Workshop Manual

Audi TT 2007 ➢

6-speed manual gearbox 02Q, four-wheel drive

Edition 10.2009

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Repair Group

00 - Technical data

30 - Clutch

34 - Controls, housing

35 - Gears, shafts

39 - Final drive - front differential

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.

Contents

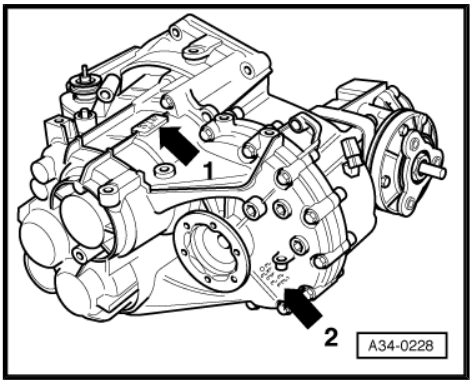
00 – Technical data

1 Gearbox identification

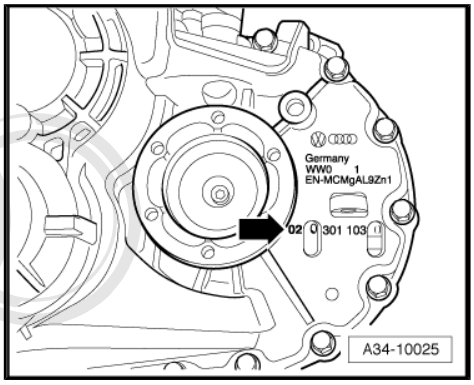
The 6-speed manual gearbox 02Q, four-wheel drive is installed in the Audi TT 2007 ‣. Allocation ⇒ page 2 .

Location on gearbox

- Code letters and date of manufacture -arrow 1-
- Manual gearbox 02Q, four-wheel drive -arrow 2-

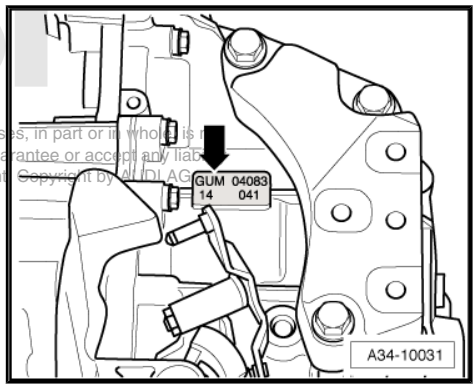


Manual gearbox 02Q, four-wheel drive -arrow-



Code letters and date of manufacture of gearbox -arrow-

Example:	GUM	04	08	3
	I	I	I	I
	Code letters	Day	Month	Year of manufacture (2003)



Additional data identify the factory where the unit was built.

Note

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

2 Code letters, allocation, transmission ratios, capacities

Manual gearbox				
Code letters		**JLV**	**JYV**	**KDP**
Manufactured	from	04.06	11.06	06.07
	to	11.06	05.07	02.08
Allocation	Model	Audi TT 2007 ‣	Audi TT 2007 ‣	Audi TT 2007 ‣
	Engine	3.2 ltr. MPI - 184 kW	3.2 ltr. MPI - 184 kW	3.2 ltr. MPI - 184 kW
Ratio	Final drive I for 1st to 4th gear	72 : 17 = 4.235	72 : 17 = 4.235	72 : 17 = 4.235
$i = Z_2 : Z_1$	Final drive II for 5th/6th gear and reverse gear	72 : 22 = 3.273	72 : 22 = 3.273	72 : 22 = 3.273
	1st gear	47 : 14 = 3.357	47 : 14 = 3.357	47 : 14 = 3.357
	2nd gear	48 : 23 = 2.087	48 : 23 = 2.087	48 : 23 = 2.087
	3rd gear	47 : 32 = 1.469	47 : 32 = 1.469	47 : 32 = 1.469
	4th gear	37 : 34 = 1.088	37 : 34 = 1.088	37 : 34 = 1.088
	5th gear	41 : 37 = 1.108	41 : 37 = 1.108	41 : 37 = 1.108
	6th gear	31 : 34 = 0.912	31 : 34 = 0.912	31 : 34 = 0.912
	Reverse gear	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990
Overall ratio $i_{ov.}$ in top gear		2.985	2.985	2.985
Capacity of manual gearbox		2.3 litres		
Capacity of bevel box		0.9 litres		
Clutch actuation		Hydraulic		

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

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

Manual gearbox				
Code letters		**KNT**	**KNZ**	**KNW**
Manufactured	from	01.08	05.08	06.08
	to	12.09	06.09	06.09
Allocation	Model	Audi TT 2007 ‣	Audi TT 2007 ‣	Audi TT 2007 ‣
	Engine	3.2 ltr. MPI - 184 kW	2.0 ltr. TFSI - 199 kW	2.0 ltr. TDI CR - 125 kW
Ratio	Final drive I for 1st to 4th gear	72 : 17 = 4.235	72 : 17 = 4.235	62 : 16 = 3.875
$i = Z_2 : Z_1$	Final drive II for 5th/6th gear and reverse gear	72 : 22 = 3.273	72 : 22 = 3.273	62 : 20 = 3.100
	1st gear	47 : 14 = 3.357	47 : 14 = 3.357	49 : 13 = 3.769

Manual gearbox				
Code letters		**KNT**	**KNZ**	**KNW**
	2nd gear	48 : 23 = 2.087	48 : 23 = 2.087	48 : 23 = 2.087
	3rd gear	47 : 32 = 1.469	47 : 32 = 1.469	45 : 34 = 1.324
	4th gear	37 : 34 = 1.088	37 : 34 = 1.088	34 : 37 = 0.919
	5th gear	41 : 37 = 1.108	34 : 31 = 1.097	37 : 41 = 0.902
	6th gear	31 : 34 = 0.912	31 : 34 = 0.912	28 : 37 = 0.757
	Reverse gear	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990	36 : 23 x 13 : 14 = 4.549
Overall ratio $i_{ov.}$ in top gear		2.985	2.985	2.826
Capacity of manual gearbox		2.3 litres		
Capacity of bevel box		0.9 litres		
Clutch actuation		Hydraulic		
The following data can be found in the ⇒ Electronic parts catalogue . ♦ Gear oil specification ♦ Bevel box gear oil specification ♦ Allocation of drive shaft flange type ♦ Allocation of clutch type ♦ Rear final drive identification				

Manual gearbox				
Code letters		**KXY**	**KZN**	**KZV**
Manufactured	from to	06.09	12.09	06.09
Allocation	Model Engine	Audi TT 2007 ▸ 2.0 ltr. TDI CR - 125 kW	Audi TT 2007 ▸ 3.2 ltr. MPI - 184 kW	Audi TT 2007 ▸ 2.0 ltr. TFSI - 199 kW
Ratio	Final drive I for 1st to 4th gear	62 : 16 = 3.875	72 : 17 = 4.235	72 : 17 = 4.235
$i = Z_2 : Z_1$	Final drive II for 5th/6th gear and reverse gear	62 : 20 = 3.100	72 : 22 = 3.273	72 : 22 = 3.273
	1st gear	49 : 13 = 3.769	47 : 14 = 3.357	47 : 14 = 3.357
	2nd gear	48 : 23 = 2.087	48 : 23 = 2.087	48 : 23 = 2.087
	3rd gear	45 : 34 = 1.324	47 : 32 = 1.469	47 : 32 = 1.469
	4th gear	34 : 37 = 0.919	37 : 34 = 1.088	37 : 34 = 1.088
	5th gear	37 : 41 = 0.902	41 : 37 = 1.108	34 : 31 = 1.097
	6th gear	28 : 37 = 0.757	31 : 34 = 0.912	31 : 34 = 0.912
	Reverse gear	36 : 23 x 13 : 14 = 4.549	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990
Overall ratio $i_{ov.}$ in top gear		2.826	2.985	2.985
Capacity of manual gearbox		2.3 litres		
Capacity of bevel box		0.9 litres		
Clutch actuation		Hydraulic		

Manual gearbox			
Code letters	**KXY**	**KZN**	**KZV**
The following data can be found in the ⇒ Electronic parts catalogue . ♦ Gear oil specification ♦ Bevel box gear oil specification ♦ Allocation of drive shaft flange type ♦ Allocation of clutch type ♦ Rear final drive identification			

3 Transmission layout

Identification

Arrows point in direction of travel

1 - Engine

2 - Clutch

3 - Manual gearbox

4 - Input shaft

5 - Output shaft II for 5th, 6th and reverse gear

6 - Output shaft I for 1st - 4th gear

7 - Differential

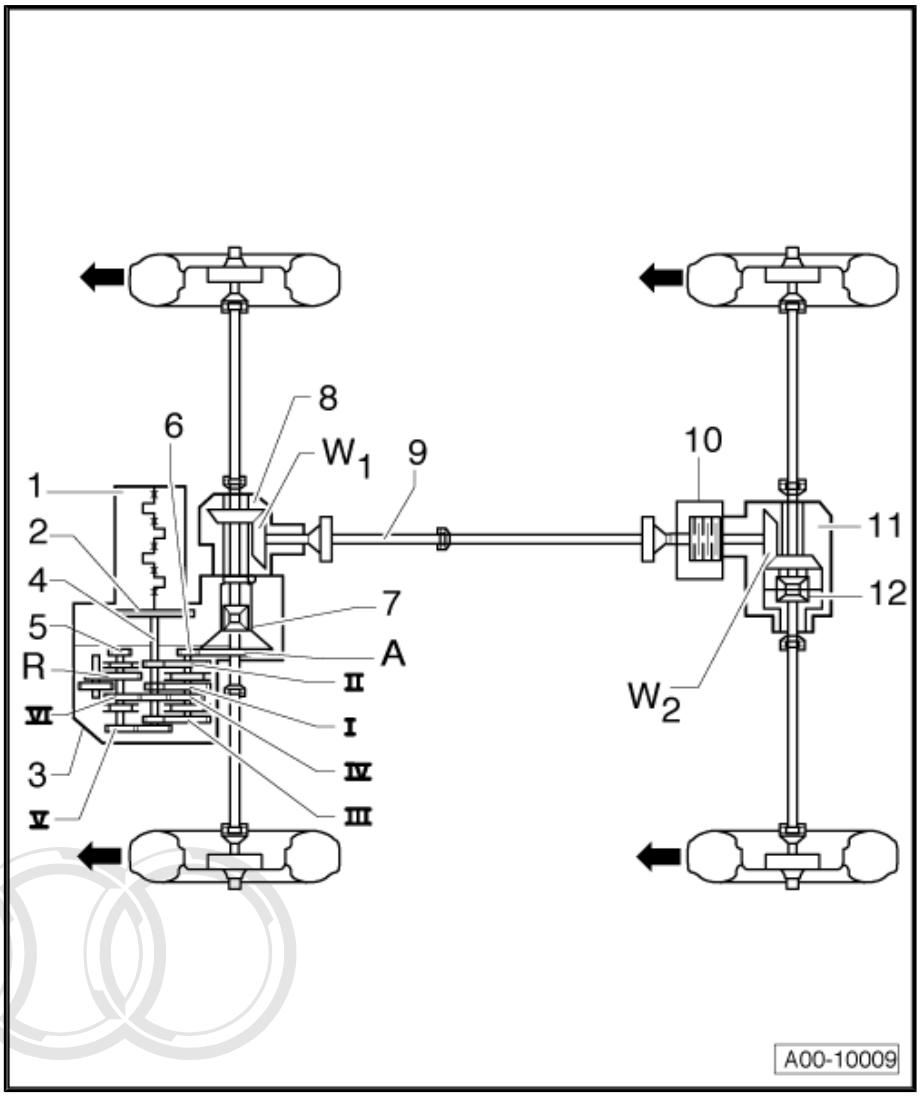
8 - Bevel box

9 - Propshaft

10 - Haldex coupling

11 - Rear final drive

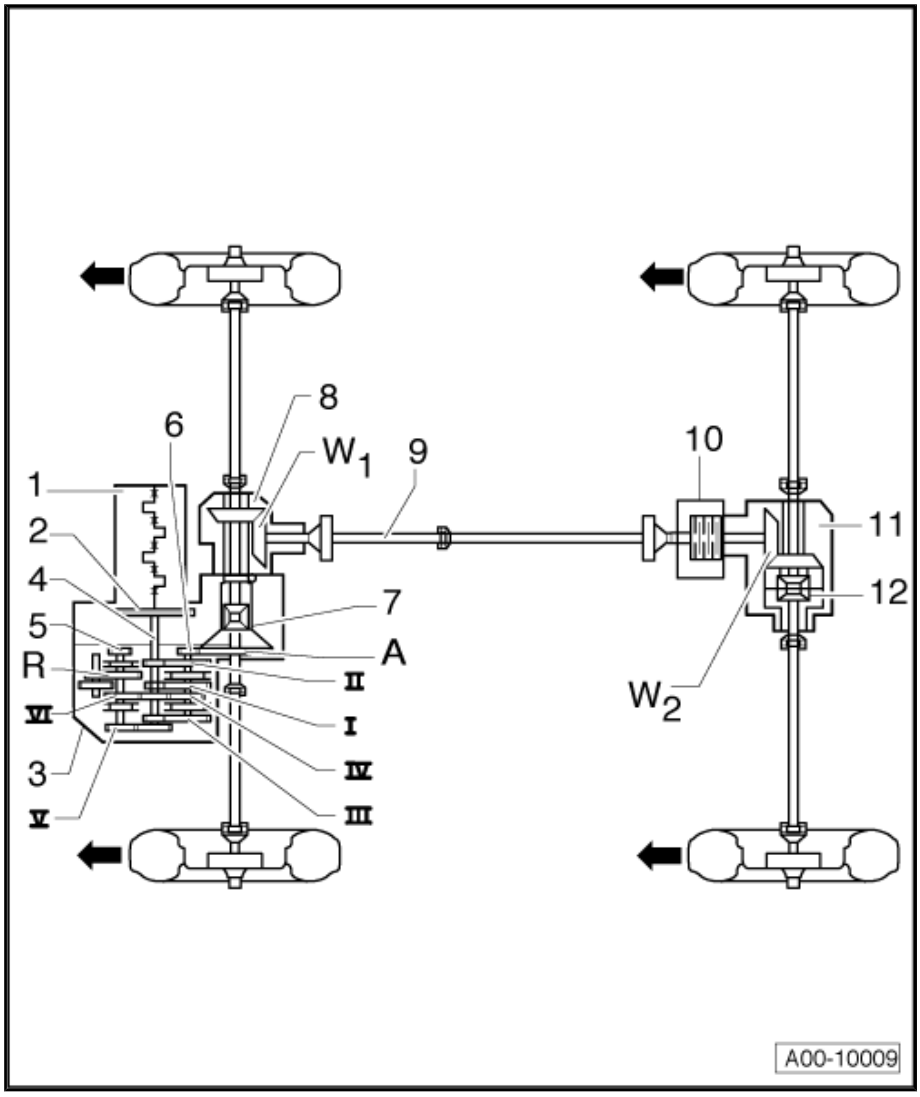
12 - Differential



Ratio

Arrows point in direction of travel

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



3.1 Calculating ratio “i”

Example:

	6th gear	Final drive
Drive gear	$ZG_1 = 34$	$ZA_1 = 22$
Driven gear	$ZG_2 = 31$	$ZA_2 = 72$

$i = ZG_2 : ZG_1$ [1)]

i_G = gear ratio = $ZG_2 : ZG_1 = 31 : 34 = 0.912$

i_A = axle ratio = $ZA_2 : ZA_1 = 72 : 22 = 3.273$

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

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

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.

4.1 Contact corrosion!

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

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

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

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

Please note:

- The gearbox casing is made of a magnesium alloy.
- Use only genuine spare parts: these have been fully tested and are compatible with aluminium.
- We recommend the use of accessories approved by Audi.

Caution

Damage caused by contact corrosion is not covered under warranty.

4.2 Repair instructions

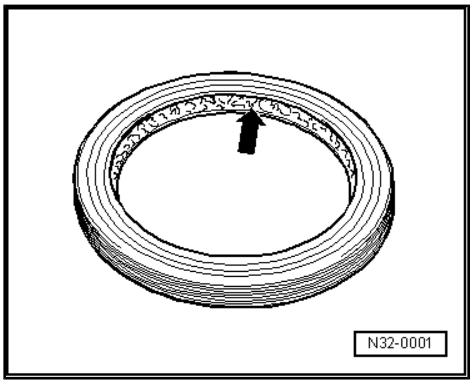
Special tools

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

Gearbox

- Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- When installing the gearbox, ensure that the dowel sleeves between the engine and the gearbox are correctly located.
- For allocation of bolts and other components, refer to ⇒ Electronic parts catalogue .
- Clean contact surfaces when assembling mounting brackets and waxed components. The contact surfaces must be free of wax and grease.
- After installing a replacement gearbox with bevel box, check oil level in gearbox ⇒ page 138 and bevel box ⇒ page 150 .
- Capacities ⇒ page 2 , specifications ⇒ Electronic parts catalogue .

Oil seals, seals, O-rings and gaskets



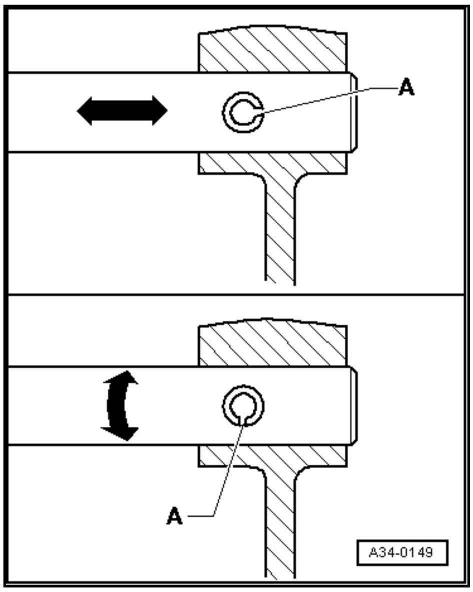
- Always renew oil seals, O-rings and gaskets.
- After removing gaskets and seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- Before installing oil seals, lightly oil the outer circumference of the seal and fill the space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

- Lightly lubricate O-rings with oil before installation to prevent them being trapped during assembly.
- After installing new gaskets, O-rings and oil seals, check oil level in manual gearbox ⇒ page 138 and bevel box ⇒ page 150 .

Sealants

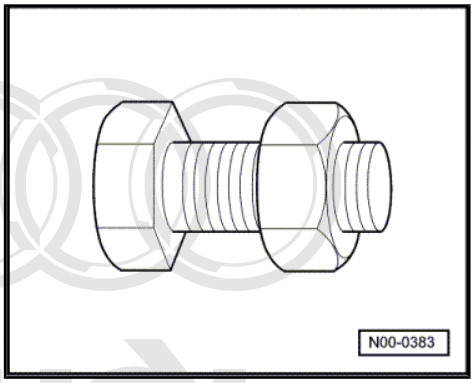
- Thoroughly clean joint surfaces on gearbox housing etc. before applying sealing paste.
- Apply sealing paste -AMV 188 200 03- evenly and not too thick.
- Breather holes must remain free of sealing paste.

Locking elements



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

Nuts, bolts

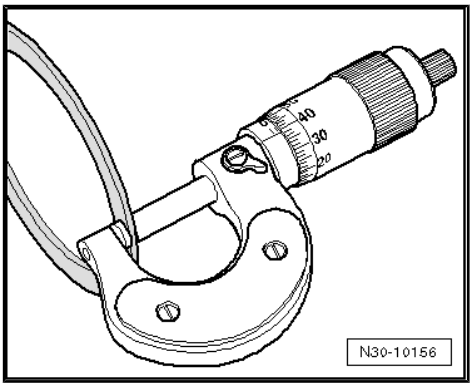


- Loosen the nuts and bolts in reverse sequence to the specified tightening sequence.
- Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- Renew self-locking nuts and bolts.
- The tightening torques stated apply to non-oiled nuts and bolts.
- Threaded holes which take self-locking bolts or bolts coated with locking fluid must be cleaned (using a tap or similar). Otherwise there is a danger of the bolts shearing off the next time they are removed.
- For all threaded connections, ensure that (where applicable) the contact surfaces and the nuts and bolts are not coated with wax until after assembly is completed.

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.

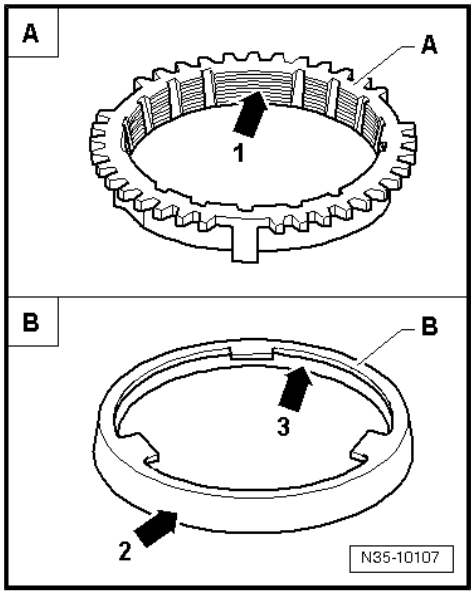
Shims



- 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.
- Install only shims which are in perfect condition.

Synchro-rings

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



Gear wheels

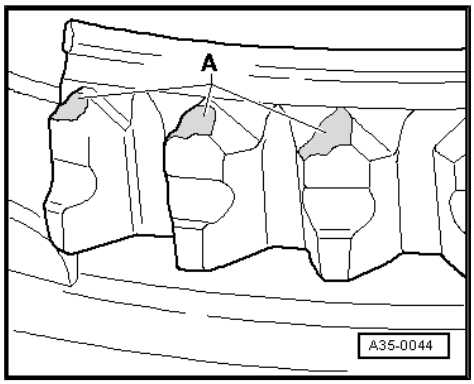
- Clean before pressing on.
- Use inductive heater -VAS 6414- to heat to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.

Selector gears and locking collars

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

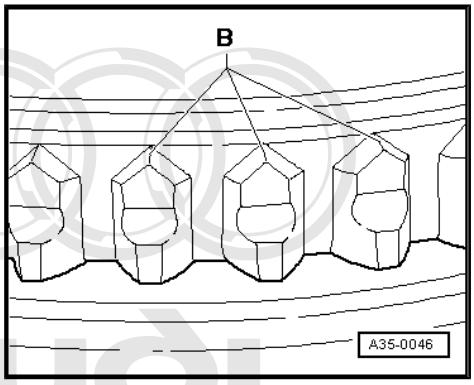
- Abnormal wear on synchro-ring or selector gear:

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



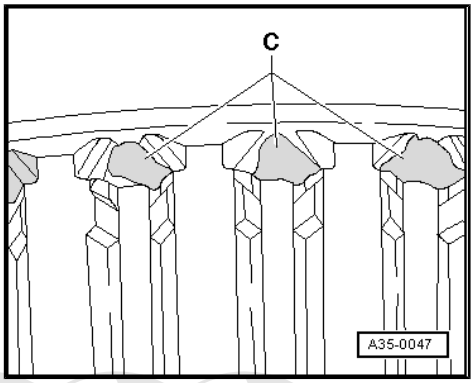
- In comparison: intact synchro-ring or selector gear:

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



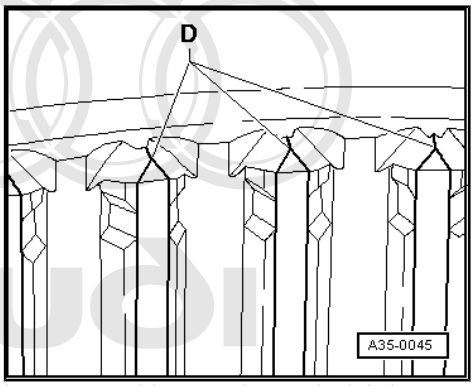
♦ Abnormal wear on locking collar:

C - Worn chamfer on internal splines of locking collar.



♦ In comparison: intact locking collar:

D - Intact chamfer on internal splines of locking collar.



Clutch actuation, clutch

♦ If the clutch pedal does not return to its initial position after releasing it (clutch pedal in rest position), you must bleed the clutch system (further measures ⇒ page 12).

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

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

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

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

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

30 – Clutch

1 Overview - clutch mechanism

Note

If you suspect a defective clutch master cylinder or clutch slave cylinder, pay attention to
⇒ "1.1 Notes on removing and installing clutch master cylinder and slave cylinder", page 12 and perform
⇒ "1.2 Function check for clutch master cylinder and slave cylinder", page 13 prior to renewing.

I -
⇒ "2 Exploded view - pedal cluster, clutch master cylinder", page 15

⇒ "2.1 Removing and installing over-centre spring", page 16

⇒ "2.2 Removing and installing clutch pedal", page 18

⇒ "2.3 Removing and installing mounting bracket", page 21

⇒ "2.4 Removing and installing clutch position sender G476 ", page 23

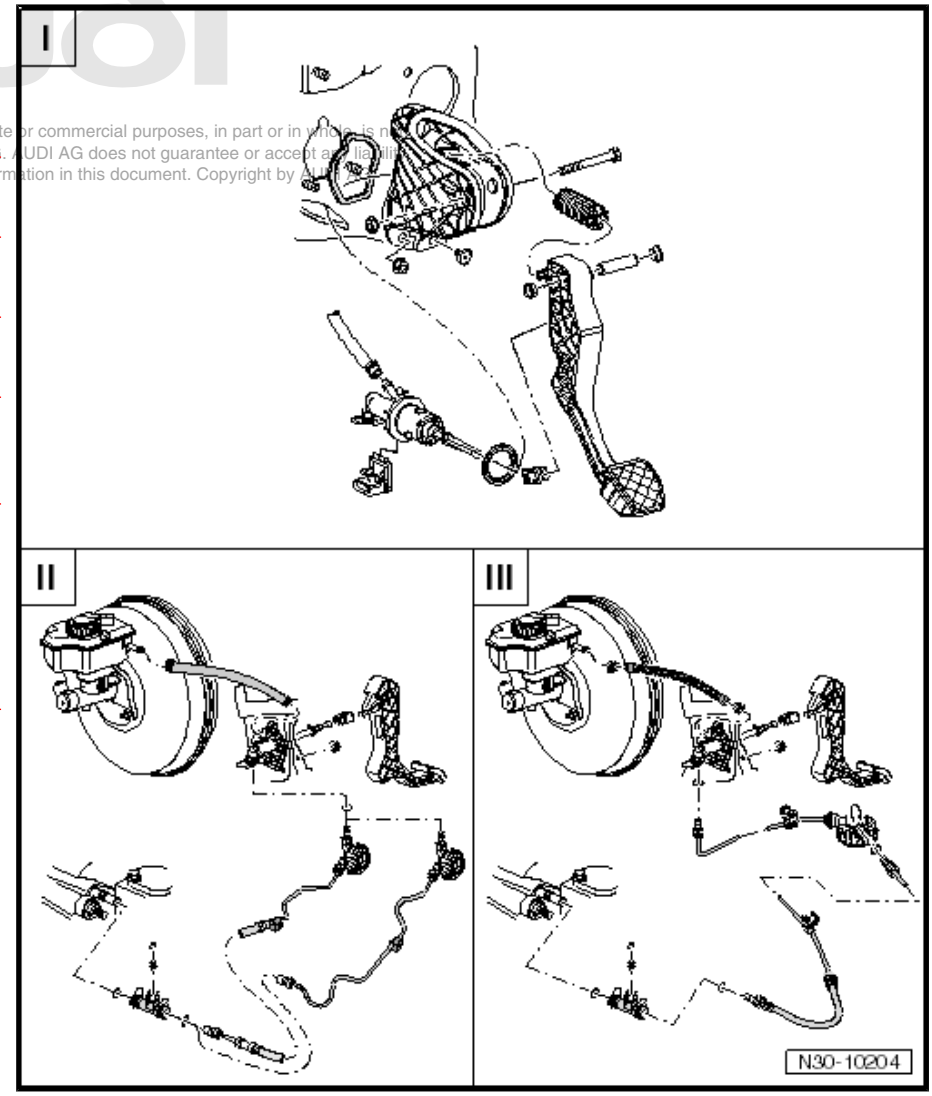
⇒ "2.5 Removing and installing clutch master cylinder", page 24

II -
⇒ "3 Exploded view - hydraulics (LHD)", page 27

⇒ "3.1 Removing and installing pipe/hose assembly or plastic pipe", page 29

⇒ "3.2 Bleeding clutch system", page 31

III -
⇒ "4 Exploded view - hydraulics (RHD)", page 33



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

- Before renewing the clutch master cylinder or slave cylinder on the assumption that it is defective you must first carry out a function check

⇒ “1.2 Function check for clutch master cylinder and slave cylinder”, page 13 .

- 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.

1.2 Function check for clutch master cylinder and slave cylinder

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

Noises when operating the clutch:

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

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

- Check whether the clutch pedal returns all the way to its initial position, thereby uncovering the vent opening in the master cylinder.
- The vent opening is integrated in the clutch master cylinder. It is not visible from the outside.
- The vent opening must be uncovered, otherwise the permanent self-bleeding function for the hydraulic clutch system will no longer be effective.

- Make the customer aware that the driver must NOT rest his/her foot on the clutch pedal for long periods of time. This could impair the self-bleeding function of the clutch system as the vent opening in the master cylinder can no longer function.
- The self-bleeding function of the clutch system can be impaired if the footwell trim or floor mats get trapped, if the clutch pedal switch jams or if the driver rests his foot on the clutch pedal for long periods of time.

Check the complete hydraulic system for leaks.

- Check brake fluid level in brake fluid reservoir.
- Check clutch master cylinder and slave cylinder as well as the pipe/hose assembly including connections for external leaks (visual inspection).
- If you identify any leaks you must renew the leaking component.
- Bleed clutch system ⇒ page 12 .

Pedal forces:

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

High pedal force:

- Mechanical fault on pressure plate/clutch plate ⇒ page 39 or ⇒ page 45

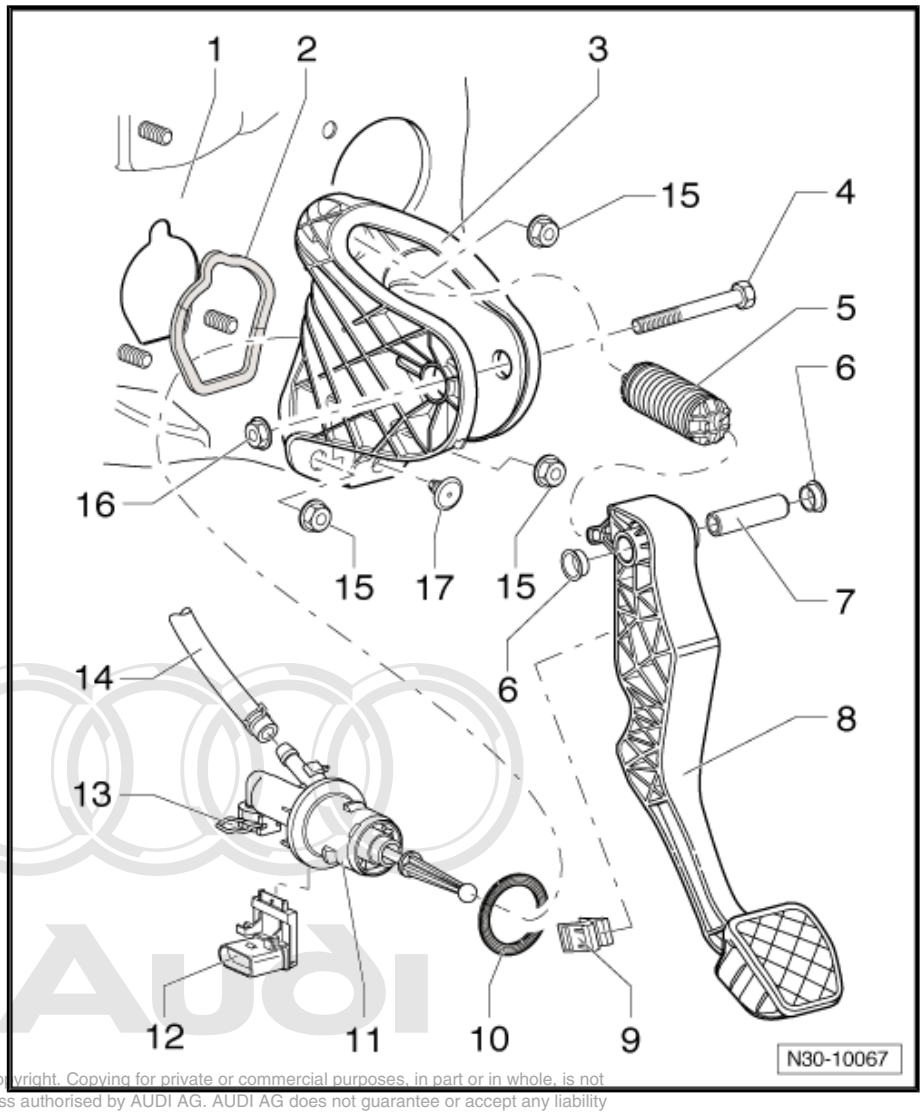
Clutch does not disengage or does not disengage fully:

- Air in hydraulic system: bleed clutch system ⇒ page 12 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
- Mechanical fault on pressure plate/clutch plate ⇒ page 39 or ⇒ page 45
- Wrong components used or components forgotten when carrying out repair work (e.g. intermediate plate or dowel sleeves).

2 Exploded view - pedal cluster, clutch master cylinder

Note

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



1 - Bulkhead

- ❑ With mounting for mounting bracket

2 - Gasket

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

3 - Mounting bracket

- ❑ For clutch pedal
- ❑ Removing and installing ⇒ page 21

4 - Bolt

5 - Over-centre spring

- ❑ Removing and installing ⇒ page 16

6 - Bearing bush

7 - Pivot pin

8 - Clutch pedal

- ❑ Removing and installing ⇒ page 18
- ❑ If fitting new pedal rubber, cut to required size as described ⇒ page 16

9 - Retaining clip

- ❑ For operating rod on clutch master cylinder

10 - Seal

- ❑ Renew
- ❑ Between master cylinder and mounting bracket

11 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 24

12 - Clutch position sender -G476-

- ❑ Removing and installing ⇒ page 23
- ❑ Checking in “Guided Fault Finding” ⇒ Vehicle diagnosis, 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

- ❑ Made of rubber or plastic, depending on version
- ❑ Plastic supply hose with additional seals ⇒ page 28

15 - Nut

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

16 - Nut

- ❑ 25 Nm
- ❑ Self-locking
- ❑ Renew

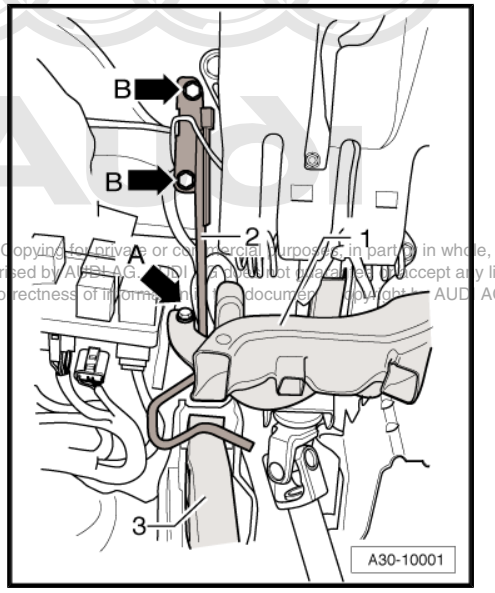
17 - Stop

- ❑ For clutch pedal

Crash bar - tightening torque

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

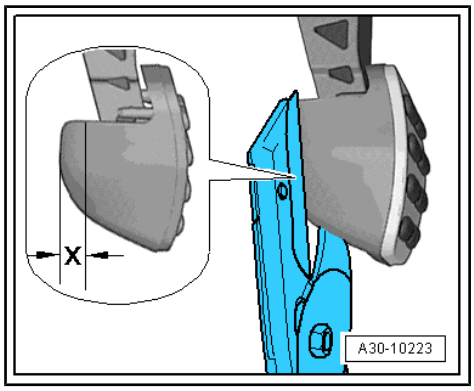
- M6 10 Nm
- M8 20 Nm



Renewing pedal rubber for clutch pedal

– Cut new clutch pedal rubber to size as illustrated.

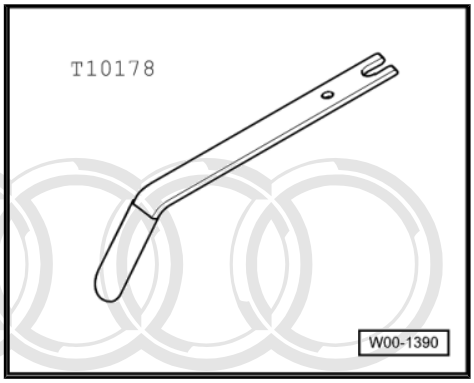
- Dimension -x- = 20 mm



2.1 Removing and installing over-centre spring

Special tools and workshop equipment required

♦ Assembly tool -T10178-



♦ Grease -G 000 450 02-

Removing

- Clutch pedal mounting bracket fitted in vehicle

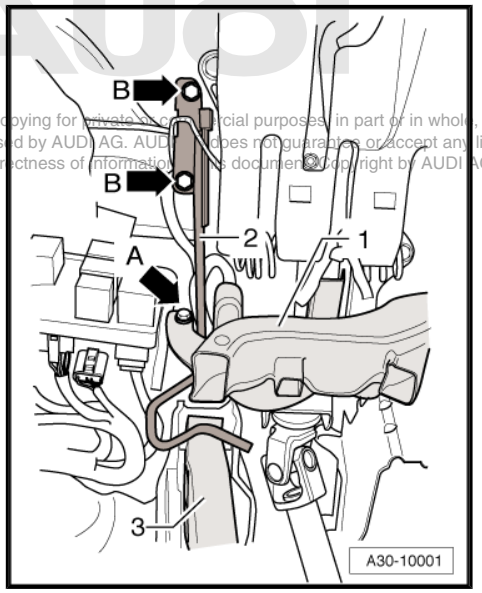
– Move driver's seat away from pedals.

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

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

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

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

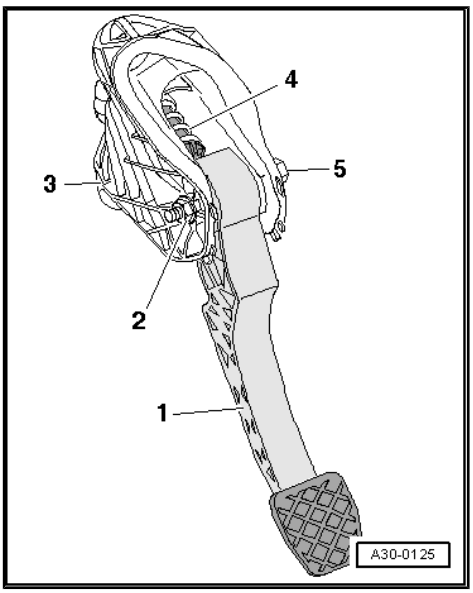


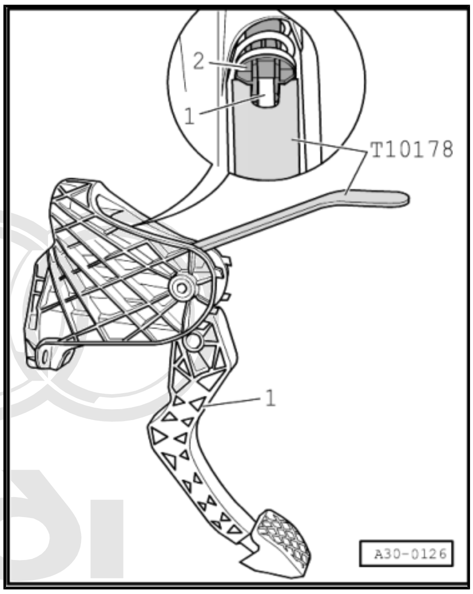
– Unbolt clutch pedal -1- from mounting bracket -3-. To do this, remove nut -2- and pull out bolt -5-.

Note

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

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





Installing

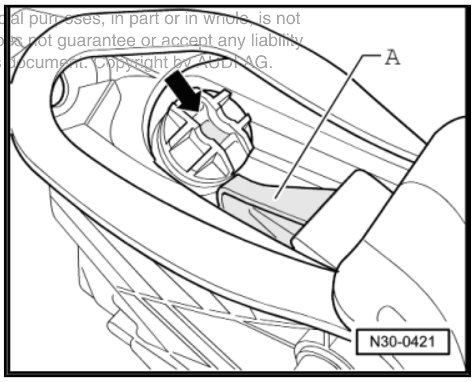
- Tightening torque ⇒ page 15

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 16 .

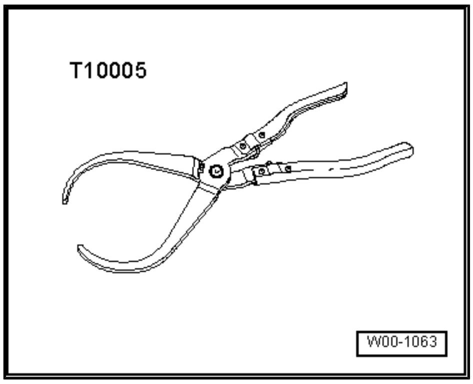
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .

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

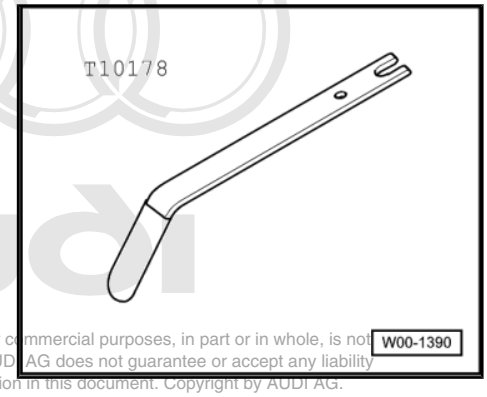
2.2 Removing and installing clutch pedal

Special tools and workshop equipment required

- ♦ Pliers -T10005-



♦ Assembly tool -T10178-



♦ Grease -G 000 450 02-

Removing

• Clutch pedal mounting bracket fitted in vehicle

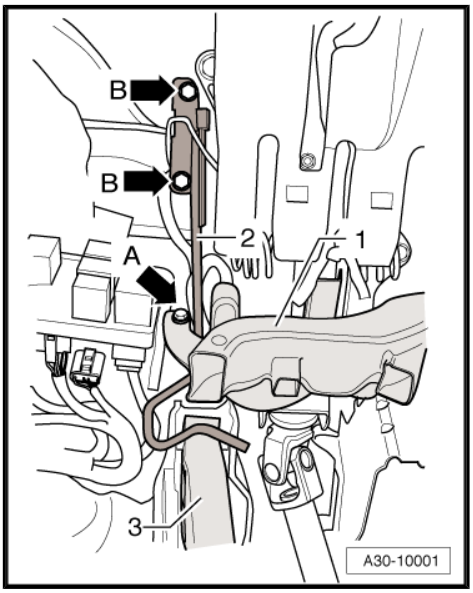
– Move driver's seat away from pedals.

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

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

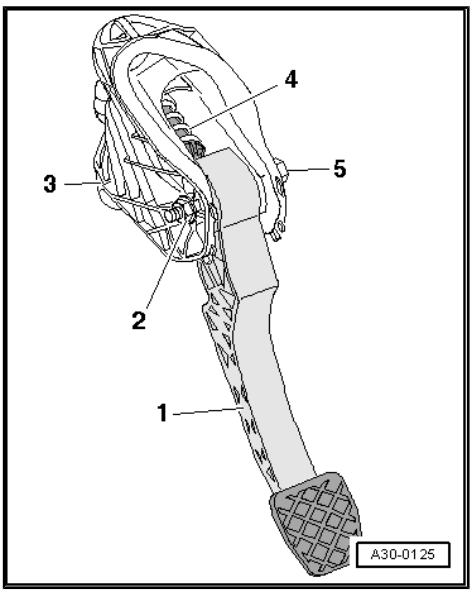
– Unclip wiring harness at rear of footwell air outlet -1- and move clear to one side.

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

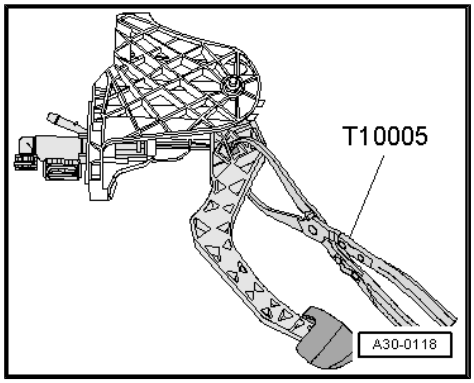


– Unbolt clutch pedal -1- from mounting bracket -3-. To do this, remove nut -2- and pull out bolt -5-.

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



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



Installing

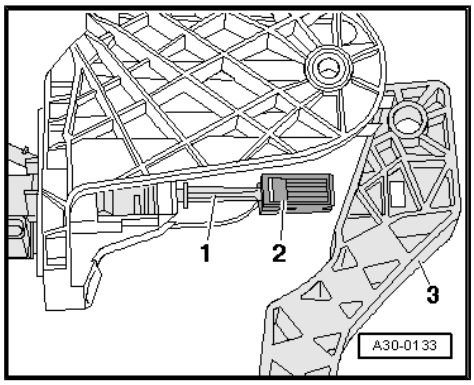
• Tightening torque ⇒ page 15

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

Note

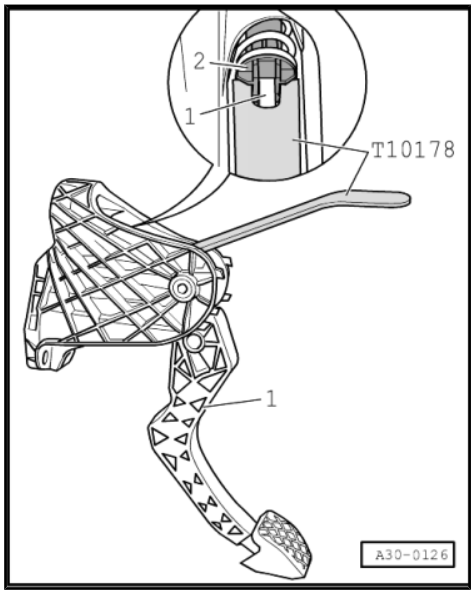
♦ *Renew self-locking nut.*

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



– Install retaining clip -2- on operating rod -1- of master cylinder.
– Press retaining clip into mounting on clutch pedal so that it snaps into place.

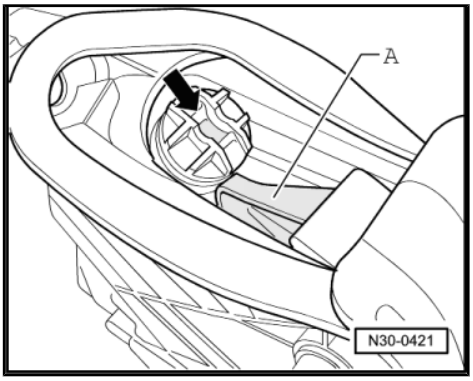
– Fit over-centre spring -2- into mounting bracket from above while holding end of spring in correct position with assembly tool -T10178- .



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

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

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



Note

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

– Install crash bar ⇒ page 16 .

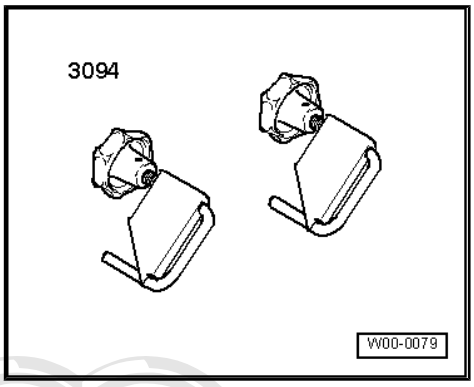
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .

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

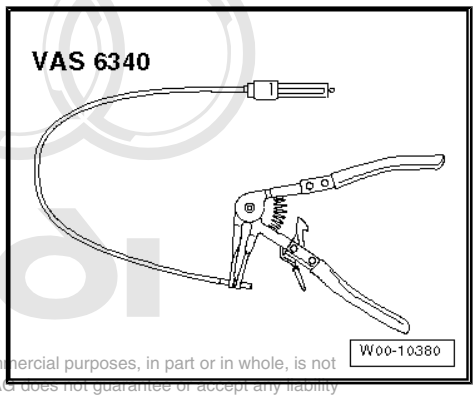
2.3 Removing and installing mounting bracket

Special tools and workshop equipment required

♦ Hose clamp, up to Ø 25 mm -3094-



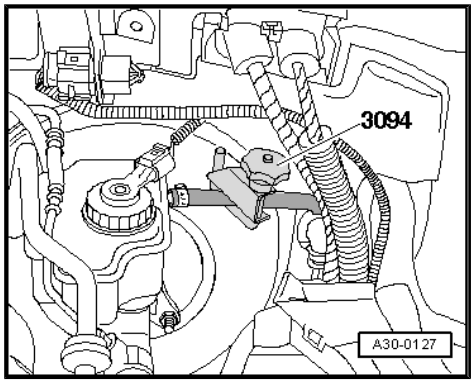
♦ Hose clip pliers -VAS 6340-



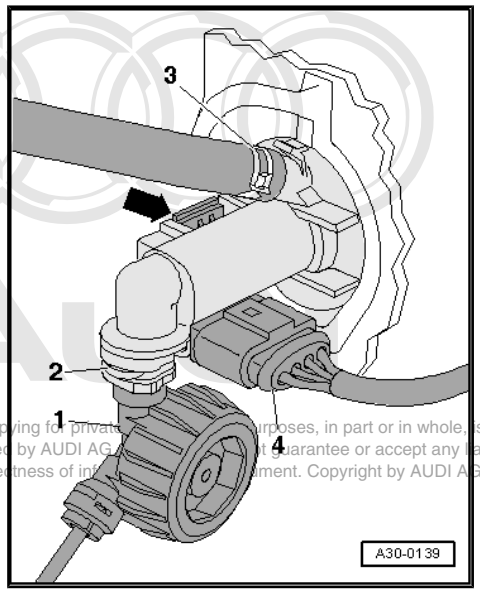
Removing

Note

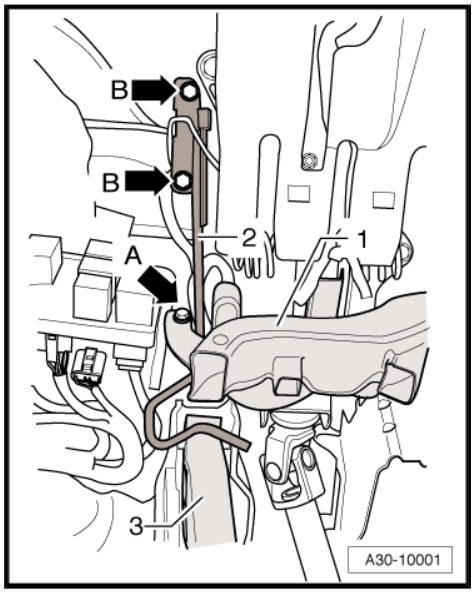
In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below. If this does happen, clean the affected area thoroughly.



– Use hose clamp -3094- to clamp off supply hose to clutch 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- or plastic pipe from clutch master cylinder.
– Unclip and detach clutch position sender -G476- from clutch master cylinder -arrow-. Electrical connector -4- can remain connected.

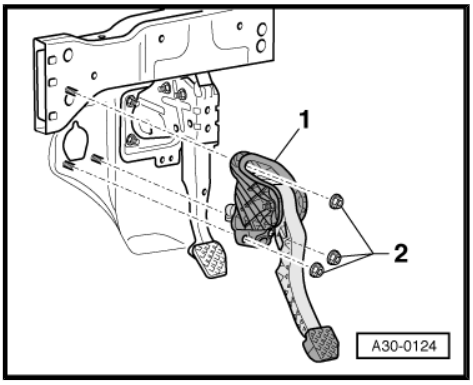


– Move driver's seat to rear as far as possible and move steering wheel into uppermost position.
– Remove storage compartment on driver's side ⇒ Rep. Gr. 68 .
– Unscrew bolt -arrow A- and remove footwell air outlet (front left) -1-.
– Unclip wiring harness at rear of footwell air outlet -1- and move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

Note

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

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



Installing

• Tightening torque ⇒ page 15

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

Note

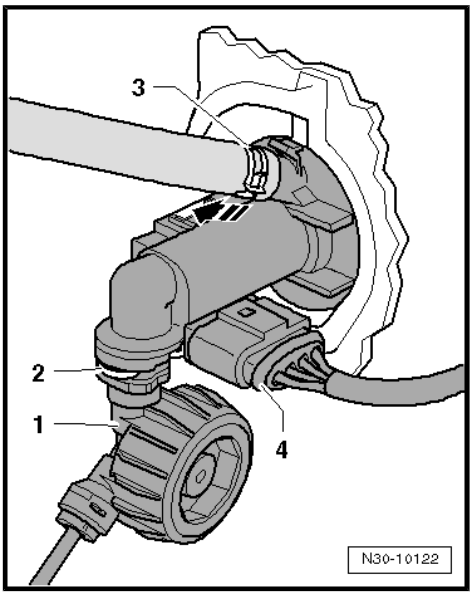
♦ *Renew self-locking nuts.*
♦ *Secure all hose connections with the correct hose clips (as original equipment); refer to ⇒ Electronic parts catalogue .*

– Fit mounting bracket -1- and tighten nuts -2-.
– Install pipe/hose assembly or plastic pipe ⇒ page 29 .
– Bleed clutch system ⇒ page 31 .
– Install crash bar ⇒ page 16 .
– Install front footwell vent (left-side) ⇒ Rep. Gr. 80 .
– Install storage compartment on driver's side ⇒ Rep. Gr. 68 .

2.4 Removing and installing clutch position sender -G476-

Removing

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



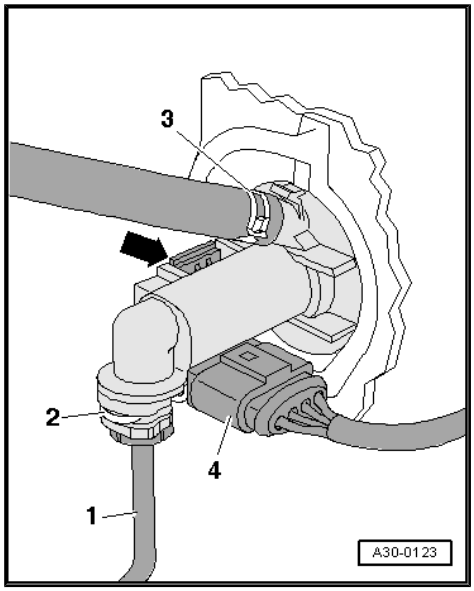
Note

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

Installing

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

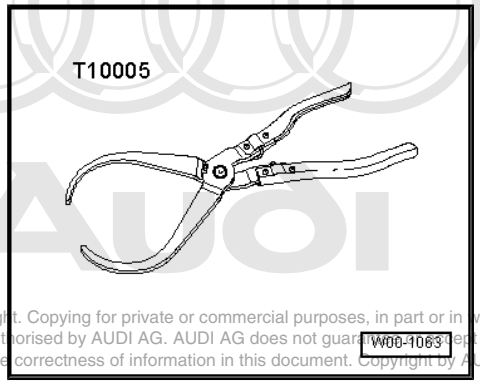
– Attach electrical connector -4-.



2.5 Removing and installing clutch master cylinder

Special tools and workshop equipment required

♦ Pliers -T10005-



Removing

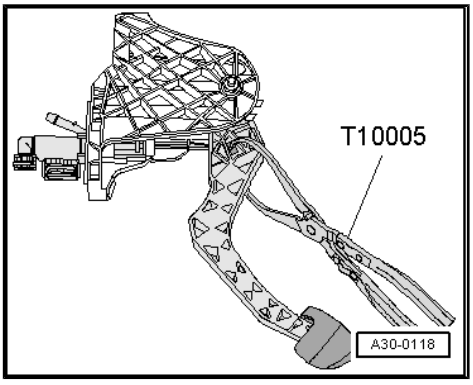
Note

♦ *If you suspect a defective clutch master cylinder, perform function test prior to renewing*
⇒ "1.1 Notes on removing and installing clutch master cylinder and slave cylinder", page 12 .

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

– Remove mounting bracket ⇒ page 21 .

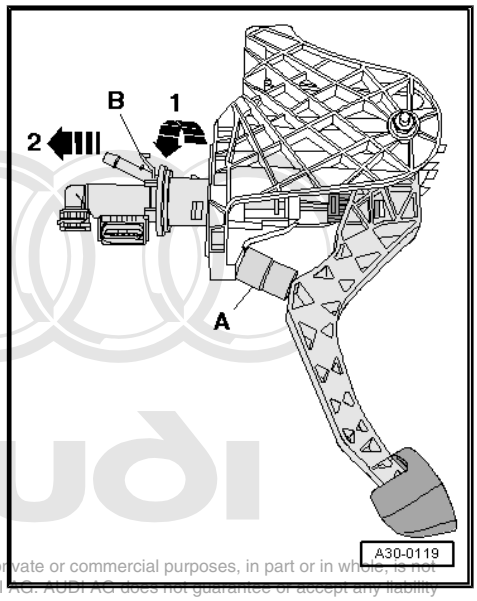
– Release retaining clip for operating rod on clutch pedal using pliers -T10005- .



– 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)

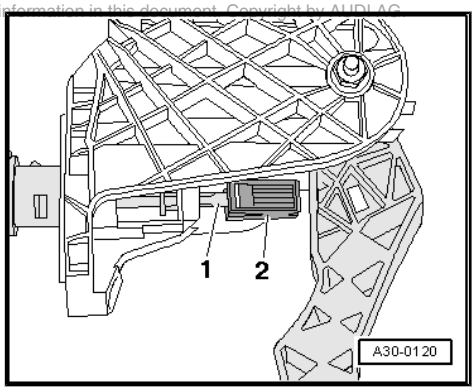
– Release retainer clip -B- and pull master cylinder out of mounting bracket -arrow 1- and -arrow 2-.



Installing

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

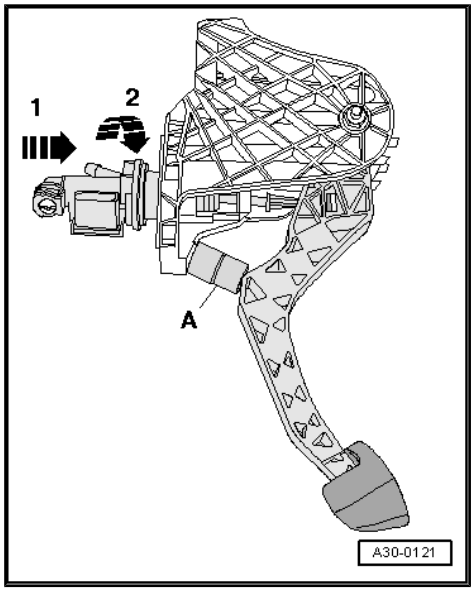
– Install retaining clip -2- on operating rod -1- for clutch master cylinder.



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

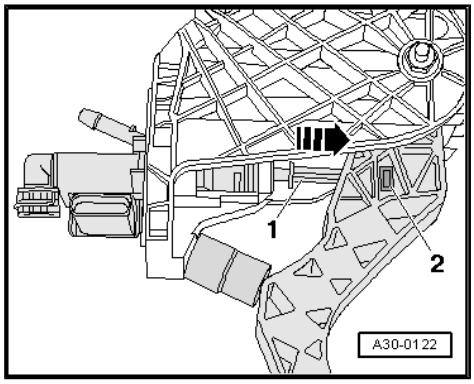
• Length of spacer = approx. 40 mm (e.g. $^{1}/_{2}$” socket)

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

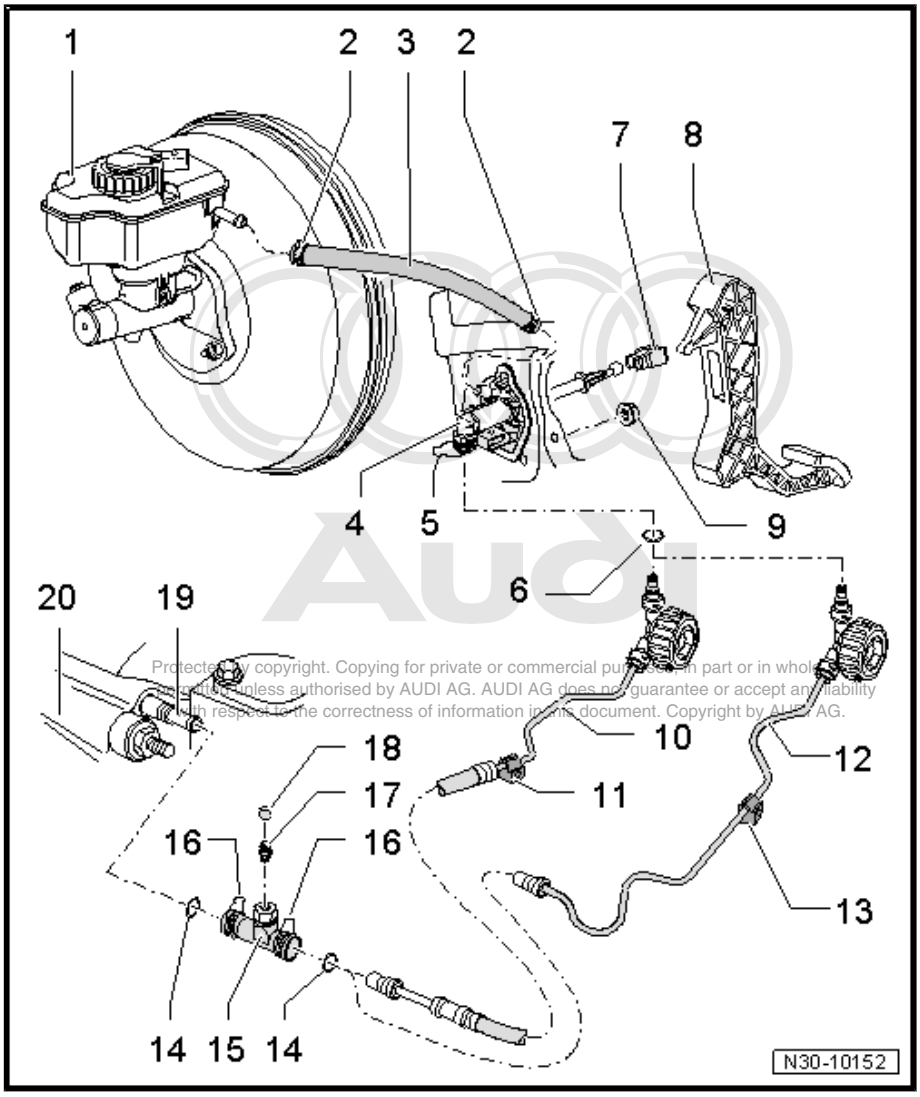


– Press operating rod -1- for master cylinder in direction of -arrow- so that retaining clip -2- snaps into place in clutch pedal.

– Install mounting bracket ⇒ page 21 .



3 Exploded view - hydraulics (LHD)



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 28

4 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 24

5 - Clip

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

6 - Seal or O-ring

- ❑ Renew damaged seals or 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 28
- ❑ 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 ⇒ page 18

8 - Clutch pedal

- ❑ Removing and installing ⇒ page 18

9 - Nut

- ❑ For securing mounting bracket to bulkhead
- ❑ Tightening torque ⇒ Item 15 (page 16)

10 - Pipe/hose assembly

- ❑ Removing and installing ⇒ page 29
- ❑ Different types depending on gearbox version
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

11 - Bracket

- ❑ For pipe/hose assembly ⇒ Item 10 (page 27)
- ❑ Secured on body
- ❑ Identification of brackets ⇒ page 29

12 - Plastic pipe

- ❑ Removing and installing ⇒ page 29

- ❑ Different types depending on gearbox version
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

13 - Bracket

- ❑ For plastic pipe ⇒ Item 12 (page 27)
- ❑ Secured on body
- ❑ Identification of brackets ⇒ page 29

14 - Seal or O-ring

- ❑ Renew damaged seals or 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 28
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

15 - Bleeder connection

16 - Clip

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

17 - Bleeder screw

- ❑ 4.5 Nm
- ❑ Bleeding clutch system ⇒ page 31

18 - Dust cap

19 - Clutch slave cylinder with release bearing

- ❑ Can only be renewed after removing gearbox

20 - Gearbox

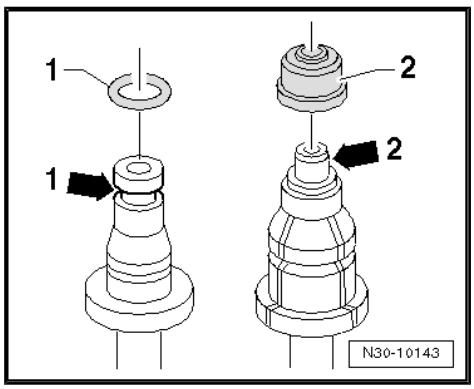
O-ring or seal for pipe/hose assembly or plastic pipe

1 - O-ring

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

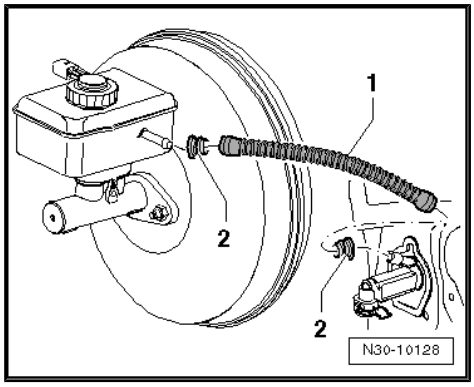
2 - Seal

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



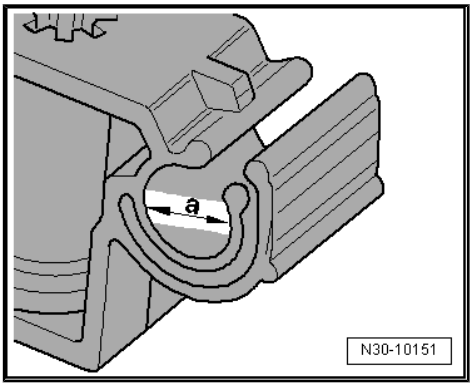
Vehicles with plastic supply hose -1-

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



Identification of brackets

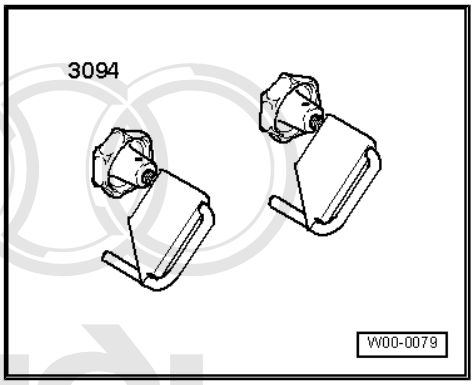
Dimension “a” (mm)	Pipe version
8	Plastic pipe
6	Pipe/hose assembly



3.1 Removing and installing pipe/hose assembly or plastic pipe

Special tools and workshop equipment required

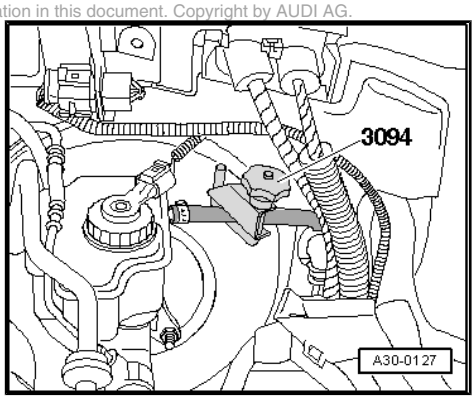
- Hose clamps, up to Ø 25 mm -3094-



Removing

– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

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

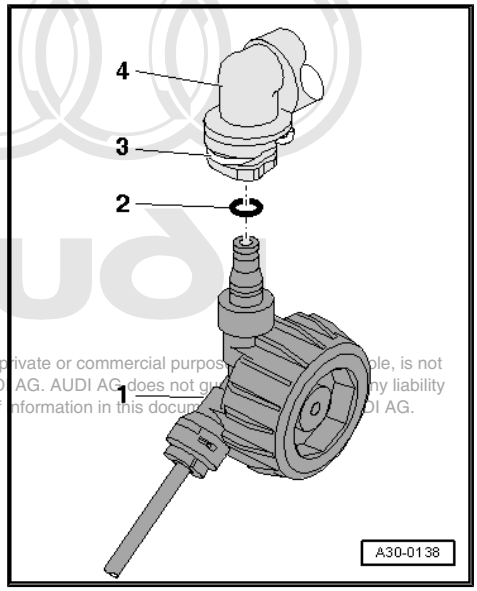


Note

- *In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below. If this does happen, clean the affected area thoroughly.*
- *Place a cloth underneath to catch escaping brake fluid.*

– To detach at clutch master cylinder, release retaining clip -3- with a screwdriver.

– Pull off pipe/hose assembly -1- or plastic pipe with O-ring -2- and detach from bracket.



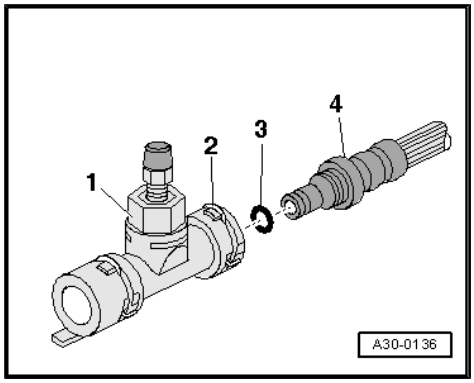
Caution

Do not depress clutch pedal after removing pipe/hose assembly or plastic pipe.

Note

Place a cloth underneath to catch escaping brake fluid.

– To detach at bleeder connection, release retaining clip -2- with a screwdriver and pull pipe/hose assembly -4- or plastic pipe with O-ring -3- off bleeder connection -1-.



Installing

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

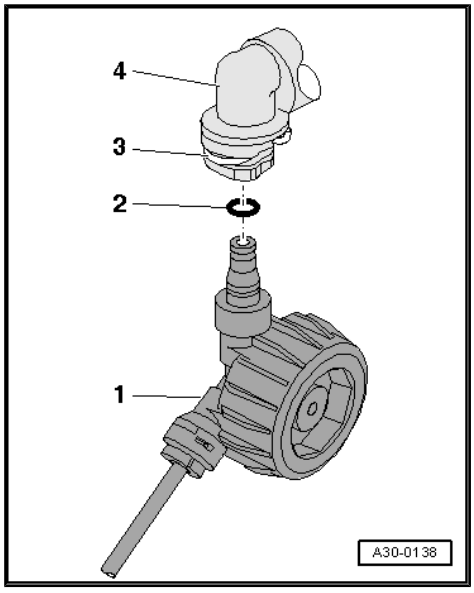
Note

For distinction between O-rings -2- and seals, refer to *⇒ page 28*

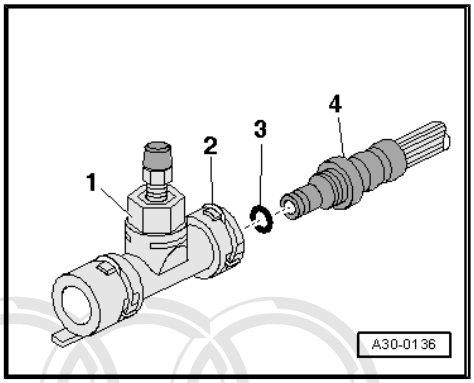
– Check O-ring -2- for damage and renew if necessary.

– Press pipe/hose assembly -1- or plastic pipe onto connection on clutch master cylinder -4- so that retaining clip -3- snaps into place.

– Pull on pipe to check it is secure.



– Check O-ring -3- for damage and renew if necessary.
– Press pipe/hose assembly -4- or plastic pipe onto bleeder connection so that retaining clip -2- snaps into place.
– Pull on pipe to check it is secure.
– Bleed clutch system ⇒ page 31 .



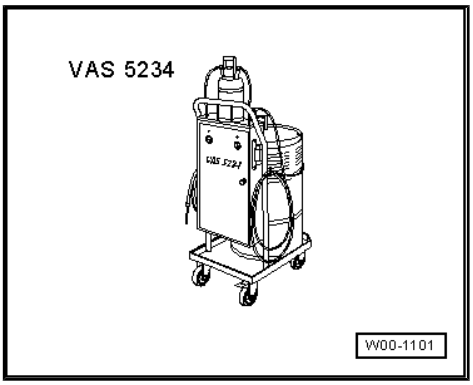
3.2 Bleeding clutch system

Note

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

Special tools and workshop equipment required

- Brake filling and bleeding equipment -VAS 5234-



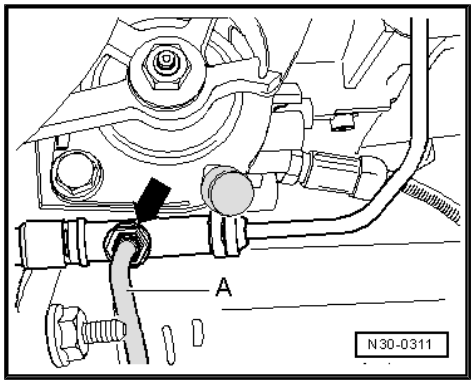
- Brake fluid specification ⇒ Rep. Gr. 47.

Procedure

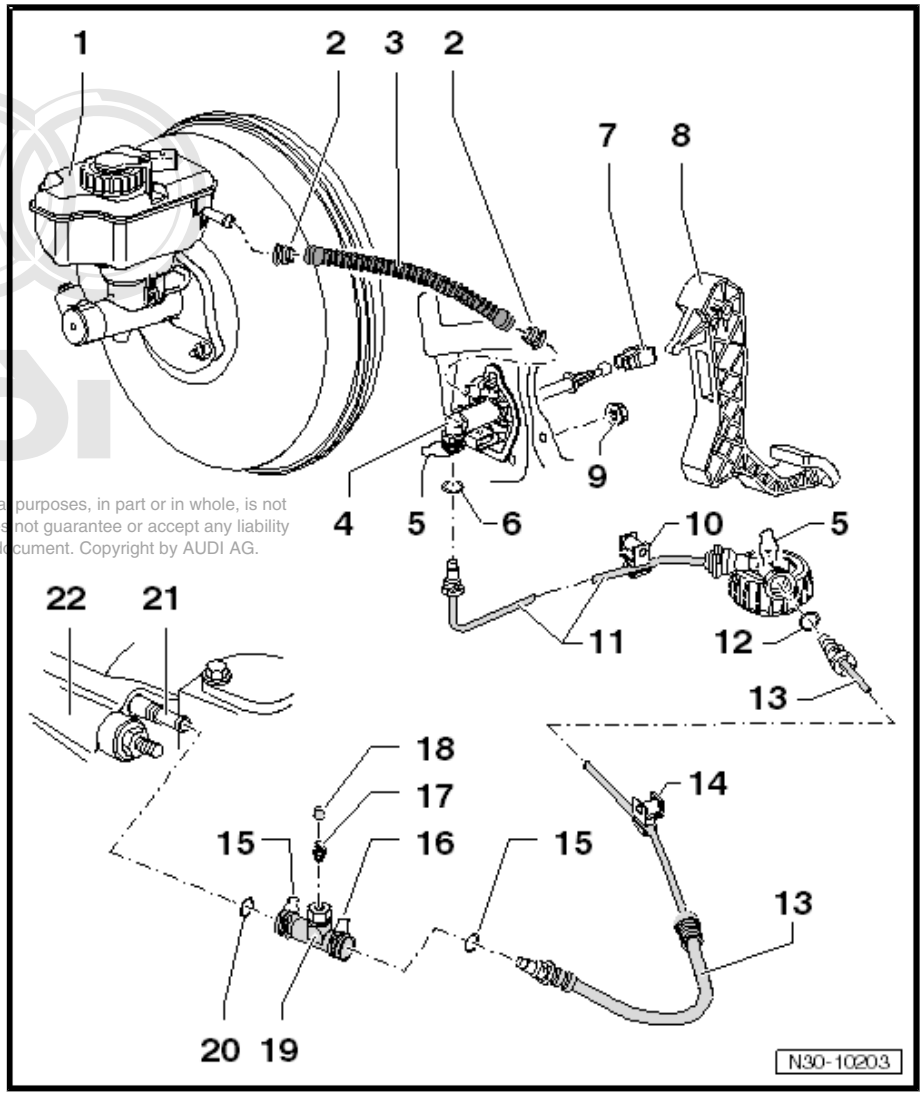
• Tightening torque ⇒ page 27

– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

– Pull clutch pedal back to its normal rest position.
– Connect brake filling and bleeding equipment -VAS 5234- to brake fluid reservoir.
– Remove protective cap from bleeder screw -arrow- and connect hose -A- from bleeder bottle to bleeder screw.
– Switch on bleeding equipment.
• Operating pressure 2.0 bar
– Now open bleeder screw approx $^1/_4$ turn and allow 100 cm^3 of brake fluid to run out.
– With bleeder screw open, pump clutch pedal rapidly all the way in and out by hand 15 to 20 times (approx. 2 times per second).
– Close bleeder screw.
– Switch off brake filling and bleeding equipment -VAS 5234- and relieve pressure from bleeding equipment.
– Now press clutch pedal slowly all the way in and out 10 times.
– Check that clutch system is functioning properly.
– Disconnect bleeder hose and fit protective cap.
– Remove brake filling and bleeding equipment -VAS 5234- from brake fluid reservoir.
– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .



4 Exploded view - hydraulics (RHD)



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 33)

4 - Clutch master cylinder

- ❑ Removing and installing ⇒ page 24

5 - Clip

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

6 - Seal or O-ring

- ❑ Matched to type of connection ⇒ page 28
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renew damaged seals or O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing

7 - Retaining clip

- ❑ To remove and install retaining clip first detach master cylinder from clutch pedal ⇒ page 18

8 - Clutch pedal

9 - Nut

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

10 - Bracket

- ❑ Secured on body

11 - Pipe

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

12 - Seal or O-ring

- ❑ Matched to type of connection ⇒ page 28
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renew damaged seals or O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing

13 - Pipe/hose assembly

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

14 - Bracket

- ❑ Secured to bracket for ABS/EDL

15 - Seal or O-ring

- ❑ Matched to type of connection ⇒ page 28
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Renew damaged seals or O-rings
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing

16 - Clip

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

17 - Bleeder screw

- ❑ Bleeding clutch system ⇒ page 31
- ❑ 4.5 Nm

18 - Dust cap

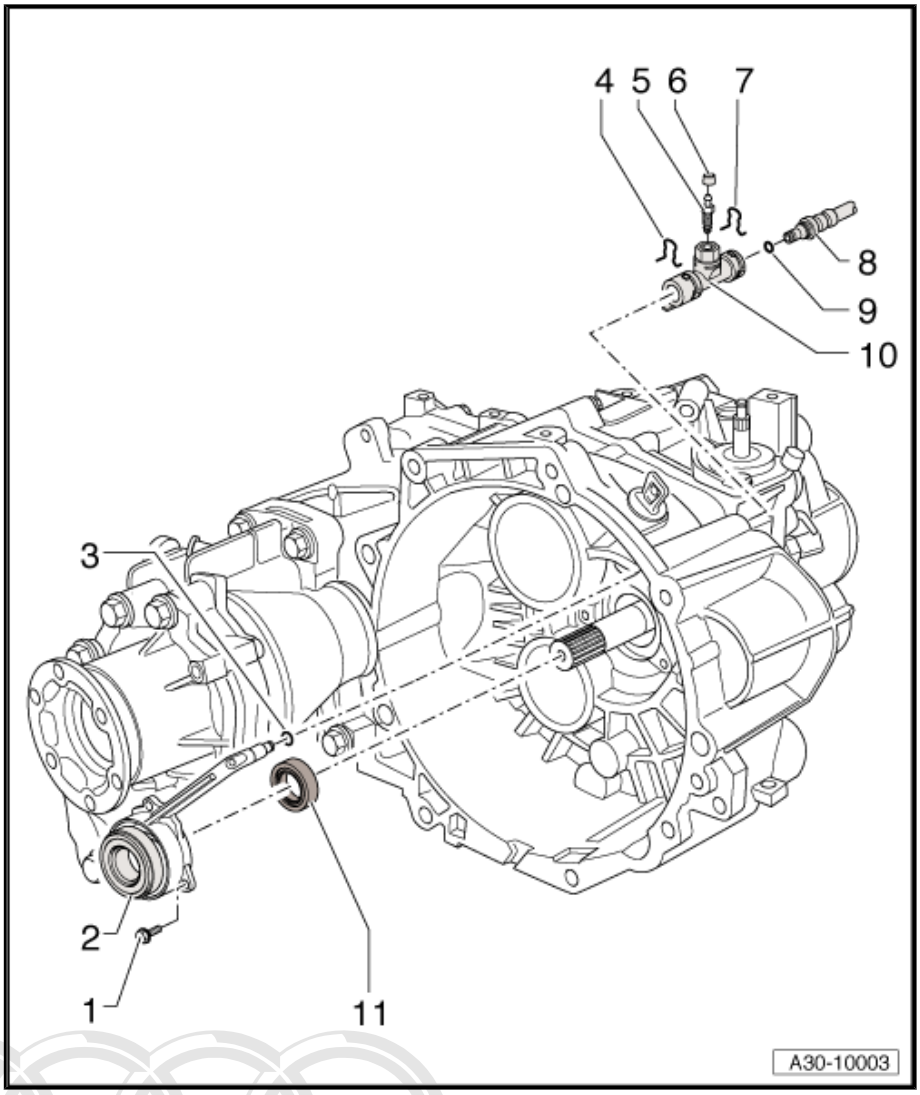
19 - Bleeder connection

20 - Clutch slave cylinder with release bearing

- ❑ Can only be renewed after removing gearbox
- ❑ Removing and installing ⇒ page 36

21 - Gearbox

5 Exploded view - clutch release mechanism, slave cylinder



1 - Bolt

- ❑ 12 Nm for metal clutch slave cylinder
- ❑ 15 Nm for plastic clutch slave cylinder
- ❑ 3x
- ❑ Renew
- ❑ Tighten bolts carefully in several small steps and in diagonal sequence; make sure that mounting lugs on slave cylinder do not break off

2 - Clutch slave cylinder with release bearing

- ❑ Slave cylinder and release bearing are one unit and can only be renewed together
- ❑ Do not wash out bearing; wipe clean only
- ❑ If bearing is noisy, renew together with slave cylinder
- ❑ Removing and installing ⇒ page 36

3 - O-ring

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

4 - Retaining clip

5 - Bleeder screw

- ❑ Tightening torque ⇒ Item 17 (page 28)

6 - Protective cap

7 - Retaining clip

8 - Pipe/hose assembly or plastic pipe

- ❑ To clutch master cylinder
- ❑ Removing and installing ⇒ page 29

9 - O-ring

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

10 - Bleeder connection

- ❑ Removing and installing ⇒ “5.1 Removing and installing clutch slave cylinder together with release bearing”, page 36

11 - Oil seal

- ❑ For input shaft

❑ Removing and installing ⇒ page 198

5.1 Removing and installing clutch slave cylinder together with release bearing

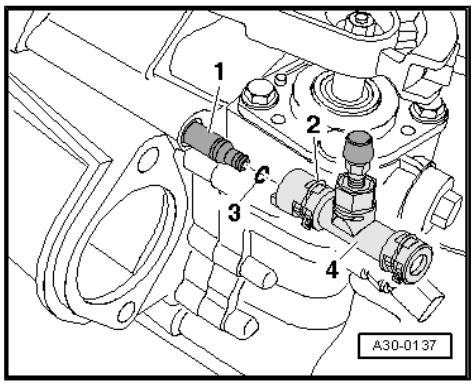
Note

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

Removing

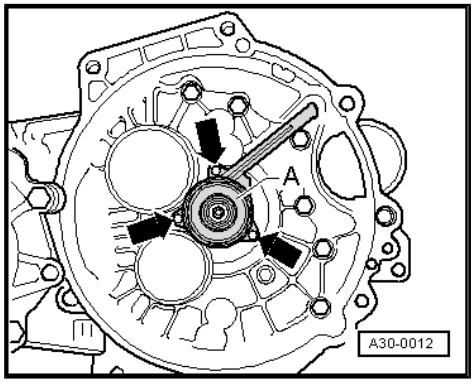
- Gearbox removed ⇒ page 82 .

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



– Remove bolts -arrows-.

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



Installing

- Tightening torque ⇒ page 35

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

Caution

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

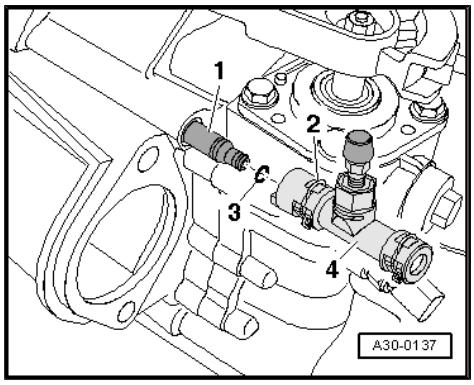
– Secure clutch slave cylinder with release bearing -arrows-.

