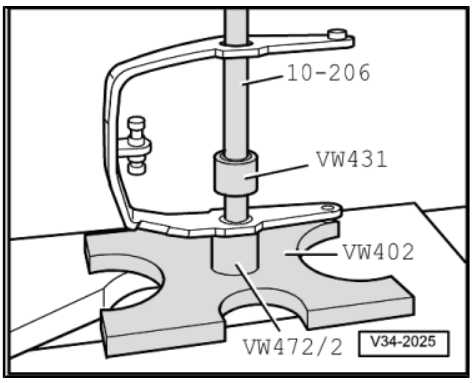
Removing angular contact ball bearing

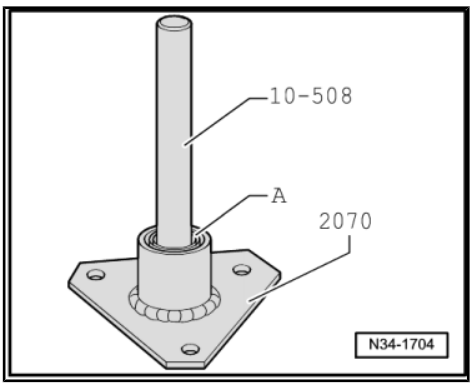
Note

Do not bend selector forks when removing and installing the ball bearing.



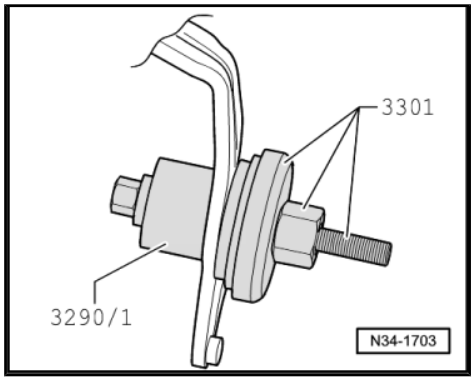
Pressing inner race -A- of angular contact ball bearing into outer race

Inner race must engage positively in outer race.



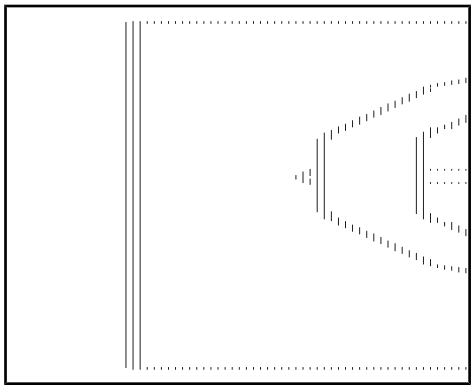
Pulling angular contact ball bearing into selector fork (insert onto stop)

Recess in thrust piece -3290/1- points towards ball bearing.



Selector forks with detent segments installed

	Dimension -a- (mm)
1st/2nd gear selector fork	87.2 ... 87.4
3rd/4th gear selector fork	93.6 ... 93.8



For identification of detent segments ⇒ page 136

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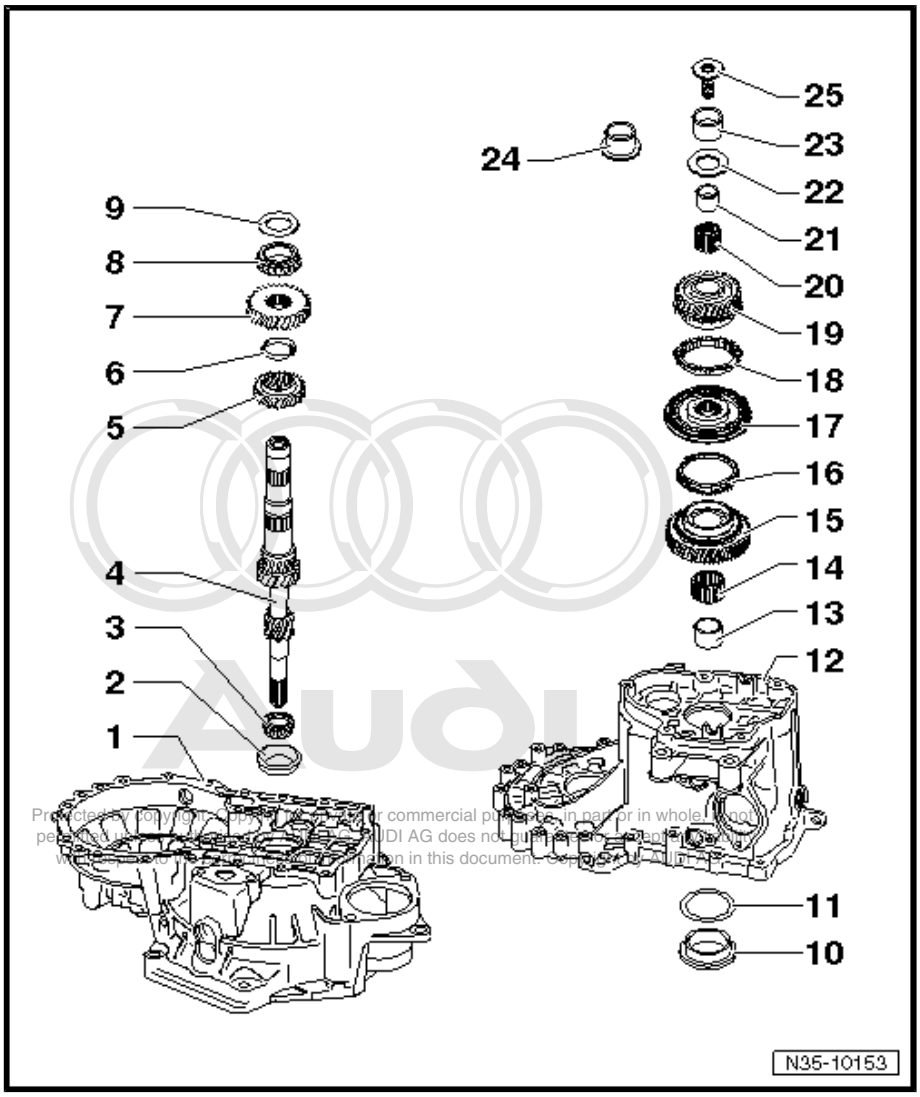
35 – Gears, shafts

1 Exploded view - input shaft



1 - Clutch housing

2 - Tapered roller bearing outer race

- ❑ Pressing out ⇒ page 142
- ❑ Pressing in ⇒ page 143

3 - Tapered roller bearing inner race

- ❑ Pressing off ⇒ page 143
- ❑ Pressing on ⇒ page 143

4 - Input shaft

- ❑ Adjusting ⇒ page 147

5 - 3rd gear wheel

- ❑ Installation position: Collar faces 4th gear
- ❑ Pressing off ⇒ page 144
- ❑ Pressing on ⇒ page 144

6 - Circlip

- ❑ Always renew

7 - 4th gear wheel

- ❑ Pressing off with tapered roller bearing outer race and sleeve ⇒ page 143
- ❑ Pressing on ⇒ page 144
- ❑ Installation position: Collar faces 3rd gear

8 - Tapered roller bearing inner race

- ❑ Pressing off with 4th gear wheel and sleeve ⇒ page 143
- ❑ Pressing on ⇒ page 144

9 - Thrust washer

10 - Tapered roller bearing outer race

- ❑ Pressing out ⇒ page 145
- ❑ Pressing in ⇒ page 145

11 - Shim

- ❑ Determining thickness ⇒ page 147

12 - Gearbox housing

13 - Sleeve

- ❑ For needle bearing
- ❑ Press off with 4th gear wheel and tapered roller bearing inner race ⇒ page 143

- ❑ Pressing on ⇒ page 145
- ❑ Fit thrust washer ⇒ Item 9 (page 139) before installing

14 - Needle bearing

15 - 5th speed selector gear

16 - 5th gear synchro-ring

- ❑ With cast locking pieces ⇒ page 116
- ❑ Checking for wear ⇒ page 115

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

- ❑ Removing and installing ⇒ page 104
- ❑ Dismantling and assembling ⇒ page 146 and ⇒ page 146
- ❑ Locking collar modified on gearboxes manufactured from 12 06 6 onwards ⇒ page 145
- ❑ Adjusting on gearboxes manufactured up to 11 06 6 ⇒ page 118
- ❑ Adjusting on gearboxes manufactured from 12 06 6 onwards ⇒ page 119
- ❑ Installing offset springs for locking pieces ⇒ page 146

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18 - 6th gear synchro-ring

- ❑ With cast locking pieces ⇒ page 116
- ❑ Checking for wear ⇒ page 115

19 - 6th speed selector gear

- ❑ Modified according to sleeve and needle bearing on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

20 - Needle bearing

- ❑ For 6th gear
- ❑ Renew together with sleeve
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

21 - Sleeve

- ❑ For 6th gear needle bearing
- ❑ Renew together with needle bearing
- ❑ Larger diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Select correct components from ⇒ Electronic parts catalogue

22 - Thrust washer

- ❑ On gearboxes manufactured up to 20 08 6

23 - Roller bearing inner race

- ❑ For input shaft
- ❑ Mark before removing
- ❑ Do not interchange with roller bearing inner race for output shaft

24 - Roller bearing inner race with thrust washer

- ❑ Allocation ⇒ page 102
- ❑ For input shaft
- ❑ On gearboxes manufactured from 21 08 6 onwards

25 - Bolt

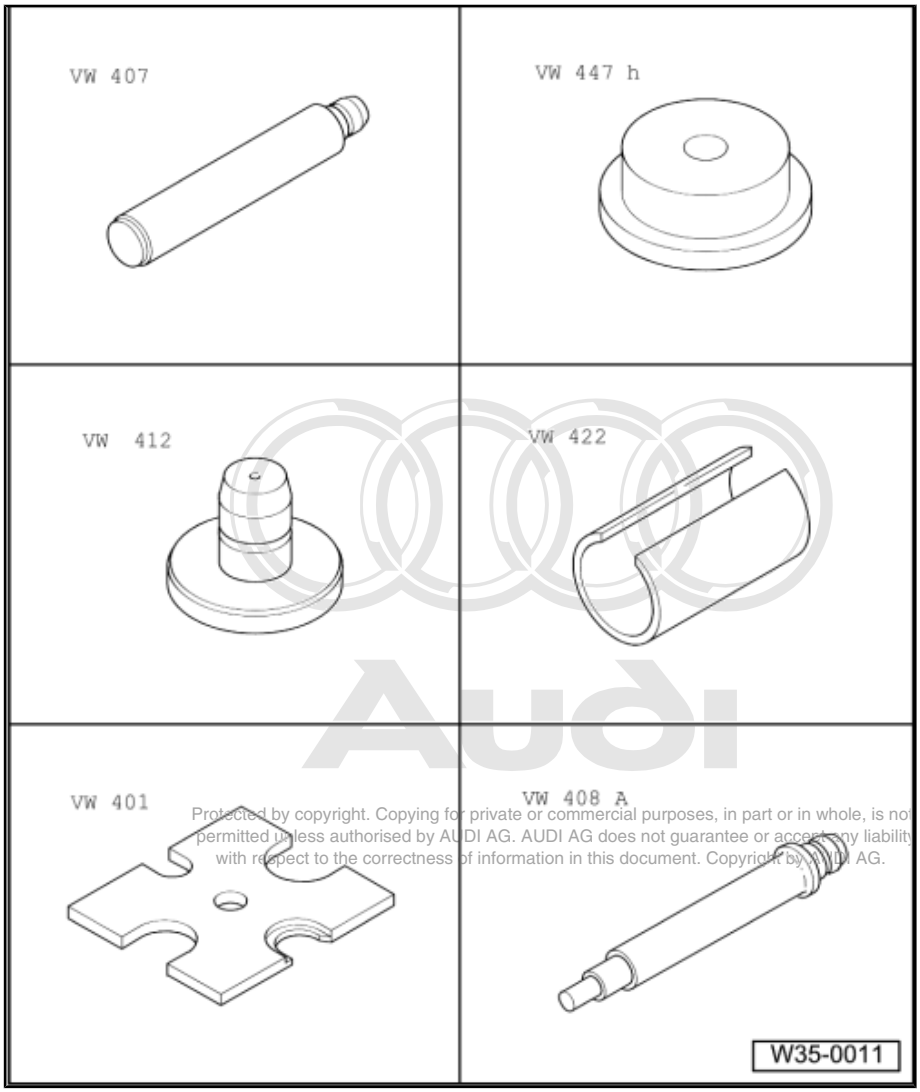
- ❑ Tightening torque ⇒ Item 9 (page 101)
- ❑ For input shaft
- ❑ Allocation of bolts ⇒ page 102
- ❑ Self-locking
- ❑ Always renew

❑ Use thread tap to remove any remaining locking fluid from threaded holes for bolts securing 5th/6th gear synchronising hub and 6th gear wheel. Otherwise there is a risk that the bolts will shear off

1.1 Dismantling and assembling input shaft

Special tools and workshop equipment required

- Press tool -VW 407-
- Thrust plate -VW 447 H-
- Press tool -VW 412-
- Tube -VW 422-
- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 408 A-



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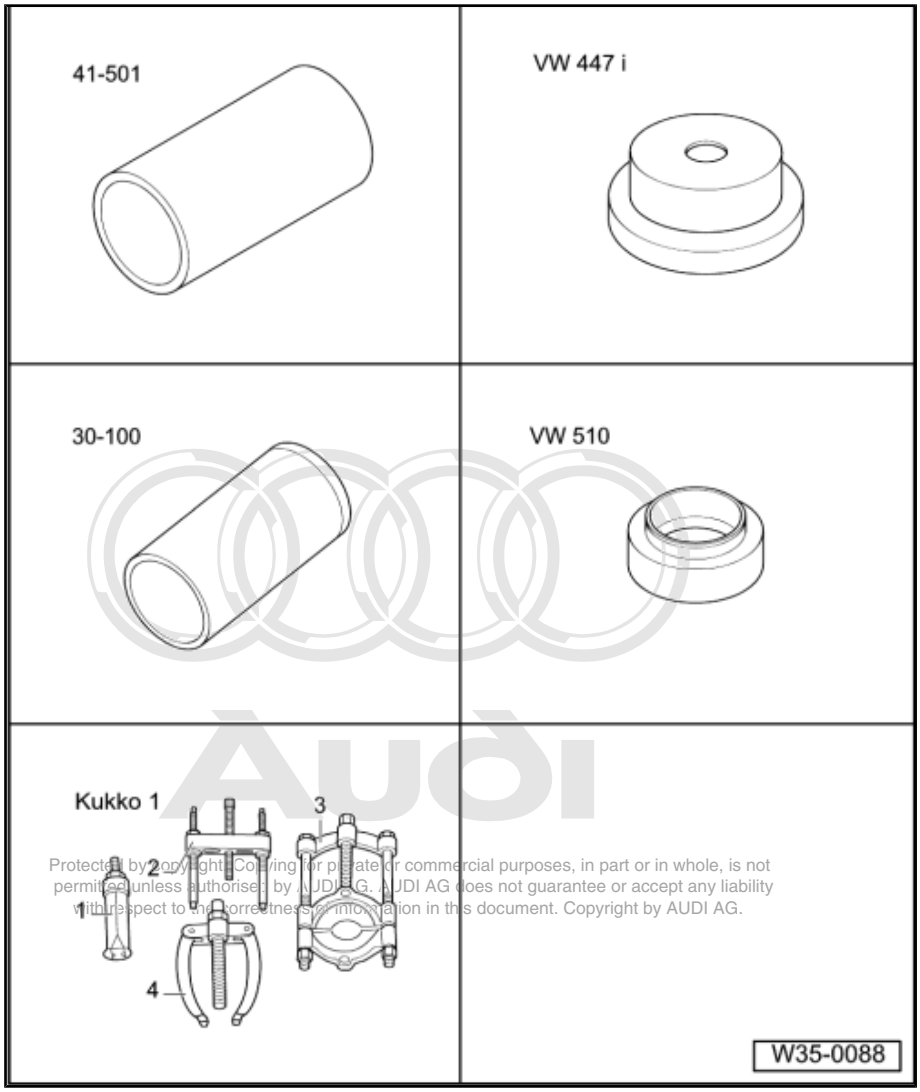
- Drift sleeve -41 - 501-
- Thrust plate -VW 447 i-
- Drift sleeve -30 - 100-
- Thrust pad -VW 510-
- Splitter -3 - Kukko 17/1-



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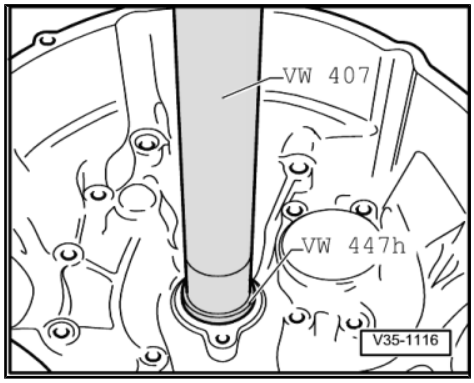
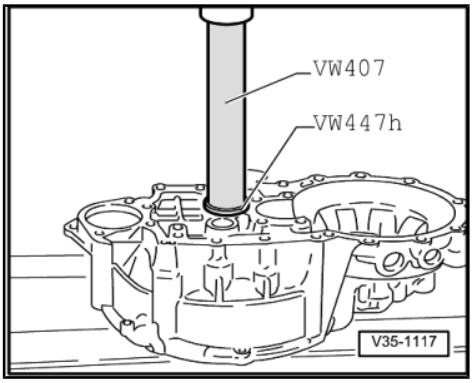
Note

- *Refer to ⇒ Electronics parts catalogue and technical data ⇒ page 1 when installing new gears.*
- *The input shaft must be re-adjusted if the position of tapered roller bearings is affected when renewing parts. Refer to table of adjustments ⇒ page 187*



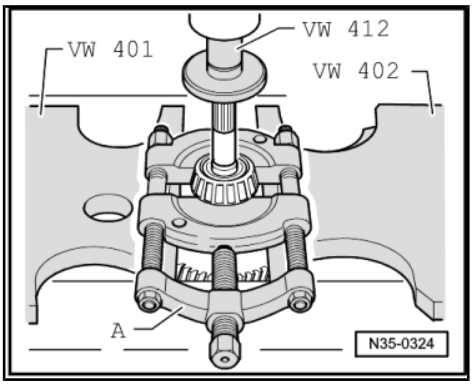
Pressing out tapered roller bearing outer race