– Check O-ring -3- for damage and renew if necessary.

– Press bleeder connection -4- onto connection on clutch slave cylinder -1- so that retaining clip -2- snaps into place.

– Pull on bleeder connection to check it is secure.

– Bleed clutch system ⇒ page 31 .



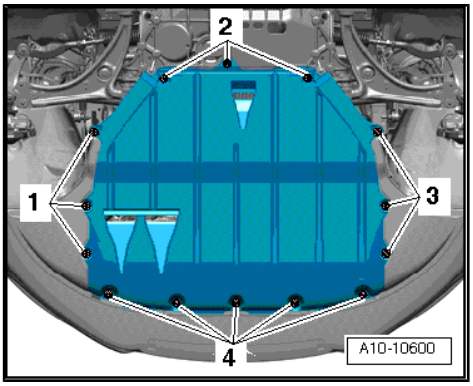
6 Clutch identification

Note

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

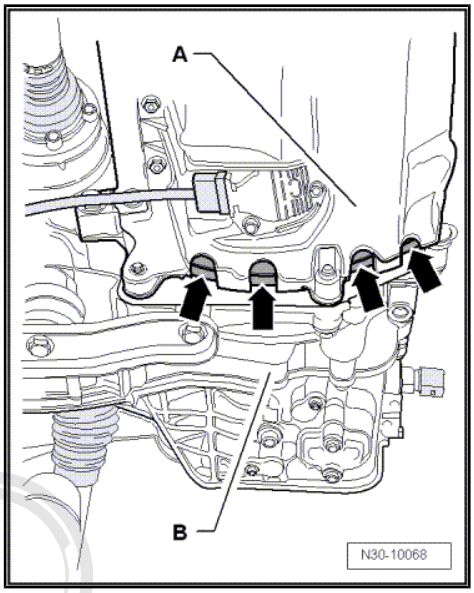
With gearbox installed, the clutch version fitted can be distinguished as follows:

– Release fasteners -1 ... 4- and remove centre noise insulation.



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.

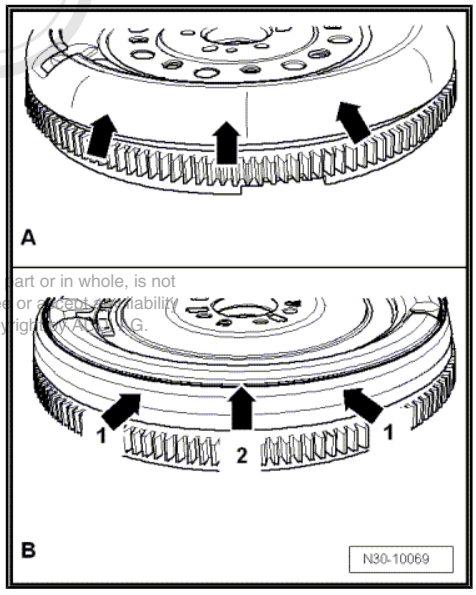


A - round contour -arrows- = Sachs version clutch

Exploded view - Sachs version clutch ⇒ page 39

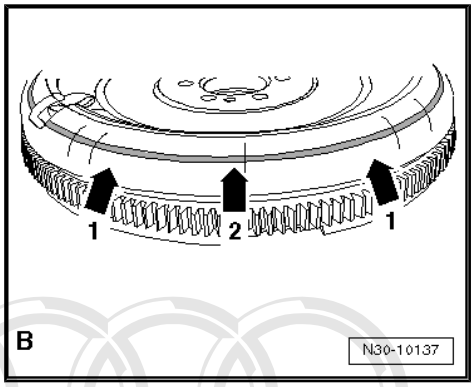
B - square contour -arrows 1- and annular groove -arrow 2- = LuK version clutch

Exploded view - LuK version clutch ⇒ page 45



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

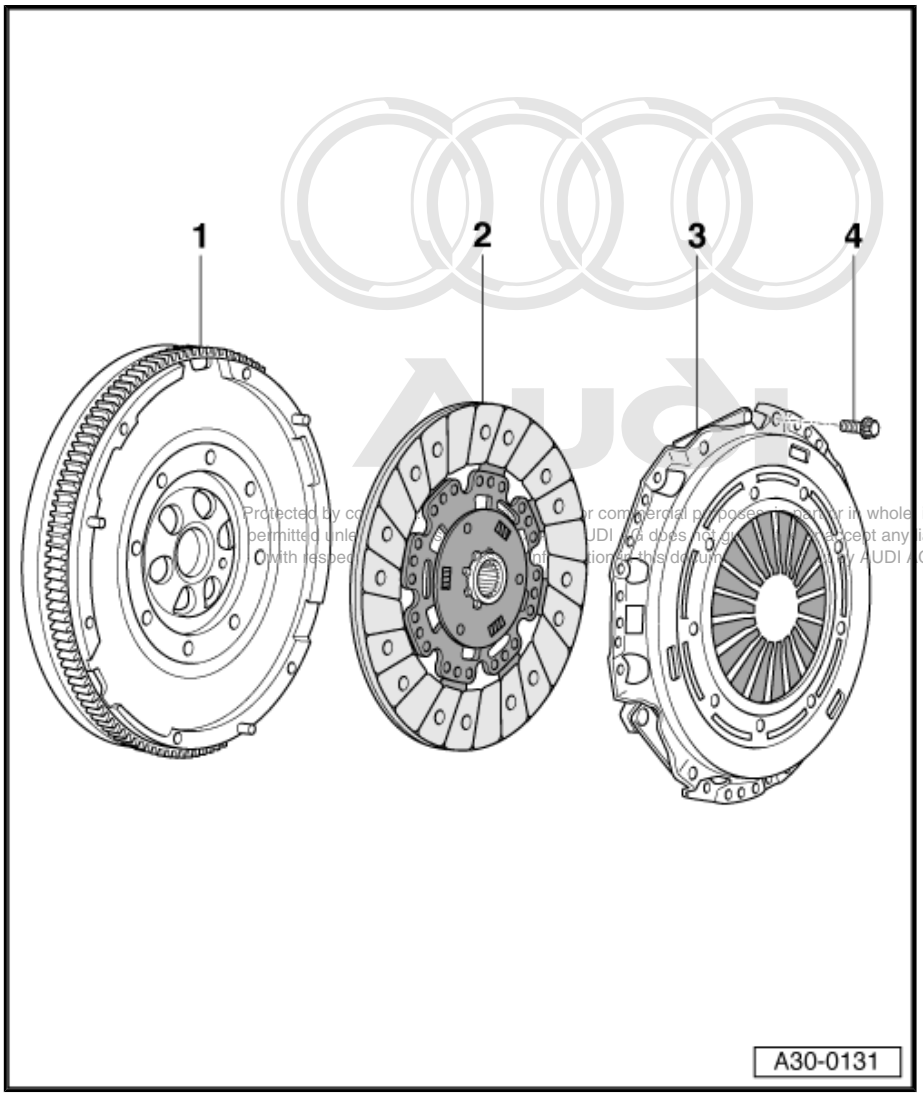
Exploded view - LuK version clutch ⇒ page 45



7 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 41

2 - Clutch plate

- ❑ Removing and installing ⇒ page 41
- ❑ Always renew pressure plate as well
- ❑ Installation position ⇒ page 44
- ❑ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

3 - Pressure plate

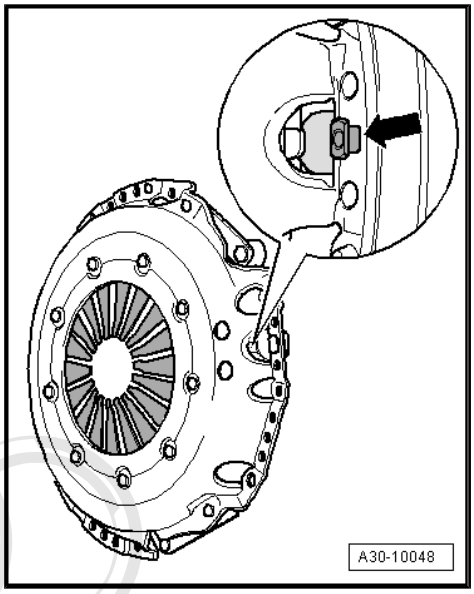
- ❑ With adjustment mechanism
- ❑ Identification ⇒ page 40
- ❑ Removing and installing ⇒ page 41
- ❑ Checking ends of diaphragm spring ⇒ page 40
- ❑ Checking springs and riveting ⇒ page 40
- ❑ Checking wire ring or sheet-metal ring ⇒ page 41
- ❑ Always renew clutch plate as well
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Contact surface for clutch lining must be free of grooves, oil and grease

4 - Bolt

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

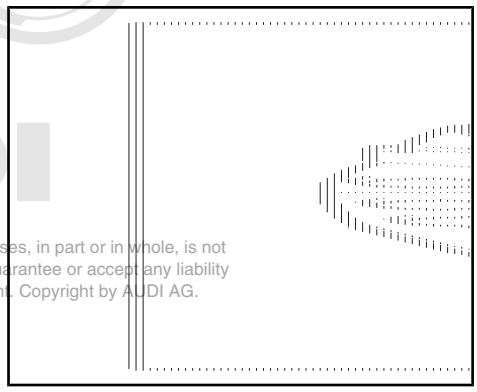
Identification of self-adjusting Sachs version clutch

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



Checking ends of diaphragm spring

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



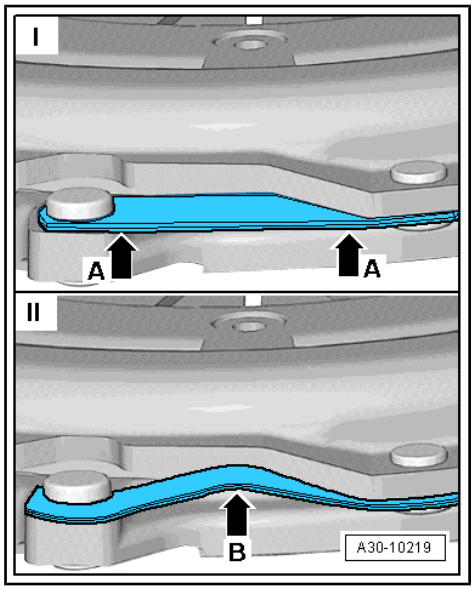
Checking springs and riveting

I - Springs OK

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

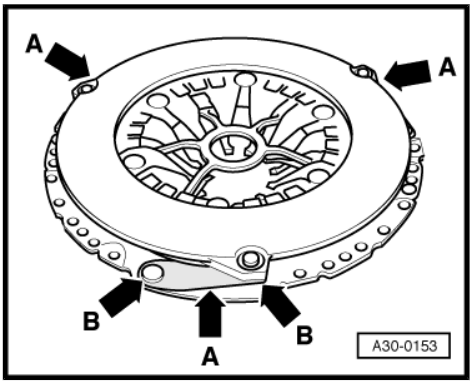
II - Springs damaged

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



– Check that rivets -arrows B- are secure at all springs -arrows A-.

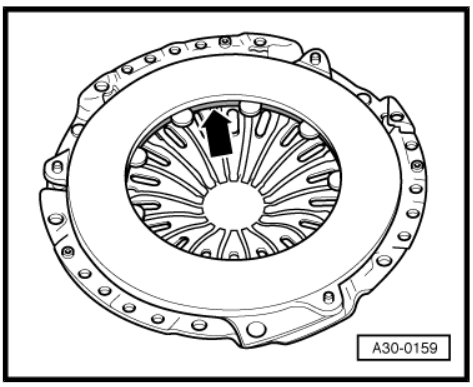
• Renew pressure plate if rivets -arrows B- are loose.



Checking wire ring or sheet-metal ring

– Check wire ring or sheet-metal ring -arrow- in pressure plate for damage.

• Renew pressure plate if wire ring or sheet-metal ring is broken.



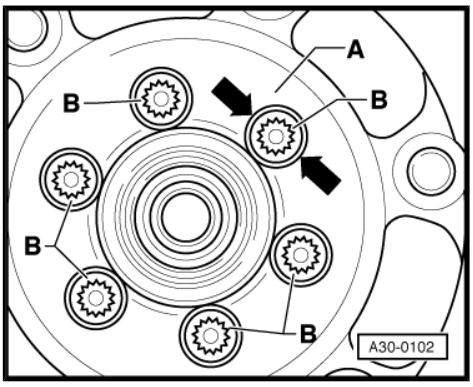
Instructions for removing dual-mass flywheel

Note

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

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

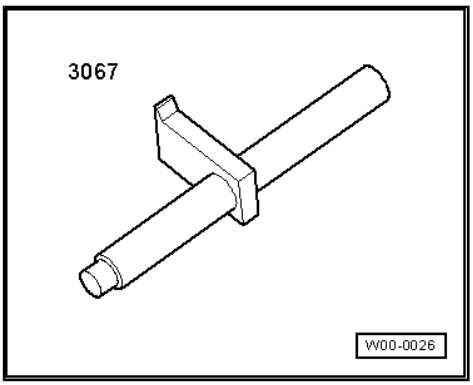
– When removing the bolts, make sure that none of the bolt heads contacts the dual-mass flywheel, as this would damage the flywheel when the bolts are unscrewed further.



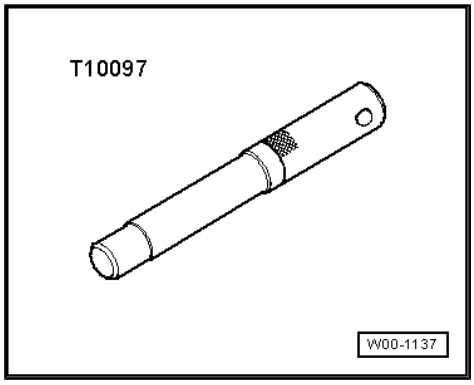
7.1 Removing and installing clutch (Sachs version)

Special tools and workshop equipment required

♦ Counterhold tool -3067-



- Centring mandrel -T10097-



- Grease for clutch plate splines -G 000 100-

Removing

- Gearbox removed ⇒ page 82 .

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:

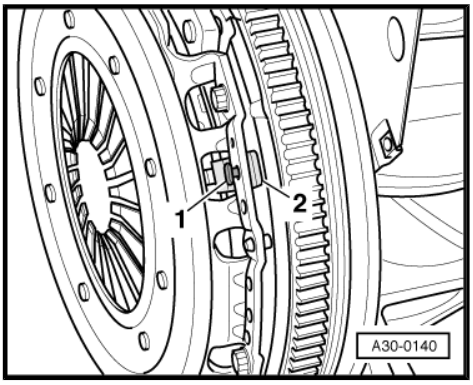
– Apply counter-hold tool -3067- in order to loosen bolts.

– 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 39

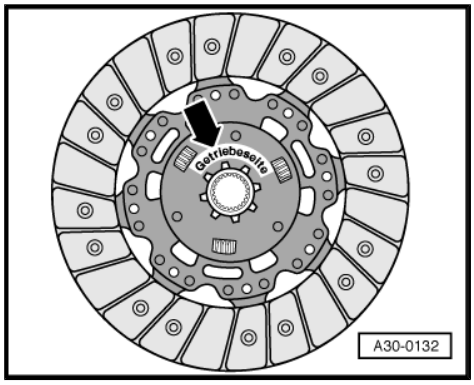
Installation is carried out in reverse sequence; note the following:

Note

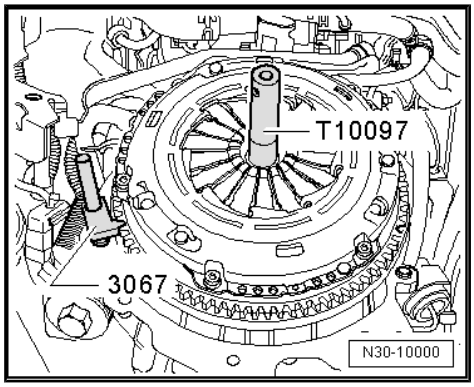
- *The dual-mass flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.*
- *Always renew clutch plate and pressure plate together and select the correct parts according to engine code ⇒ Electronic parts catalogue .*
- *If the clutch has burnt out, thoroughly clean the gearbox housing in area of clutch 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.*
- *Clutch pressure plates have an anti-corrosion coating and are greased. With the exception of the friction surface for the clutch plate, the pressure plate must not be cleaned. Otherwise the service life of the clutch will be considerably reduced.*
- *Pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then insert bolts.*
- *Only blow out dual-mass flywheel with compressed air.*
- *The friction surface of the pressure plate and the dual-mass flywheel must be cleaned (degreased) thoroughly.*
- *Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.*
- *If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).*

Installation position of clutch plate

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

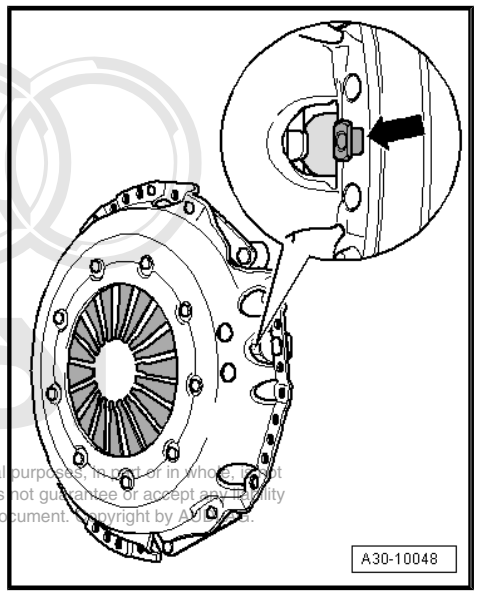


– Use counter-hold tool -3067- .
– Fit pressure plate onto dowel pins.
– Use centring mandrel -T10097- to centralise clutch plate.



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

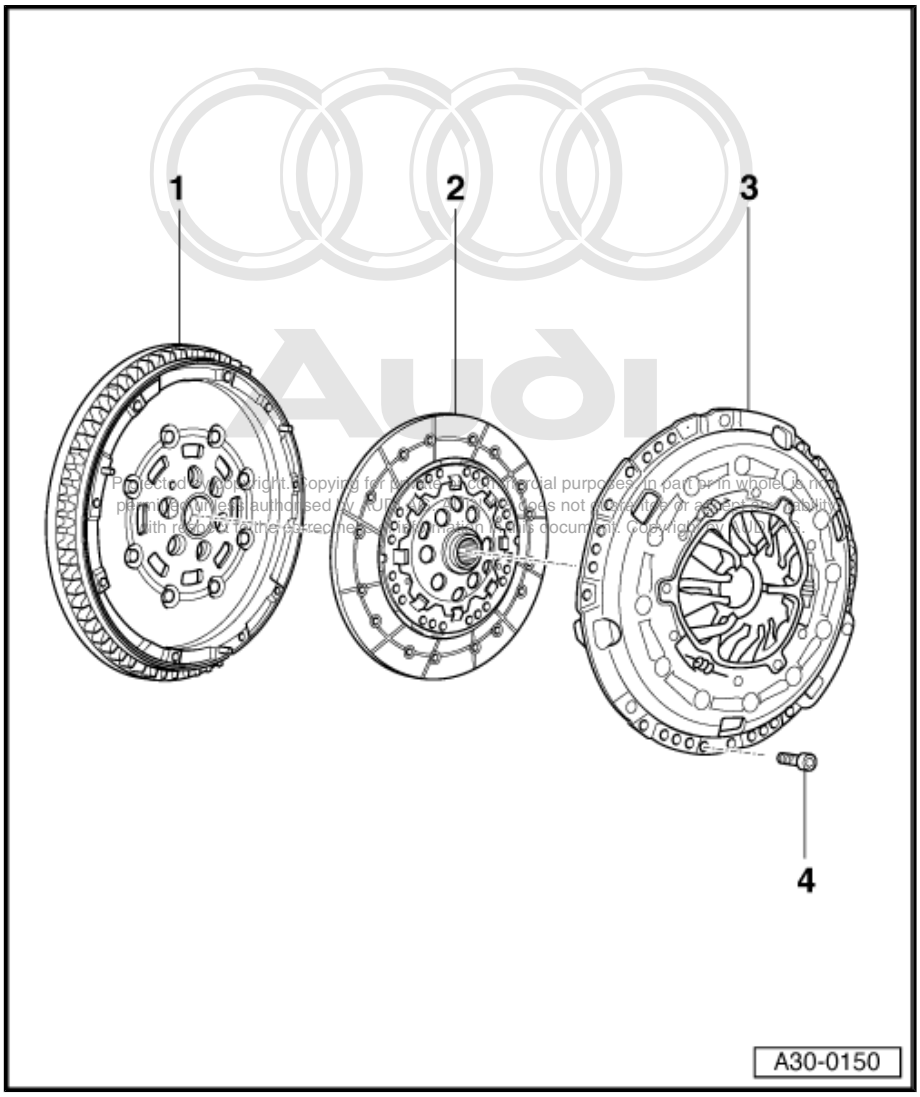
– Make sure that the stop pin (position sensor) -arrow- is free to move.
– Screw in all 6 bolts evenly by hand until bolt heads make contact with pressure plate.
– Working clockwise, tighten all six bolts consecutively in steps of 90° ($^1/_4$ turn) until the housing makes contact with the flywheel.
• 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 39)



8 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.



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 47

2 - Clutch plate

- ❑ Removing and installing ⇒ page 47
- ❑ Always renew SAC pressure plate as well
- ❑ Installation position: marking “Getriebeseite” (gear-box side) faces towards gearbox
- ❑ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

3 - SAC pressure plate

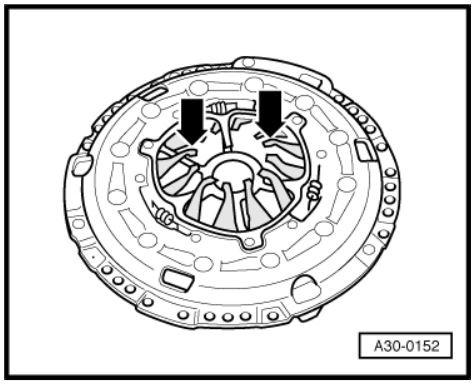
- ❑ “SAC” = self adjusting clutch
- ❑ Always renew clutch plate as well
- ❑ Removing and installing ⇒ page 47
- ❑ Checking position of adjuster ring on new SAC pressure plate ⇒ page 49
- ❑ Checking ends of diaphragm spring ⇒ page 40
- ❑ Checking spring connection and rivets ⇒ page 46
- ❑ Checking metal ring ⇒ page 46
- ❑ Contact surface for clutch lining must be free of grooves, oil and grease

4 - Bolt

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

Checking ends of diaphragm spring

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



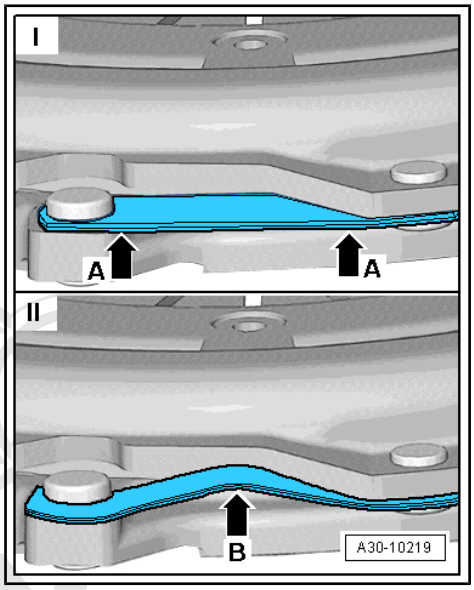
Checking springs and riveting

I - Springs OK

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

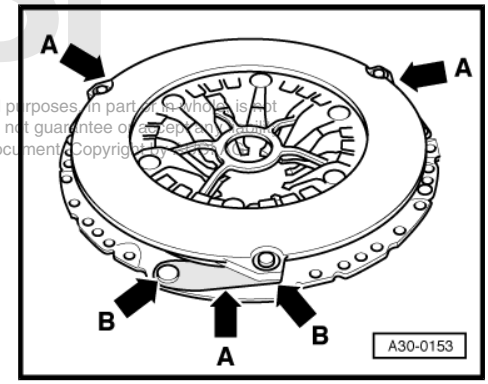
II - Springs damaged

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



– Check that rivets -arrows B- are secure at all springs -arrows A-.

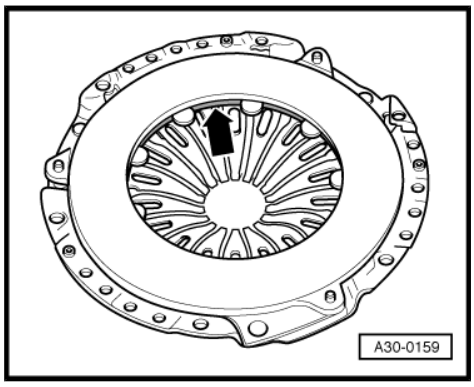
- Renew pressure plate if rivets -arrows B- are loose.



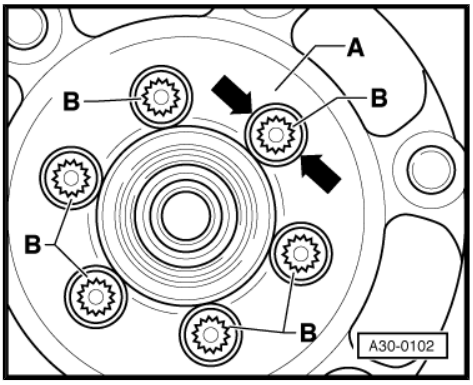
Checking metal ring

– Check metal ring -arrow- in pressure plate for damage.

- Renew pressure plate if metal ring is broken.



Instructions for removing dual-mass flywheel



Note

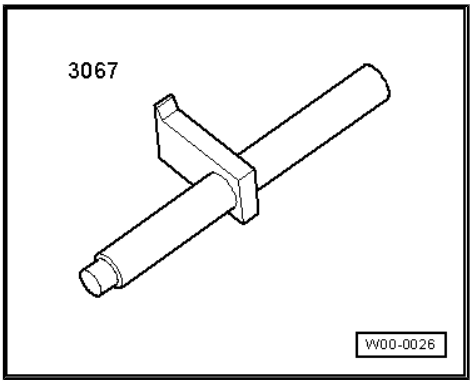
Do not use an impact wrench or pneumatic wrench to remove bolts -B-: this would severely damage the dual-mass flywheel. The bolts must always be removed by hand.

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

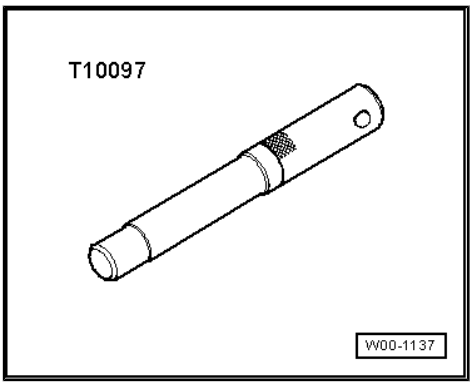
8.1 Removing and installing clutch (LuK version)

Special tools and workshop equipment required

♦ Counterhold tool -3067-



♦ Centring mandrel -T10097-



♦ Grease for clutch plate splines -G 000 100-

Removing

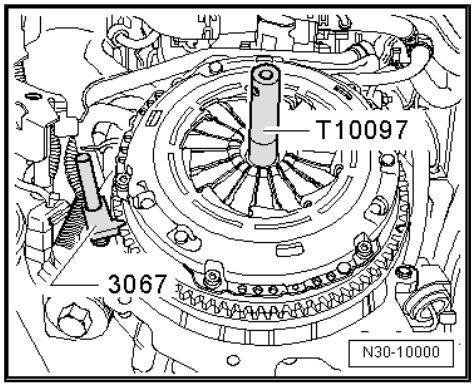
- Gearbox removed ⇒ page 82 .

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

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

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

– Take off pressure plate and clutch plate.



Installing

- Tightening torque ⇒ page 45

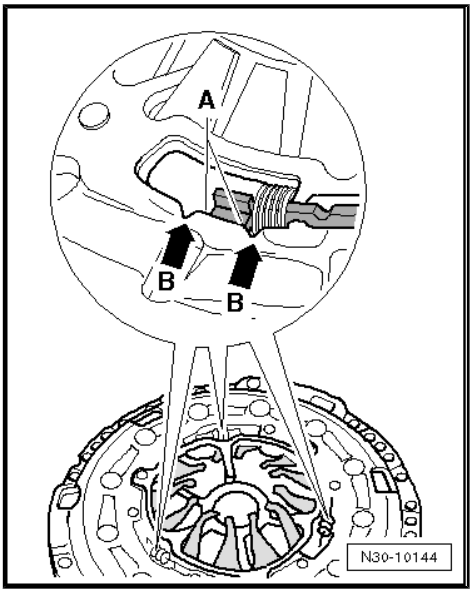
Installation is carried out in reverse sequence; note the following:

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 49*
- *If the clutch has burnt out, thoroughly clean the gearbox housing in area of clutch and parts of the engine facing the gearbox in order to prevent odours.*
- *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.*
- *Clutch pressure plates have an anti-corrosion coating and are greased. With the exception of the friction surface for the clutch plate, the pressure plate must not be cleaned. Otherwise the service life of the clutch will be considerably reduced.*
- *Pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then insert bolts.*
- *Only blow out dual-mass flywheel with compressed air.*
- *The friction surface of the pressure plate and the dual-mass flywheel must be cleaned (degreased) thoroughly.*
- *Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.*
- *If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).*

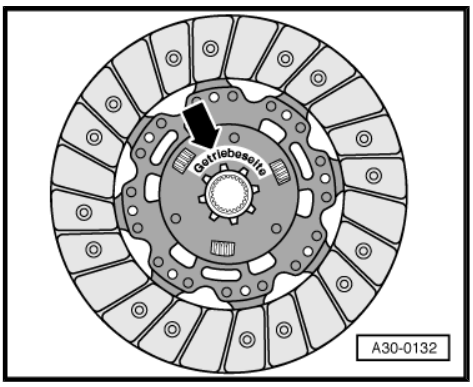
Checking position of adjustment mechanism (new SAC pressure plates only)

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



Installation position of clutch plate:

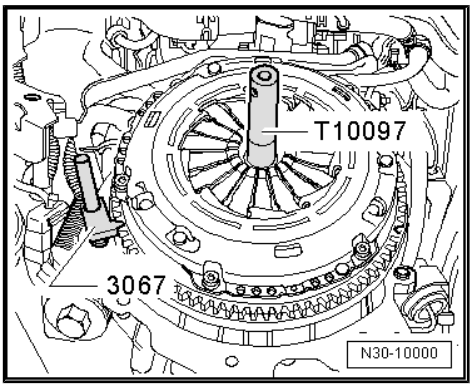
- The marking “Getriebeseite” (gearbox side) faces towards the gearbox



– Use counter-hold tool -3067- .

– Fit pressure plate onto dowel pins.

– Use centring mandrel -T10097- to centralise clutch plate.



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

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

– Working clockwise, tighten all six bolts consecutively in steps of 90° (1/4 turn) until the housing makes contact with the flywheel.

– Working clockwise, tighten all 6 bolts to final torque consecutively. Tightening torque ⇒ Item 4 (page 45)

34 – Controls, housing

1 Overview - selector mechanism

-Arrow A- gear selection movement

-Arrow B- gate selection movement

1 - Gear selector cable

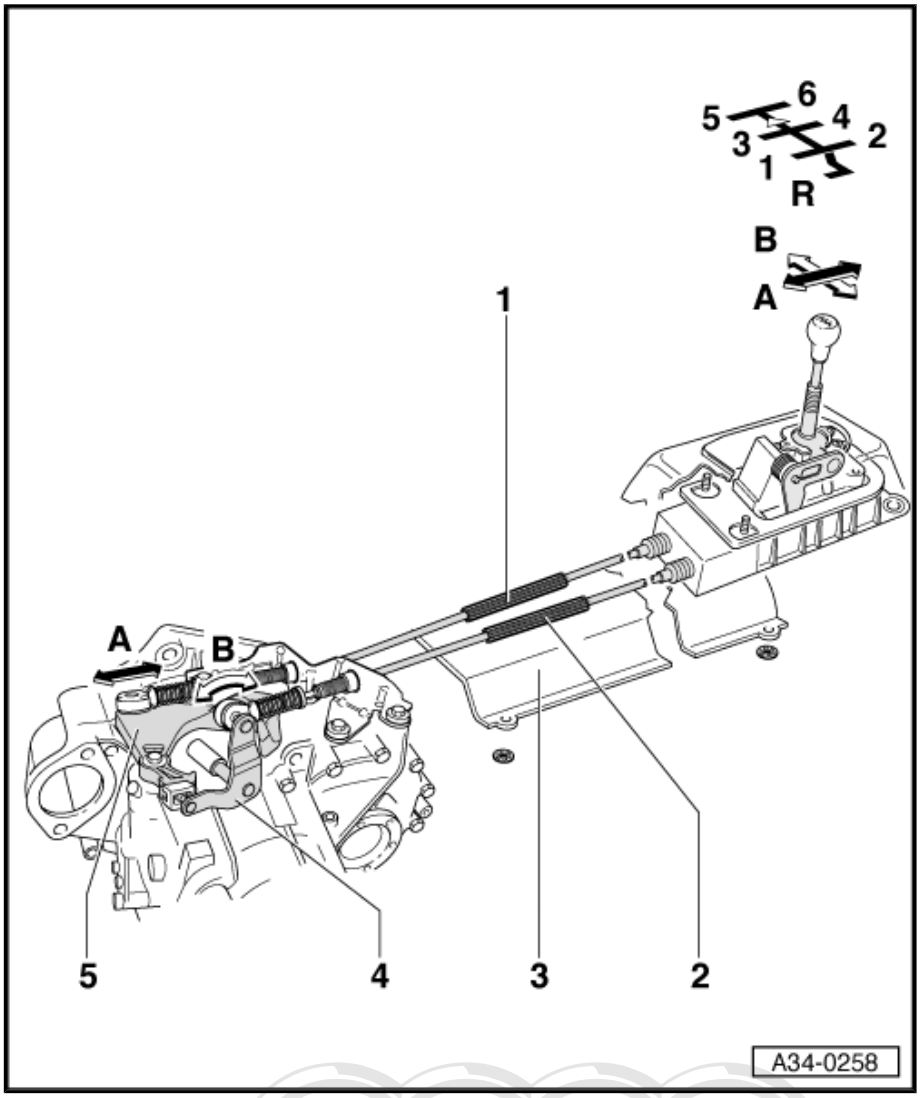
2 - Gate selector cable

3 - Heat shield

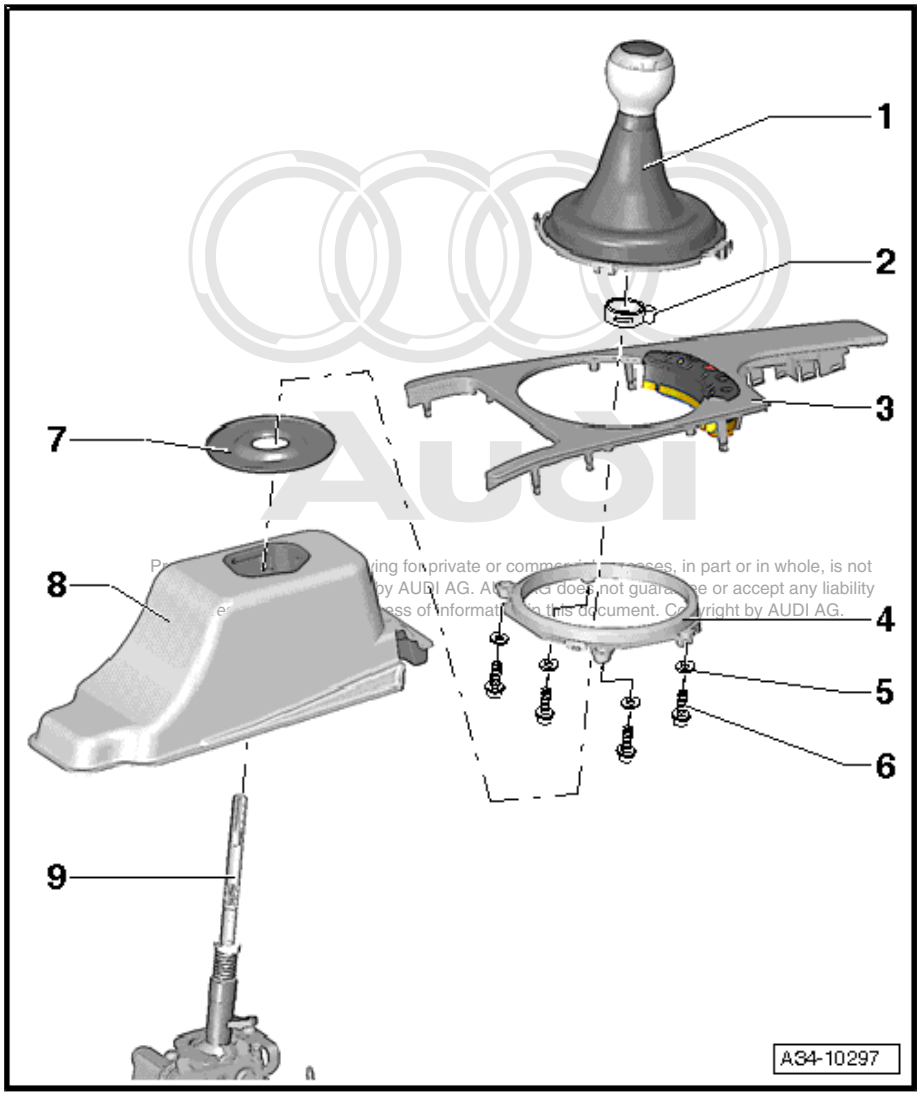
- ❑ Detach before removing selector mechanism

4 - Gate relay lever

5 - Gearbox selector lever



2 Exploded view - gear knob and covers



1 - Gear knob with gear lever boot

- ❑ Cannot be separated from each other
- ❑ Renew together
- ❑ Removing and installing ⇒ page 53
- ❑ Detaching from trim panel for centre console ⇒ page 53
- ❑ Disconnecting from securing frame ⇒ page 53

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 53
- ❑ Detaching from gear lever boot ⇒ page 53

4 - Securing frame

- ❑ Detaching from trim panel for centre console ⇒ page 53
- ❑ Detaching from gear lever boot ⇒ page 53

5 - Washer

- ❑ 4x

6 - Bolt

- ❑ 1.5 Nm
- ❑ 4x

7 - Noise insulation plate

8 - Noise insulation

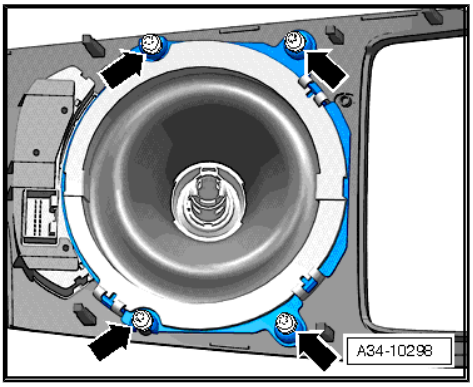
9 - Gear lever

- ❑ Adjusting selector mechanism ⇒ page 79

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

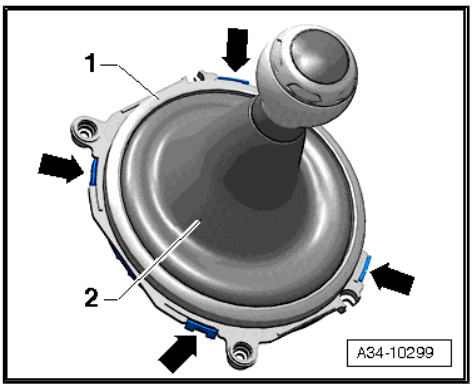
– Remove bolts -arrows-.

– 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-.



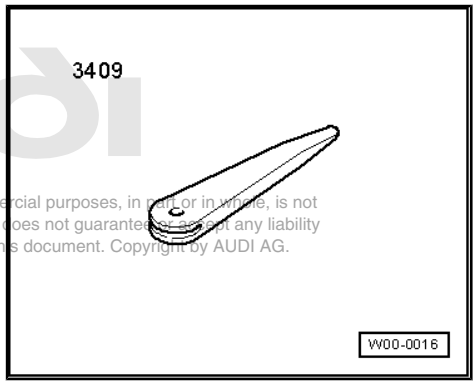
2.1 Removing and installing gear knob with gear lever boot

Note

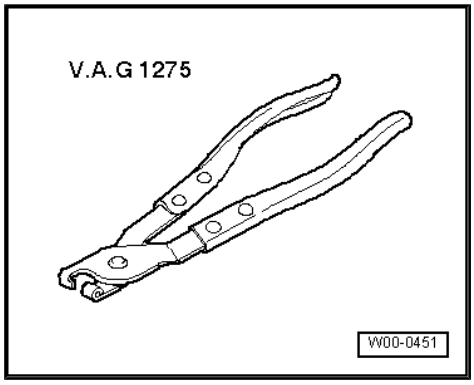
The gear knob is removed together with the gear lever boot and the trim panel for the centre console.

Special tools and workshop equipment required

♦ Removal wedge -3409-



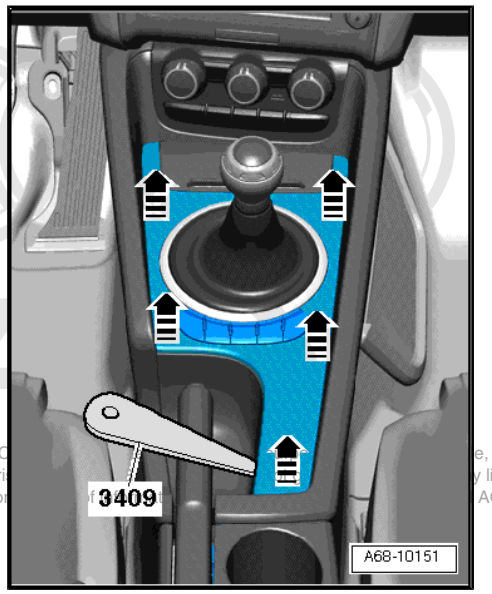
♦ Hose clip pliers -V.A.G 1275-



Removing

– Open ashtray.

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

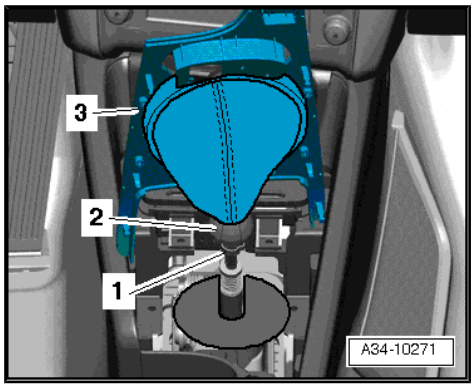


– Unplug electrical connector on trim panel.

– 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 53 .



Installing

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

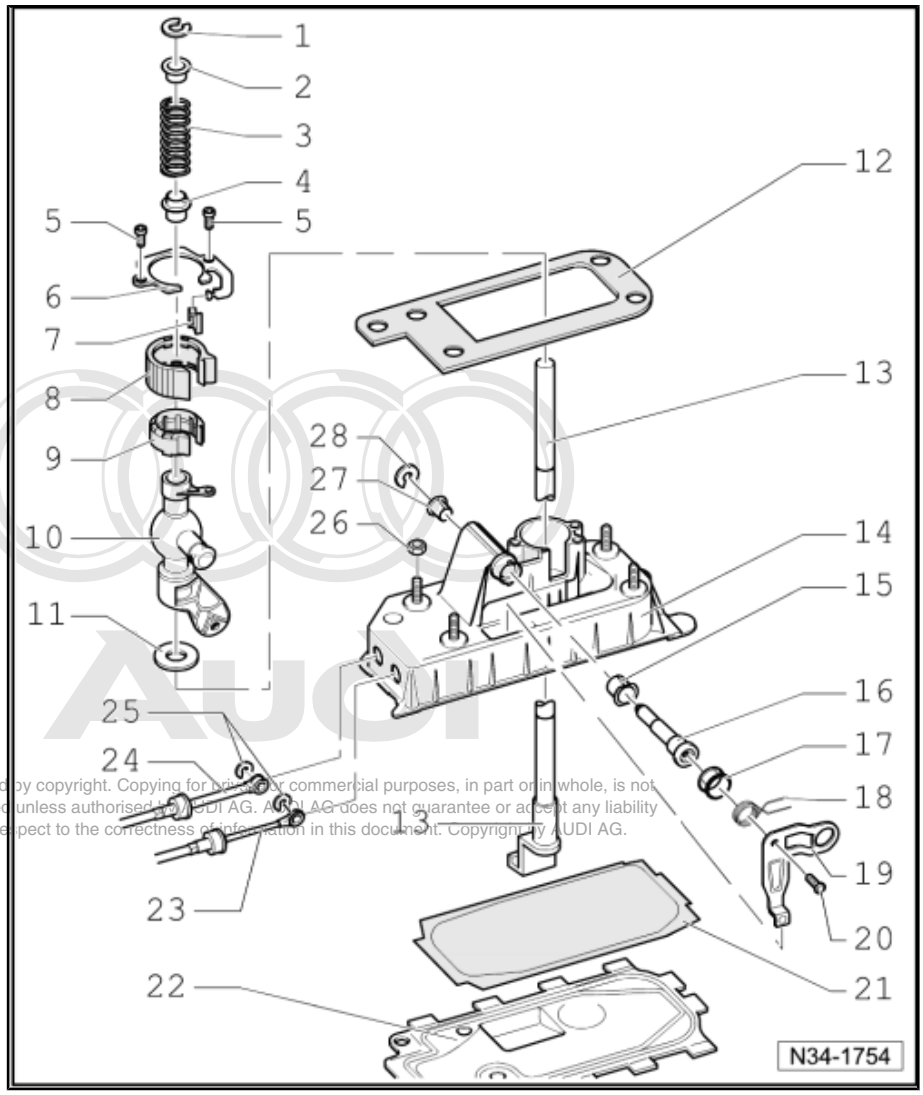
– Push gear knob onto gear lever until it contacts stop.

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

3 Exploded view - gear lever and selector housing for vehicles with vehicle ID No. up to 8J-7-013000

Note

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



1 - Securing clip
- ❑ Removing and installing ⇒ page 57

2 - Bush

3 - Spring

4 - Bush

5 - Bolt
- ❑ 6 Nm

6 - Cover

7 - Damper
- ❑ For spring ⇒ Item 18 (page 55)

8 - Damper

9 - Ball socket

10 - Gear lever guide

11 - Damping washer

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

13 - Gear lever

14 - Selector housing

15 - Bearing bush

16 - Pivot pin

17 - Guide bush
- ❑ Press onto selector housing

18 - Spring
- ❑ Installing ⇒ page 57

19 - Gate selector lever

20 - Bolt
- ❑ 5 Nm

21 - Gasket
- ❑ Renew

22 - Floor plate
- ❑ Bend tabs open to remove
- ❑ Renew

23 - Gate selector cable

- ❑ Removing and installing ⇒ page 77
- ❑ Adjusting ⇒ page 79

24 - Gear selector cable

- ❑ Removing and installing ⇒ page 77
- ❑ Adjusting ⇒ page 79

25 - Securing clip

- ❑ Renew
- ❑ Removing ⇒ page 56

26 - Nut

- ❑ 8 Nm
- ❑ 4x

27 - Bearing bush

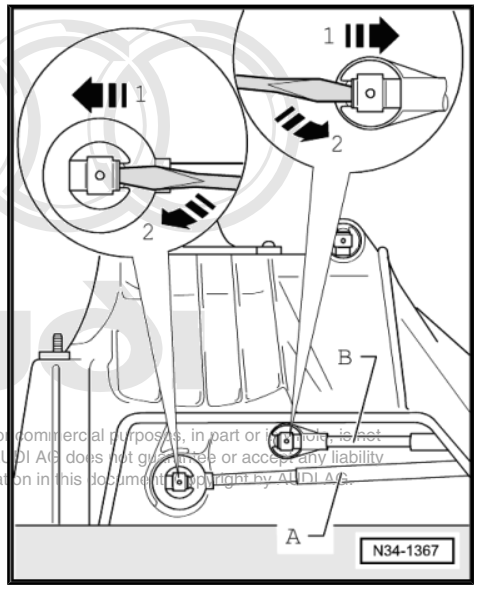
- ❑ Only fits in one position

28 - Securing clip

- ❑ Renew

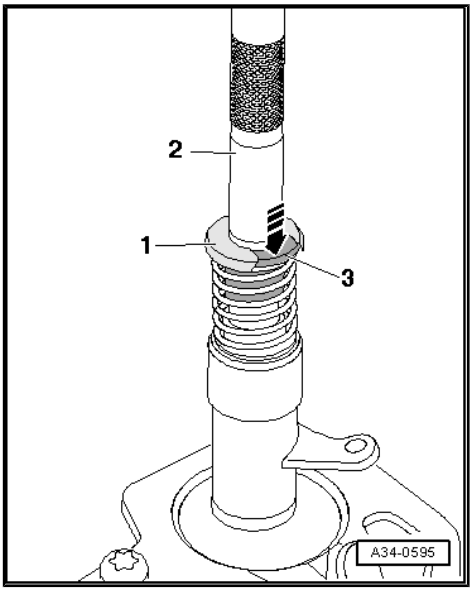
Detaching securing clip for gear selector cable -A- and gate selector cable -B-

– Use screwdriver to lift tab -arrow 1- and lever off securing clip -arrow 2-.



Removing and installing securing clip

– Hold gear lever -2- in position.
– Press spacer bush -3- in direction indicated -arrow-.
– Take off securing clip -1-.

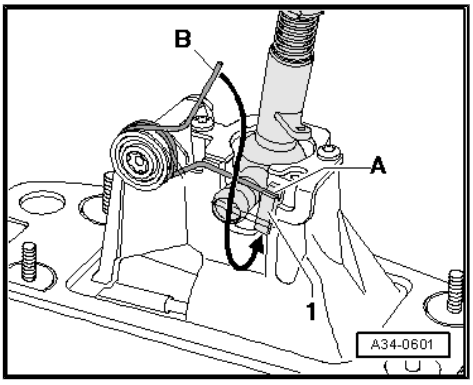


Installing spring

– Insert arm -A- of spring in guide -1- from above.
– Pull down arm -B- of spring and insert it in the guide from below.

Note

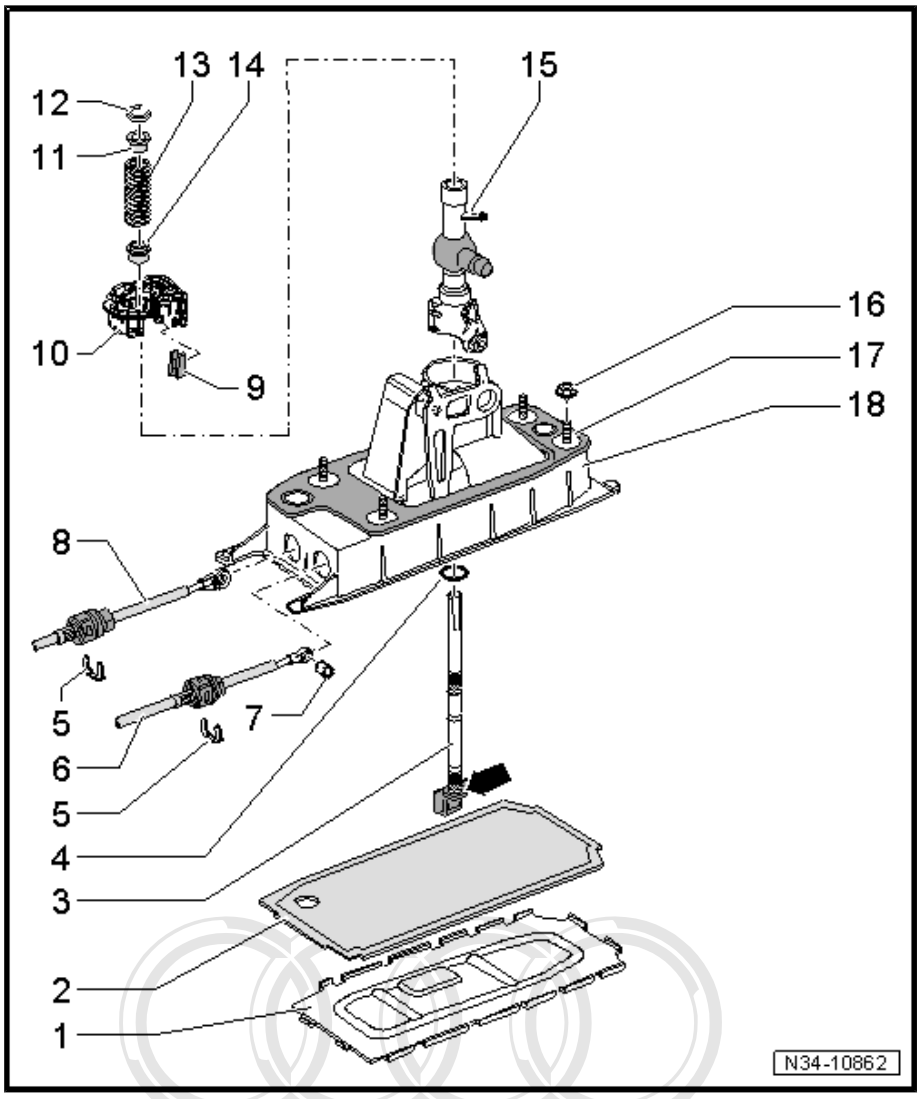
The gate selector lever is removed to give a better illustration.



4 Exploded view - gear lever and selector housing for vehicles with vehicle ID No. from 8J-7-013001 onwards

Note

- *Lubricate bearings and moving surfaces with grease -G 000 450 02- .*
- *Dismantling and assembling selector mechanism* ⇒ page 59



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

2 - Gasket
- ❑ Renew

3 - Gear lever
- ❑ Can be removed and installed without removing gear lever guide ⇒ Item 15 (page 59)

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

5 - Retaining clip
- ❑ Take care not to damage selector cables when removing.
- ❑ Renew

6 - Gate selector cable
- ❑ Lever off gate selector lever
- ❑ Press onto gate selector lever inside selector mechanism
- ❑ Installation position ⇒ page 50

7 - Bush

8 - Gear selector cable
- ❑ Lever off gear lever guide
- ❑ Press onto gear lever guide inside selector mechanism
- ❑ Installation position ⇒ page 50

9 - Damper

10 - Ball socket
- ❑ Will be damaged during removal
- ❑ Renew

11 - Bush

12 - Securing clip
- ❑ Removing and installing ⇒ page 57

13 - Spring

14 - Bush

15 - Gear lever guide

16 - Nut

- ❑ 4x

- M6 - 8 Nm
- M8 - 25 Nm

17 - Gasket

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

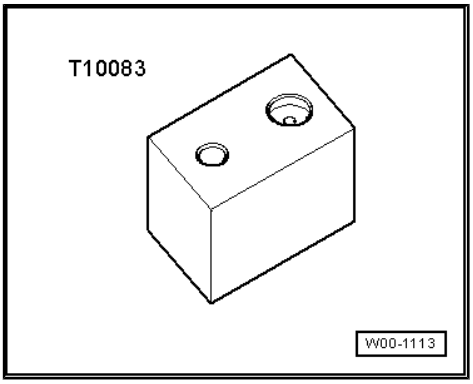
18 - Selector housing

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

4.1 Dismantling and assembling selector mechanism

Special tools and workshop equipment required

- ♦ Thrust block -T10083-



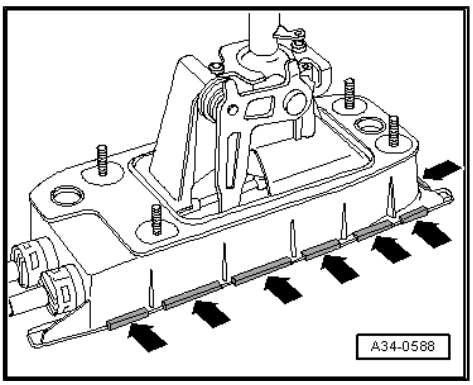
Dismantling

– Remove selector mechanism ⇒ page 64

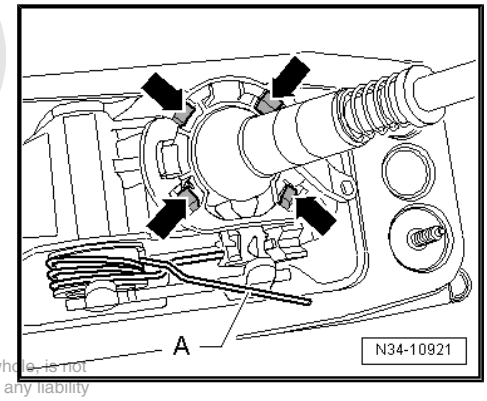
– Using a screwdriver, bend open tabs -arrows- on all sides of floor plate and remove floor plate.

– Remove gasket from selector housing.

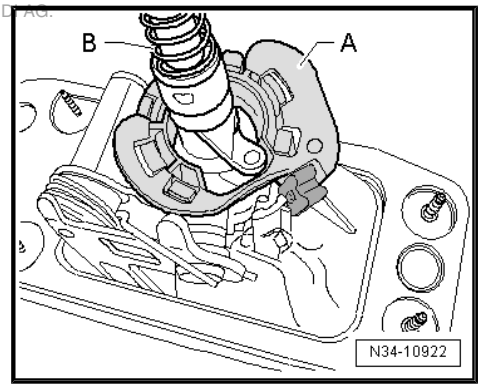
– Remove gear selector cable and gate selector cable from selector housing ⇒ page 58 .



– 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.



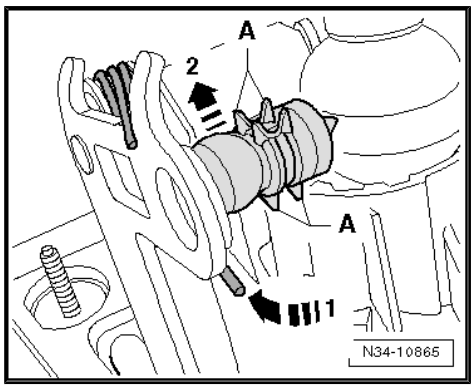
– Prise ball socket -A- out of selector housing together with gear lever guide and gear lever -B-.
– Then press ball socket off ball on gear lever guide and remove.



Note

- *Note guides -A- when performing the following steps.*
- *They must not be allowed to 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.

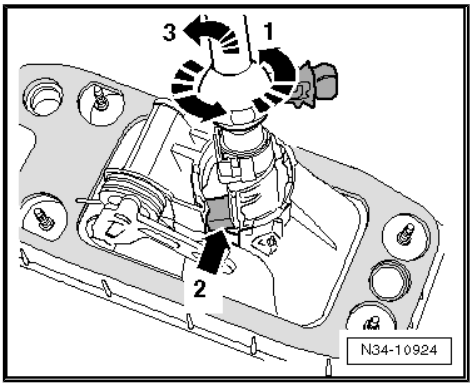
– Pull gear lever guide upwards as far as stop and at the same time pull ball-head pin -arrow 2- out of gate selector lever.
– Press spring -arrow 1- carefully off the shoulder of the gate selector lever.

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.

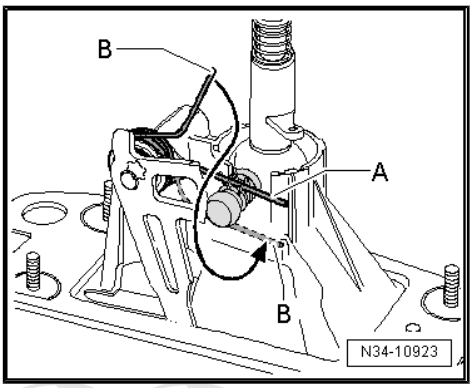
– Next, swivel gear lever guide out in direction of -arrow 3- together with gear lever.



Assembling selector mechanism

– Release spring arms -A- and -B-.

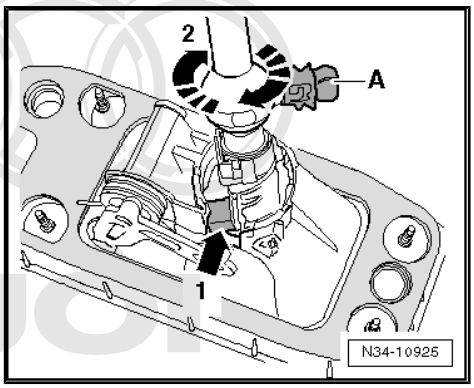
• Spring arms -A- and -B- must point in opposite directions. (Shown here with gear lever guide installed.)



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

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

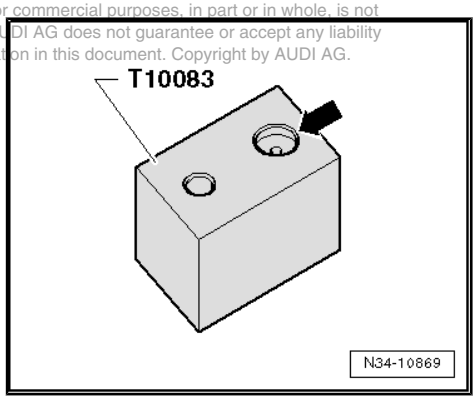
– Turn gear lever guide in direction of -arrow 2- until ball-head pin -A- is above recess on selector housing.



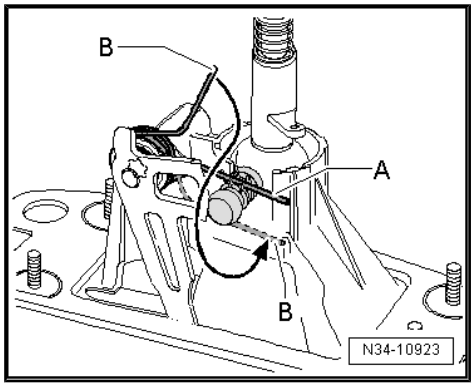
– Position selector housing with gear lever guide onto thrust block -T10083- .

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

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



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

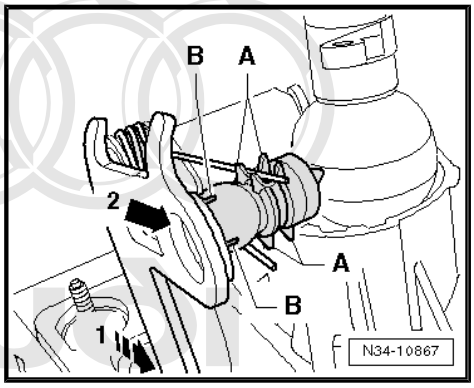


Note

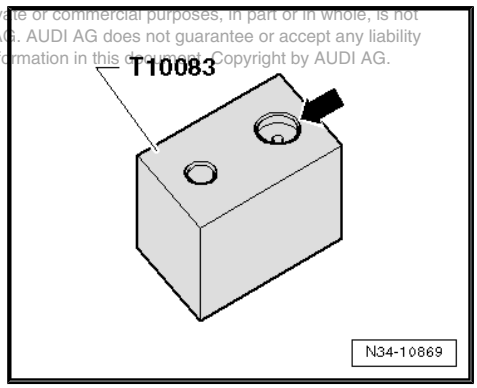
For illustration purposes, only part of the gate selector lever is shown.

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

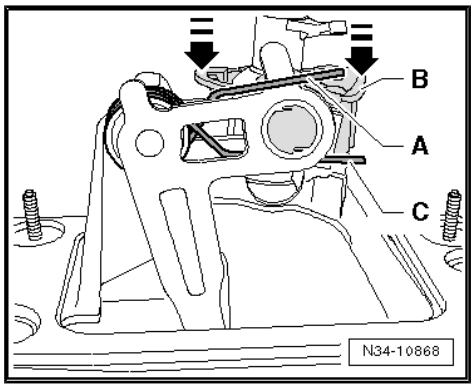
– Move gate selector lever rearwards as far as stop in direction of -arrow 1-.
– Grease ball-head pin.
– Press ball-head pin into gate selector lever -arrow 2-.
• Guides -A- and tabs -B- must not be damaged.



– Now insert gear lever guide (which is now fitted in selector housing) into larger recess -arrow- in thrust block -T10083- again.
• The gear lever guide should protrude out of the selector housing as far as the 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-.



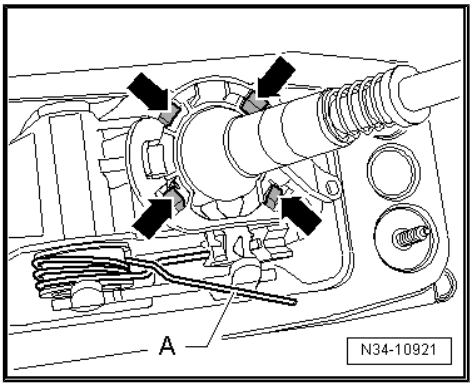
- All four lugs -arrows- must engage.

– 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 ⇒ page 58 .

– Install selector mechanism ⇒ page 64 .



5 Removing and installing selector mechanism

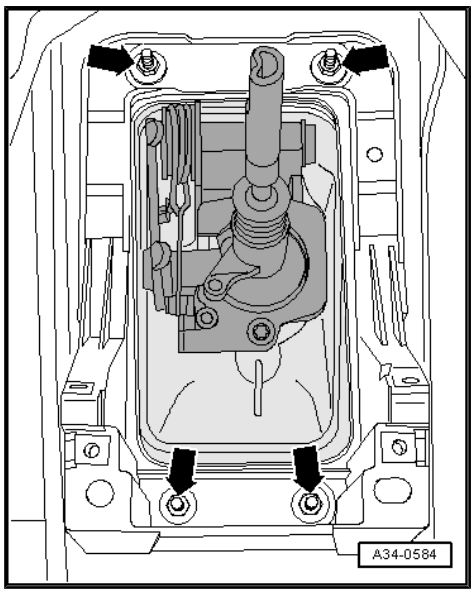
Removing

– Remove gear knob together with trim panel for centre console ⇒ page 53 .

– Remove centre console ⇒ Rep. Gr. 68 .

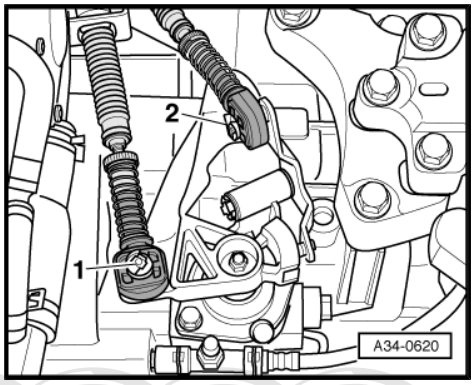
– Remove noise insulation panels above selector mechanism.

– Remove nuts -arrows-.



– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

– Detach securing clip -1- for gear selector cable and pull cable off pin.



Metal gate relay lever:

– Detach securing clip -2- for gate selector cable from gate relay lever and pull cable off pin.

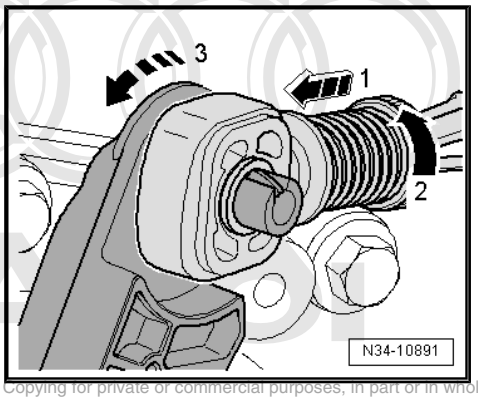
Plastic gate relay lever:

- To prevent damage to gate selector cable, cable end-piece must be detached from gate selector cable before removing relay lever.

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

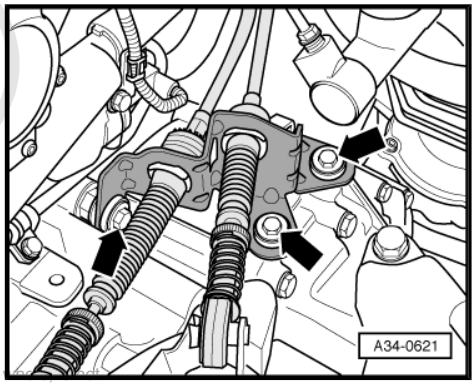
– Then press gate relay lever forwards (in direction of -arrow 3-).

- Detach cable end-piece only when gate relay lever is removed ⇒ page 76 .



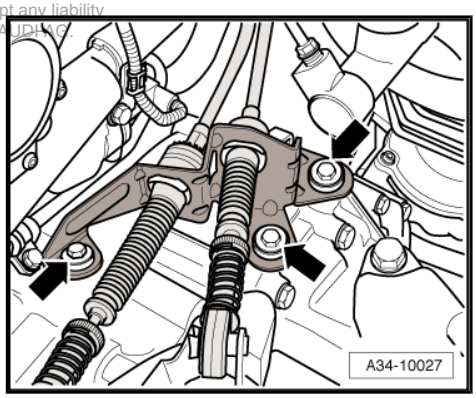
Vehicles with 4-cylinder engine:

– Remove two bolts and one flange nut -arrows- and detach cable support bracket from gearbox.



Vehicles with V6 engine:

– Remove three bolts -arrows- and detach cable support bracket from gearbox.

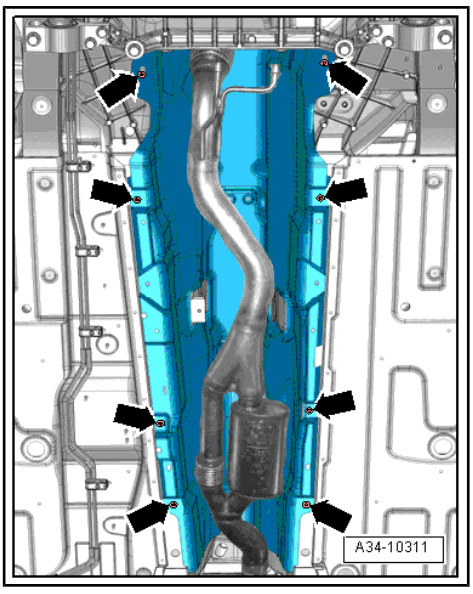


Continued for all vehicles:

– Remove propshaft ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

– Loosen fasteners -arrows- and detach heat shield towards rear of vehicle.

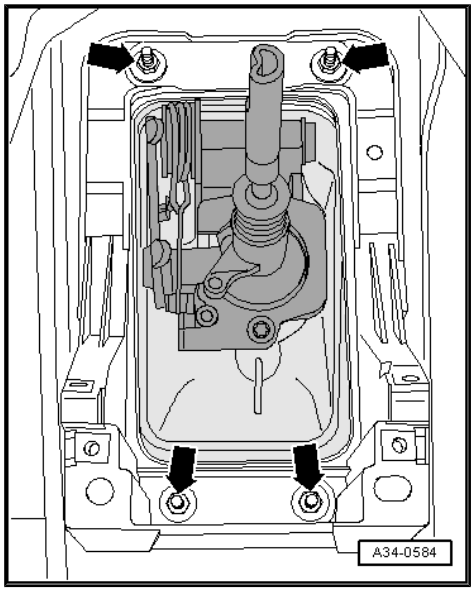
– Swing selector housing down and remove with selector cables.



Installing

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

– Install selector mechanism and tighten nuts -arrows-. Tightening torque ⇒ Item 16 (page 59)

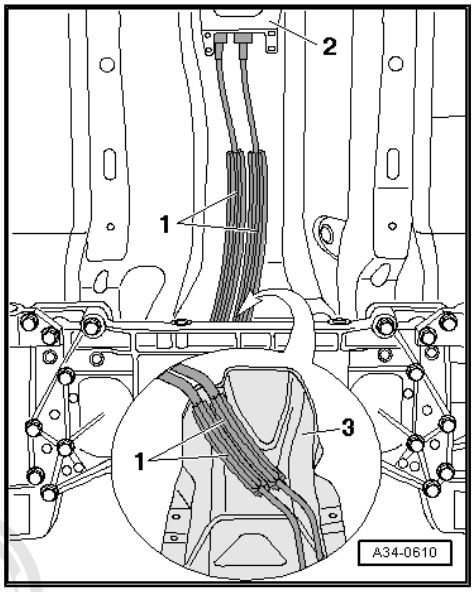


– Route cables -1- from selector mechanism -2- to gearbox as follows:

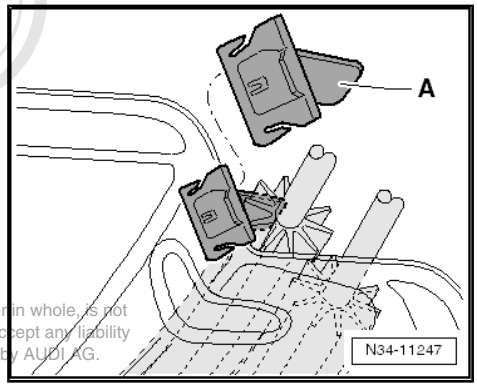
- The cables must run parallel and must not be crossed.
- The cables must be routed in the slot provided in heat shield -3-.

Note

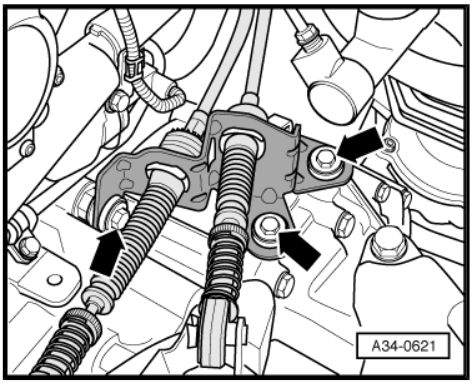
The enlargement shows the heat shield from above.



The cables and heat shield are held in the correct positions by clip -A-.



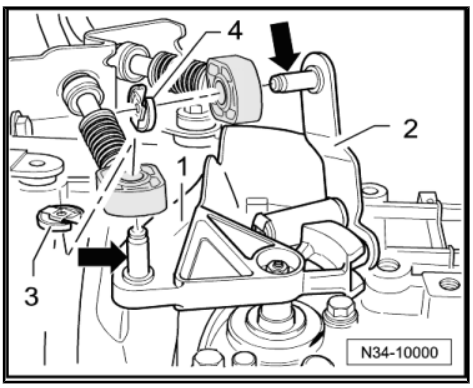
– Attach cable support bracket to gearbox -arrows-. Tightening torque ⇒ page 68



– Spread a small amount of grease -G 000 450 02- onto pins -arrows- of gearbox selector lever -1- and, if necessary, gate relay lever -2-.

• If they are removed, always renew securing clip -3- and, on vehicles with metal gate relay lever, securing clip -4-.

– Fit gear selector cable and secure with securing clip -3-.



Metal gate relay lever:

– Fit gate selector cable and secure with securing clip -4-.

Plastic gate relay lever

– Insert gate selector cable in cable end-piece.

Continued for all vehicles:

– Adjust selector mechanism ⇒ page 79 .

– Install propshaft ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

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

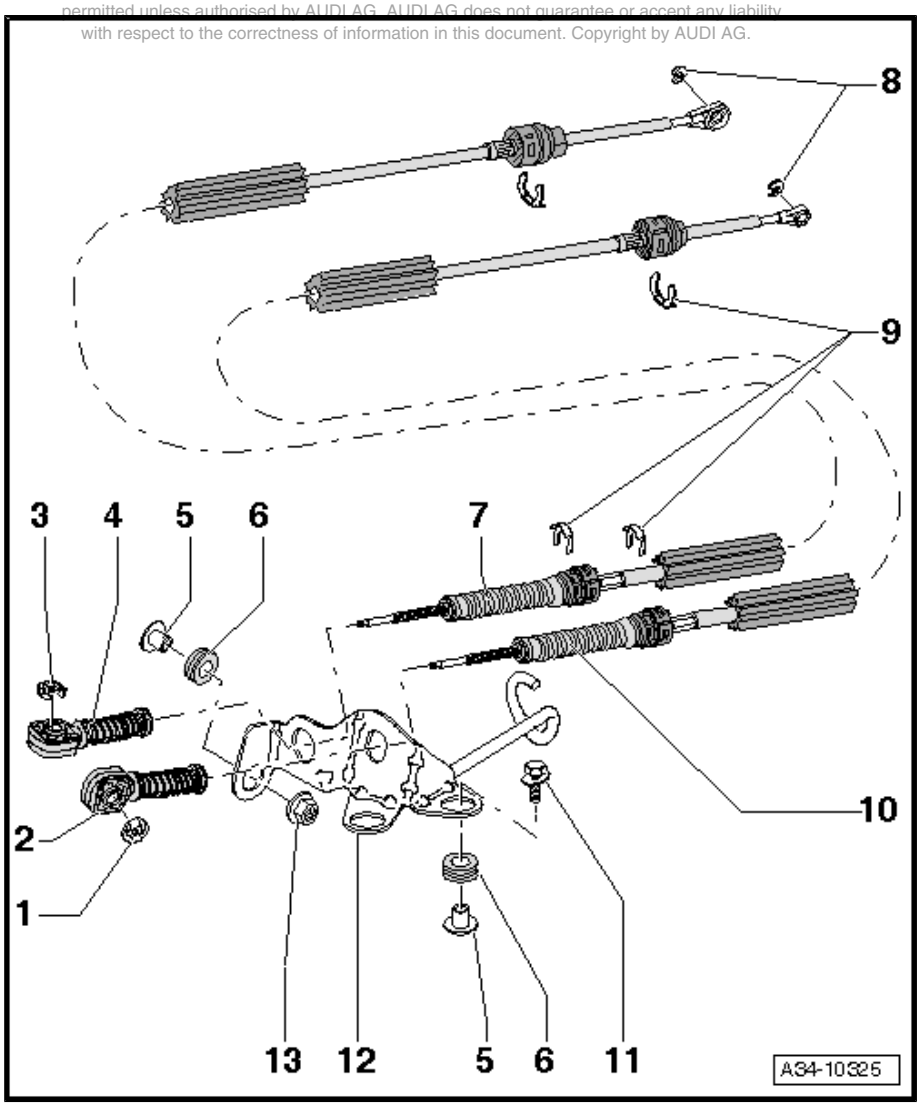
– Install gear knob together with boot ⇒ page 53 .

– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

6 Exploded view - gear selector cable and gate selector cable up to model year 2007

Note

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



1 - Securing clip

2 - Cable end-piece

- Secures gate selector cable to gate relay lever
- Allocation ⇒ page 69
- Release to adjust selector mechanism ⇒ page 80

3 - Securing clip

4 - Cable end-piece

- Secures gear selector cable to gearbox selector lever
- Allocation ⇒ page 69
- Release to adjust selector mechanism ⇒ page 80

5 - Bush

6 - Grommet

7 - Gear selector cable

- Removing and installing ⇒ page 77
- From vehicle ID No. 8J-7-013001 onwards: modified attachment on gear lever inside selector mechanism ⇒ Item 8 (page 58)
- Adjusting ⇒ page 79

8 - Securing clips

- Discontinued for vehicle ID No. 8J-7-013001 onwards ⇒ page 58

9 - Retaining clips

10 - Gate selector cable

- Removing and installing ⇒ page 77
- From vehicle ID No. 8J-7-013001 onwards: modified attachment on gate selector lever inside selector mechanism ⇒ Item 6 (page 58)
- Adjusting ⇒ page 79

11 - Bolt

- 20 Nm
- 2x on vehicles with 4-cylinder engine
- 3x on vehicles with 6-cylinder engine

12 - Cable support bracket

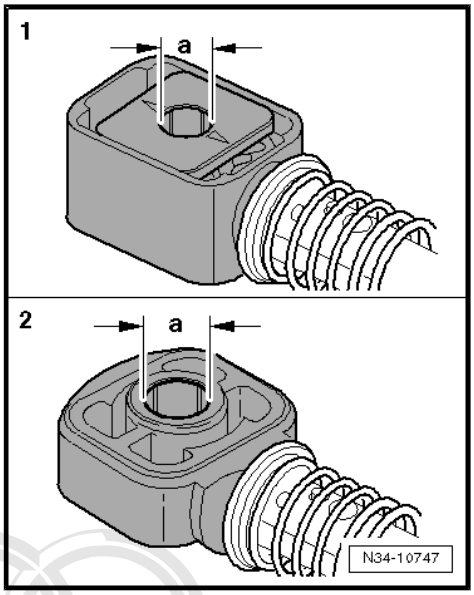
13 - Nut

- ❑ 20 Nm
- ❑ Only on vehicles with 4-cylinder engine

Identification of cable end-pieces

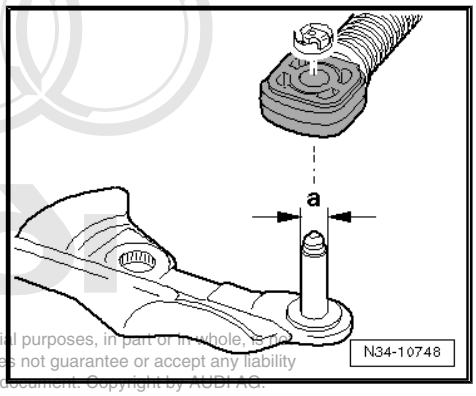
The holes in the cable end-pieces have different diameters.

Cable end-piece for:	Dimension “a”
1. - Gear selector cable to gearbox selector lever from 06.06 onwards	8.5 mm
2. - Gear selector cable to gearbox selector lever up to 05.06	10 mm
2. - Gate selector cable to metal gate relay lever	8 mm



From 06.06 onwards: smaller diameter of mounting pin for cable end-piece (on gear selector cable)

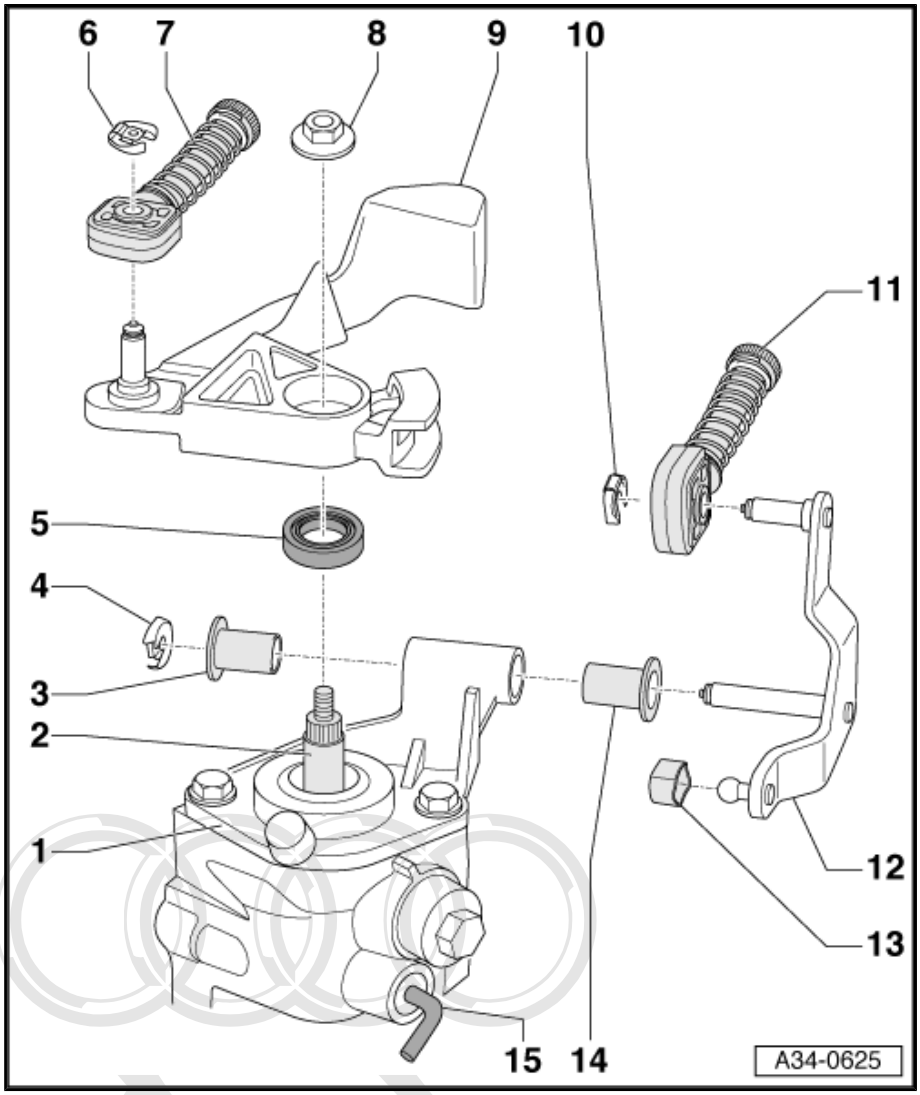
Mounting pin for cable end-piece (on gear selector cable)	Dimension “a”
Up to 05.06	10 mm
From 06.06 onwards	8.5 mm



6.1 Exploded view - gearbox selector lever and gate relay lever up to model year 2007

Note

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



1 - Selector mechanism cover
- ❑ Removing and installing (with gearbox installed) ⇒ page 203

2 - Selector shaft
- ❑ Removing and installing (with gearbox installed) ⇒ page 203

3 - Bush

4 - Securing clip
- ❑ Removing ⇒ page 71

5 - Oil seal
- ❑ Renewing ⇒ page 201

6 - Securing clip

7 - Cable end-piece
- ❑ Secures gear selector cable to gearbox selector lever ⇒ Item 4 (page 68)
- ❑ Allocation ⇒ page 69

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

9 - Gearbox selector lever
- ❑ With damper weight
- ❑ Install so that gap in splines aligns with selector shaft ⇒ page 71
- ❑ Installation position ⇒ page 71
- ❑ Different diameters of mounting pin for cable end-piece ⇒ page 69

10 - Securing clip

11 - Cable end-piece
- ❑ Secures gate selector cable to gate relay lever ⇒ Item 2 (page 68)
- ❑ Allocation ⇒ page 69
- ❑ Release to adjust selector mechanism ⇒ page 80

12 - Gate relay lever
- ❑ Installation position ⇒ page 71

13 - Slide block

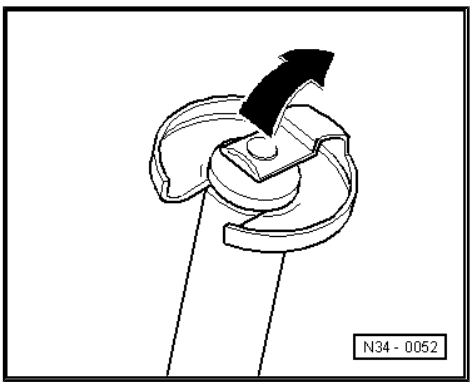
14 - Bush

15 - Angled rod

❑ For adjusting selector mechanism ⇒ page 79

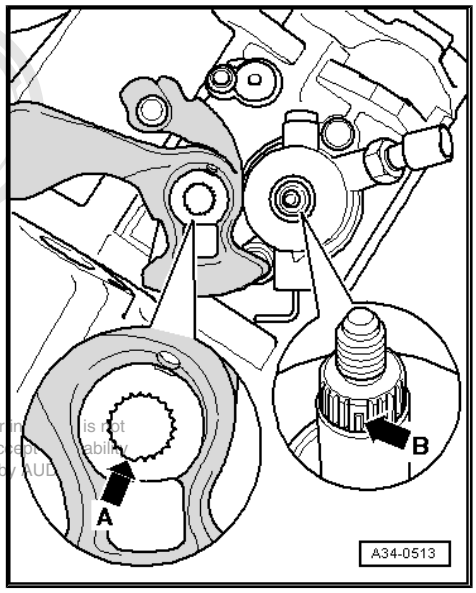
Removing securing clip for gate relay lever

– Lift clip -arrow-.