Pressing in tapered roller bearing outer race

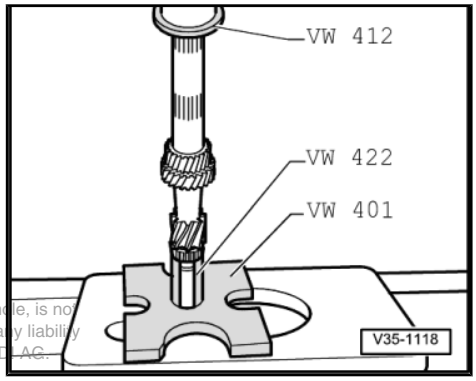


Pressing off tapered roller bearing inner race

A - Splitter -Kukko 17/1-



Pressing on tapered roller bearing inner race



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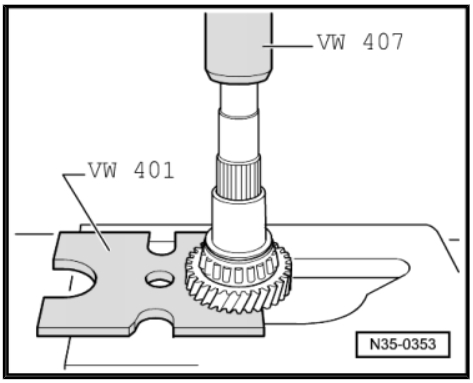
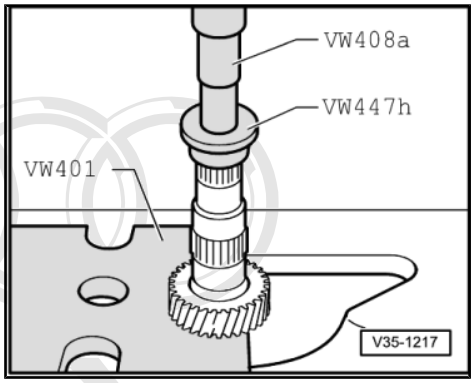
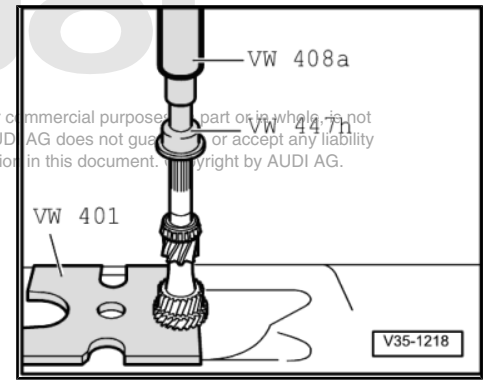
Pressing off 4th gear wheel with tapered roller bearing and sleeve



Pressing off 3rd gear wheel



Pressing on 3rd gear wheel



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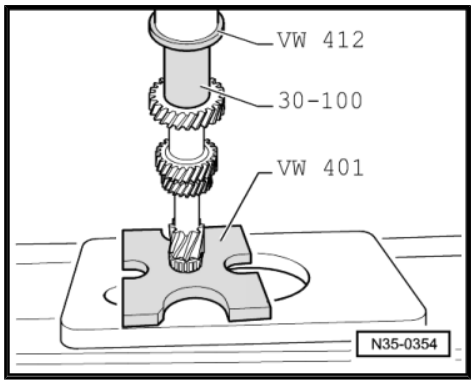
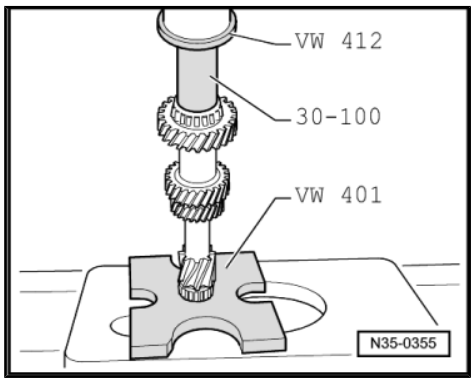
Pressing on 4th gear wheel

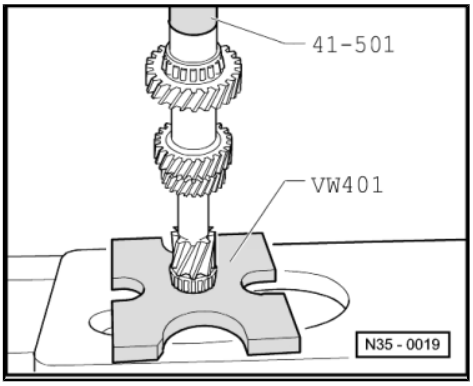
Shoulder faces towards 3rd gear.



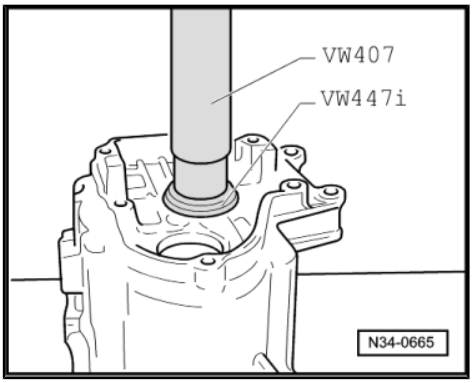
Pressing on tapered roller bearing inner race



Pressing on sleeve for needle bearing

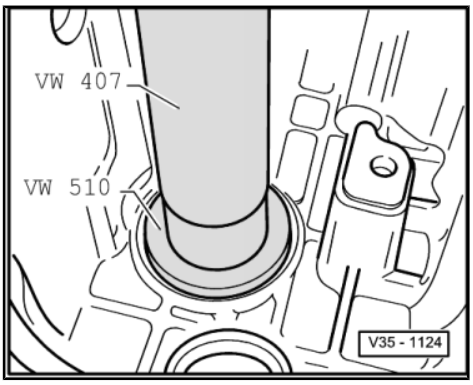


Pressing out tapered roller bearing outer race



Pressing in tapered roller bearing outer race

– Install with shim after adjusting input shaft.



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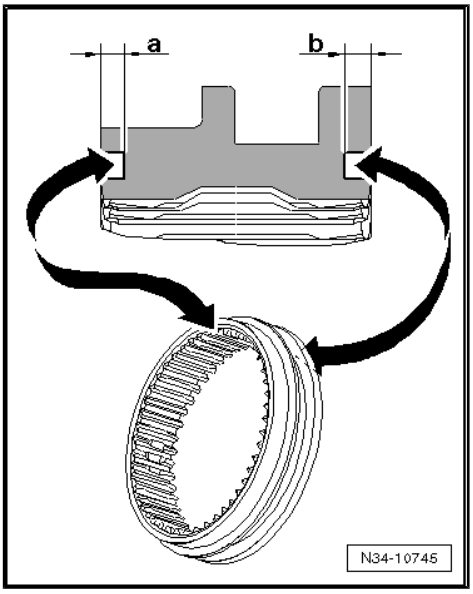
On gearboxes manufactured from 12 06 6 onwards, deeper recesses in 5th/6th gear locking collars on both sides -arrows-.



Dimension -a- (side of 6th gear)	On gearboxes manufactured up to 11 06 6	On gearboxes manufactured from 12 06 6 onwards
	1.5 mm	1.8 mm

Dimension -b- (side of 5th gear)	On gearboxes manufactured up to 11 06 6	On gearboxes manufactured from 12 06 6 onwards
	1.5 mm	2.0 mm

– Refer to ⇒ Electronic parts catalogue to allocate locking collars and 5th/6th gear synchronising hub.

Modified adjustment procedure on 5th/6th gears due to the deeper recesses:

– Adjusting 5th/6th gear on gearboxes manufactured up to 11 06 6 ⇒ page 118

– Adjusting 5th/6th gear on gearboxes manufactured from 12 06 6 onwards ⇒ page 119

Dismantling and assembling 5th/6th gear locking collar and synchronising hub

1 - Spring

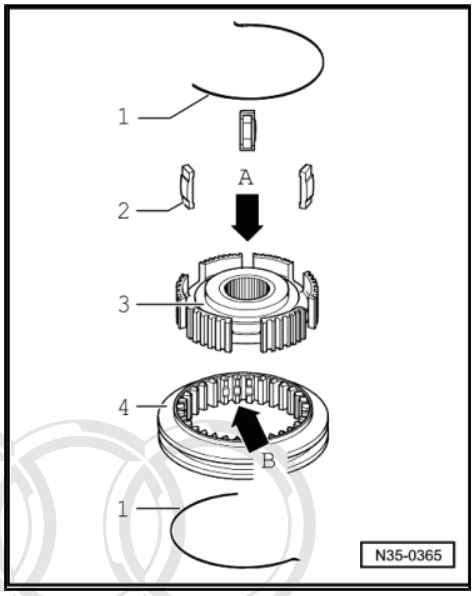
2 - Locking piece

3 - Synchronising hub

4 - Locking collar

– Push locking collar over synchronising hub.

The deeper recesses -arrow A- for the locking pieces in the synchronising hub must align with the recesses -arrow B- in the locking collar.



Assembling 5th/6th gear locking collar/synchronising hub

- Locking collar is pushed over synchronising hub.

– Insert locking pieces in the deeper recesses -arrows- and install springs 120° off-set. Angled end of spring must locate in hollow locking piece.

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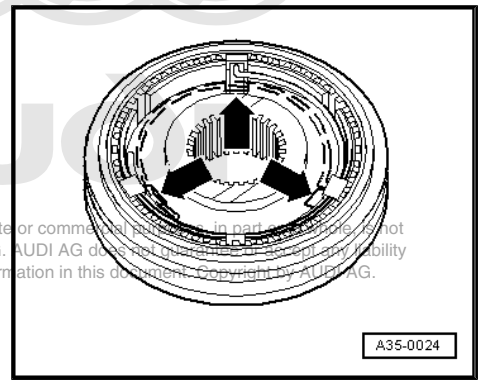
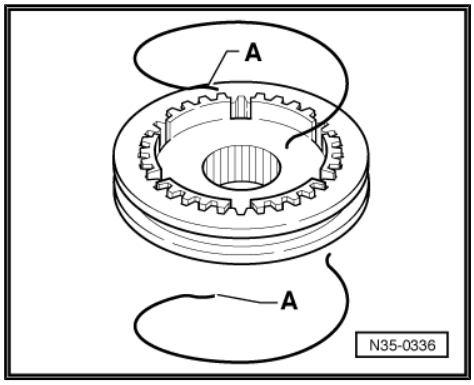


Springs with ends -A- angled upwards are fitted on some gearbox versions.

The modified springs are fitted on both sides.

– On gearboxes of the earlier type, the modified springs can only be installed in combination with hollow locking pieces.

– Fit locking pieces.



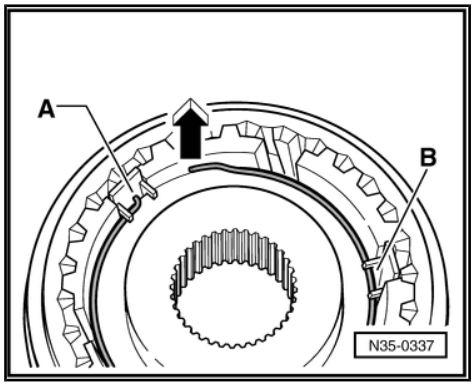
Installation position of springs:

– Insert springs offset by 120°.

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

Spring must be fitted under lug -B- of locking pieces.

The offset end must always point away from synchronising hub (in direction of -arrow-).

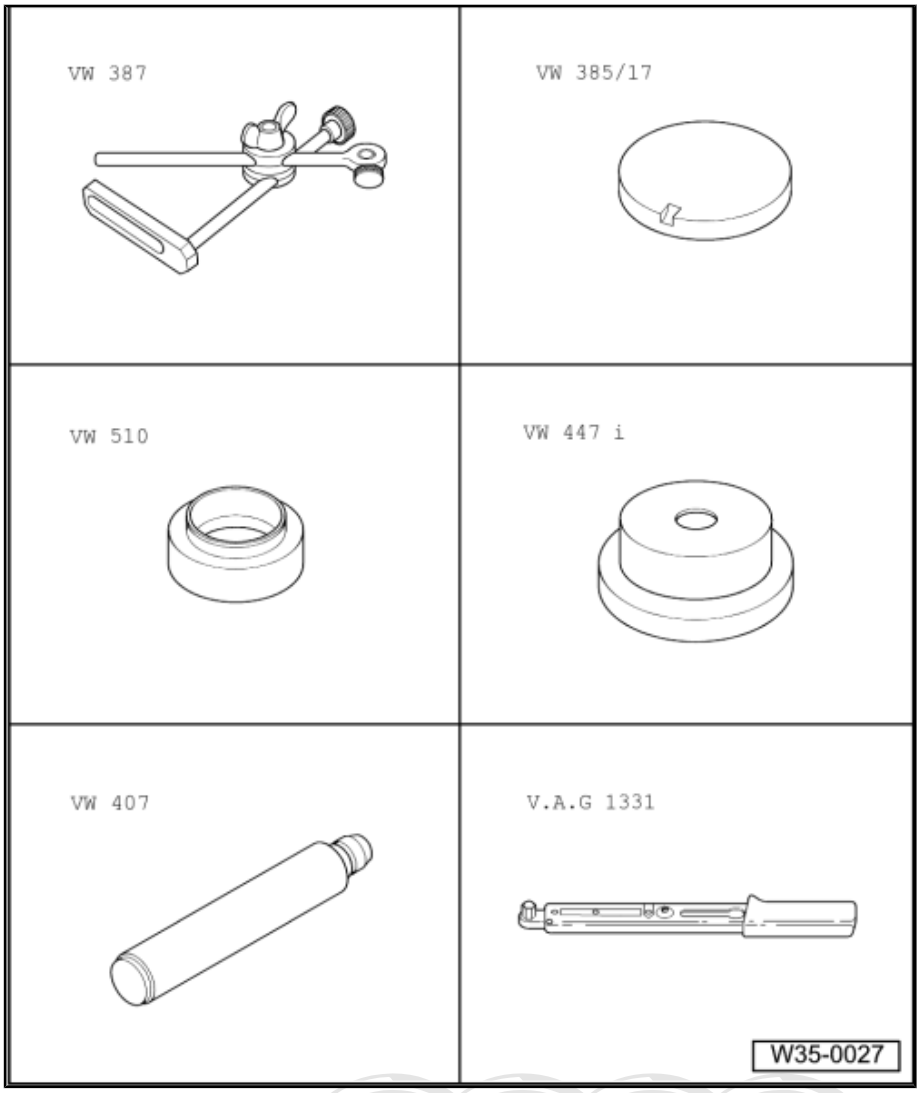


2 Adjusting input shaft

(Determining thickness of shim for input shaft)

Special tools and workshop equipment required

- Universal dial gauge bracket -VW 387-
- End measuring plate -VW 385/17-
- Thrust pad -VW 510-
- Thrust plate -VW 447 i-
- Press tool -VW 407-
- Torque wrench -V.A.G 1331-
- Dial gauge



Procedure

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

- Gearbox housing
- Clutch housing
- Input shaft
- 4th gear wheel

or the

- Tapered roller bearings

Table of adjustments ⇒ page 187

Requirement:

- Sealing surfaces of clutch and gearbox housings must be free of sealant.

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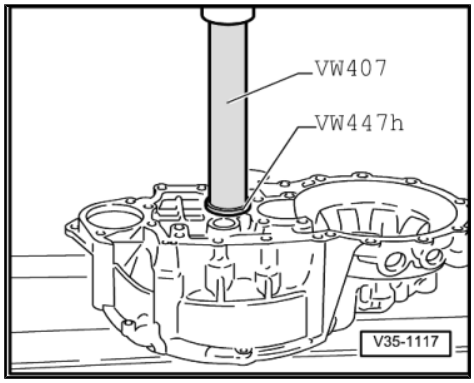
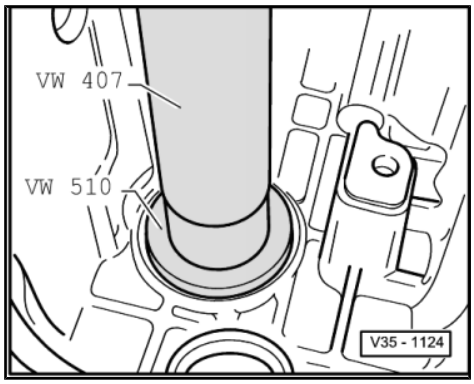
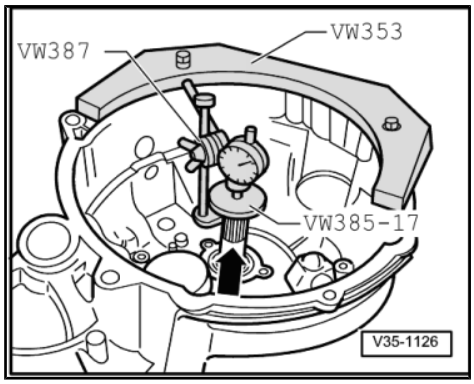
– Press tapered roller bearing outer race without shim onto stop in clutch housing.



– Press tapered roller bearing outer race without shim onto stop in gearbox housing.
– Install input shaft in clutch housing and put on gearbox housing. Tighten hexagon bolts to 25 Nm, then turn 90° further.



– Fit measuring appliance and dial gauge in clutch housing (large tapered roller bearing in gearbox housing).
– Before measurement, rotate input shaft to allow tapered roller bearings to settle. Set dial gauge to “0” with 1 mm preload.



Note

This procedure must be repeated for each subsequent measurement, as otherwise the dial gauge will not return to its original setting.

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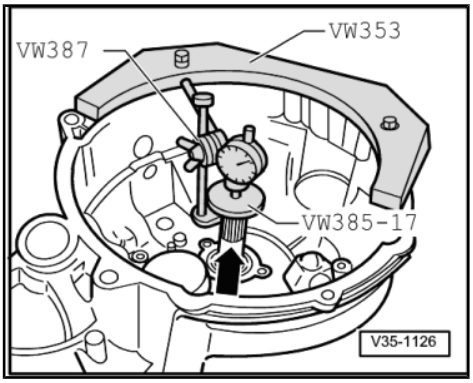
– Push input shaft towards dial gauge in direction of -arrow-.
– Read off and note play indicated on dial gauge (in this example: 1.21 mm).



Note

Dial gauge does not return to original setting by itself.

– Select shim of required thickness according to table ⇒ page 149 (in this example: 1.175 mm).
– Remove input shaft and press tapered roller bearing outer race out of gearbox housing using VW 447i.
– Press tapered roller bearing outer race together with the 1.175 mm shim into gearbox housing using -VW 510- .
– Assemble gearbox housing and tighten hexagon bolts to 25 Nm and then turn 90° further.

Table of shims

Note

Select correct shims from ⇒ Electronic parts catalogue .

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Bearing clearance	Shim
Measured value (mm)	**Thickness (mm)**
0.671…0.699	0.650
0.700…0.724	0.675
0.725…0.749	0.700
0.750…0.774	0.725
0.775…0.799	0.750
0.800…0.824	0.775
0.825…0.849	0.800
0.850…0.874	0.825
0.875…0.899	0.850
0.900…0.924	0.875
0.925…0.949	0.900
0.950…0.974	0.925
0.975…0.999	0.950
1.000…1.024	0.975
1.025…1.049	1.000
1.050…1.074	1.025
1.075…1.099	1.050
1.100…1.124	1.075
1.125…1.149	1.100
1.150…1.174	1.125
1.175…1.199	1.150
1.200…1.224	1.175
1.225…1.249	1.200
1.250…1.274	1.225
1.275…1.229	1.250
1.300…1.324	1.275
1.325…1.349	1.300
1.350…1.374	1.325
1.375…1.399	1.350
1.400…1.424	1.375
1.425…1.449	1.400
1.450…1.474	1.425
1.475…1.499	1.450
1500…1.524	1.475
1.525…1.549	1.500
1.550…1.574	1.525
1.575…1.599	1.550
1.600…1.624	1.575
1.625…1.649	1.600
1.650…1.674	1.625
1.675…1.699	1.650
1.700…1.724	1.675

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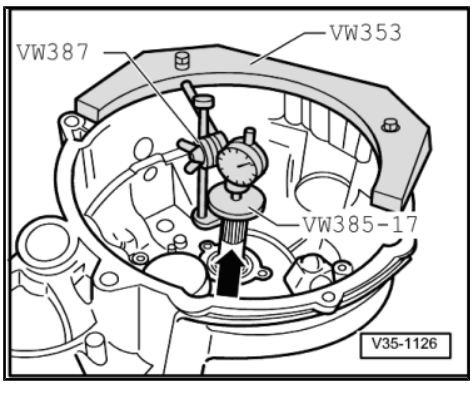
Checking adjustment

- Install measuring appliance and dial gauge.
- Rotate input shaft to allow tapered roller bearings to settle.
- Press input shaft in direction of -arrow-.
- Bearing clearance should be min. 0.01 ... max. 0.09 mm.



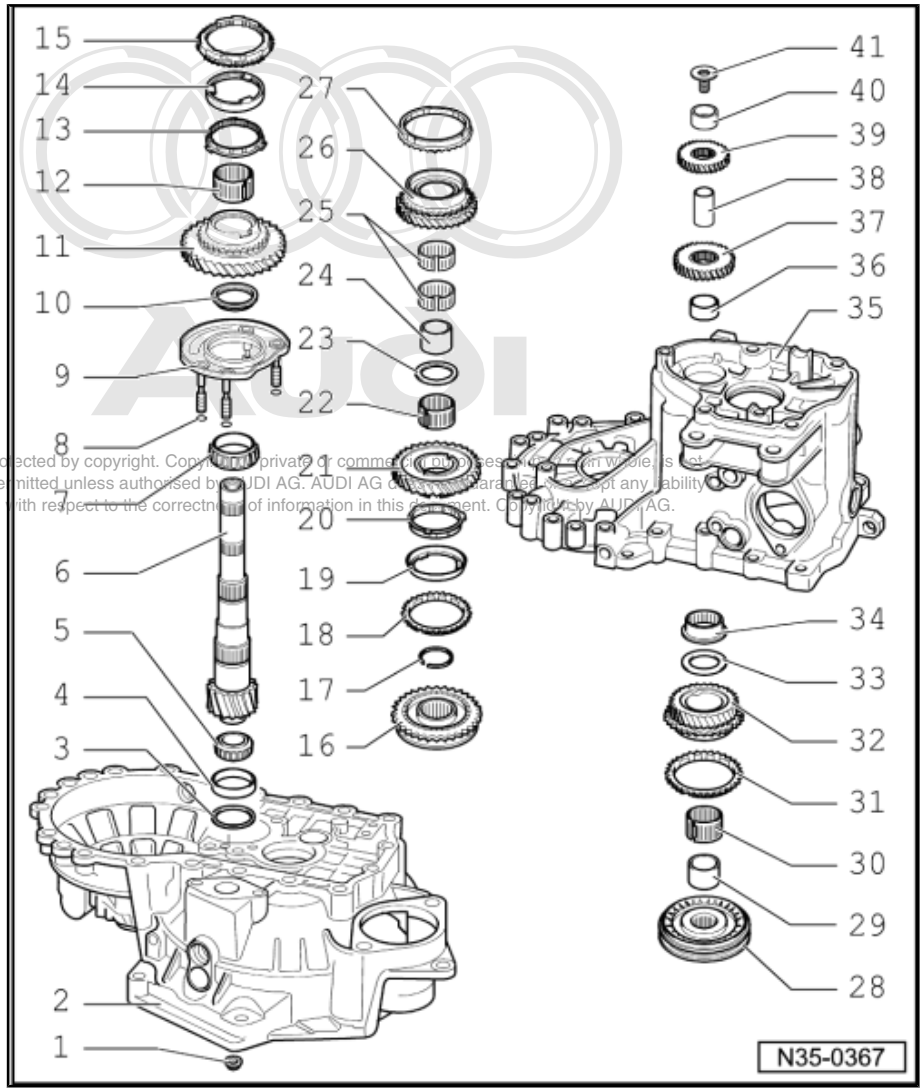
Note

If the bearing clearance cannot be measured, but input shaft play is perceptible and the input shaft turns freely, the adjustment is acceptable.

3 Exploded view - output shaft

Note

- *The output shaft is dismantled as follows:- Position splitter under 2nd speed selector gear (⇒ Item 21 (page 152)) and press off as described in ⇒ page 158 . Remove circlip ⇒ Item 17 (page 152) . Then press off locking collar and synchronising hub for 1st and 2nd gear as shown in ⇒ page 158 .*
- *Refer to ⇒ Electronics parts catalogue and technical data ⇒ page 1 when installing new gears or a new output shaft.*
- *Always renew both tapered roller bearings together.*



1 - Nut

- ❑ 25 Nm + 90°
- ❑ 4 nuts for bearing mounting
- ❑ Always renew

2 - Clutch housing

3 - Shim

- ❑ For output shaft
- ❑ Table of adjustments ⇒ page 187

4 - Small tapered roller bearing outer race

- ❑ Removing ⇒ page 157
- ❑ Pressing in ⇒ page 157

5 - Small tapered roller bearing inner race

- ❑ Pulling off ⇒ page 157
- ❑ Pressing on ⇒ page 158

6 - Output shaft

- ❑ Adjusting ⇒ page 165

7 - Large tapered roller bearing inner race

- ❑ Pulling off ⇒ page 158
- ❑ Pressing on ⇒ page 159

8 - Seal

- ❑ Place seals (4x) on bolts for bearing mounting

9 - Bearing mounting

- ❑ With large tapered roller bearing outer race and bolts
- ❑ Only renew outer race together with large tapered roller bearing and bearing mounting

10 - Thrust washer

- ❑ Shoulder on thrust washer faces towards tapered roller bearing

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11 - 1st speed selector gear

12 - Needle bearing

- For 1st gear

13 - Synchro-ring

- (Inner ring for 1st gear)
- Installation position ⇒ page 159
- Checking for wear ⇒ page 159
- Check lugs for scoring

14 - Outer ring for 1st gear

- Installation position ⇒ page 159
- Checking for wear ⇒ page 159
- Renew if scored or if there are visible traces of wear

15 - 1st gear synchro-ring

- Installation position ⇒ page 159
- Checking for wear ⇒ page 159

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

- Press off together with bearing mounting ⇒ Item 17 (page 152) after removing circlip ⇒ page 158
- Dismantling ⇒ page 160
- Assembling locking collar/synchronising hub ⇒ page 160 , ⇒ page 160 and ⇒ page 160
- Installation position ⇒ page 161
- Pressing on ⇒ page 161

17 - Circlip

18 - 2nd gear synchro-ring

- Checking for wear ⇒ page 159
- Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ Item 16 (page 152)

19 - Outer ring for 2nd gear

- Insert in synchro-ring ⇒ Item 18 (page 152)
- Installation position ⇒ page 161
- Renew if scored or if there are visible traces of wear

20 - Synchro-ring

- (Inner ring for 2nd gear)
- Checking for wear ⇒ page 159
- Check lugs for scoring
- Installation position ⇒ page 161

21 - 2nd speed selector gear

- Installation position ⇒ page 162

22 - Needle bearing

- For 2nd gear

23 - Thrust washer

24 - Sleeve for 3rd gear needle bearing

- Pressing off with 2nd speed selector gear ⇒ page 158
- Pressing on ⇒ page 162

25 - Needle bearing

- For 3rd gear

26 - 3rd speed selector gear

27 - 3rd gear synchro-ring

- ❑ Checking for wear ⇒ page 162

28 - Locking collar with synchronising hub for 3rd and 4th gear

- ❑ Pressing off with 2nd speed selector gear ⇒ Item 21 (page 152) and 3rd speed selector gear ⇒ Item 26 (page 152) ⇒ page 158
- ❑ Dismantling ⇒ page 162
- ❑ Assembling locking collar/synchronising hub ⇒ page 162 , ⇒ page 163 and ⇒ page 163
- ❑ Installation position: Locking collar/synchronising hub ⇒ page 163
- ❑ Pressing on ⇒ page 163

29 - Sleeve

- ❑ For needle bearing
- ❑ Pressing off with locking collar and synchronising hub for 3rd and 4th gear ⇒ Item 28 (page 153) ⇒ page 158
- ❑ Pressing on ⇒ page 164

30 - Needle bearing

- ❑ For 4th gear

31 - 4th gear synchro-ring

- ❑ Checking for wear ⇒ page 162

32 - 4th speed selector gear

33 - Thrust washer

34 - Needle bearing

- ❑ For output shaft
- ❑ Removing and installing ⇒ page 124

35 - Gearbox housing

36 - Sleeve

- ❑ For needle bearing/output shaft
- ❑ Pressing off ⇒ page 158
- ❑ Pressing on ⇒ page 164

37 - 5th gear wheel

- ❑ Removing and installing ⇒ page 104

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38 - Sleeve

39 - 6th gear wheel

- ❑ Removing and installing ⇒ page 104

40 - Roller bearing inner race

- ❑ For output shaft
- ❑ Larger outer diameter on gearboxes manufactured from 21 08 6 onwards
- ❑ Allocation ⇒ page 102
- ❑ Mark before removing
- ❑ Do not interchange with roller bearing inner race for input shaft

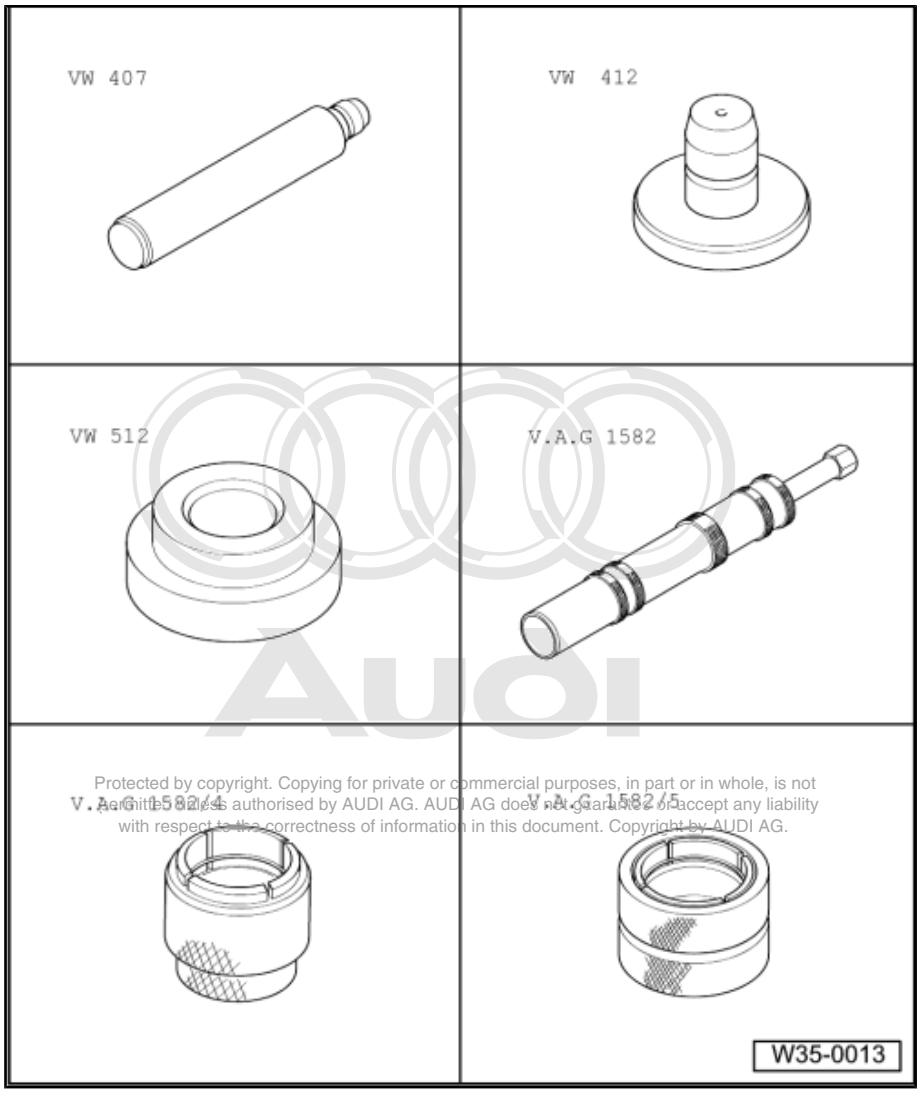
41 - Bolt

- ❑ Tightening torque ⇒ Item 6 (page 100)
- ❑ Allocation of bolts ⇒ page 102
- ❑ For output shaft
- ❑ Self-locking
- ❑ Always renew

3.1 Dismantling and assembling output shaft

Special tools and workshop equipment required

- Press tool -VW 407-
- Press tool -VW 412-
- Thrust pad -VW 512-
- Puller -V.A.G 1582-
- Adapter -V.A.G 1582/4-
- Adapter -V.A.G 1582/5-



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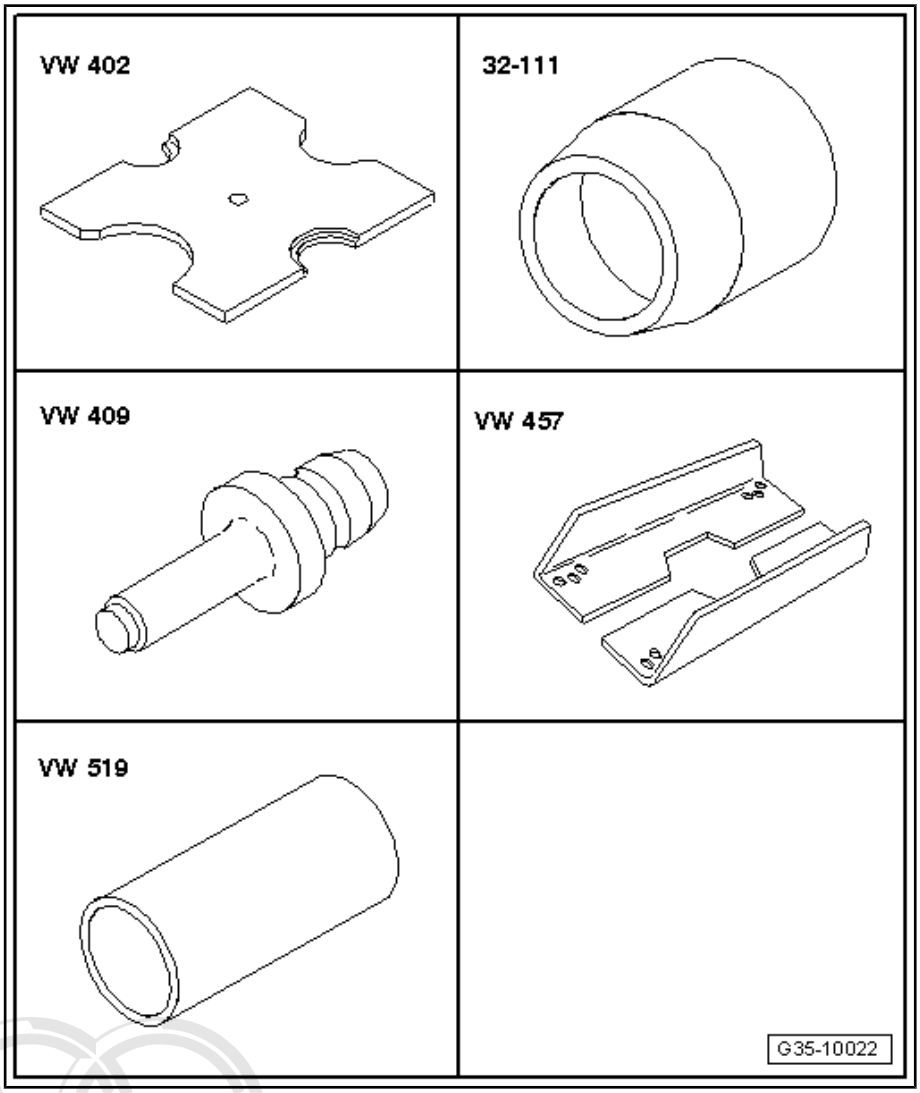
- Thrust plate -VW 402-
- Thrust piece -32 - 111-
- Press tool -VW 409-
- Support rails -VW 457-
- Tube -VW 519-



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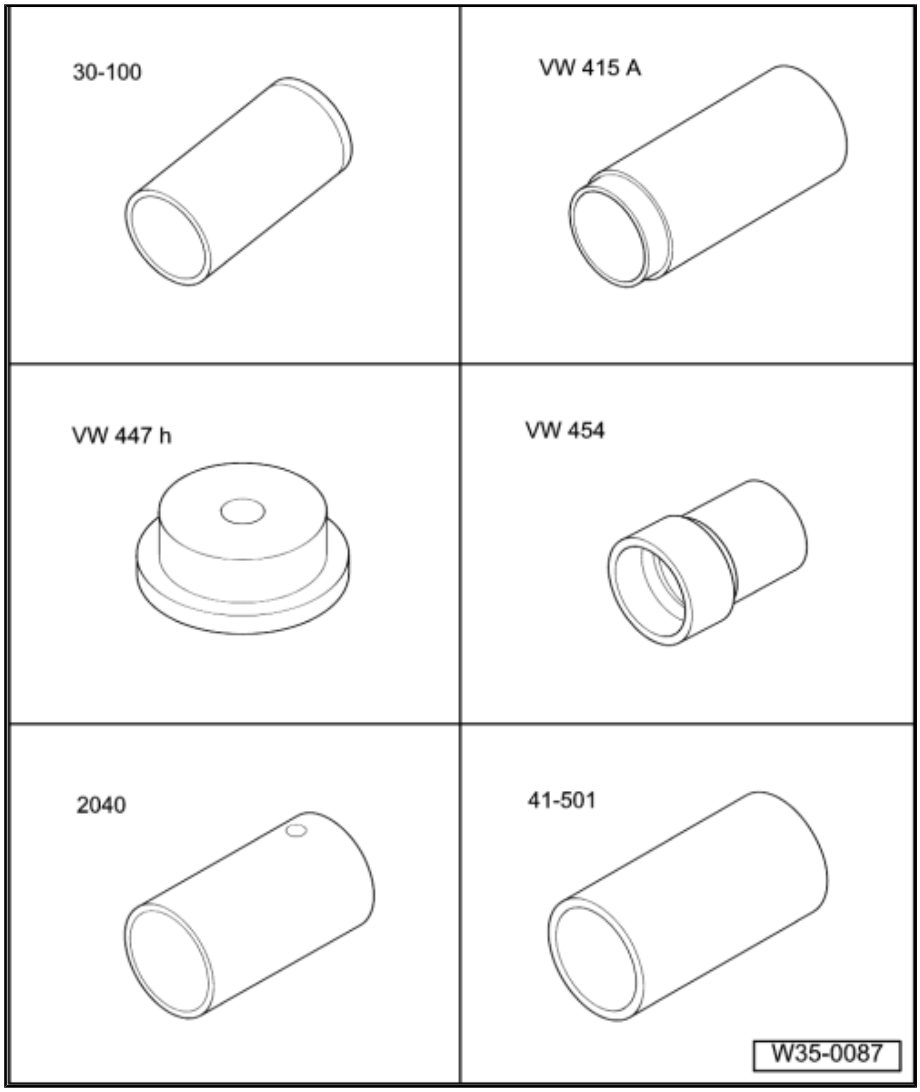
- Drift sleeve -30 - 100-
- Tube -VW 415 A-
- Thrust plate -VW 447 H-
- Press tool -VW 454-
- Tube -2040-
- Drift sleeve -41 - 501-