Installing gearbox selector lever

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

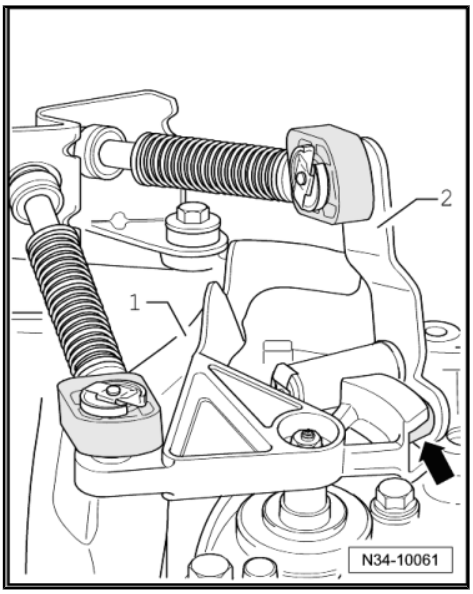


Installation position: gearbox selector lever/gate relay lever

1 - Gearbox selector lever with damper weight

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

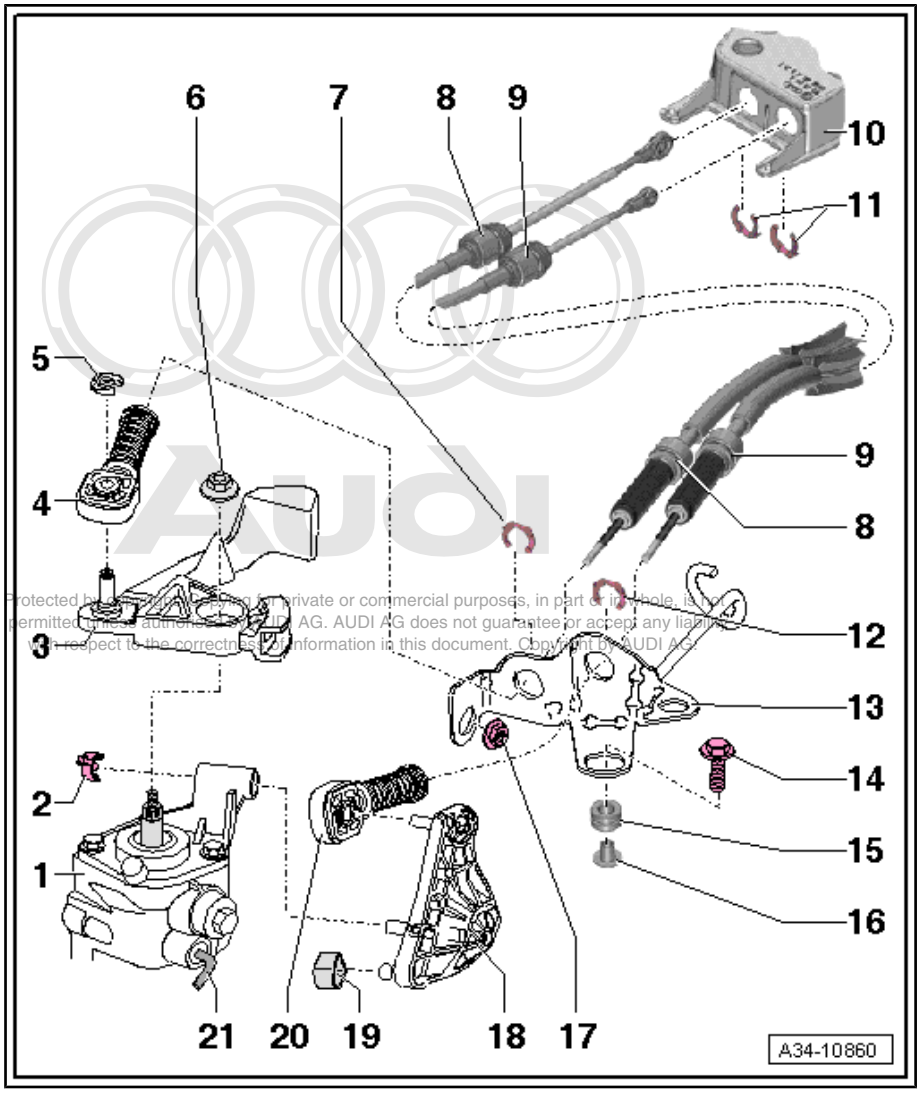
– Coat guide rail and slide block -arrow- with grease -G 000 450 02- .



6.2 Exploded view - gear selector cable and gate selector cable from model year 2008 onwards

Note

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



1 - Gearbox

2 - Clip

- ❑ Not fitted on all versions
- ❑ For gate relay lever from 08.2008 onwards
- ❑ Detaching and fitting ⇒ page 76

3 - Gearbox selector lever

- ❑ Fitting ⇒ page 74
- ❑ Installation position ⇒ page 74
- ❑ After installing, adjust selector mechanism ⇒ page 79

4 - Cable end-piece

- ❑ Secures gear selector cable to gearbox selector lever
- ❑ Allocation ⇒ page 73
- ❑ Detaching from gear selector cable ⇒ page 74

5 - Securing clip

- ❑ Removing ⇒ page 75
- ❑ Renew

6 - Nut

- ❑ Self-locking
- ❑ Renew
- ❑ 23 Nm

7 - Retaining clip

- ❑ Renew

8 - Gear selector cable

- ❑ Detaching and securing at gearbox selector lever ⇒ page 75
- ❑ Removing and installing ⇒ page 77
- ❑ Adjusting ⇒ page 79

9 - Gate selector cable

- ❑ Removing and installing ⇒ page 77
- ❑ Adjusting ⇒ page 79

10 - Selector housing

11 - Retaining clips

- ❑ Renew

12 - Retaining clip

- ❑ Renew

13 - Cable support bracket

14 - Bolt

- ❑ 20 Nm
- ❑ 2x on vehicles with 4-cylinder engine
- ❑ 3x on vehicles with 6-cylinder engine

15 - Grommet

16 - Bush

17 - Nut

- ❑ 20 Nm
- ❑ Only on vehicles with 4-cylinder engine

18 - Gate relay lever

- ❑ Made of plastic
- ❑ Different versions available; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Installation position ⇒ page 74
- ❑ Detaching and securing gate relay lever (with detent catch) at gearbox selector lever ⇒ page 75
- ❑ Detaching and securing gate relay lever (with clip) at gearbox selector lever ⇒ page 76

19 - Slide block

- ❑ Installation position ⇒ page 74

20 - Cable end-piece

- ❑ Secures gate selector cable to gate relay lever
- ❑ Allocation ⇒ page 69
- ❑ Detaching from gate selector cable ⇒ page 74

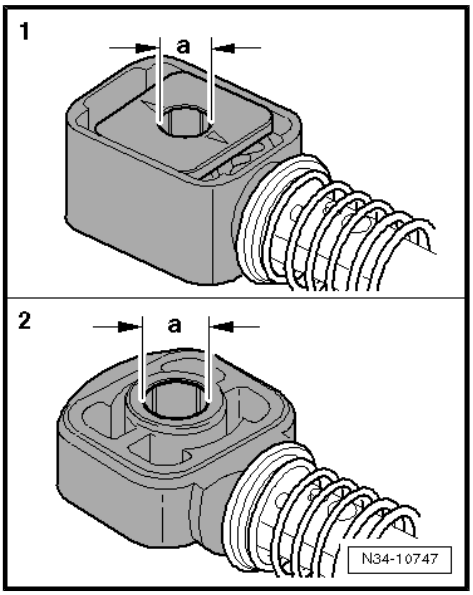
21 - Angled rod

- ❑ For adjusting selector mechanism ⇒ page 79

Identification of cable end-pieces

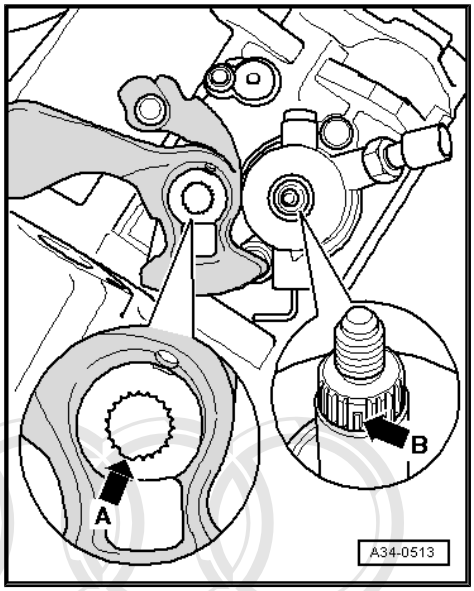
The holes in the cable end-pieces have different diameters.

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



Installing gearbox selector lever

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



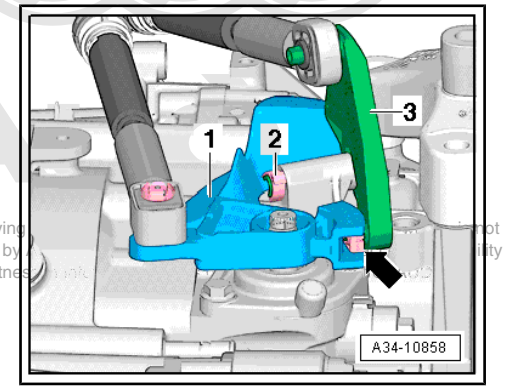
Installation position: gearbox selector lever/gate relay lever

1 - Gearbox selector lever

2 - Clip or detent catch (depending on version)

3 - Gate relay lever locates in guide rail of gearbox selector lever via slide block -arrow B-.

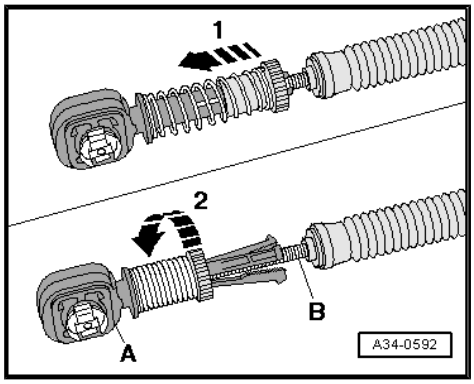
– Coat guide rail and slide block -arrow- with grease -G 000 450 02- .



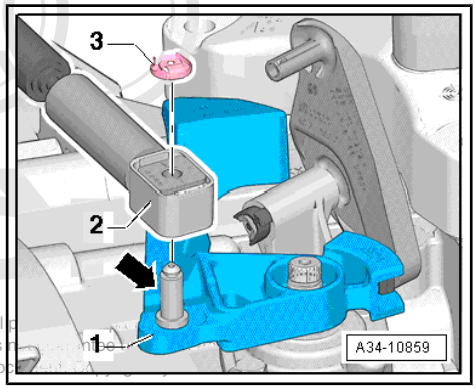
Detaching cable end-pieces from gear selector cable and gate selector cable

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

– Take cable -B- out of cable end-piece -A-.



Detaching and securing gear selector cable at gearbox selector lever



Detaching

– Lift up tab and detach securing clip -3- for gear selector cable from gearbox selector lever -1-.

– Pull gear selector cable -2- off pin -arrow-.

Securing

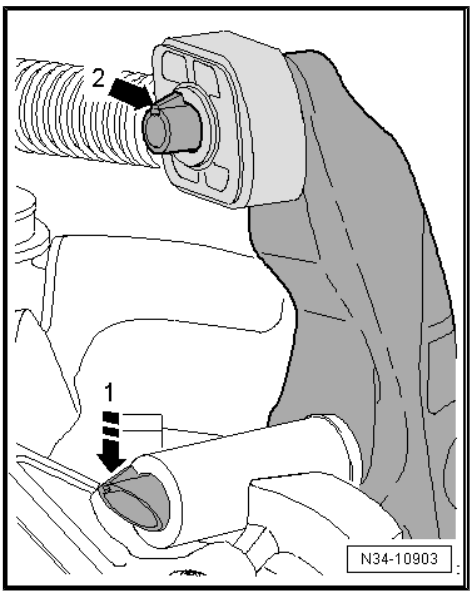
Note

♦ *Renew securing clip for gear selector cable.*

♦ *Apply a small quantity of grease -G 000 450 02- to the pin -arrow-.*

– Push gear selector cable -2- onto gearbox selector lever -1- and secure with securing clip -3-.

Detaching and securing gate relay lever (with detent catch) at gearbox selector lever -arrow 1-



Detaching

– Press in detent -arrow 1- as far as stop and remove gate relay lever together with cable end-piece (move relay lever in normal direction of operation).

Note

-Arrow 2- can be disregarded.

Securing

Note

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

– Press cable end-piece onto gate relay lever ⇒ page 76 .

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

• Gate relay lever is secured by detent -arrow 1-.

• Cable end-piece is secured by detent -arrow 2-.

• Ensure that components engage securely.

Detaching and securing gate relay lever (with clip) at gearbox selector lever -arrow 1-

Detaching

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

Securing

Note

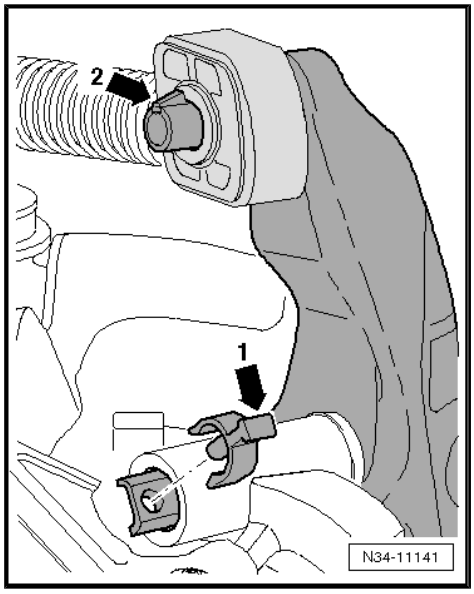
Lubricate all bearings and moving surfaces with grease -G 000 450 02- .

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

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

Note

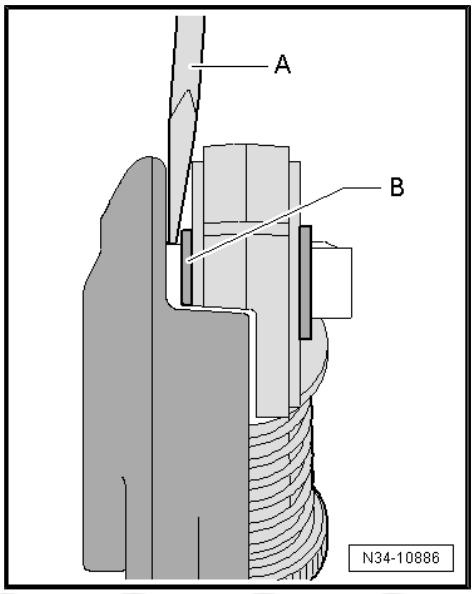
-Arrow 2- can be disregarded.



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

• Gate relay lever removed

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



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

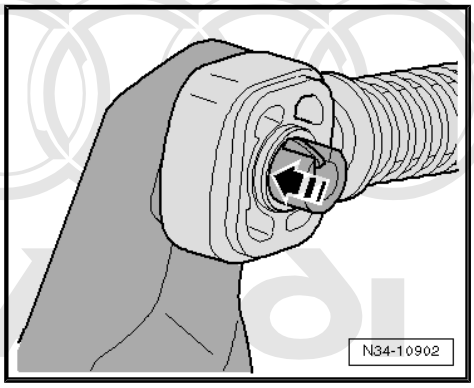
• Gate relay lever removed

• Press on cable end-piece only at bush -arrow-.

• Cable end-piece must move freely on gate relay lever.

• Cable end-piece must be behind detent.

– Ensure that components engage securely.



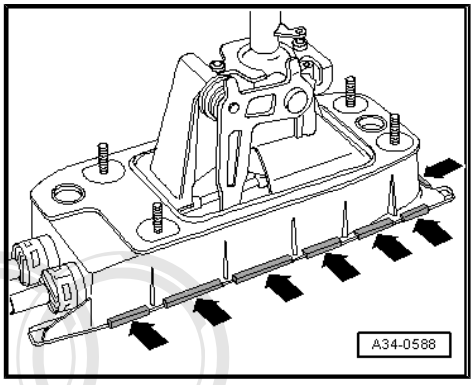
6.3 Removing and installing gear selector cable and gate selector cable

Removing

– Remove selector mechanism ⇒ page 64 .

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

– Remove gasket.



Vehicles with vehicle ID No. up to 8J-7-013000:

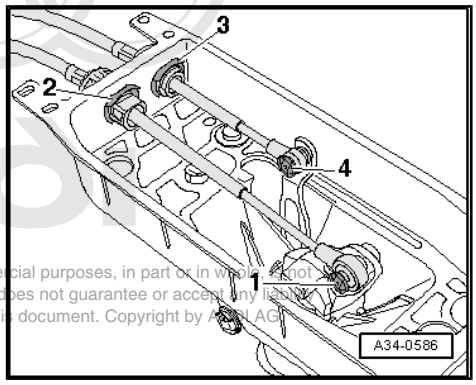
– Detach securing clips -1- and -4- and pull both cables off pins.

Vehicles with vehicle ID No. from 8J-7-013001 onwards:

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

Continued for all vehicles:

– Take off securing clips -2 ... 3- and detach gear selector cable and gate selector cable from selector housing.

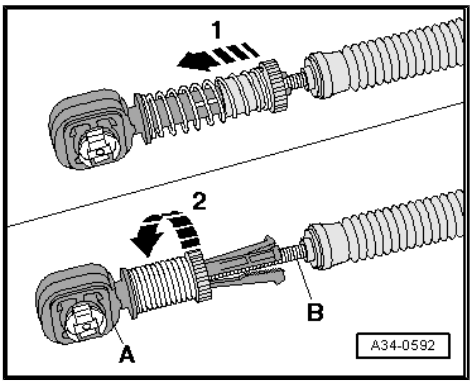


Release cable end-pieces -A- for gate selector cable and gear selector cable -B- as follows:

– Push sleeve forwards onto stop -arrow 1-.

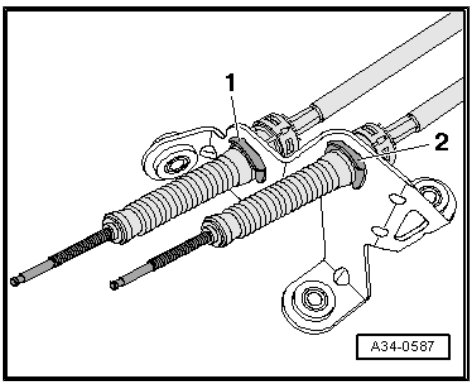
– Turn sleeve clockwise onto stop -arrow 2- so that it engages.

– Detach cable end-pieces from cables.



– Pull off securing clips -1- and -2-.

– Detach cable support bracket from cables.



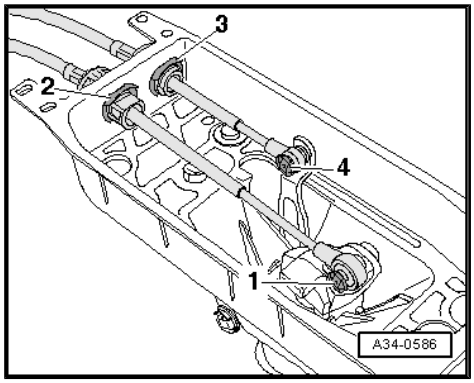
Installing

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 ... 4-.

Vehicles with vehicle ID No. from 8J-7-013001 onwards:

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

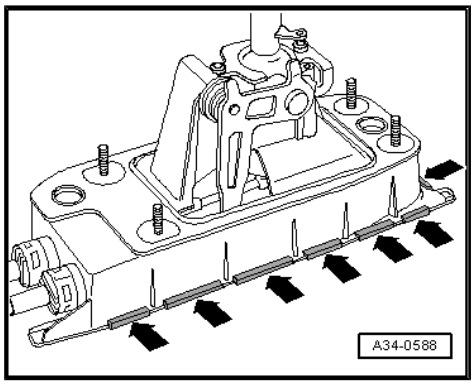


Continued for all vehicles:

– Fit new gasket and secure new floor plate to selector mechanism by bending over tabs -arrows-.

– Install selector mechanism ⇒ page 64 .

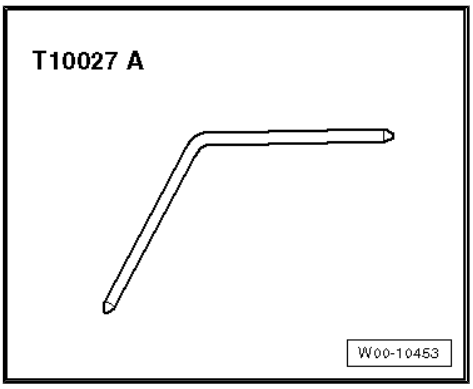
– Adjust selector mechanism ⇒ page 79 .



7 Adjusting selector mechanism

Special tools and workshop equipment required

- Locking pin -T10027 A-



Requirements for adjustment

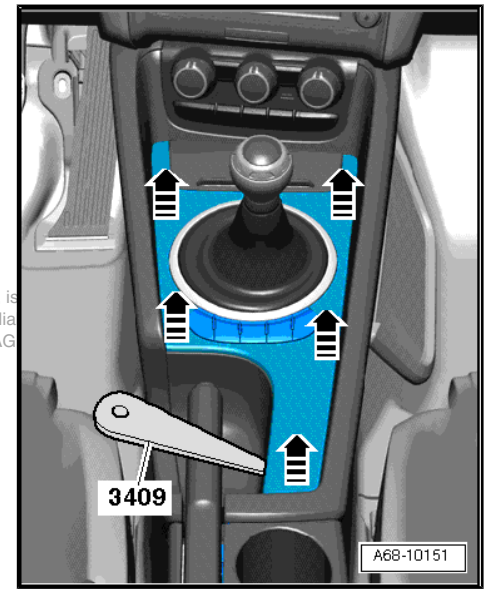
- Gear selector linkage must be in proper condition and undamaged.
- Selector mechanism must move freely.
- Gearbox, clutch and clutch mechanism must be in proper condition.
- Gearbox in neutral.

Adjusting

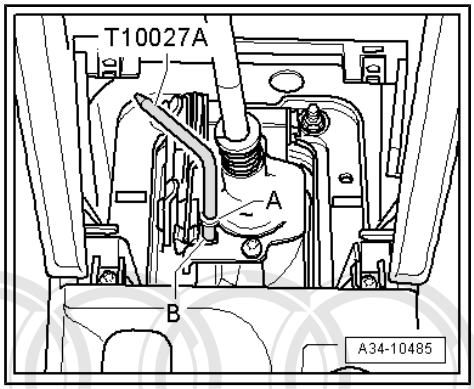
– Open ashtray.

– 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.
– Then guide locking pin -T10027A- through hole -A- and into hole -B-.



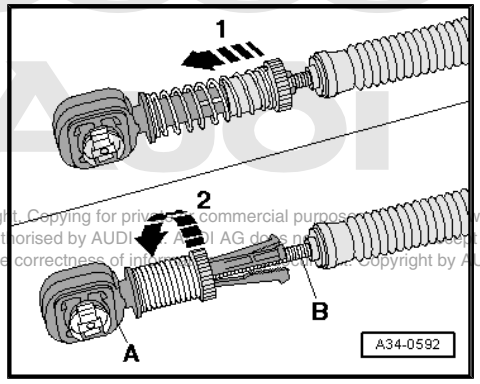
Note

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

– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

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

– Push sleeve forwards onto stop -arrow 1-.
– Turn sleeve clockwise onto stop -arrow 2- so that it engages.



Note

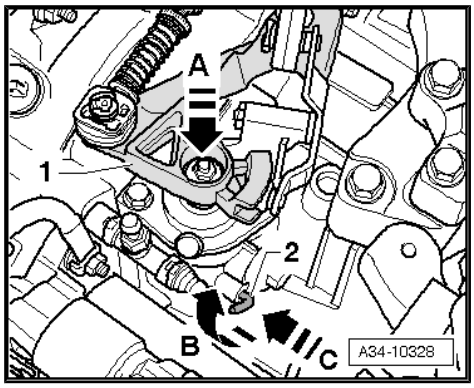
It should be possible to move selector cable -B- in the cable end-piece.

• Gearbox in neutral.

Lock the selector shaft as follows:

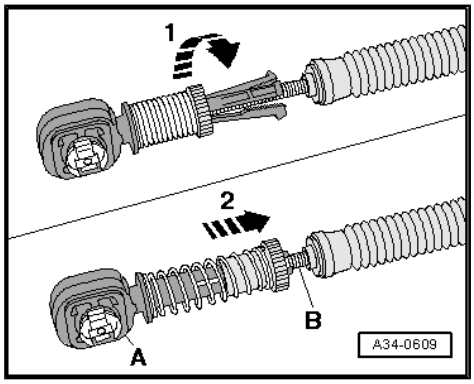
– Press down gearbox selector lever -1- in direction of arrow -A-.
– At the same time press and turn angled rod -2- in direction of arrow -B- and -C- until it engages.

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



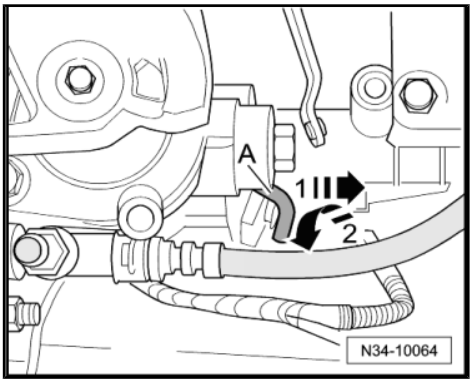
– Check that gate selector cable and gear selector cable -B- are located in cable end-pieces -A- without tension.
– Release locking sleeve -arrow 1-.
– Allow locking sleeve to slide onto stop -arrow 2-.

Cable adjustment is now complete.



– Turn angled rod -A- back to initial position in direction of -arrow 2- and pull out of gearbox in direction of -arrow 1-.

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



Checking gear lever setting

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

– Depress clutch.

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

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

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

– Fit cover and trim panel for centre console.

– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

8 Removing and installing gearbox

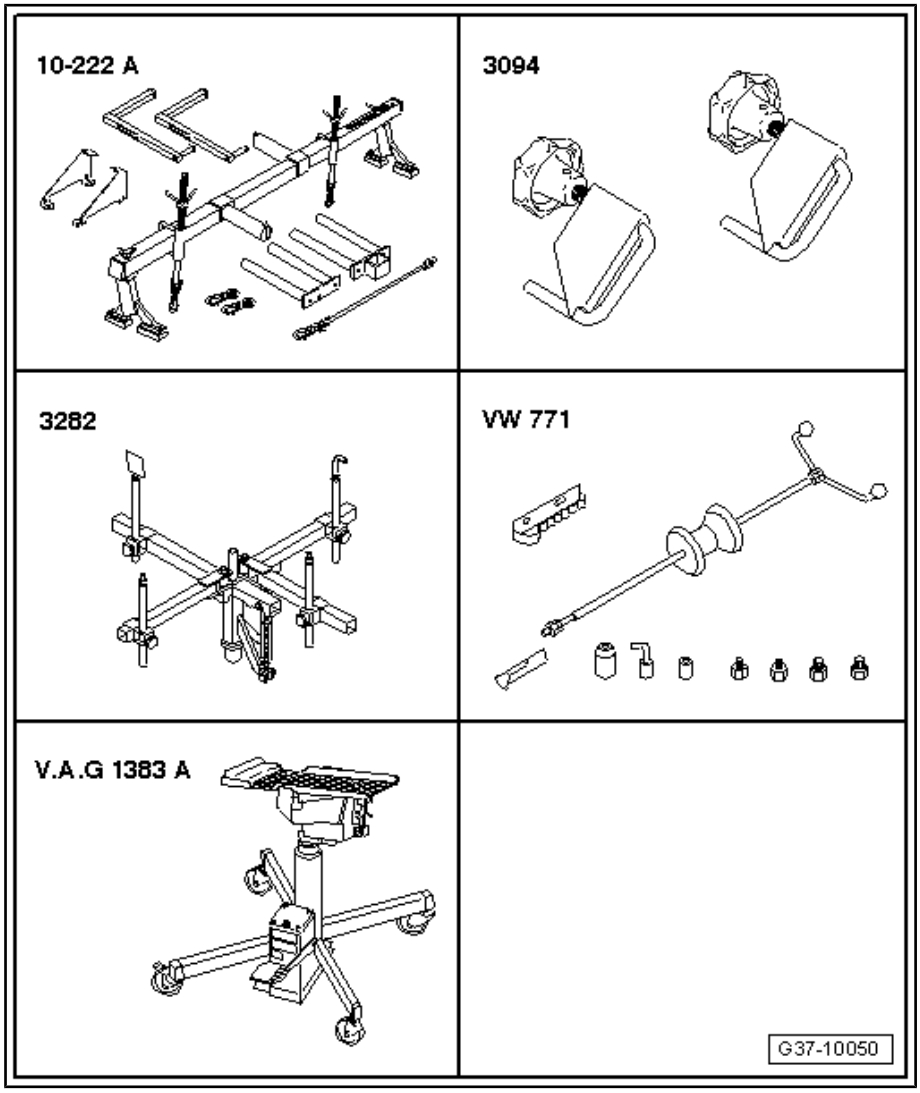
General view

- ⇒ “8.1 Removing gearbox - vehicles with 2.0 ltr. TFSI engine”, page 82
- ⇒ “8.2 Removing gearbox - vehicles with 3.2 ltr. MPI engine”, page 93 .
- ⇒ “8.3 Removing gearbox - vehicles with 2.0 ltr. TDI engine”, page 106
- ⇒ “8.4 Installing gearbox”, page 115

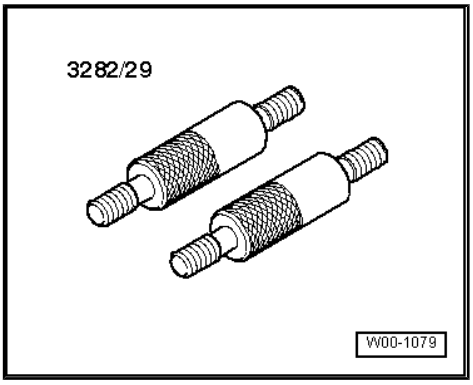
8.1 Removing gearbox - vehicles with 2.0 ltr. TFSI engine

Special tools and workshop equipment required

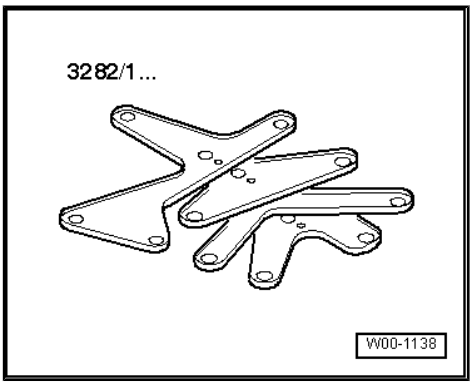
- Support bracket -10 - 222 A-
- Hose clamps, up to Ø 25 mm -3094-
- Gearbox support -3282-
- Adapter -VW 771/40-
- Engine and gearbox jack - V.A.G 1383 A-



- Pin -3282/29-



- Adjustment plate -3282/33-



- Bolt M10x20
- Grease -G 000 450 02-
- Grease for clutch plate splines -G 000 100-

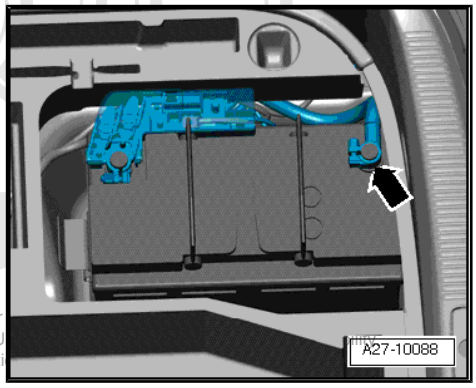
Procedure

Caution

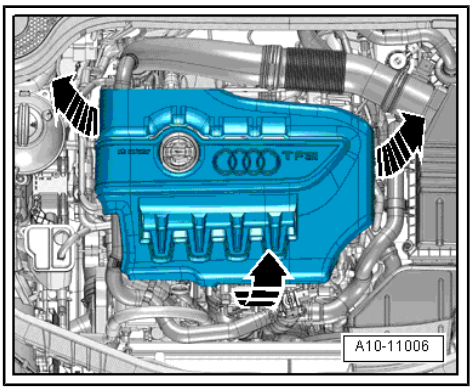
When disconnecting the battery there is a risk of serious damage to electronic components:

- ***Observe the correct procedure for disconnecting the battery.***

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

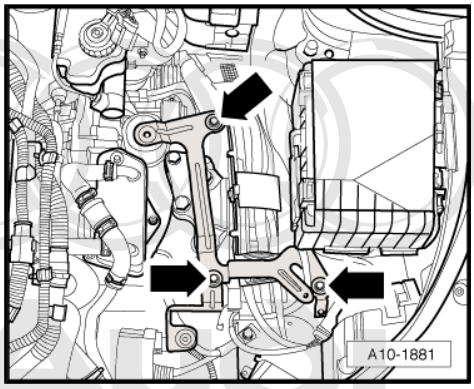


– Remove engine cover panel -arrows-.



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

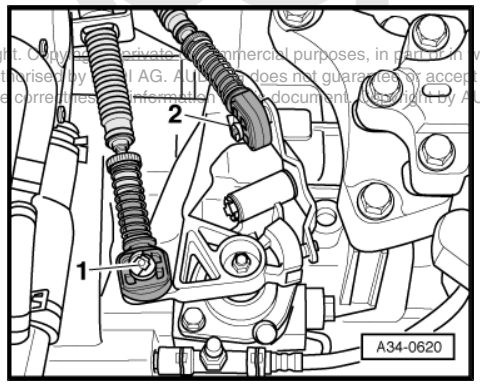
– Remove bolts -arrows- and detach bracket for air cleaner housing.



– Detach securing clip -1- and pull cable end-piece off pin.

Metal gate relay lever:

– Detach securing clip -2- and pull cable end-piece off gate relay lever.



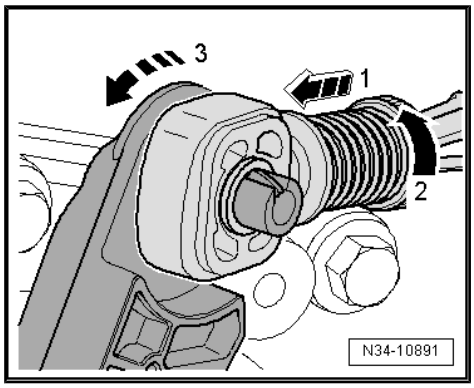
Plastic gate relay lever:

- To prevent damage to gate selector cable, cable end-piece must be detached from gate selector cable before removing relay lever.

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

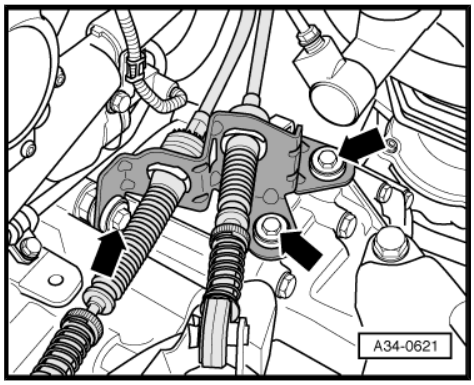
– Then press gate relay lever forwards (in direction of -arrow 3-).

- Detach cable end-piece only when gate relay lever is removed ⇒ page 76 .

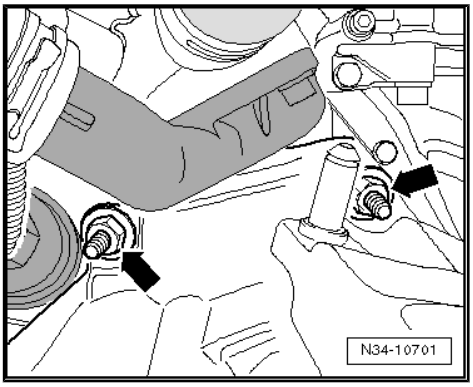


Continued for all vehicles:

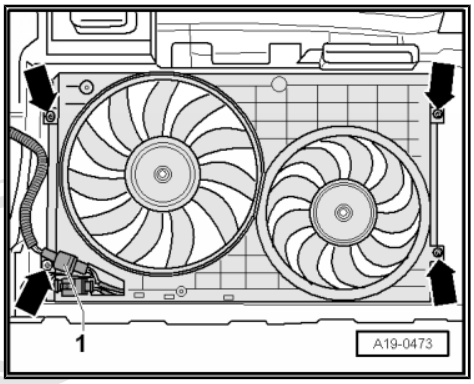
– Detach cable support bracket from gearbox -arrows-; then move to one side and tie up together with selector cables.



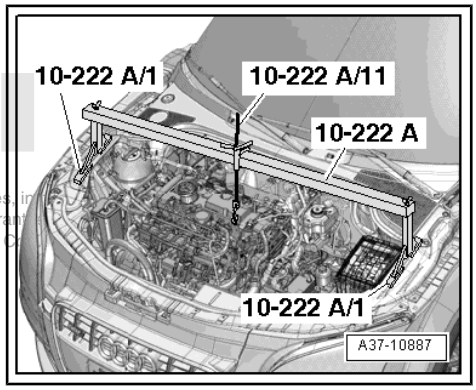
– Unscrew top engine/gearbox securing bolts -arrows-.



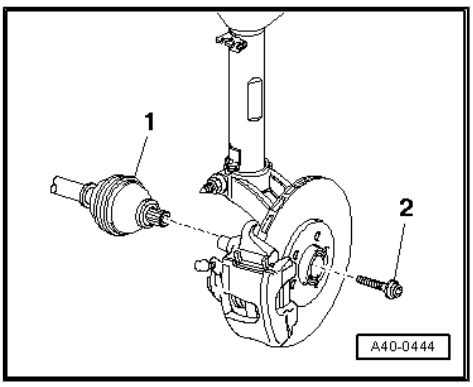
– Remove the two top bolts on radiator cowl -top arrows-.



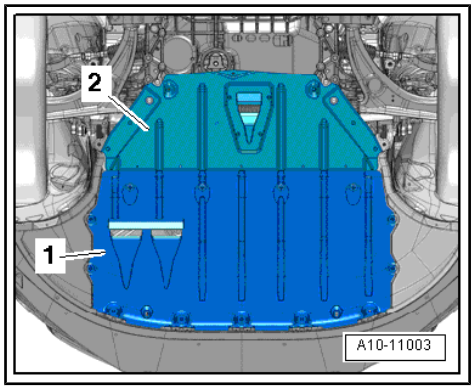
– Set up support bracket -10 - 222 A- together with racks -10 - 222 A /1- on wing mounting flanges.
– Engage hook of spindle -10 - 222 A /11- in engine lifting eye (left-side).
– Partly take up weight of engine with spindle, but do not lift.



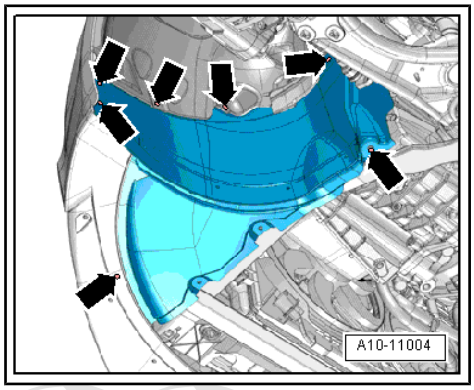
– With vehicle still standing on its wheels, slacken off front left flange bolt -2- 90° (maximum). Do not slacken further, as this would damage the wheel bearing.
– Remove both front wheels.



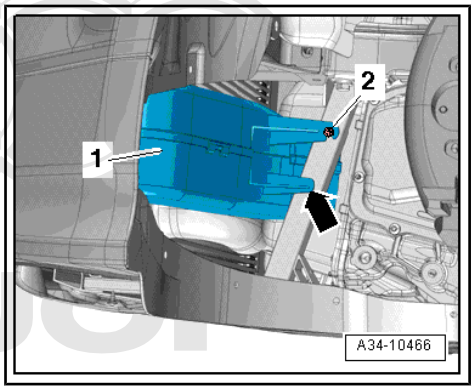
– Remove noise insulation panels -1- and -2- ⇒ Rep. Gr. 66 .



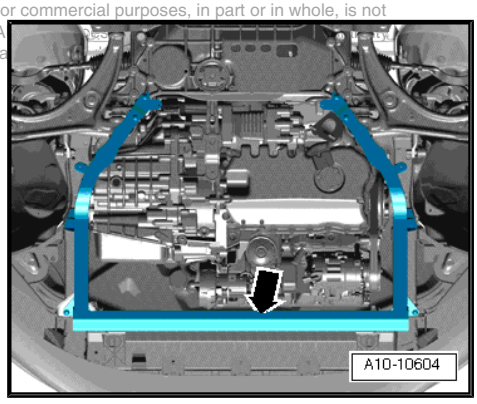
– Remove noise insulation (left and right) -arrows-.



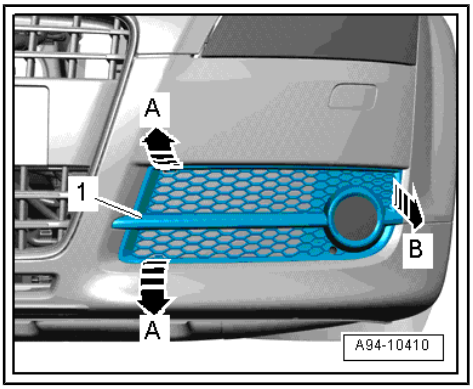
– Unscrew bolt -2- and disconnect air duct for gearbox cooling -1- (-arrow-).



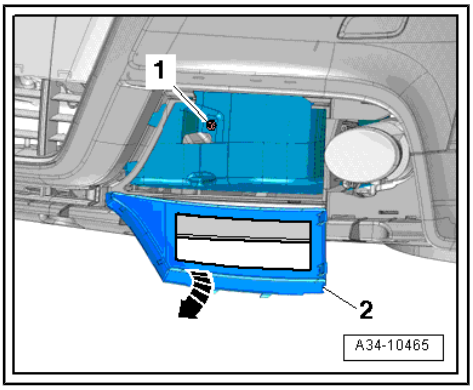
– Remove noise insulation frame -arrow- ⇒ Rep. Gr. 50 .



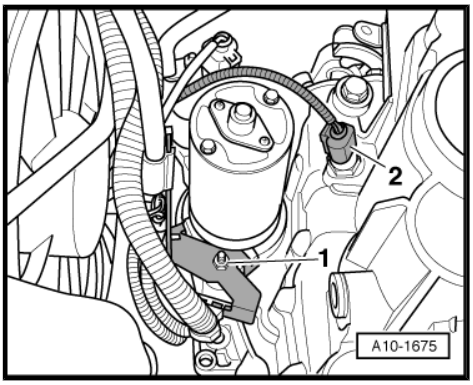
– Release retainers -arrows A- using a screwdriver.
– Detach air intake grille -1- (left-side) from bumper cover in direction of -arrow B-.



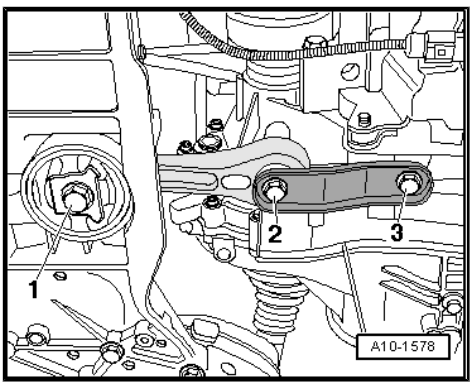
– Open flap -2- -arrow- and remove bolt -1-.



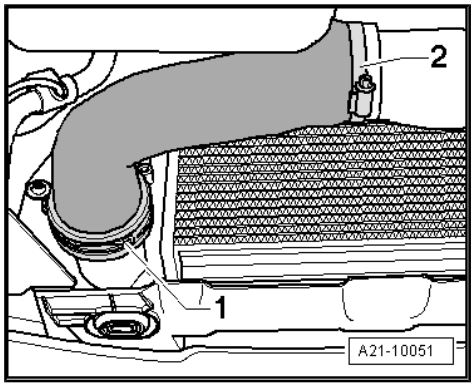
– Unplug electrical connector -2- for reversing light switch -F4- .
– Remove nut -1- and detach bracket from stud together with electrical wiring.
– Move bracket and wiring clear to the side.
– Remove bottom bolt securing starter -1-.



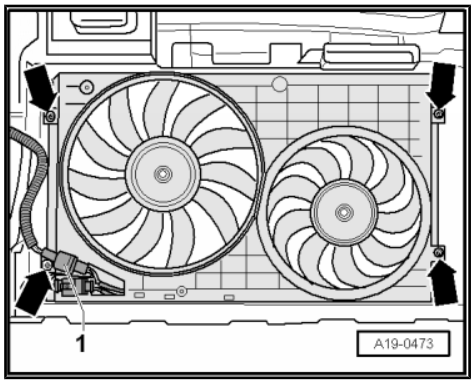
– Unscrew bolts -1 ... 3- and remove pendulum support.



– Release hose clips -1- and -2- and remove air intake pipe.



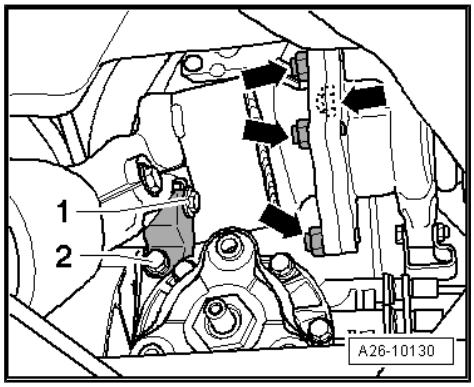
– Detach electrical connector -1-.
– Remove remaining bolts -bottom arrows- and take out radiator cowl from below.



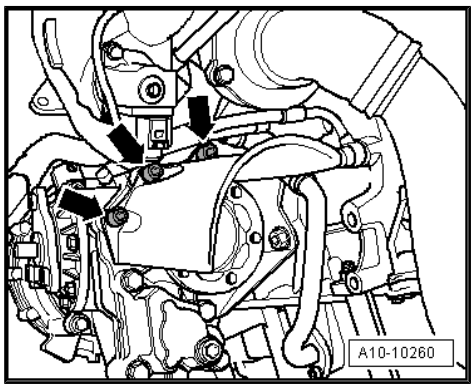
– Remove nuts -arrows-.
– Detach catalytic converter from turbocharger and secure catalytic converter to prevent it from falling.

Note

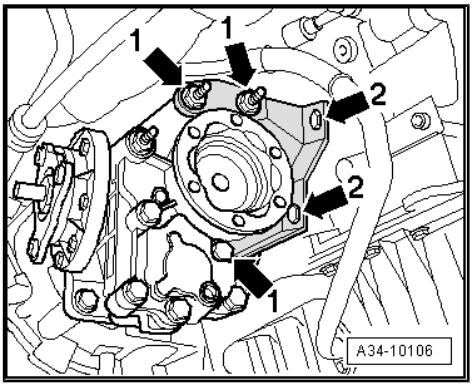
-Item 1- and -item 2- can be disregarded.



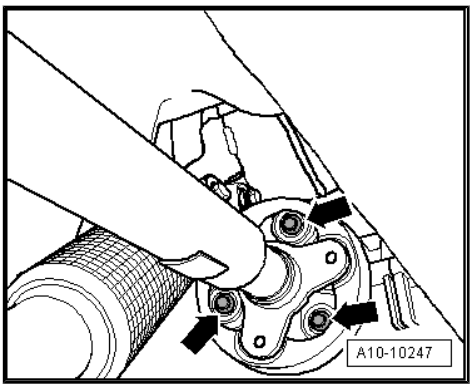
– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.
– Unbolt drive shaft (left-side) from flange shaft on gearbox.
– Unbolt drive shaft (right-side) from flange shaft on bevel box.



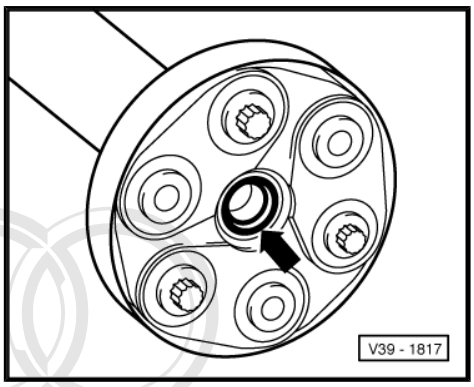
– Slacken bolts -1- and remove bolts -2-.



– Mark position of flexible coupling and bevel box flange in relation to one another.
– Unbolt propshaft with flexible coupling from bevel box -arrows- (counterhold triangular flange with suitable lever).



– Push engine/gearbox assembly forward slightly (towards front end) and then pull propshaft off bevel box.



Caution

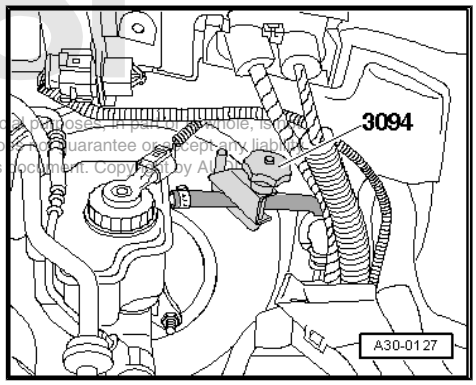
The seal -arrow- in the propshaft flange can be damaged.

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

Note

If seal is damaged propshaft must be renewed.

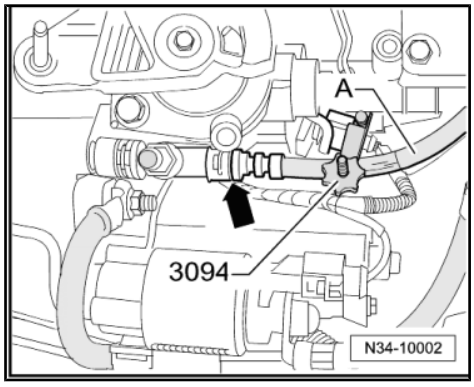
– If a plastic pipe is installed between clutch master cylinder and slave cylinder, clamp off supply hose to clutch master cylinder using hose clamp up to 25 mm -3094- .



Note

- *In the following steps make sure that no brake fluid escapes onto the starter or onto the gearbox below. If this does happen, clean the affected area thoroughly.*
- *Seal off open lines and connections with clean plugs or sealing caps to prevent dirt from entering.*

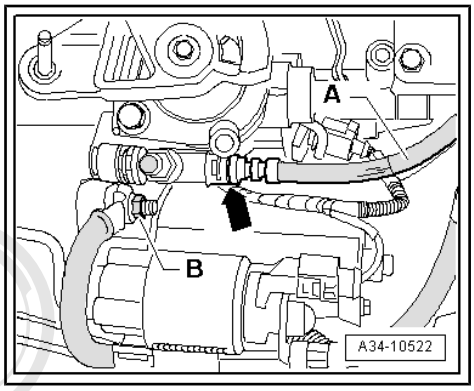
– If a pipe/hose assembly is installed between clutch master cylinder and slave cylinder, clamp off hose -A- using hose clamp up to 25 mm -3094- .



Note

-Arrow- can be disregarded.

– Pull clip -arrow- out as far as stop.
– Pull plastic pipe or pipe/hose assembly -A- out of bleeder connection for clutch slave cylinder and seal end of pipe.

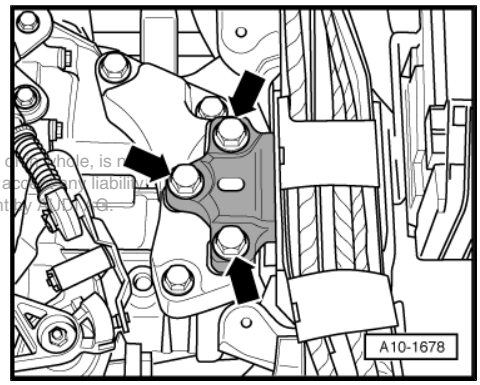


Caution

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

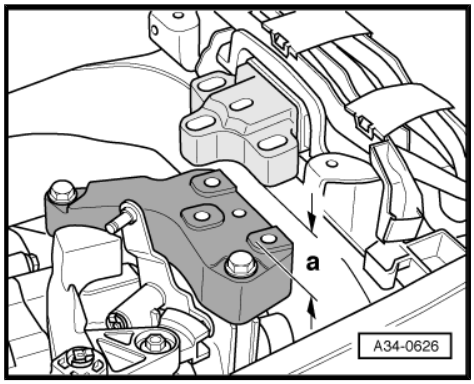
– Remove nut -B-.
– Detach earth cable and remove top securing bolt for starter.
– Place starter to side onto longitudinal member.

– Remove bolts on gearbox mounting -arrows-.

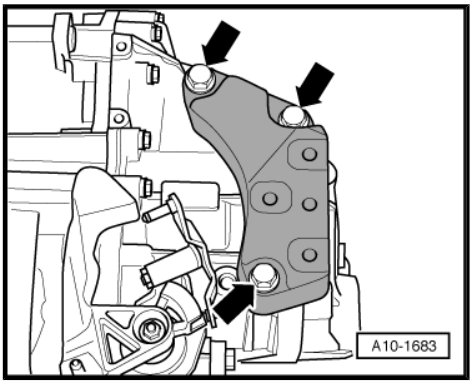


– By adjusting spindles on support bracket -10 - 222 A- , lower gearbox by distance -a-.

• Dimension -a- = 60 mm.



– Unbolt gearbox bracket from gearbox -arrows-.



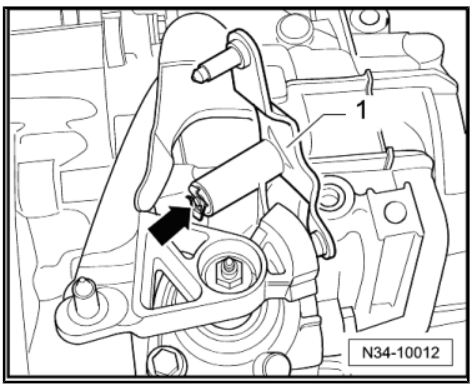
Metal gate relay lever -1-:

– Pull off securing clip -arrow- and remove gate relay lever -1-.

Plastic gate relay lever -1-:

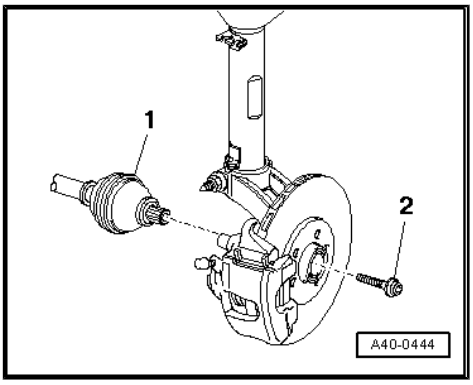
– Removing gate relay lever (with detent catch) ⇒ page 75

– Removing gate relay lever (with clip) ⇒ page 75



Continued for all vehicles:

– Remove flange bolt -2- and detach drive shaft (left-side) -1-.



Note

The wheel bearing must not be subjected to load after the bolt -2- securing the drive shaft has been slackened.

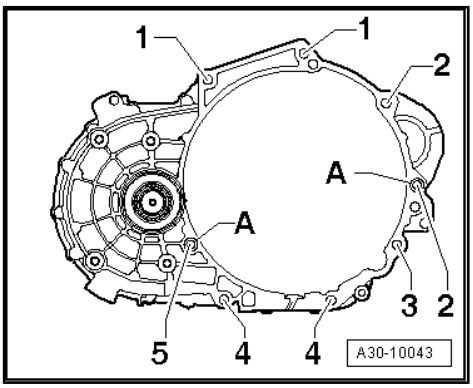
– Remove engine/gearbox connecting bolts (bottom) -4- and -5-.

• Leave connecting bolt -3- screwed in.

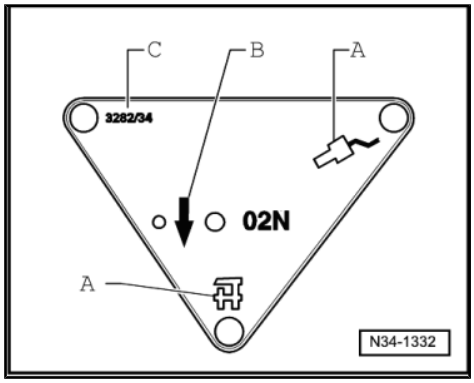
To remove gearbox “02Q” set up gearbox support -3282- with adjustment plate -3282/33- .

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

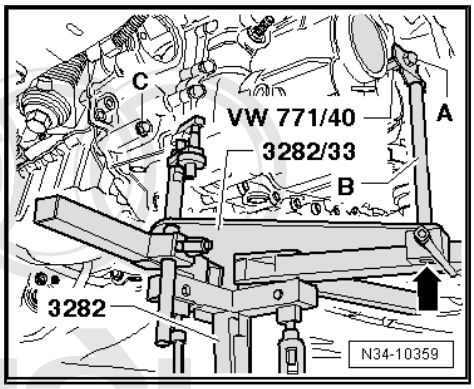
– Align arms of gearbox support according to holes in adjustment plate .



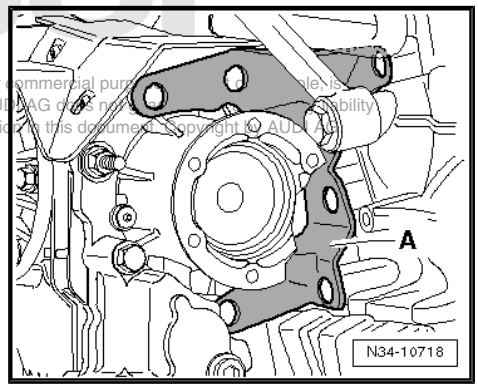
– Bolt on support elements -A-, as illustrated on adjustment plate .
– Screw in pin -3282/29- instead of support element -C-.
– Place engine and gearbox jack -V.A.G 1383 A- under vehicle; arrow symbol -B- on adjustment plate points to front of vehicle.
– Align adjustment plate and gearbox parallel to one another.



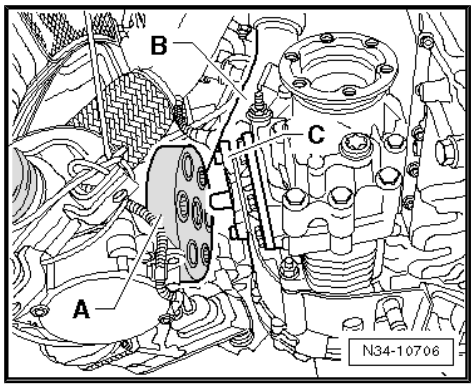
– Secure adapter -VW 771/40- in tapped hole of gearbox housing, as shown in illustration.
– Screw pin -3282/29- into hole for bolt securing pendulum support to gearbox.
– Secure gearbox to gearbox support -3282- with bolt M10x20 -item A-.
• Make sure pin -B- is flush at bottom with guide of gearbox support -3282- -arrow-.
– Unscrew last engine/gearbox securing bolt -C-.



– Press gearbox off dowel sleeves.
– Now remove bracket -A- for bevel box.



– Turn gearbox upwards at differential end. Guide output flange -C- on gearbox past propshaft -A- and front exhaust pipe -B-. Rotate output flange if necessary.



Note

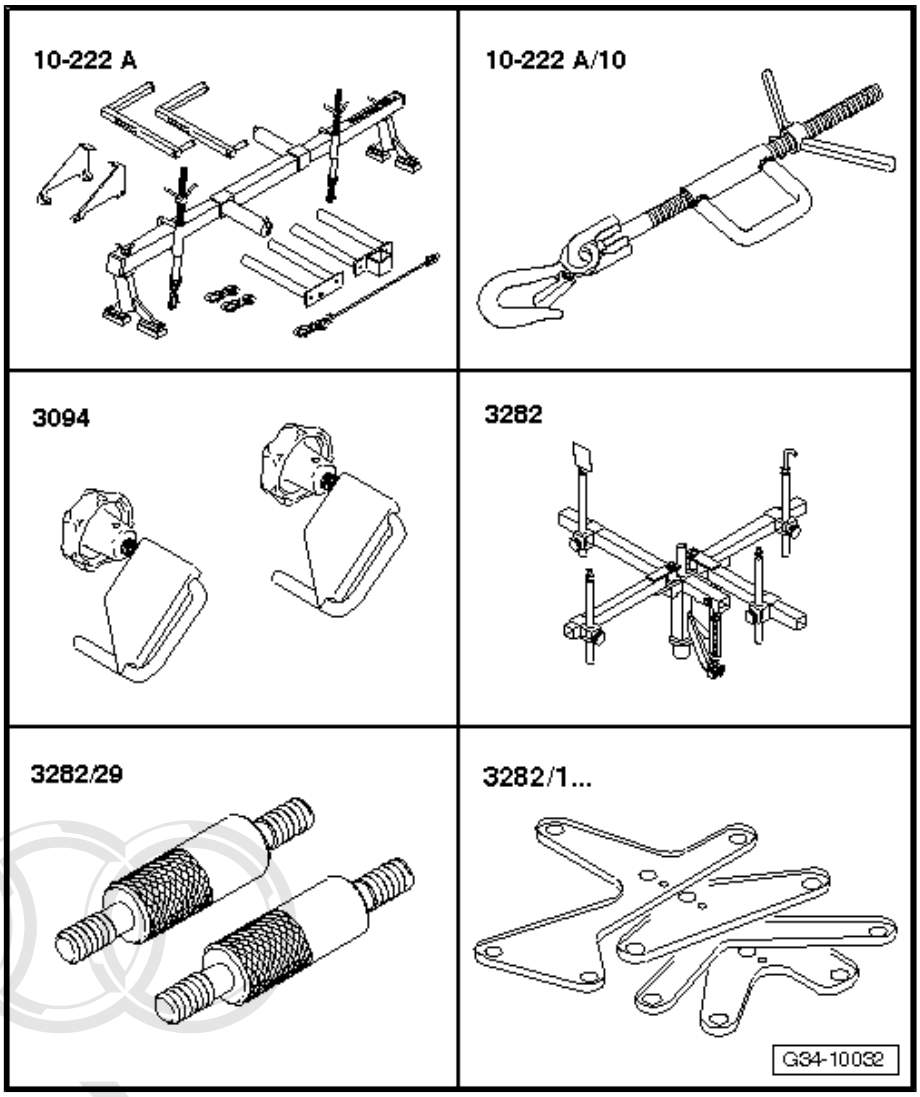
Also pay attention to area between bevel box and intermediate plate on engine.

– Then tilt gearbox to the left by turning spindles of gearbox support -3282- .
– Guide gearbox past suspension bracket for wishbone, then push gearbox forwards slightly and lower out carefully.

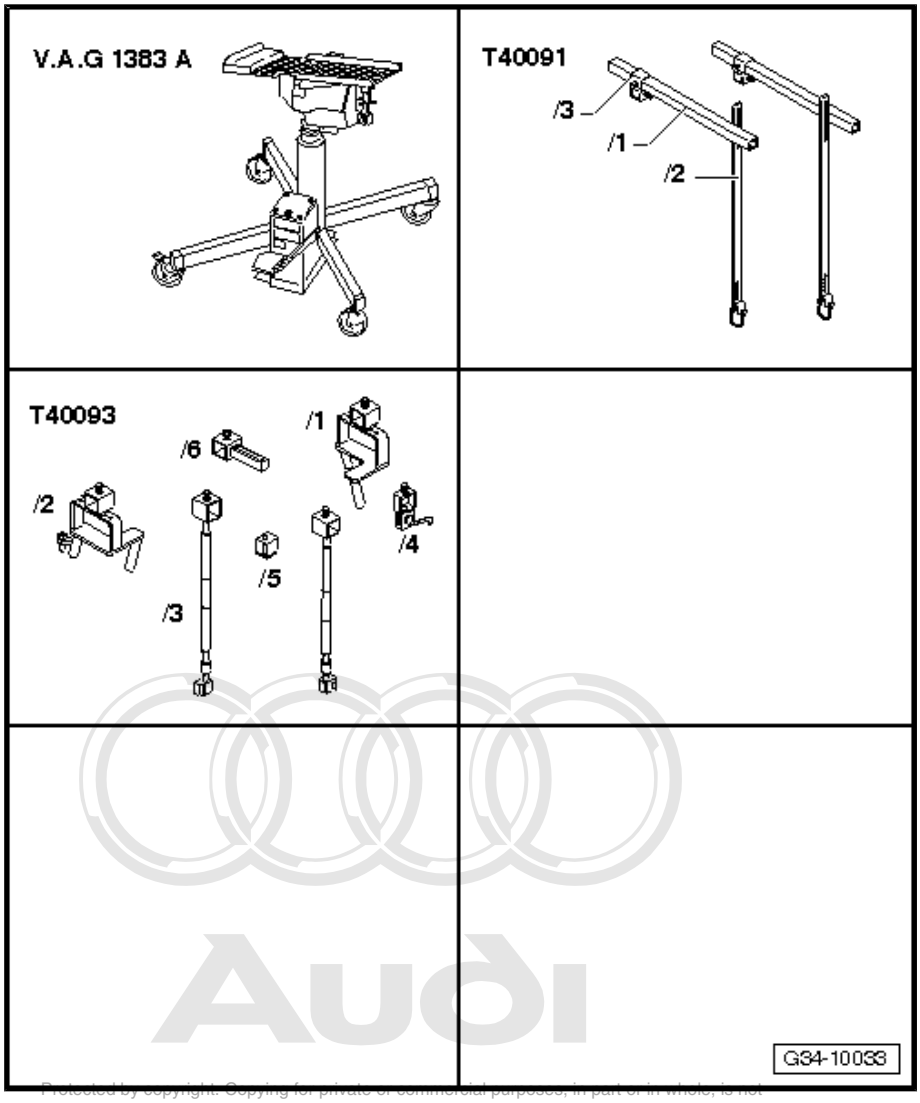
8.2 Removing gearbox - vehicles with 3.2 ltr. MPI engine

Special tools and workshop equipment required

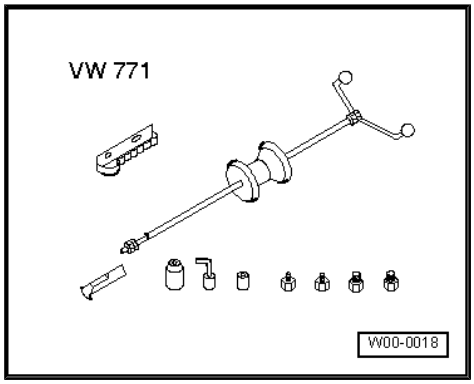
- Support bracket -10 - 222 A-
- Hooks -10 - 222 A /10-
- Hose clamps, up to Ø 25 mm -3094-
- Gearbox support -3282-
- Pin -3282/29-
- Adjustment plate -3282/33-



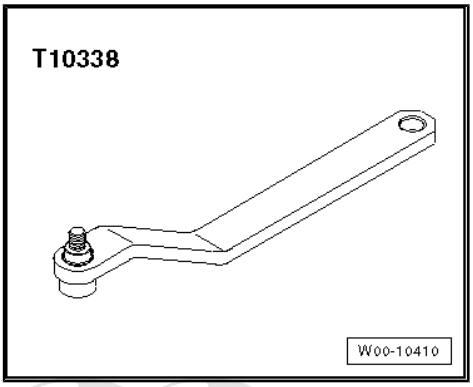
- Engine and gearbox jack - V.A.G 1383 A-
- Engine support bracket, basic set -T40091-
- Engine support bracket, supplementary set - T40093-



- Adapter -VW 771/40-



- Bracket -T10338-



- Bolt M10x20
- Grease -G 000 450 02-
- Grease for clutch plate splines -G 000 100-
- Universal grease -G 052 735-

Procedure

Note

- *Observe general repair instructions ⇒ page 7 .*
- *All cable ties which are released or cut open during removal must be fitted in the same position when installing.*

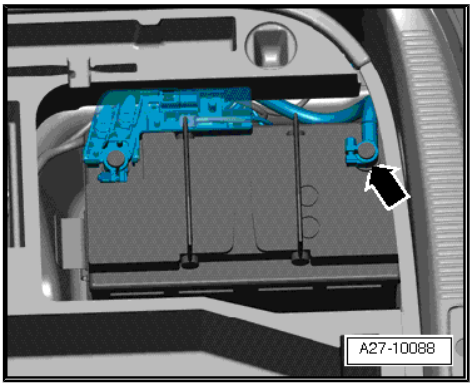
Caution

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

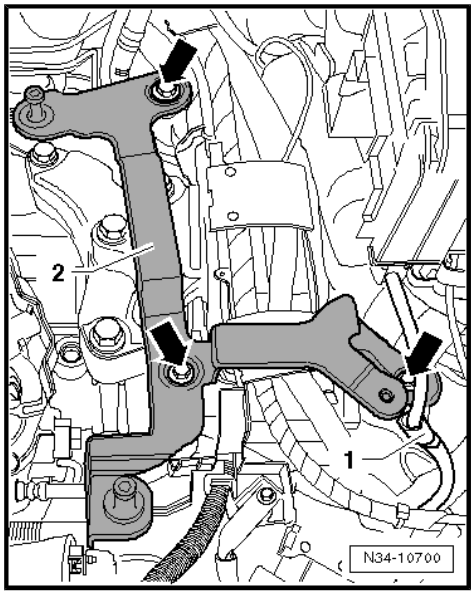
- ***Observe the correct procedure for disconnecting the battery.***

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

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



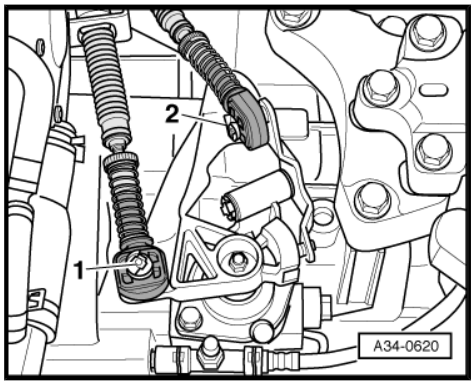
– Detach line -1- from air cleaner bracket -2-.
– Remove bolts -arrows- and remove air cleaner bracket.
– Detach securing clip -3- for gear selector cable from gearbox selector lever -1- and pull cable off pin -arrow-.



– Detach securing clip -arrow 1- and pull cable end-piece off pin.

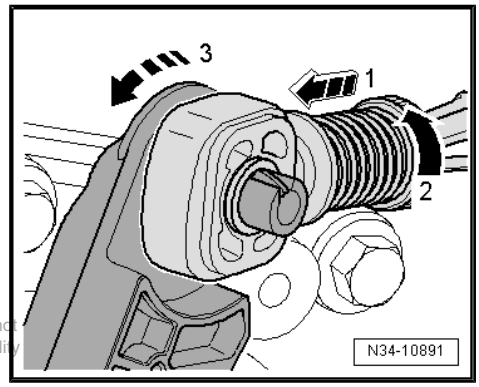
Metal gate relay lever:

– Detach securing clip -2- and pull cable end-piece off pin gate relay lever.



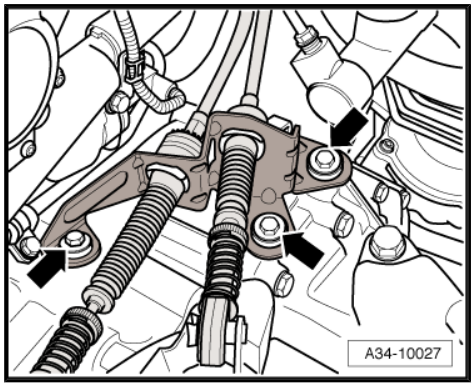
Plastic gate relay lever:

- To prevent damage to gate selector cable, cable end-piece must be detached from gate selector cable before removing relay lever.
– 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 gate relay lever forwards (in direction of -arrow 3-).
- Detach cable end-piece only when gate relay lever is removed ⇒ page 76 .

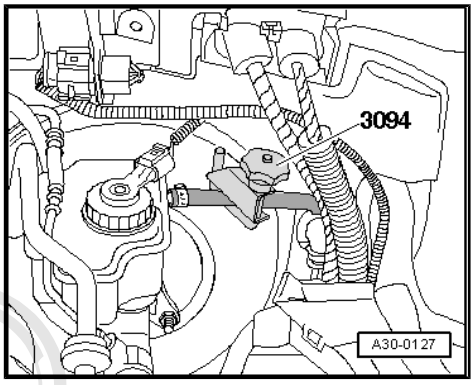


Continued for all vehicles:

– Detach cable support bracket from gearbox -arrows-; then move to one side and tie up together with selector cables.



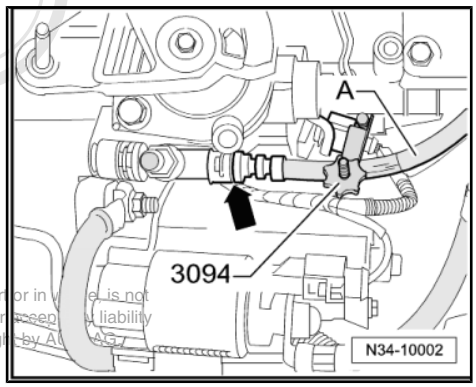
– If a plastic pipe is installed between clutch master cylinder and slave cylinder, clamp off supply hose to clutch master cylinder using hose clamp -3094- .



Note

- *In the following steps make sure that no brake fluid escapes onto the starter or onto the gearbox below. If this does happen, clean the affected area thoroughly.*
- *Seal off open lines and connections with clean plugs or sealing caps to prevent dirt from entering.*

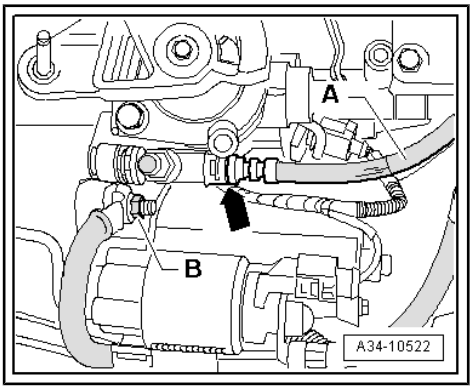
– If a pipe/hose assembly is installed between clutch master cylinder and slave cylinder, clamp off hose -A- using hose clamp -3094- .



Note

-Arrow- can be disregarded.

– Pull clip -arrow- out as far as stop.
– Pull plastic pipe or pipe/hose assembly -A- out of bleeder connection for clutch slave cylinder and seal end of pipe.



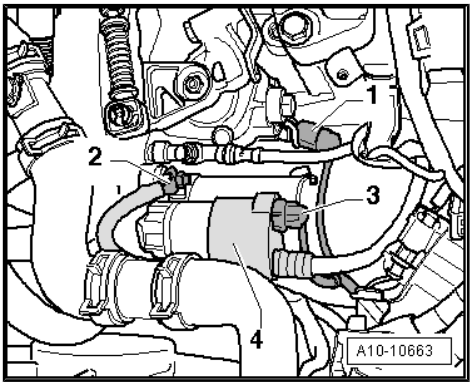
Note

-Item B- can be disregarded.

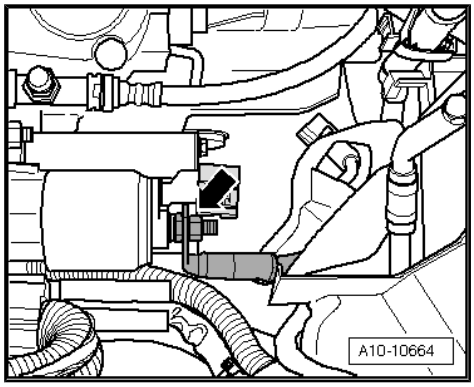
Caution

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

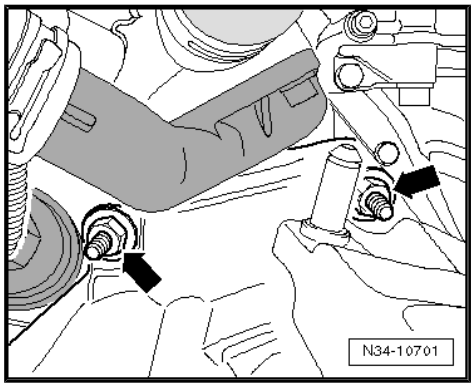
– Unplug electrical connector -1- for reversing light switch -F4- .
– Unscrew earth wire -2-.
– Then remove upper securing bolt from starter located below earth wire -2-.
– Unplug electrical connector -3-.
– Push cover -4- to rear.



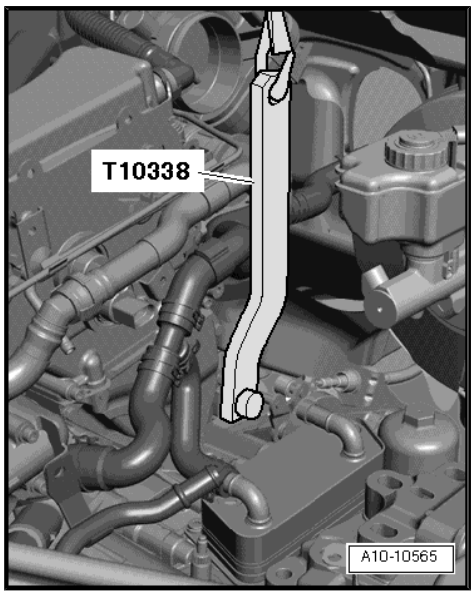
– Disconnect electrical wire -arrow- from starter and move clear.



– Unscrew top engine/gearbox securing bolts -arrows-.



– Secure bracket -T10338- to vacant tapped hole at rear left of engine.



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

♦ Rack -10 - 222 A /1- (2x)

♦ Hook -10 - 222 A /10- (spindle faces towards rear)

♦ Spindle -10 - 222 A /11- (spindle faces towards front)

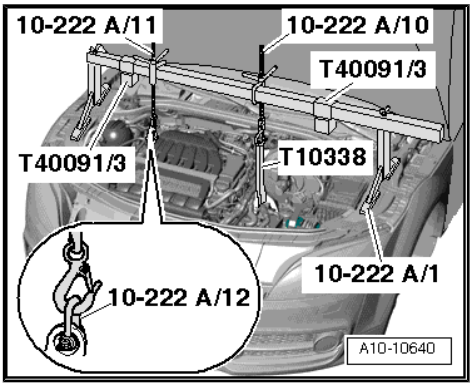
♦ Shackle -10 - 222 A /12-

♦ Connecting piece -T40091/3- (2x)

– Hook spindle -10 - 222 A /11- with shackle -10 - 222 A /12- onto engine lifting eye (right-side).

– Attach hook -10 - 222 A /10- to bracket -T10338- .

– Partly take up weight of engine/gearbox assembly via the spindles.

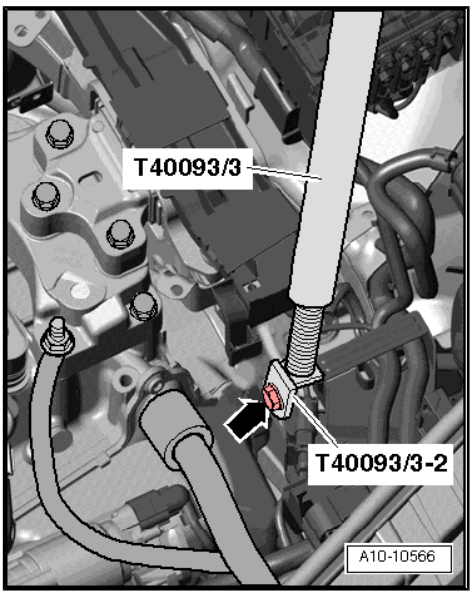


– Assemble supports -T40093/3- (2x) with adapters -T40093/3-2- for left side and -T40093/3-3- for right side.

– Disconnect earth wire from longitudinal member (left-side).

– Remove securing bolt for front section of longitudinal member on left and right.

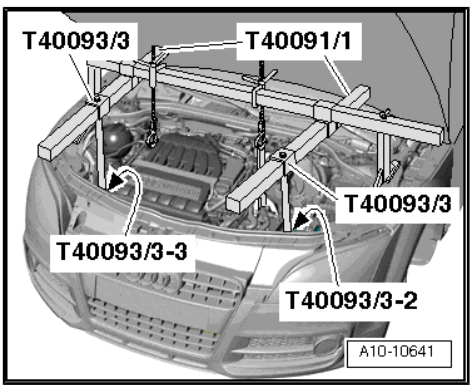
– Bolt adapter -T40093/3-2- (left-side) and -T40093/3-3- (right-side) to longitudinal members -arrow-, using the bolts removed previously.



Note

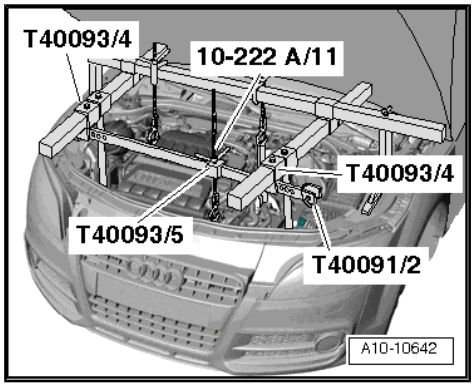
Illustration shows left side of vehicle.

– Insert square bars -T40091/1- into connecting pieces -T40091/3- and supports -T40093/3- as illustrated.



– Fit connecting pieces -T40093/4- onto square bars.

– Insert support -T40091/2- with slide -T40093/5- into the two connecting pieces -T40093/4- .



WARNING

Accidents can be caused if parts of the support bracket are not correctly secured.