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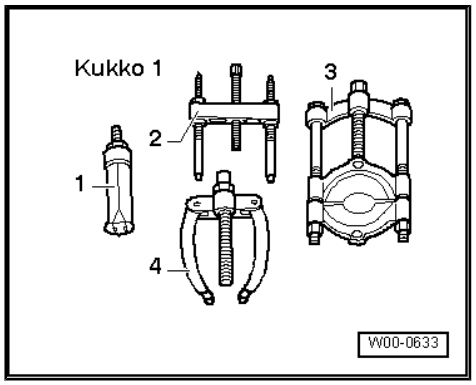
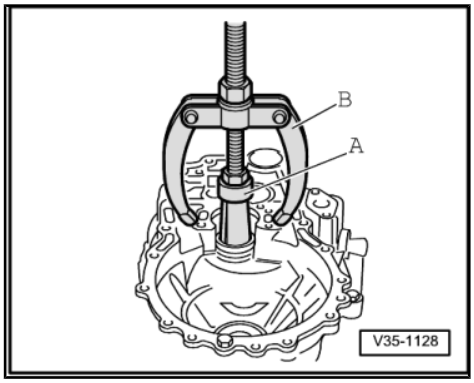
- Internal puller -1- Kukko 21/8-





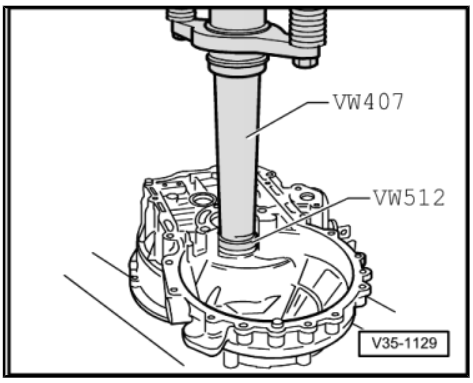
- Counter-support -4- Kukko 22/2-
- Splitter -3- Kukko 17/2-

Pulling out small tapered roller bearing outer race

A - Internal puller 37 ... 46 mm , e.g. -Kukko 21/8-

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

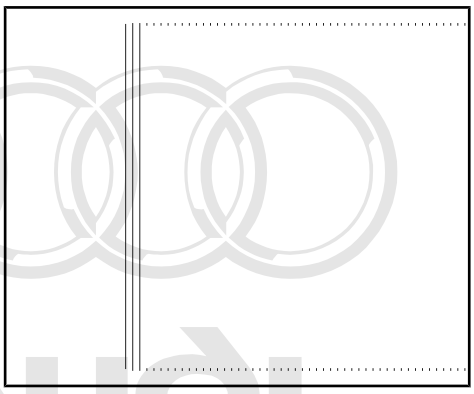
Pressing in small tapered roller bearing outer race



Pulling off small tapered roller bearing inner race

A - Soft jaws/vice

– Fit adapter and apply tension to it behind the bearing rollers, then turn bearing and re-tension adapter.



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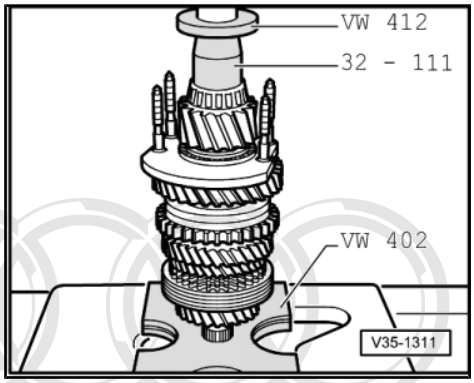
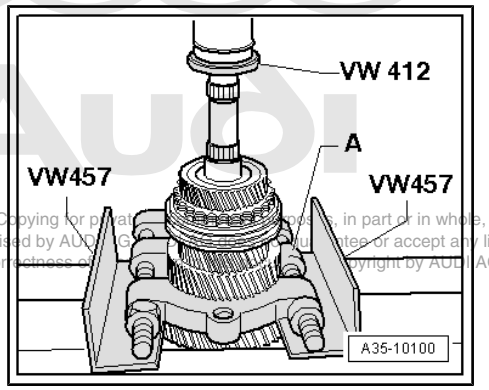
Pressing on small tapered roller bearing inner race



Pressing off 3rd and 4th gear synchronising hub/locking collar; 2nd, 3rd and 4th speed selector gears with needle bearing sleeve for output shaft

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

B - Hexagon bolt, 17 mm M10 x 20



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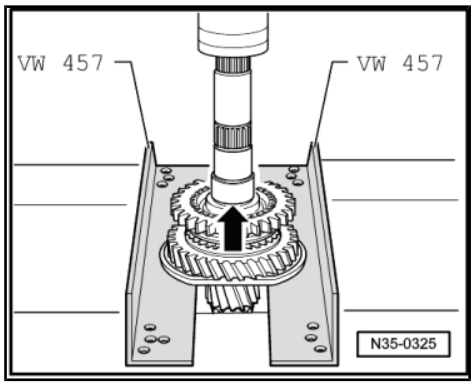
Note

Support splitter so that the 1st and 2nd gear locking collar is not pulled off at the same time.

Pressing off locking collar with synchronising hub and bearing mounting

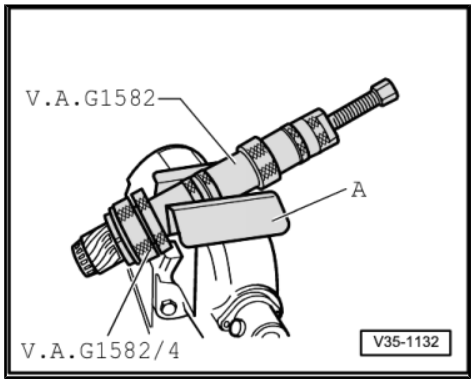
– First remove circlip -arrow-.



Pulling off large tapered roller bearing inner race

A - Soft jaws

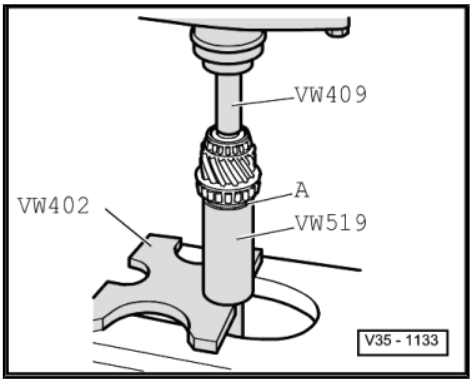
– Before applying puller insert a M10 x 20 hexagon bolt in output shaft hole.



Pressing on large tapered roller bearing inner race

-A- Thrust washer

– Fit thrust washer before pressing on inner race. Shoulder faces towards inner race.



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

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

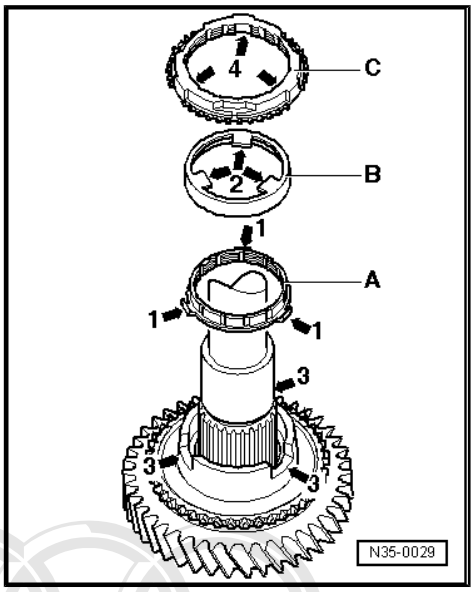
The angled tabs -arrow 1- point towards the outer ring -B-.

– Fit outer ring -B-.

The tabs -arrow 2- lock in the recesses -arrow 3- of the selector gear.

– Fit synchro-ring -C-.

The recesses -arrow 4- locate on the tabs -arrow 1- of the inner ring -A-.



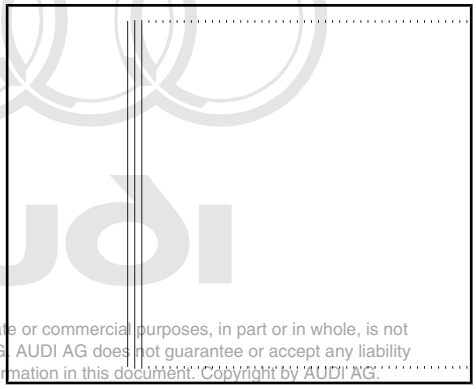
Note

If components are not being renewed, make sure they are re-installed on the same gear.

Checking inner ring for 1st and 2nd gear 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



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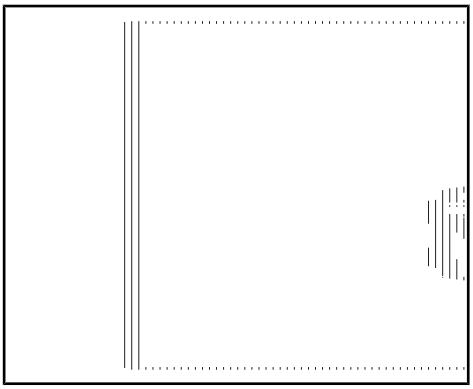
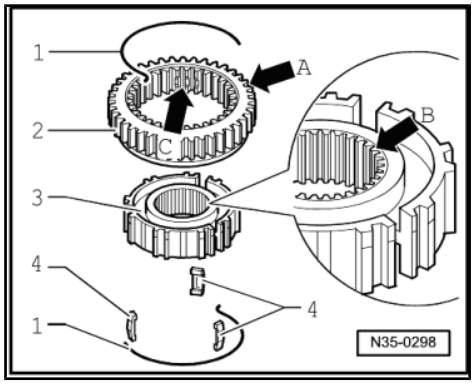
Checking 1st and 2nd gear synchro-ring for wear

– 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	1.2 ... 1.8 mm	0.5 mm



Dismantling and assembling 1st and 2nd gear locking collar and synchronising hub



1 - Spring

Select correct spring from ⇒ Electronic parts catalogue .

Assembling version used together with hollow locking pieces (with internal recess) ⇒ page 160

Assembling version used together with solid locking pieces (no internal recess) ⇒ page 160

2 - Locking collar

3 - Synchronising hub

4 - Locking piece

Select locking pieces from ⇒ Electronic parts catalogue .

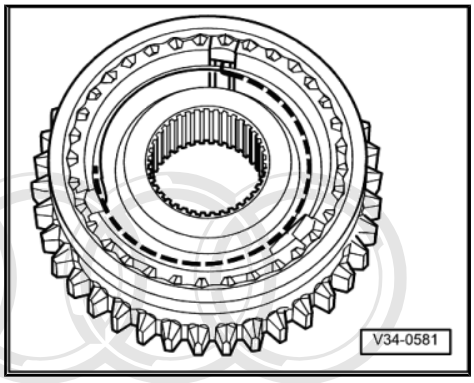
Shoulders on synchronising hub are of equal width on both sides.

The shoulder on one side is chamfered -arrow B-.

When assembled, the chamfer on the shoulder of the synchronising hub and the external teeth on the locking collar -arrow A- face in the same direction.

The recesses for the locking pieces on synchronising hub and locking collar -arrow C- must align.

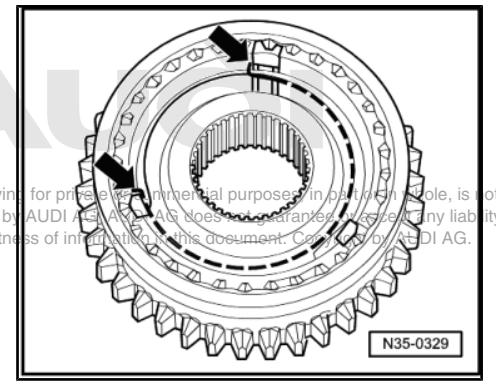
Assembling locking collar/synchronising hub for 1st and 2nd gear (version with hollow locking pieces)



- 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.

Assembling locking collar/synchronising hub for 1st and 2nd gear (version with solid locking pieces: no internal recess)



- Locking collar is pushed over synchronising hub.

– Insert locking pieces and install springs offset at 120°. Angled ends of spring must be in front of locking pieces -arrows-.

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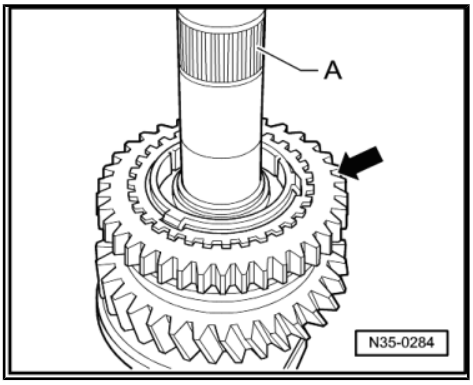
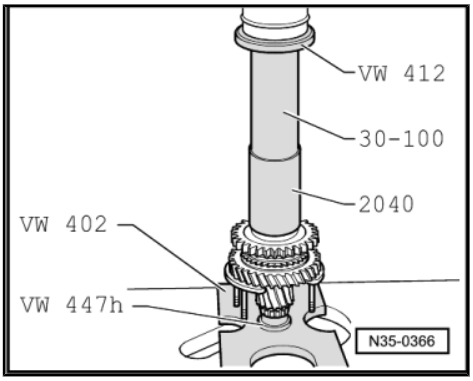
Installation position of 1st and 2nd gear locking collar/synchronising hub

Splines on locking collar -arrow- point to splines for 3rd/4th gear synchronising hub -A-.



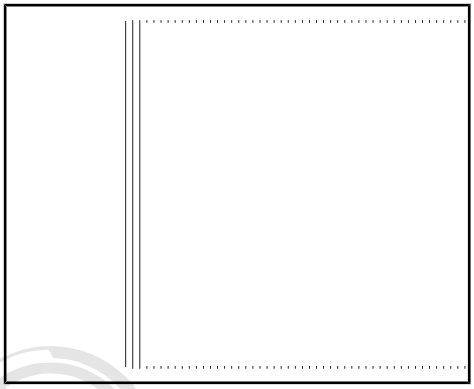
Pressing on 1st and 2nd gear locking collar/synchronising hub

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



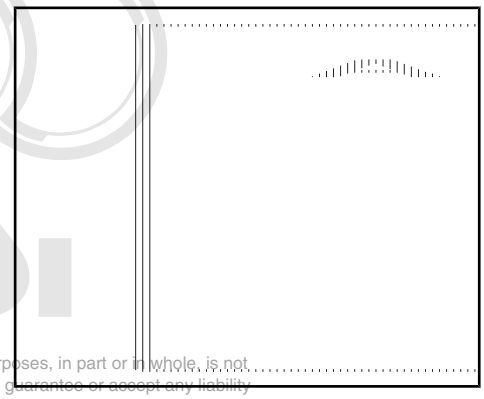
Installation position of outer ring for 2nd gear

The lugs -arrows- face towards 1st gear -A-.



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

The lugs -arrow 1- locate in the recesses -arrow 2- in the synchro-ring -B-.



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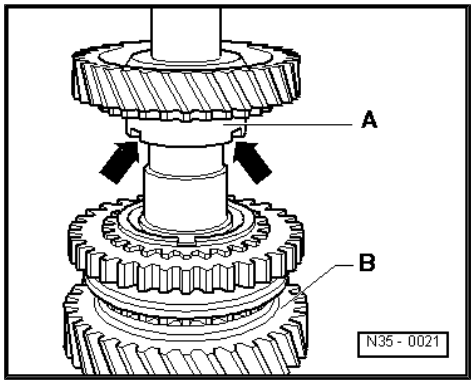
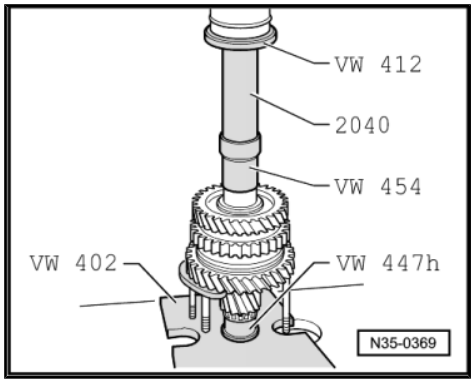
Installation position of 2nd speed selector gear

The higher shoulder -A- faces towards 1st gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ⇒ page 161



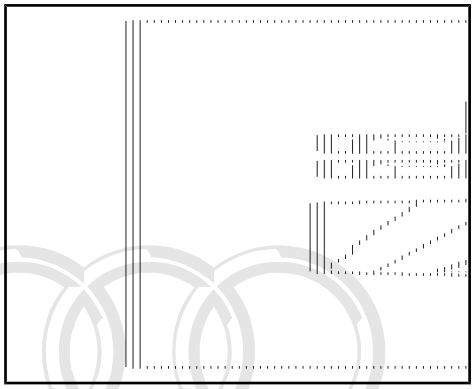
Pressing on sleeve for 3rd gear needle bearing



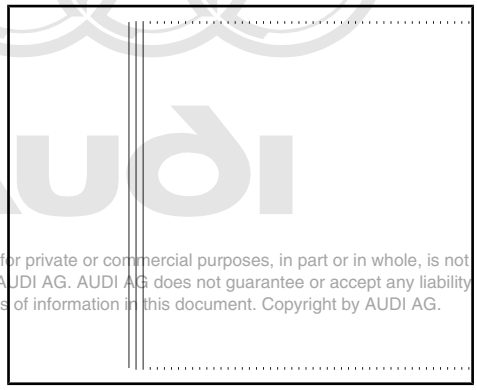
Checking 3rd and 4th gear synchro-ring for wear

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

Gap -a-	Installation depth	Wear limit
1st gear 3rd gear 4th gear	1.0…1.7 mm 1.0…1.7 mm 1.0…1.7 mm	0.5 mm



Dismantling and assembling 3rd and 4th gear locking collar and synchronising hub



1 - Spring

Select correct spring from ⇒ Electronic parts catalogue .

Assembling version used together with hollow locking pieces (with internal recess) ⇒ page 163

Assembling version used together with solid locking pieces (no internal recess) ⇒ page 163

2 - Locking piece

Select locking pieces from ⇒ Electronic parts catalogue .

3 - Locking collar

4 - Synchronising hub

– Push locking collar over synchronising hub.

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

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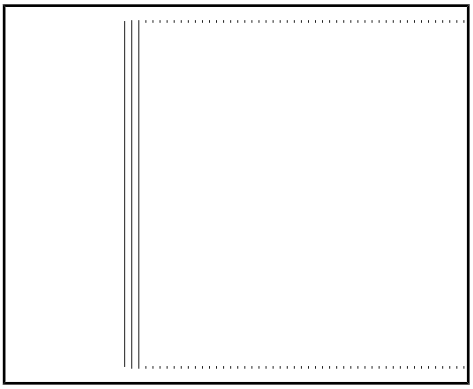
Assembling locking collar/synchronising hub for 3rd and 4th gear (version with hollow locking pieces)

Locking collar is pushed over synchronising hub.

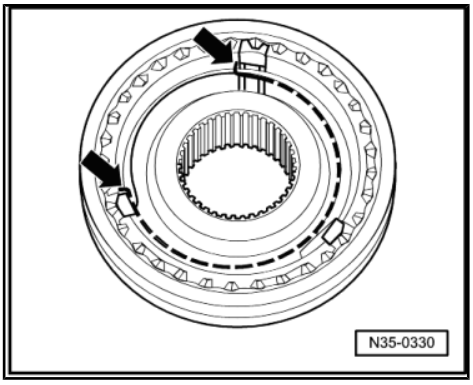
– Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.



Assembling locking collar/synchronising hub for 3rd and 4th gear (version with solid locking pieces: no internal recess)

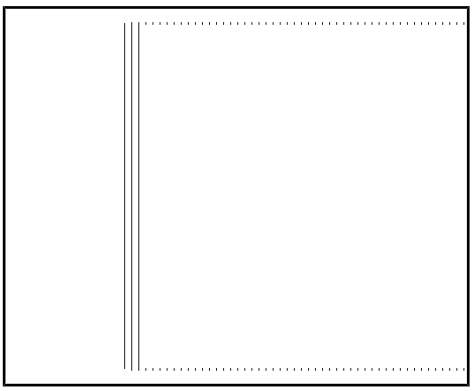
• Locking collar is pushed over synchronising hub.

– Insert locking pieces and install springs offset at 120°. Angled ends of spring must be in front of locking pieces -arrows-.

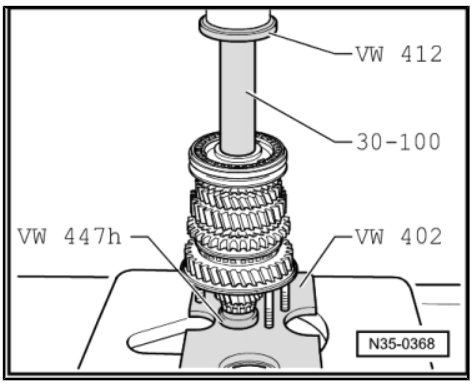


Installation position of 3rd and 4th gear locking collar/synchronising hub

Chamfer -arrow- faces towards 4th gear.



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



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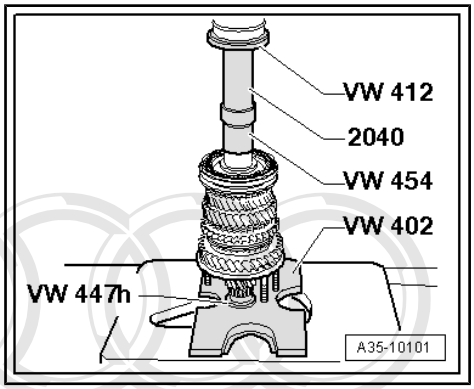
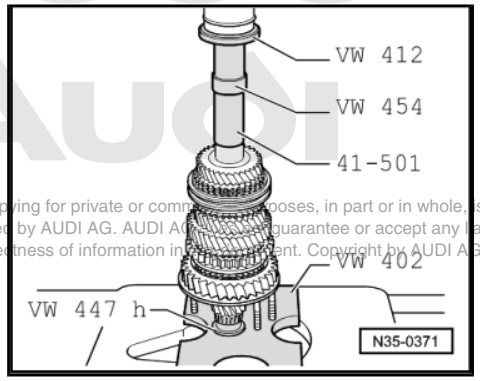
Pressing on sleeve for 4th gear needle bearing



Pressing on sleeve for needle bearing/output shaft



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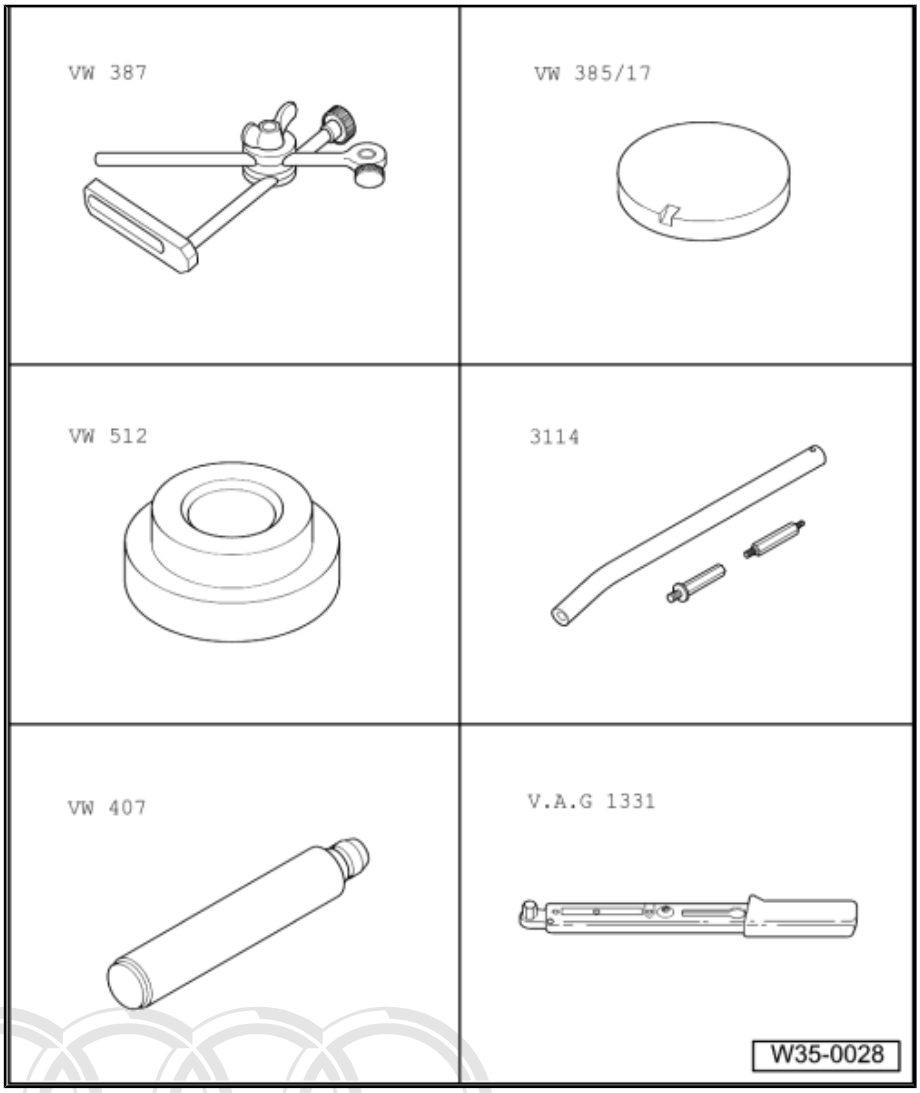
4 Adjusting output shaft

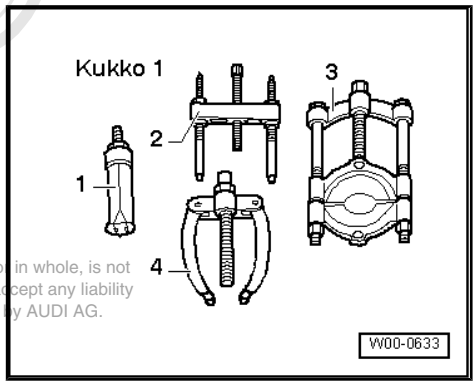
(Determining thickness of output shaft shim)

Special tools and workshop equipment required

- Universal dial gauge bracket -VW 387-
- End measuring plate - VW 385/17-
- Thrust pad -VW 512-
- Straightening tool -3114/2-
- Press tool -VW 407-
- Torque wrench - V.A.G 1331-
- Dial gauge



- Internal puller -1- Kukko 21/8-



- Counter-support -4- Kukko 22/2-
- Puller -2- Kukko 18/0- (threaded spindle)

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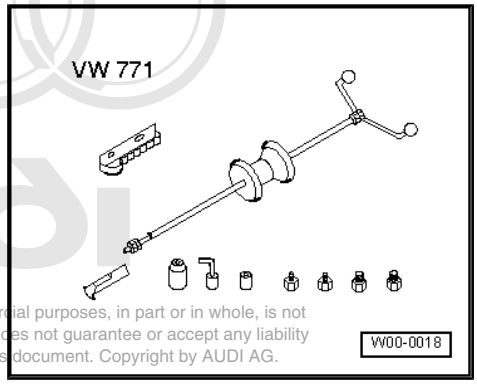
- Adapter -VW 771/15-



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Procedure

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

- Output shaft
- Clutch housing

or

- Tapered roller bearings

Table of adjustments ⇒ page 187

Requirement:

- Sealing surfaces of clutch and gearbox housings must be free of sealant.

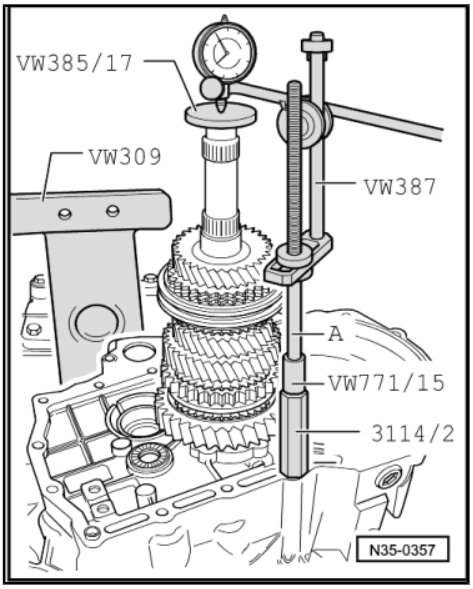
– Press small tapered roller bearing outer race together with a 0.65 mm thick shim fully into clutch housing ⇒ page 157 .

– Insert output shaft and tighten bearing mounting nuts to 25 Nm and then turn 90° further.

– Mount dial gauge (3 mm measuring range) and set to “0” with 1 mm preload.

-A- = (threaded spindle) from puller --Kukko 18/0- .

– Move output shaft up and down; read off and note play indicated on dial gauge (in this example 0.30 mm).



Determining thickness of shim

The specified bearing preload is obtained by adding a constant preload figure (0.14 mm) to the measured value obtained (0.36 mm) and the thickness of the shim installed (0.65 mm).

Example:

Shim installed	0.65 mm
+ Measured value	0.36 mm
+ Preload (constant value)	0.14 mm
Thickness of shim	1.15 mm

– Remove output shaft and pull out small tapered roller bearing outer race ⇒ page 157

Note

- *Select correct shims from ⇒ Electronic parts catalogue .*
- *If the size of the shim required is larger than those listed in ⇒ Electronic parts catalogue install two shims amounting to the correct value.*
- *Tolerance variations make it possible to obtain the exact shim thickness required.*

– Press in tapered roller bearing outer race together with the correct shim (in example 1.15 mm) ⇒ page 157 and install output shaft.

– Tighten bearing mounting nuts in clutch housing to 25 Nm and then turn 90° further.

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5 Exploded view - reverse shaft

Note

After removal, always renew needle bearings in clutch housing and in reverse shaft support.

1 - Clutch housing

2 - Needle bearing

- ❑ Pulling out ⇒ page 170
- ❑ Pressing in ⇒ page 170

3 - Reverse gear wheel

4 - Circlip

- ❑ Always renew after removing
- ❑ Fit new circlip carefully
- ❑ Do not overstretch

5 - Reverse selector gear

- ❑ Remove circlip before renewing
- ❑ Shoulder faces towards reverse gear wheel

6 - Reverse shaft

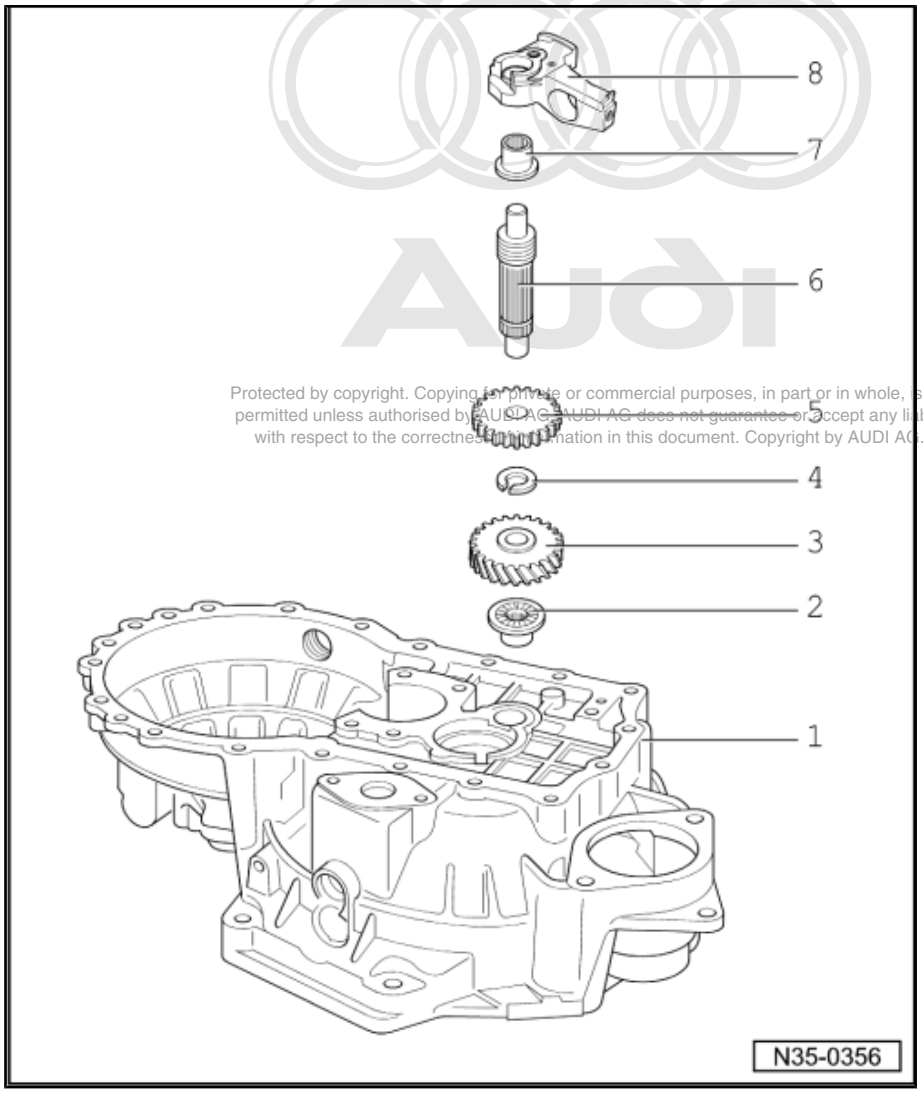
- ❑ Removing ⇒ page 104

7 - Needle bearing

- ❑ Pressing out ⇒ page 170
- ❑ Pressing in ⇒ page 171

8 - Reverse shaft support

- ❑ Removing and installing ⇒ page 104



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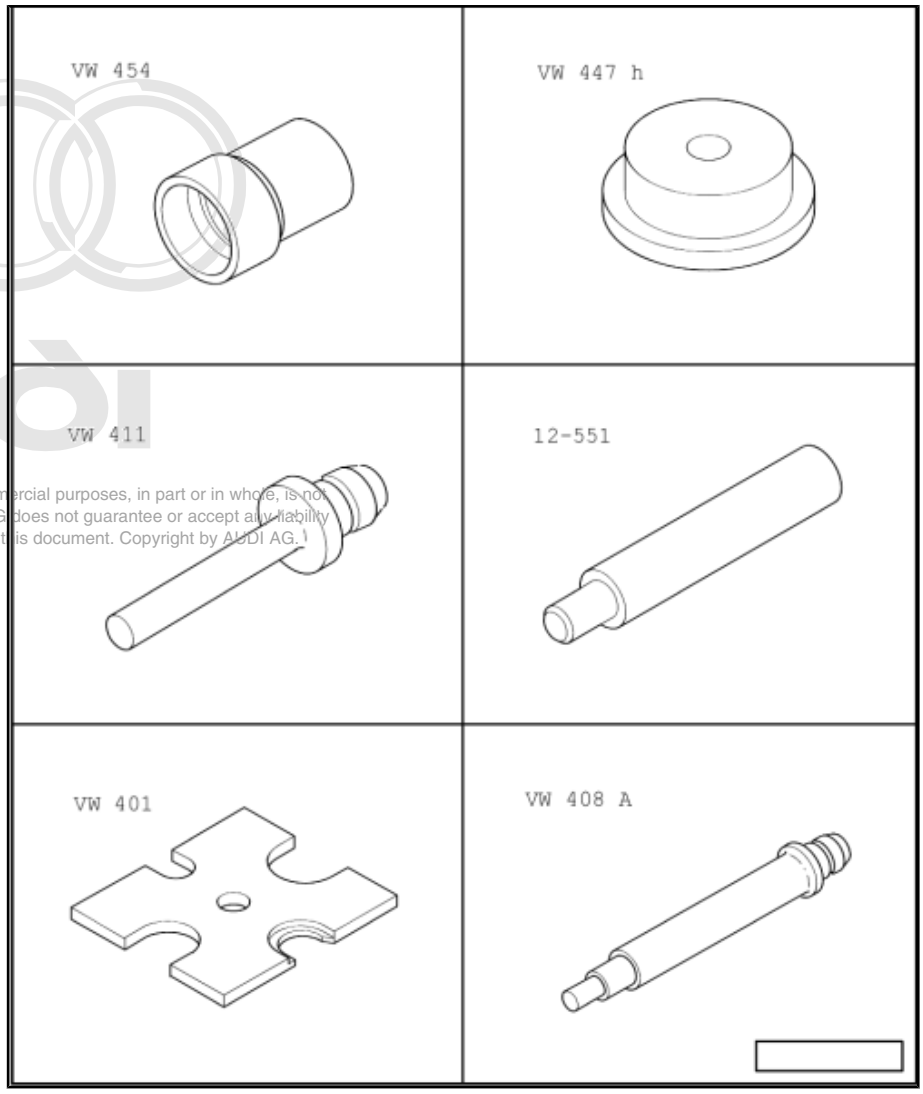
5.1 Dismantling and assembling reverse shaft