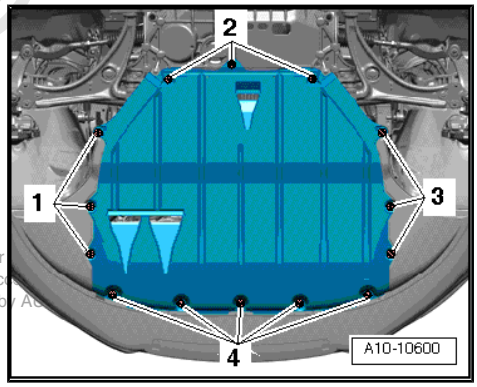
- ***Secure support -T40091/2- using retaining pins and split pins of the connecting pieces -T40093/4- .***
- ***Secure connecting pieces and supports using clamping bolts.***

– Attach spindle -10 - 222 A /11- to slide and engine lifting eye.

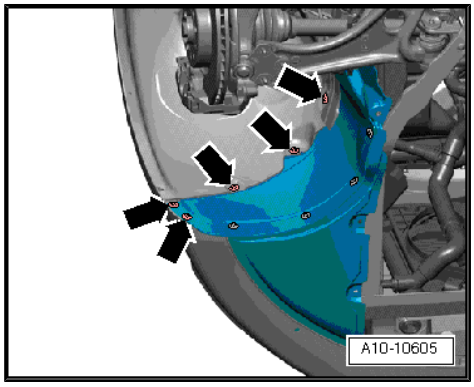
– Take up weight of engine/gearbox assembly by tightening the 3 spindles evenly.

– Remove both front wheels.

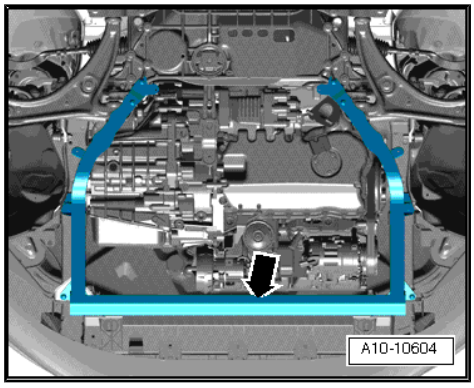
– Release fasteners -1 ... 4- and remove centre noise insulation.



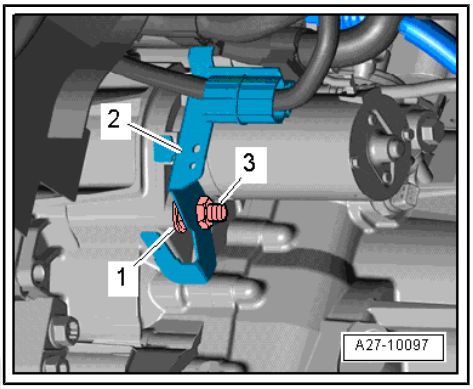
– Remove noise insulation (left and right) -arrows-.



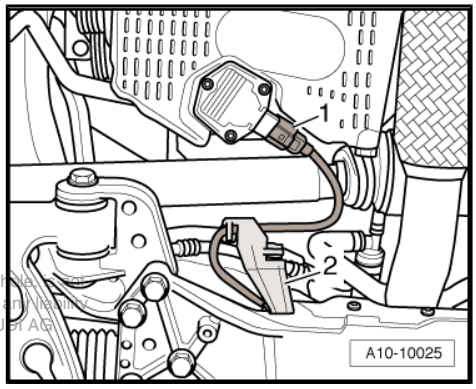
– Remove noise insulation frame -arrow- ⇒ Rep. Gr. 50 .



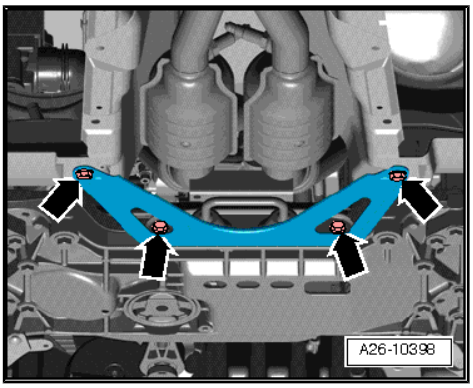
– Remove nut -3- and detach bracket -2- for wiring harness.
– Remove starter securing bolt -1- and detach starter.



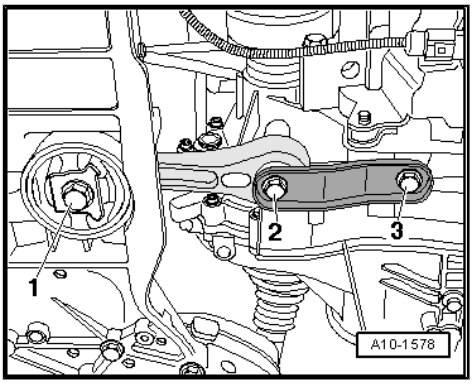
– Unplug electrical connector -1- at oil level and oil temperature sender -G266- .
– Unclip bracket -2- for electrical wiring leading to oil level and oil temperature sender -G266- at subframe.



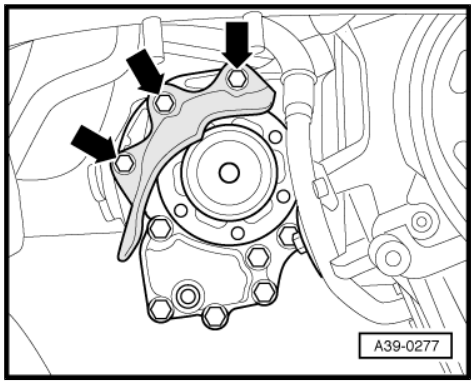
– Remove bolts -arrows- for exhaust pipe bracket.



– Remove bolts -2- and -3-.
– Fix position of subframe to avoid unnecessary wheel alignment ⇒ Rep. Gr. 40 .
– Remove subframe ⇒ Rep. Gr. 40 .



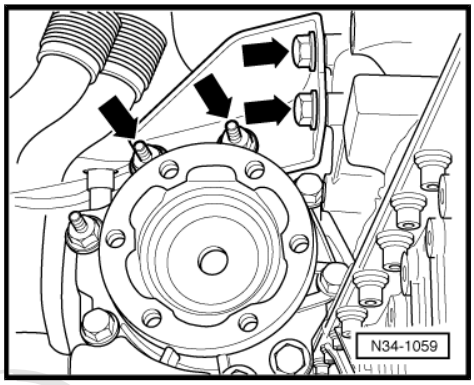
– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.
– Unbolt drive shaft (left-side) from flange shaft on gearbox.
– Unbolt drive shaft (right-side) from flange shaft on bevel box.
– Tie up drive shafts with cable ties.



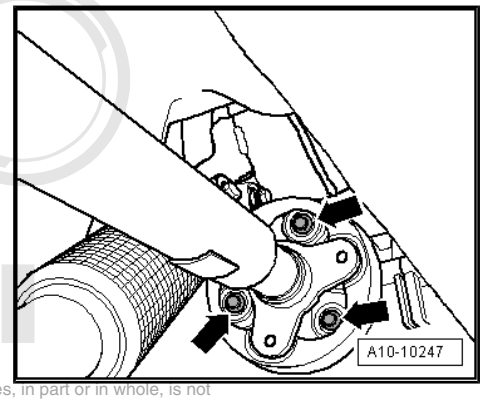
Note

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

– Remove bolts -arrows- and detach bracket for bevel box.



– Mark position of flexible coupling and bevel box flange in relation to one another.
– Unbolt propshaft with flexible coupling from bevel box -arrows- (counterhold triangular flange with suitable lever).

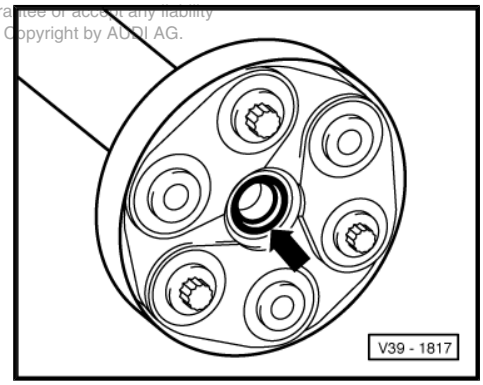


– Push engine/gearbox assembly forward slightly (towards front end) and then pull propshaft off bevel box.

Caution

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

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

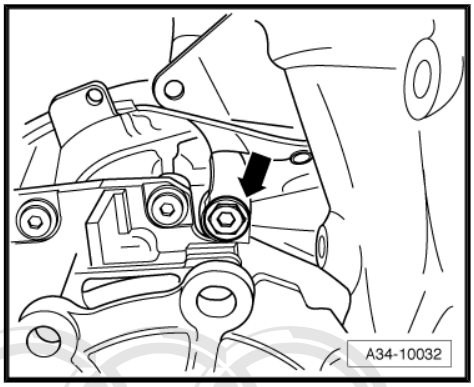


Note

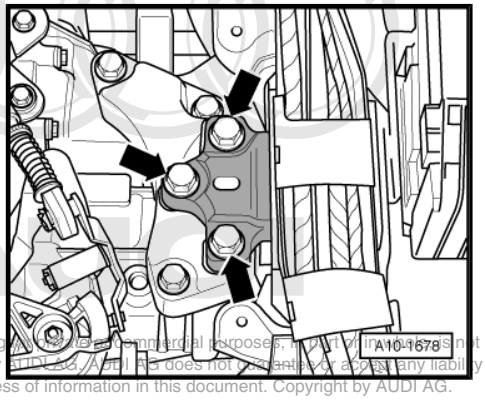
If seal is damaged propshaft must be renewed.

– Tie up propshaft.

– Remove bolt -arrow- from above bevel box.

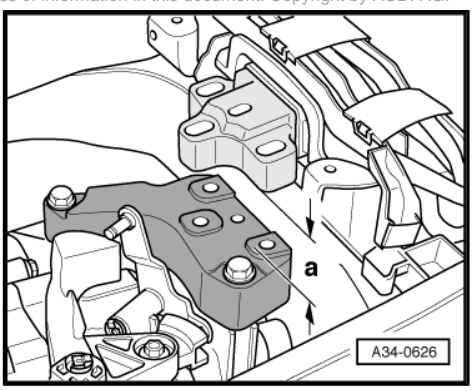


– Remove bolts -arrows- on gearbox mounting.

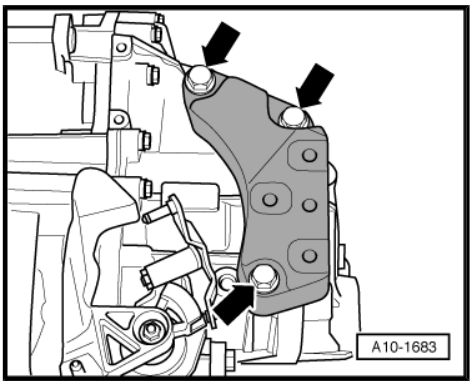


– By adjusting spindles on support bracket -10 - 222 A- , lower gearbox by distance -a-.

• Dimension -a- = 70 mm.



– Unbolt gearbox bracket from gearbox -arrows-.



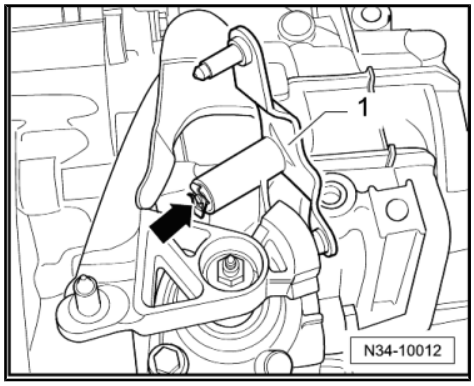
Metal gate relay lever -1-:

– Pull off securing clip -arrow- and remove gate relay lever -1-.

Plastic gate relay lever -1-:

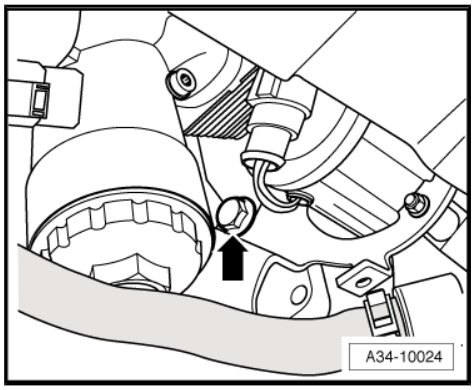
– Removing gate relay lever (with detent catch) ⇒ page 75

– Removing gate relay lever (with clip) ⇒ page 75



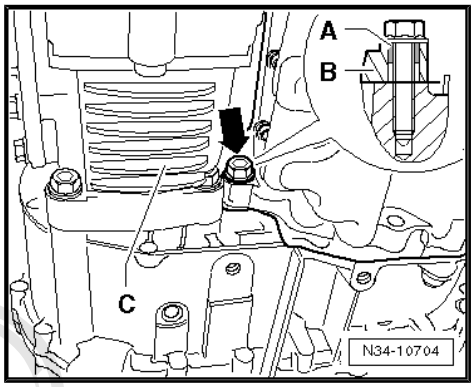
Continued for all vehicles:

– Remove engine/gearbox connecting bolt -arrow- (on engine side).



– Unscrew engine/gearbox securing bolt -arrow- located next to bevel box -C-.

Note: retaining clip -A- securing bolt -arrow- is fitted in sump -B-.



To remove gearbox “02Q” set up gearbox support -3282- with adjustment plate -3282/33- .

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

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

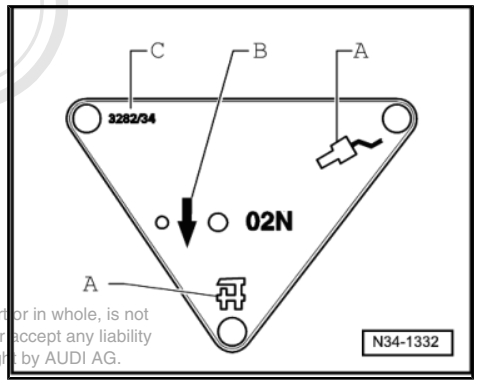
– Bolt on support elements -A-, as illustrated on adjustment plate .

– Screw in pin -3282/29- instead of support element -C-.

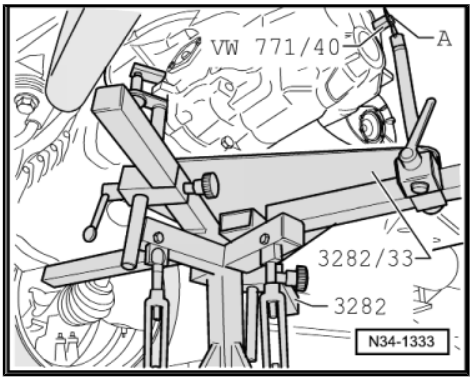
– Place engine and gearbox jack -V.A.G 1383 A- under vehicle; arrow symbol -B- on adjustment plate points to front of vehicle.

– Align adjustment plate and gearbox parallel to one another.

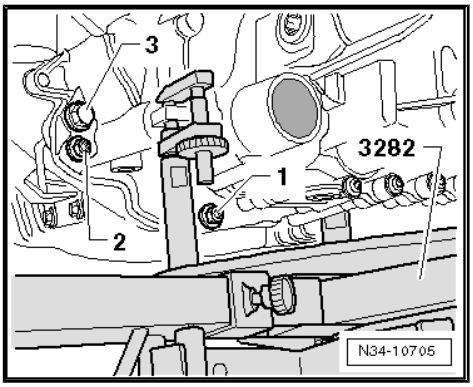
– Screw pin -3282/29- into hole for bolt securing pendulum support to gearbox.



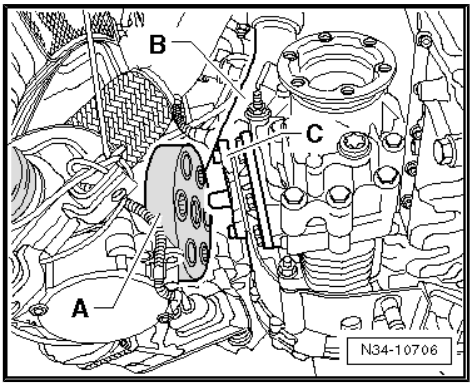
– Secure adapter -VW 771/40- in tapped hole of gearbox housing, as shown in illustration.
– Secure gearbox to gearbox support -3282- with bolt M10x20 -item A-.



– Unscrew last engine/gearbox securing bolts at bottom -1 ... 3-.



– Separate gearbox from engine and pivot upwards at differential end. Guide output flange -C- on gearbox past propshaft -A- and front exhaust pipe -B-. Rotate output flange if necessary.



Note

Also pay attention to area between bevel box and intermediate plate on engine.

– Press gearbox off dowel sleeves.
– Carefully lower gearbox.

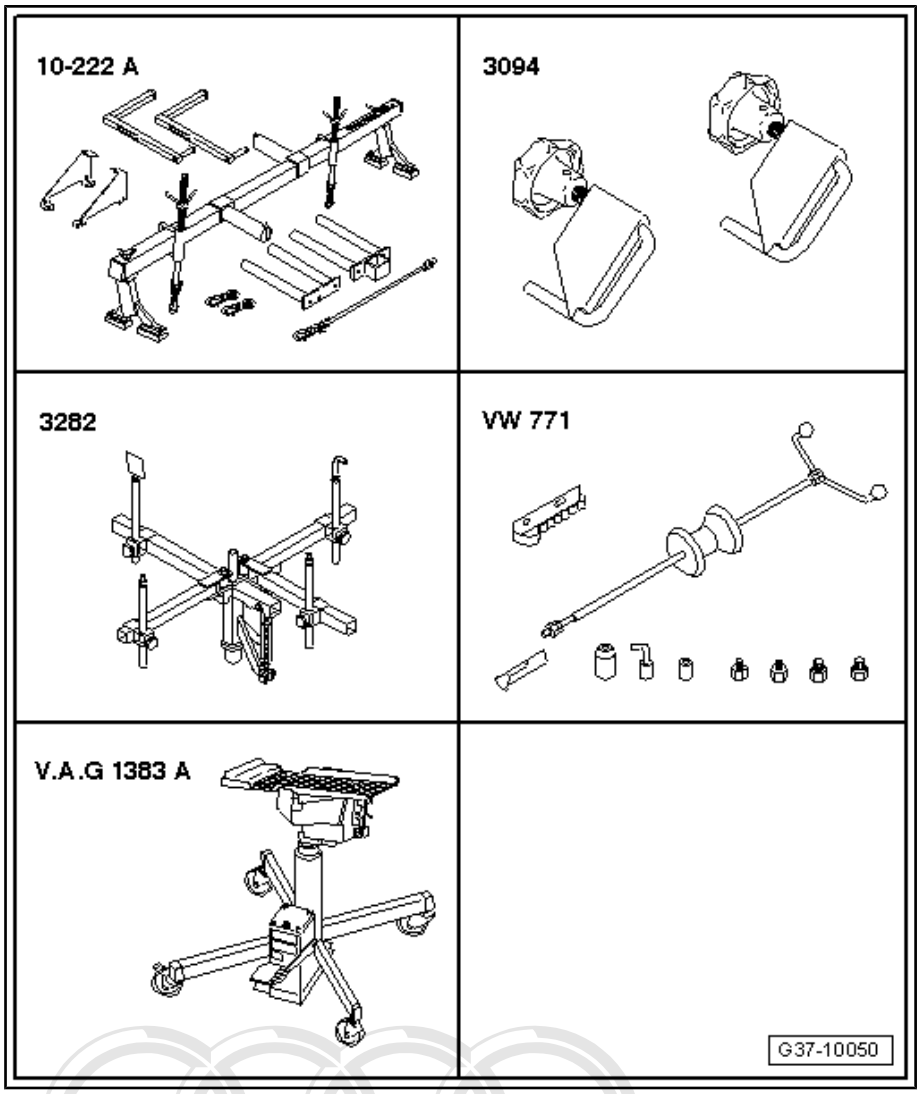
Note

When lowering gearbox make sure the electromechanical power steering is not damaged.

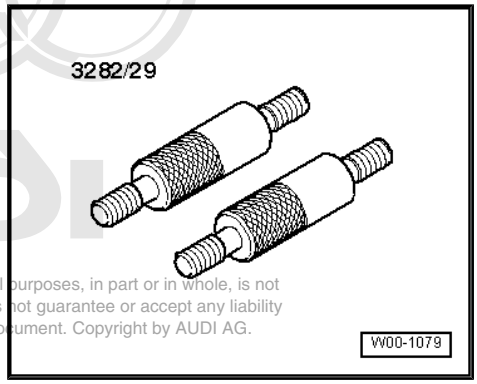
8.3 Removing gearbox - vehicles with 2.0 ltr. TDI engine

Special tools and workshop equipment required

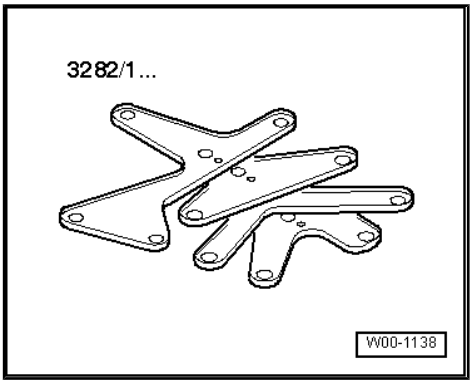
- Support bracket -10 - 222 A-
- Hose clamps, up to Ø 25 mm -3094-
- Gearbox support -3282-
- Adapter -VW 771/40-
- Engine and gearbox jack - V.A.G 1383 A-



- Pin -3282/29-



- Adjustment plate -3282/33-



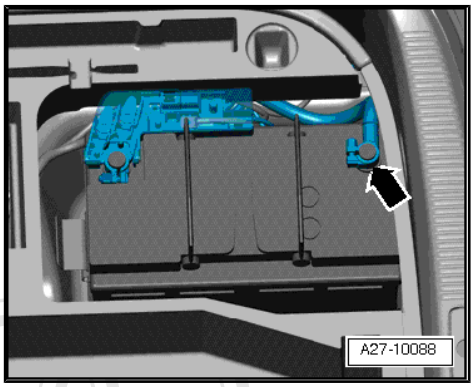
- Bolt M10x20
- Grease -G 000 450 02-
- Grease for clutch plate splines -G 000 100-
- Universal grease -G 052 735-

Procedure

Caution

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

- *Observe the correct procedure for disconnecting the battery.*



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

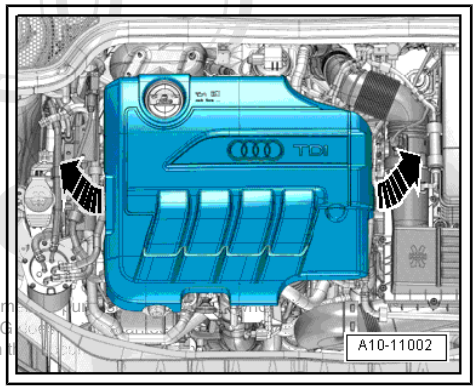
– Remove engine cover panel -arrows-.

– Remove air cleaner housing ⇒ Rep. Gr. 23 .

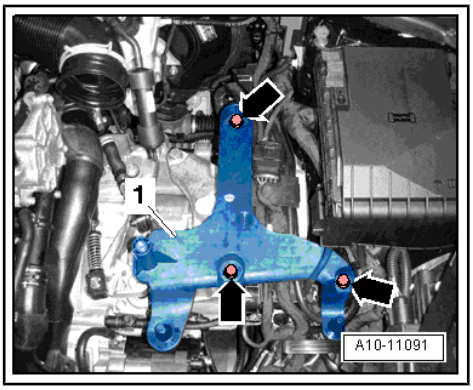
– Drain coolant ⇒ Rep. Gr. 19 .

– Remove starter ⇒ Rep. Gr. 27 .

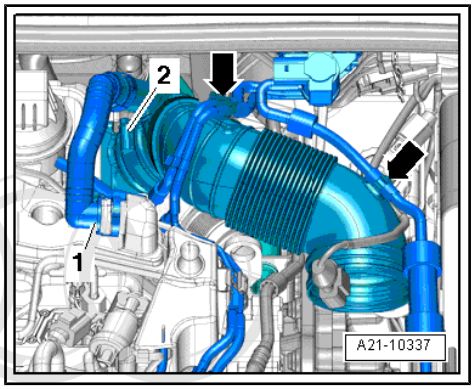
– Remove radiator cowl ⇒ Rep. Gr. 19 .



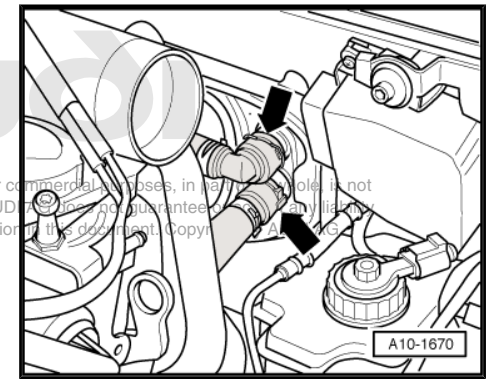
– Remove bolts -arrows- and detach bracket for air cleaner housing.



– Press release tabs and disconnect crankcase breather hose -1- from cylinder head cover.
– Move clear vacuum hoses -arrows- at air pipe.
– Release hose clip -2- and detach air pipe.



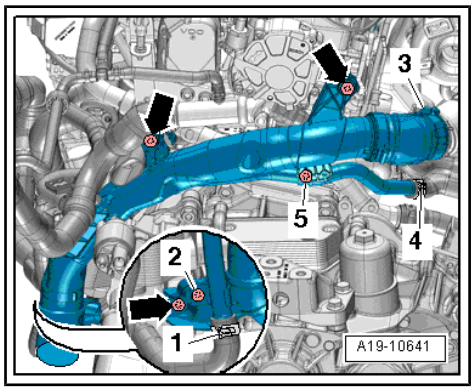
– Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger.



Note

Place a cloth underneath heat exchanger to catch escaping coolant.

– Remove bolts -arrows- at air pipe.



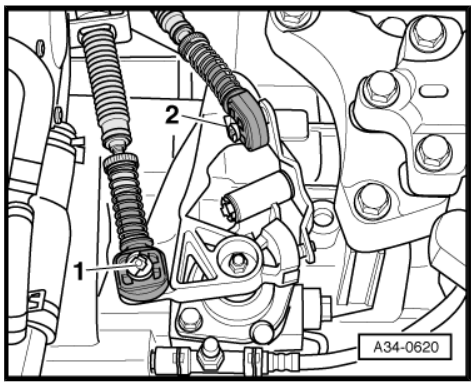
Note

-Items 1 ... 5- can be disregarded.

– Detach securing clip -arrow 1- and pull cable end-piece off pin.

Metal gate relay lever:

– Detach securing clip -2- and pull cable end-piece off pin gate relay lever.



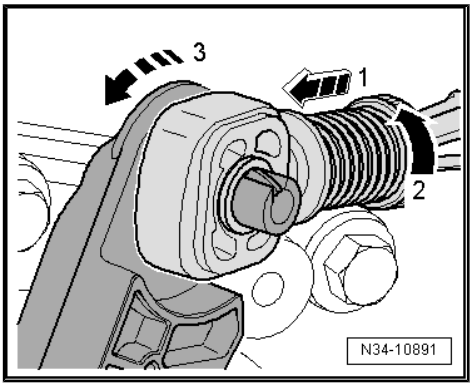
Plastic gate relay lever:

- To prevent damage to gate selector cable, cable end-piece must be detached from gate selector cable before removing relay lever.

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

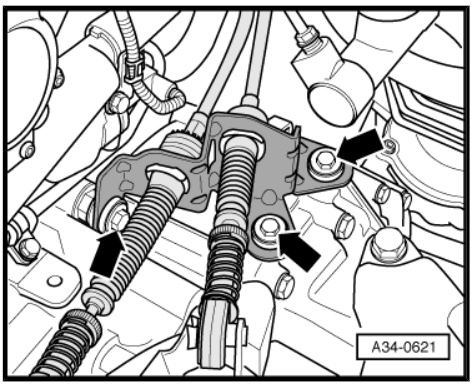
– Then press gate relay lever forwards (in direction of -arrow 3-).

- Detach cable end-piece only when gate relay lever is removed ⇒ page 76 .

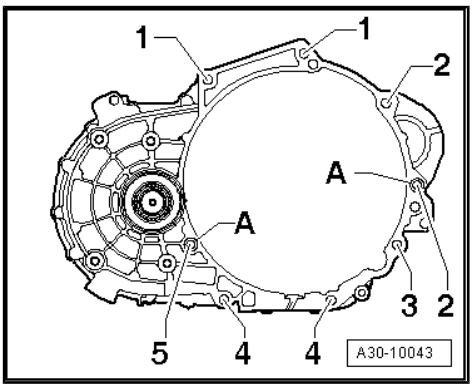


Continued for all vehicles:

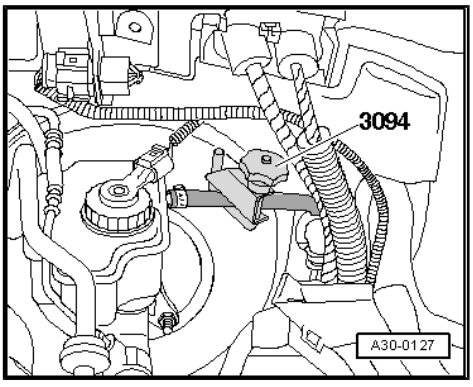
– Detach cable support bracket from gearbox -arrows-; then move to one side and tie up together with selector cables.



– Remove top engine/gearbox securing bolts -1-.



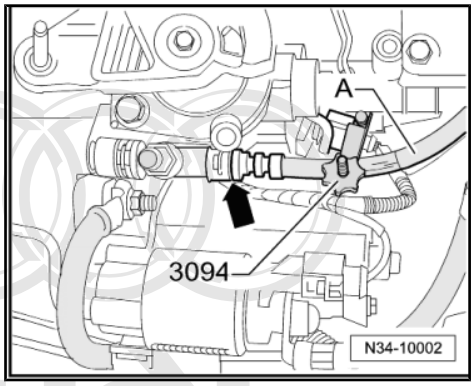
– If a plastic pipe is installed between clutch master cylinder and slave cylinder, clamp off supply hose to clutch master cylinder using hose clamp -3094- .



Note

- *In the following steps make sure that no brake fluid escapes onto the starter or onto the gearbox below. If this does happen, clean the affected area thoroughly.*
- *Seal off open lines and connections with clean plugs or sealing caps to prevent dirt from entering.*

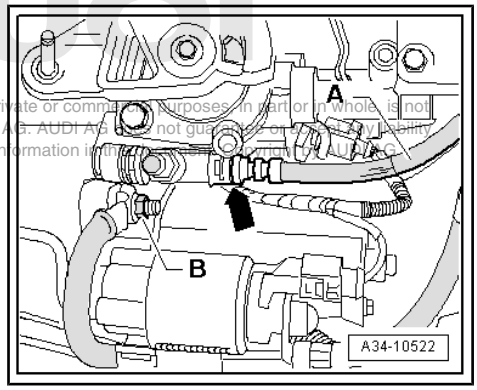
– If a pipe/hose assembly is installed between clutch master cylinder and slave cylinder, clamp off hose -A- using hose clamp -3094- .



Note

-Arrow- can be disregarded.

– Pull clip -arrow- out as far as stop.
– Pull plastic pipe or pipe/hose assembly -A- out of bleeder connection for clutch slave cylinder and seal end of pipe.



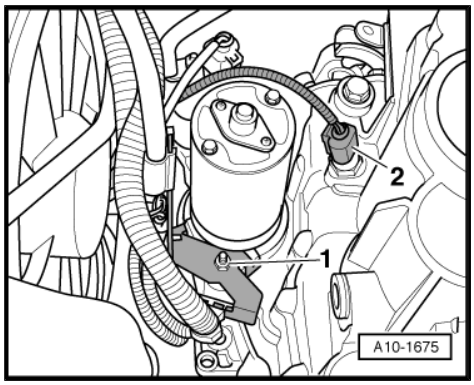
Note

-Item B- can be disregarded.

Caution

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

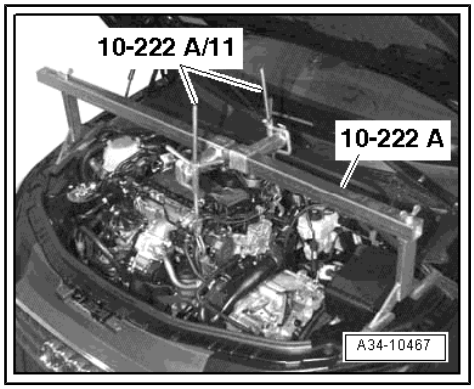
– Unplug electrical connector -2- for reversing light switch -F4- .



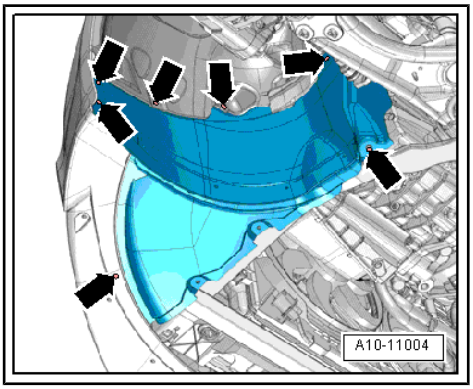
Note

-Item 1- can be disregarded.

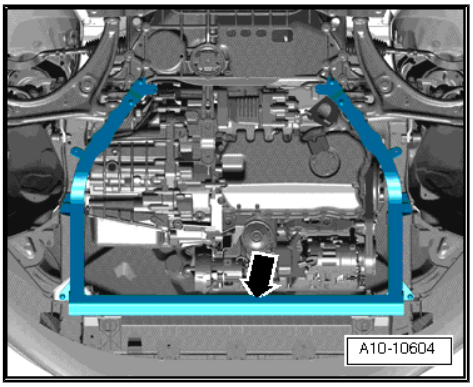
– Set up support bracket -10 - 222 A- on wing mounting flanges.
– Attach hooks of spindles -10 - 222 A /11- to engine lifting eyes.
– Take up weight of engine evenly with spindles; do not lift.
– Remove both front wheels.



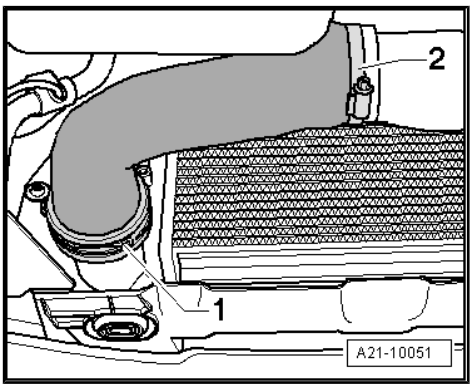
– Remove noise insulation (left and right) -arrows-.



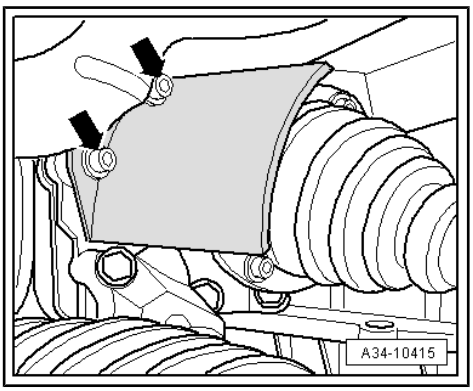
– Remove noise insulation frame -arrow- ⇒ Rep. Gr. 50 .



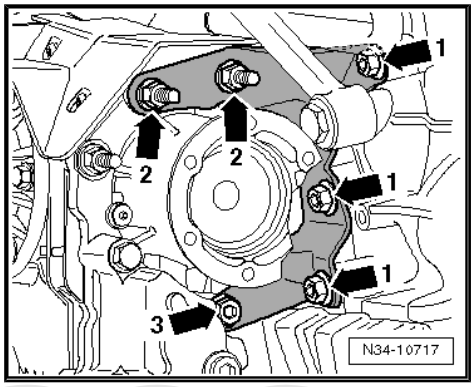
– Release hose clip -2- and lift retaining clip -1- to remove air hose.



– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.
– Unbolt drive shaft (left-side) from flange on gearbox and tie up.
– Unbolt drive shaft (right-side) from bevel box flange.



– Remove bolts -arrows 2, 3- from bracket for bevel box.

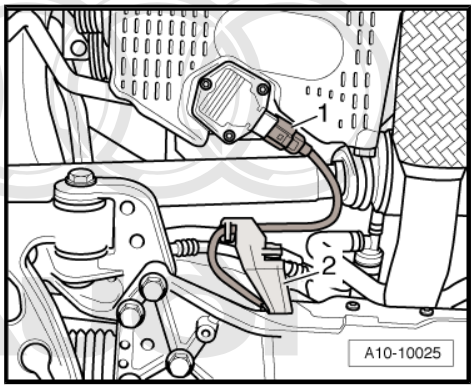


Note

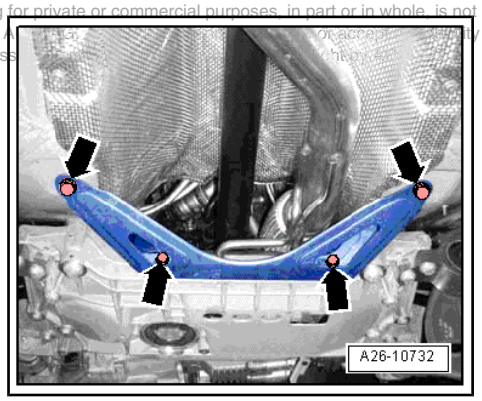
-Arrows 1- can be disregarded.

– 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.



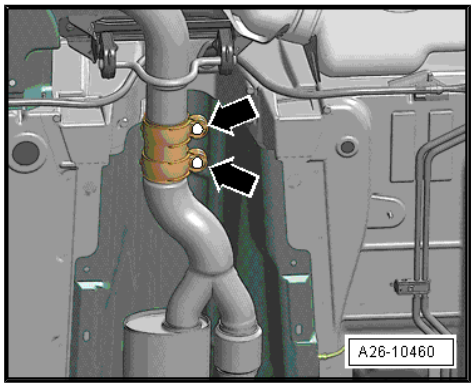
– Unbolt bracket for exhaust system -arrows- and pull bracket off retaining pins.



Caution

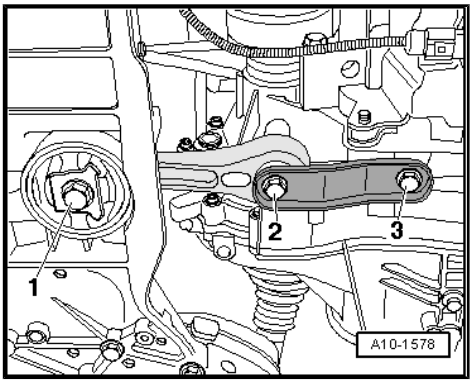
The flexible joints in the exhaust system can be damaged.

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

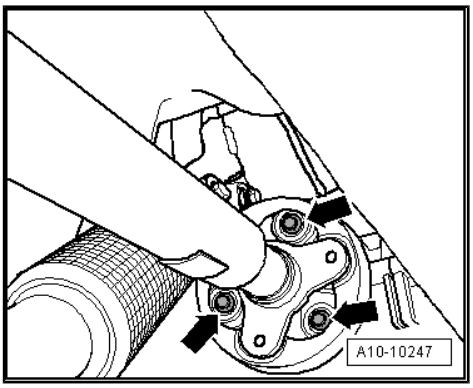


– Remove nuts -arrows- for exhaust pipe clamp.

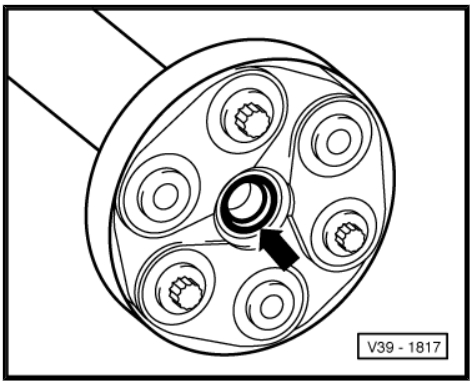
– Unscrew bolts -1 ... 3- and remove pendulum support.



– Mark position of flexible coupling and bevel box flange in relation to one another.
– Unbolt propshaft with flexible coupling from bevel box -arrows- (counterhold triangular flange with suitable lever).



– Push engine/gearbox assembly forward slightly (towards front end) and then pull propshaft off bevel box.



Caution

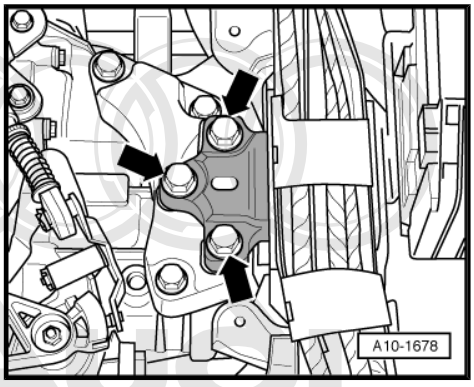
The seal -arrow- in the propshaft flange can be damaged.

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

Note

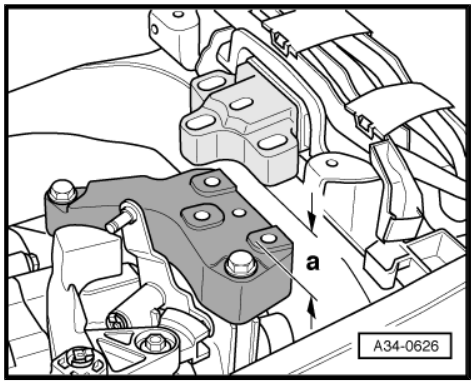
If seal is damaged propshaft must be renewed.

– Remove bolts on gearbox mounting -arrows-.

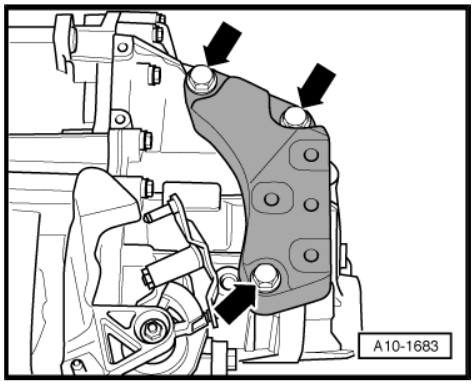


– By adjusting spindles on support bracket -10 - 222 A- , lower gearbox by distance -a-.

• Dimension -a- = 70 mm.



– Unbolt gearbox bracket from gearbox -arrows-.



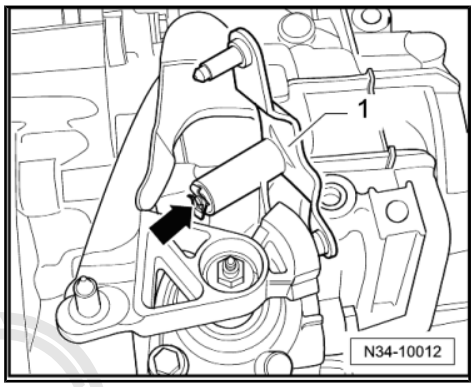
Metal gate relay lever -1-:

– Pull off securing clip -arrow- and remove gate relay lever -1-.

Plastic gate relay lever -1-:

– Removing gate relay lever (with detent catch) ⇒ page 75

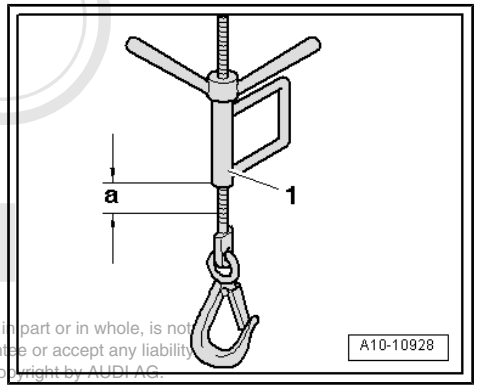
– Removing gate relay lever (with clip) ⇒ page 75



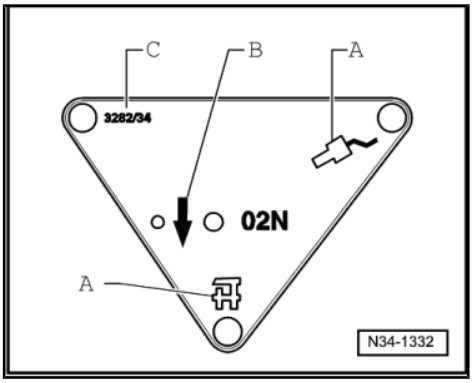
Continued for all vehicles:

– Lower rear of engine by dimension -a- using spindle -10 - 222 A /11- .

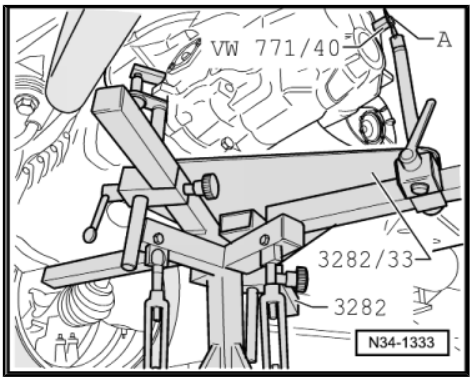
• Dimension -a- = 30 mm.



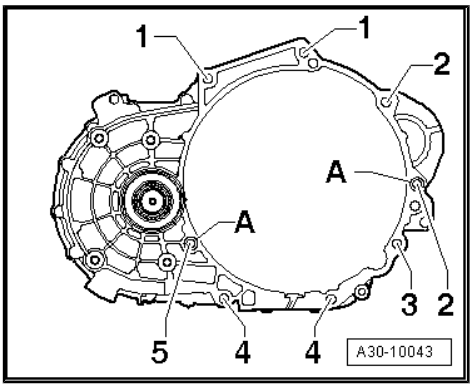
To remove gearbox “02Q” set up gearbox support -3282- with adjustment plate -3282/33- .



– Insert gearbox support -3282- in engine and gearbox jack -V.A.G 1383 A- .
– Align arms of gearbox support according to holes in adjustment plate .
– Bolt on support elements -A-, as illustrated on adjustment plate .
– Screw in pin -3282/29- instead of support element -C-.
– Place engine and gearbox jack -V.A.G 1383 A- under vehicle; arrow symbol -B- on adjustment plate points to front of vehicle.
– Align adjustment plate and gearbox parallel to one another.
– Screw pin -3282/29- into hole for bolt securing pendulum support to gearbox.



– Secure adapter -VW 771/40- in tapped hole of gearbox housing, as shown in illustration.
– Secure gearbox to gearbox support -3282- with bolt M10x20 -item A-.



– Remove engine/gearbox connecting bolts (bottom) -3, 4, 5-.
– Press gearbox off dowel sleeves.
– Carefully lower gearbox using engine and gearbox jack -V.A.G 1383 A- (press engine slightly forwards when doing so).
– Take care not to trap any wires.
– While lowering gearbox, change position of gearbox using spindles on gearbox support -3282- .

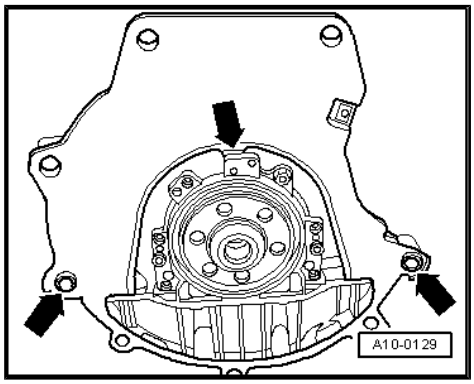
8.4 Installing gearbox

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

Note

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

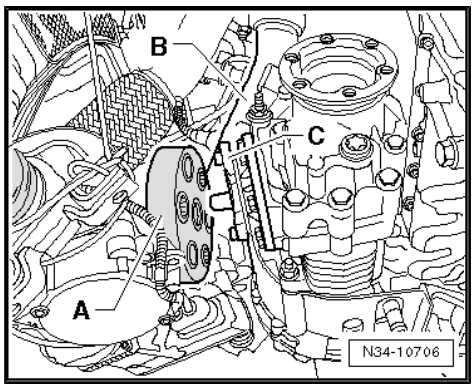
– Use thread tap to remove any remaining locking fluid from all threaded holes which will accommodate self-locking bolts.
– If no dowel sleeves for centralising engine/gearbox are in the cylinder block, install dowel sleeves.
– Make sure that the intermediate plate is engaged on the sealing flange and fitted on the dowel sleeves -arrows-.
– Check that clutch plate is centralised ⇒ page 47 .
– Check release bearing for wear. Renew clutch slave cylinder with release bearing if necessary ⇒ page 35 .
– Raise gearbox carefully using gearbox support -3282- .
– Align gearbox with engine and install.



Vehicles with petrol engine:

– Guide output flange -C- on gearbox past propshaft -A- and front exhaust pipe -B-. Rotate output flange if necessary.

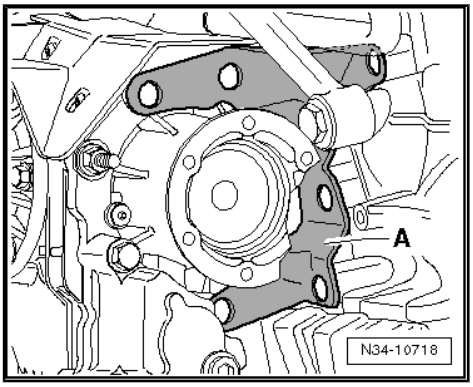
Continued for all vehicles:



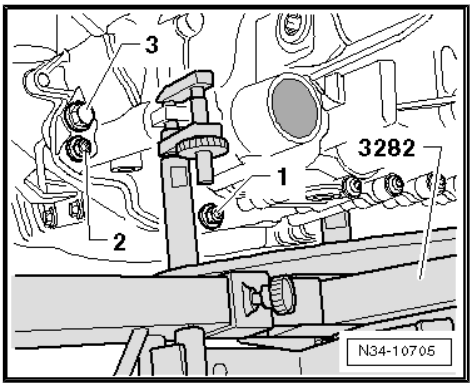
Note

- *When installing gearbox make sure the electromechanical power steering is not damaged.*
- *Pay attention to all pipes/hoses/wiring when installing the gearbox.*

– If necessary, install bracket for bevel box -A-.



– Screw in and tighten bottom engine/gearbox securing bolts -1 … 3- first, then remaining securing bolts ⇒ page 120 .



– Lubricate bearings and moving surfaces of gate relay lever -1- with grease -G 000 450 02- .

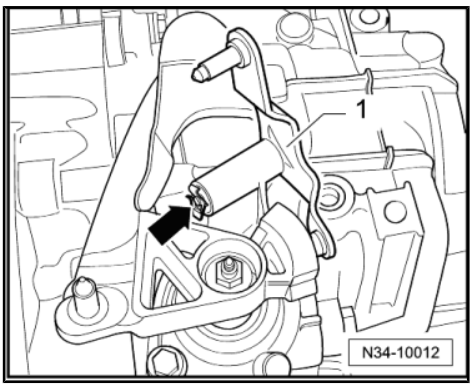
Metal gate relay lever:

– Insert gate relay lever -1- and secure with securing clip -arrow-.

Plastic gate relay lever -1-:

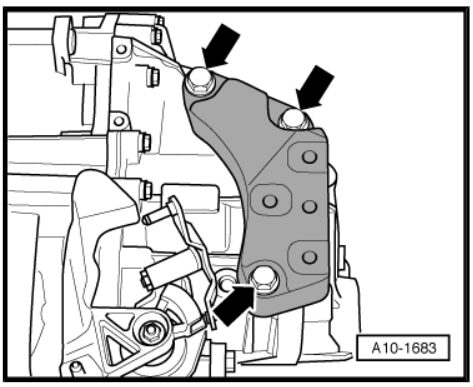
– Fit gate relay lever (with detent catch) ⇒ page 75 .

– Fit gate relay lever (with clip) ⇒ page 75 .

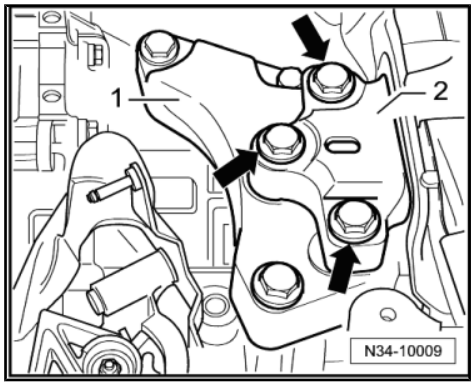


Continued for all vehicles:

– Install gearbox bracket ⇒ page 126 .



– Align engine/gearbox in installation position. To do so, tighten spindles of support bracket -10 - 222 A- until gearbox bracket -1- makes contact with gearbox mounting -2-.
– Additionally, place engine and gearbox jack -V.A.G 1383 A- below gearbox (near differential) and lift until gearbox bracket is parallel with gearbox mounting.



Note

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

– Install gearbox mounting ⇒ page 126 .

Note

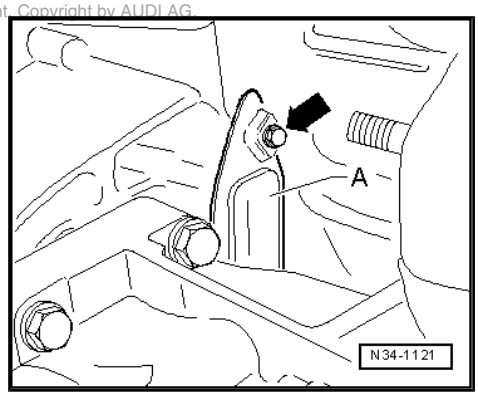
When installing gearbox ensure engine/gearbox mountings are installed stress-free ⇒ Rep. Gr. 10 .

Caution

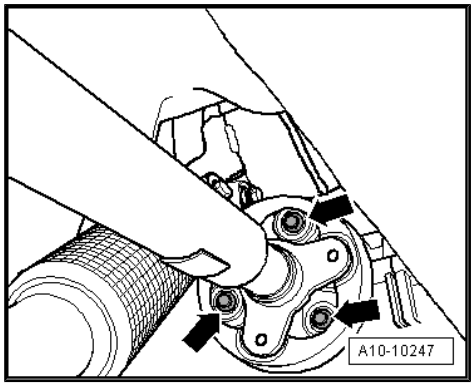
Do not remove support bracket -10 - 222 A- until all bolts securing the left-hand engine/gearbox mounting have been tightened to the specified torque.

– Install bracket for bevel box ⇒ page 121 , ⇒ page 122 , ⇒ page 122 .

– If fitted, install small cover plate -A- at rear of bevel box -arrow- ⇒ page 121 .
– Install drive shafts (left and right) ⇒ Rep. Gr. 40 .
– Install heat shield for drive shaft (right-side) ⇒ page 122 , ⇒ page 122 , ⇒ page 123 .



– Press engine/gearbox assembly towards bulkhead, taking care to guide pin on bevel box into propshaft flange.



Note

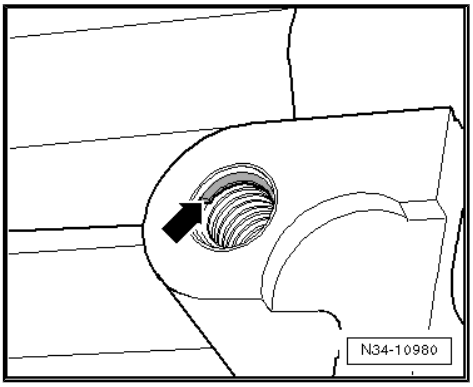
- *When removing and installing the gearbox do not damage the seal in the propshaft flange. Renew propshaft if damaged.*
- *Ensure propshaft is horizontal when pushing it onto centring pin.*

– Bolt flexible coupling on propshaft onto bevel box flange -arrows- ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

:

– Vehicles with 6-cyl. engine: install subframe ⇒ Rep. Gr. 40 .

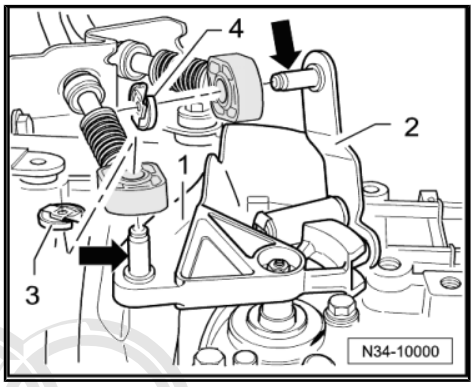
– Install pendulum support ⇒ page 126 .



Note

- *Gearboxes manufactured from 28 05 7 onwards have thread inserts (e.g. "HeliCoil") in the bolt holes for the pendulum support.*
- *These can be recognised by the shoulder on the first thread turn -arrow-.*
- *Please use the correct securing bolts and observe the specified tightening torques ⇒ Item 2 (page 126) .*

– Vehicles with 6-cyl. engine: attach steering box to subframe ⇒ Rep. Gr. 48 .
– Install exhaust system and cross piece ⇒ Rep. Gr. 26 .
– Install radiator cowl ⇒ Rep. Gr. 19 .
– Install starter ⇒ Rep. Gr. 27 .
– Install pipe/hose assembly or plastic pipe ⇒ page 29 .
– Bleed clutch system ⇒ page 31 .
– Install cable support bracket on gearbox ⇒ page 68 .



– Apply a small quantity of grease -G 000 450 02- to pin -arrow- of gearbox selector lever -1-.
– Push gear selector cable onto pin -arrow- and secure with securing clip -3-.

Metal gate relay lever -2-

– Apply a small quantity of grease -G 000 450 02- to pin -arrow- of gate relay lever -2-.
– Push gate selector cable onto pin -arrow- and secure with securing clip -4-.

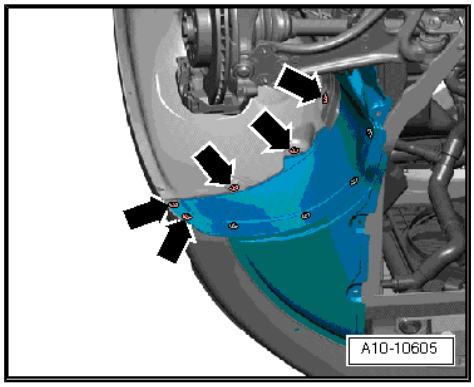
Plastic gate relay lever -2-

– Insert gate selector cable in cable end-piece.

Continued for all vehicles

– Adjust selector mechanism ⇒ page 79 .
– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .
– Connect battery. Follow the steps required after connecting the battery ⇒ Rep. Gr. 27 .
– Check oil level in gearbox ⇒ page 138 .
– Check gear oil level in bevel box ⇒ page 150 .

– Install left and right noise insulation -arrows-.
– Install noise insulation frame ⇒ Rep. Gr. 50 .
– Vehicles with TDI engine: fill up with coolant ⇒ Rep. Gr. 19 .
– Install noise insulation ⇒ Rep. Gr. 66 .
– Fit wheels ⇒ Rep. Gr. 44 .



Tightening torques (installing gearbox)

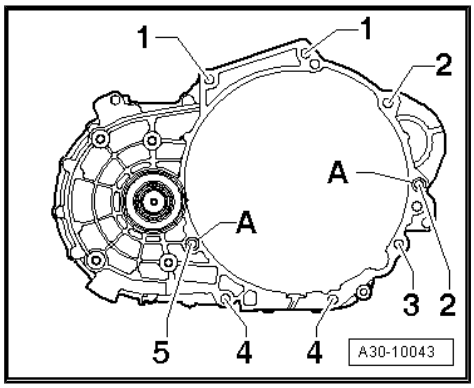
Note

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

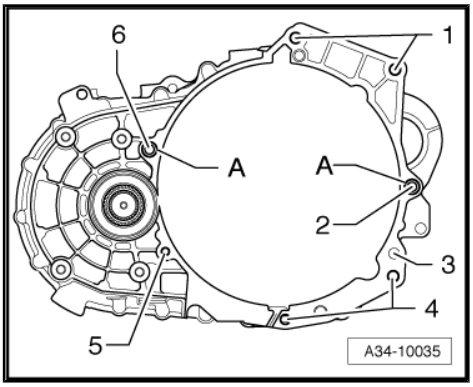
Securing manual gearbox to 2.0 ltr. TFSI engine

Item	Bolt	Nm
1 1) 2)	M12x55	80
2 2)	M12x165	80
3 1)	M10x105	40
4 1)	M10x50	40
5 3)	M12x65	80
A	Dowel sleeves for centralising	

- 1) Renew bolts.
- 2) Bolt with stud M8.
- 3) Screwed into gearbox from engine side.



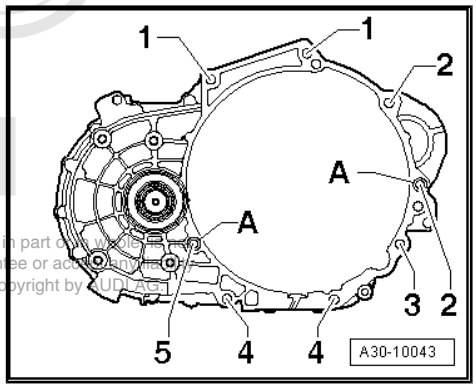
Securing manual gearbox to 3.2 ltr. MPI engine



Item	Bolt [1]	Nm
1 [2], 3 [3]	M12x55	80
2 [4]	M12x65	80
	M12x55	80
4 [4], 5 [4][5]	M10x50	40
6 [3]	M12x80	80
A	Dowel sleeves for centralising	

- [1] Renew bolts.
- [2] Bolt with stud M8.
- [3] With captive washer.
- [4] Screwed into gearbox from engine side.
- [5] Retaining clip must be fitted in engine sump.

Securing manual gearbox to 2.0 ltr. TDI engine



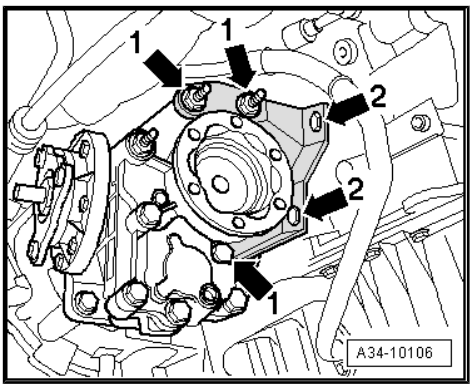
Item	Bolt	Nm
1 [1] [2]	M12x55	80
2 [2]	M12x165	80
3 [1]	M10x105	40
4 [1]	M10x50	40
5 [3]	M12x65	80
A	Dowel sleeves for centralising	

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

Further tightening torques

Component	Nm
Small cover plate for flywheel	10

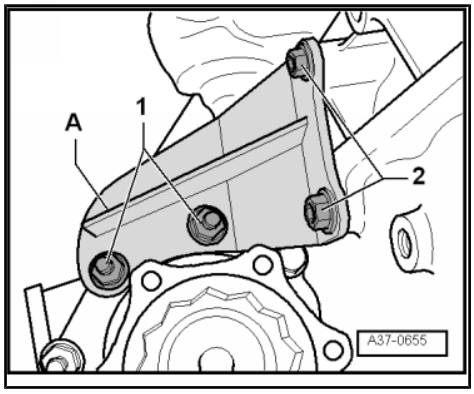
Bracket for bevel box for vehicles with 2.0 ltr. TFSI engine: tightening torque and sequence



– Tighten bolts in 3 stages as follows:

1. Screw in bolts -1- (hand-tight).
2. Tighten bolts -2- to 40 Nm.
3. Tighten bolts -1- to 40 Nm.

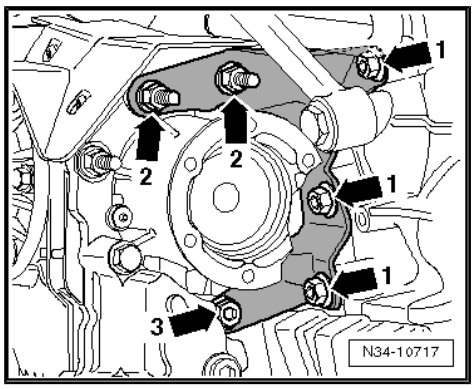
Bracket -A- for bevel box for vehicles with 3.2 ltr. MPI engine: tightening torque and sequence



– Tighten bolts in 4 stages as follows:

1. Screw in bolts -1- and -2- hand-tight.
2. Pre-tighten bolts -1- to 3 Nm.
3. Tighten bolts -2- to 35 Nm.
4. Tighten bolts -1- to 45 Nm.

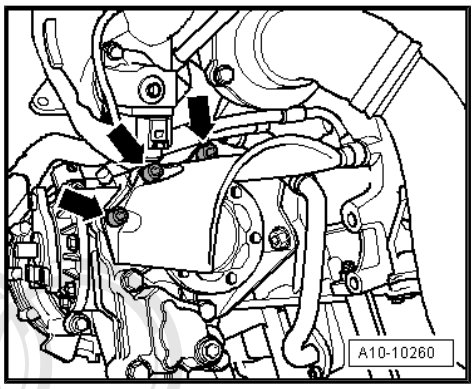
Bracket for bevel box for vehicles with 2.0 ltr. TDI engine: tightening torque and sequence



– Tighten bolts in 5 stages as follows:

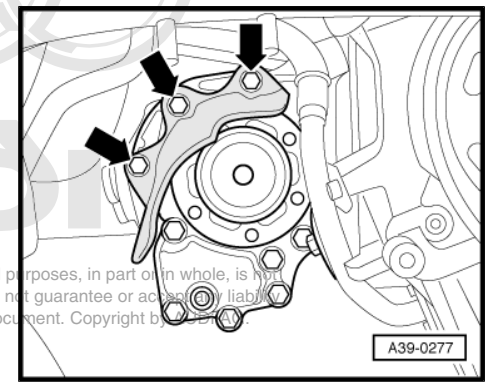
1. Screw in bolts -1- and -2- hand-tight.
2. Pre-tighten bolts -1- to 8 Nm.
3. Tighten bolts -2- to 8 Nm.
4. Tighten bolts -1- to 40 Nm.
5. Tighten bolts -2- to 40 Nm.

Heat shield for drive shaft (right-side) for vehicles with 2.0 ltr. TFSI engine: tightening torque



– Tighten bolts -arrows- to 25 Nm.

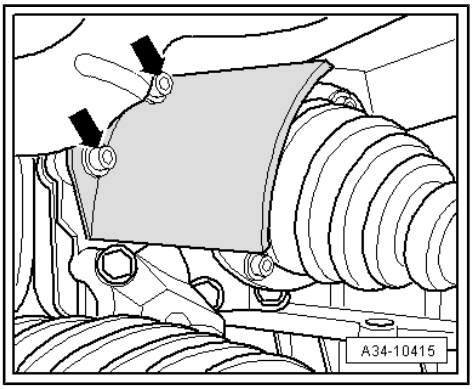
Heat shield for drive shaft (right-side) for vehicles with 3.2 ltr. MPI engine: tightening torque



– Tighten bolts -arrows- to 25 Nm.

Heat shield for drive shaft (right-side) for vehicles with 2.0 ltr. TDI engine: tightening torque

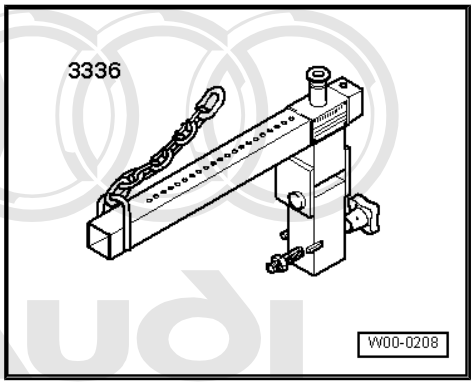
– Tighten bolts -arrows- to 25 Nm.



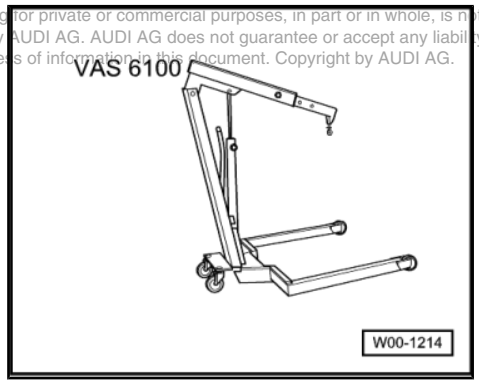
9 Transporting gearbox

Special tools and workshop equipment required

- Gearbox lifting tackle -3336-



- Workshop hoist -VAS 6100-



Procedure

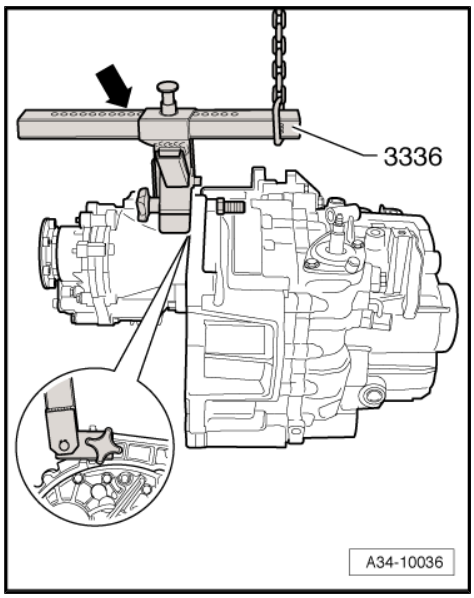
– Bolt gearbox lifting tackle -3336- to clutch housing.

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

• Number of holes visible = 9

– Lift gearbox with workshop hoist -VAS 6100- and gearbox lifting tackle -3336- .

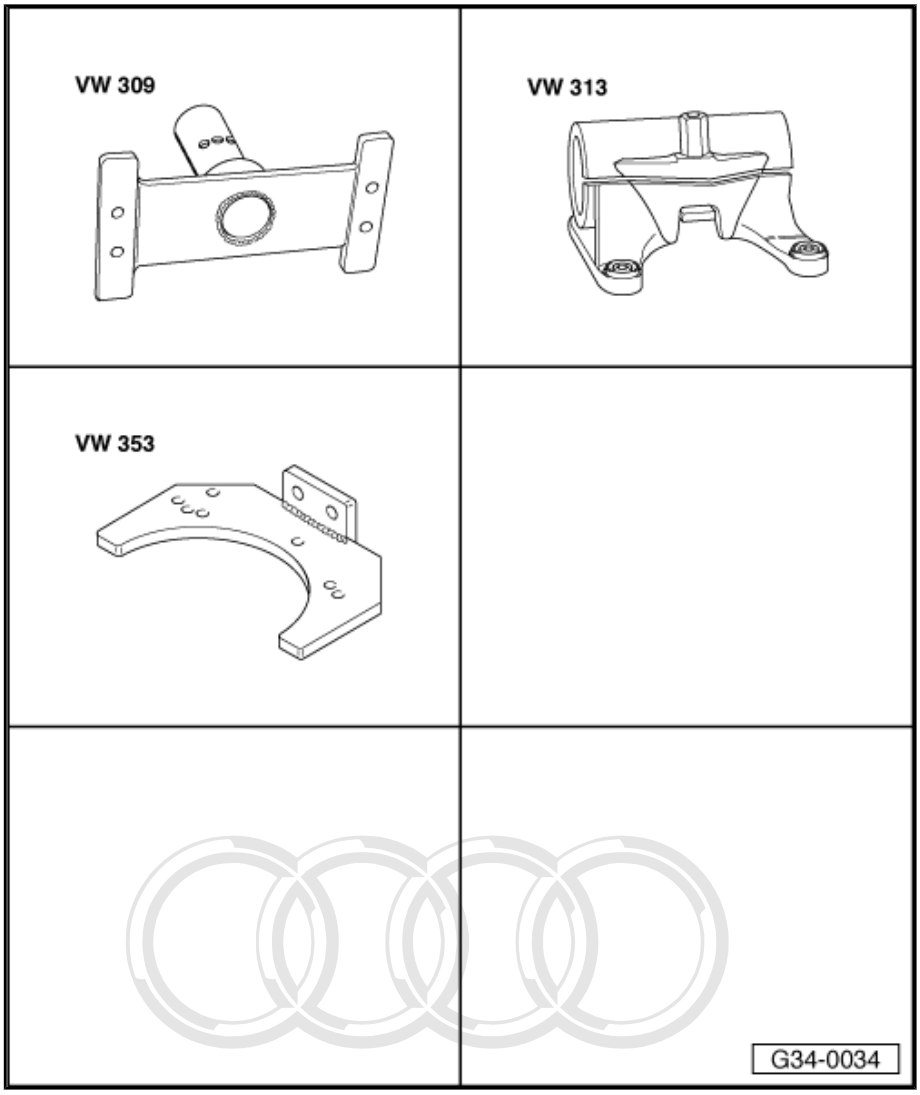
– Set down gearbox as required (for example in transport container).



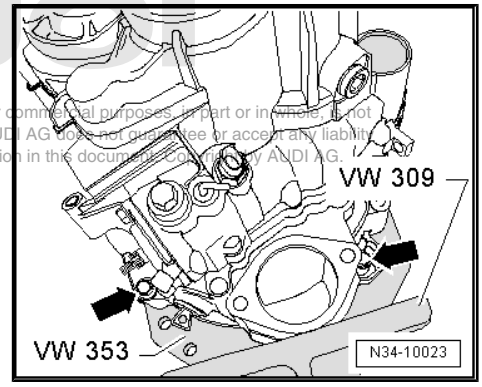
10 Securing gearbox to assembly stand

Special tools and workshop equipment required

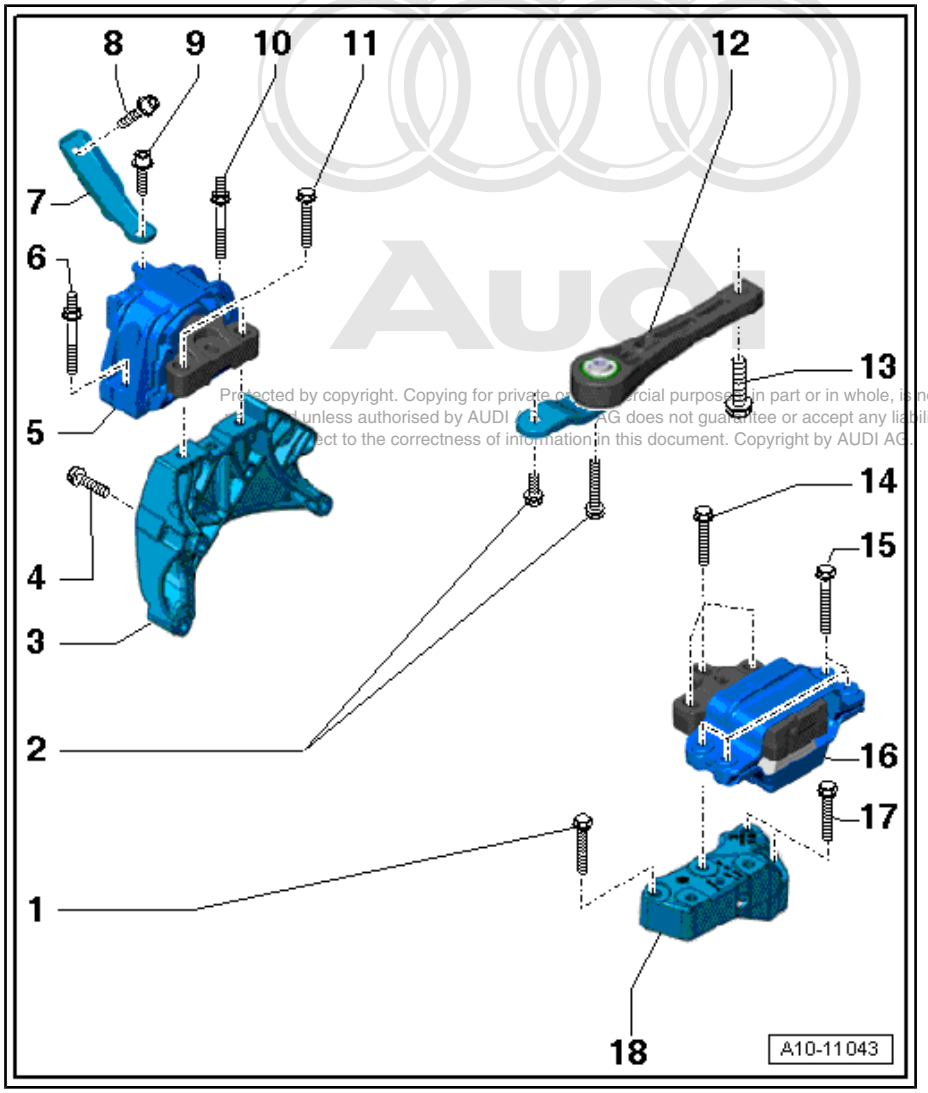
- Support plate -VW 309-
- Support clamp -VW 313-
- Gearbox support -VW 353-



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



11 Exploded view - assembly mountings



1 - Bolt

- ❑ Gearbox bracket to gearbox
- ❑ 60 Nm + 90°
- ❑ Renew

2 - Bolts

- ❑ Pendulum support to gearbox

Caution

On 02Q manual gearboxes, HeliCoil inserts may be fitted in the bolt connections for the pendulum support. These thread inserts are standard on gearboxes manufactured from 28 05 7 onwards.

Identification
⇒ page 128

Bolts of property class 10.9 must be used on all gearboxes with HeliCoil thread inserts.

Bolts of property class 8.8 are specified for gearboxes without thread inserts.

Bolts of property class 8.8 are listed in the ⇒ Parts catalogue up to ID No. 8J-7-050 000.

Bolts of property class 10.9 are listed in the ⇒ Parts catalogue from ID No. 8J-8-000 001 onwards.

The specified tightening torque for the bolts depends on the property class.

- Gearbox with thread inserts in conjunction with bolts of property class 10.9:
  - ❑ 50 Nm + 90°
- Gearbox without thread inserts with bolts of property class 8.8:
  - ❑ 40 Nm + 90°
  - ❑ Always renew

3 - Engine support

4 - Bolt

- ❑ Engine support to engine
- ❑ Tightening torque ⇒ Rep. Gr. 10

5 - Engine mounting

6 - Bolt

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

7 - Connecting bracket

8 - Bolt

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

9 - Bolt

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

10 - Bolt

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

11 - Bolts

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

12 - Pendulum support

- ❑ Removing and installing ⇒ page 136

13 - Bolt

- ❑ Pendulum support to subframe
- ❑ 100 Nm + 90°
- ❑ Renew

14 - Bolt

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

15 - Bolt

- ❑ Gearbox mounting to body
- ❑ 40 Nm + 90°
- ❑ Renew

16 - Gearbox mounting

- ❑ Removing:

- ♦ Vehicles with 2.0 ltr. TFSI engine ⇒ page 128
- ♦ Vehicles with 3.2 ltr. MPI engine ⇒ page 130
- ♦ Vehicles with 2.0 ltr. TDI engine ⇒ page 133

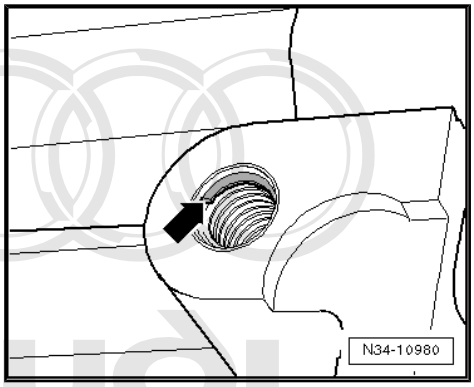
- ❑ Installing ⇒ page 136

17 - Bolt

- ❑ Gearbox bracket to gearbox
- ❑ 60 Nm + 90°
- ❑ Renew

18 - Gearbox bracket

Gearbox with thread inserts (e.g. “HeliCoil”) for securing pendulum support



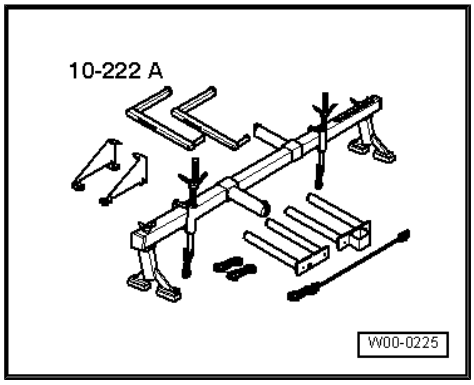
Note

- *Gearboxes manufactured from 28 05 7 onwards always have thread inserts (e.g. “HeliCoil”) in the bolt holes for the pendulum support.*
- *These can be recognised by the shoulder on the first thread turn -arrow-.*
- *Different securing bolts and tightening torques*
  ⇒ Item 2 (page 126)

11.1 Removing gearbox mounting - vehicles with 2.0 ltr. TFSI engine

Special tools and workshop equipment required

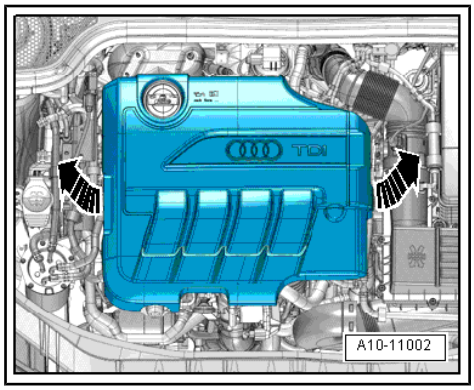
- Support bracket -10 - 222 A-



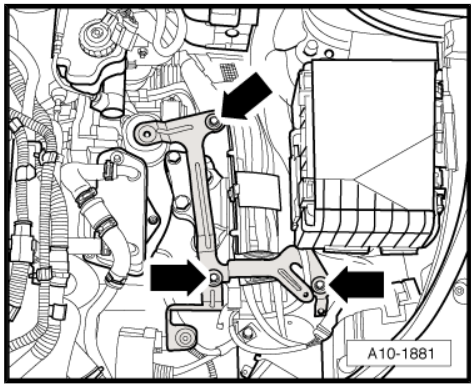
Removing

– Remove engine cover panel -arrows-.

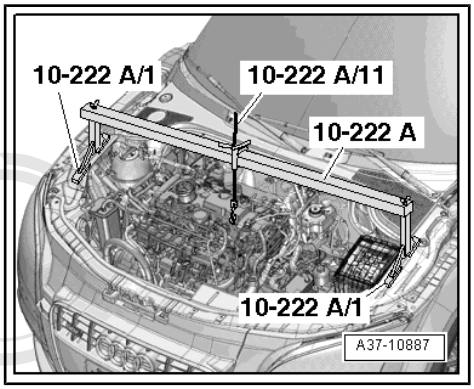
– Remove air cleaner housing completely ⇒ Rep. Gr. 23 .



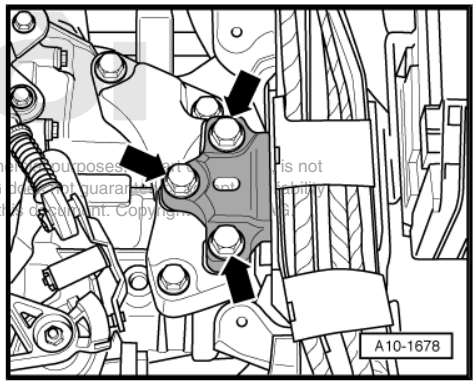
– Remove bolts -arrows- and detach bracket for air cleaner housing.



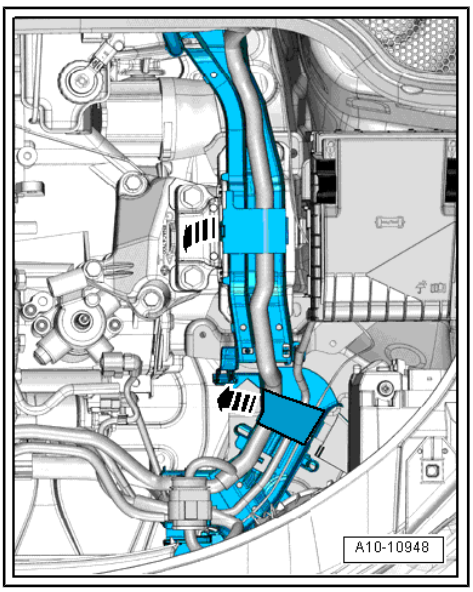
– Set up support bracket -10 - 222 A- on wing mounting flanges.
– Engage hook of spindle -10 - 222 A /11- in engine lifting eye (left-side).
– Take up weight of engine evenly with spindles; do not lift.



– Remove bolts -arrows-.

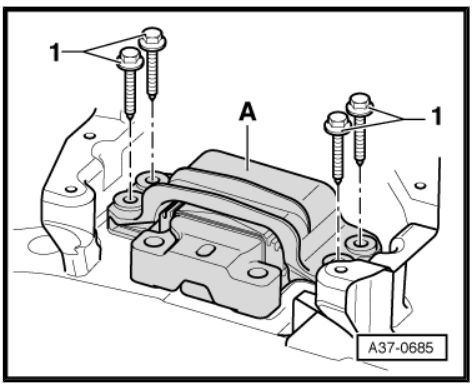


– Open retainers for wiring duct -arrows-.
– Cut open cable tie -1- and push electrical wiring to one side.
– Unclip wiring duct.



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

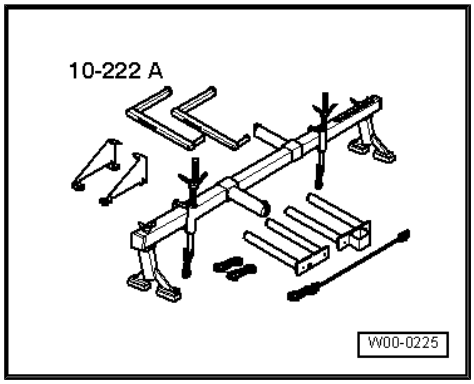
Install gearbox mounting ⇒ page 136 .



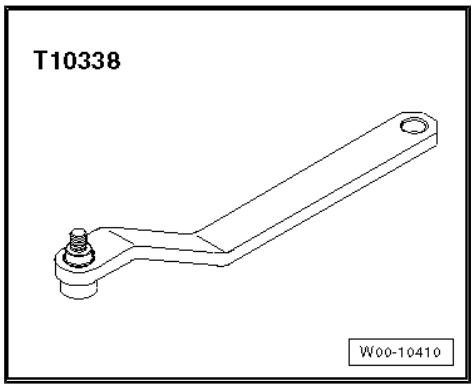
11.2 Removing gearbox mounting - vehicles with 3.2 ltr. MPI engine

Special tools and workshop equipment required

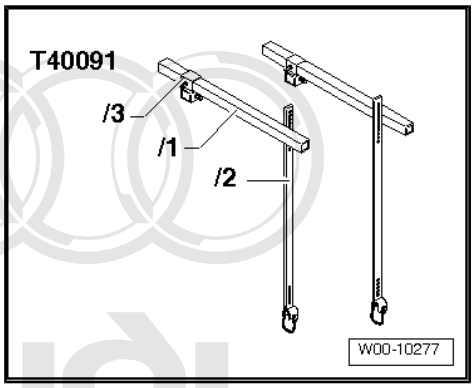
- Support bracket -10 - 222 A-



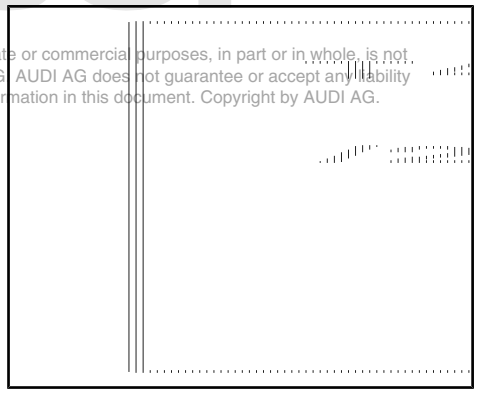
- Bracket -T10338-



- Engine support bracket, basic set -T40091-



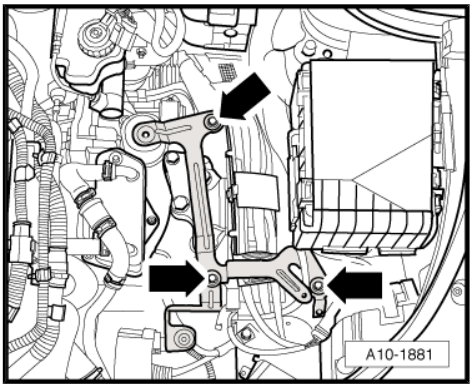
- Engine support bracket, supplementary set -T40093-



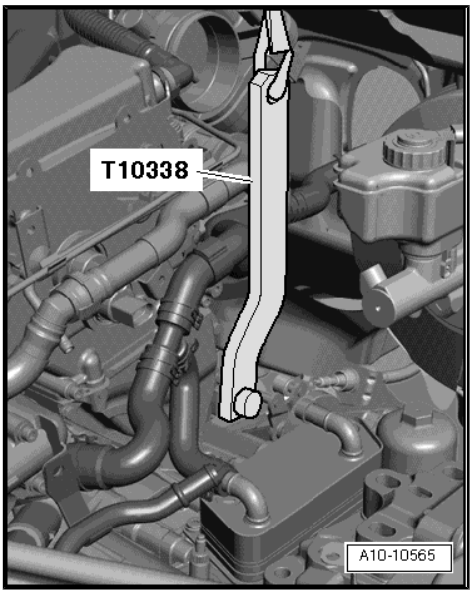
Removing

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

– Unbolt bracket for air cleaner housing -arrows-.



– Secure bracket -T10338- to vacant tapped hole at rear left of engine.



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

♦ Rack -10 - 222 A /1- (2x)

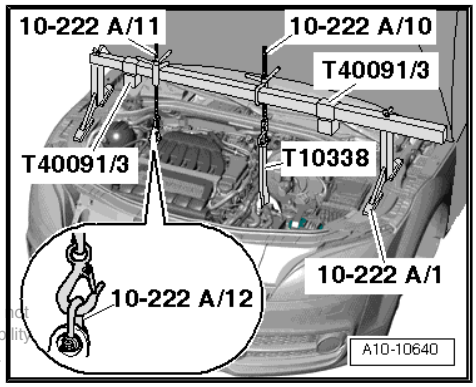
♦ Hook -10 - 222 A /10- (spindle faces towards rear)

♦ Spindle -10 - 222 A /11- (spindle faces towards front)

♦ Shackle -10 - 222 A /12-

♦ Connecting piece -T40091/3- (2x)

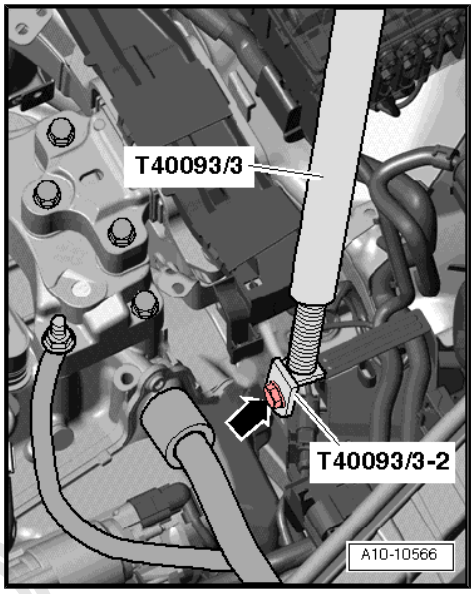
– Hook spindle -10 - 222 A /11- with shackle -10 - 222 A /12- onto engine lifting eye (right-side).



– Attach hook -10 - 222 A /10- to bracket -T10338- .

– Partly take up weight of engine/gearbox assembly via the spindles.

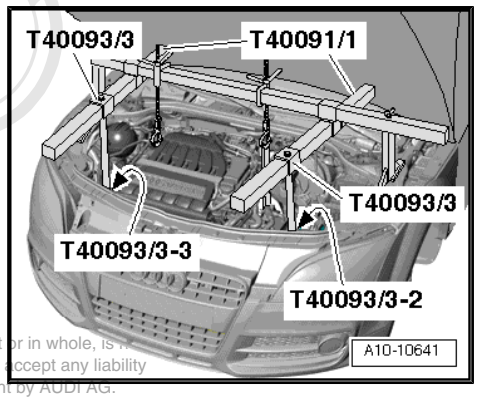
– Attach adapters -T40093/3-2- (left-side) and -T40093/3-3- (right-side) to supports -T40093/3- .
– Disconnect earth wire from longitudinal member (left-side).
– Remove securing bolt for front section of longitudinal member (both sides).
– Bolt adapters -arrow- to longitudinal members, using bolts removed previously.



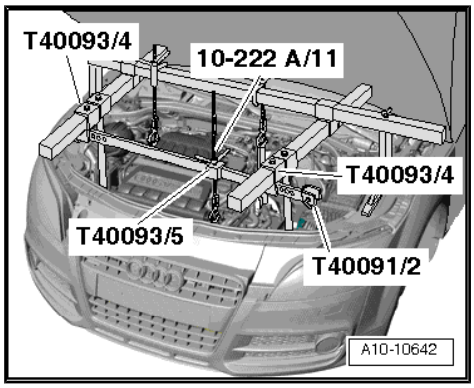
Note

Illustration shows left side of vehicle.

– Insert square bars -T40091/1- into connecting pieces -T40091/3- and supports -T40093/3- as illustrated.



– Fit connecting pieces -T40093/4- onto square bars.
– Insert support -T40091/2- with slide -T40093/5- into the two connecting pieces -T40093/4- .



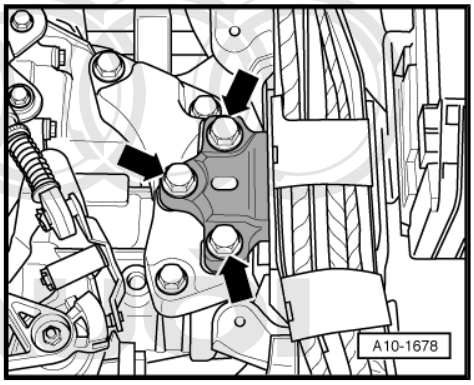
WARNING

Accidents can be caused if parts of the support bracket are not correctly secured.

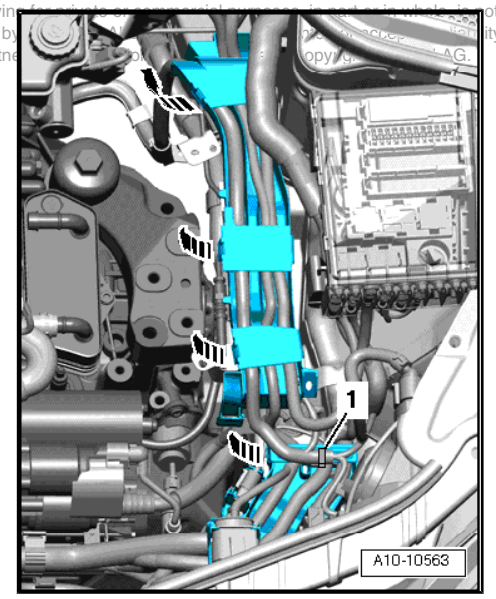
- ***Secure support -T40091/2- using retaining pins and split pins of the connecting pieces -T40093/4- .***
- ***Secure connecting pieces and supports using clamping bolts.***

– Attach spindle -10 - 222 A /11- to slide and engine lifting eye.
– Take up weight of engine/gearbox assembly by tightening the 3 spindles evenly.

– Remove bolts -arrows-.

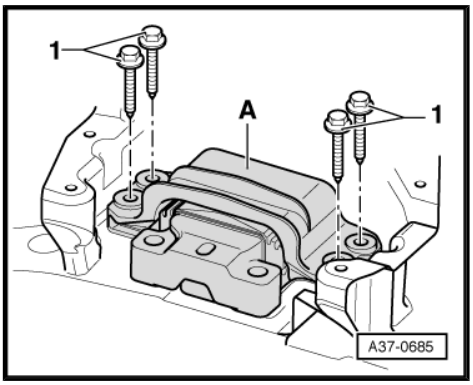


– Open retainers for wiring duct -arrows-.
– Cut open cable tie -1- and push electrical wiring to one side.
– Unclip wiring duct.



– Remove bolts -1- and detach gearbox mounting -A-.
– Detach support bracket -10 - 222 A- from engine.

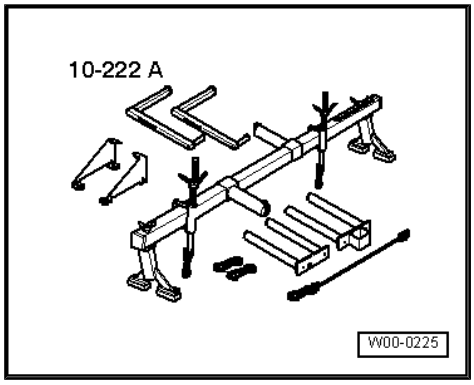
Install gearbox mounting ⇒ page 136 .



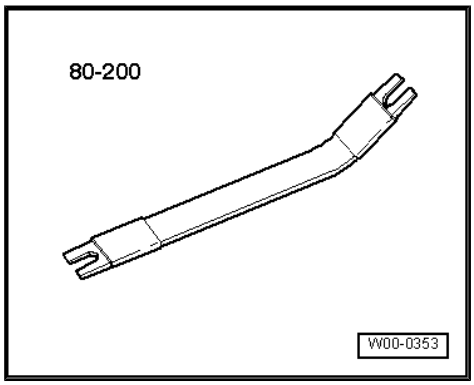
11.3 Removing gearbox mounting - vehicles with 2.0 ltr. TDI engine

Special tools and workshop equipment required

♦ Support bracket -10 - 222 A-



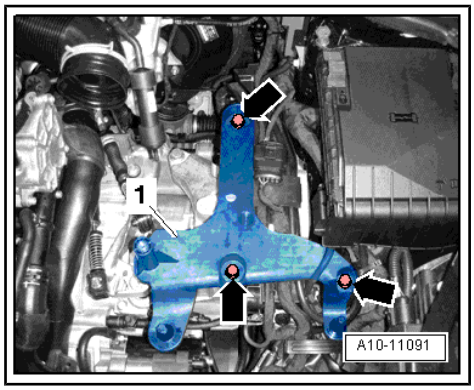
♦ Removal lever -80 - 200-



Removing

– Remove air cleaner housing ⇒ Rep. Gr. 23 .

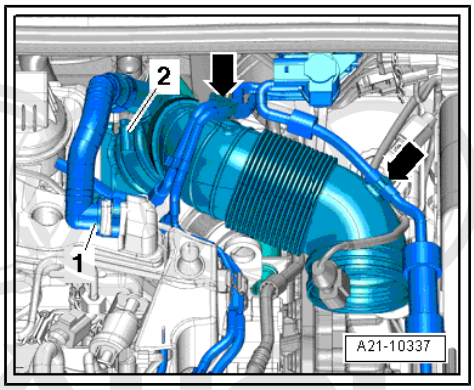
– Remove bolts -arrows- and detach bracket for air cleaner housing.



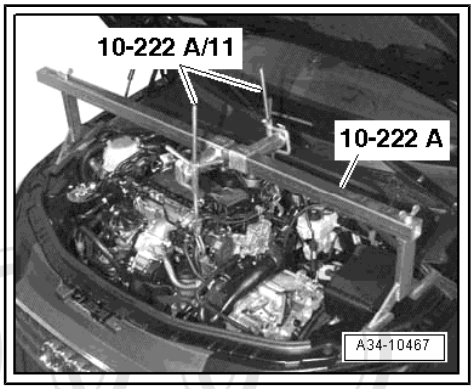
– Press release tabs and disconnect crankcase breather hose -1- from cylinder head cover.

– Move clear vacuum hoses -arrows- at air pipe.

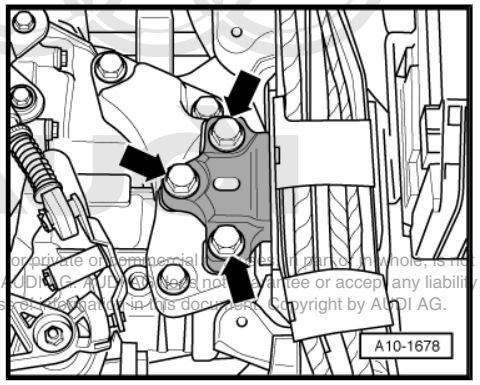
– Release hose clip -2- and detach air pipe.



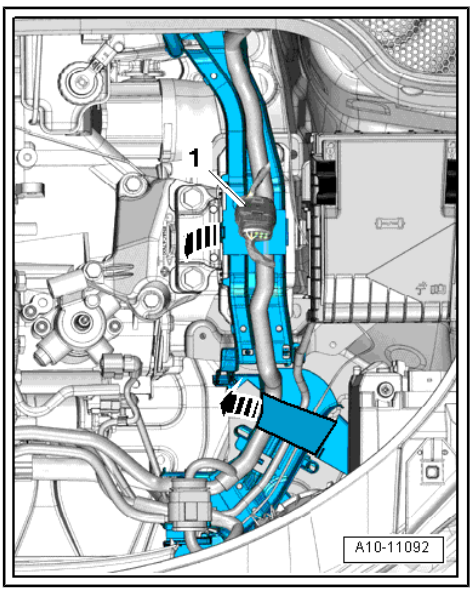
– Set up support bracket -10 - 222 A- on wing mounting flanges.
– Attach hooks of spindles -10 - 222 A /11- to engine lifting eyes.
– Take up weight of engine evenly with spindles; do not lift.



– Remove bolts -arrows-.

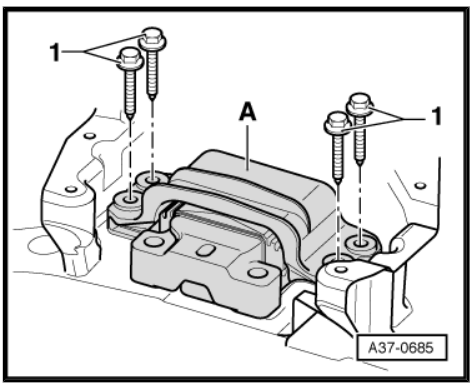


– Take electrical connector -1- out of bracket.
– Open retainers for wiring duct -arrows-, unclip electrical wiring using removal lever -80 - 200- and press electrical wiring to the side.
– Unclip wiring duct.



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

Install gearbox mounting ⇒ page 136 .



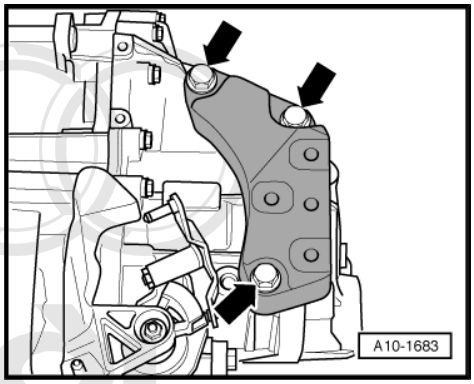
11.4 Installing gearbox mounting

Installing

- Tightening torques ⇒ page 126

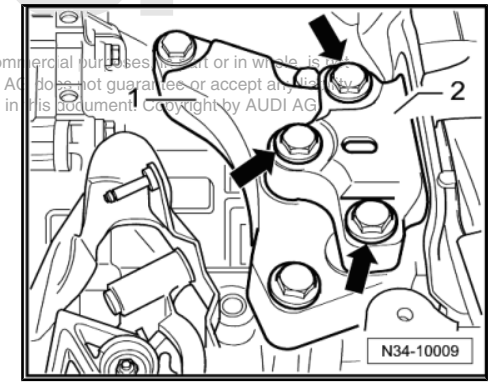
Installation is carried out in reverse sequence; note the following:

– First secure gearbox bracket to gearbox -arrows-.



– Pull gearbox up with spindle on support bracket -10 - 222 A- until gearbox bracket -1- contacts support arm of gearbox mounting -2-.

– Hand-tighten bolts -arrows- initially.



Caution

Screw in bolts straight when fitting as otherwise the threads in the support arm of the gearbox mounting will be damaged.

- *Gearbox bracket -1- and support arm of gearbox mounting -2- must be aligned in absolutely parallel position before fitting bolts -arrows-. If necessary, push the gearbox up at the rear with a trolley jack.*

– Only tighten bolts after subframe has been installed ⇒ Rep. Gr. 40 and assembly mountings aligned ⇒ Rep. Gr. 10 .

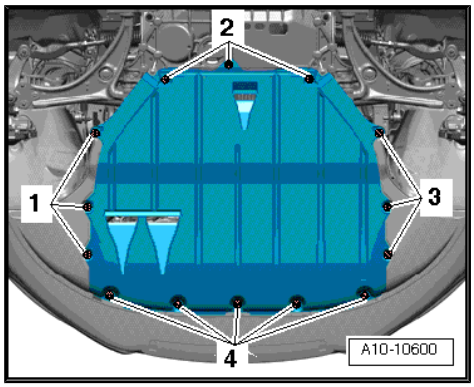
– Detach support bracket -10 - 222 A- from engine.

– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

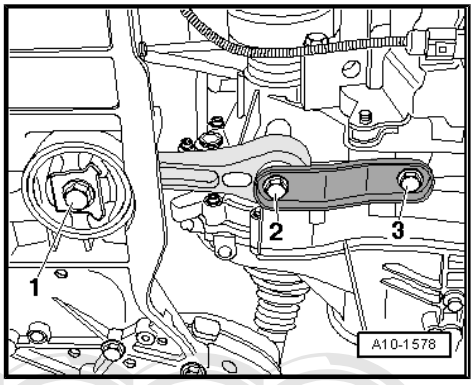
11.5 Removing and installing pendulum support

Removing

– Release fasteners -1 ... 4- and remove centre noise insulation.



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



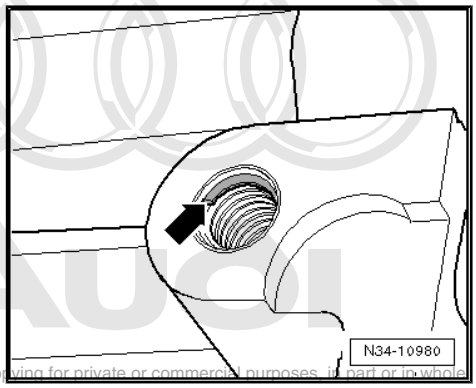
Installing

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

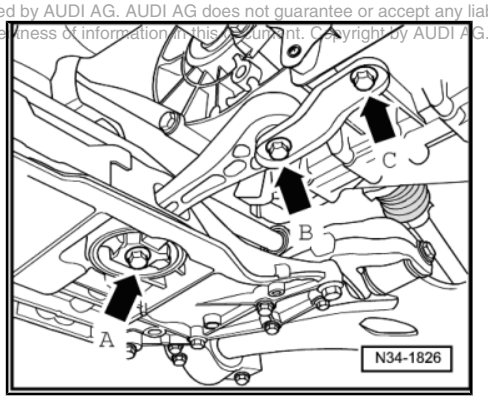
- Tightening torques
  ⇒ “11 Exploded view - assembly mountings”, page 126

Note

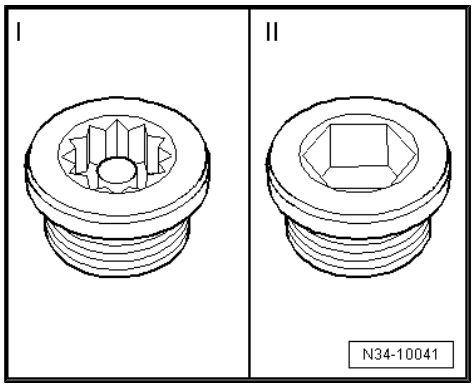
- *Gearboxes manufactured from 28 05 7 onwards have thread inserts (e.g. “HeliCoil”) in the bolt holes for the pendulum support.*
- *These can be recognised by the shoulder on the first thread turn -arrow-.*
- *Please use the correct securing bolts and observe the specified tightening torques ⇒ Item 2 (page 126) .*



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



12 Overview - oil level in manual gearbox



Oil filler plug/drain plug - tightening torques

I - Oil filler plug/drain plug with multi-point socket

- 45 Nm

II - Oil filler plug/drain plug with hexagon socket

- 30 Nm

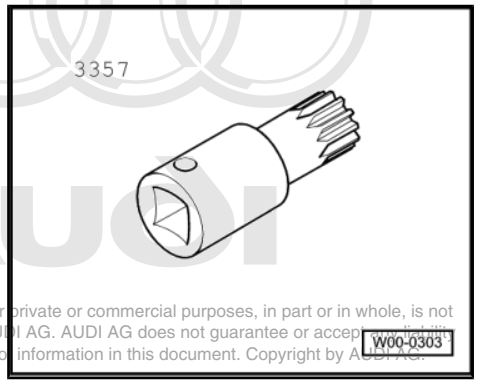
12.1 Checking oil level in manual gearbox

Note

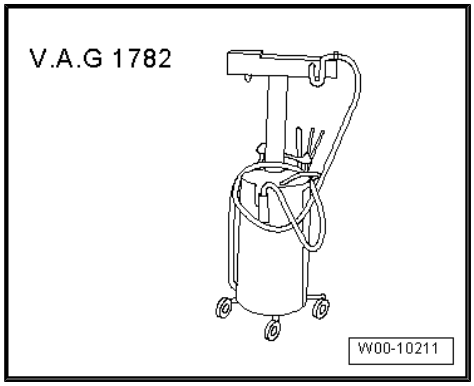
- *The manual gearbox and bevel box have separate oil fillings.*
- *Checking gear oil level in bevel box* *⇒ page 150*
- *For gear oil specification, refer to ⇒ Electronic parts catalogue .*

Special tools and workshop equipment required

- Multi-point bit -3357-



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



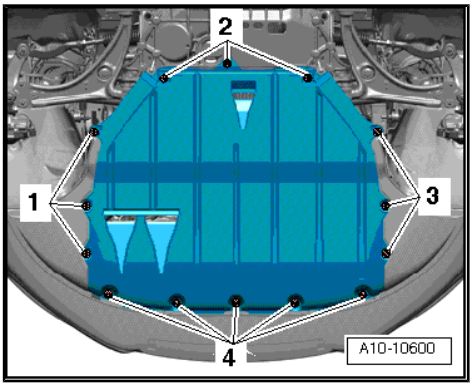
Procedure

- Tightening torque ⇒ page 138

– Drive vehicle onto a four-column lifting platform or over an inspection pit (vehicle must be horizontal).

– Release fasteners -1 ... 4- and remove centre noise insulation.

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



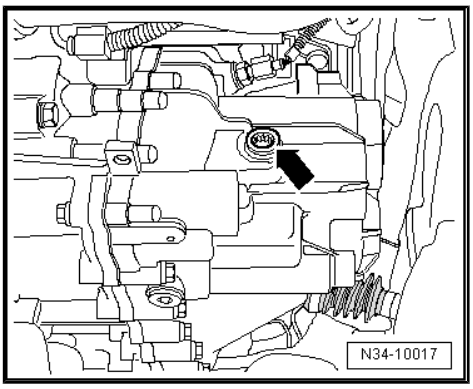
– Remove oil filler plug -arrow- in manual gearbox.

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

– Top up gear oil if necessary.

– Fit oil filler plug with new seal and tighten.

– Install noise insulation ⇒ Rep. Gr. 66 .



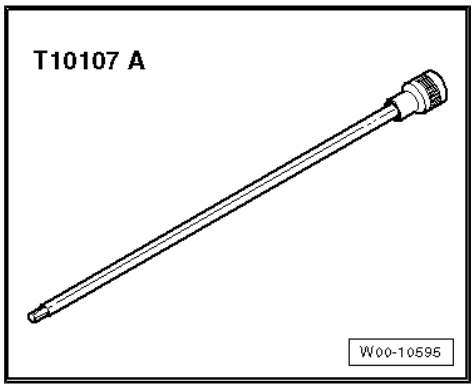
13 Removing and installing bevel box

General view

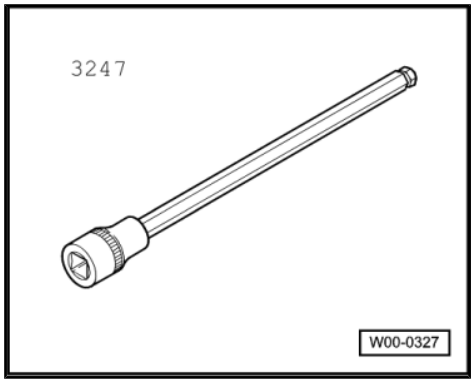
- ⇒ “13.1 Removing bevel box - vehicles with 2.0 ltr. TFSI engine”, page 141
- ⇒ “13.2 Removing bevel box - vehicles with 3.2 ltr. MPI engine”, page 143
- ⇒ “13.3 Removing bevel box - vehicles with 2.0 ltr. TDI engine”, page 146
- ⇒ “13.4 Installing bevel box”, page 147

Special tools and workshop equipment required

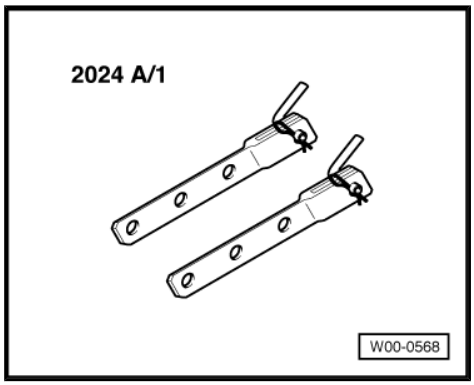
- Socket and extended bit -T10107 A- , 6 mm



- Hexagon key extension, 8 mm -3247-



- Extension -2024 A /1-



13.1 Removing bevel box - vehicles with 2.0 ltr. TFSI engine

Removing

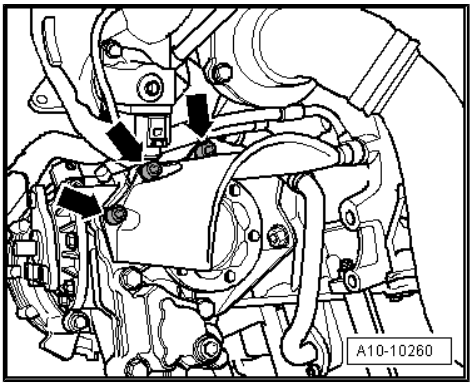
– Remove front exhaust pipe with catalytic converters and front silencer ⇒ Rep. Gr. 26 .

– Drain off engine oil ⇒ Maintenance ; Booklet 810 .

– Remove front right wheel.

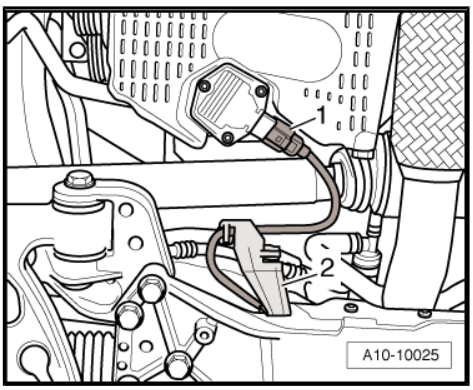
– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.

– Unbolt drive shaft (right-side) from flange shaft on bevel box.



– 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.

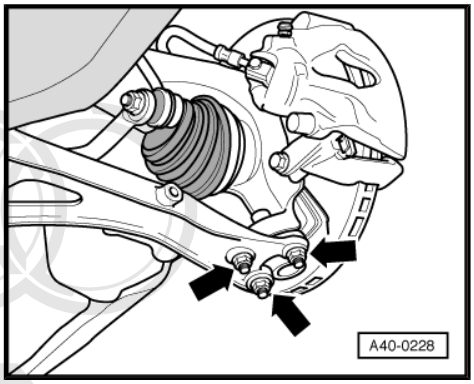


– Remove nuts -arrows- securing swivel joint (right-side).

– Disengage swivel joint from wishbone.

Note

Illustration shows installation position at front suspension (left-side).

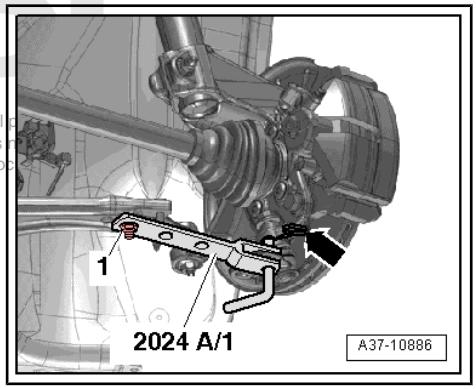


– Swivel suspension strut (right-side) outwards and support with extension -2024 A /1- , as shown in illustration.

WARNING

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

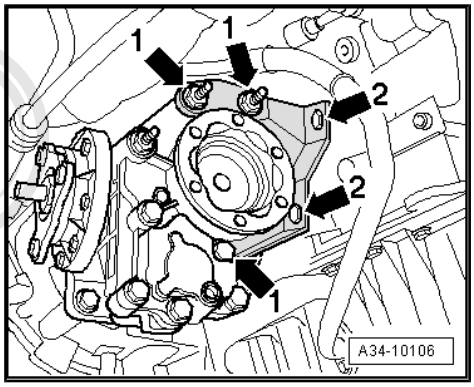
- ***Secure locking pin and wishbone with retaining clip -arrow- and nut -1-.***



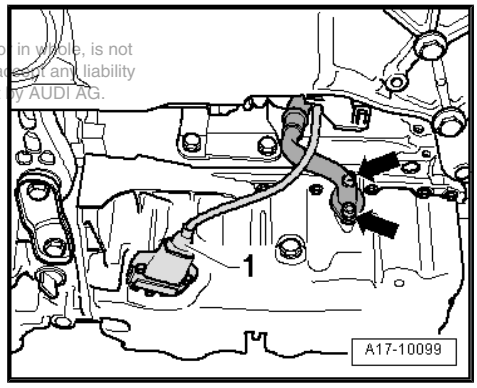
Note

Illustration shows installation position at front suspension (left-side).

– Slacken bolts -1- and remove bolts -2-.



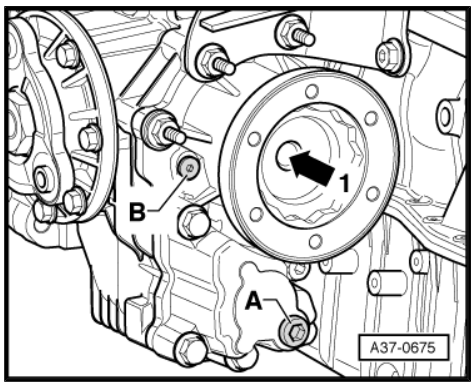
– Unscrew bolts -arrow-, detach oil return line from turbocharger and press to right side.



Note

-Item 1- can be disregarded.

– Using socket and extended bit -T10107 A- , remove bolt -arrow 1- securing flange shaft (right-side). To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.

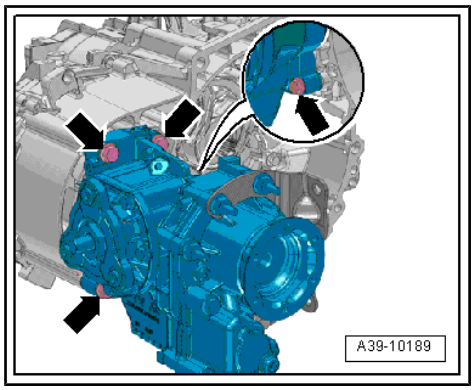


Note

Items -A and B- can be disregarded.

– Unscrew bolts (4 in total) securing bevel box to manual gearbox -arrows-.
– Pull bevel box together with flange shaft (right-side) off gearbox and take out bevel box.

Install bevel box ⇒ page 147 .

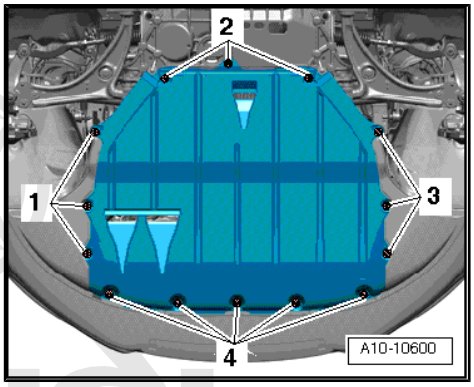


13.2 Removing bevel box - vehicles with 3.2 ltr. MPI engine

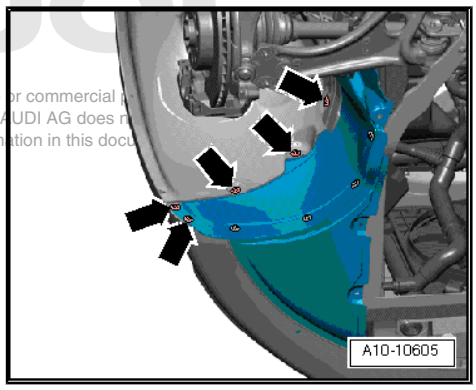
Removing

– Remove front wheels.

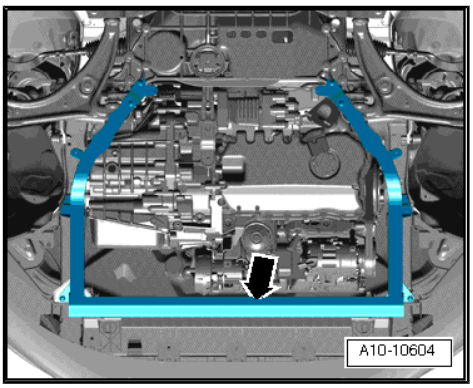
– Release fasteners -1 ... 4- and remove centre noise insulation.



– Remove right noise insulation -arrows-.

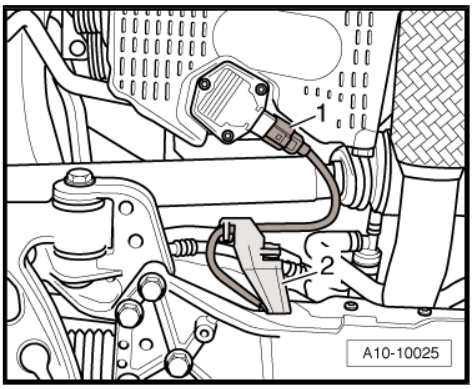


– Remove noise insulation frame -arrow- ⇒ Rep. Gr. 50 .

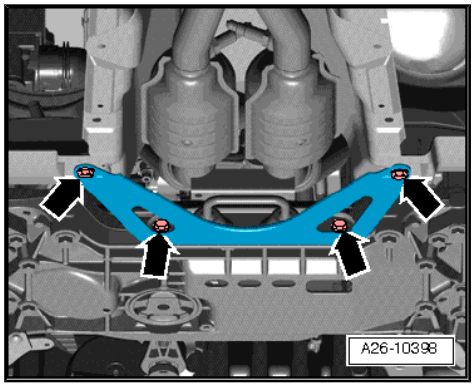


– Unplug electrical connector -1- at oil level and oil temperature sender -G266- .

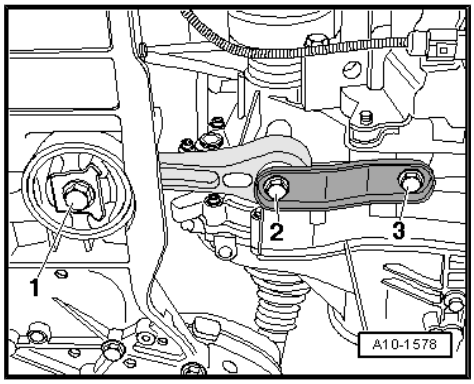
– Unclip bracket -2- for electrical wiring leading to oil level and oil temperature sender -G266- at subframe.



– Remove bolts -arrows- for exhaust pipe bracket.



– Remove bolts -2- and -3-.

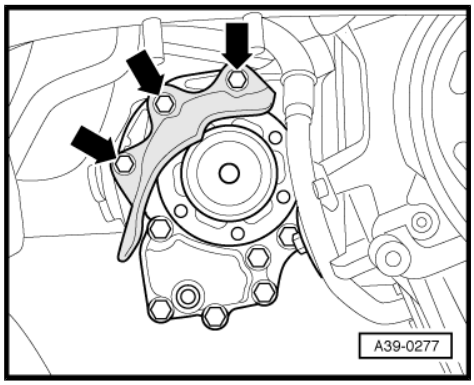


Note

Bolt -1- can be disregarded.

– Locate subframe in position to avoid unnecessary wheel alignment ⇒ Rep. Gr. 40 .
– Remove subframe ⇒ Rep. Gr. 40 .

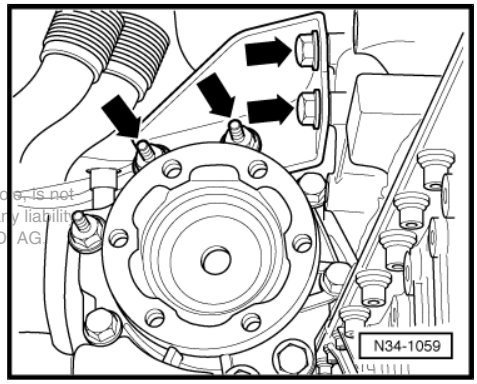
– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.
– Unbolt drive shaft (right-side) from flange shaft on bevel box.
– Lift drive shaft up as far as possible and secure with cable tie.



Note

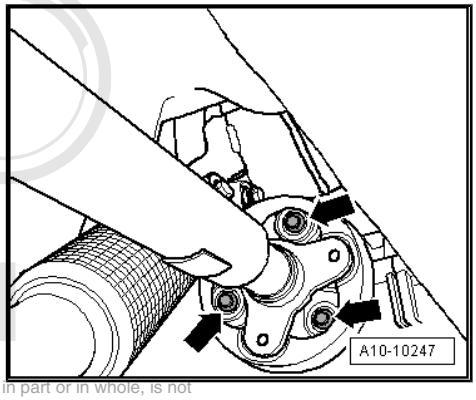
Make sure you do not damage surface coating on drive shaft.

– Remove bolts -arrows- and detach bracket for bevel box.

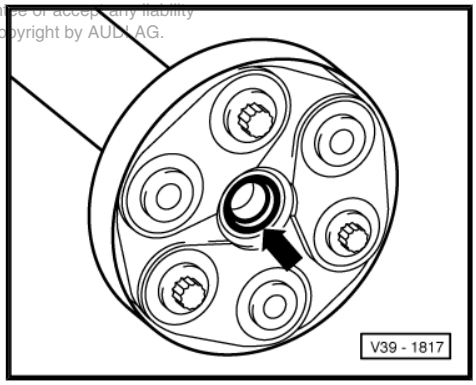


– Mark position of flexible coupling and bevel box flange in relation to one another.

– Unbolt propshaft with flexible coupling from bevel box -arrows- (counterhold triangular flange with suitable lever).



– Push engine/gearbox assembly forward slightly (towards front end) and then pull propshaft off bevel box.



Caution

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

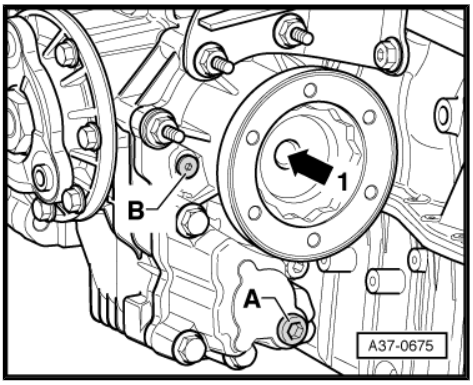
- *Push propshaft towards the rear and to the right as far as possible.*

Note

If seal is damaged propshaft must be renewed.

– Tie up propshaft.

– Using socket and extended bit -T10107 A- , remove bolt -arrow 1- securing flange shaft (right-side). To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.

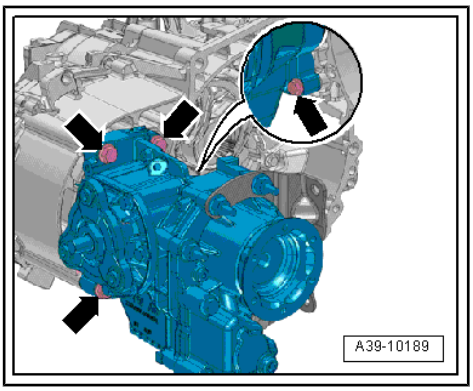


Note

- *The flange shaft (right-side) remains in the bevel box.*
- *Items -A and B- can be disregarded.*

– Unscrew bolts (4 in total) securing bevel box to manual gearbox -arrows-.

– Pull bevel box together with flange shaft (right-side) off gearbox and take out bevel box.



Install bevel box ⇒ page 147 .

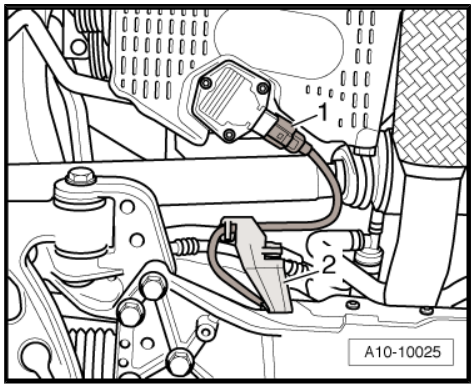
13.3 Removing bevel box - vehicles with 2.0 ltr. TDI engine

Removing

– Remove flange shaft (right-side) ⇒ page 256 .

– 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.

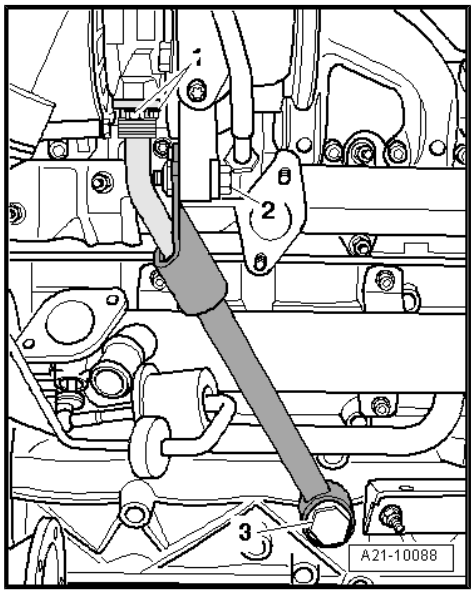


Note

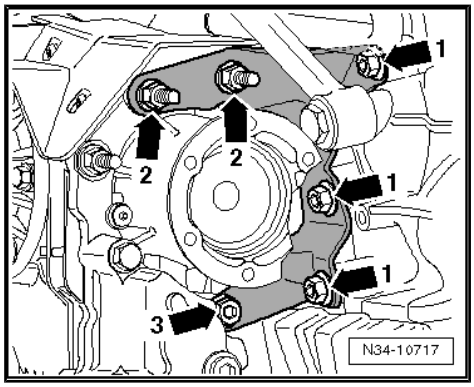
Place a cloth below the engine to catch escaping engine oil.

– Remove bolt -2- and banjo bolt -3-.

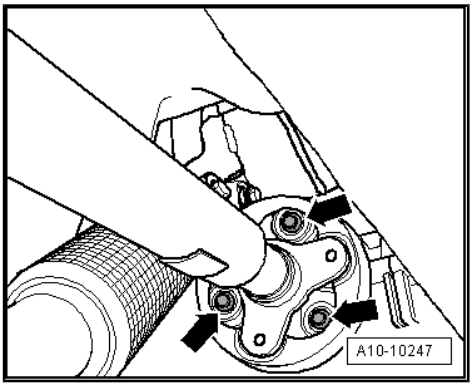
– Detach bracket for turbocharger from oil return pipe.



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



– Mark position of flexible coupling and bevel box flange in relation to one another.
– Unbolt propshaft with flexible coupling from bevel box -arrows- (counterhold triangular flange with suitable lever).

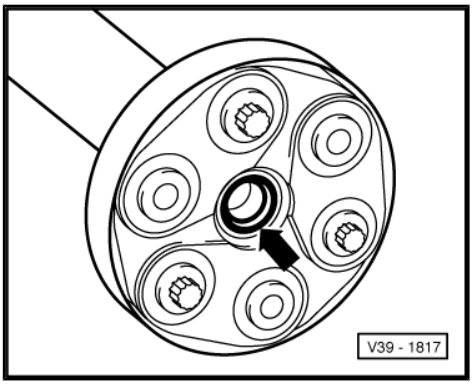


– Push engine/gearbox assembly forward slightly (towards front end) and then pull propshaft off bevel box.

Caution

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

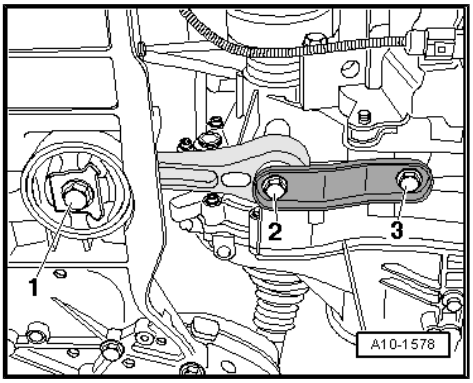
- *Push propshaft towards the rear and to the right as far as possible.*



Note

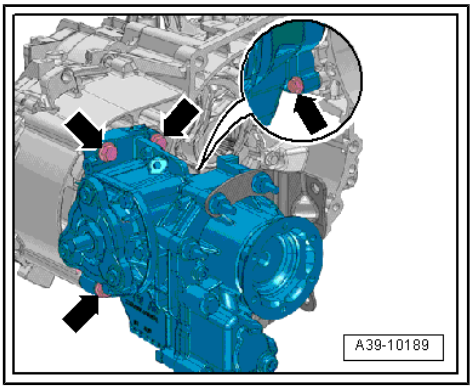
If seal is damaged propshaft must be renewed.

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



– Unscrew bolts (4 in total) securing bevel box to manual gearbox -arrows-.
– Detach bevel box from gearbox and remove.

Install bevel box ⇒ page 147 .



13.4 Installing bevel box

- Tightening torques ⇒ page 255

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

Note

Renew O-rings

Vehicles with petrol engine:

Caution

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

- ***Turn flange shaft while fitting bevel box with flange shaft (right-side) onto gearbox.***

– Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.

– If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.

– Bolt bevel box to gearbox.

Note

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

– Install bracket for bevel box ⇒ page 121 , ⇒ page 122 .

– Install heat shield for drive shaft (right-side) ⇒ page 122 , ⇒ page 122 .

– Install oil return line for turbocharger ⇒ Rep. Gr. 21 .

– Install exhaust system and cross piece ⇒ Rep. Gr. 26 .

Vehicles with 3.2 ltr. MPI engine:

– Install subframe ⇒ Rep. Gr. 40 .

– Attach steering box to subframe ⇒ Rep. Gr. 48 .

Vehicles with TDI engine:

– Install bracket for bevel box ⇒ page 122 .

– Install bracket for turbocharger ⇒ Rep. Gr. 21 .

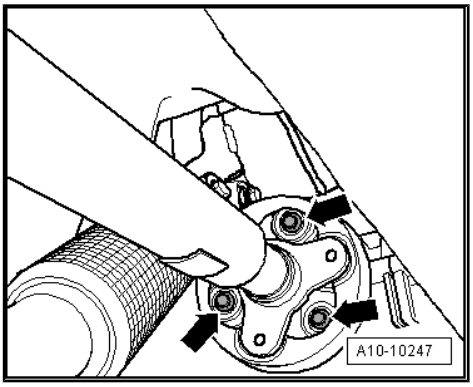
– Install flange shaft (right-side) ⇒ page 256 .

– Install heat shield for drive shaft (right-side) ⇒ page 123 .

Continued for all vehicles:

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

– Press engine/gearbox assembly towards bulkhead, taking care to guide pin on bevel box into propshaft flange.

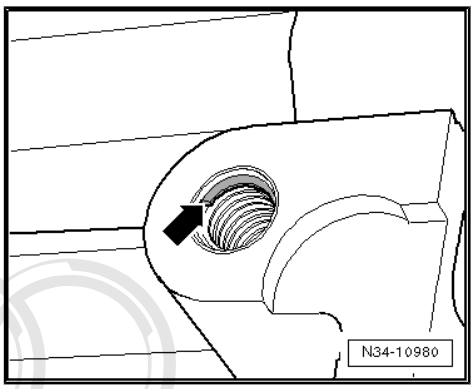


Note

- *When removing and installing the gearbox do not damage the seal in the propshaft flange. Renew propshaft if damaged.*
- *Ensure propshaft is horizontal when pushing it onto centring pin.*

– Bolt flexible coupling on propshaft onto bevel box flange -arrows- ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

– Install pendulum support ⇒ page 136 .

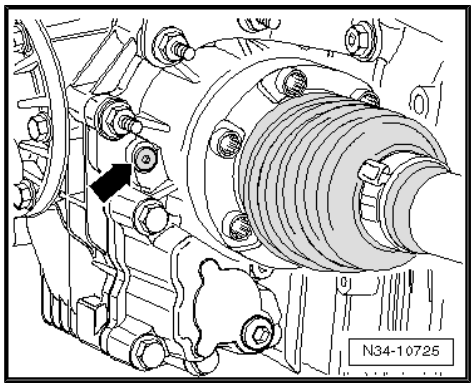


Note

- *Gearboxes manufactured from 28 05 7 onwards have thread inserts (e.g. “HeliCoil”) in the bolt holes for the pendulum support.*
- *These can be recognised by the shoulder on the first thread turn -arrow-.*
- *Please use the correct securing bolts and observe the specified tightening torques ⇒ Item 2 (page 126) .*

– Check gear oil level in bevel box ⇒ page 150 .
– Check gear oil level in gearbox ⇒ page 138 .
– Install noise insulation frame ⇒ Rep. Gr. 50 .
– Install noise insulation ⇒ Rep. Gr. 66 .
– Top up engine oil ⇒ Maintenance ; Booklet 810 .
– Fit wheels ⇒ Rep. Gr. 44 .

14 Overview - gear oil in bevel box



Oil filler plug - tightening torque

Note

Renew oil filler plug -arrow-.

– Tighten oil filler plug to 15 Nm.

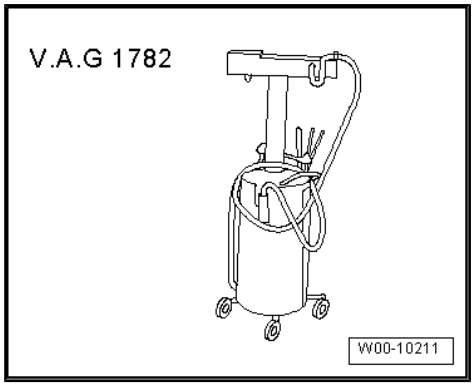
14.1 Checking gear oil level in bevel box

Note

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

Special tools and workshop equipment required

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

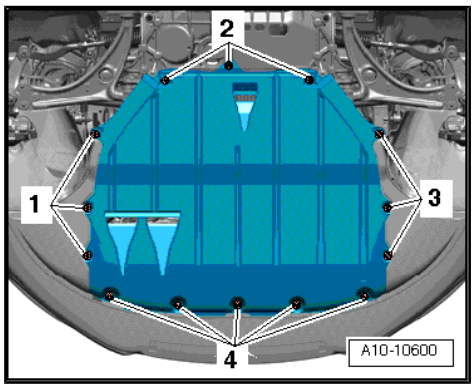


Procedure

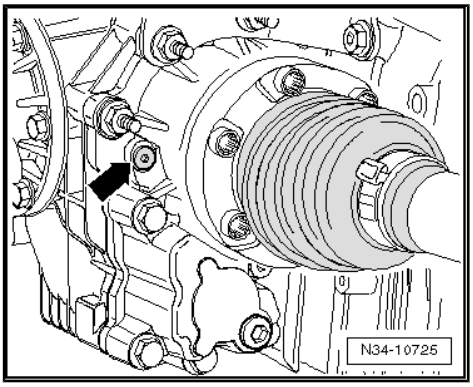
- Vehicle must be standing on level surface.
- Bevel box must be in installation position.
- Tightening torque ⇒ page 150

– Release fasteners -1 ... 4- and remove centre noise insulation.

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



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



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

– Top up gear oil if necessary
⇒ “14.2 Topping up gear oil in bevel box”, page 151

Note

Carefully remove any traces of escaped oil on bevel box.

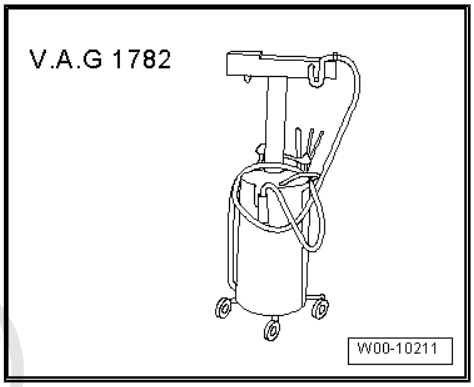
– Tighten new oil filler plug. Tightening torque ⇒ page 150

– Install noise insulation ⇒ Rep. Gr. 66 .

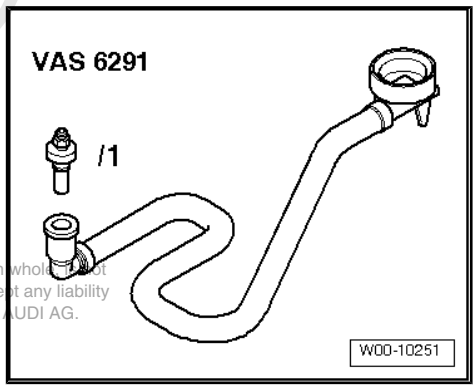
14.2 Topping up gear oil in bevel box

Special tools and workshop equipment required

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



♦ Charging device for Haldex coupling 2 -VAS 6291-



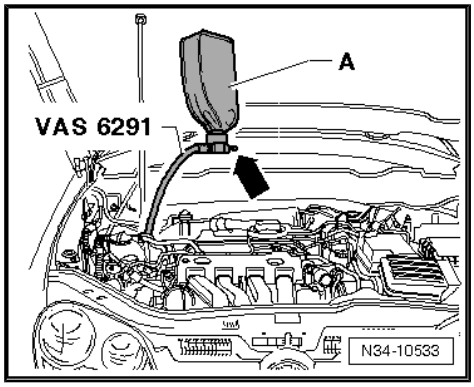
Procedure

• Vehicle must be standing on level surface.

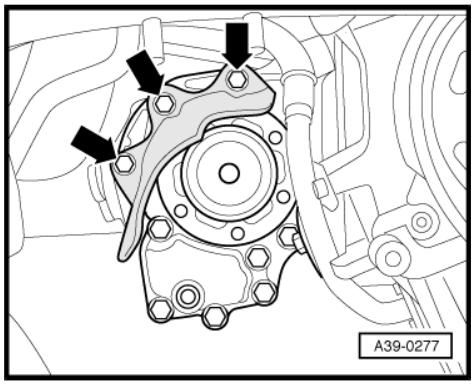
• Bevel box must be in installation position.

• Tightening torque ⇒ page 150

– Route hose of charging device for Haldex coupling 2 -VAS 6291- through engine compartment.



– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.



Note

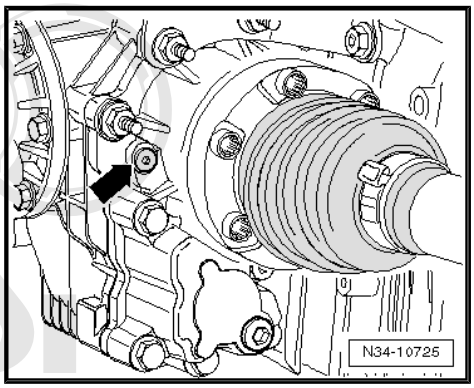
Illustration shows 3.2 ltr. MPI engine.

Note

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

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

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

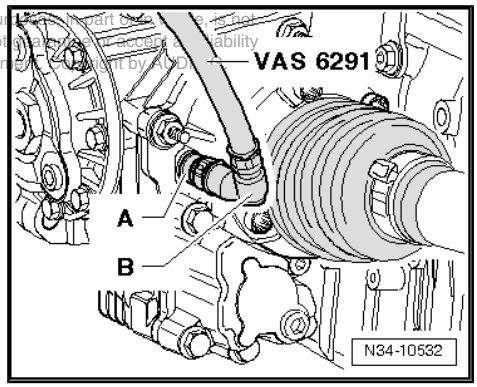


– Disconnect adapter -A- and elbow joint -B-.

– Screw adapter -A- in onto stop.

– Connect elbow joint -B- and adapter -A-, making sure they engage.

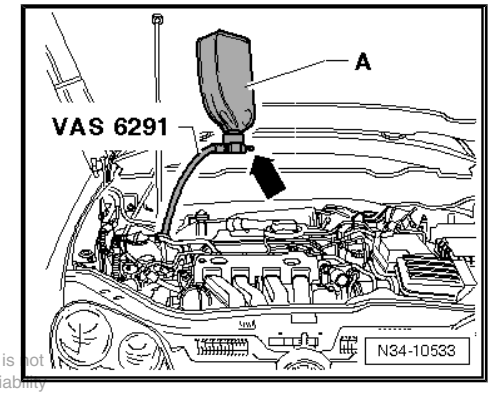
• The hose must not hang down.



– Please make sure that valve -arrow- is closed.

– Screw oil reservoir -A- onto charging device for Haldex coupling 2 -VAS 6291- .

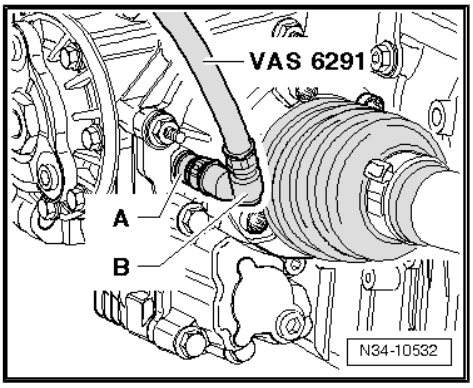
– Now open valve -arrow- and hold oil reservoir as shown in illustration.



The bevel box will now be filled.

- When bevel box is filled correctly oil will emerge at adapter -A-.

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

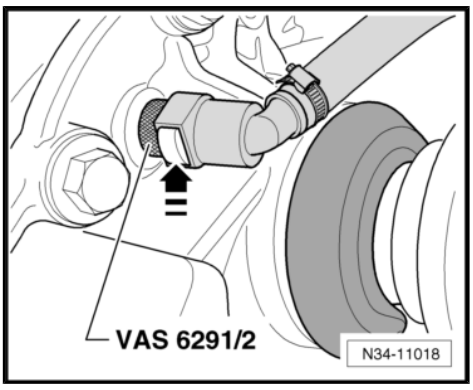


– As soon as oil stops flowing back into the reservoir, remove charging device by pressing catch in direction of -arrow-.

– Please note that some oil will remain in the hose of the charging device.

– Unscrew adapter -VAS 6291/2- .

– Fit new oil filler plug and tighten. Tightening torque ⇒ page 150



Note

Carefully remove any traces of escaped oil on bevel box.

– Install heat shield for drive shaft (right-side) ⇒ page 122 , ⇒ page 122 , ⇒ page 123 .

– Install noise insulation ⇒ Rep. Gr. 66 .

15 Dismantling and assembling gearbox

15.1 General layout of gearbox

1 - Clutch housing

2 - Reverse shaft

3 - Output shaft for 5th, 6th and reverse gear

4 - Clutch slave cylinder with release bearing

5 - Input shaft

6 - Output shaft for 1st - 4th gear

7 - Differential

8 - Bevel box

9 - Flange shaft (right-side)

10 - Bevel gear with input shaft

11 - Shaft bevel gear

12 - Output flange

13 - Flange shaft (left-side)

14 - 2nd speed selector gear

15 - 1st speed selector gear

16 - 4th speed selector gear

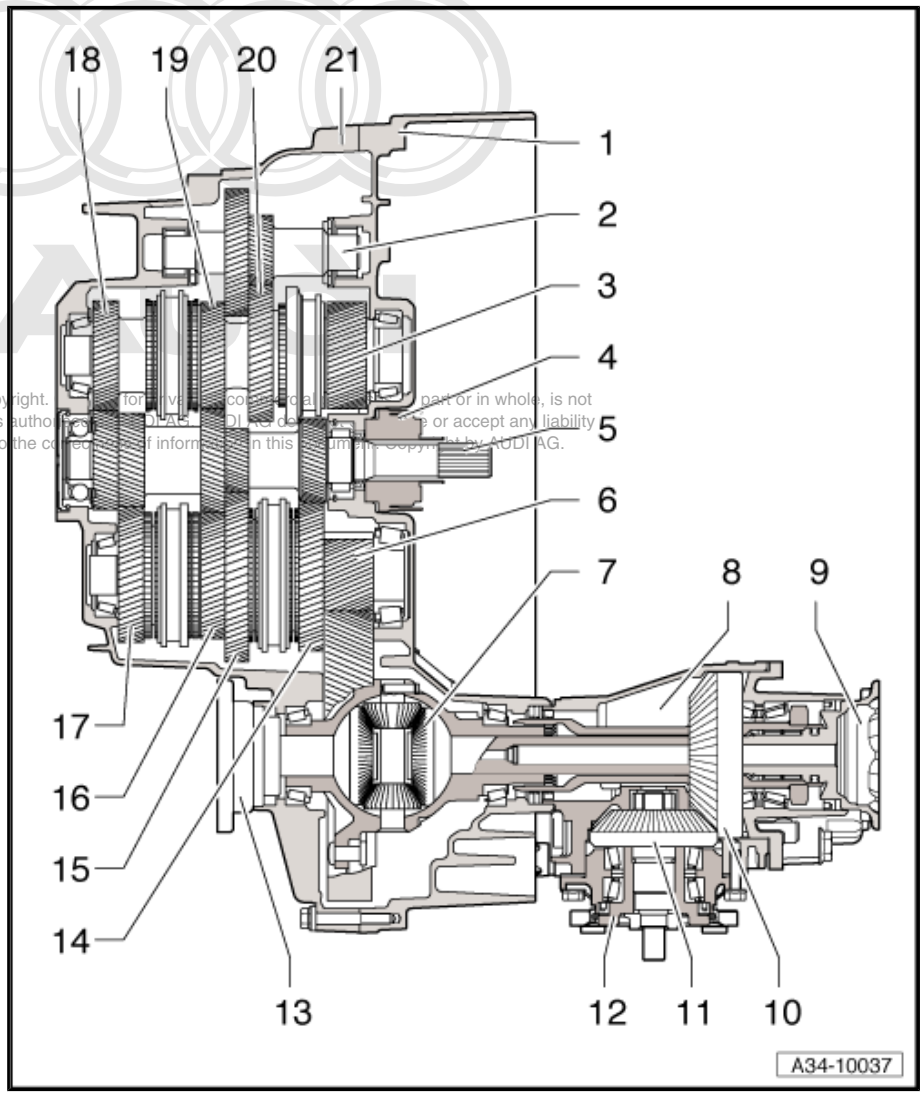
17 - 3rd speed selector gear

18 - 5th speed selector gear

19 - 6th speed selector gear

20 - Reverse selector gear

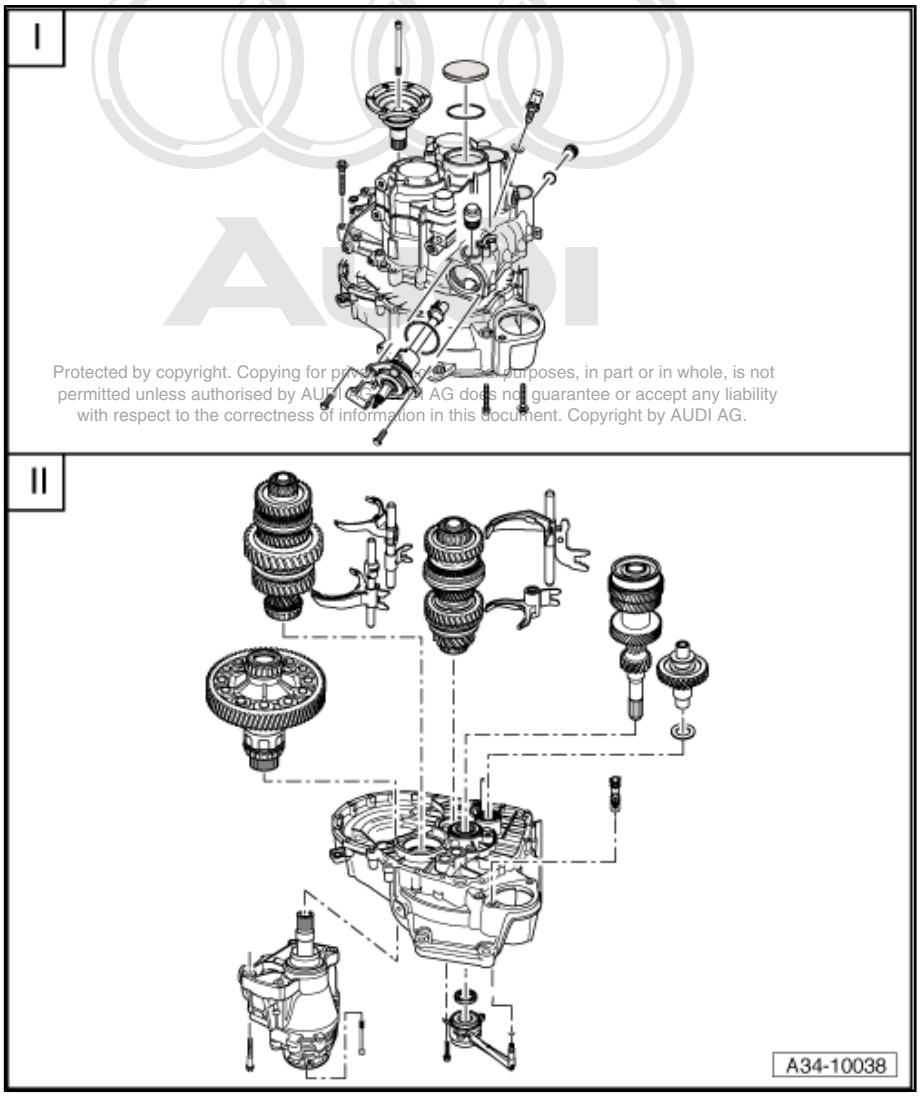
21 - Gearbox housing



15.2 Exploded view

I - Exploded view - gearbox housing and selector mechanism ⇒ page 156

II - Exploded view - input shaft, output shafts, differential, bevel box and selector rods ⇒ page 158

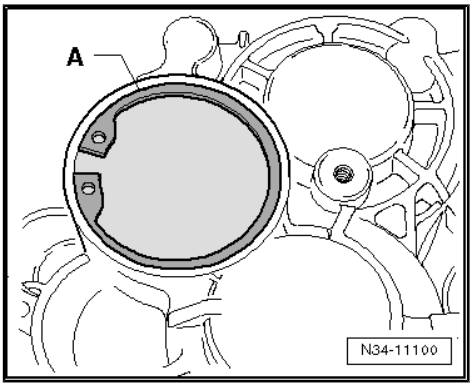


Sealing cap for input shaft with circlip -A-

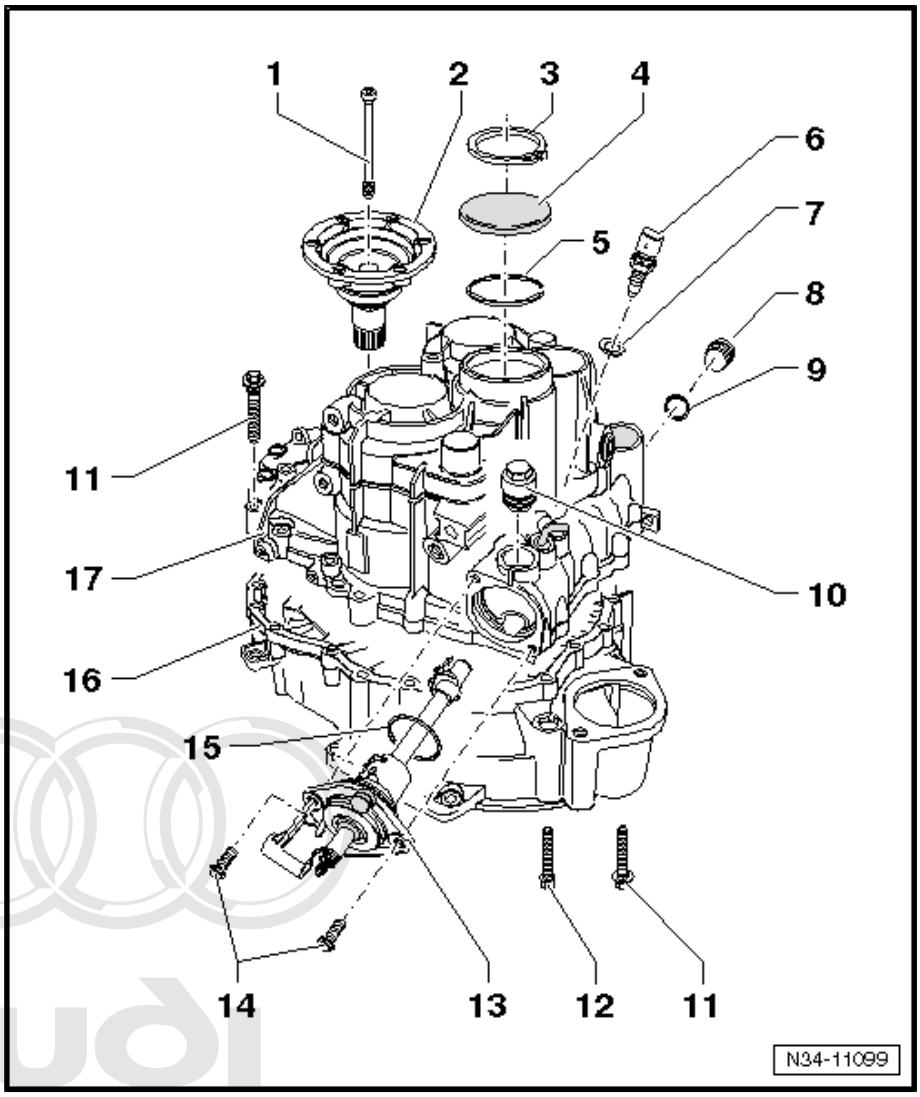
On gearboxes manufactured from 21 01 8 onwards, the sealing cap for the input shaft is secured by a circlip -A-.

⇒ "15.5 Dismantling and assembling gearbox (version without circlip A for input shaft sealing cap)", page 159

⇒ "15.6 Dismantling and assembling gearbox (version with circlip A for input shaft sealing cap)", page 172



15.3 Exploded view - gearbox housing and selector mechanism



1 - Bolt
- ❑ Tightening torque ⇒ Item 7 (page 250)

2 - Flange shaft with spring
- ❑ Removing and installing ⇒ page 159
- ❑ Assembling ⇒ page 267

3 - Circlip
- ❑ For sealing cap ⇒ Item 4 (page 156)
- ❑ Fitted in gearboxes manufactured from 21 01 8 onwards

4 - Sealing cap
- ❑ Secured by circlip in gearboxes manufactured from 21 01 8 onwards
- ❑ Removing and installing (without circlip) ⇒ page 159
- ❑ Removing and installing (with circlip) ⇒ page 159
- ❑ Select correct components from ⇒ Electronic parts catalogue .

5 - Circlip
- ❑ For grooved ball bearing on input shaft ⇒ Item 1 (page 209)

6 - Reversing light switch -F4-
- ❑ 20 Nm

7 - Seal
- ❑ Renew

8 - Oil drain plug
- ❑ Tightening torque ⇒ page 138

9 - Seal
- ❑ Renew

10 - Locking bolt
- ❑ For selector shaft
- ❑ 45 Nm

11 - Bolt
- ❑ With captive washer
- ❑ 15 Nm + 90°
- ❑ Renew
- ❑ Correct allocation of replacement bolts ⇒ page 157

12 - Bolt
- ❑ Without washer

- ❑ 15 Nm + 90°
- ❑ Renew
- ❑ Correct allocation of replacement bolts ⇒ page 157

13 - Selector mechanism

- ❑ Dismantling and assembling ⇒ page 201
- ❑ Removing with gearbox in vehicle ⇒ page 203

14 - Bolt

- ❑ 20 Nm
- ❑ Renew

15 - O-ring

- ❑ Renew

16 - Clutch housing

- ❑ Servicing ⇒ page 195

17 - Gearbox housing

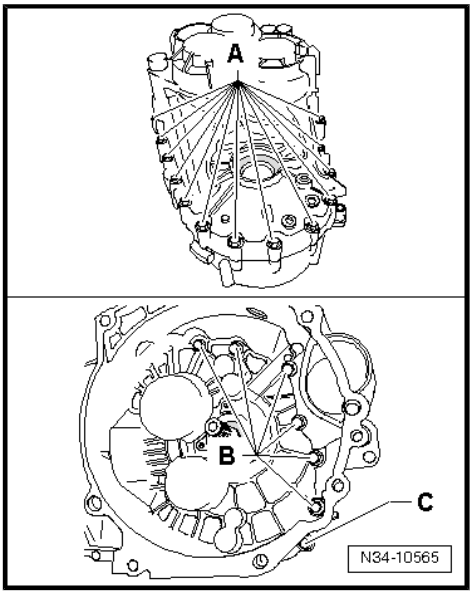
- ❑ Servicing ⇒ page 185

Correct allocation of replacement bolts

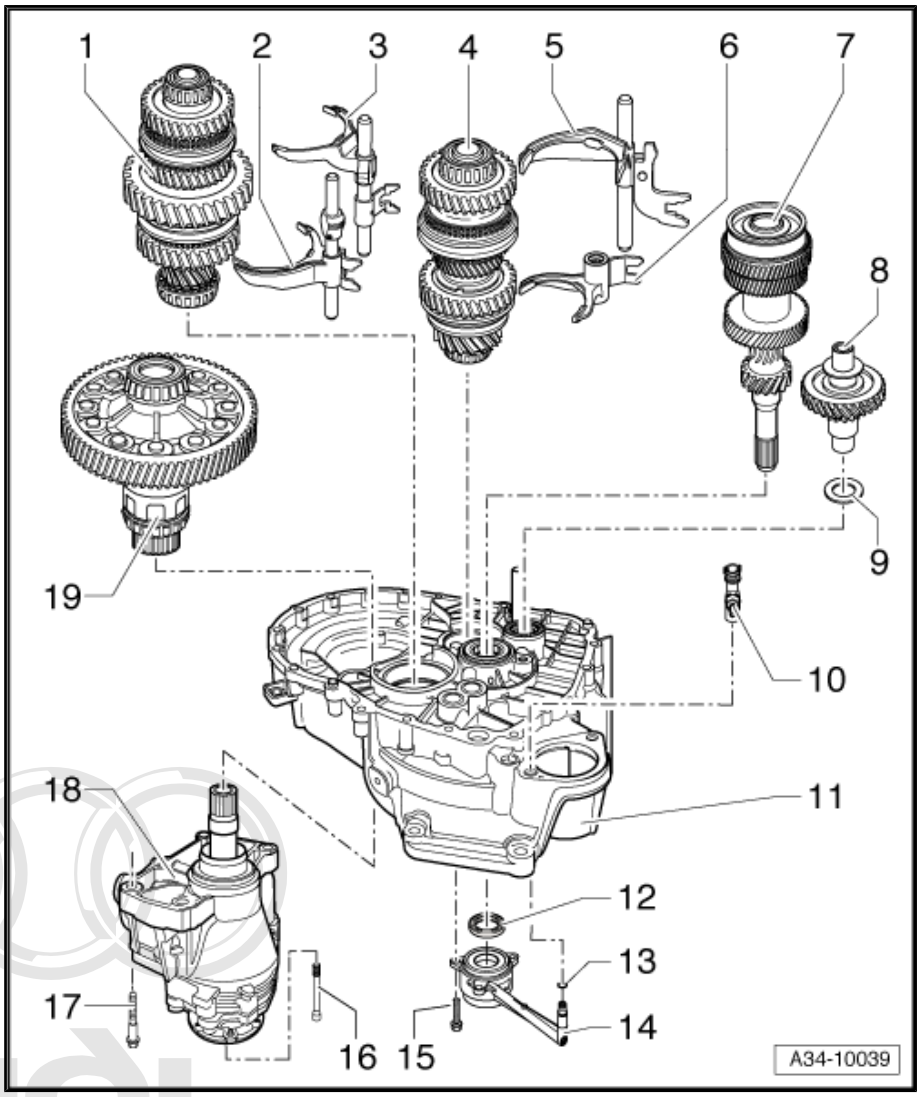
A - Bolt with captive washer

B - Bolt without washer

C - Bolt with captive washer



15.4 Exploded view - input shaft, output shafts, differential, bevel box and selector rods



1 - Output shaft for 1st - 4th gear

- ❑ Dismantling and assembling ⇒ page 220
- ❑ Installation position ⇒ page 159

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

- ❑ Installation position ⇒ page 159

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

- ❑ Installation position ⇒ page 159

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

- ❑ Dismantling and assembling ⇒ page 237
- ❑ Installation position ⇒ page 159

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

- ❑ Installation position ⇒ page 159

6 - Reverse gear selector fork

- ❑ Installation position ⇒ page 159

7 - Input shaft

- ❑ Dismantling and assembling ⇒ page 211
- ❑ Always renew grooved ball bearing on input shaft ⇒ Item 6 (page 210)

8 - Reverse shaft

- ❑ With thrust washer

9 - Thrust washer

10 - Bleeder connection

- ❑ Connect to clutch slave cylinder ⇒ Item 14 (page 158)

11 - Clutch housing

12 - Input shaft oil seal

- ❑ Renewing ⇒ page 198

13 - O-ring

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

14 - Clutch slave cylinder with release bearing

15 - Bolt

- ❑ Tightening torque ⇒ Item 1 (page 35)

16 - Bolt

- ❑ Tightening torque ⇒ Item 13 (page 255)

17 - Bolt

- ❑ 40 Nm
- ❑ 4x
- ❑ Renew

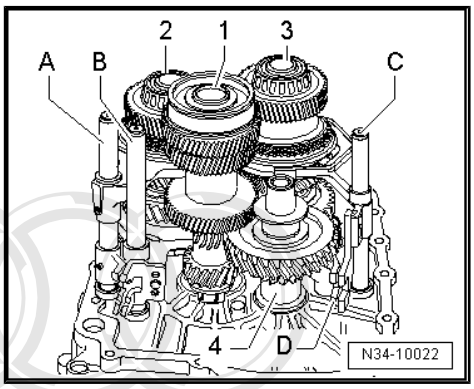
18 - Bevel box

- ❑ Removing and installing (with gearbox installed) ⇒ page 140
- ❑ Removing and installing (with gearbox removed) ⇒ page 159

19 - Differential

- ❑ Dismantling and assembling ⇒ page 269

Installation position of shafts and selector rods in gearbox



1 - Input shaft

2 - Output shaft for 1st - 4th gear

3 - Output shaft for 5th/6th and reverse gear

4 - Reverse shaft

A - Selector rod for 3rd and 4th gear

B - Selector rod for 1st and 2nd gear

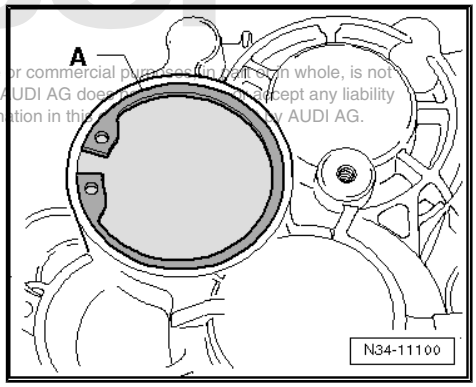
C - Selector rod for 5th and 6th gear

D - Reverse gear selector fork [1)]

[1)] In gearboxes manufactured from 25 05 9 onwards: mounted on selector rod for 5th/6th gear selector fork -item C-. Identification of different types of reverse gear selector forks ⇒ page 207

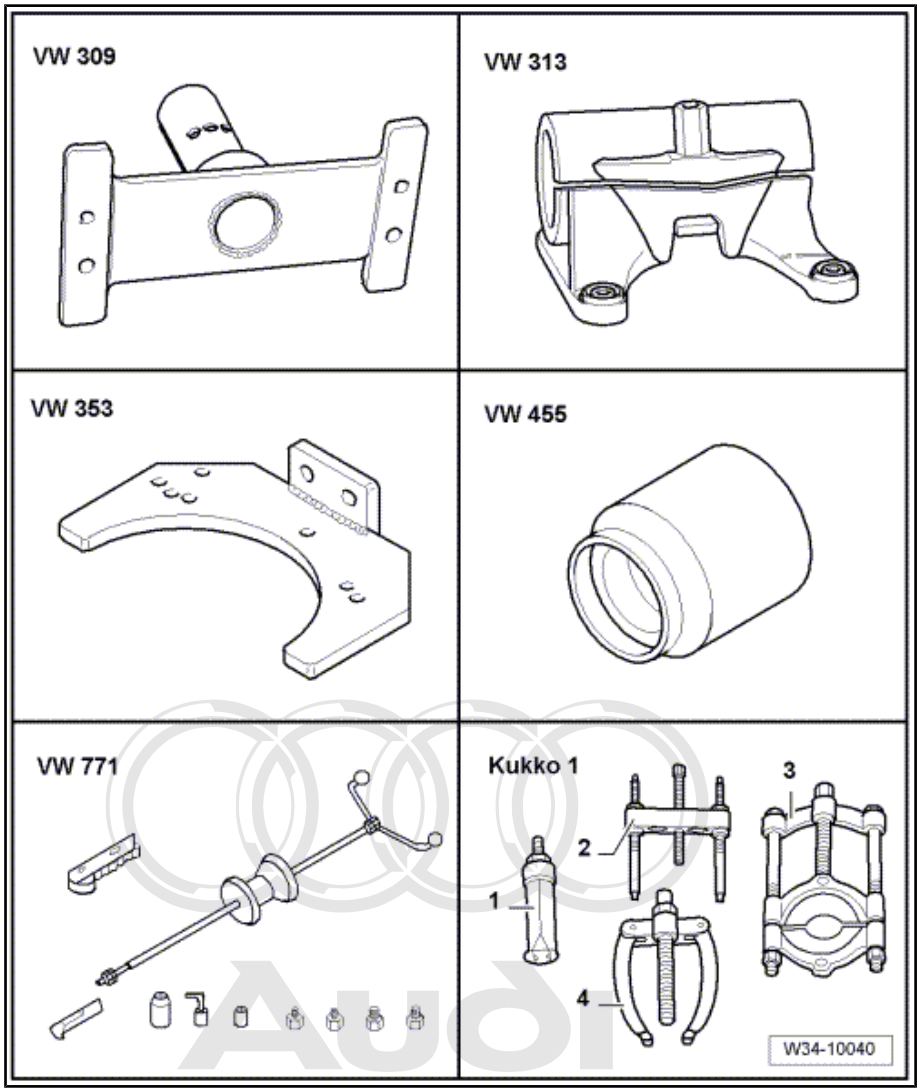
15.5 Dismantling and assembling gearbox (version without circlip -A- for input shaft sealing cap)

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

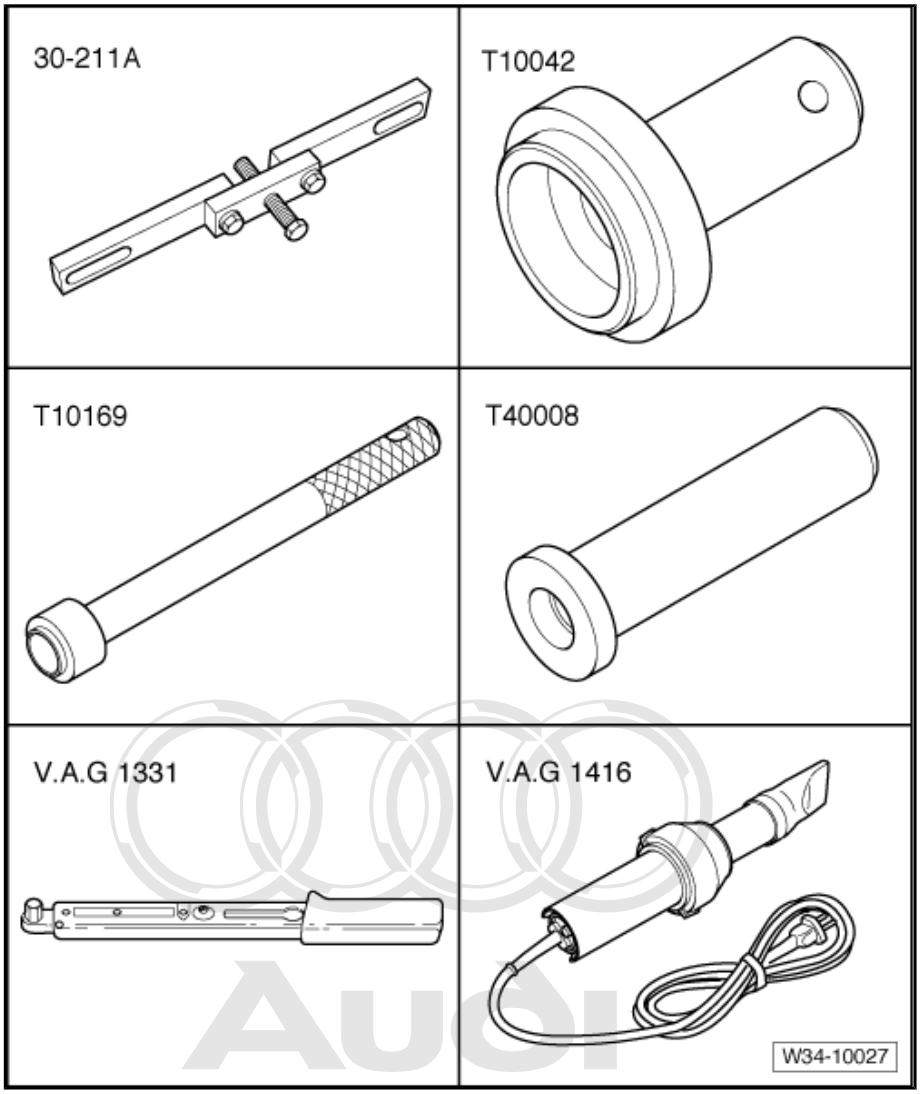


Special tools and workshop equipment required

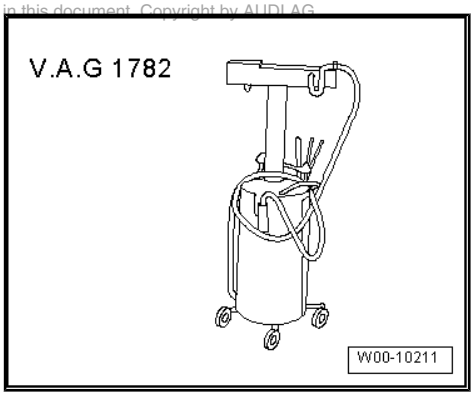
- Support plate -VW 309-
- Support clamp -VW 313-
- Gearbox support -VW 353-
- Installing sleeve -VW 455-
- Multi-purpose tool -VW 771-
- -1- Kukko internal puller 21/1
- -3- Kukko 17/0 splitter
- -4- Kukko 22/1 counter-support



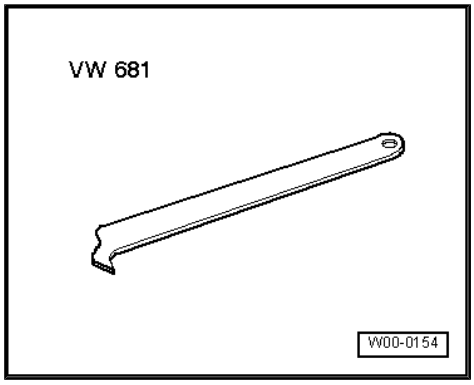
- Support bridge -30 - 211 A-
- Thrust piece -T10042-
- Drift -T10169-
- Thrust piece -T40008-
- Torque wrench -V.A.G 1331-
- Hot air blower -V.A.G 1416-



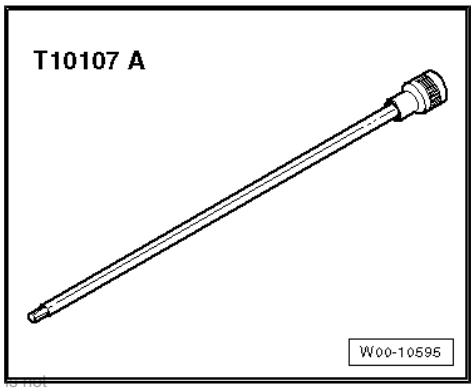
- Used oil collection and extraction unit -V.A.G 1782-



♦ Oil seal extractor lever -VW 681-



♦ Socket and extended bit -T10107 A-



Dismantling

- Gearbox removed ⇒ page 82 and mounted on assembly stand ⇒ page 125 .