Special tools and workshop equipment required

- Press tool -VW 454-
- Thrust plate -VW 447 H-
- Press tool -VW 411-
- Centring mandrel -12 - 551-
- Thrust plate -VW 401-
- Press tool -VW 408 A-



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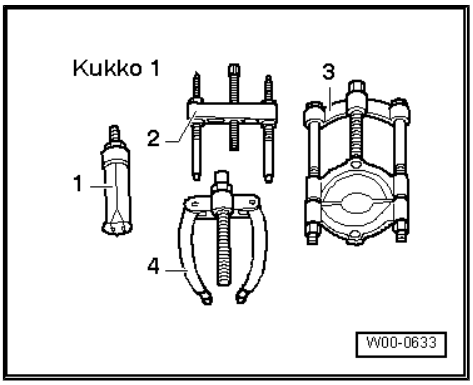
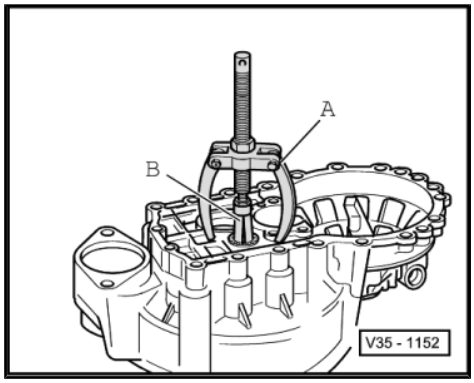
- Internal puller -1- Kukko 21/2-





- Counter-support -4- Kukko 22/1-

Pulling needle bearing out of clutch housing

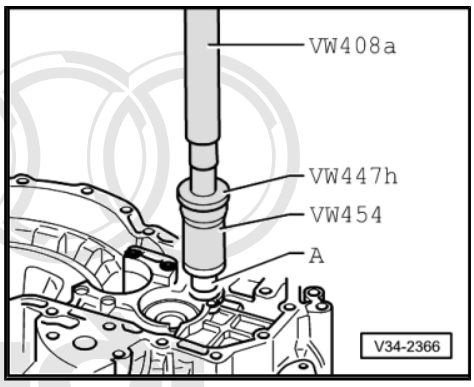
A - Counter-support , e.g. -Kukko 22/1-

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

Note

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

Pressing needle bearing -A- into clutch housing



Pressing needle bearing out of reverse shaft support

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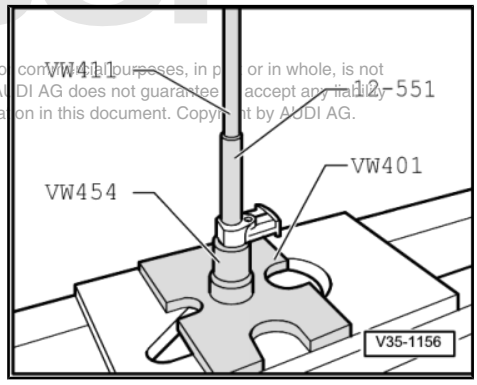
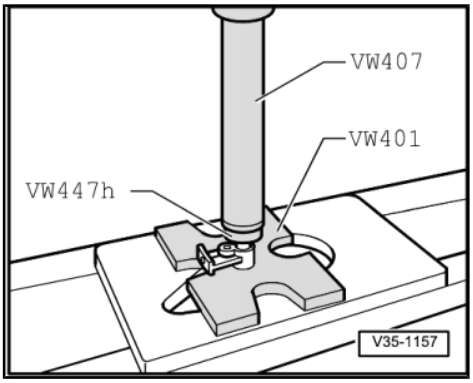


Pressing needle bearing into reverse shaft support



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39 – Final drive - differential

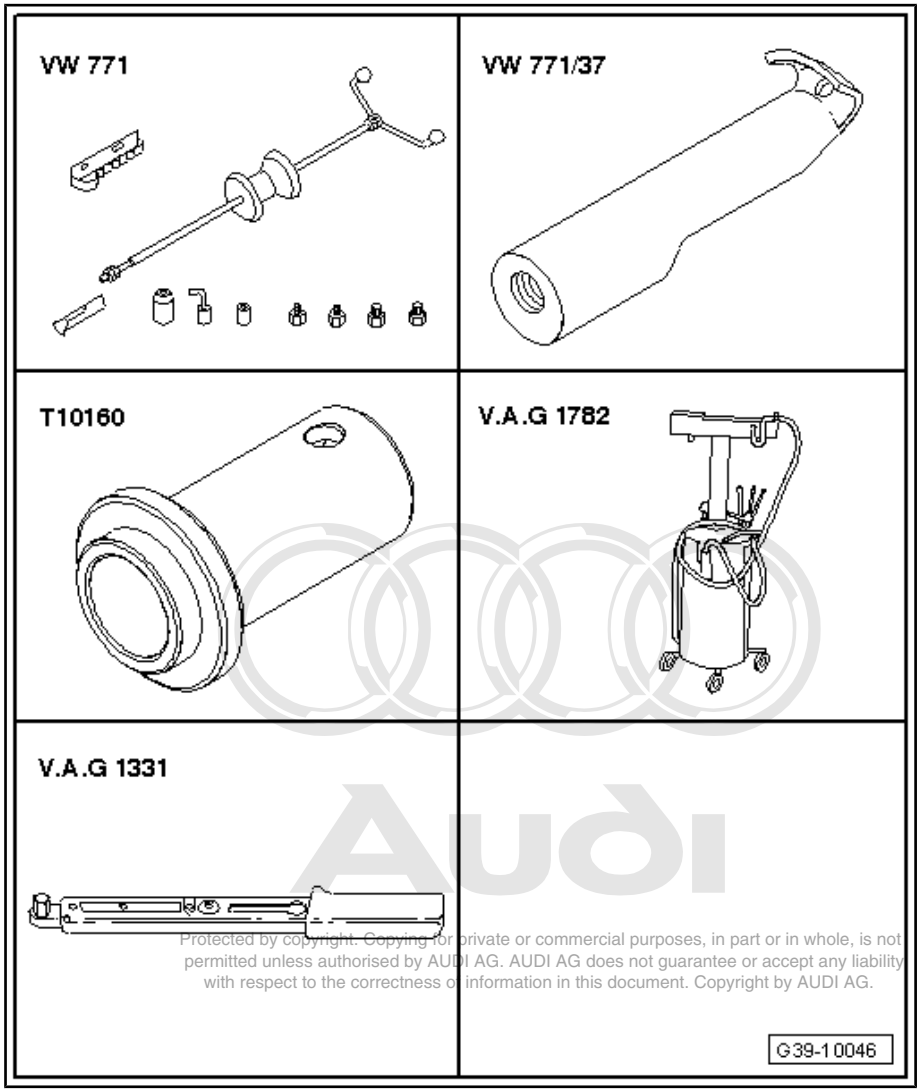
1 Renewing flange shaft oil seals with gearbox installed

- ⇒ “1.1 Renewing flange shaft oil seal (left-side)”, page 172
- ⇒ “1.2 Renewing flange shaft oil seal and sleeve (right-side; one-piece oil seal and sleeve)”, page 175

1.1 Renewing flange shaft oil seal (left-side)

Special tools and workshop equipment required

- Multi-purpose tool - VW 771-
- Puller hook -VW 771/37-
- Thrust piece -T10160-
- Used oil collection and extraction unit -V.A.G 1782-
- Torque wrench - V.A.G 1331-
- Sealing grease -G 052 128 A1-



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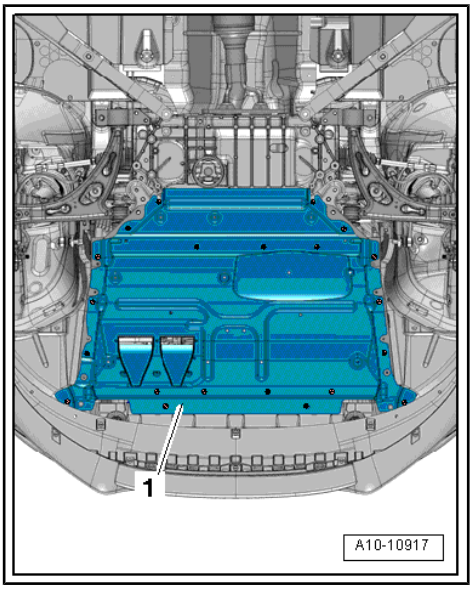
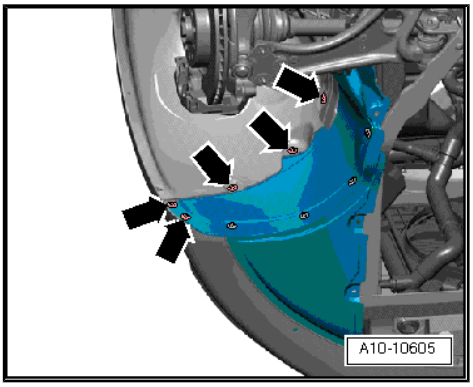
Removing

- Gearbox in vehicle

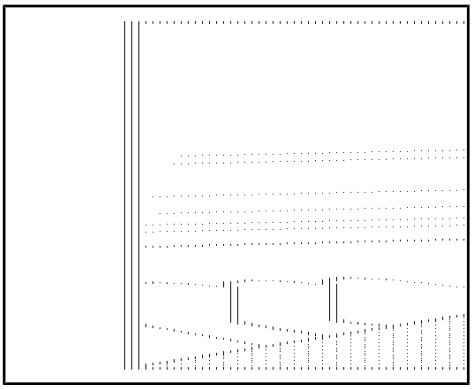
– Remove noise insulation (centre) -1- ⇒ Rep. Gr. 66 .
– Remove left wheel.



– Remove front left wheel.
– Remove left noise insulation -arrows-.
– Unbolt drive shaft from flange shaft ⇒ Rep. Gr. 40 .
– Lift drive shaft clear and tie in place. Do not damage surface coating.
– Place container under the gearbox.



– Remove left flange shaft securing bolt; to do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
– Pull out flange shaft together with spring, thrust washer and tapered ring.



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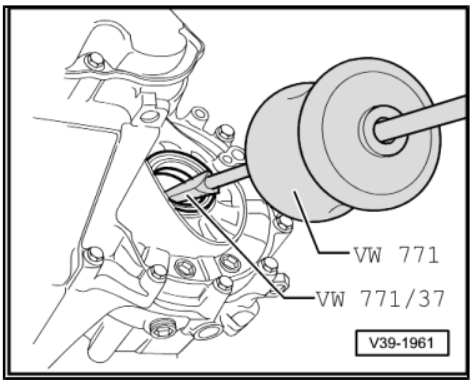
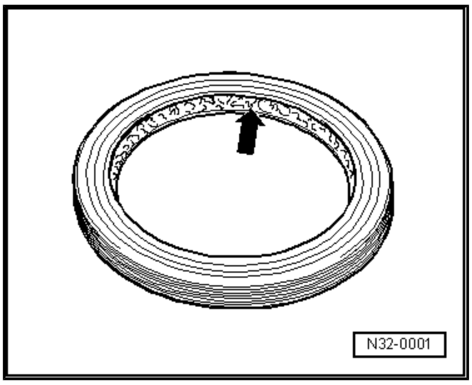
– Pull out flange shaft oil seal using multi-purpose tool -VW 771- and puller hook -VW 771/37- .

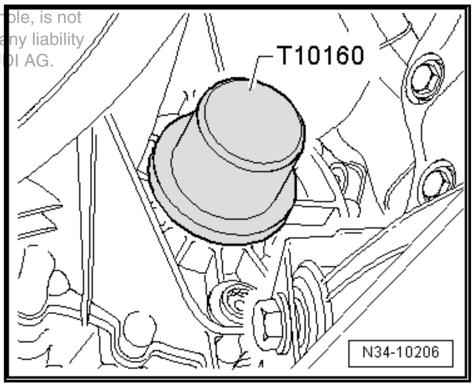


Installing



– Lightly oil outer circumference of new oil seal.

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



– Drive in new seal onto stop (take care to keep seal straight).

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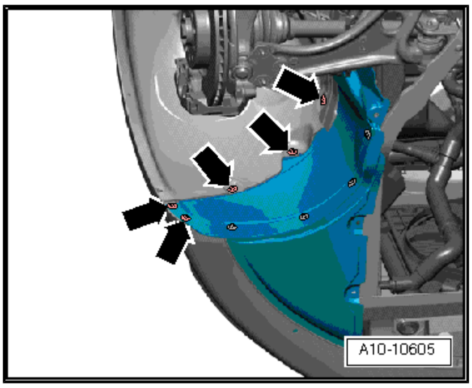
– Install flange shaft.

– Press flange shaft in against spring on gearbox housing and secure with countersunk bolt. Tightening torque ⇒ Item 12 (page 180) .

– Bolt drive shaft to flange shaft ⇒ Rep. Gr. 40 .

– Check oil level in gearbox and top up with gear oil if necessary ⇒ page 95 .



– Install wheel housing liner (front left) -arrows-.

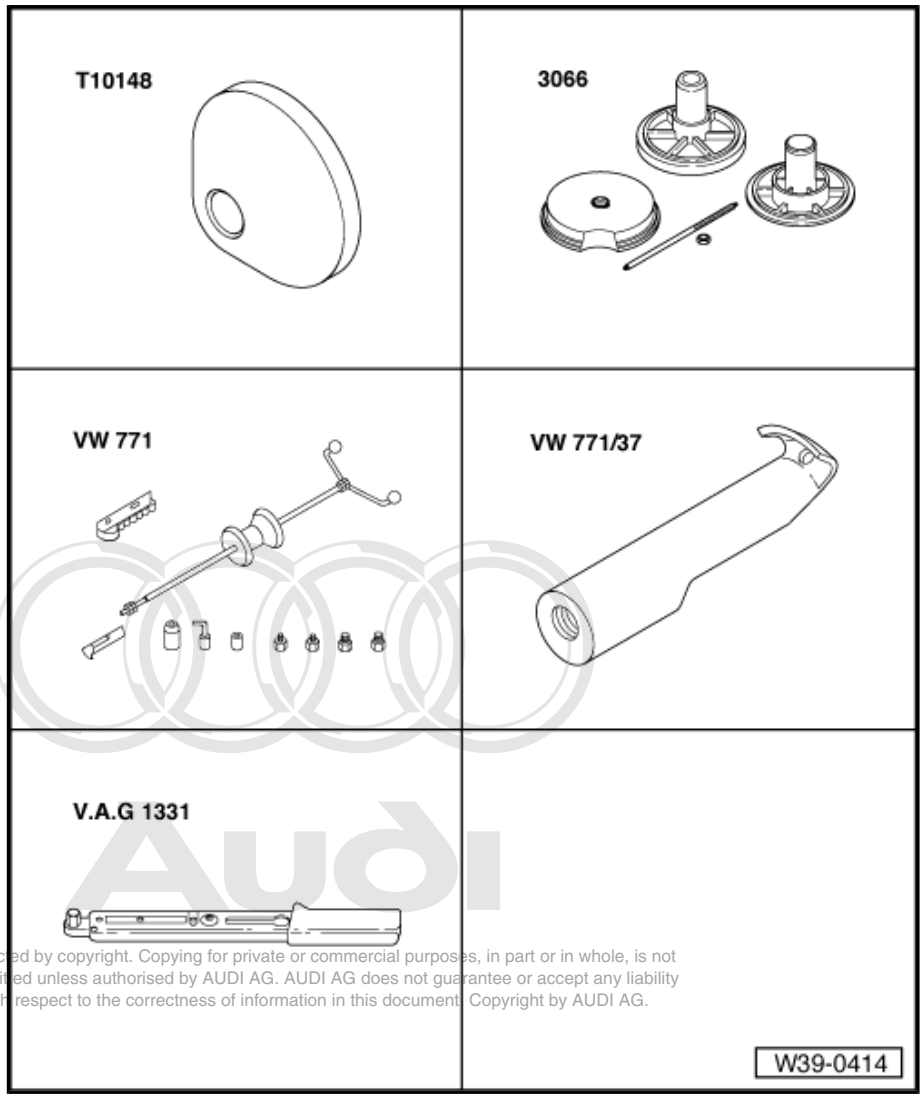
– Install noise insulation (centre) ⇒ Rep. Gr. 66 .

– Fit wheel.

1.2 Renewing flange shaft oil seal and sleeve (right-side; one-piece oil seal and sleeve)

Special tools and workshop equipment required

- Thrust piece -T10148-
- Spindle from assembly device -3066-
- Multi-purpose tool - VW 771-
- Puller hook -VW 771/37-
- Torque wrench - V.A.G 1331-



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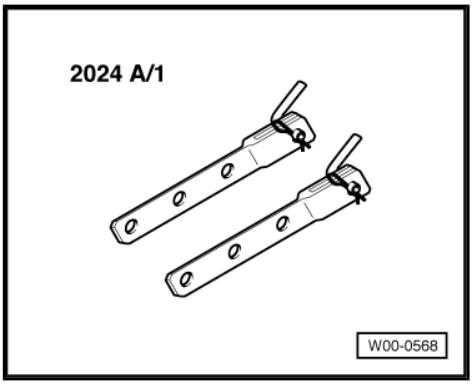
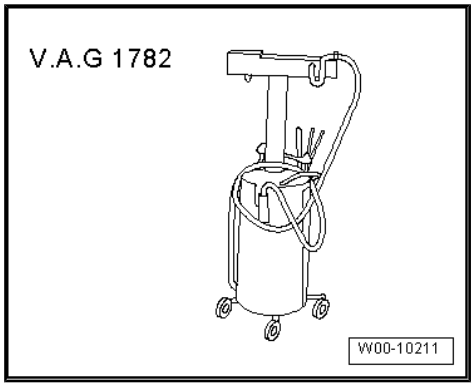
Special tools and workshop equipment required

- Lifting aid -2024 A/1-



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

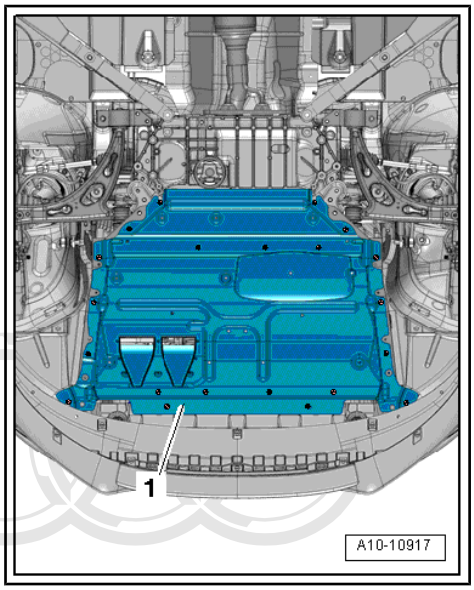


Removing

- Gearbox in vehicle

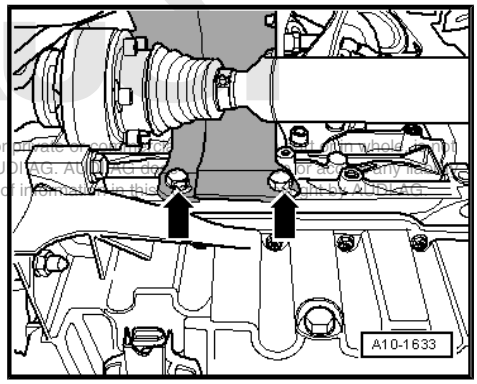
– Remove noise insulation (centre) -1- ⇒ Rep. Gr. 66 .

– Remove right wheel.



– Unbolt heat shield for right-side drive shaft -arrows-.

– Turn steering to full right lock.



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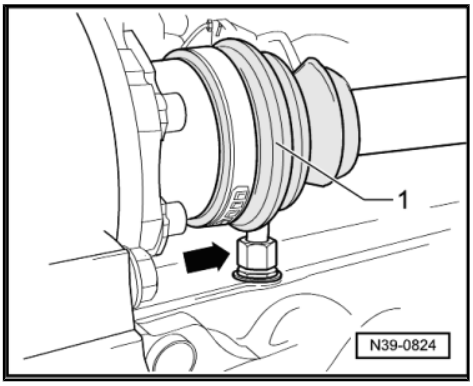
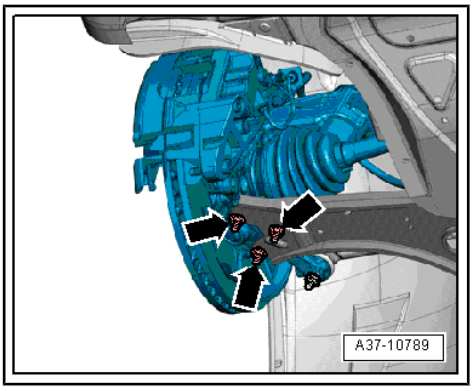
– Unbolt drive shaft -1- from flange shaft ⇒ Rep. Gr. 40 .
– Lift drive shaft as far as possible and tie in place. Do not damage surface coating.



Note

Before removing the swivel joint, mark the installation position ⇒ Rep. Gr. 40 ; Removing and installing swivel joint .

– Remove nuts -arrows- on swivel joint (right-side).



– Disengage wishbone (right-side) at swivel joint.
– Swivel suspension strut (right-side) outwards and support with -2024 A/1- as shown in illustration.

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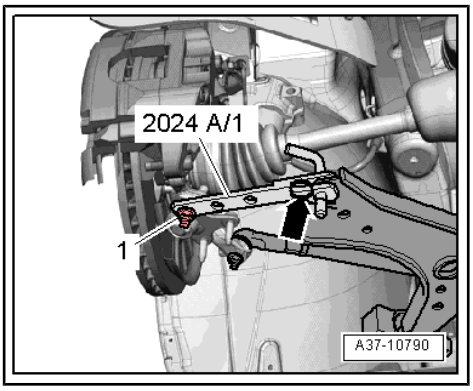
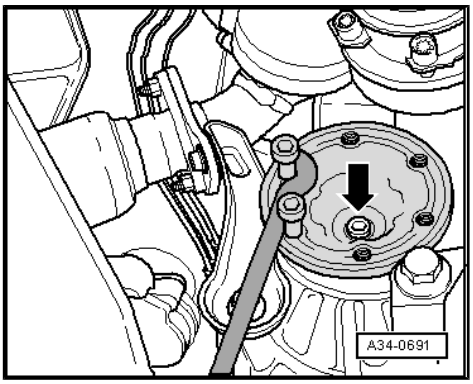
WARNING

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



– Place used oil collection and extraction unit -V.A.G 1782- below gearbox and engine.
– Remove flange shaft securing bolt -arrow-. To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
– Pull out flange shaft together with spring, thrust washer and tapered ring.

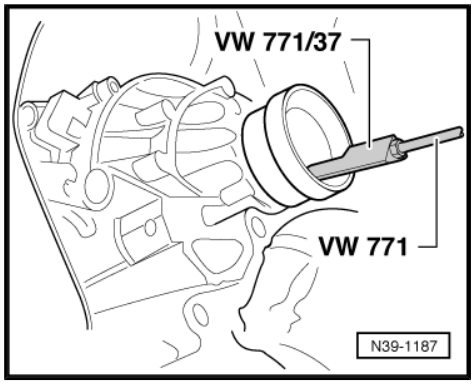


– Pull out oil seal with sleeve.

A projection is located on inside diameter of sleeve.

– Position puller hook -VW 771/37- directly behind projection in sleeve.

– During this operation, press puller hook -VW 771/37- firmly in against sleeve.



Installing

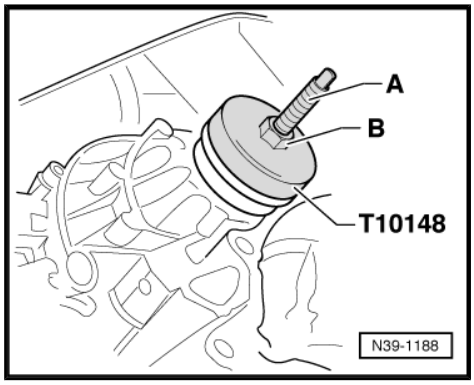
– Clean seat for oil seal in gearbox.

– Pull in oil seal together with sleeve.

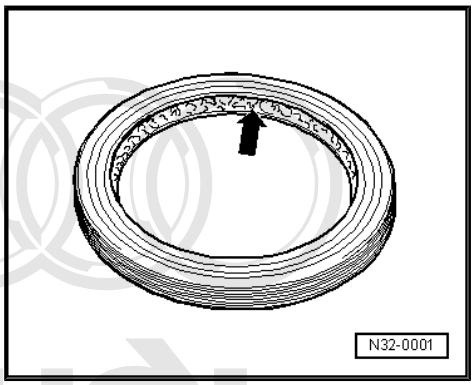
A - Spindle from assembly device -3066- screwed into threaded piece in differential.

B - M12 nut

– Turn nut -B- and pull oil seal with sleeve in onto stop with thrust piece -T10148- .



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



– Install flange shaft.

– Press flange shaft in against spring on gearbox housing and secure with countersunk bolt -arrow-. Tightening torque ⇒ Item 12 (page 180) .

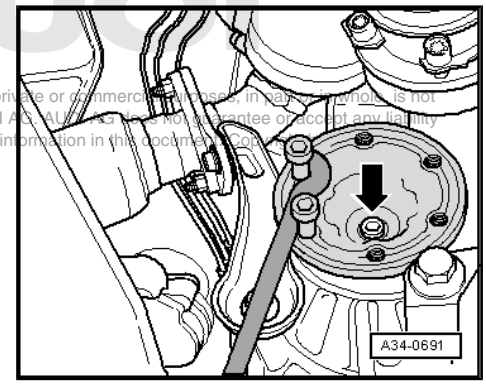
– Attach swivel joint to wishbone and secure ⇒ Rep. Gr. 40 ; Removing and installing swivel joint .

– Bolt drive shaft to flange shaft ⇒ Rep. Gr. 40 .

– Install heat shield for right-side drive shaft.

– Check oil level in gearbox and top up with gear oil if necessary ⇒ page 95 .

– Install noise insulation (centre) ⇒ Rep. Gr. 66 .



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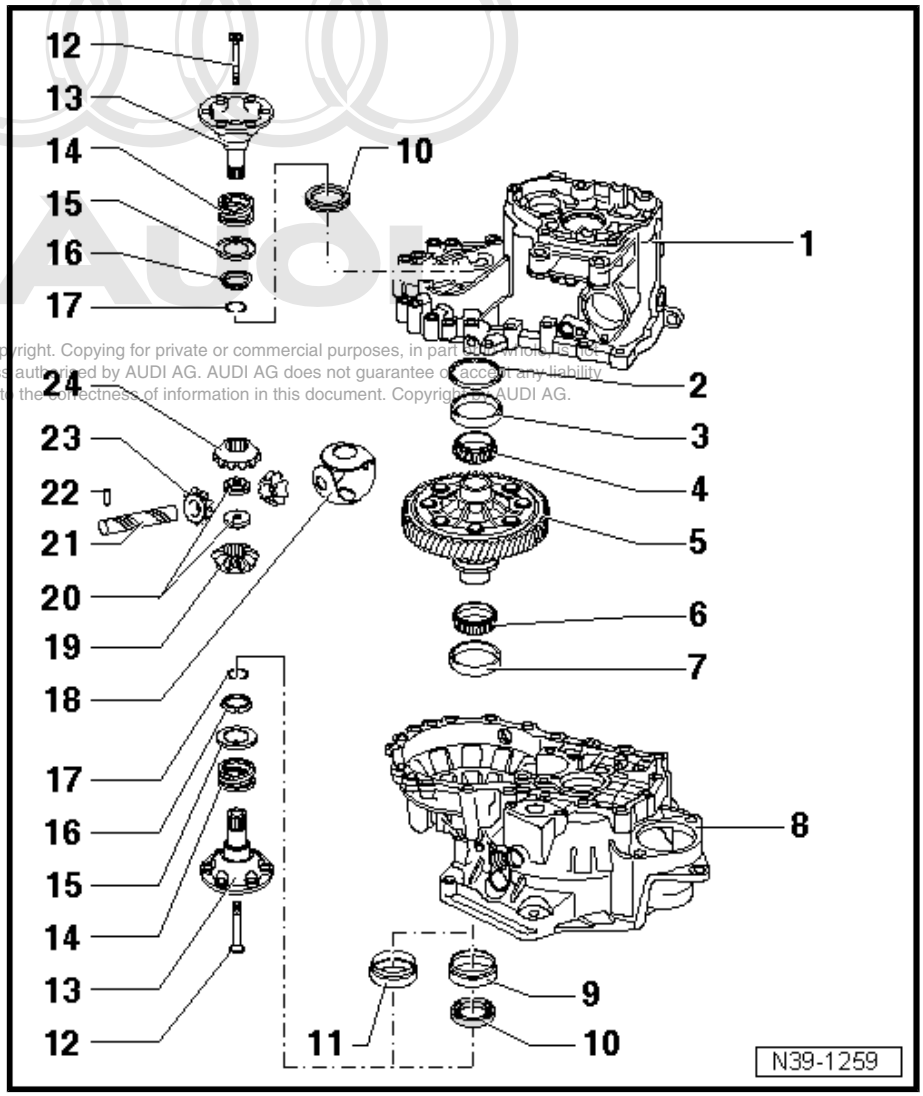
Tightening torque

Component	Nm
Heat shield for drive shaft to cylinder block	25

2 Exploded view - differential

Note

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



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1 - Gearbox housing

2 - Shim

- ❑ For differential
- ❑ Determining thickness ⇒ page 188

3 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 183
- ❑ Pressing in ⇒ page 184

4 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 183
- ❑ Pressing on ⇒ page 183

5 - Differential cage

- ❑ With final drive gear
- ❑ Differential cage is matched to one-piece thrust washer ⇒ page 185
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

6 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 183
- ❑ Pressing on ⇒ page 183

7 - Tapered roller bearing outer race

- ❑ Pressing out ⇒ page 182
- ❑ Pressing in ⇒ page 183

8 - Clutch housing

9 - Sleeve

- ❑ Cannot be renewed separately on this version
- ❑ One-piece oil seal and sleeve ⇒ Item 11 (page 180)

10 - Oil seal

- ❑ Cannot be renewed separately on this version

- One-piece oil seal and sleeve ⇒ Item 11 (page 180)

11 - One-piece oil seal and sleeve

- If oil seal is damaged, renew sleeve and oil seal together ⇒ page 175

12 - Countersunk bolt

- 25 Nm
- Screws into threaded piece ⇒ Item 20 (page 180)

13 - Flange shaft

- Removing and installing ⇒ page 172

14 - Spring for flange shaft

- Installed behind flange shafts

15 - Thrust washer

- Installation position ⇒ page 186

16 - Tapered ring

- With grooves to engage on thrust washer
- Installation position: Taper towards differential cage

17 - Circlip

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

18 - One-piece thrust washer

- Lubricate with gear oil before installing
- One-piece thrust washer has a projection on some versions ⇒ page 185

19 - Sun wheel

- Installing ⇒ page 185

20 - Threaded piece

- Installing ⇒ page 185

21 - Differential pinion pin

- Drive out with drift
- Installing ⇒ page 185

22 - Spring pin

- For securing differential pinion pin
- Spring pins of two different lengths are fitted
- Identification of different types of spring pin ⇒ page 184
- Short spring pin: removing and installing ⇒ page 184
- Long spring pin: is sheared off on removal ⇒ page 185
- Long spring pin: installing ⇒ page 185

23 - Planet pinion

- Installing ⇒ page 185

24 - Sun wheel

- Installing ⇒ page 185

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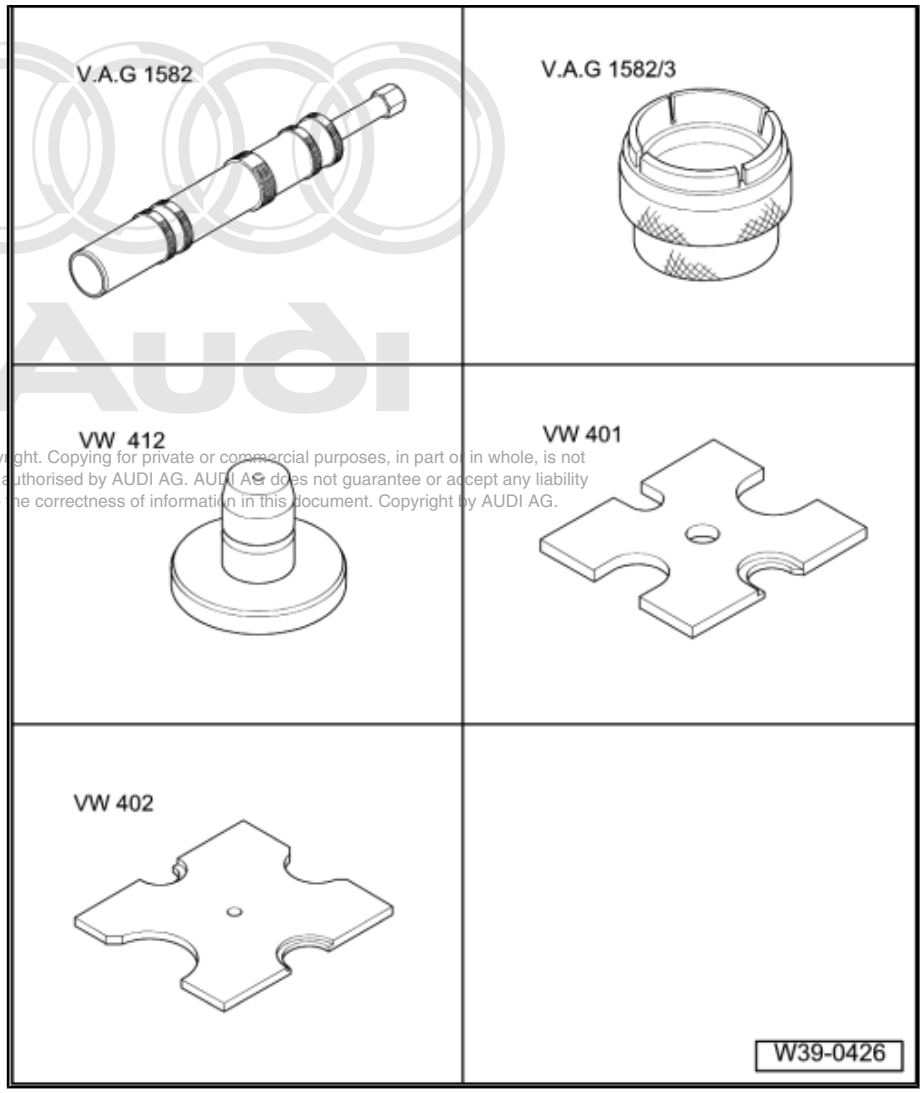
2.1 Dismantling and assembling differential

Special tools and workshop equipment required

- Tapered roller bearing puller -V.A.G 1582-
- Adapter -V.A.G 1582/3-
- Press tool -VW 412-
- Thrust plate -VW 401-
- Thrust plate -VW 402-



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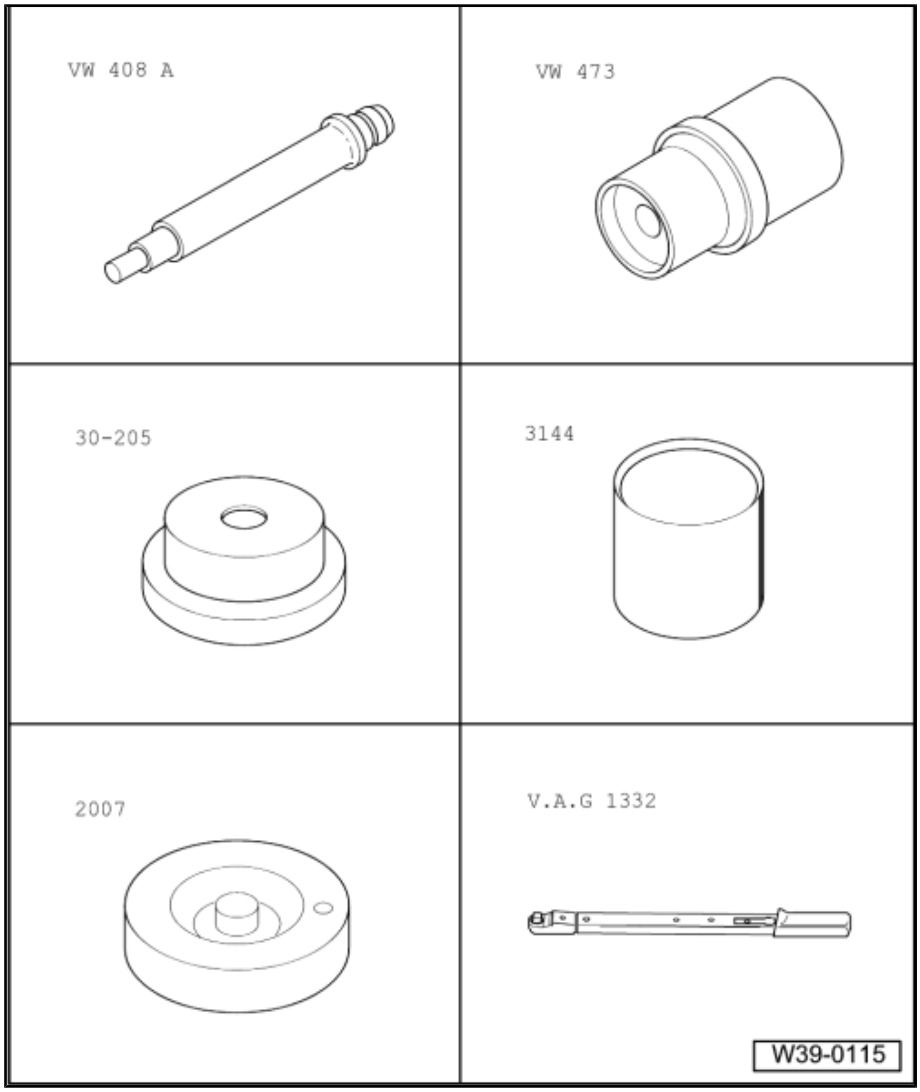
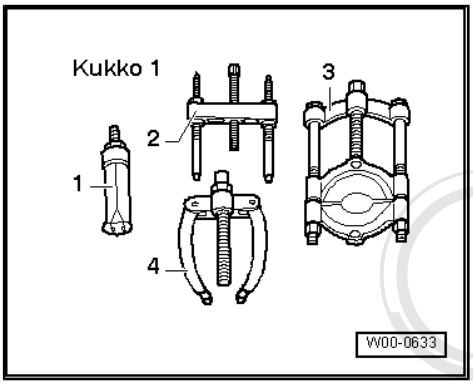
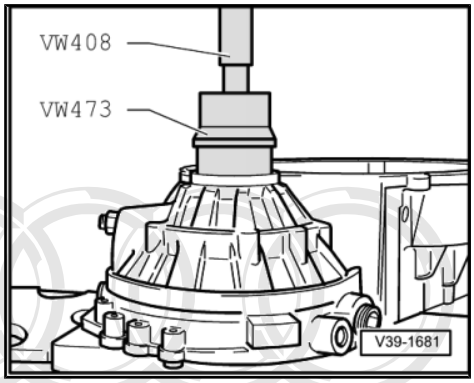
- Press tool -VW 408 A-
- Press tool -VW 473-
- Thrust plate -30 - 205-
- Sleeve -3144-
- Press tool -2007-
- Torque wrench -V.A.G 1332-



- Internal puller -1- Kukko 21/7-





- Counter-support -4- Kukko 22/2-

Pressing tapered roller bearing outer race out of clutch housing

– First remove mounting sleeve for flange shaft oil seal.