– Turn gearbox on assembly stand so that oil drain plug faces downwards.

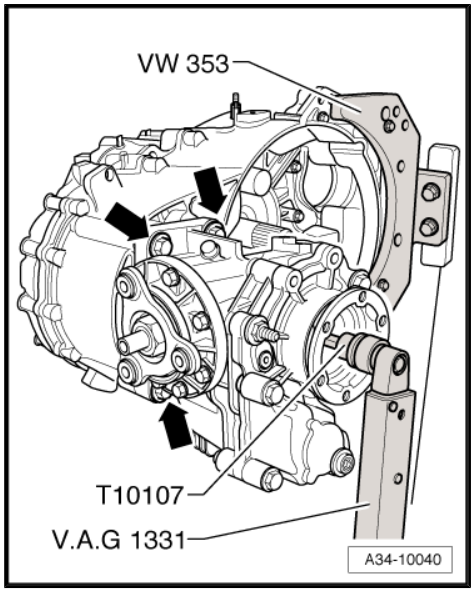
– Place used oil collection and extraction unit -V.A.G 1782- below gearbox.

– Drain gear oil out of gearbox.

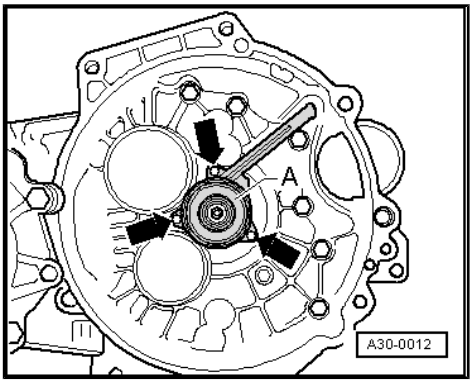
– Unscrew bolt for flange shaft (right-side) using socket and extended bit -T10107 A- .

– Remove all 4 bolts -arrows- securing bevel box to gearbox (illustration only shows 3 bolts).

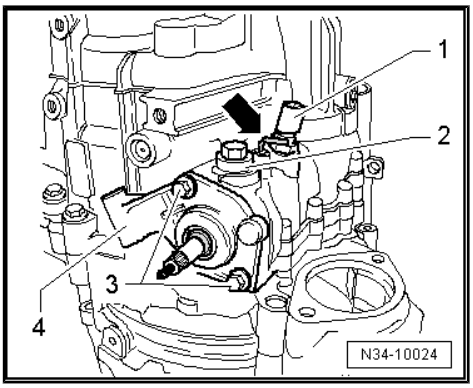
– Carefully push bevel box away from gearbox, making sure it does not fall down.



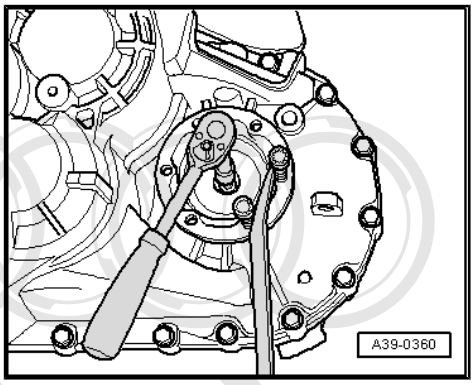
– Remove bolts -arrows-.
– Take off slave cylinder together with release bearing -A-.



– Make sure that the selector shaft is not locked in position by the angled rod -arrow- when carrying out the following steps.
– Put selector shaft in neutral position.
– Remove locking bolt -2-.
– Remove bolts -3-.
– Remove reversing light switch -F4- -1-.
– Pull selector shaft -4- out of gearbox housing.



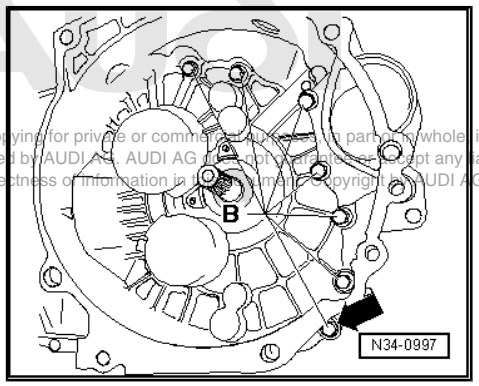
– Remove bolt securing flange shaft (left-side). To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.



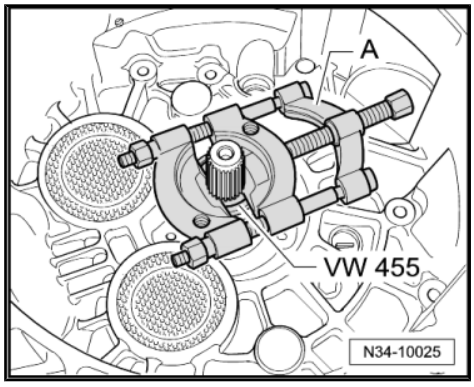
– Remove bolts -B- securing gearbox housing from inside clutch housing.

Note

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



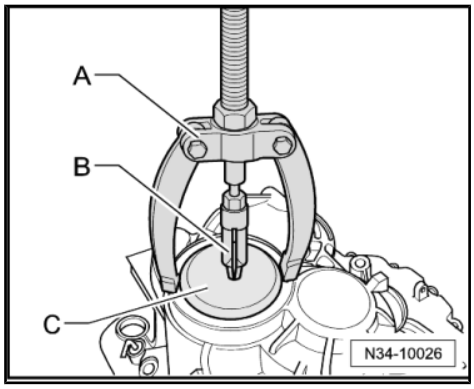
– Lock input shaft by fitting installing sleeve -VW 455- over input shaft and against clutch housing.
– Tighten splitter -A-, e.g. -Kukko 17/0- behind splines on input shaft.
• The rear side of the splitter must be in contact with installing sleeve (zero play).



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

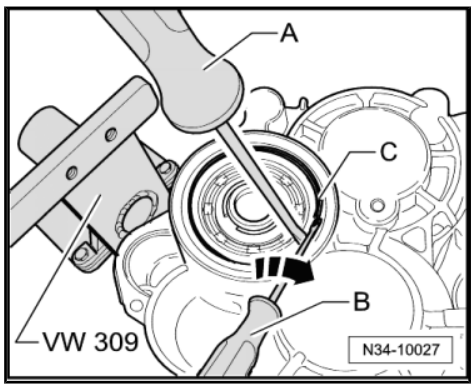
A - Counter-support , e.g. -Kukko 22/1-

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

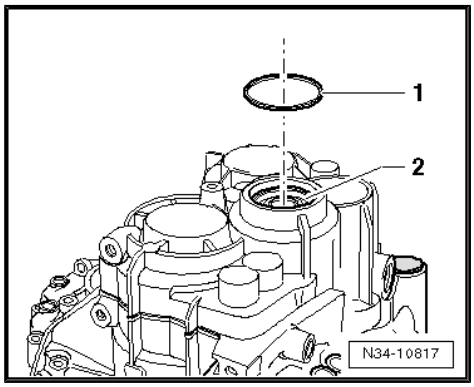


Detach circlip -C- from input shaft grooved ball bearing as follows:

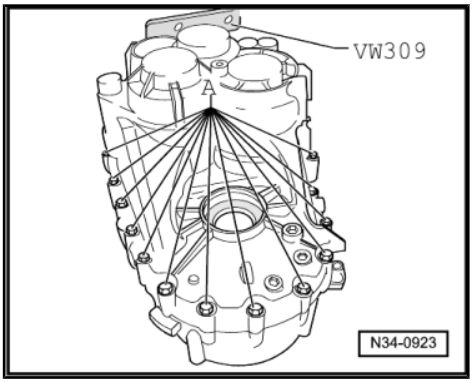
– Hold one end of circlip with screwdriver -A-.
– Lever other end of circlip out of slot in ball bearing -arrow- with 2nd screwdriver -B-.
– Lever out circlip further by re-applying screwdriver -B-.



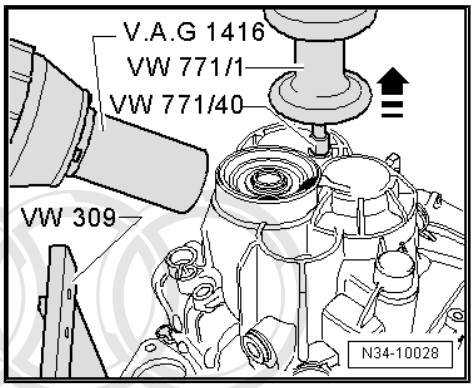
– Where fitted, detach spacer -1- from gearbox housing -2-.
• When renewing the gearbox housing, check whether the spacer has to be re-installed ⇒ page 167 .



– Remove bolts -A-.



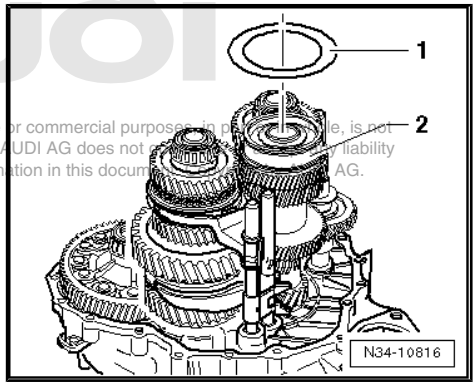
– Screw adapter VW 771/40 into threaded hole in gearbox housing.
– Using hot air blower -V.A.G 1416- , heat area around seat of input shaft ball bearing in gearbox housing for approx. 10 minutes to approx. 100°C.
– Using multi-purpose tool VW 771/1 , pull gearbox housing off clutch housing -arrow-.



Note

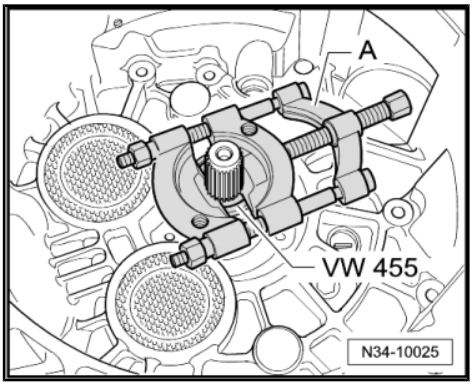
If necessary, carefully apply a lever to the protruding flanges on alternate sides of the gearbox housing, taking care not to damage the sealing surfaces.

– If fitted, detach spacer -1- from grooved ball bearing -2-.
– When renewing the gearbox housing, check whether the spacer has to be re-installed ⇒ page 167 .



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

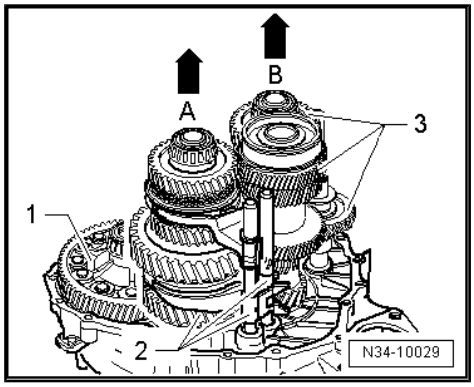
A second mechanic is required for removing the shafts from the clutch housing.



– Lift up differential -1- with your left hand.

– With your right hand, lift 1st - 4th gear output shaft together with selector rods -2- -arrow A-.

– At the same time, the second mechanic must lift the input shaft, reverse shaft and 5th/6th gear output shaft -3- out of the clutch housing together with the selector rods -arrow B-.



Note

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

– Drive out input shaft oil seal with sleeve -30-21- .

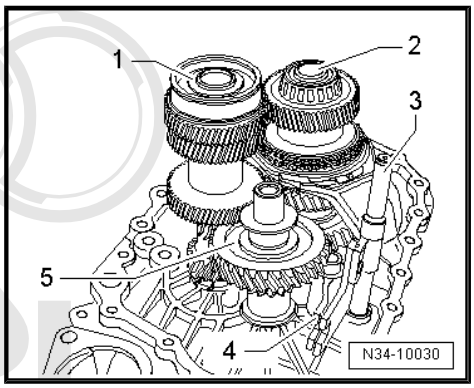
Note

Always renew grooved ball bearing on input shaft
⇒ Item 6 (page 210) .

Assembling

- A new grooved ball bearing has been pressed onto the input shaft ⇒ Item 6 (page 210) .
- Tightening torques ⇒ page 156

– Insert input shaft -1-, output shaft for 5th and 6th gear -2- together with selector rod -3-, selector fork -4- and reverse shaft -5-.



– Install differential -1-.

Note

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

– Take 1st - 4th gear output shaft -3- with selector rods -4- in your right hand as illustrated.

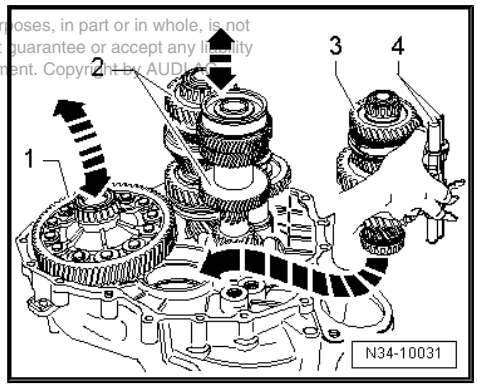
– Lift up differential slightly with your left hand.

– At the same time the second mechanic must lift the input shaft and output shaft for 5th, 6th and reverse gear -2- slightly, together with the reverse shaft.

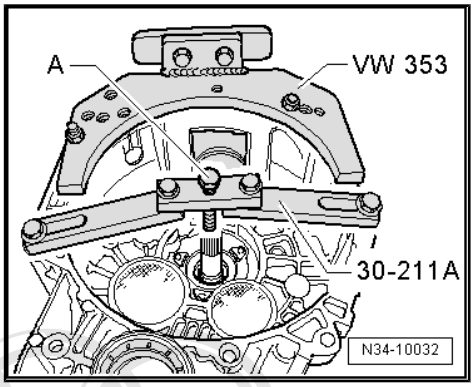
– Now insert 1st - 4th gear output shaft in direction of -arrow-.

- The teeth of the input shaft, output shafts and final drive gear/ differential must mesh.

– Now, together with second mechanic, locate shafts and differential in their bearing seats.



– Secure support bridge -30 - 211 A- for input shaft to clutch housing.



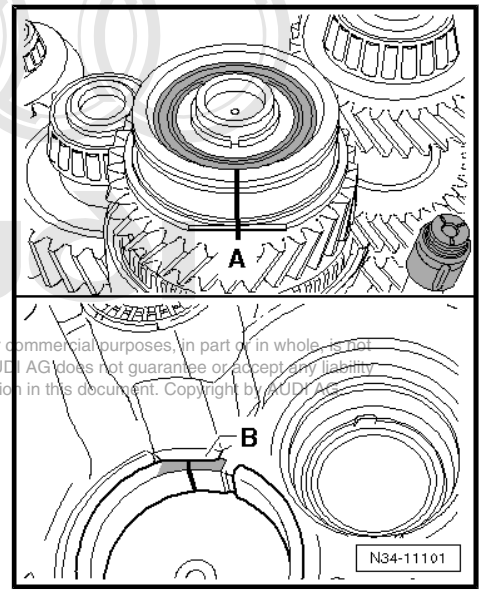
Note

Illustration shows clutch housing turned through 180° for clarity.

– Screw in bolt -A- until input shaft lifts slightly.

Note

- *On some gearboxes, grooved ball bearing for input shaft -A- and bearing mounting -B- are flattened on one side.*
- *Check grooved ball bearing for input shaft and gearbox housing.*



Grooved ball bearing for input shaft and gearbox housing
Without flattened sides on grooved ball bearing -A- and bearing mounting -B- ⇒ page 167
With flattened sides on grooved ball bearing -A- and bearing mounting -B- ⇒ page 168

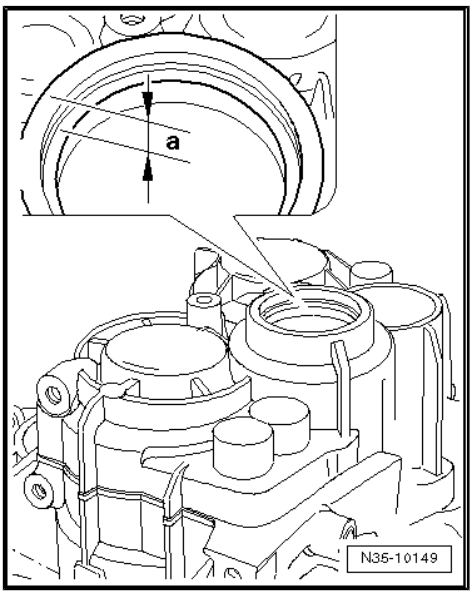
From gearbox manufacturing date 10 04 6 to approx. 20 01 8:

A spacer is fitted on either side of grooved ball bearing for input shaft ⇒ Item 6 (page 210) .

Top spacer	Outside diameter	78.6 mm
Bottom spacer	Outside diameter	85 mm

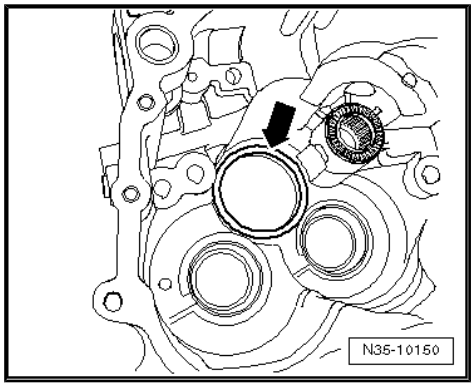
Measuring area above seat for grooved ball bearing

Area above grooved ball bearing	Dimension “a”	Top spacer
Up to gearbox manufacturing date 09 04 6	10 mm	No
From gearbox manufacturing date 10 04 6 onwards	10.7 mm	Yes

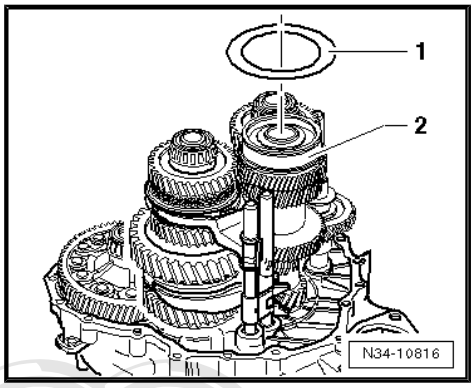


In the gearbox housing, the area below the seat for the grooved ball bearing has also been modified -arrow-.

Area below bearing seat		Bottom spacer
Up to gearbox manufacturing date 09 04 6	Not modified	No
From gearbox manufacturing date 10 04 6 onwards	Slightly deeper	Yes



– If necessary, fit a spacer (outside diameter = 85 mm) -1- onto grooved ball bearing -2-.



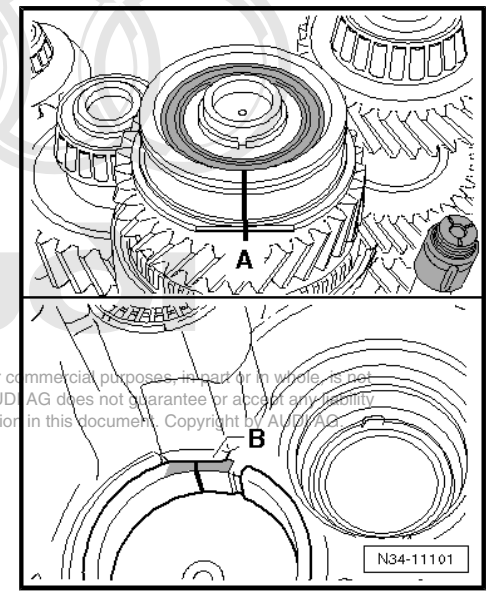
Gearboxes with flattened sides on grooved ball bearing for input shaft -A- and bearing mounting -B-:

- A spacer must not be fitted above or below the grooved ball bearing.
- Flattened sides -A- on grooved ball bearing and bearing mounting -B- in gearbox housing must be aligned.

– Mark flattened sides with paint.

– Copy markings onto top area of grooved ball bearing and top area of bearing mounting on gearbox housing (⇒ next illustration).

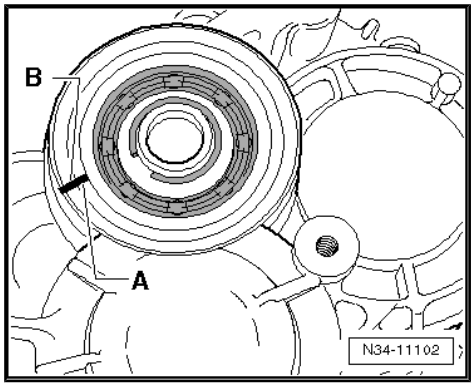
– Using hot air blower -V.A.G 1416- , heat area around seat of input shaft ball bearing in gearbox housing for approx. 10 minutes to approx. 100°C.



Note

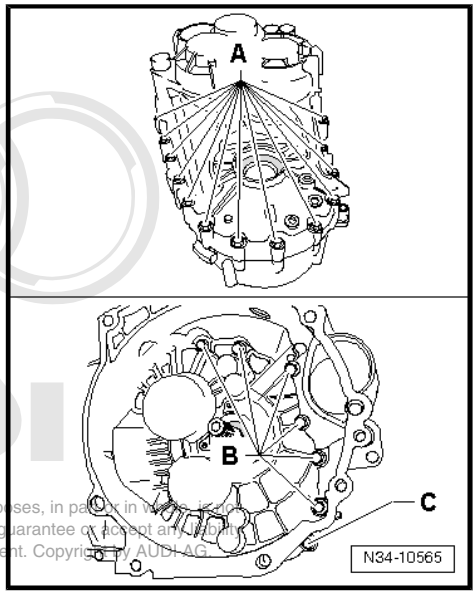
Heating is necessary to ensure that grooved ball bearing is not damaged when installing gearbox housing.

– Align marking -A- on grooved ball bearing with marking -B- on gearbox housing and fit gearbox housing.



Continued for all gearboxes:

– Using hot air blower -V.A.G 1416- , heat area around seat of input shaft ball bearing in gearbox housing for approx. 10 minutes to approx. 100°C.



Note

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

– Apply sealing paste -AMV 188 200 03- evenly to sealing surface of clutch housing.

– Fit gearbox housing and tighten new bolts -A-, -B- and -C- to specified torque.

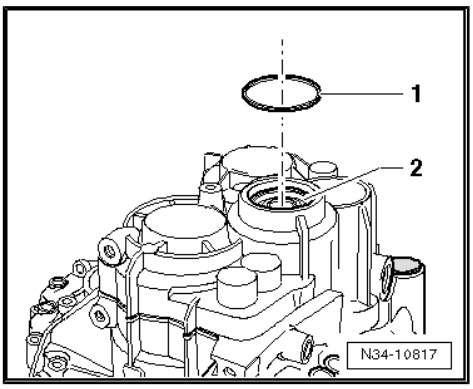
Allocation of bolts:

A - Bolt with captive washer

B - Bolt without washer

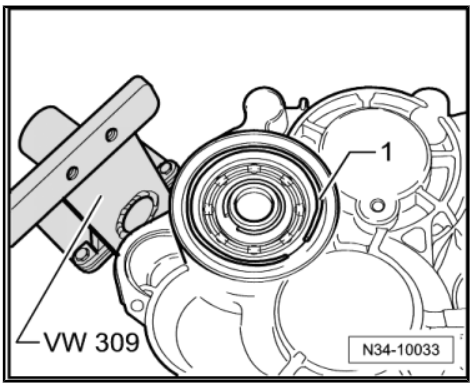
C - Bolt with captive washer

– If a spacer was fitted on the grooved ball bearing before installing the gearbox housing, a spacer -1- (outer diameter = 78.6 mm) must also be fitted after installing the gearbox housing -2- ⇒ page 167 .



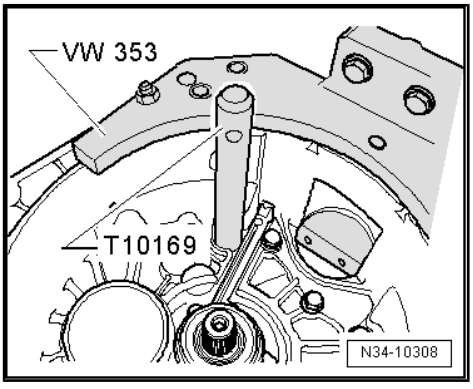
– Install circlip -1- for input shaft grooved ball bearing.

– Remove support bridge -30 - 211 A- for input shaft.

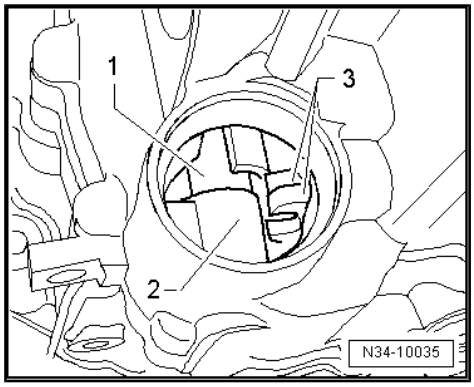


– If stop sleeve for selector shaft has been removed, drive it in now using drift -T10169- (drive in until drift contacts stop).

– Turn gearbox on assembly stand so that opening for selector shaft faces up.



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

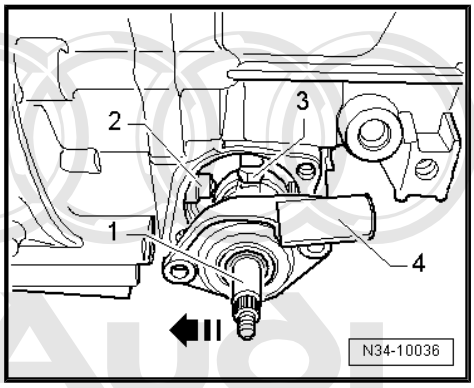


Note

The sealing cap is removed to give a better illustration.

– Now push selector shaft -1- against stop sleeve -2- in direction of -arrow- and run selector finger -3- down through selector forks and onto stop.

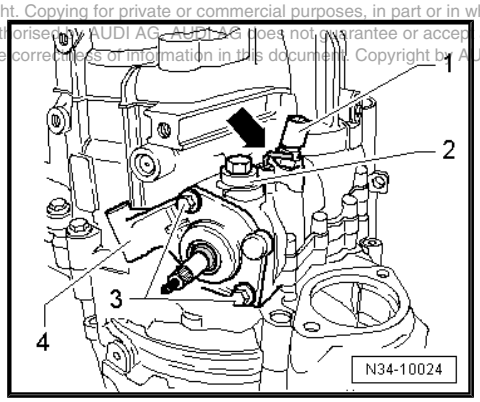
- Selector mechanism cover -4- should be parallel to joint surface on gearbox housing.
- Selector shaft should move up and down easily (gate selector movement).



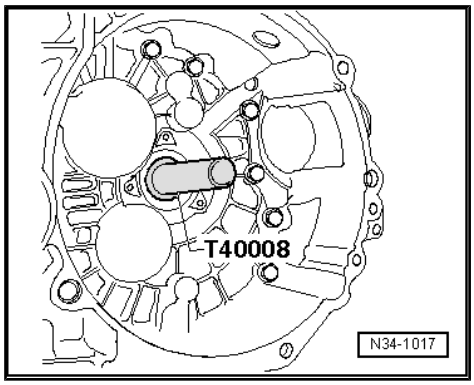
Note

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

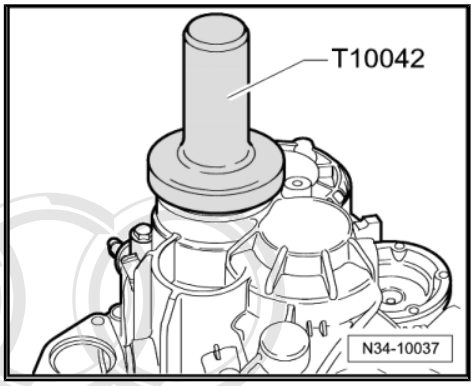
– Tighten bolts -3- for selector mechanism cover -4-.
– Screw in locking bolt -2-; angled rod -arrow- must be released.
– Install reversing light switch -F4- -1-.
– Install flange shaft (left-side) ⇒ page 250 .



– Drive in input shaft oil seal.
– Install clutch slave cylinder with release bearing ⇒ page 36 .
– Select all gears.



– Drive sealing cap into gearbox housing onto stop using thrust piece -T10042- .



Attach bevel box to gearbox as follows:

Caution

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

- ***Turn flange shaft while fitting bevel box with flange shaft (right-side) onto gearbox.***

– On manual gearbox, grease splines on differential with grease for clutch plate splines -G 000 100- .

– Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.

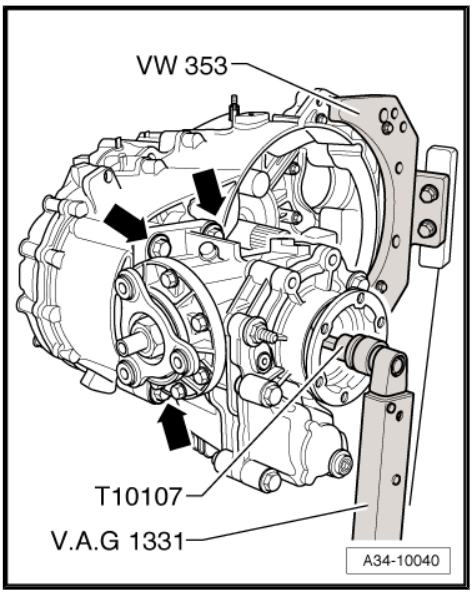
– If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.

Note

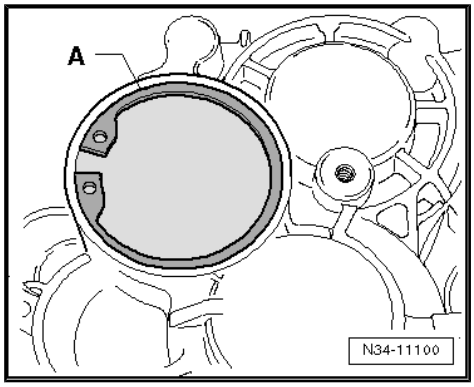
Do not use the securing bolts to pull the bevel box onto the gearbox. This could cause the bevel box to tilt and the securing eyes may break off.

– Tighten all 4 bolts -arrows- securing bevel box to gearbox (illustration only shows 3 bolts). Tightening torques ⇒ Item 10 (page 255)

– Install flange shaft (right-side) ⇒ page 255 .



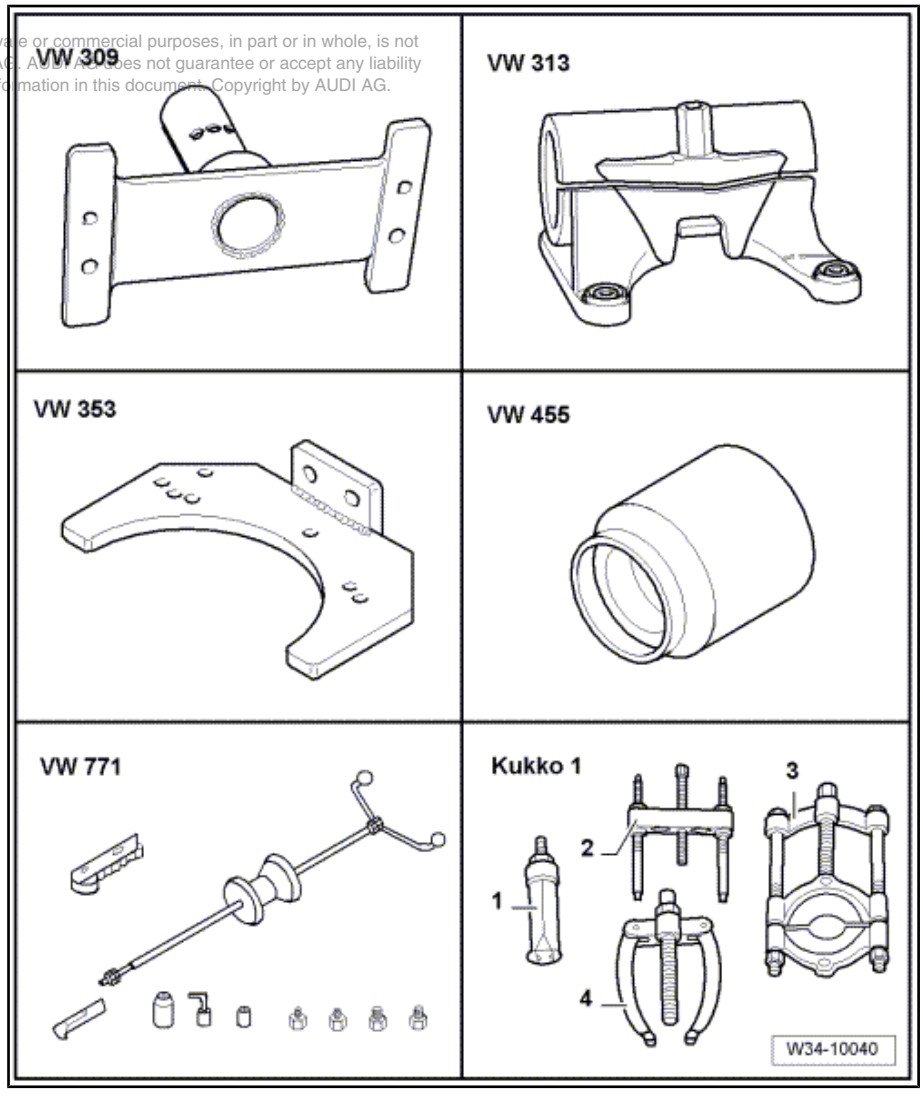
15.6 Dismantling and assembling gearbox (version with circlip -A- for input shaft sealing cap)



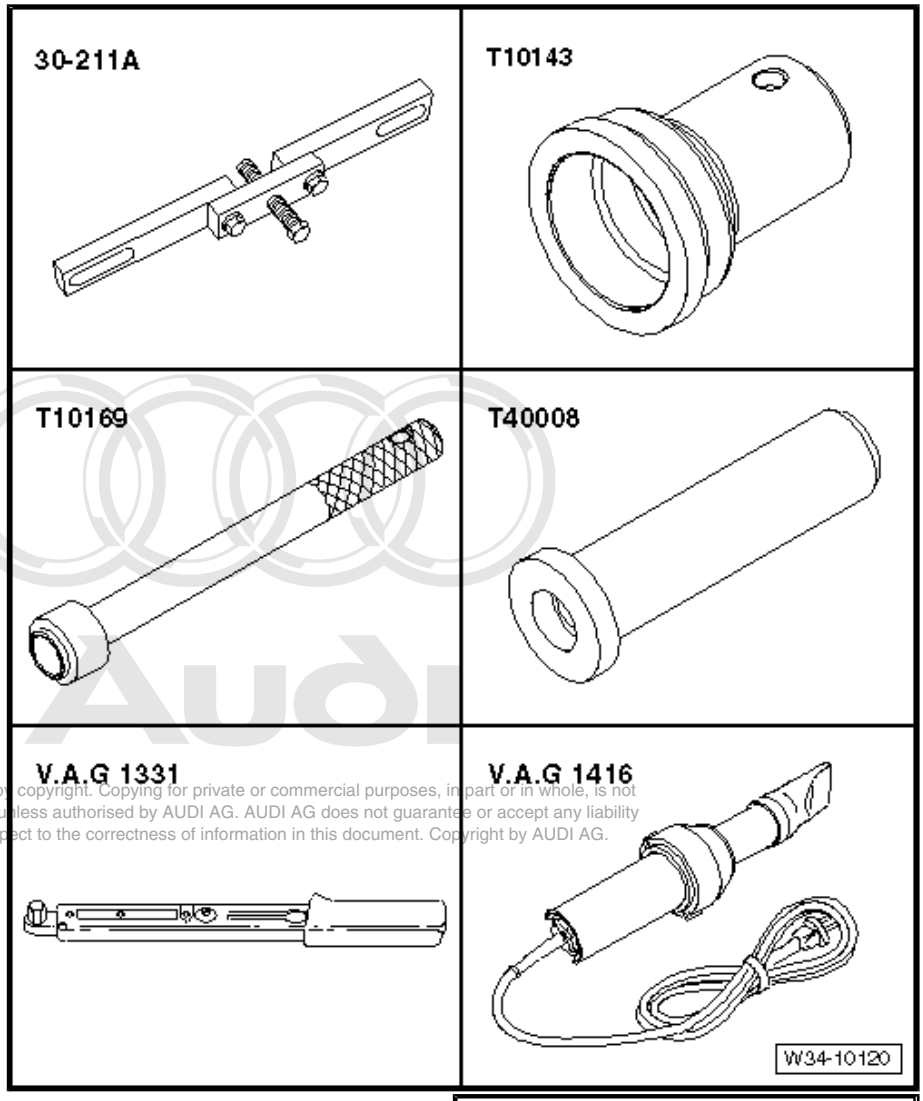
Removing and installing gearbox housing, selector mechanism, input shaft, output shafts, differential, bevel box and selector rods

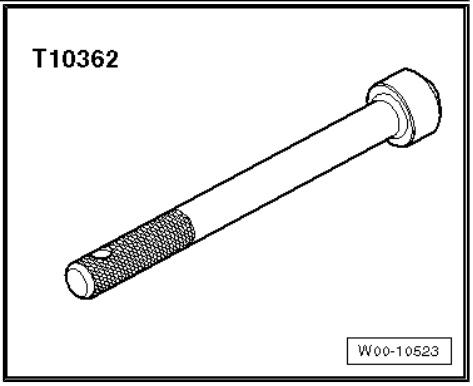
Special tools and workshop equipment required

- Support plate -VW 309-
- Support clamp -VW 313-
- Gearbox support -VW 353-
- Installing sleeve -VW 455-
- Multi-purpose tool -VW 771-
- -1- Kukko internal puller 21/1
- -3- Kukko 17/0 splitter
- -4- Kukko 22/1 counter-support

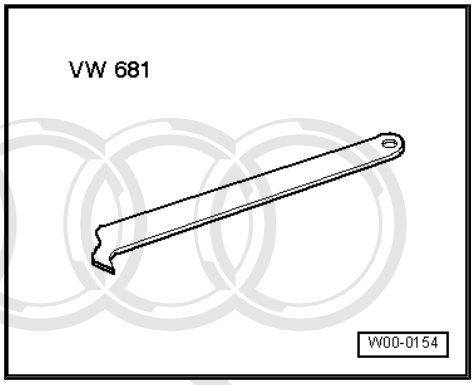


- Support bridge -30-211A-
- Thrust piece -T10042-
- Thrust piece -T10143-
- Thrust piece -T40008-
- Torque wrench -V.A.G 1331-
- Hot air blower -V.A.G 1416-
- Drift -T10169-
- Or drift -T10362-
⇒ page 192

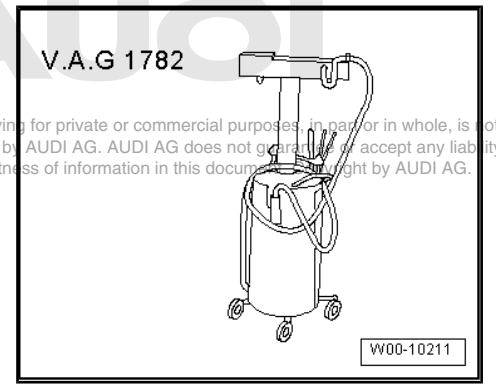




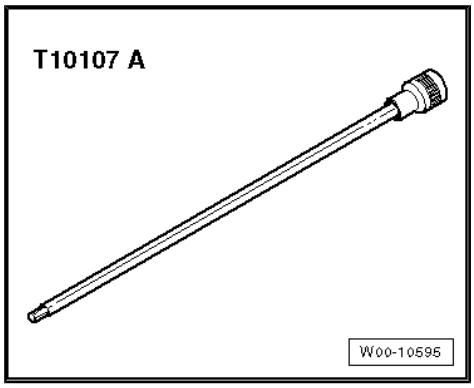
♦ Oil seal extractor lever -VW 681-



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



♦ Socket and extended bit -T10107 A-



Removing

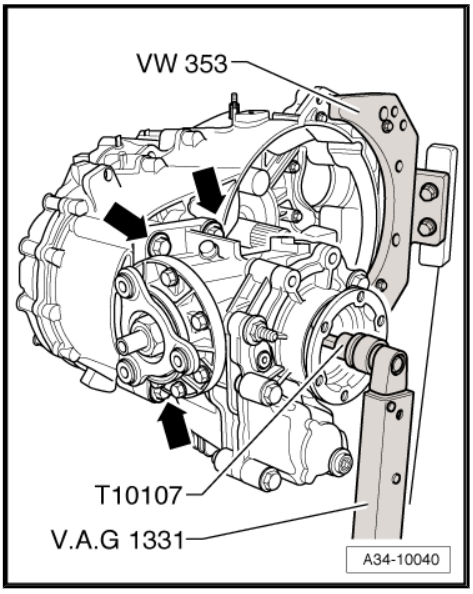
- Gearbox removed ⇒ page 82 and mounted on assembly stand ⇒ page 125 .

– Turn gearbox on assembly stand so that oil drain plug faces downwards.

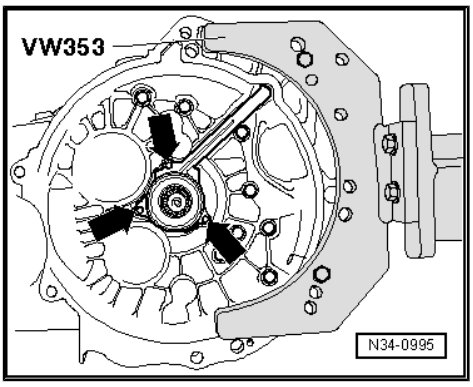
– Place drip tray underneath.

– Drain gear oil out of gearbox.

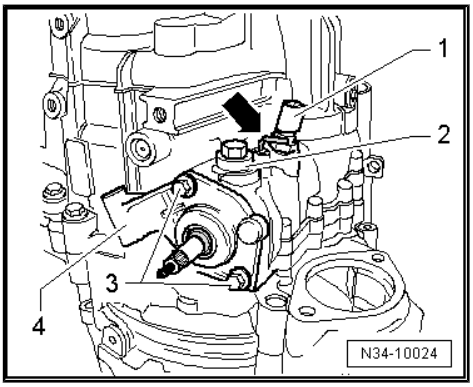
– Remove bolt for flange shaft (right-side) using socket and extended bit -T10107 A- .
– Remove all 4 bolts -arrows- securing bevel box to gearbox (illustration only shows 3 bolts).
– Carefully push bevel box away from gearbox, making sure it does not fall down.



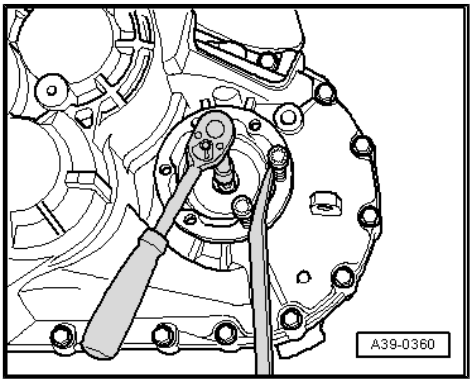
– Remove clutch slave cylinder with release bearing -arrows-.



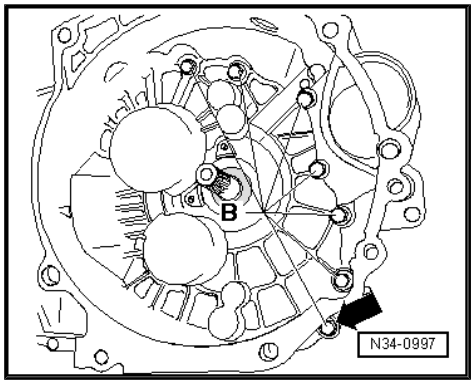
– Make sure that the selector shaft is not locked in position by the angled rod -arrow- when carrying out the following steps.
– Put selector shaft in neutral position.
– Remove locking bolt -2-.
– Remove bolts -3-.
– Remove reversing light switch -F4- -1-.
– Pull selector shaft -4- out of gearbox housing.



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



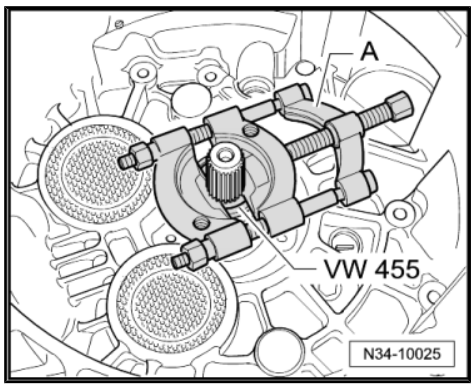
– Remove bolts -B- securing gearbox housing from inside clutch housing.



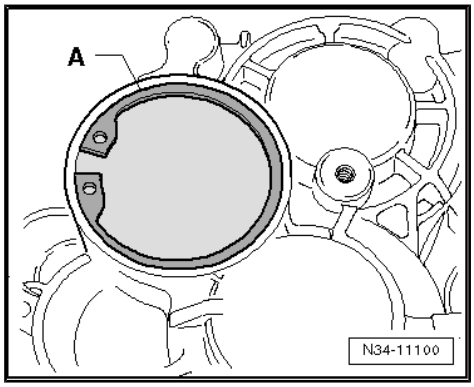
Note

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

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



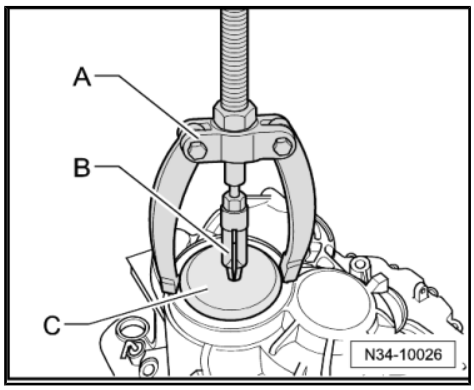
– Remove circlip -A- for input shaft sealing cap.



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

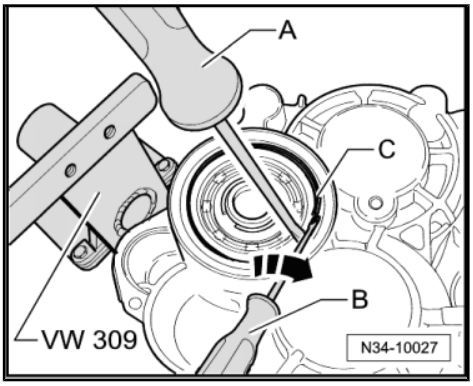
A - Counter-support , e.g. -Kukko 22/1-

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

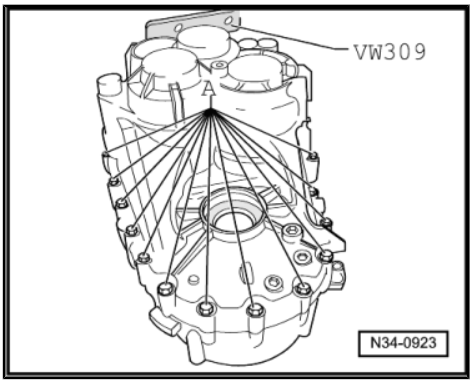


Detach circlip -C- from input shaft grooved ball bearing as follows:

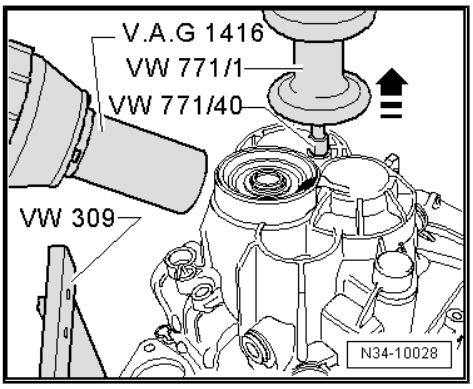
– Hold one end of circlip with screwdriver -A-.
– Lever other end of circlip out of slot in ball bearing -arrow- with 2nd screwdriver -B-.
– Lever circlip out further by repositioning screwdriver -B-.



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



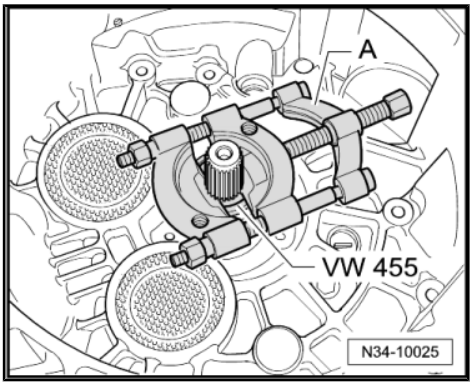
– Screw adapter VW 771/40 into threaded hole in gearbox housing.
– Using hot air blower -V.A.G 1416- , heat area around seat of input shaft ball bearing in gearbox housing for approx. 10 minutes to approx. 100°C.
– Using multi-purpose tool VW 771/1 , pull gearbox housing off clutch housing -arrow-.



Note

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

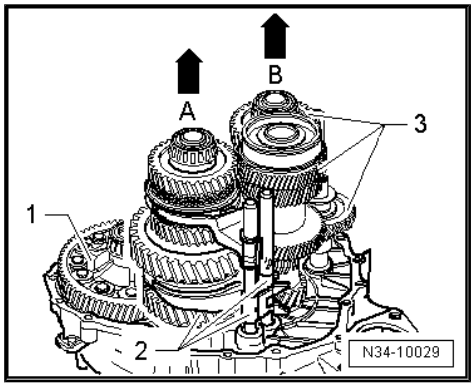
– Remove splitter -A- and installing sleeve VW 455 from input shaft.



Note

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

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



Note

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

– Remove oil seal for input shaft using oil seal extractor lever - VW 681- .

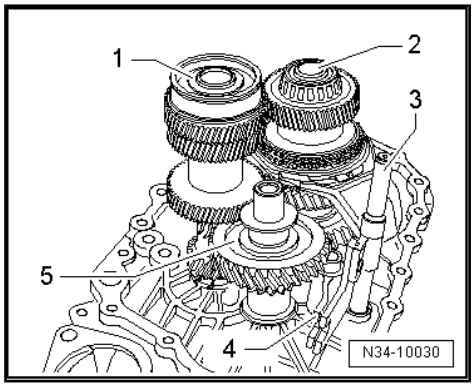
Note

Always renew grooved ball bearing on input shaft ⇒ Item 6 (page 210) .

Assembling gearbox

• A new grooved ball bearing has been pressed onto the input shaft ⇒ Item 6 (page 210) .

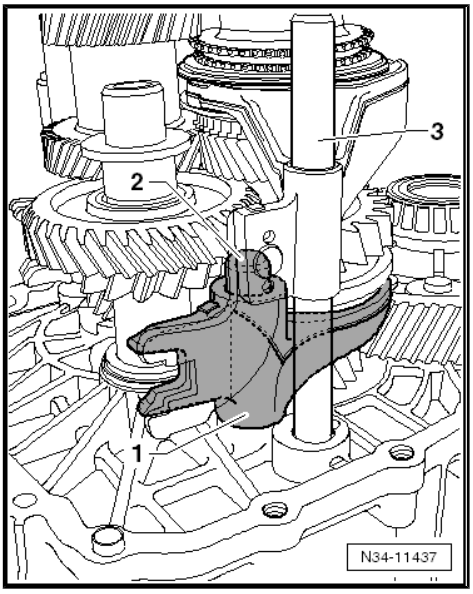
– Insert input shaft -1-, output shaft for 5th and 6th gear -2- together with selector rod -3-, selector fork -4- and reverse shaft -5-.



Up to gearbox manufacturing date 24 05 9:

- Bearing for reverse gear selector fork:

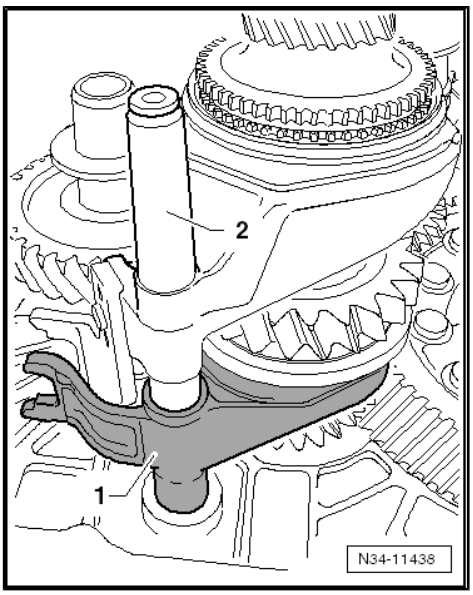
– Fit reverse gear selector fork -1- on shaft -2- behind selector rod for 5th/6th gear -3-.



From gearbox manufacturing date 25 05 9 onwards

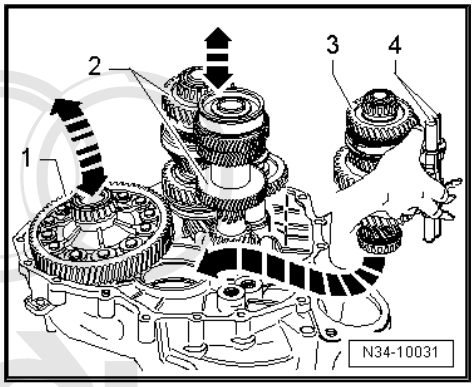
- Bearing for reverse gear selector fork:

– Fit reverse gear selector fork -1- on selector rod with selector fork for 5th/6th gear -2-.



Continued for all gearboxes:

– Install differential -1-.



Note

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

– Take 1st - 4th gear output shaft -3- with selector rods -4- in your right hand as illustrated.

– Lift differential slightly with your left hand.

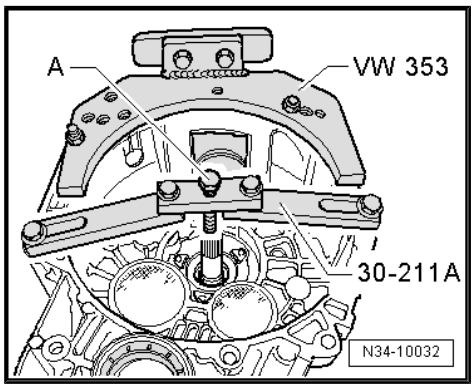
– At the same time, have the second mechanic lift the input shaft and output shaft for 5th, 6th and reverse gear -2- slightly, together with the reverse shaft.

– Now insert 1st - 4th gear output shaft in direction of -arrow-.

• The teeth of the input shaft, output shafts and final drive gear/ differential must mesh.

– Now, together with second mechanic, locate shafts and differential in their bearing seats.

– Secure support bridge -30-211A- for input shaft to clutch housing.



Note

Illustration shows clutch housing turned through 180° for clarity.

– Screw in bolt -A- until input shaft lifts slightly.

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

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

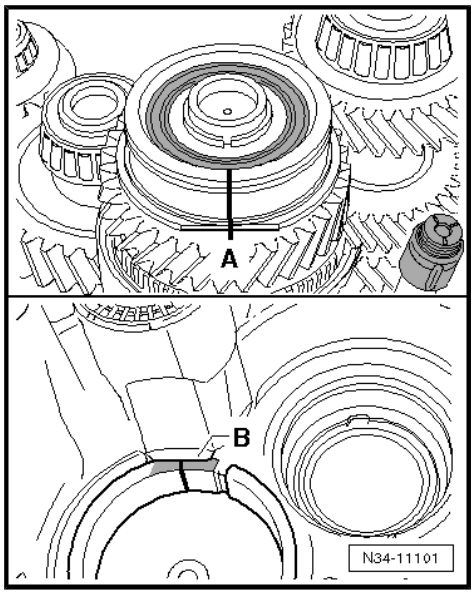
• If the sides are flattened -A- and -B-, a spacer must not be fitted above or below the grooved ball bearing ⇒ page 215 .

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

– Mark flattened sides with paint.

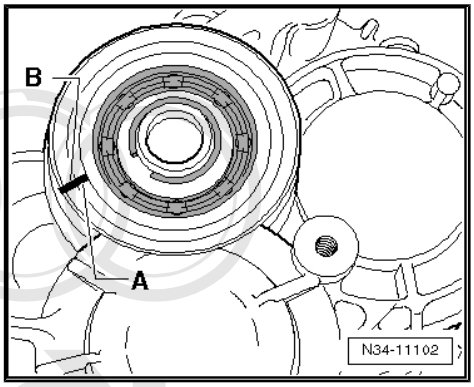
– Copy markings onto top area of grooved ball bearing and top area of bearing mounting on gearbox housing (⇒ next illustration).

– Using hot air blower -V.A.G 1416- , heat area around seat of input shaft ball bearing in gearbox housing for approx. 10 minutes to approx. 100°C.



Note

- *Heating is necessary to ensure that grooved ball bearing is not damaged when installing gearbox housing.*
- *Align marking -A- on grooved ball bearing with marking -B- on gearbox housing and fit gearbox housing.*
- *Apply sealing paste -AMV 188 200 03- evenly to sealing surface of clutch housing.*



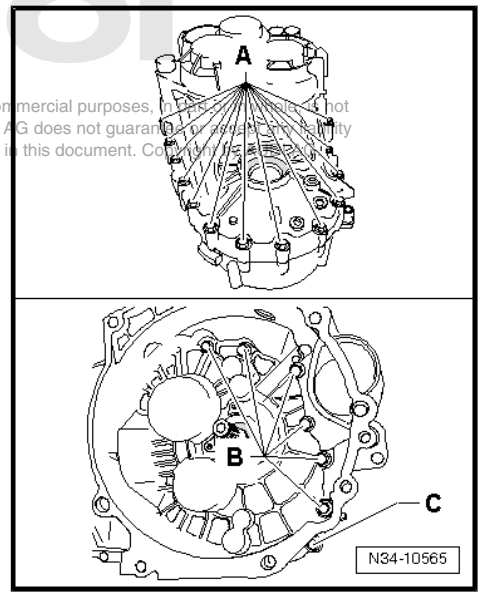
– Fit gearbox housing and tighten new bolts -A-, -B- and -C- to specified torque.

Allocation of bolts:

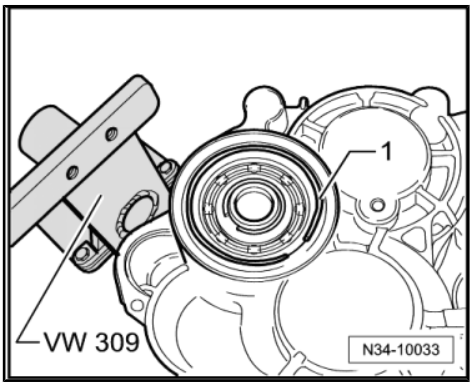
A - Bolt with captive washer

B - Bolt without washer

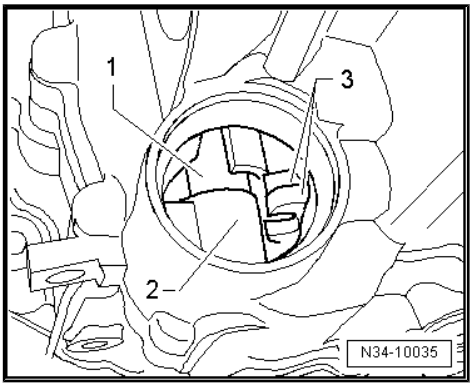
C - Bolt with captive washer



– Install circlip -1- for input shaft grooved ball bearing.
– Remove support bridge -30-211A- for input shaft.
– If stop sleeve for selector shaft has been removed, drive it in now ⇒ page 192 (drive in until tool reaches stop).



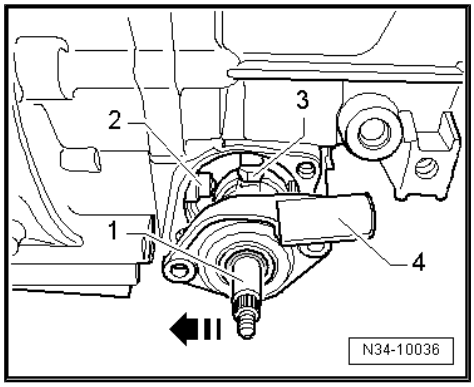
– Turn gearbox on assembly stand so that opening for selector shaft faces up.
– Insert selector shaft -1- into bottom mounting -2- and into selector forks -3-.



Note

The sealing cap is removed to give a better illustration.

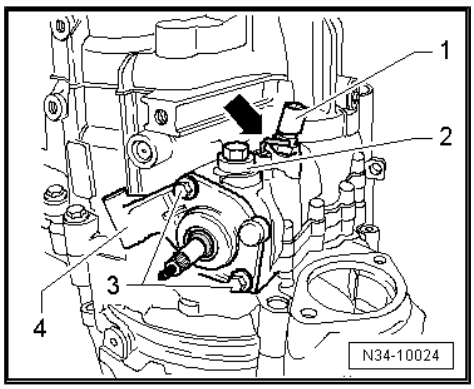
– Now push selector shaft -1- against stop sleeve -2- in direction of -arrow- and run selector finger -3- down through selector forks and onto stop.
• Selector mechanism cover -4- should be parallel to joint surface on gearbox housing.
• Selector shaft should move up and down easily (gate selector movement).



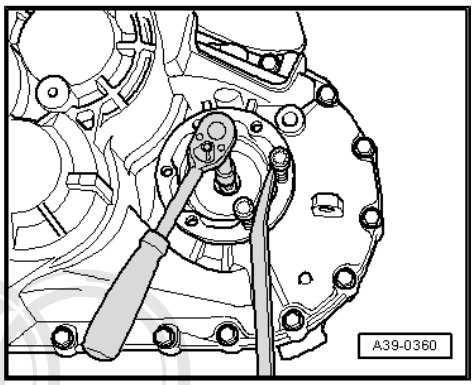
Note

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

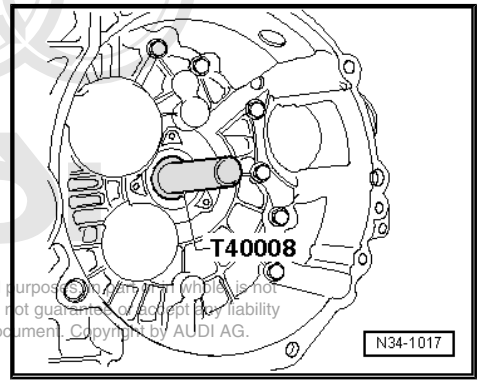
– Tighten bolts -3- for selector mechanism cover -4-.
– Screw in locking bolt -2-; angled rod -arrow- must be released.
– Install reversing light switch -F4- -1-.



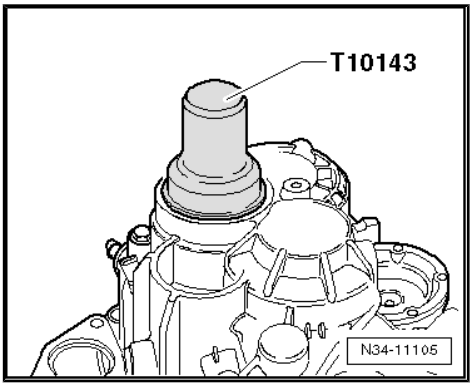
– Install flange shaft together with spring, thrust washer and tapered ring.



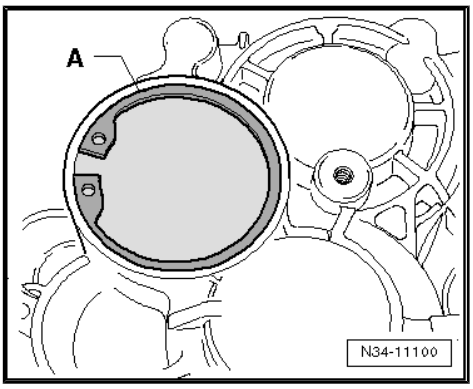
– Drive in input shaft oil seal so it is flush.
– Install clutch slave cylinder with release bearing ⇒ page 36 .
– Select all gears.



– Drive sealing cap into gearbox housing onto stop.



– Secure sealing cap with circlip -A-.



Attach bevel box to gearbox as follows:

Caution

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

- *Turn flange shaft while fitting bevel box with flange shaft (right-side) onto gearbox.*

– On manual gearbox, grease splines on differential with grease for clutch plate splines -G 000 100- .

– Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.

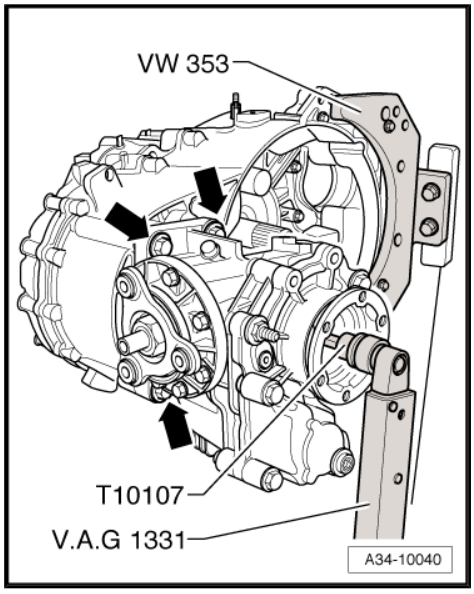
– Also align the teeth of the flange shaft (right-side) and the differential pinion; if necessary turn the flange shaft.

– If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.

Note

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

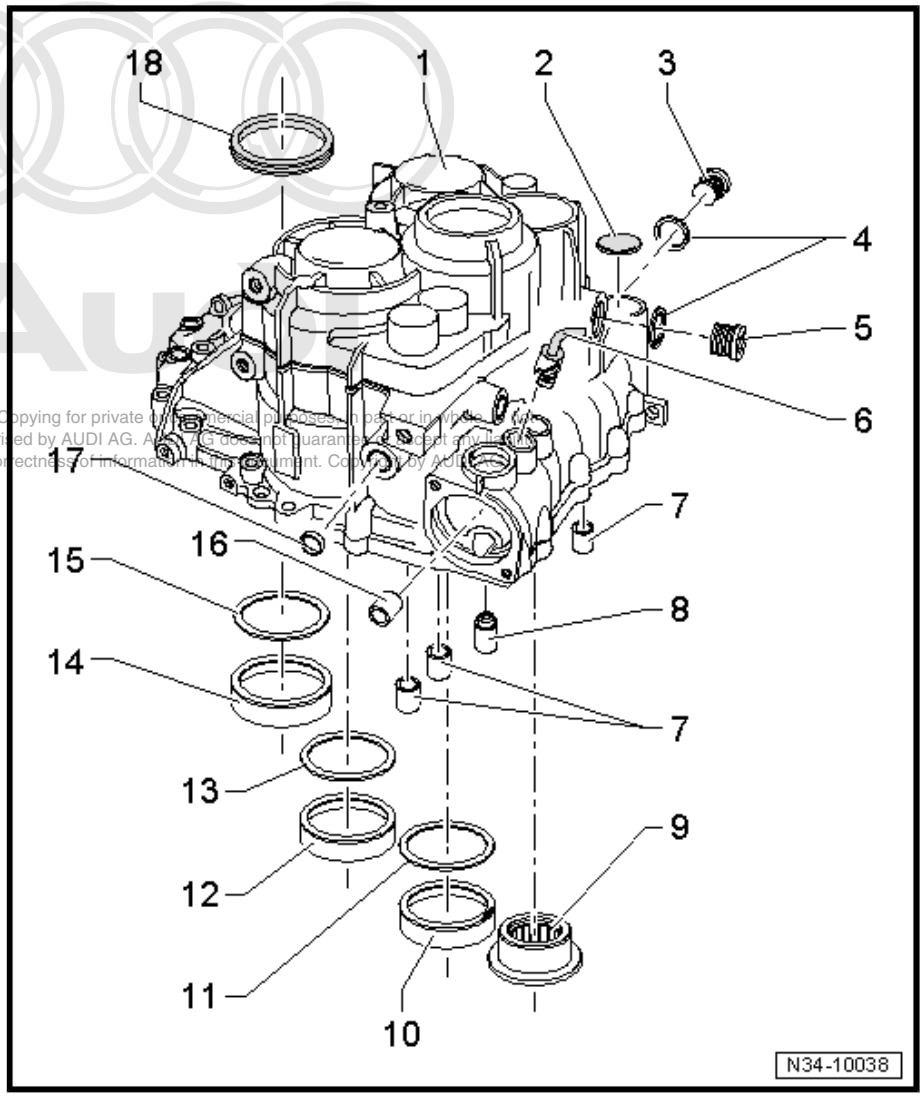
– Tighten all 4 bolts -arrows- securing bevel box to gearbox (illustration only shows 3 bolts). Tightening torques
⇒ Item 10 (page 255)
– Install flange shaft (right-side) ⇒ page 255 .



16 Exploded view - gearbox housing

Note

Securing gearbox to assembly stand ⇒ page 125



1 - Gearbox housing

- ❑ If renewed: Adjust output shafts and differential ⇒ page 274
- ❑ Modifications in area of mounting for grooved ball bearing on input shaft ⇒ Item 3 (page 209)
- ❑ Select correct components from ⇒ Electronic parts catalogue

2 - Sealing cap

- ❑ Removing ⇒ page 189
- ❑ Driving in ⇒ page 190

3 - Plug

- ❑ For oil drain hole
- ❑ Tightening torque ⇒ page 138

4 - Seal

- ❑ Renew

5 - Plug

- ❑ For oil filler hole
- ❑ Tightening torque ⇒ page 138

6 - Angled rod

- ❑ For adjusting selector mechanism ⇒ page 79
- ❑ Can be renewed without dismantling gearbox
- ❑ Removing ⇒ page 190
- ❑ Installation position ⇒ page 190
- ❑ Driving in ⇒ page 190

7 - Bearing bush for selector rods

- ❑ Pulling out ⇒ page 191
- ❑ Driving in ⇒ page 191

8 - Stop sleeve

- ❑ Pressing out (gearbox dismantled) ⇒ page 191
- ❑ Driving out (gearbox not dismantled) ⇒ page 191
- ❑ Identification of different types of stop sleeve ⇒ page 192
- ❑ Driving in stop sleeve with shoulder ⇒ page 192
- ❑ Driving in stop sleeve without shoulder ⇒ page 192

9 - Reverse shaft needle bearing

- ❑ Always renew after removing
- ❑ Pulling out ⇒ page 192
- ❑ Pressing in ⇒ page 193

10 - Tapered roller bearing outer race

- ❑ For 5th/6th and reverse gear output shaft
- ❑ Removing and installing ⇒ page 237
- ❑ If renewed: Adjust 5th/6th and reverse gear output shaft ⇒ page 245

11 - Shim

- ❑ For 5th/6th and reverse gear output shaft
- ❑ Table of adjustments ⇒ page 274

12 - Tapered roller bearing outer race

- ❑ For 1st - 4th gear output shaft
- ❑ Removing and installing ⇒ page 220
- ❑ If renewed: Adjust 1st - 4th gear output shaft ⇒ page 230

13 - Shim

- ❑ For 1st - 4th gear output shaft
- ❑ Table of adjustments ⇒ page 274

14 - Tapered roller bearing outer race

- ❑ For differential
- ❑ Removing and installing ⇒ page 267
- ❑ If renewed: adjust differential ⇒ page 274

15 - Shim

- ❑ For differential
- ❑ Table of adjustments ⇒ page 274

16 - Bearing bush for selector shaft

- ❑ Pulling out ⇒ page 193
- ❑ Driving in ⇒ page 193

17 - Sealing plug

- ❑ Driving out ⇒ page 193
- ❑ Driving in ⇒ page 194

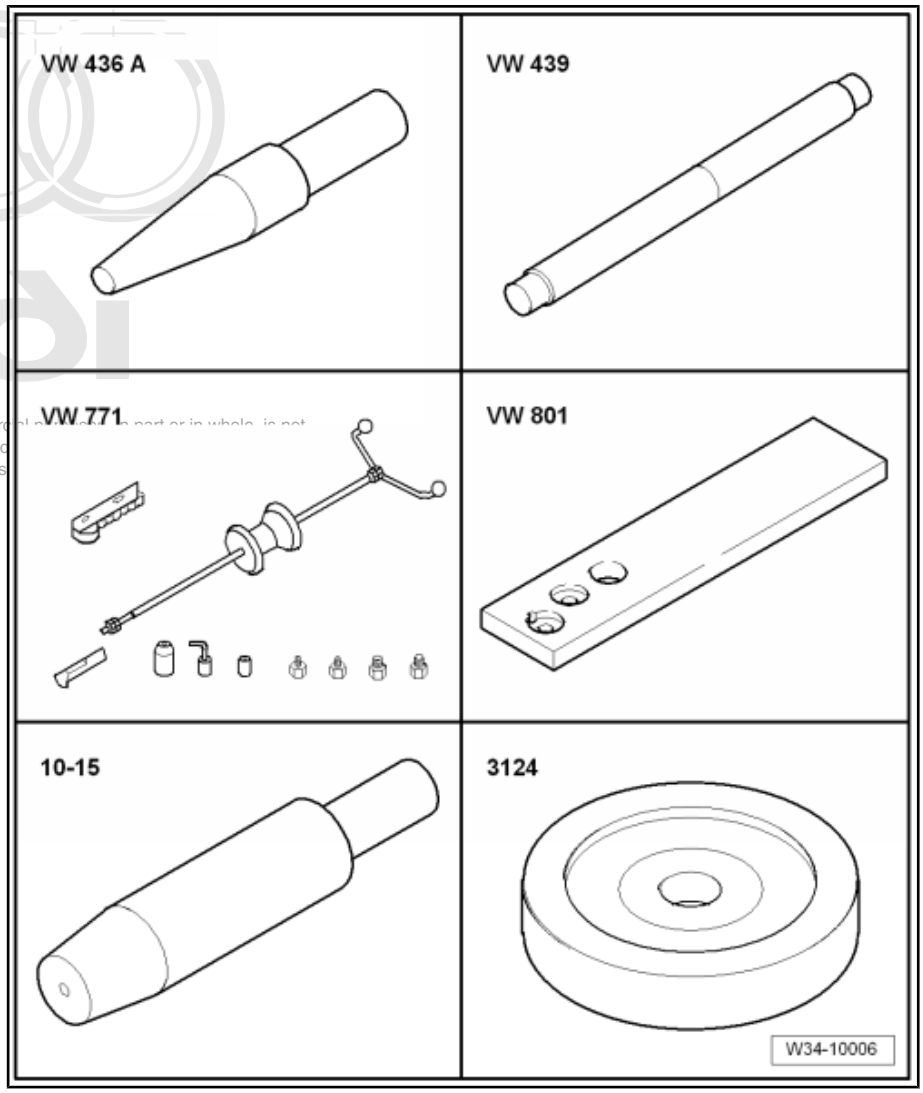
18 - Oil seal for flange shaft (left-side)

- ❑ Renewing ⇒ page 251

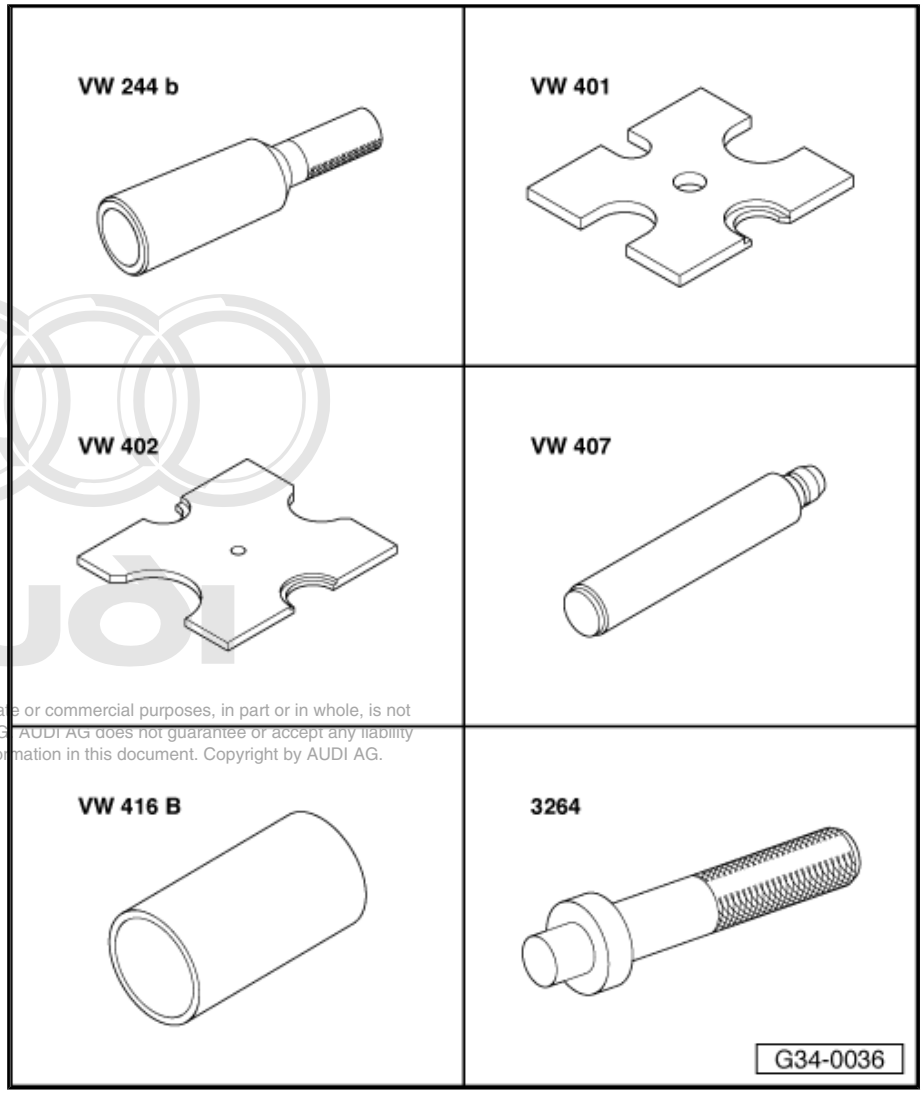
16.1 Servicing gearbox housing

Special tools and workshop equipment required

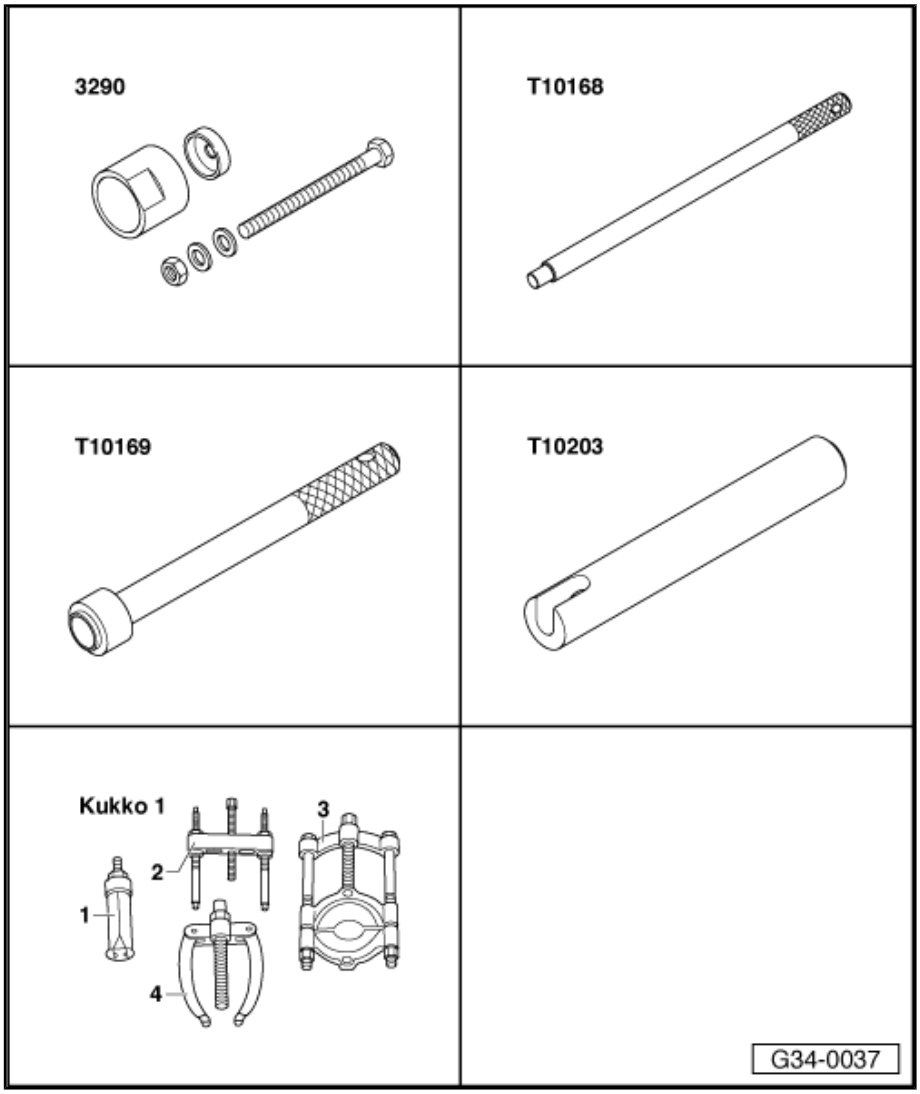
- Guide pin -VW 436 A-
- Guide pin -VW 439-
- Multi-purpose tool -VW 771-
- Support plate -VW 801-
- Guide pin -10 - 15-
- Thrust piece -3124-



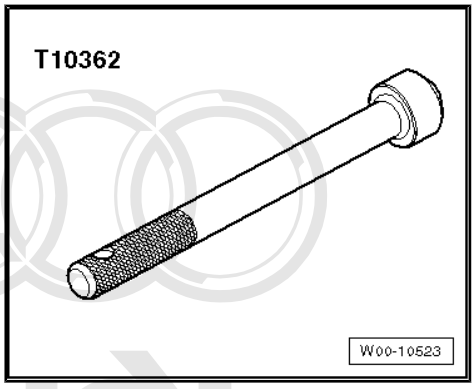
- Drift sleeve -VW 244 B-
- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Tube -VW 416 B-
- Punch -3264-

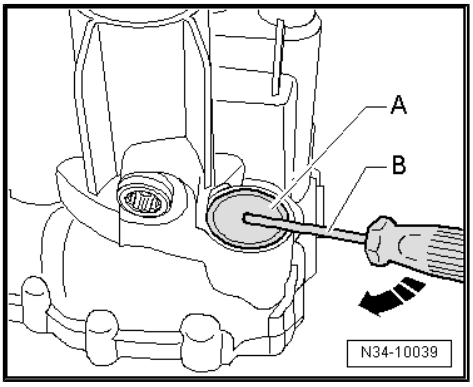


- Assembly tool -3290-
- Drift -T10168-
- Drift -T10169-
- Thrust piece -T10203-
- -1- Kukko internal puller 21/2 and 21/4
- -4- Kukko 22/2 counter-support



- Drift -T10362-



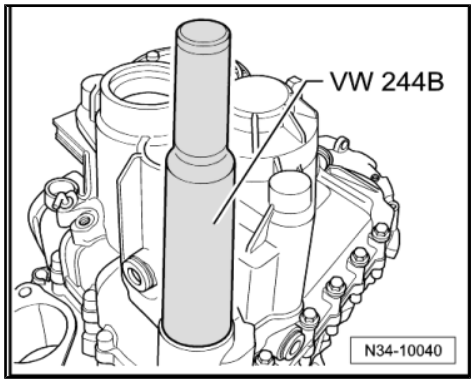


Removing sealing cap -A-

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

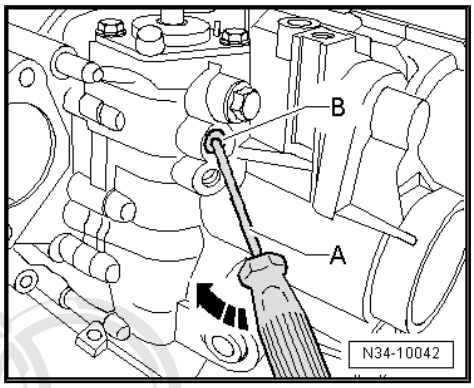
Driving in sealing cap

– Drive in sealing cap as far as stop.