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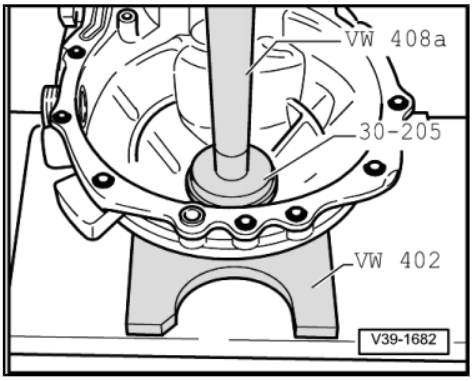
Pressing tapered roller bearing outer race into clutch housing

No shim is installed on the clutch housing side.

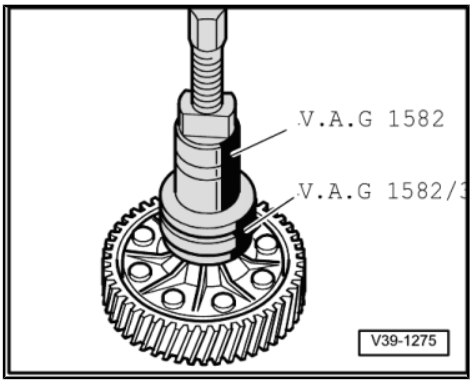


Pulling off tapered roller bearing inner races

– Before setting up the puller, place thrust plate -40 - 105- on differential cage.

Note

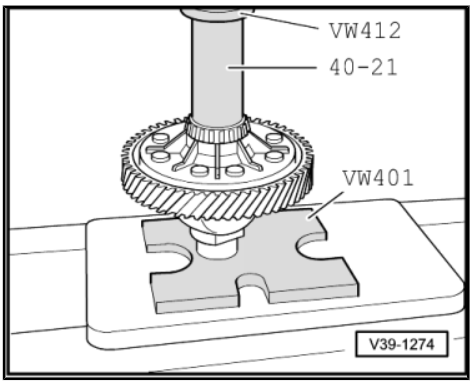
The procedure for pulling tapered roller bearing inner races off differential cage is the same for both bearings.



Pressing on tapered roller bearing inner races

Note

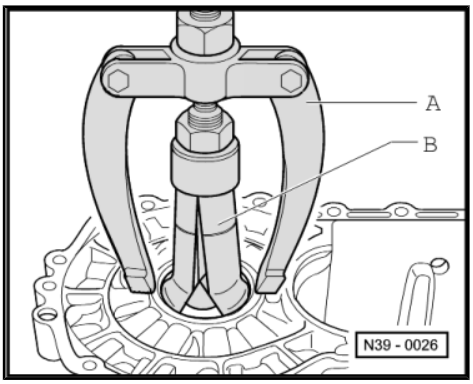
The same special tools are used for pressing on tapered roller bearing inner races for gearbox housing and clutch housing.



Pulling outer race for tapered roller bearing out of gearbox housing

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

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



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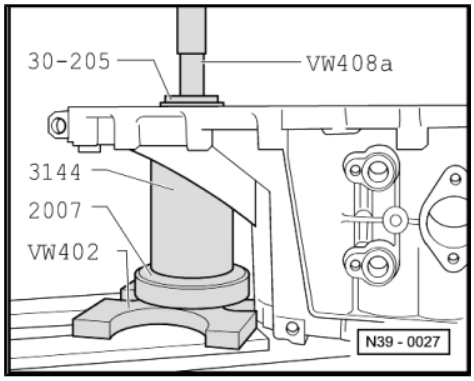
Pressing outer race for tapered roller bearing into gearbox housing

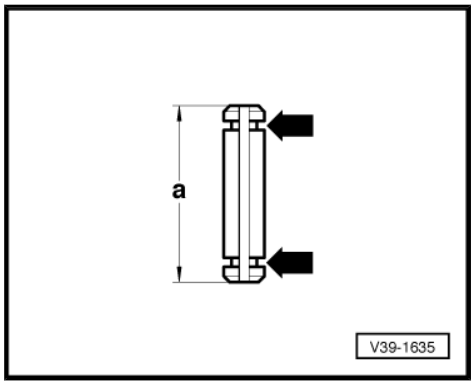
– Fit shim below outer race.

– Support gearbox housing with sleeve -3144- directly below bearing mounting.



Identification of different types of spring pin

Dimension “a” (mm)	Identification
28.5 (short spring pin), removing and installing ⇒ page 184	Annular groove -arrows-
36.0 (long spring pin), removing ⇒ page 185 , installing ⇒ page 185	No annular groove

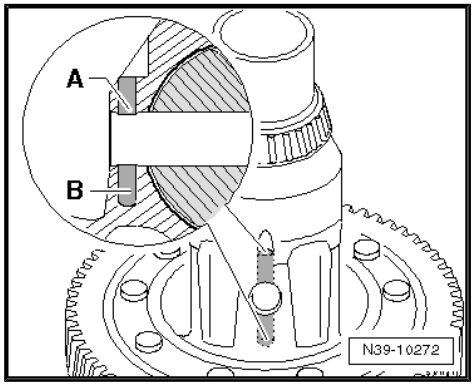


Allocation of differential cage

– Check hole for spring pin in differential cage.

Hole in differential cage has been modified for longer spring pin.

Hole	Length of spring pin (mm)
-A-	28.5 (short spring pin)
-A- and -B-	36.0 (long spring pin)



Spring pin with annular groove (short spring pin): removing and installing

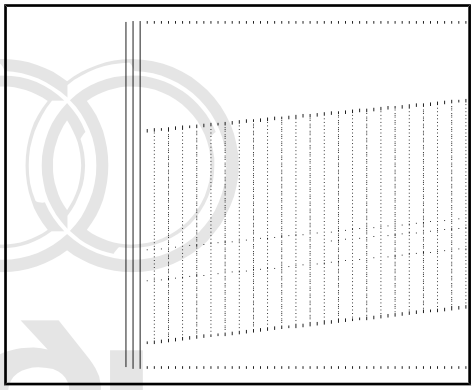
Removing

– Cover up tapered roller bearing inner race and speedometer drive gear to keep out metal particles and to prevent damage.

– Drive out spring pin with chisel, inserting chisel into annular groove.

Installing

– Drive fully into differential cage.



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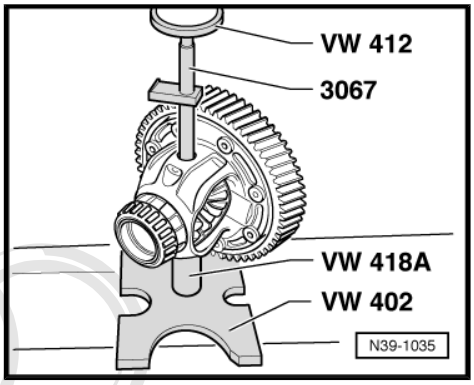
Removing spring pin without annular groove (long spring pin): pressing out differential pinion pin.

The spring pin is sheared off when pressing out.

– Drive the remaining part of the spring pin out of the differential cage.



Installing spring pin without annular groove (long spring pin)

– Align hole in differential pinion pin with hole in differential cage.

– Use a punch -1- to drive in new spring pin to dimension -a- = 3.0 mm.

• Spring pin must not come into contact with gearbox when differential cage is installed.

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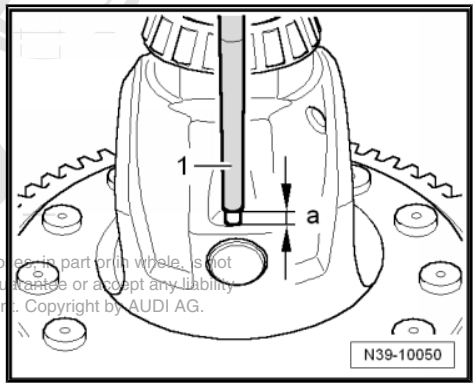
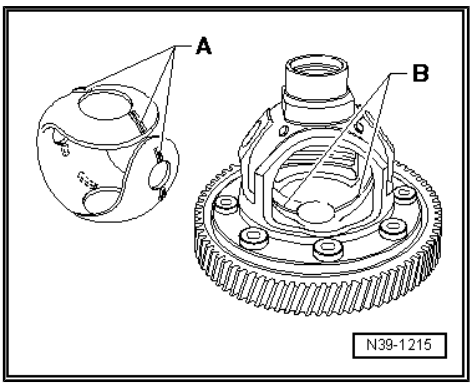


On some versions the one-piece thrust washer has a projection next to the holes -A-.

In this case the differential cage has a corresponding circular slot -B-.

– Lubricate one-piece thrust washer with gear oil and install.

– Position one-piece thrust washer so that it engages in the slot -B- in the differential cage.



Installing differential bevel gears

– Lubricate one-piece thrust washer with gear oil and install.

– Install both sun wheels and secure (e.g. with flange shaft).

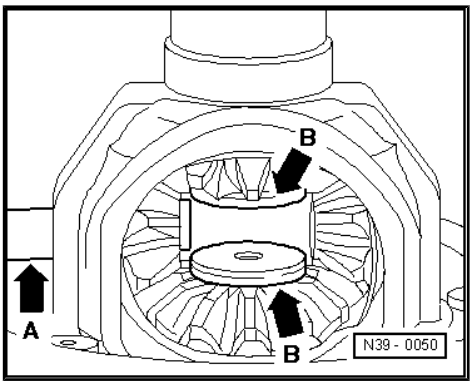
– Insert planet pinions (180° apart) and pivot into position.

– 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.

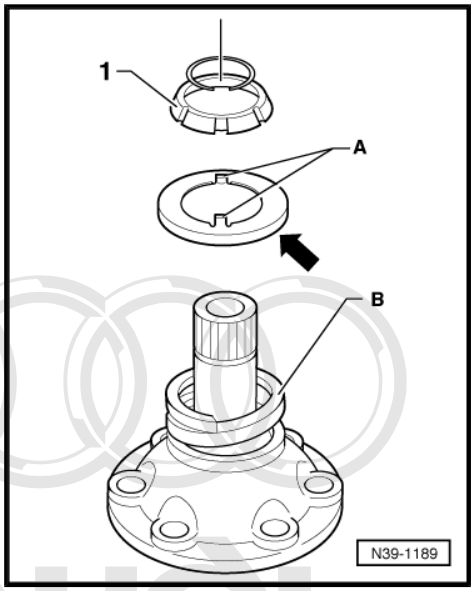


Installation position of thrust washer for tapered ring -1-

Collar -arrow- faces spring -B-.

Some gearbox versions have projections -A-.

The projections -A- face towards tapered ring -1-.



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3 Table of adjustments

Note

When performing repairs on the gearbox it is only necessary to re-adjust the input shaft, output shaft or differential if components have been renewed which have a direct effect on the adjustment of the gearbox. Refer to the following table to avoid unnecessary adjustment work.

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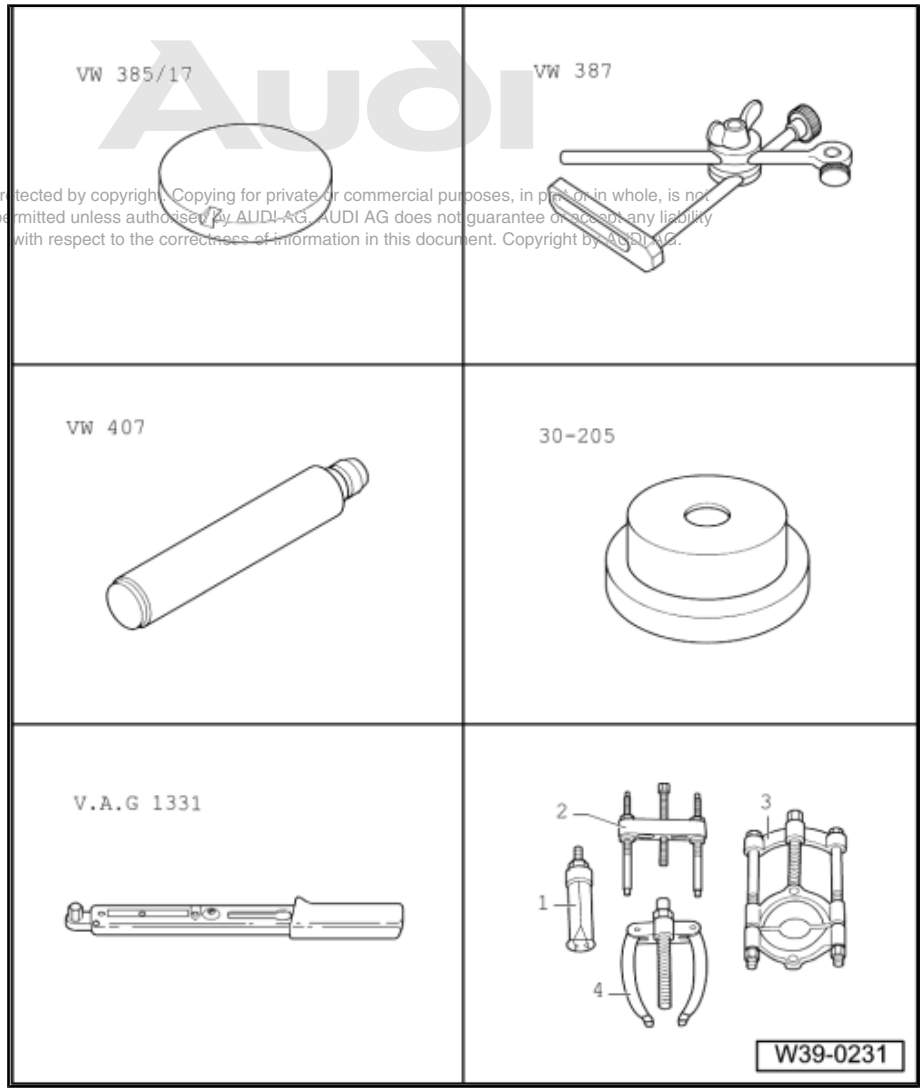
		Components requiring adjustment:		
		Input shaft ⇒ page 147	Output shaft ⇒ page 165	Differential ⇒ page 188
Components renewed:	Gearbox housing	x	One-piece oil seal and sleeve ⇒ Item 11 (page 180)	x
	Clutch housing	x	x	x
	Input shaft	x		
	Output shaft (final drive set)		x	
	Differential cage			x
	Tapered roller bearing for input shaft	x		
	Tapered roller bearing for output shaft		x	
	Tapered roller bearings for differential			x
	4th gear wheel	x		

4 Adjusting differential

Special tools and workshop equipment required

- Universal dial gauge bracket -VW 387-
- End measuring plate - VW 385/17-
- Press tool -VW 407-
- Thrust plate -30 - 205-
- Torque wrench - V.A.G 1331-
- Internal puller -1 - Kukko 21/7-
- Counter-support -4 - Kukko 22/2-
- Dial gauge



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Procedure

It is necessary to readjust the differential when the following components have been renewed:

- Gearbox housing
- Clutch housing
- Differential cage

or the

- Differential tapered roller bearings

Table of adjustments ⇒ page 187

– Press tapered roller bearing outer race without shim into gearbox housing using thrust plate -30 - 205- ⇒ page 183

Note

The tapered roller bearing inner and outer races are paired. Do not interchange.

– Press tapered roller bearing outer race into clutch housing using thrust plate -30 - 205- ⇒ page 184 .
– Install differential in clutch housing.
– Place gearbox housing in position and tighten 5 bolts to 25 Nm.

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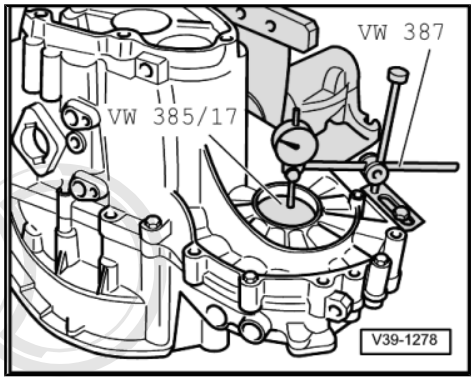
– Attach dial gauge and set to “0” with a preload of 1 mm.

– Move differential up and down and read off and note play indicated on dial gauge. (0.70 mm in this example.)



Determining thickness of shim

The specified bearing preload is obtained by adding a constant figure (0.40 mm) to the reading indicated.

Example:

Measured value	0.70 mm
+ Preload (constant value)	0.40 mm
Thickness of shim =	1.10 mm

– Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing ⇒ page 183 .

– Install shims of the calculated thickness, thickest shim first.

The following shims are available:

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Note

Select correct shims from ⇒ Electronic parts catalogue .

Bearing clearance	Shim
Measured value (mm)	Thickness (mm)
0.303 ...0.449	0.650
0.450 ... 0.499	0.700
0.500 ... 0.549	0.750
0.550 ... 0.599	0.800
0.600 ... 0.649	0.850
0.650 ... 0.699	0.900
0.700 ... 0.749	0.950
0.750 ... 0.799	1.000
0.800 ... 0.849	1.050
0.850 ... 0.899	1.100
0.900 ... 0.949	1.150
0.950 ... 0.999	1.200
1.000 ... 1.049	1.250
1.050 ... 1.099	1.300
1.100 ... 1.149	1.350
1.150 ... 1.199	1.400

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.