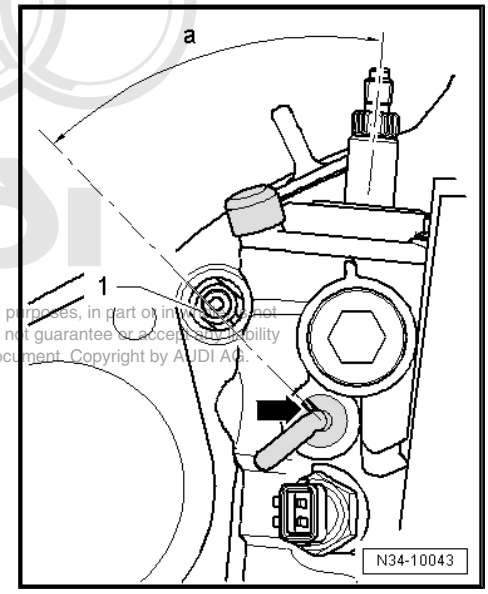
Removing angled rod for selector shaft

– Shear off pin in released position.
– Insert screwdriver -A- in bore for angled rod -B-.
– Pry out angled rod -arrow-.



Installation position of angled rod

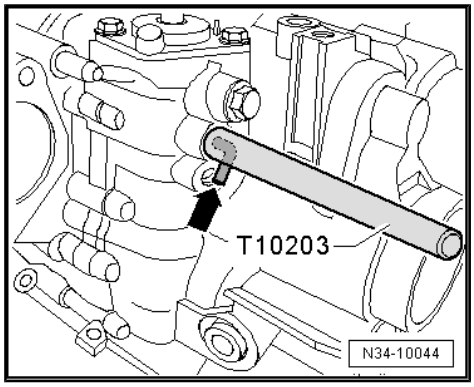
- Marking on angled rod -arrow- must face towards connection on clutch slave cylinder -1-.
- Angle -a- must be approx. 45°.



Driving in angled rod for selector shaft

- The angled rod -arrow- must be in the released position when driving in.

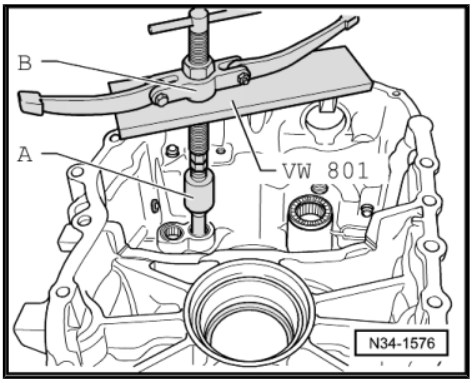
– Drive in angled rod until tool contacts stop.



Pulling out bearing bush for selector rod

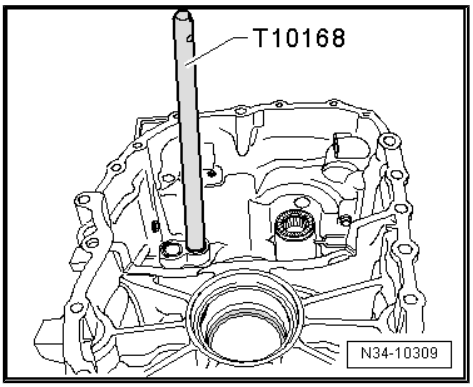
A - Internal puller 14.5 ... 18.5 mm , e.g. -Kukko 21/2-

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



Driving in selector rod bush

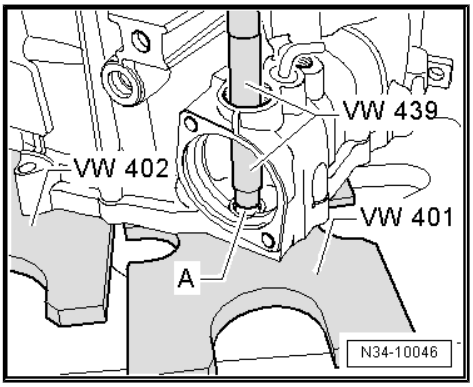
– Drive in selector rod bush until tool contacts stop.



Pressing out stop sleeve (gearbox dismantled)

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

– Press out stop sleeve -A-.

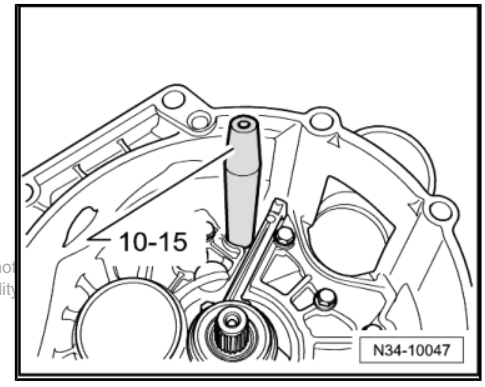


Driving out stop sleeve (gearbox not dismantled)

• Locking bolt and selector shaft removed

– Turn gearbox so that stop sleeve does not drop into gearbox.

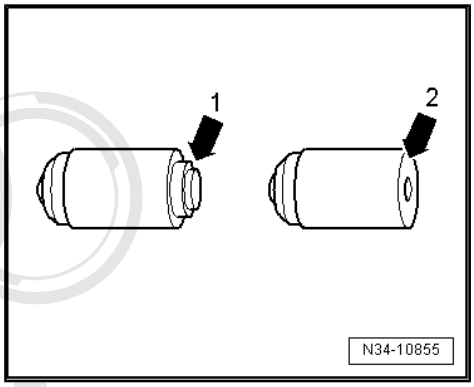
– Drive out stop sleeve using guide pin -10 - 15- .



Identification of different types of stop sleeve

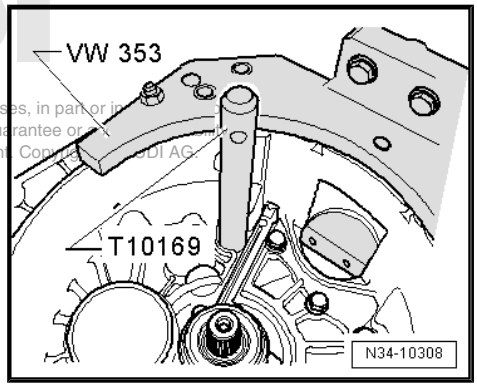
– A stop sleeve with shoulder -arrow 1- ⇒ page 192 or without shoulder -arrow 2- ⇒ page 192 may be fitted.

– Select correct components from ⇒ Electronic parts catalogue .



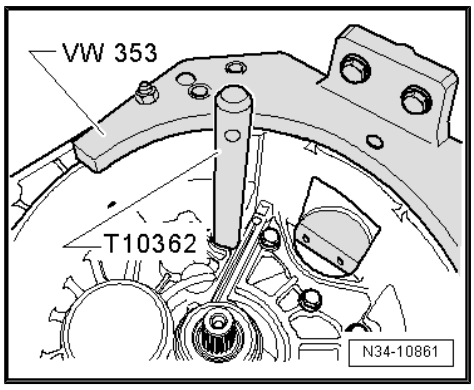
Driving in stop sleeve with shoulder as far as tool stop

• Gearbox housing bolted to clutch housing



Driving in stop sleeve without shoulder as far as tool stop

• Gearbox housing bolted to clutch housing



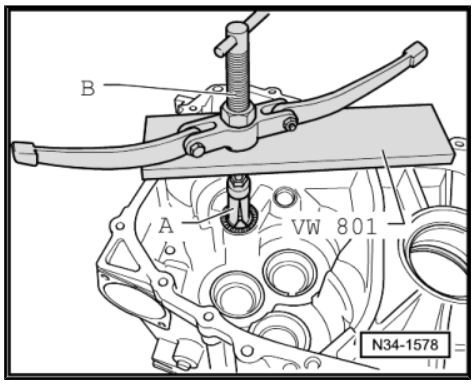
Pulling needle bearing for reverse shaft out of gearbox housing

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

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

Note

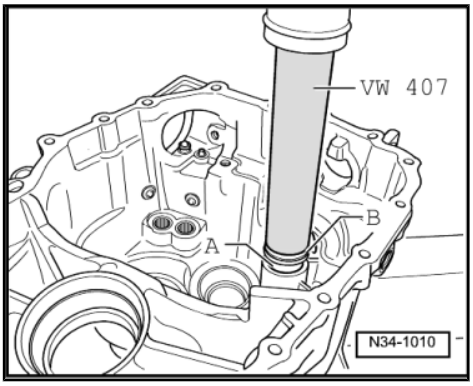
The needle bearing is destroyed during removal and must be renewed.



Pressing needle bearing into gearbox housing

– Before pressing in, place reverse shaft thrust washer -B- on needle bearing -A-.

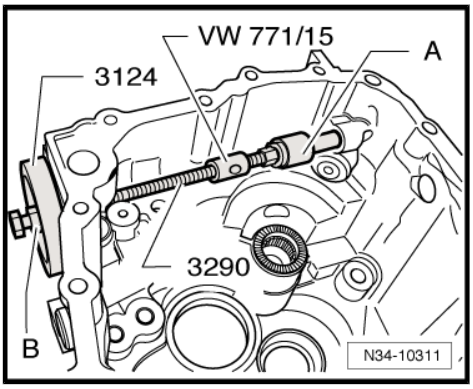
– Place tube -VW 416 B- directly under bearing mounting to support gearbox housing.



Pulling out selector shaft bush

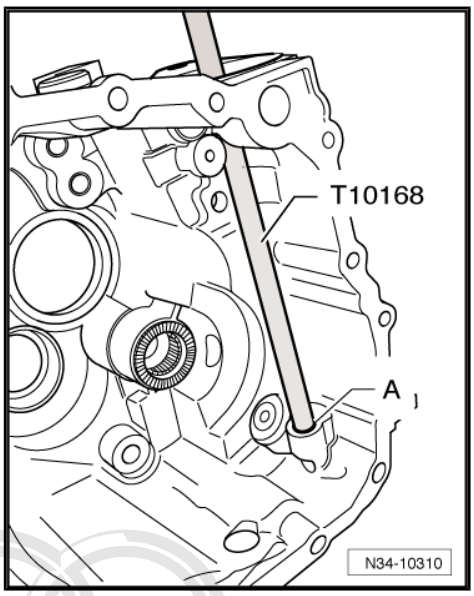
– Hold spindle of assembly tool -3290- tight and turn nut -B-.

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



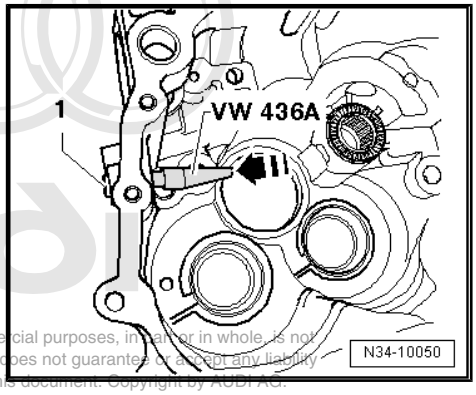
Driving in selector shaft bearing bush

– Drive in selector shaft bush -A- until flush.



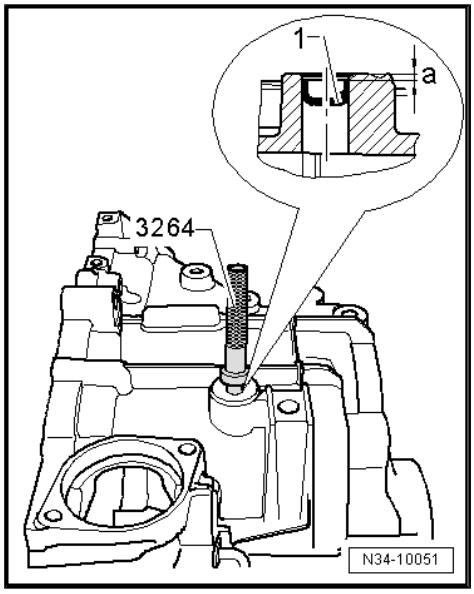
Driving out plug

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

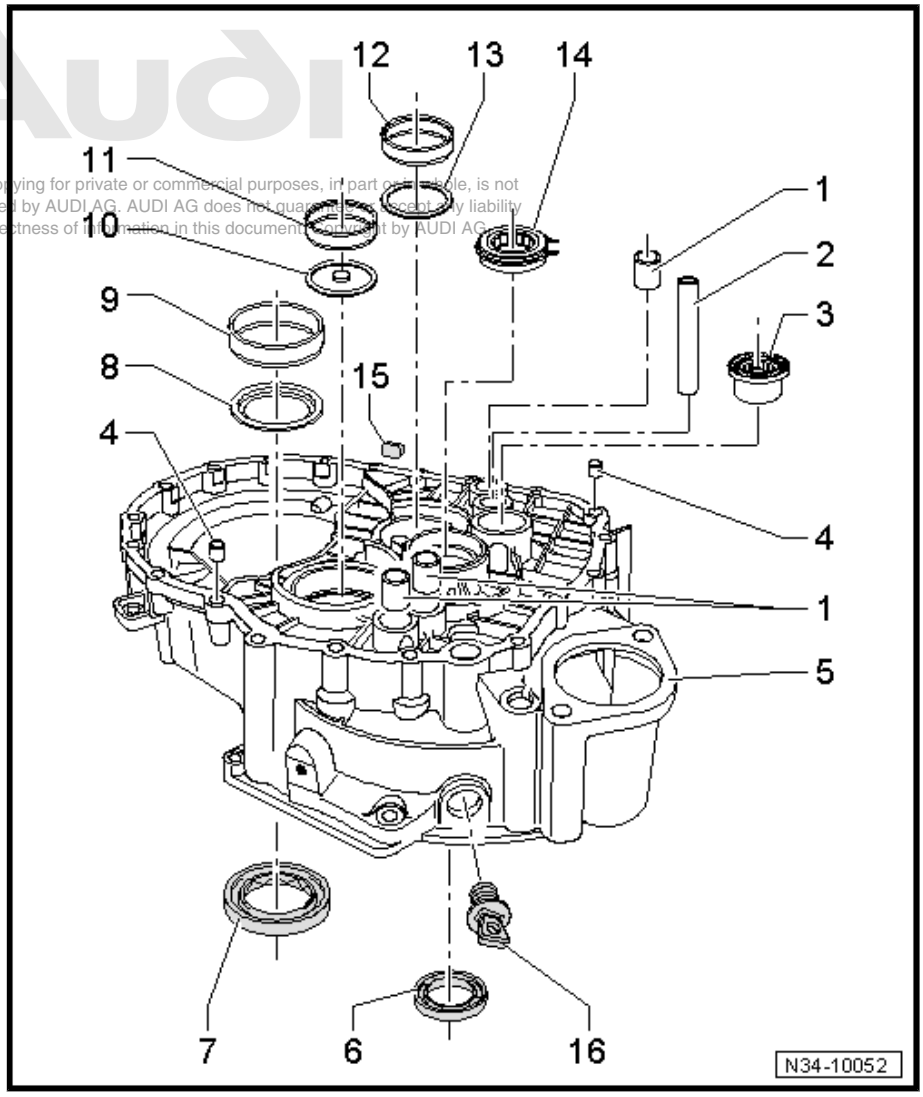


Driving in plug

– Drive in plug -1- using punch -3264- to a depth of approx. 3 mm (distance -a- below surface of housing).



17 Exploded view - clutch housing



1 - Bearing bush for selector rods

- ❑ Pulling out ⇒ page 197
- ❑ Driving in ⇒ page 198

2 - Reverse gear selector fork shaft

- ❑ Installed up to gearbox manufacturing date 24 05 9 ⇒ page 196
- ❑ Shaft cannot be removed with workshop tools
- ❑ Up to gearbox manufacturing date 24 05 9: press in new shaft if a new clutch housing is fitted ⇒ page 198
- ❑ Discontinued from gearbox manufacturing date 25 05 9 onwards; reverse gear selector fork is then mounted together with selector fork for 5th/6th gear ⇒ page 179
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

3 - Reverse shaft needle bearing

- ❑ Always renew after removing
- ❑ Pulling out ⇒ page 198
- ❑ Pressing in ⇒ page 198

4 - Dowel sleeve

- ❑ 2x

5 - Clutch housing

- ❑ If renewed: Adjust output shafts and differential ⇒ page 274

6 - Input shaft oil seal

- ❑ Renewing ⇒ page 198

7 - Oil seal

- ❑ Between gearbox and bevel box
- ❑ Renewing with manual gearbox installed ⇒ page 253
- ❑ Can be removed using sleeve -30 - 21- when gearbox is dismantled
- ❑ When gearbox has been dismantled, it can be driven in onto stop using thrust piece -T40007- .

8 - Shim

- ❑ For differential
- ❑ Installation position: Shoulder on inside diameter faces towards oil seal ⇒ Item 7 (page 195)

9 - Tapered roller bearing outer race

- ❑ For differential

- ❑ Removing and installing ⇒ page 267
- ❑ If renewed: adjust differential ⇒ page 274

10 - Oil deflector plate

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

11 - Tapered roller bearing outer race

- ❑ For 1st - 4th gear output shaft
- ❑ Removing and installing ⇒ page 220
- ❑ If renewed: Adjust 1st - 4th gear output shaft ⇒ page 230

12 - Tapered roller bearing outer race

- ❑ For 5th/6th and reverse gear output shaft
- ❑ Removing and installing ⇒ page 237
- ❑ If renewed: Adjust 5th/6th and reverse gear output shaft ⇒ page 245

13 - Shim

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

14 - Roller bearing

- ❑ For input shaft
- ❑ Removing and installing ⇒ page 211

15 - Magnet

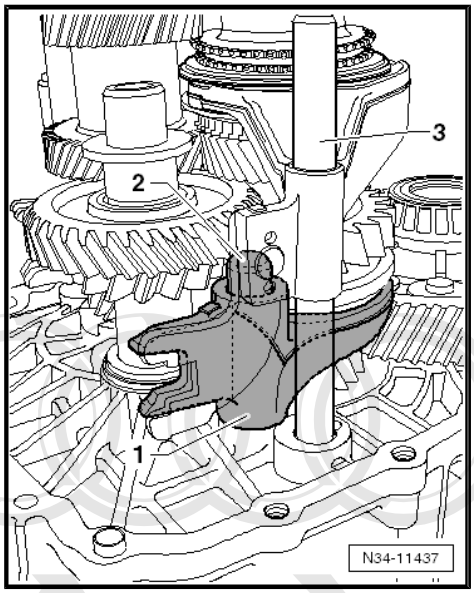
- ❑ Held in place by joint surface of housing

16 - Cap

- ❑ Only fitted in clutch housing for 4-cylinder engine

Reverse gear selector fork shaft in gearboxes manufactured up to 24 05 9

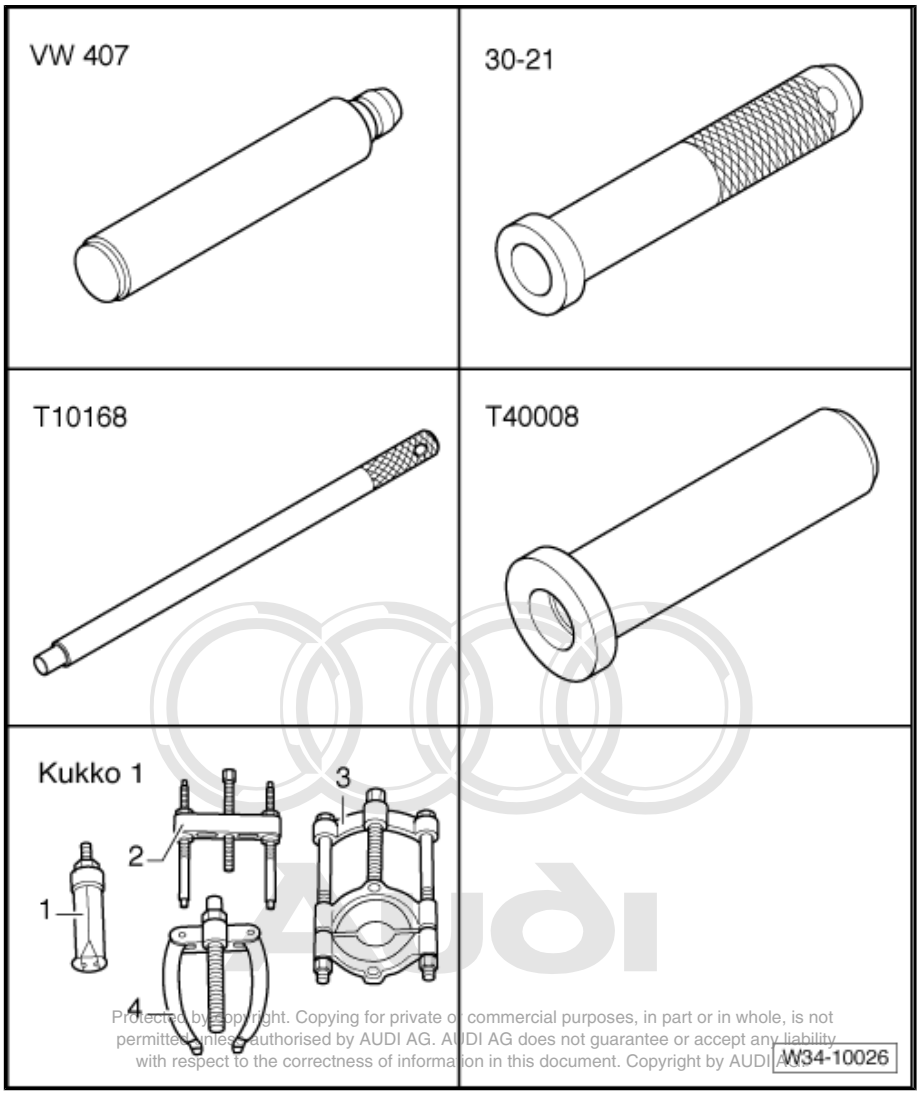
– Fit reverse gear selector fork -1- on shaft -2- behind selector rod for 5th/6th gear -3-.



17.1 Servicing clutch housing

Special tools and workshop equipment required

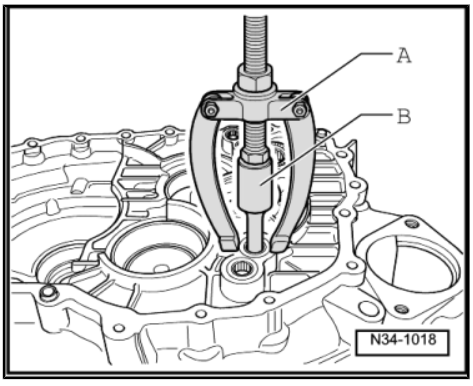
- Press tool -VW 407-
- Sleeve -30 - 21-
- Drift -T10168-
- Thrust piece -T40008-
- -1- Kukko internal puller 21/2 and 21/4
- -4- Kukko counter-support 22/1 and 22/2



Pulling out bearing bush for selector rod

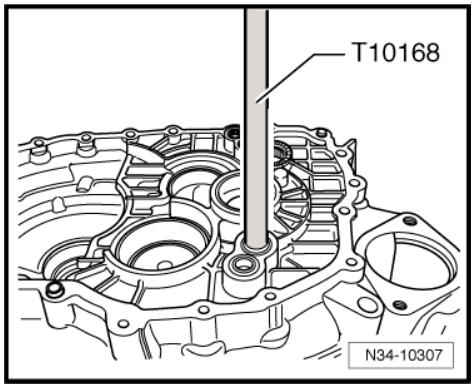
A - Counter-support , e.g. -Kukko 22/1-

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



Driving in selector rod bush

– Drive in bush until tool contacts stop.



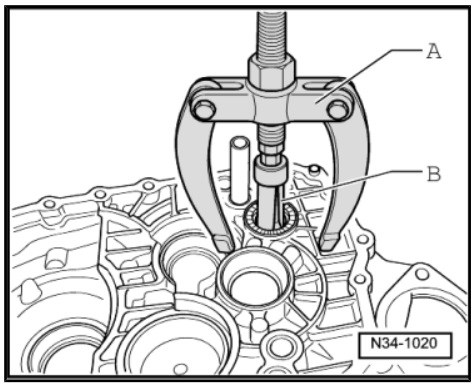
Pulling needle bearing out of clutch housing

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

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

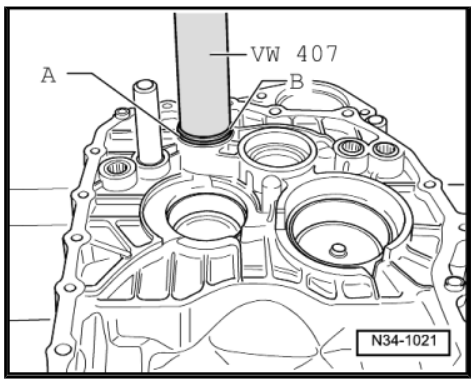
Note

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

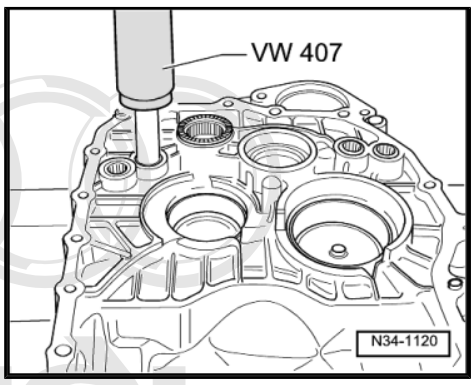


Pressing needle bearing into clutch housing

– Before pressing in, place reverse shaft thrust washer -B- on needle bearing -A-.



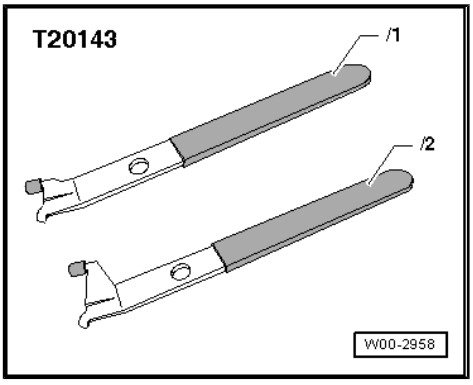
Pressing reverse gear selector fork shaft into clutch housing



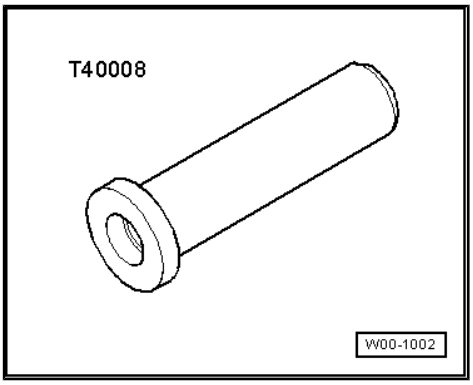
17.2 Renewing input shaft oil seal

Special tools and workshop equipment required

♦ Extractor tool -T20143/1-



♦ Thrust piece -T40008-



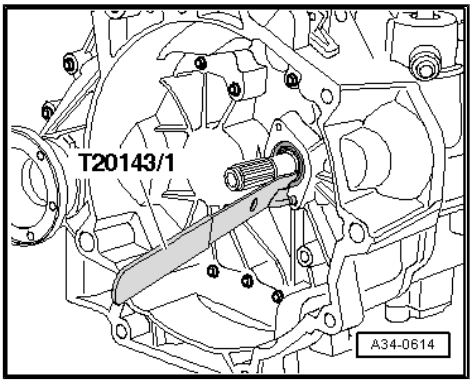
♦ Sealing grease -G 052 128 A1-

Procedure

• Gearbox removed ⇒ page 82 .

– Remove clutch slave cylinder with release bearing ⇒ page 36 .

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

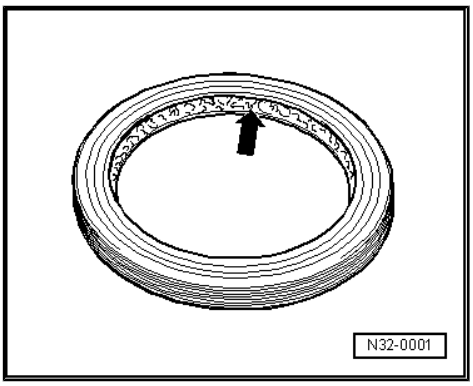


Note

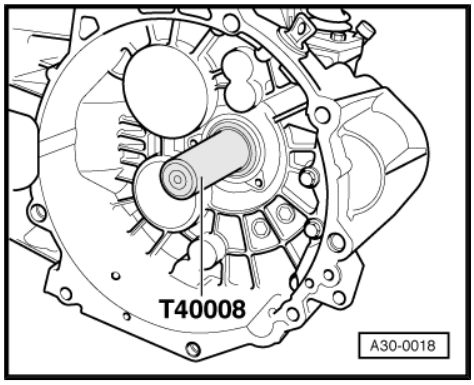
Take care not to damage contact surface for oil seal on input shaft.

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

– Lightly oil outer circumference of new oil seal.



– Drive in oil seal until flush using thrust piece -T40008- .
– Install clutch slave cylinder with release bearing ⇒ page 36 .



18 Exploded view - selector mechanism in gearbox

Note

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

1 - Bearing bush for selector shaft

- ❑ Removing and installing ⇒ Item 16 (page 186)

2 - Selector shaft

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

3 - O-ring

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

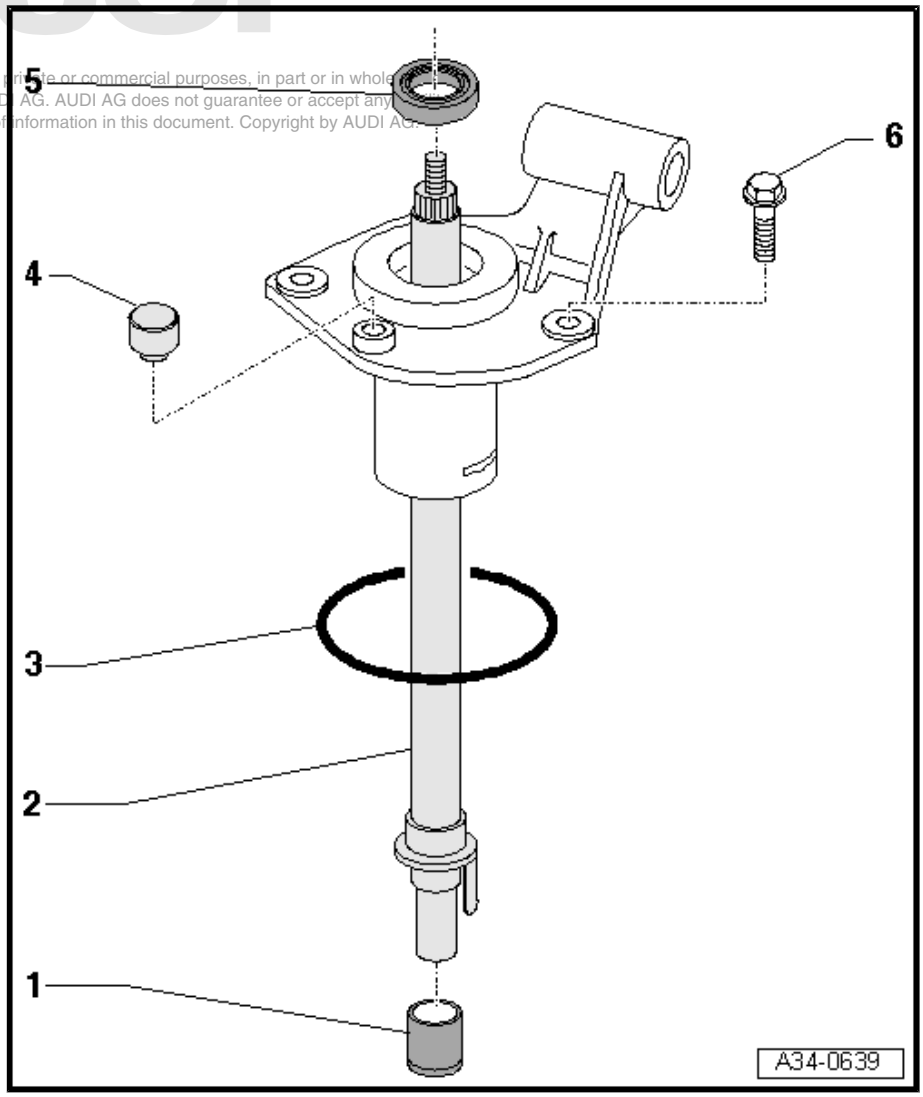
4 - Cap for gearbox breather

5 - Oil seal for selector shaft

- ❑ Renewing ⇒ page 201

6 - Bolt

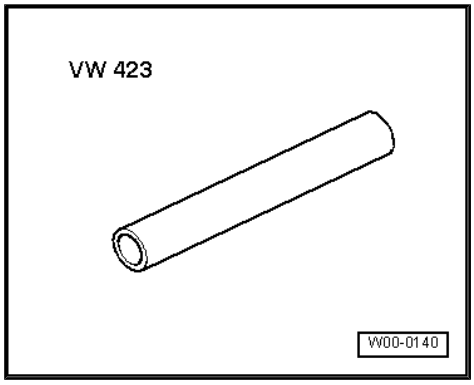
- ❑ 20 Nm
- ❑ Renew



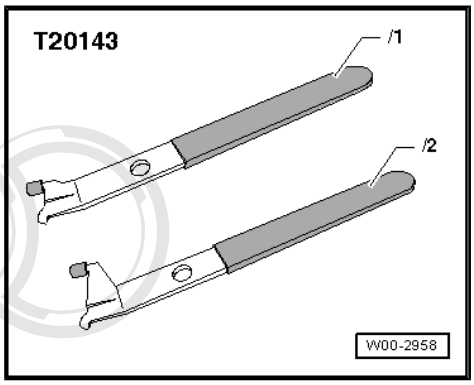
18.1 Renewing oil seal for selector shaft

Special tools and workshop equipment required

♦ Tube -VW 423-



♦ Extractor tool -T20143/1-



♦ Sealing grease -G 052 128 A1-

Procedure

– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

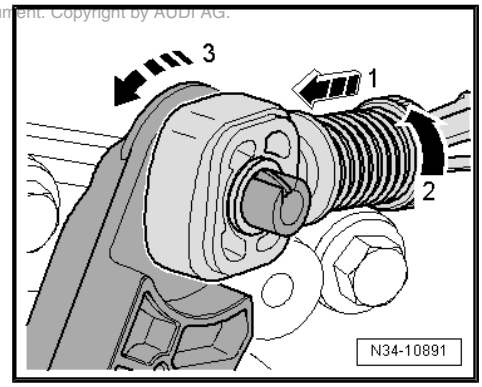
Plastic gate relay lever -1-:

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

– Press gate relay lever forwards (in direction of -arrow 3-) and at the same time pull gate selector cable out of cable end-piece.

– Removing gate relay lever (with detent catch) ⇒ page 75

– Removing gate relay lever (with clip) ⇒ page 75



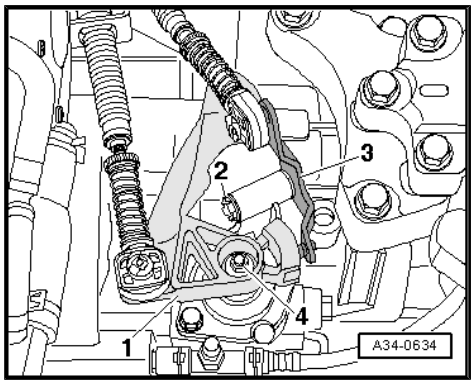
Metal gate relay lever:

– Detach circlip -2- and push gate relay lever -3- sideways out of bearing.

Continued for all vehicles:

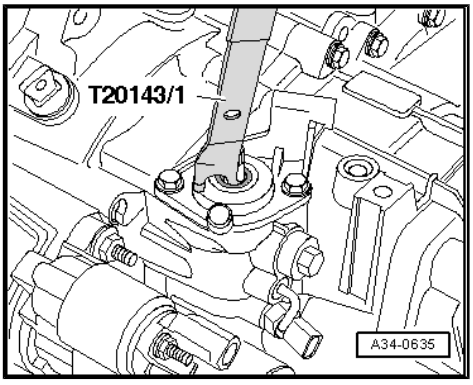
Note

If the gearbox bracket makes it impossible to remove the gate relay lever, remove the gate selector cable from the gate relay lever. Guide the slide block out of gearbox selector lever.

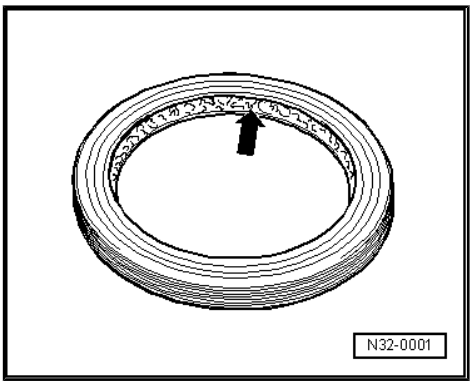


– Remove nut -4- and take out gearbox selector lever -1-.

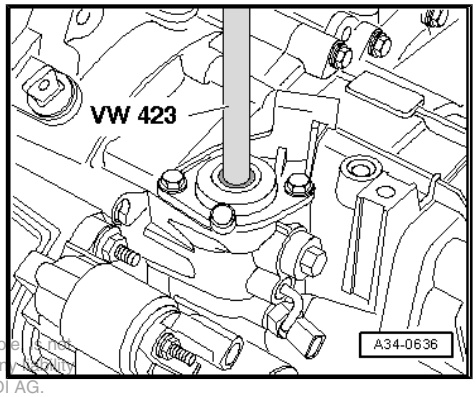
– Pry out oil seal using extractor tool -T20143/1- .



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



– Drive in oil seal using tube -VW 423- .
– Install gearbox selector lever and gate relay lever ⇒ page 70 / ⇒ page 72 .



Note

The gearbox selector lever can only be installed in one position.

– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

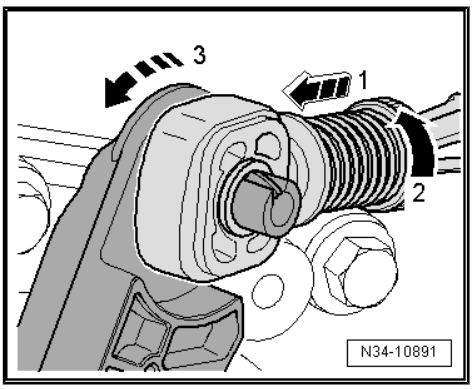
18.2 Removing and installing selector shaft

Removing

– Remove air cleaner housing completely ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

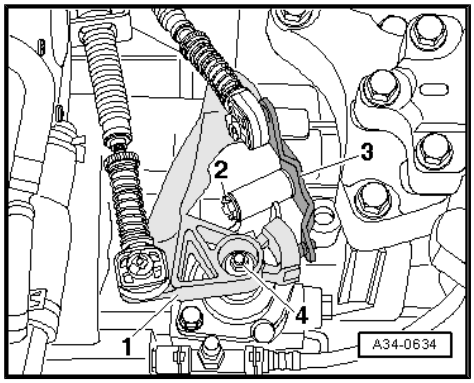
Plastic gate relay lever -1-:

– Pull locking mechanism forwards in direction of -arrow 1- onto stop and then turn to left in direction of -arrow 2- to lock.
– Press gate relay lever forwards (in direction of -arrow 3-) and at the same time pull gate selector cable out of cable end-piece.
– Removing gate relay lever (with detent catch) ⇒ page 75
– Removing gate relay lever (with clip) ⇒ page 75



Metal gate relay lever:

– Detach securing clip -2- and push gate relay lever -3- sideways out of bearing.



Continued for all vehicles:

Note

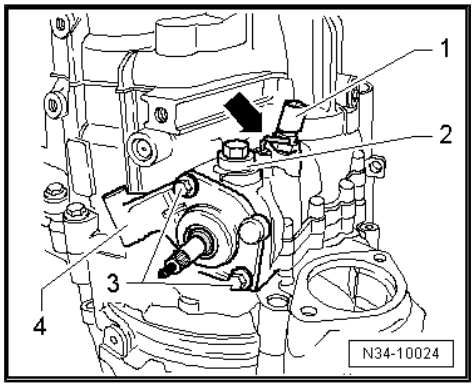
If the gearbox bracket makes it impossible to remove the gate relay lever, remove the gate selector cable from the gate relay lever. Guide the slide block out of gearbox selector lever.

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

– Put selector shaft in neutral position.

Caution

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



– Remove reversing light switch -F4- -1-.

– Remove locking bolt -2-.

– Remove bolts -3-.

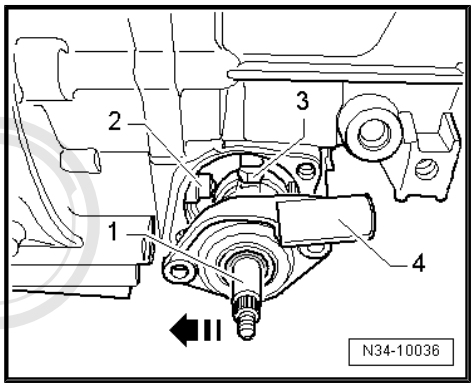
– Pull selector shaft with selector mechanism cover -4- out of gearbox housing.

Installing

- Tightening torques ⇒ page 156 , ⇒ page 201

– Now push selector shaft -1- against stop sleeve -2- in direction of -arrow- and run selector finger -3- down through selector forks and onto stop.

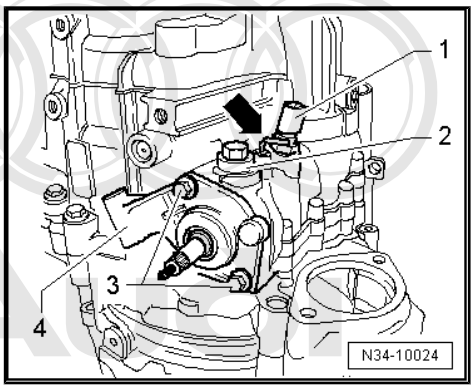
- Selector mechanism cover -4- should be parallel to joint surface on gearbox housing.
- Selector shaft should move up and down easily (gate selector movement).



Note

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

– Tighten bolts -3- for selector mechanism cover -4-.
– Screw in locking bolt -2-; angled rod -arrow- must be released.
– Install reversing light switch -F4- -1-.
– Install gearbox selector lever and gate relay lever ⇒ page 70 / ⇒ page 72 .

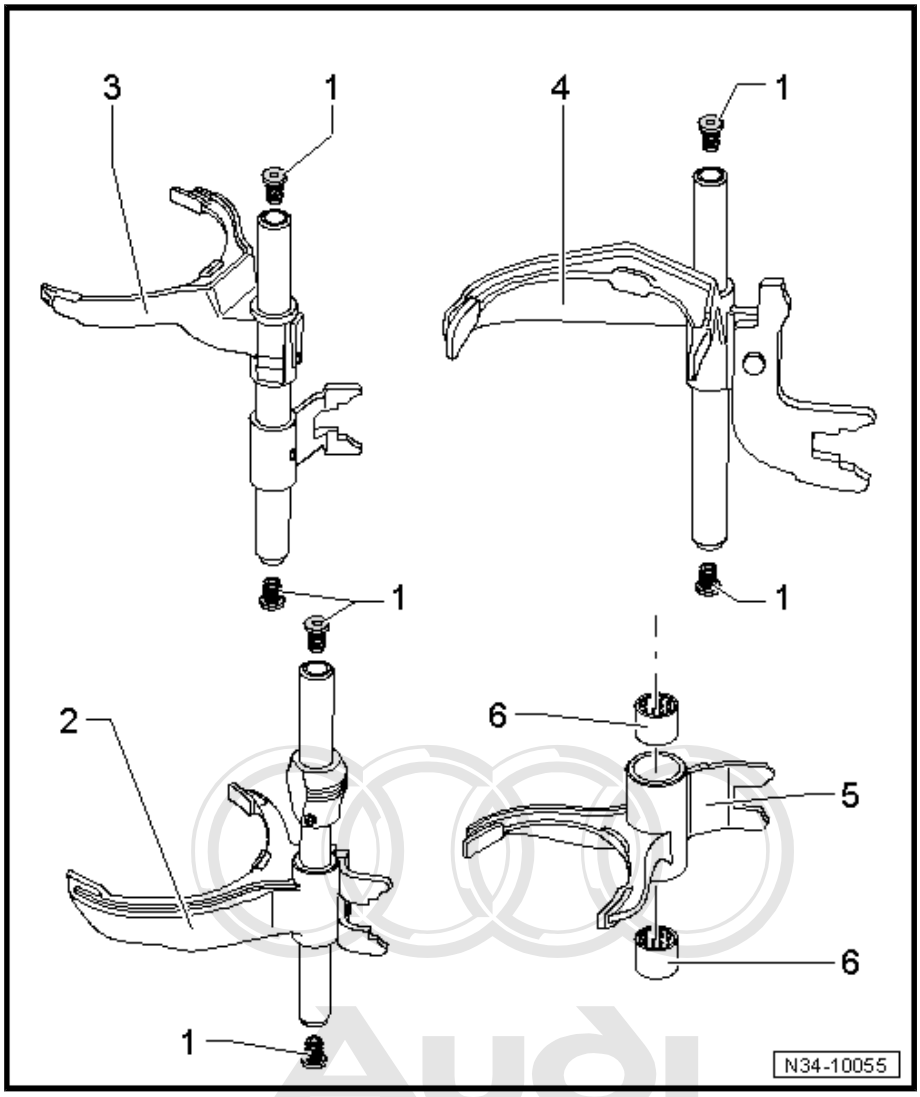


Note

The gearbox selector lever can only be installed in one position.

– Install air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

19 Exploded view - selector forks



1 - Damper rubber

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

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

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

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

- ❑ From gearbox manufacturing date 25 05 9 onwards: also serves as bearing for reverse gear selector fork

5 - Reverse gear selector fork

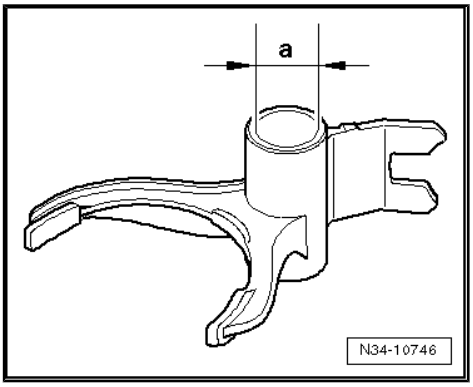
- ❑ Ball sleeve is not fitted from gearbox manufacturing date 06 03 6 ⇒ Item 6 (page 206)
- ❑ Gradually discontinued
- ❑ Different types of reverse gear selector forks are fitted according to version
- ❑ From gearbox manufacturing date 25 05 9 onwards: mounted on selector rod for 5th/6th gear selector fork
- ❑ Identification of different types of reverse gear selector forks ⇒ page 207
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

6 - Ball sleeve

- ❑ Discontinued on gearboxes manufactured from 06 03 6 onwards
- ❑ Gradually discontinued
- ❑ For correct version, refer to ⇒ Electronic parts catalogue
- ❑ Pulling out ⇒ page 208
- ❑ Pressing in ⇒ page 208

Identification of different types of reverse gear selector forks

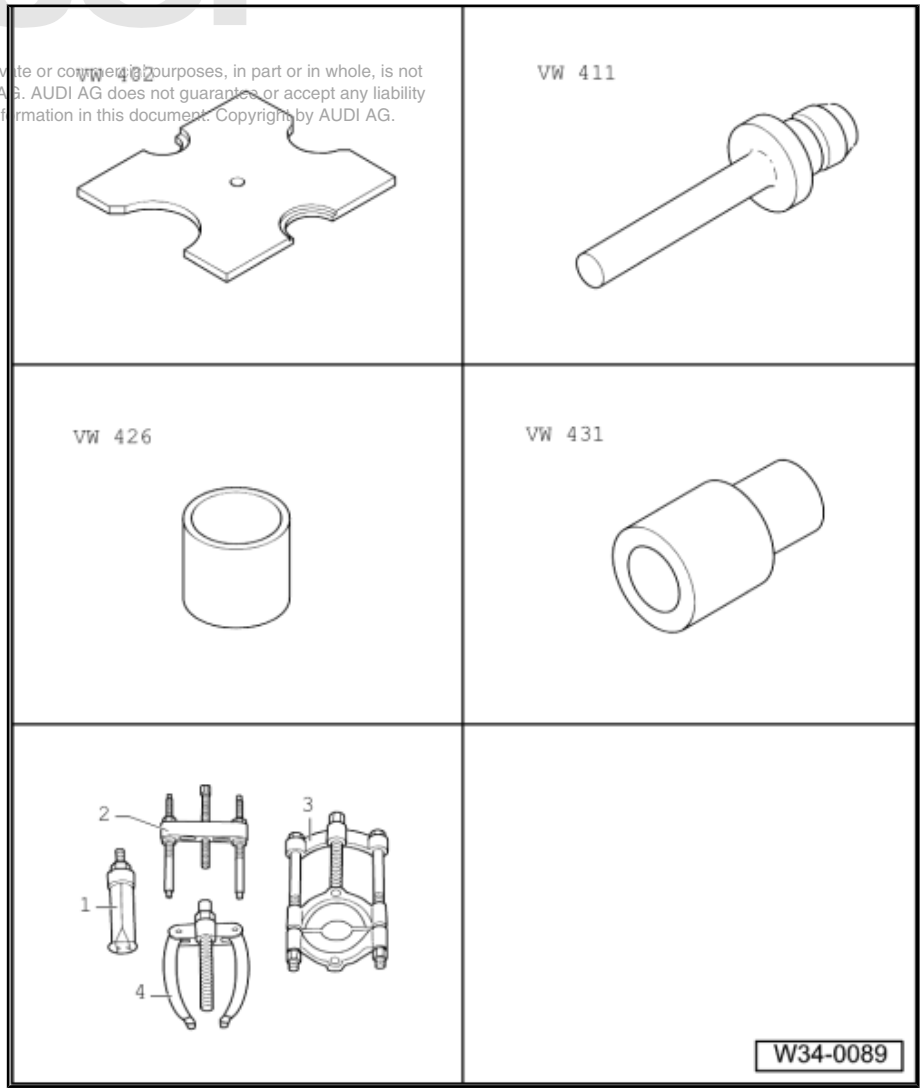
Dimension “a” (mm)	Gearbox manufacturing date	Reverse gear selector fork	Mounting
24	Up to 05 03 6	With ball sleeve	On reverse gear selector fork shaft ⇒ page 196
18	From 06 03 6 to 24 05 9	Without ball sleeve	
15	From 25 05 9 onwards	Without ball sleeve	On selector rod with selector fork for 5th and 6th gear ⇒ page 179



19.1 Dismantling and assembling selector forks

Special tools and workshop equipment required

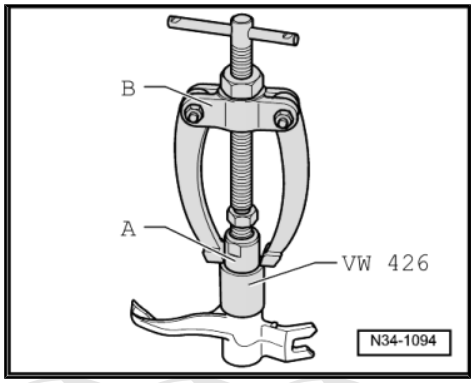
- Thrust plate -VW 402-
- Press tool -VW 411-
- Tube -VW 423-
- Press tool -VW 431-
- -1- Kukko internal puller 21/3
- -4- Kukko 22/1 counter-support



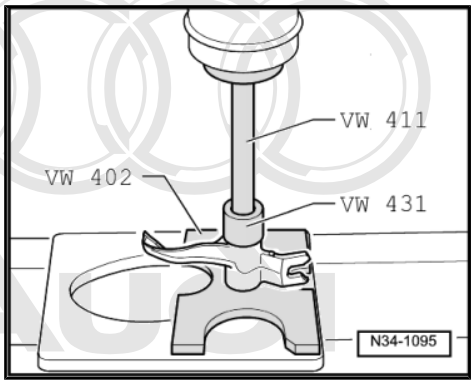
Pulling out ball sleeve for reverse gear selector fork

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

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



Pressing in ball sleeve for reverse gear selector fork

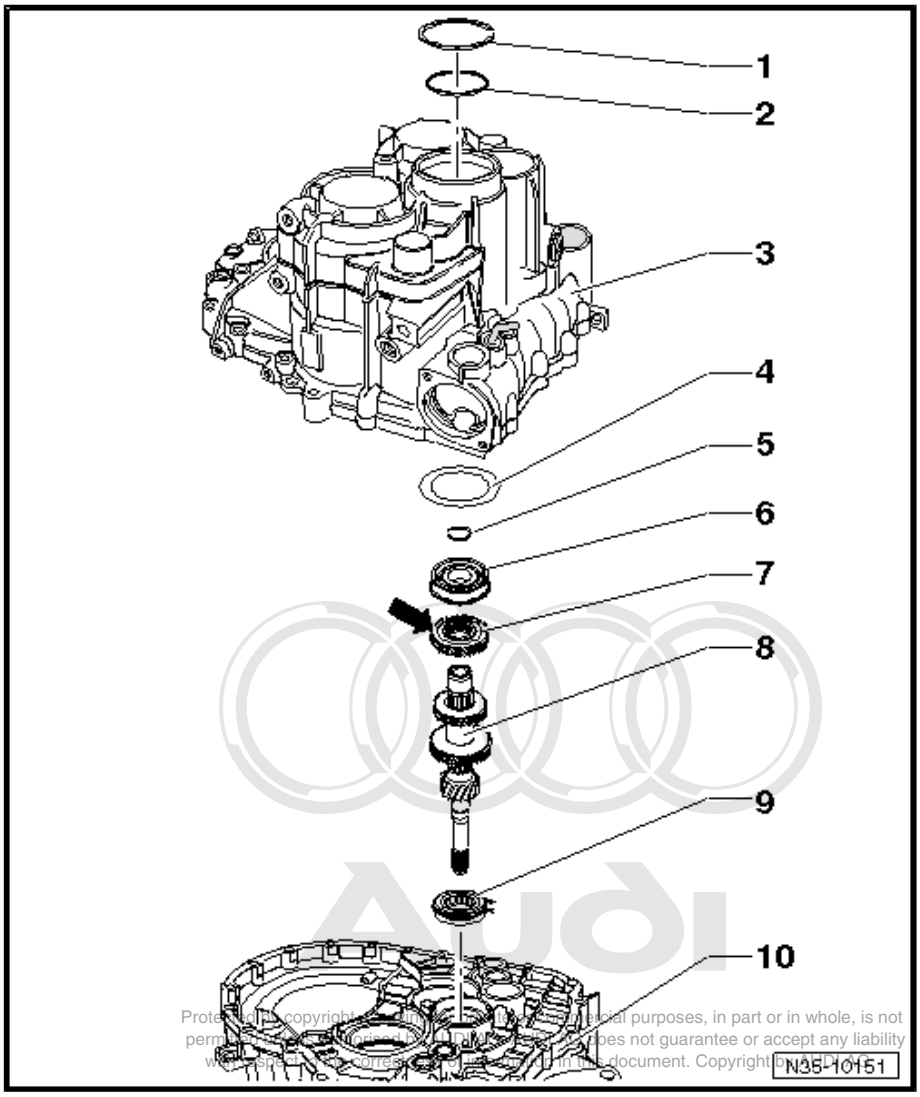


35 – Gears, shafts

1 Exploded view - input shaft

Note

- *Mounting gearbox on assembly stand ⇒ page 125*
- *Refer to technical data when installing new gears ⇒ page 2 .*
- *Lubricate all bearings on input shaft with gear oil before installing.*



1 - Circlip

- ❑ For grooved ball bearing on input shaft ⇒ Item 6 (page 210)
- ❑ Removing and installing ⇒ page 159

2 - Spacer

- ❑ Outside diameter = 78.6 mm
- ❑ Can only be fitted on modified gearbox housing (from gearbox manufacturing date 10 04 6 to approx. 20 01 8) ⇒ page 215
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

3 - Gearbox housing

- ❑ From gearbox manufacturing date 10 04 6 to approx. 20 01 8: modified in area of seat for grooved ball bearing ⇒ Item 6 (page 210) to match spacers ⇒ Item 2 (page 209) and ⇒ Item 4 (page 209) ⇒ page 215
- ❑ From gearbox manufacturing date approx. 21 01 8 onwards, grooved ball bearing and bearing seat have flattened sides ⇒ page 215
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

4 - Spacer

- ❑ Outside diameter = 85 mm
- ❑ Can only be fitted on modified gearbox housing (from gearbox manufacturing date 10 04 6 to approx. 20 01 8) ⇒ page 215
- ❑ For correct version, refer to ⇒ Electronic parts catalogue

5 - Circlip

- ❑ When grooved ball bearing ⇒ Item 6 (page 210) or input shaft ⇒ Item 8 (page 210) are renewed: determine thickness of required circlip ⇒ page 214

6 - Grooved ball bearing

- ❑ Always renew
- ❑ Pulling off ⇒ page 212
- ❑ Installation position ⇒ page 213
- ❑ Pressing on ⇒ page 213
- ❑ From gearbox manufacturing date approx. 21 01 8 onwards, grooved ball bearing and bearing seat have flattened sides ⇒ page 215

7 - 5th gear wheel

- ❑ Pressing off ⇒ page 213
- ❑ Installation position: Circular slot -arrow- faces towards grooved ball bearing ⇒ Item 6 (page 210)
- ❑ Pressing on ⇒ page 213

8 - Input shaft

- ❑ With 3rd/4th and 6th gear wheels

9 - Roller bearing

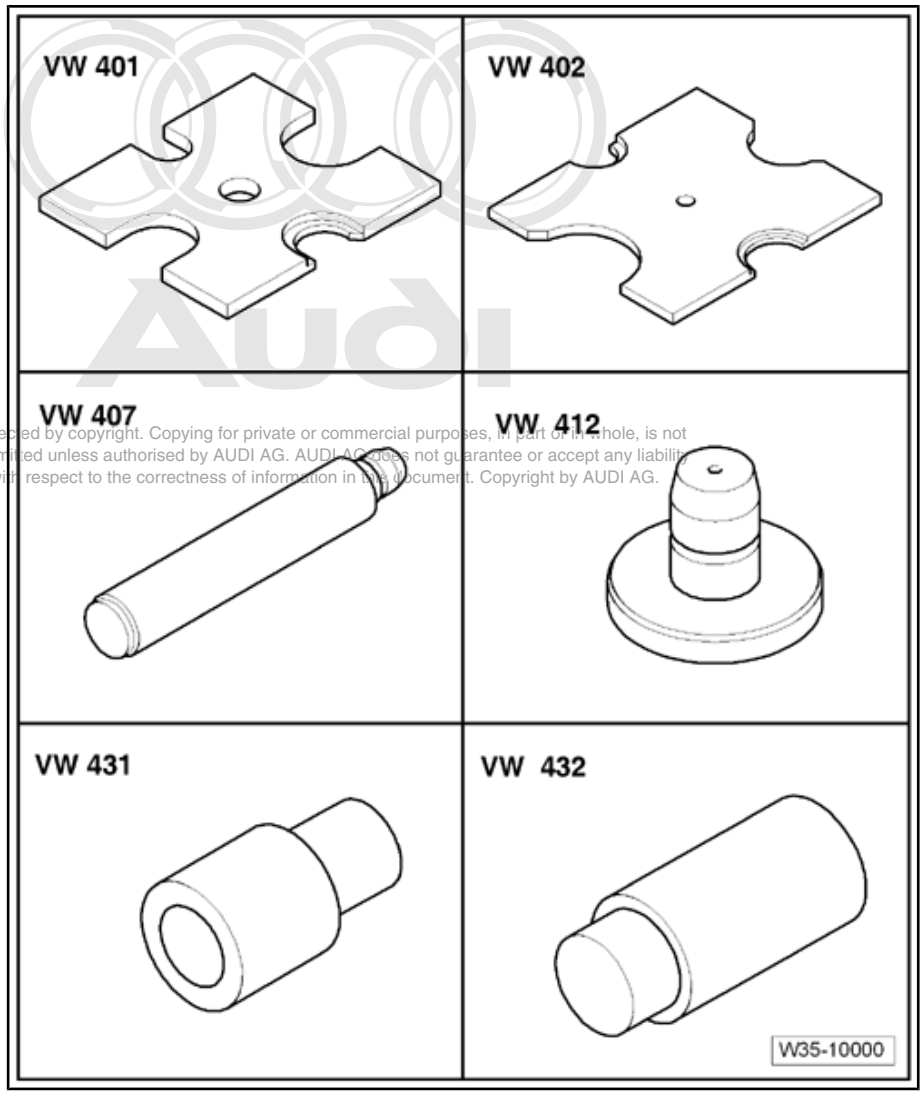
- ❑ With circlip
- ❑ Pulling out ⇒ page 214
- ❑ Pressing in ⇒ page 214
- ❑ Installation position: Circlip in bearing faces towards input shaft

10 - Clutch housing

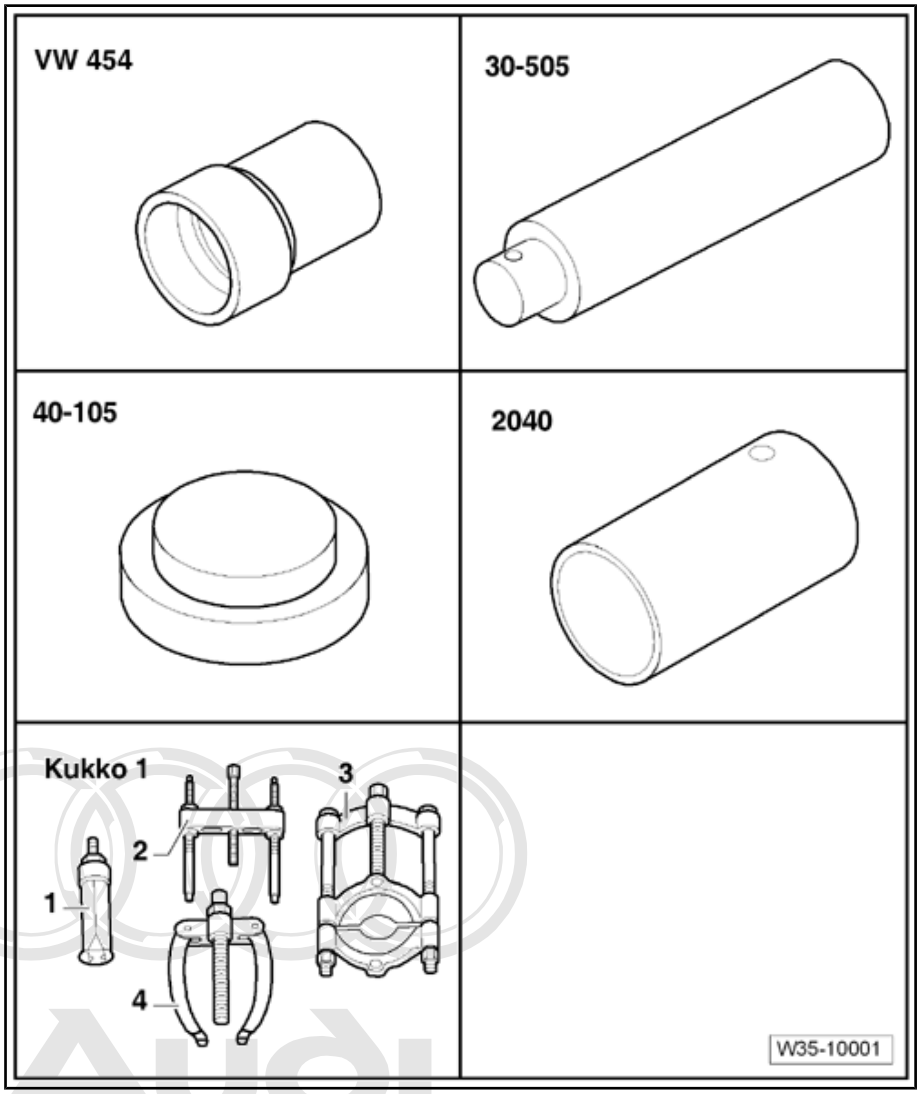
1.1 Dismantling and assembling input shaft

Special tools and workshop equipment required

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



- Press tool -VW 454-
- Mandrel -30 - 505-
- Thrust plate -40 - 105-
- Tube -2040-
- -1- Kukko internal puller 21/5
- -2- Puller 18/1
- -3- Splitter 17/1 and 17/2
- -4- Kukko 22/2 counter-support



Pulling off grooved ball bearing

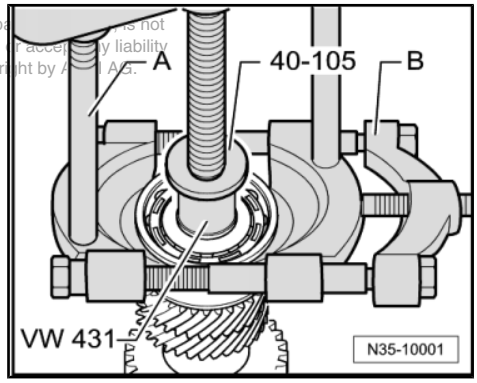
– Remove circlip on input shaft.

– Before setting up puller, position press tool -VW 431- and thrust plate -40 - 105- on input shaft.

– Apply splitter -B- at circular slot for circlip in bearing.

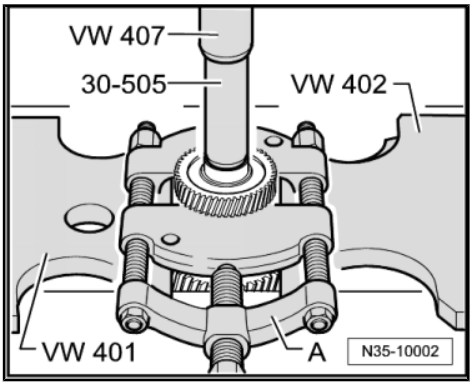
A - Puller , e.g. -Kukko 18/1-

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



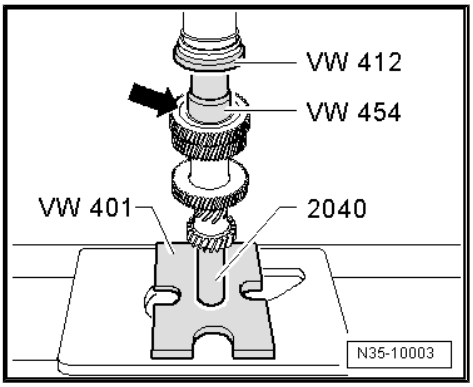
Pressing off 5th gear wheel

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



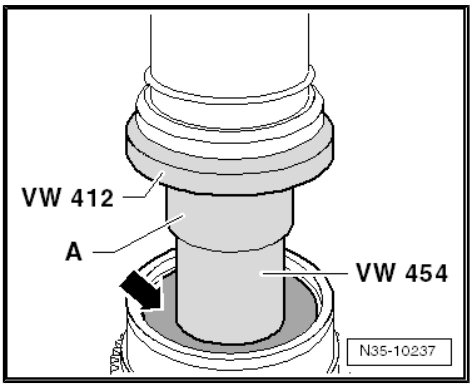
Pressing on 5th gear wheel

- Slot -arrow- on gear wheel must face upwards.



Pressing on grooved ball bearing with rubber ring

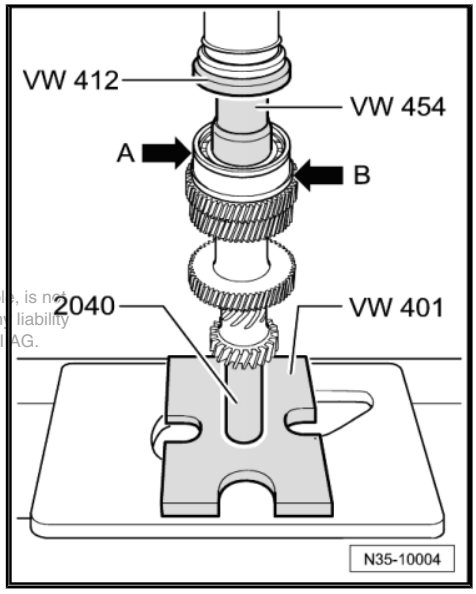
- If grooved ball bearing is fitted with a rubber ring -arrow-, press tool -VW 454- must be applied so that shoulder -A- faces towards press tool -VW 412- .



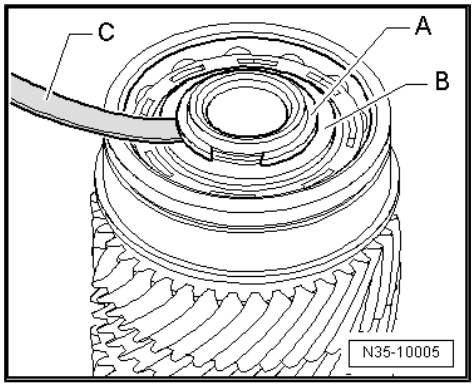
Installation position of grooved ball bearing

- Installation position of grooved ball bearing: Slot for circlip faces upwards -arrow A- and shoulder -arrow B- must face towards 5th gear wheel.

– Then determine thickness of required circlip ⇒ page 214 and install circlip.



Determining thickness of circlip

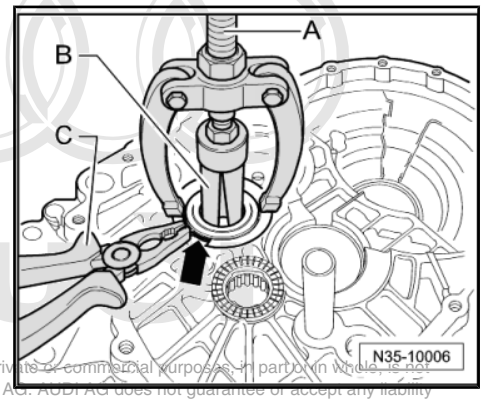


– Install a 1.86 mm thick circlip -A- in slot on input shaft and press circlip upwards.
– Measure gap between grooved ball bearing -B- and fitted circlip -A- using feeler gauge -C-.
– Remove circlip fitted for measurement.
– Determine thickness of required circlip according to table; for part number refer to ⇒ Electronic parts catalogue .

The following circlips are available:

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

Pulling roller bearing out of clutch housing

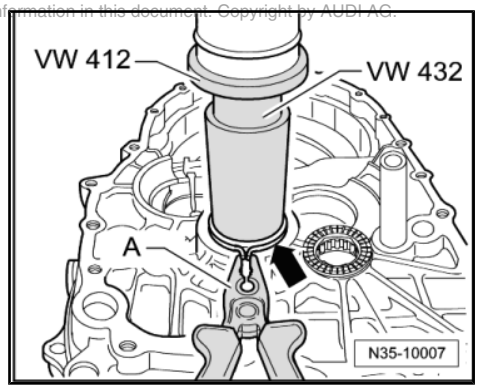


– When pulling out, compress circlip -arrow- for roller bearing using pliers -C-.

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

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

Pressing roller bearing into clutch housing



– When pressing in, compress circlip -arrow- for roller bearing using pliers -A-.
– Remove pliers before roller bearing seats in its final position.

• The circlip must engage in the groove in the clutch housing.

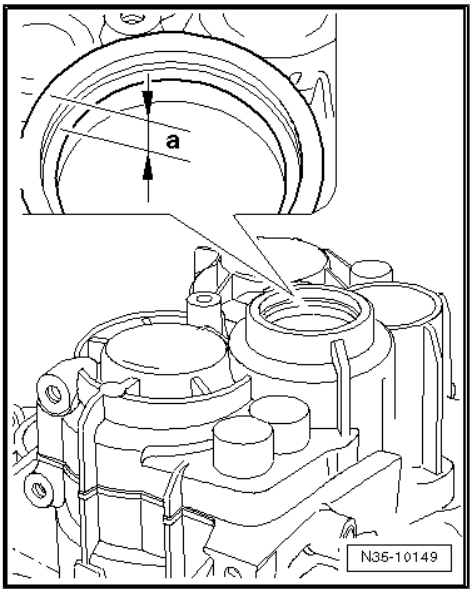
1.2 Modifications in area of grooved ball bearing

From gearbox manufacturing date 10 04 6 to approx. 20 01 8:

One spacer above and one spacer below bearing seat for grooved ball bearing ⇒ Item 6 (page 210) .

Above bearing seat:

Bearing seat		Spacer above bearing seat
Up to gearbox manufacturing date 09 04 6	Dimension “a” = 10 mm	No
From gearbox manufacturing date 10 04 6 to 20 01 8	Dimension “a” = 10.7 mm	Yes
From gearbox manufacturing date approx. 21 01 8 onwards	Below bearing seat: Flattened side for grooved ball bearing	No

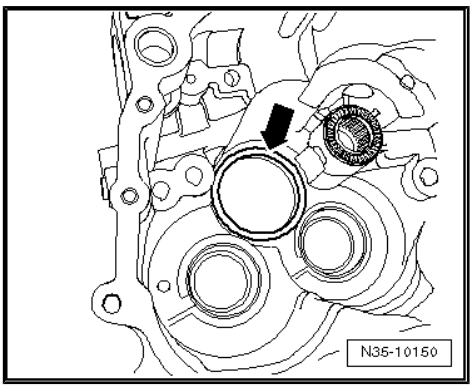


Below bearing seat -arrow-:

From gearbox manufacturing date 10 04 6 to approx. 20 01 8 slightly deeper

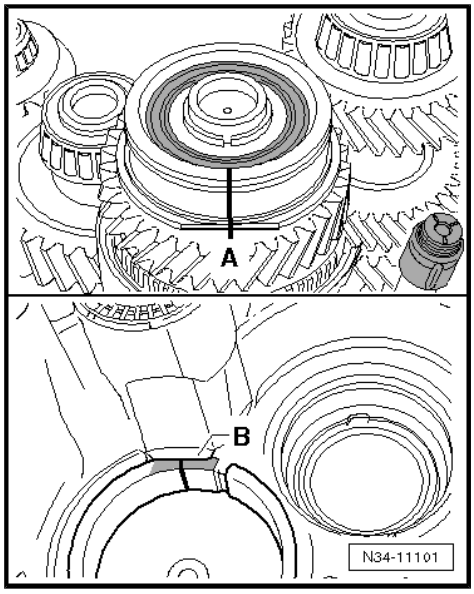
The bearing seat for the grooved ball bearing -arrow- is slightly deeper to accommodate the spacer below the bearing ⇒ Item 6 (page 210) .

Below bearing seat		Spacer below bearing seat
Up to gearbox manufacturing date 09 04 6	Not modified	No
From gearbox manufacturing date 10 04 6 to 20 01 8	Slightly deeper	Yes
From gearbox manufacturing date approx. 21 01 8 onwards	Flattened side -B- for grooved ball bearing -A-	No



From gearbox manufacturing date approx. 21 01 8 onwards, grooved ball bearing -A- and bearing seat -B- have flattened sides

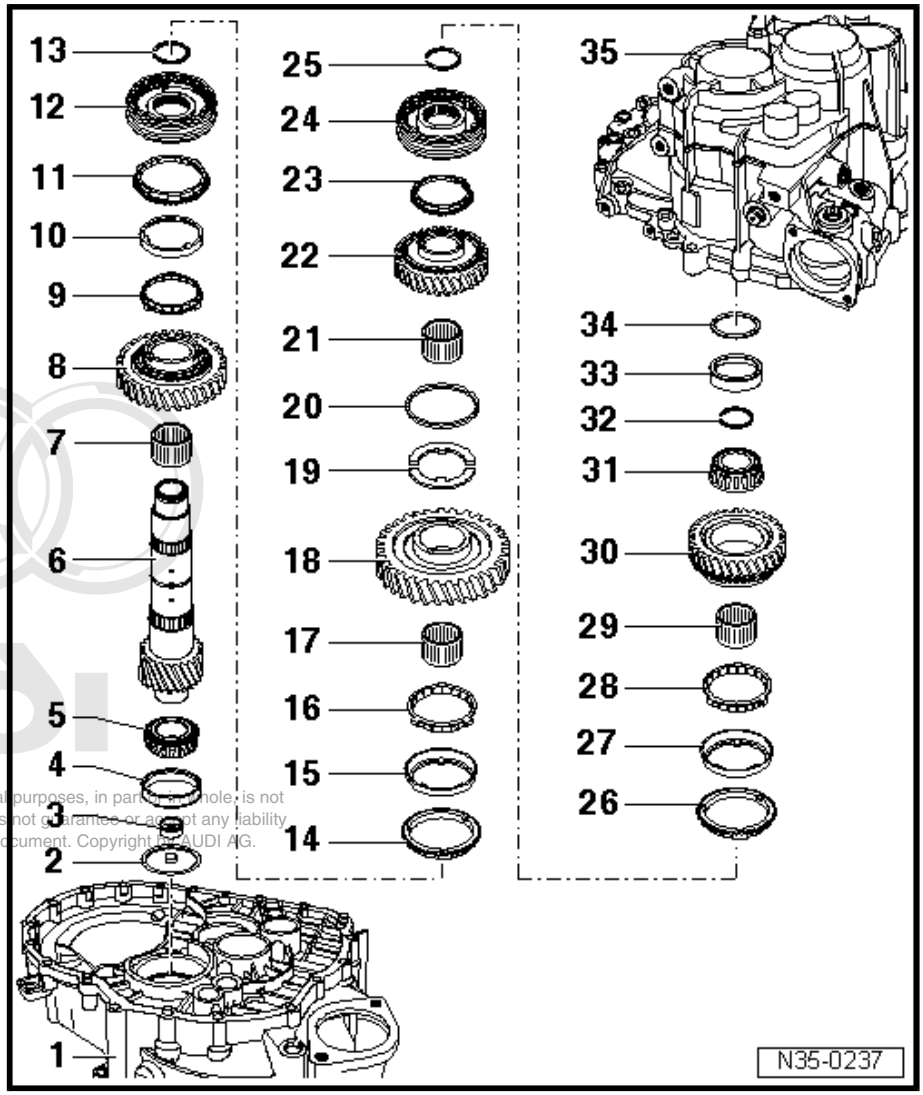
- If sides are flattened, a spacer must not be fitted above or below grooved ball bearing.



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

Note

- *Mounting gearbox on assembly stand ⇒ page 125 .*
- *Carry out output shaft adjustment ⇒ page 230 if the output shaft or tapered roller bearings have been renewed .*
- *Refer to technical data ⇒ page 2 when installing new gears or a new output shaft.*
- *Always renew both tapered roller bearings together.*



1 - Clutch housing

2 - Oil deflector plate

3 - Dished washer

- ❑ Pulling out ⇒ page 223
- ❑ Pressing in ⇒ page 224

4 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 224
- ❑ Pressing in ⇒ page 224

5 - Tapered roller bearing inner race

- ❑ Pressing off ⇒ page 225
- ❑ Pressing on ⇒ page 225

6 - Output shaft

- ❑ For 1st to 4th gear
- ❑ Adjusting ⇒ page 230

7 - Needle bearing

- ❑ For 2nd gear

8 - 2nd speed selector gear

9 - Synchro-ring

- ❑ (Inner ring for 2nd gear)
- ❑ Checking for wear ⇒ page 226
- ❑ Check lugs for scoring
- ❑ Installation position ⇒ page 226

10 - Outer ring for 2nd gear

- ❑ Fit on synchro-ring ⇒ Item 9 (page 217)
- ❑ Renew if scored or if there are visible traces of wear
- ❑ Installation position ⇒ page 226

11 - 2nd gear synchro-ring

- ❑ Checking for wear ⇒ page 226
- ❑ Installation position ⇒ page 226

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

- ❑ Press off together with 2nd speed selector gear after removing circlip ⇒ Item 13 (page 218) ⇒ page 225
- ❑ Dismantling ⇒ page 227
- ❑ Assembling locking collar/synchronising hub ⇒ page 227
- ❑ Installation position ⇒ page 227
- ❑ Pressing on ⇒ page 227

13 - Circlip

14 - 1st gear synchro-ring

- ❑ Checking for wear ⇒ page 226
- ❑ Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ Item 12 (page 217)

15 - Outer ring for 1st gear

- ❑ Insert in synchro-ring ⇒ Item 14 (page 218) ; installation position ⇒ page 228
- ❑ Renew if scored or if there are visible traces of wear

16 - Synchro-ring

- ❑ (Inner ring for 1st gear)
- ❑ Checking for wear ⇒ page 226
- ❑ Check lugs for scoring
- ❑ Installation position ⇒ page 228

17 - Needle bearing

- ❑ For 1st gear

18 - 1st speed selector gear

- ❑ Installation position ⇒ page 228

19 - Thrust washers

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

20 - Circlip

- ❑ Holds thrust washers ⇒ Item 19 (page 218) in position on output shaft

21 - Needle bearing

- ❑ For 4th gear

22 - 4th speed selector gear

23 - 4th gear synchro-ring

- ❑ Checking for wear ⇒ page 229

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

- ❑ Pull off together with 4th speed selector gear after removing circlip ⇒ Item 25 (page 218) ⇒ page 225
- ❑ Dismantling ⇒ page 227
- ❑ Installation position: Locking collar/synchronising hub ⇒ page 228
- ❑ Assembling locking collar/synchronising hub ⇒ page 227 and ⇒ page 227
- ❑ Pressing on ⇒ page 229

25 - Circlip

26 - 3rd gear synchro-ring

- ❑ Checking for wear ⇒ page 226

27 - Outer ring for 3rd gear

- ❑ Insert in synchro-ring ⇒ Item 26 (page 218) ; installation position ⇒ page 228
- ❑ Renew if scored or if there are visible traces of wear

28 - Synchro-ring

- ❑ (Inner ring for 3rd gear)
- ❑ Checking for wear ⇒ page 226
- ❑ Check lugs for scoring
- ❑ Installation position ⇒ page 228

29 - Needle bearing

- ❑ For 3rd gear

30 - 3rd speed selector gear

- ❑ Installation position ⇒ page 228

31 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 224
- ❑ Pressing on ⇒ page 229

32 - Circlip

- ❑ When tapered roller bearing ⇒ Item 31 (page 219) or output shaft ⇒ Item 6 (page 217) are renewed: determine thickness of required circlip ⇒ page 229

33 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 230
- ❑ Pressing in ⇒ page 230

34 - Shim

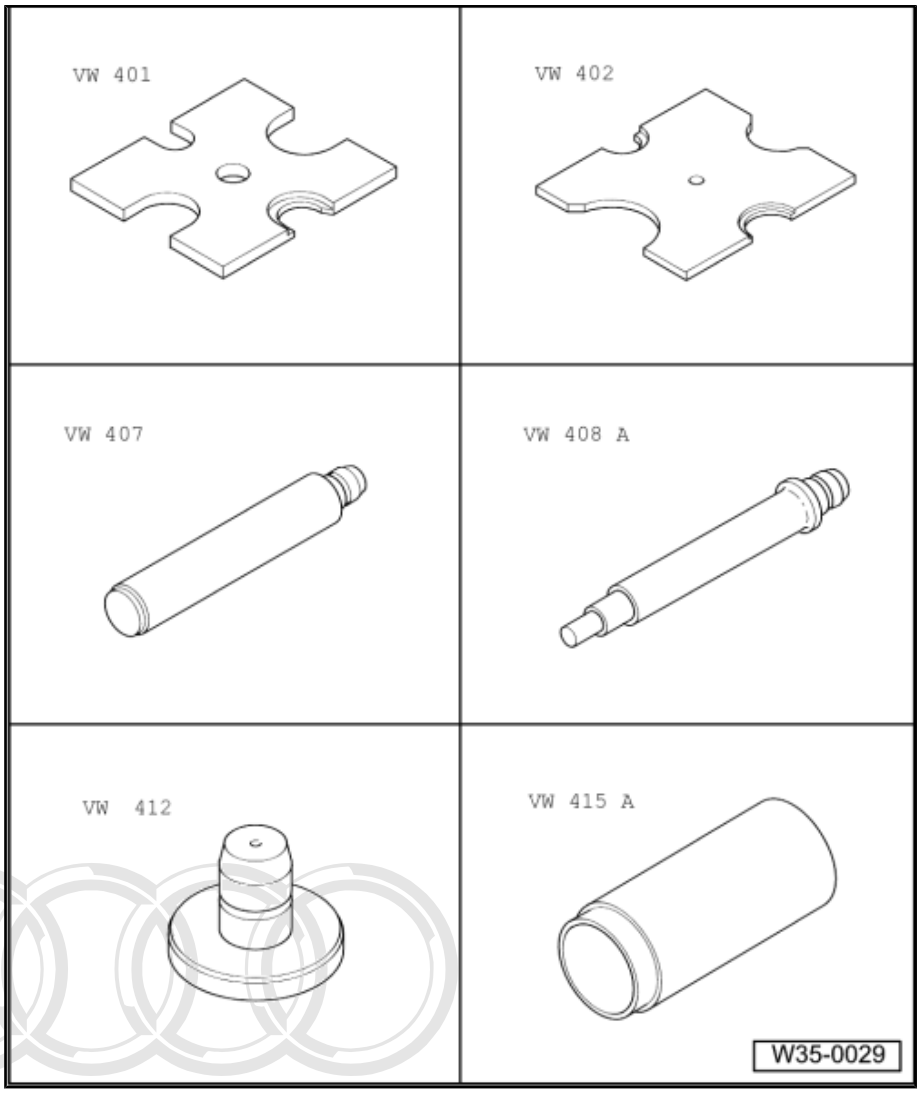
- ❑ Determining thickness ⇒ page 230

35 - Gearbox housing

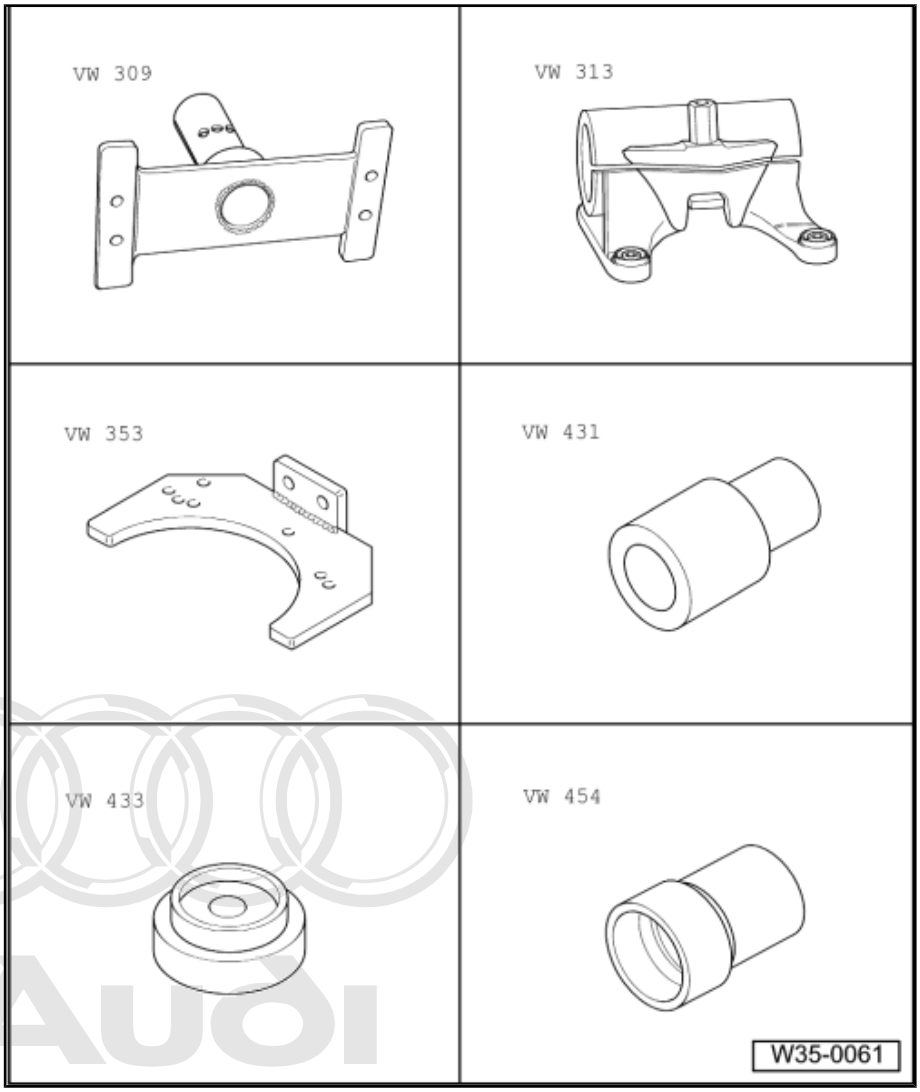
2.1 Dismantling and assembling output shaft for 1st - 4th gear

Special tools and workshop equipment required

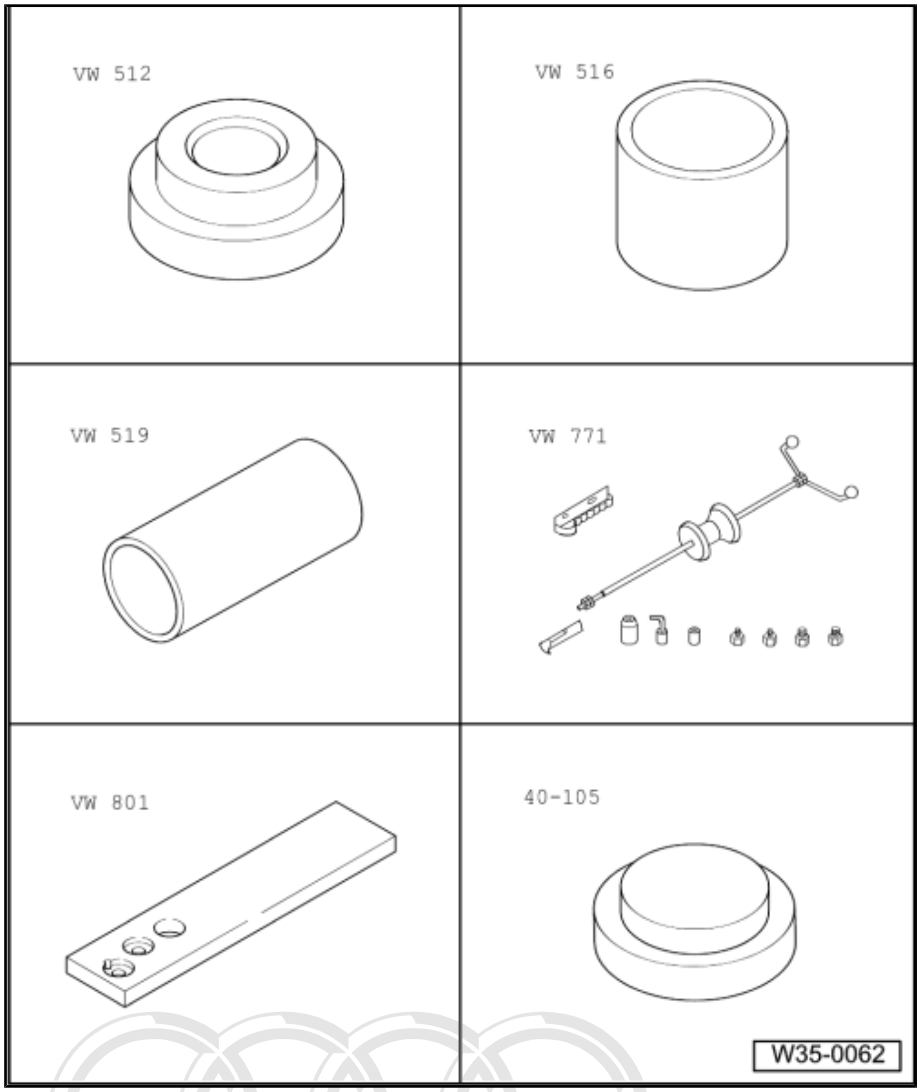
- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Press tool -VW 408A-
- Press tool -VW 412-
- Tube -VW 415A-



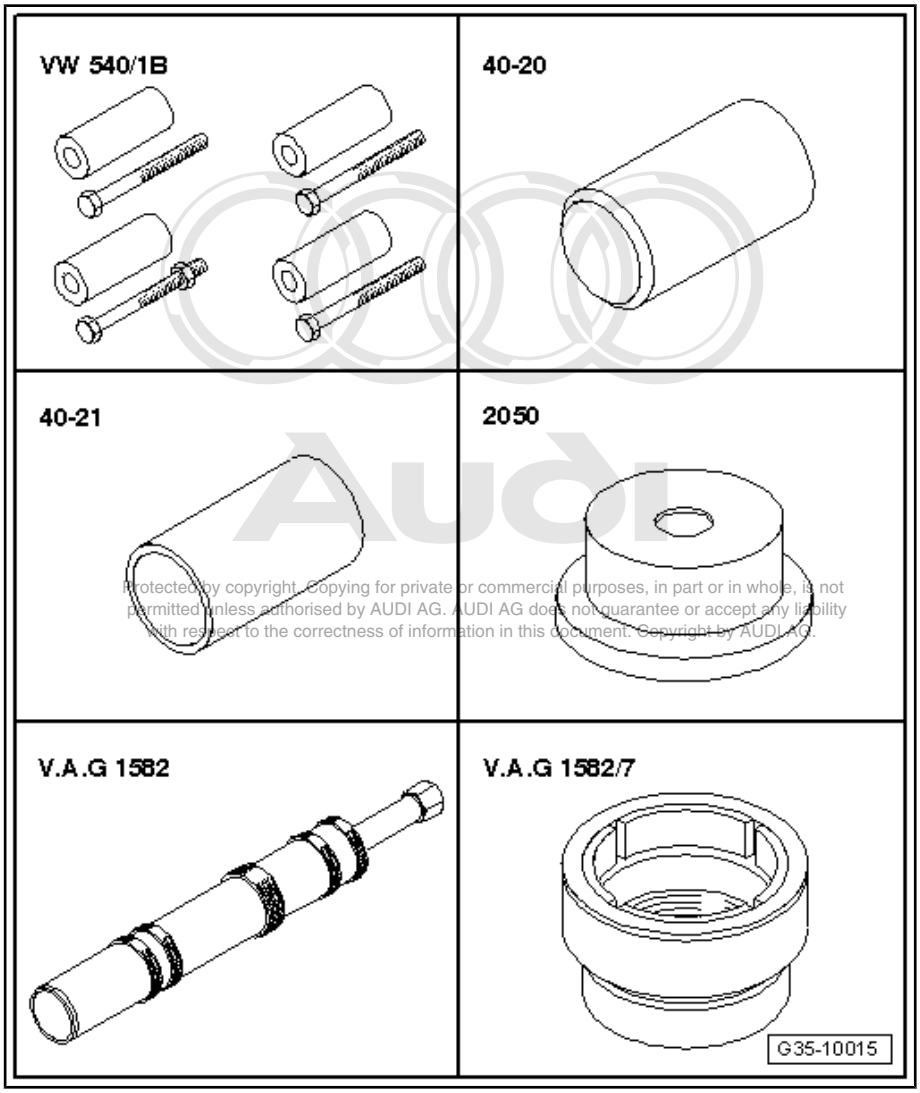
- Support plate -VW 309-
- Support clamp -VW 313-
- Gearbox support -VW 353-
- Press tool -VW 431-
- Press tool -VW 433-
- Press tool -VW 454-



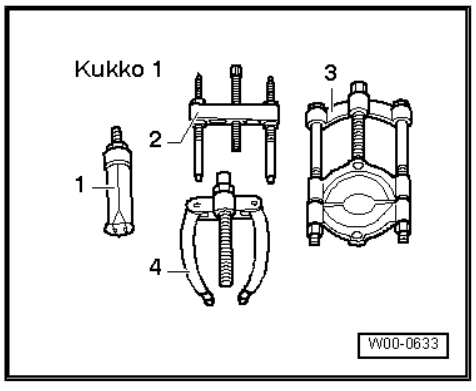
- Thrust pad -VW 512-
- Tube -VW 516-
- Tube -VW 519-
- Multi-purpose tool -VW 771-
- Support plate -VW 801-
- Thrust plate -40 - 105-

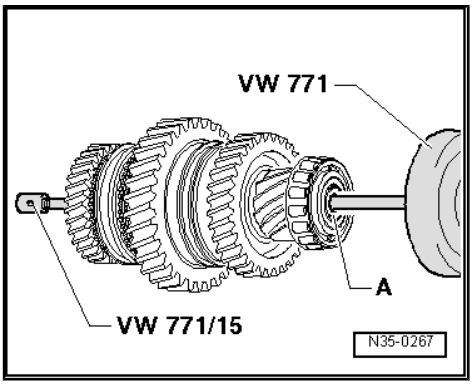


- Sleeve from engine and gearbox support supplement -VW 540/1 B-
- Drift sleeve -40 - 20-
- Press tool -40 - 21-
- Thrust piece -2050-
- Tapered roller bearing puller -V.A.G 1582-
- Adapter -V.A.G 1582/7-



- -1- Kukko internal puller 21/7 and 21/8



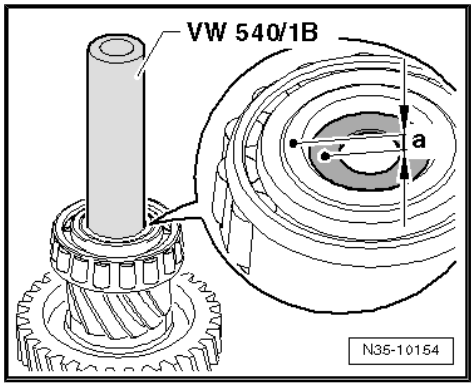


- -2- Puller 18/2
- -3- Splitter 17/2
- -4- Kukko 22/2 counter-support

Pulling dished washer -A- out of output shaft

Pressing dished washer into output shaft onto stop

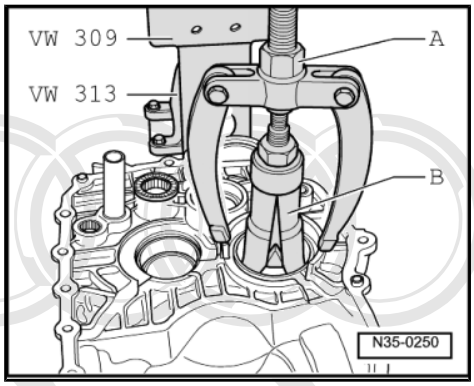
- Dimension -a- = 2 mm



Pulling out tapered roller bearing outer race

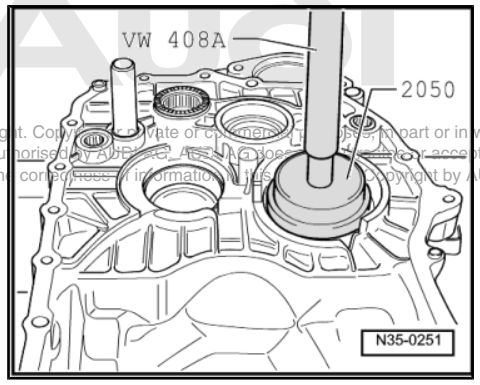
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into clutch housing

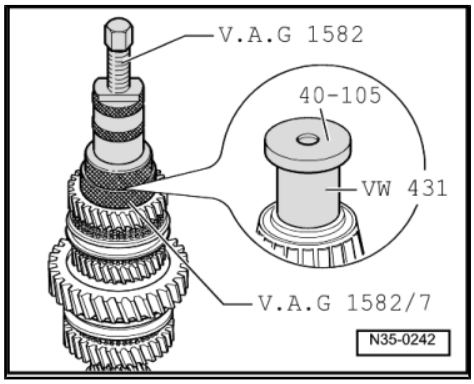
– Support clutch housing with drift sleeve -40 - 20- directly below bearing mounting.



Pulling off tapered roller bearing inner race

– Remove circlip.

– Before setting up puller, position press tool -VW 431- and thrust plate -40 - 105- on input shaft.

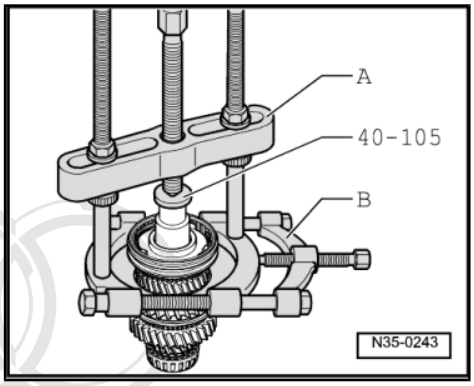


Pulling off 3rd and 4th gear synchronising hub/locking collar with 4th speed selector gear

– Remove circlip before pulling off.

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

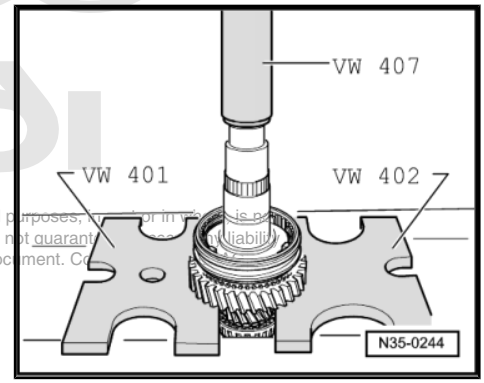
B - Splitter 22...115 mm , e.g. -Kukko 17/2-



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

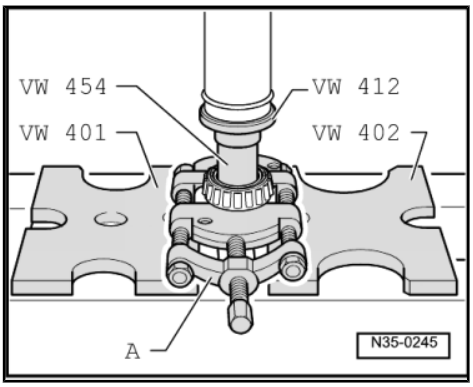
– Remove circlip.

– Press off selector gear and locking collar/synchronising hub together.

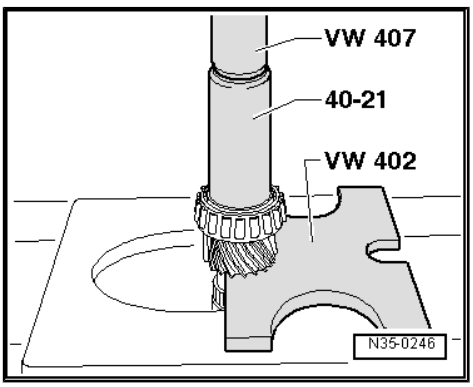


Pressing off tapered roller bearing inner race

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



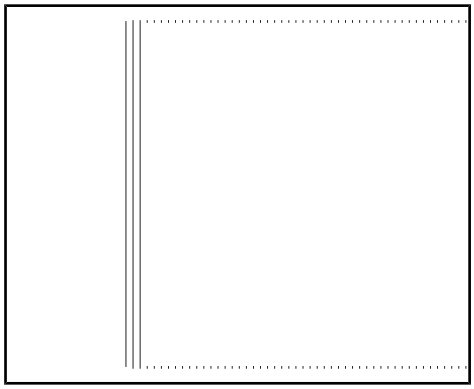
Pressing on tapered roller bearing inner race



Checking inner ring for 1st, 2nd and 3rd gear for wear

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

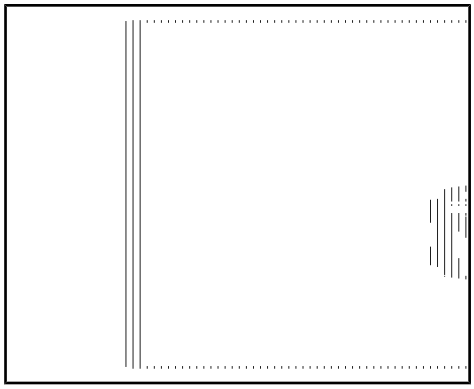
Gap -a-	Installation depth	Wear limit
1st, 2nd and 3rd gear	0.75...1.25 mm	0.3 mm



Checking 1st, 2nd and 3rd gear synchro-rings for wear

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

Gap -a-	Installation depth	Wear limit
1st, 2nd and 3rd gear	1.2...1.8 mm	0.5 mm



Installation position of outer ring, inner ring and synchro-ring of 2nd gear

– Place inner ring -A- on 2nd speed selector gear.

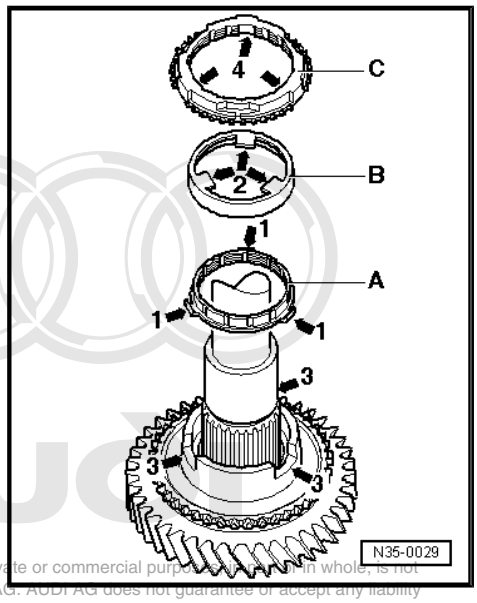
• The angled lugs -arrows 1- point towards outer ring -B-.

– Fit outer ring -B-.

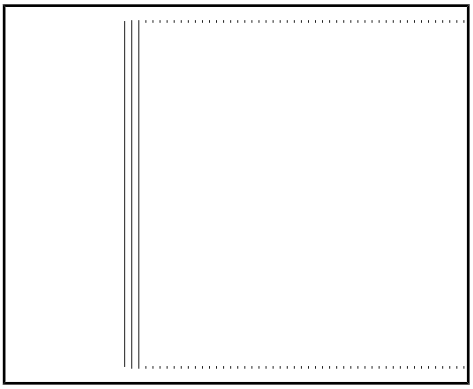
• Lugs -arrows 2- engage in slots -arrows 3- on selector gear.

– Fit synchro-ring -C-.

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



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



– Take off springs -1- before dismantling.

1 - Spring

2 - Locking piece

3 - Locking collar

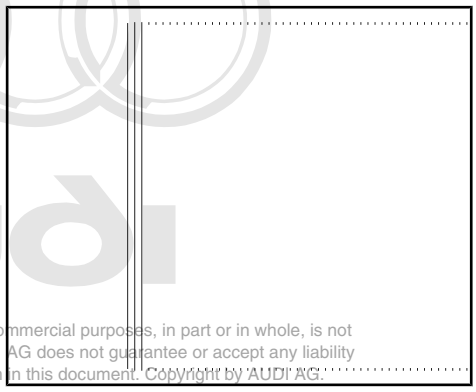
4 - Synchronising hub

– To assemble, slide locking collar over synchronising hub.

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

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

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

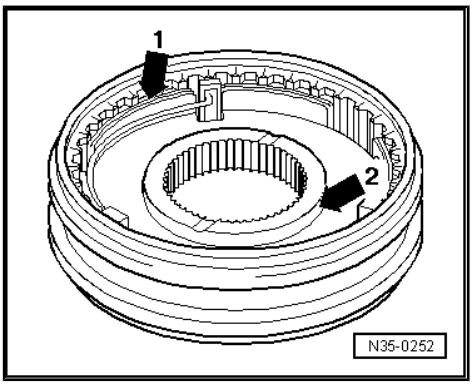


• Locking collar is pushed over synchronising hub.

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

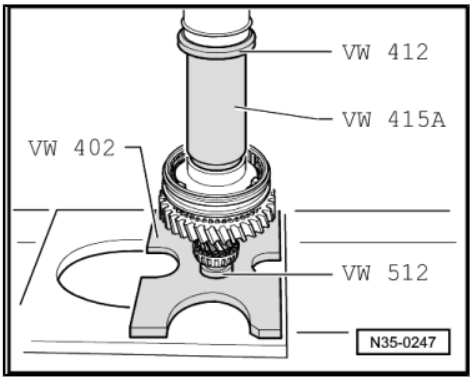
• Angled end of spring must locate in hollow locking piece.

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



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

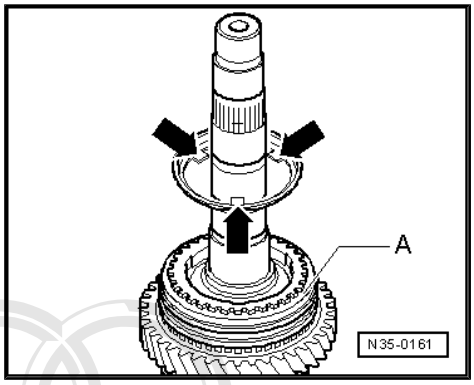
Pressing on 1st and 2nd gear locking collar/synchronising hub



– Then install circlip.

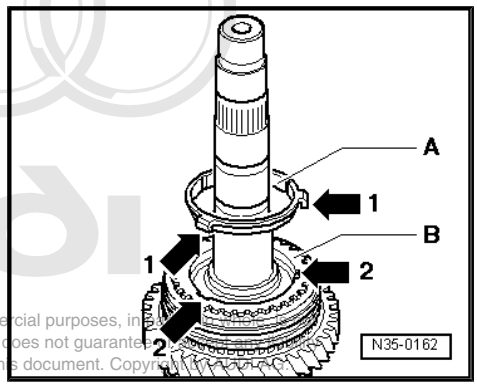
Installation position of 1st or 3rd gear outer ring

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



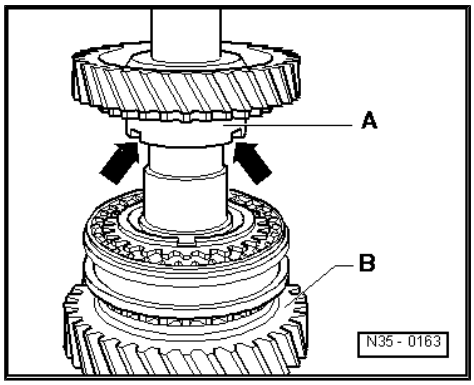
Installation position of synchro-ring -A- (inner ring for 1st or 3rd gear)

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



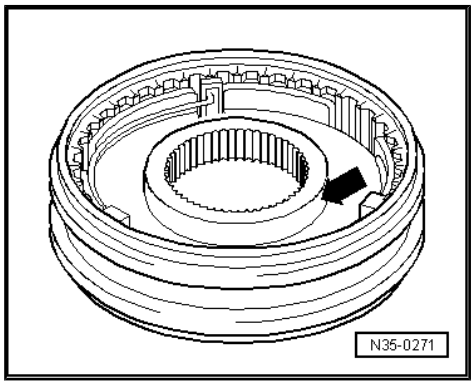
Installation position of 1st and 3rd speed selector gear

- The higher shoulder -A- faces towards 2nd or 4th gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ⇒ page 228 .



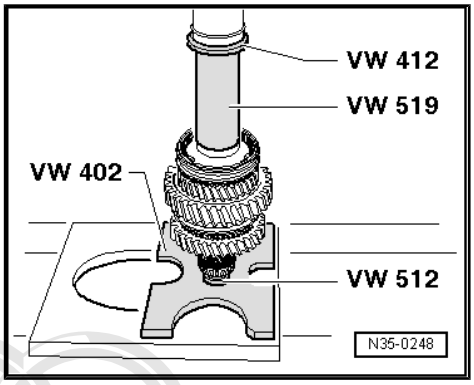
Installation position of 3rd and 4th gear locking collar/synchronising hub

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



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

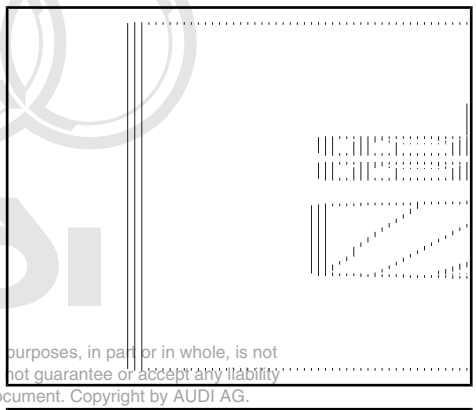
– Then install circlip.



Checking synchro-ring for 4th gear for wear

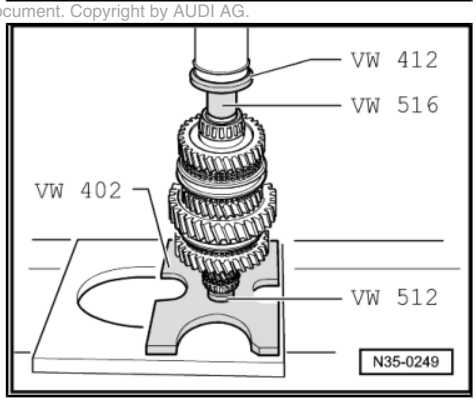
– Press synchro-ring onto tapered seat on selector gear and measure gap -a- with a feeler gauge.

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



Pressing on tapered roller bearing inner race

– Determine thickness of required circlip ⇒ page 229 and install circlip.

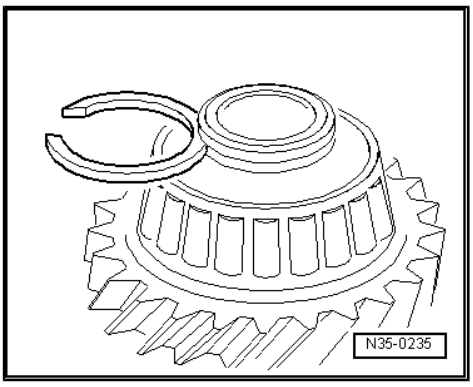


Determining thickness of circlip

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

The following circlips are available:

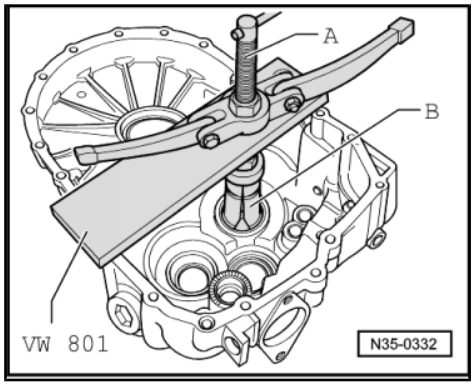
Circlip thickness (mm)		
1.79	1.83	1.86
1.89	1.92	1.95
1.98		



Pulling tapered roller bearing outer race out of gearbox housing

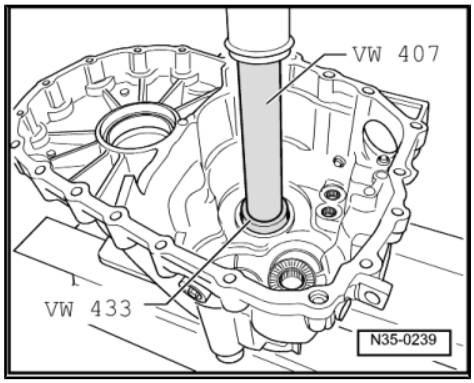
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

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



2.2 Adjusting output shaft for 1st - 4th gear

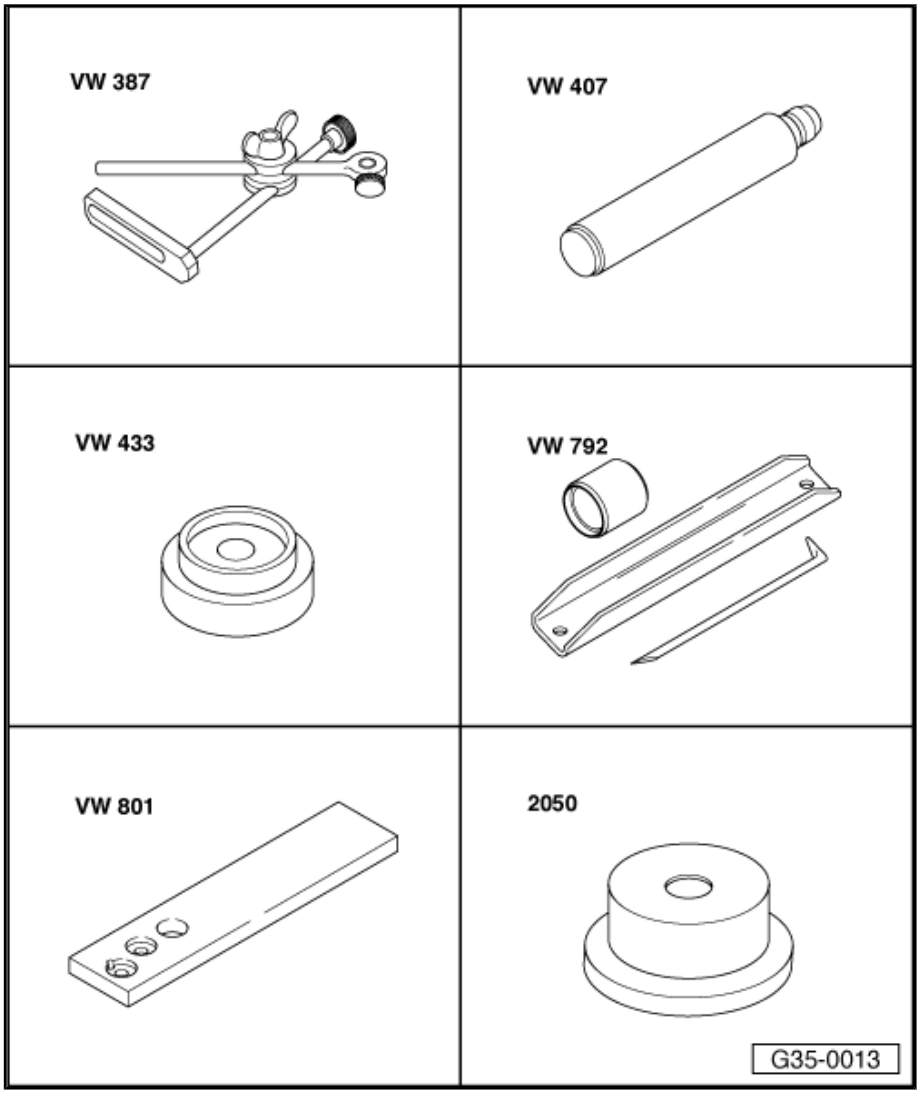
The output shaft must be re-adjusted when the following components have been renewed:

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

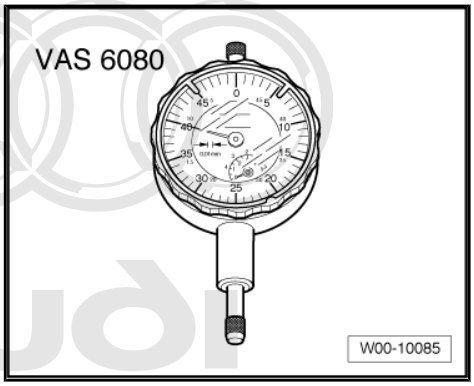
Table of adjustments ⇒ page 274

Special tools and workshop equipment required

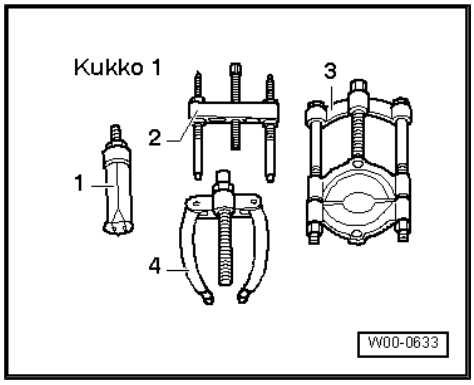
- Universal dial gauge bracket -VW 387-
- Press tool -VW 407-
- Press tool -VW 433-
- Assembly tool -VW 792-
- Support plate -VW 801-
- Thrust piece -2050-



- Dial gauge -VAS 6080-



♦ -1- Kukko internal puller 21/7



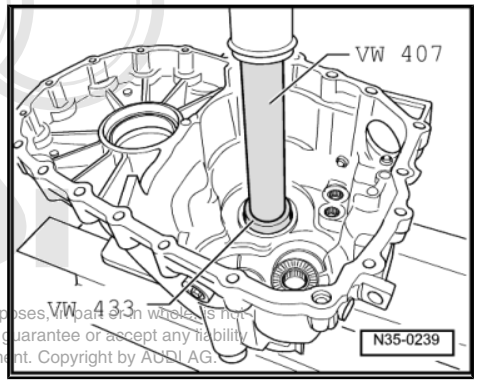
♦ -4- Kukko 22/2 counter-support

Adjusting

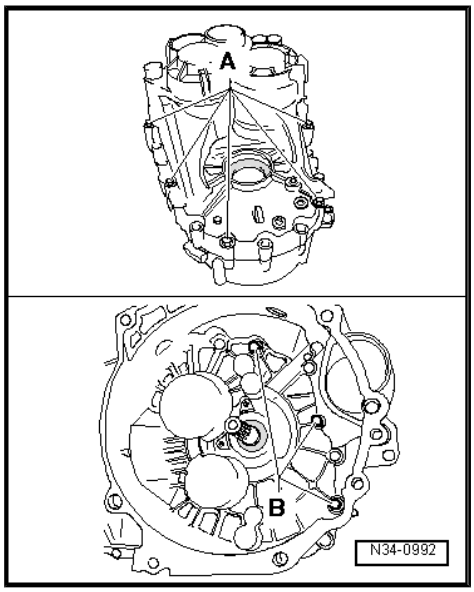
- Mounting gearbox on assembly stand ⇒ page 125 .
- Sealing surfaces of clutch and gearbox housings must be free of sealant.
- When taking measurements, install only the shaft to be measured.

– Press tapered roller bearing outer race with shim (thickness 1.70 mm) into gearbox housing. Support gearbox housing with thrust piece -2050- directly below bearing mounting.

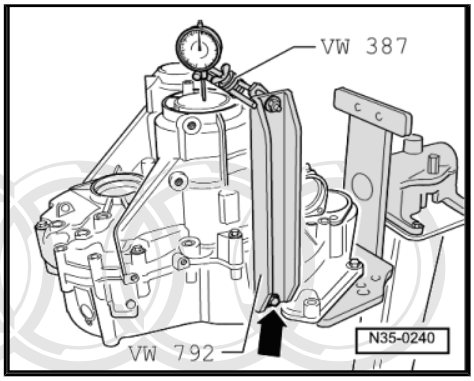
– Fit complete 1st to 4th gear output shaft into clutch housing.



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



– Set up measuring tools and secure with bolt -arrow- to clutch housing.
– Set dial gauge -VAS 6080- (3 mm measuring range) to “0” with 1 mm preload.
– Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
– Read off play on gauge and note reading (example: 0.14 mm).



Note

If no play is indicated on the dial gauge when the clutch housing/gearbox housing securing bolts are loosened, fit a 1.95 mm shim (part number -084 409 383 AS-), or if necessary a 2.20 mm shim (part number -084 409 383 BD-) for performing the measurement.

Determining thickness of shim

The specified bearing preload is attained by subtracting the measured value (0.14 mm) from the inserted shim (1.70 mm) and adding a constant value for preload (0.20 mm).

Example:

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

– Select a shim of the required thickness from the table. For part number refer to ⇒ Electronic parts catalogue .

The following shims are available:

Thickness of shims in mm			
1.45	1.70	1.95	2.20
1.50	1.75	2.00	2.25
1.55	1.80	2.05	
1.60	1.85	2.10	
1.65	1.90	2.15	

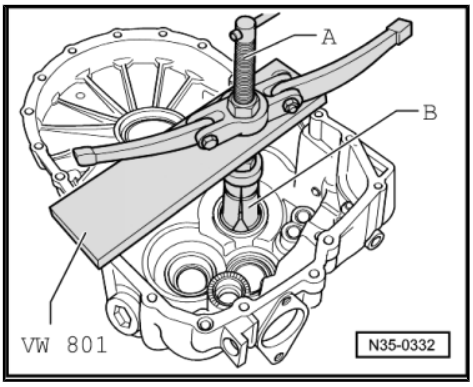
The exact shim thickness required can be obtained by combining shims of different thicknesses.

– Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing.

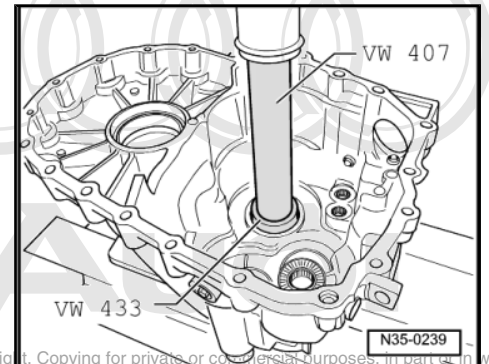
A - Counter-support , e.g. -Kukko 22/2-

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

– Remove inserted shim (1.70 mm thick) from gearbox housing.



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



Checking adjustment

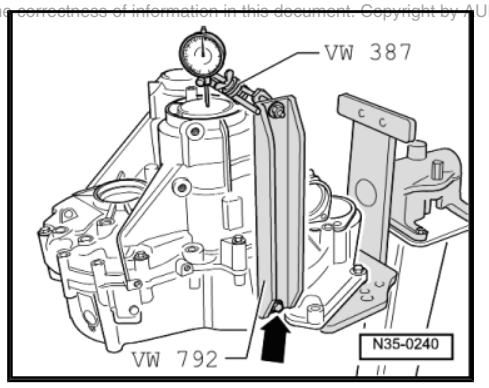
- Required shim installed (thickness as determined above)

– Set up measuring tools and secure with bolt -arrow- to clutch housing.

– Set dial gauge -VAS 6080- (3 mm measuring range) to “0” with 1 mm preload.

– Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.

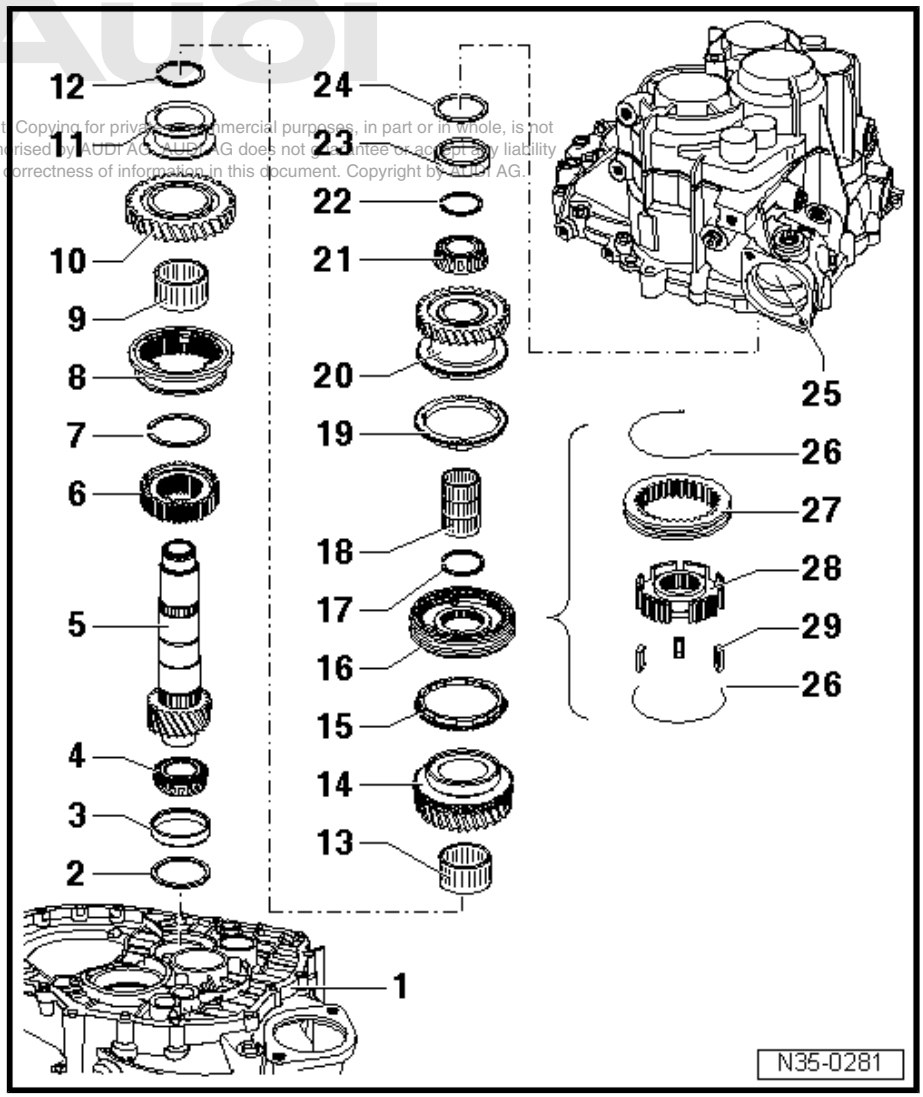
- If the correct shim has been selected, the dial gauge should now indicate a value between 0.15 and 0.25 mm.



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

Note

- *Mounting gearbox on assembly stand ⇒ page 125 .*
- *Carry out output shaft adjustment ⇒ page 245 if the output shaft or tapered roller bearings have been renewed .*
- *Refer to technical data ⇒ page 2 when installing new gears or a new output shaft.*
- *Always renew both tapered roller bearings together.*



1 - Clutch housing

2 - Shim

- ❑ 0.65 mm thick

3 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 240
- ❑ Pressing in ⇒ page 241

4 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 242
- ❑ Pressing on ⇒ page 244

5 - Output shaft for 5th, 6th and reverse gear

- ❑ Adjusting ⇒ page 245

6 - Reverse gear synchronising hub

- ❑ Pressing off ⇒ page 242
- ❑ Installation position ⇒ page 242
- ❑ Pressing on ⇒ page 242

7 - Circlip

8 - Reverse gear locking collar

- ❑ With synchro-ring

9 - Needle bearing

- ❑ For reverse selector gear

10 - Reverse selector gear

11 - Sleeve

- ❑ Press off with reverse selector gear ⇒ page 241
- ❑ Installation position: Wide shoulder of sleeve faces towards reverse selector gear
- ❑ Pressing on ⇒ page 243

12 - Circlip

13 - Needle bearing

- ❑ For 6th gear

14 - 6th speed selector gear

15 - 6th gear synchro-ring

- ❑ Checking for wear ⇒ page 243

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

- ❑ Press off together with 6th speed selector gear after removing circlip ⇒ Item 17 (page 236) ⇒ page 241
- ❑ Dismantling ⇒ page 243
- ❑ Assembling locking collar/synchronising hub ⇒ page 243 and ⇒ page 243
- ❑ Pressing on ⇒ page 244

17 - Circlip

18 - Needle bearing

- ❑ For 5th gear

19 - 5th gear synchro-ring

- ❑ Checking for wear ⇒ page 243

20 - 5th speed selector gear

21 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 241
- ❑ Pressing on ⇒ page 244

22 - Circlip

- ❑ When tapered roller bearing ⇒ Item 21 (page 236) or output shaft ⇒ Item 5 (page 235) are renewed: determine thickness of required circlip ⇒ page 244

23 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 245
- ❑ Pressing in ⇒ page 245

24 - Shim

- ❑ Determining thickness ⇒ page 245

25 - Gearbox housing

26 - Spring

- ❑ Installation position ⇒ page 243

27 - Locking collar

28 - Synchronising hub

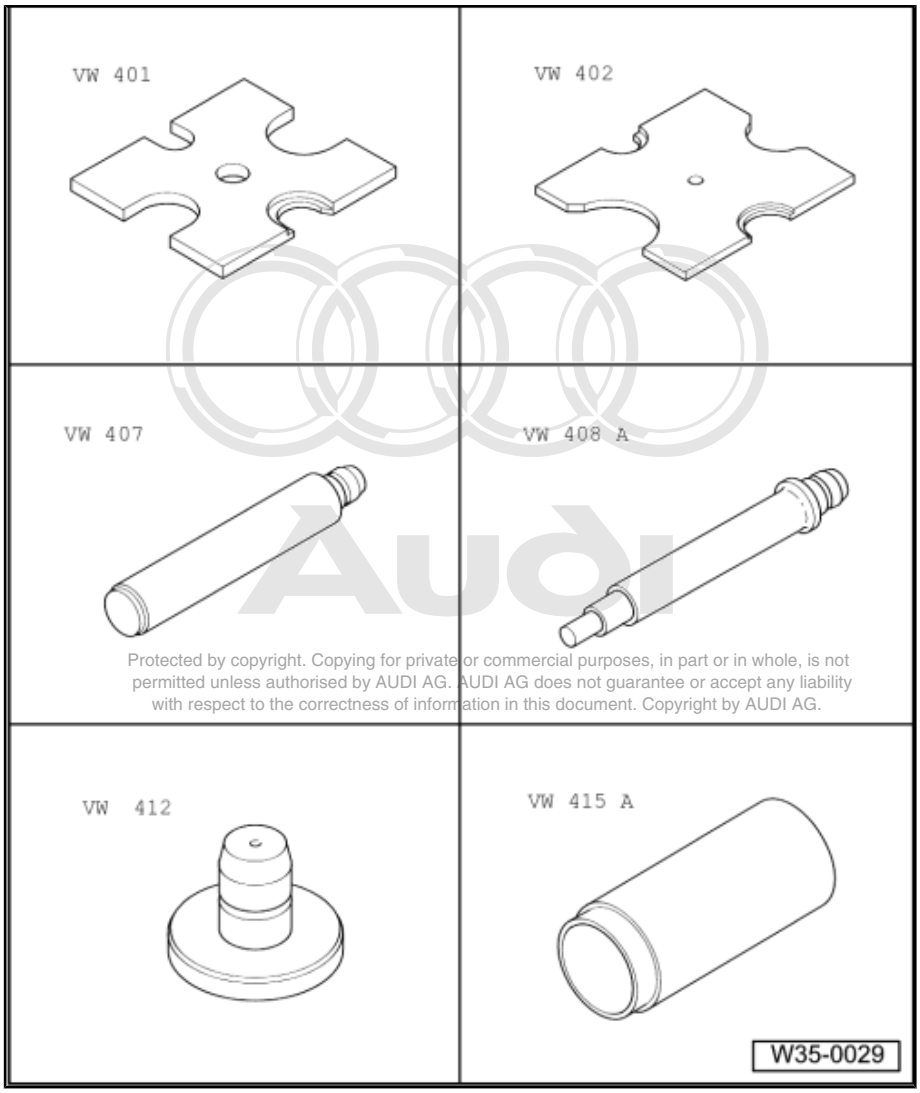
29 - Locking pieces (3x)

- ❑ Installation position ⇒ page 243

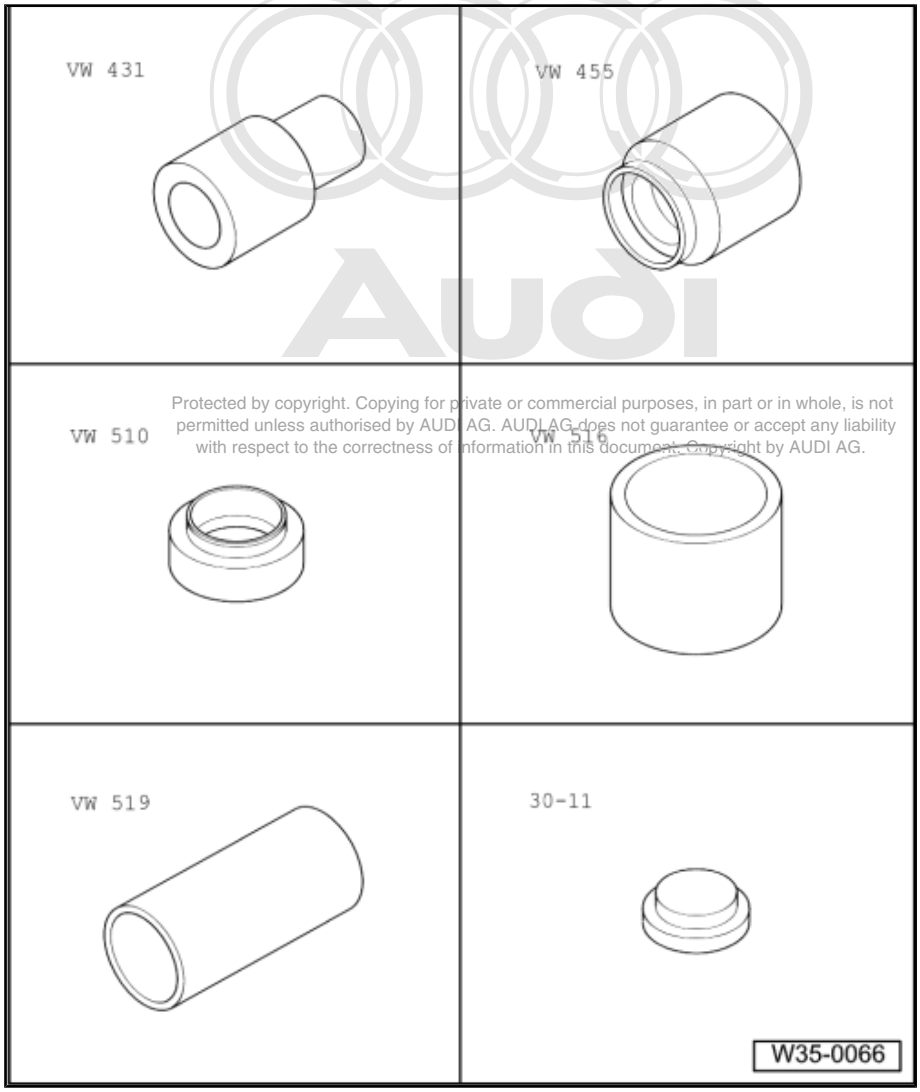
3.1 Dismantling and assembling output shaft for 5th, 6th and reverse gear

Special tools and workshop equipment required

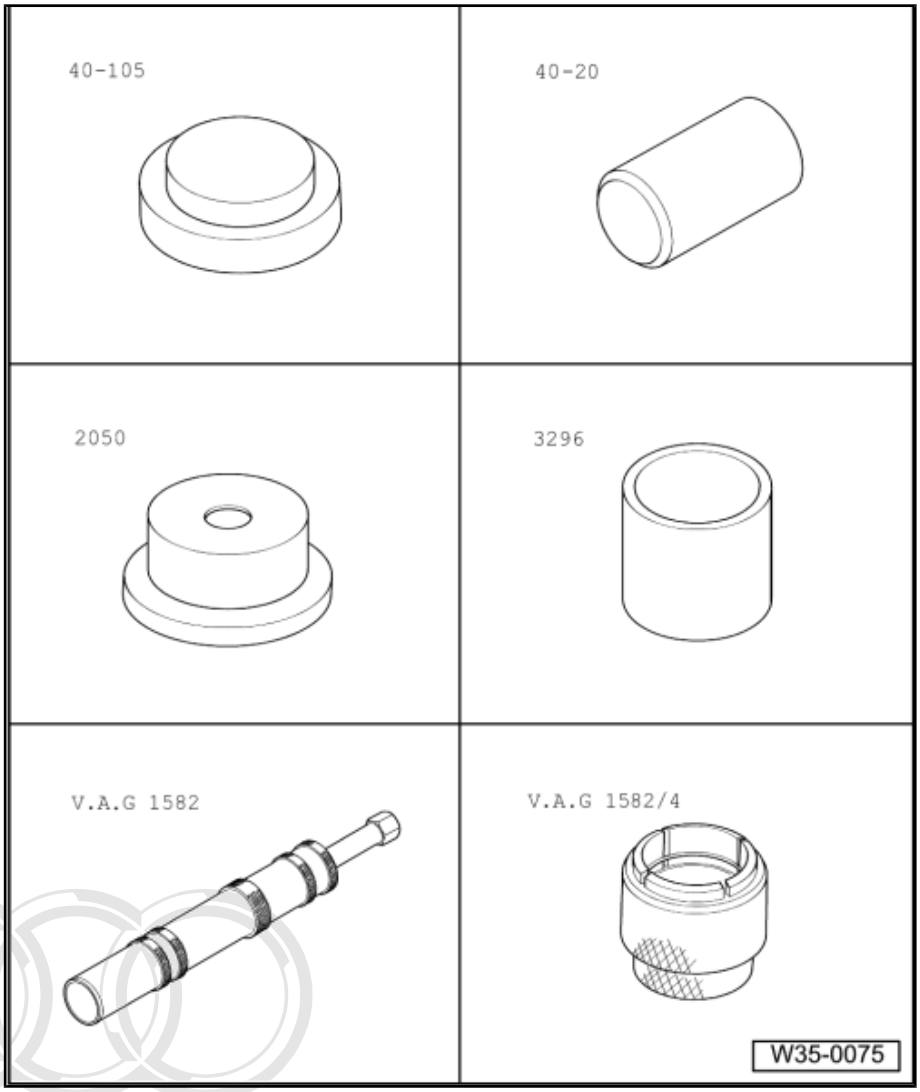
- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Press tool -VW 408 A-
- Press tool -VW 412-
- Tube -VW 415 A-



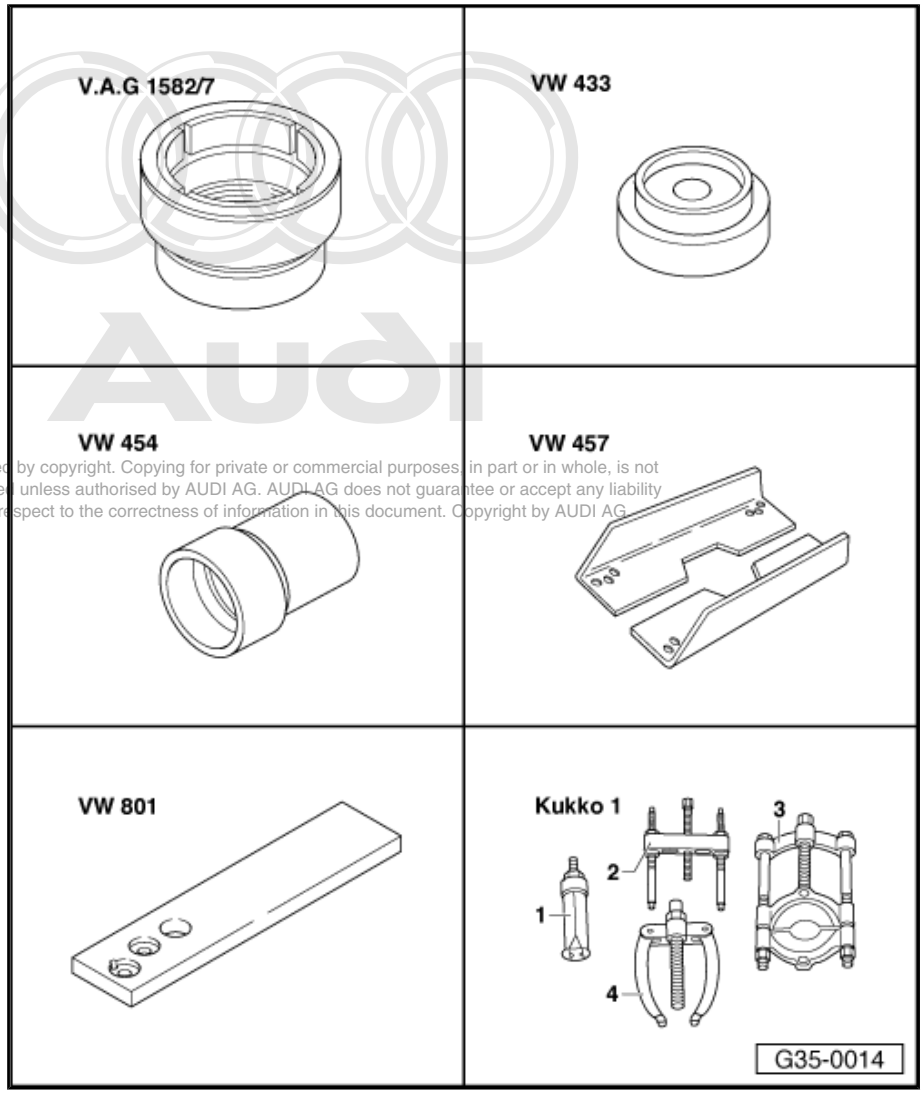
- Press tool -VW 431-
- Installing sleeve -VW 455-
- Thrust pad -VW 510-
- Tube -VW 516-
- Tube -VW 519-
- Thrust plate -30 - 11-



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



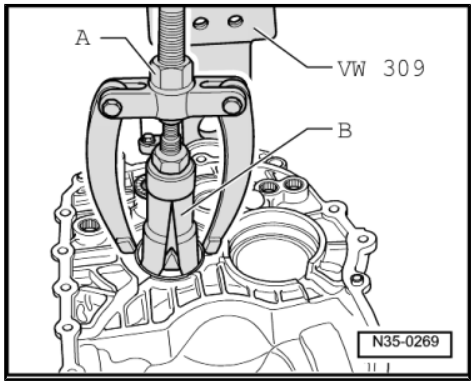
- Adapter -V.A.G 1582/7-
- Press tool -VW 433-
- Press tool -VW 454-
- Support rails -VW 457-
- Support plate -VW 801-
- -1- Kukko internal puller 21/7
- -3- Splitter 17/2
- -4- Kukko 22/2 counter-support



Pulling out tapered roller bearing outer race

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

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



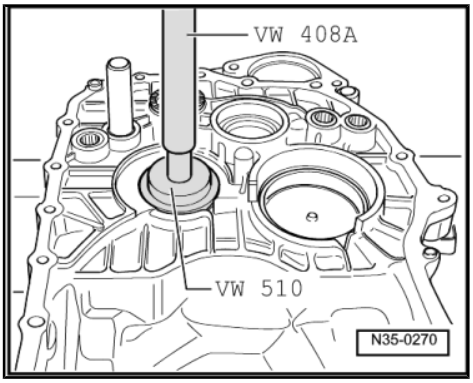
Note

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

Pressing tapered roller bearing outer race into clutch housing

– Fit shim below outer race.

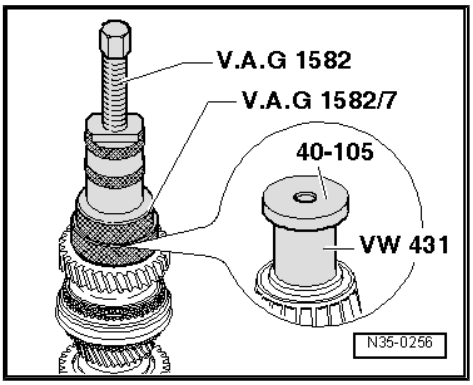
– Support clutch housing with drift sleeve -40 - 20- directly below bearing mounting.



Pulling off tapered roller bearing inner race

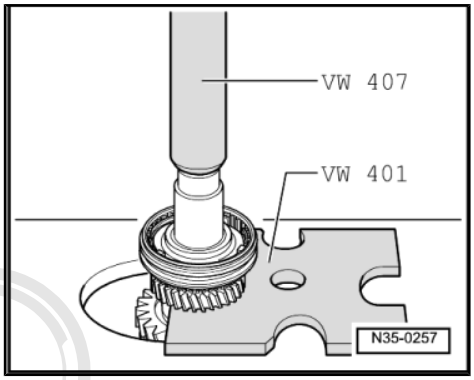
– Remove circlip.

– Before setting up puller, position press tool -VW 431- and thrust plate -40 - 105- on output shaft.



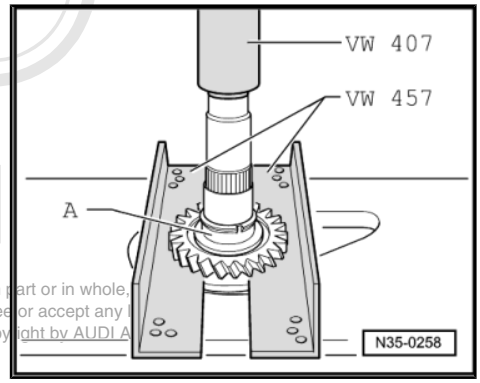
Pressing off 5th and 6th gear synchronising hub/locking collar with 6th speed selector gear

– Remove circlip before pressing off.



Pressing off sleeve -A- with reverse selector gear

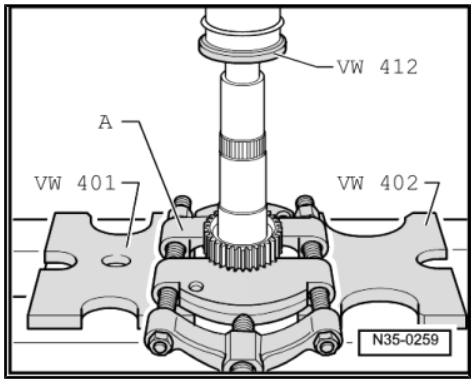
– Remove circlip before pressing off.



Pressing off reverse gear synchronising hub

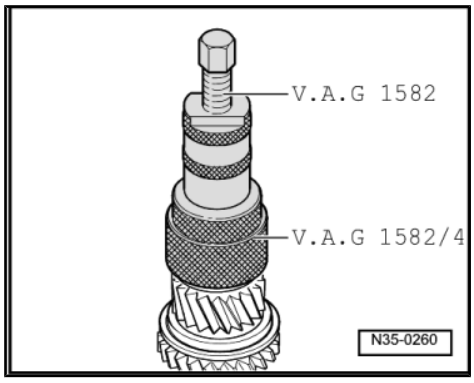
– Remove circlip before pressing off.

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



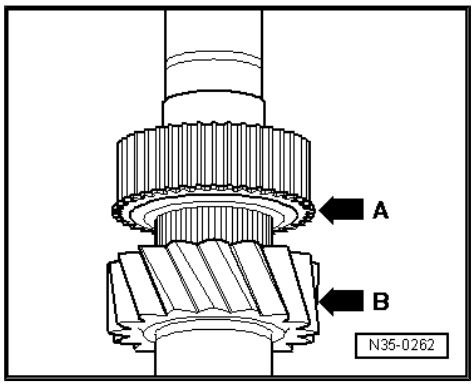
Pulling off tapered roller bearing inner race

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



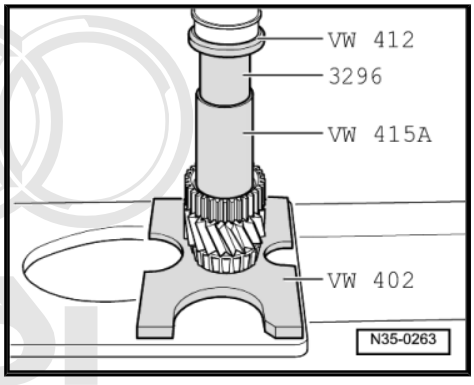
Installation position of reverse gear synchronising hub

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



Pressing on reverse gear synchronising hub

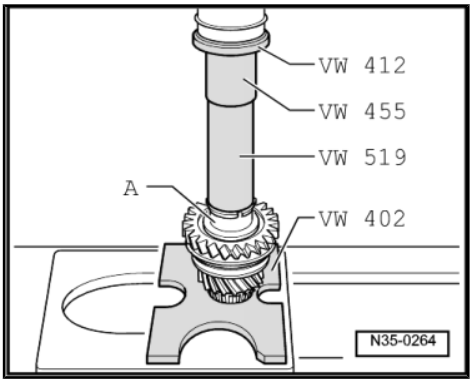
– Then install circlip.



Pressing on sleeve -A-

- Installation position: Wide shoulder faces towards reverse selector gear

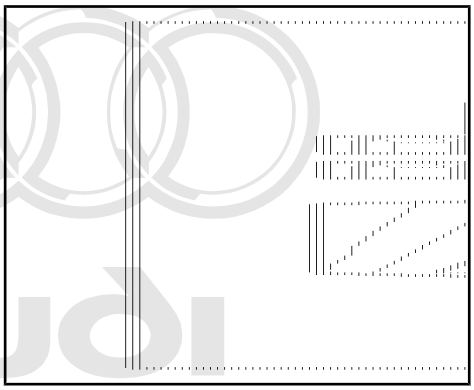
– Then install circlip.



Checking 5th and 6th 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
5th and 6th gear	1.0...1.7 mm	0.5 mm



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

– Take off springs -1- before dismantling.

1 - Spring

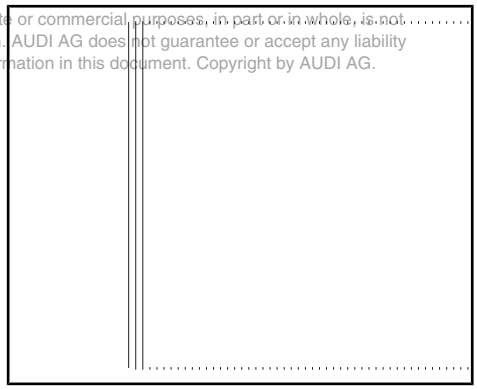
2 - Locking piece

3 - Locking collar

4 - Synchronising hub

– To assemble, slide locking collar over synchronising hub.

- Installation position: Narrower recesses for locking pieces in synchronising hub align with recesses in locking collar

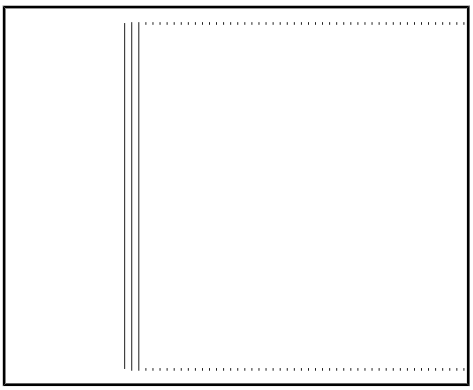


Assembling 5th and 6th gear locking collar/synchronising hub

- Locking collar is pushed over synchronising hub.

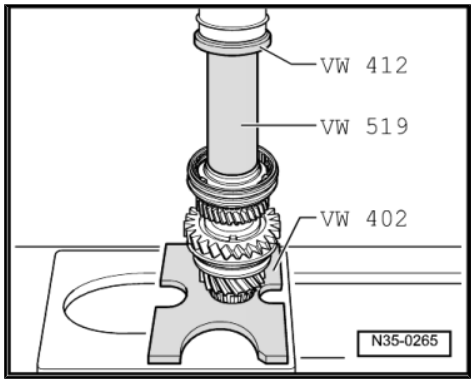
– Insert locking pieces and install springs offset at 120°.

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



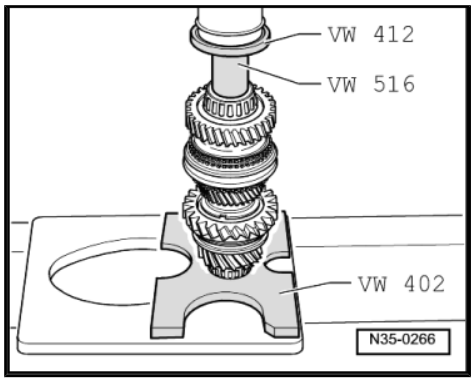
Pressing on 5th and 6th gear locking collar/synchronising hub

– Then install circlip.



Pressing on tapered roller bearing inner race

– Then determine thickness of required circlip ⇒ page 244 and install circlip.

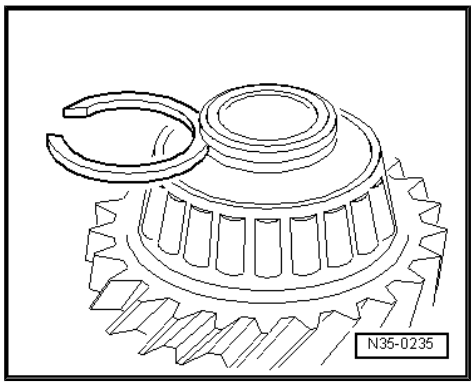


Determining thickness of circlip

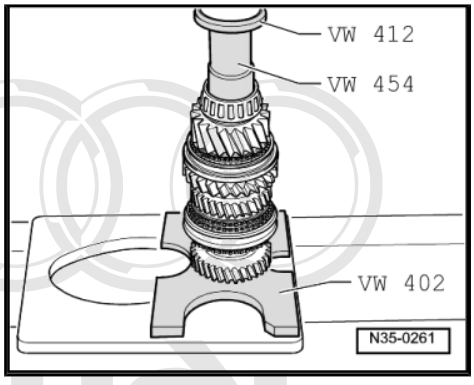
– Determine the thickest circlip that will just fit and install it. For part number refer to ⇒ Electronic parts catalogue .

The following circlips are available:

Circlip thickness (mm)		
1.79	1.83	1.86
1.89	1.92	1.95
1.98		



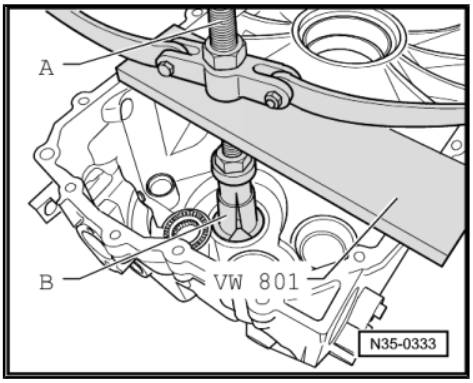
Pressing on tapered roller bearing inner race



Pulling tapered roller bearing outer race out of gearbox housing

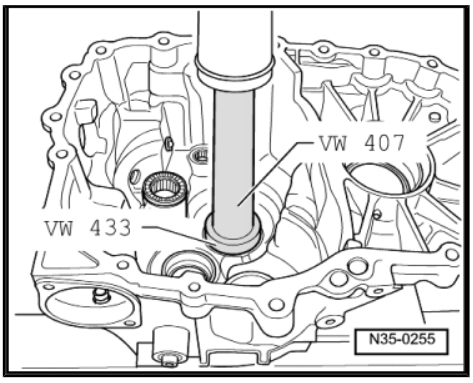
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

– Place thrust piece -2050- directly under bearing mounting to support gearbox housing.



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

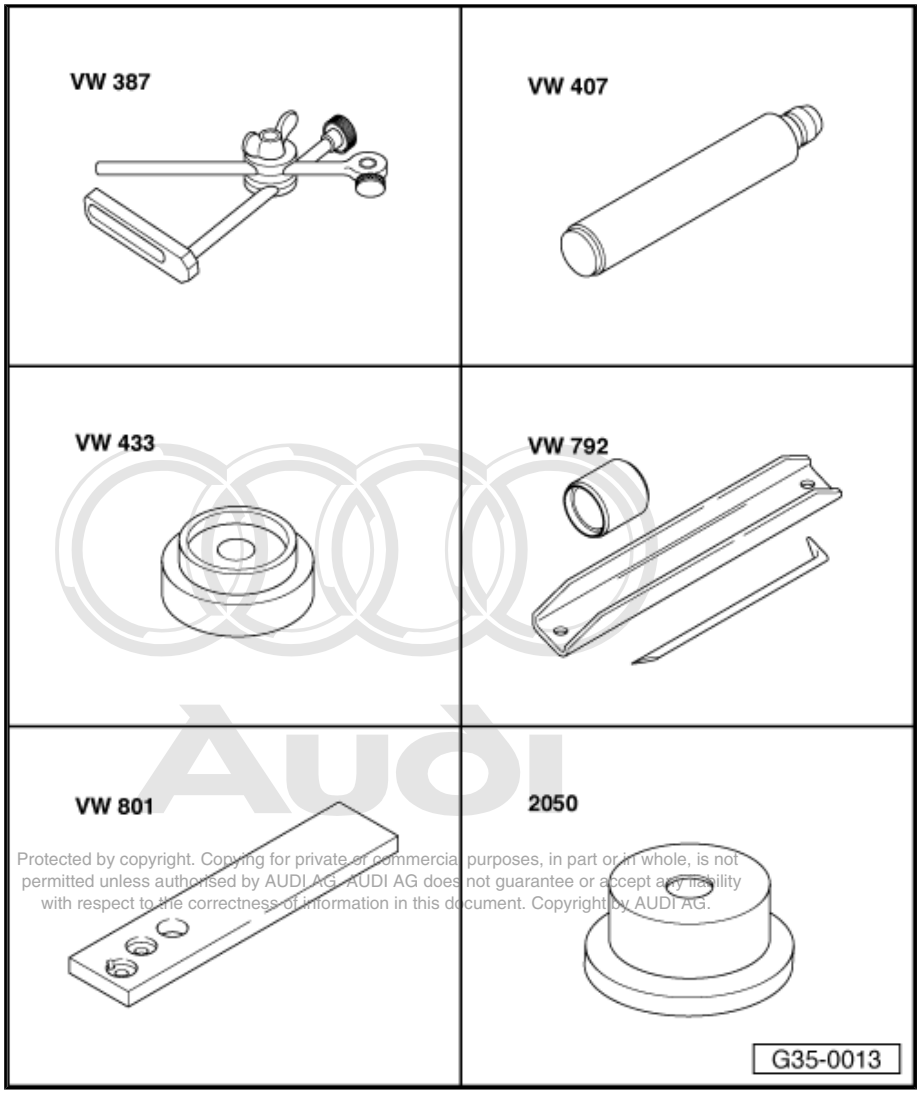
The output shaft must be re-adjusted when the following components are renewed:

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

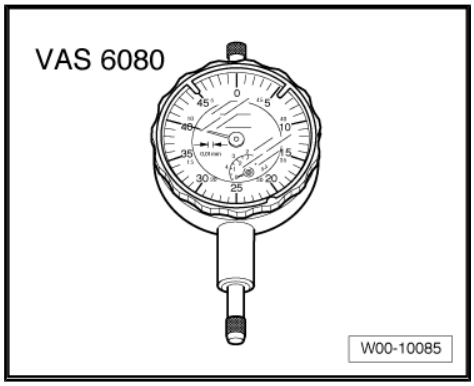
Table of adjustments ⇒ page 274

Special tools and workshop equipment required

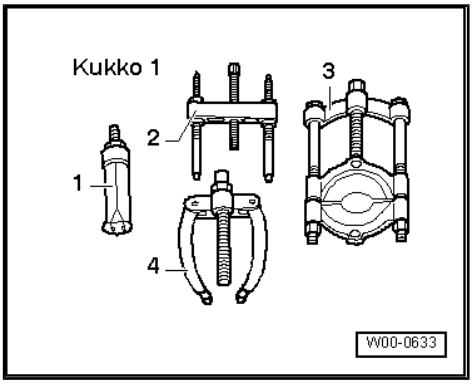
- Universal dial gauge bracket -VW 387-
- Press tool -VW 407-
- Press tool -VW 433-
- Assembly device -VW 792-
- Support plate -VW 801-
- Thrust piece -2050-



- Dial gauge -VAS 6080-



♦ -1- Kukko internal puller 21/7



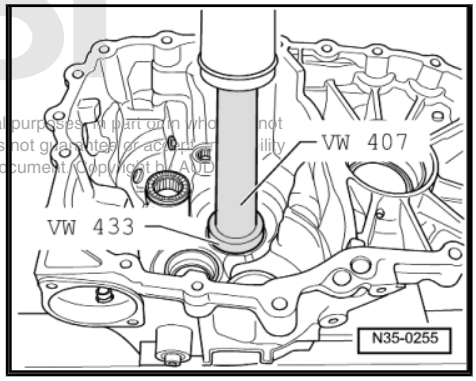
♦ -4- Kukko 22/2 counter-support

Adjusting

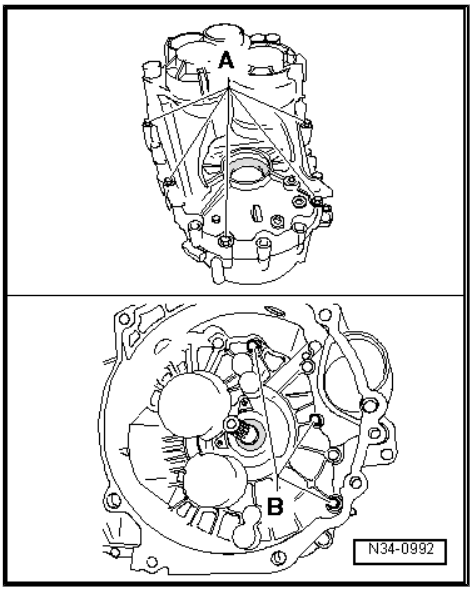
- Gearbox removed ⇒ page 82 and mounted on assembly stand ⇒ page 125 .
- Sealing surfaces of clutch and gearbox housings must be free of sealant.
- When taking measurements, install only the shaft to be measured.

– Press tapered roller bearing outer race with shim (thickness 1.70 mm) into gearbox housing. Support gearbox housing with thrust piece -2050- directly below bearing mounting.

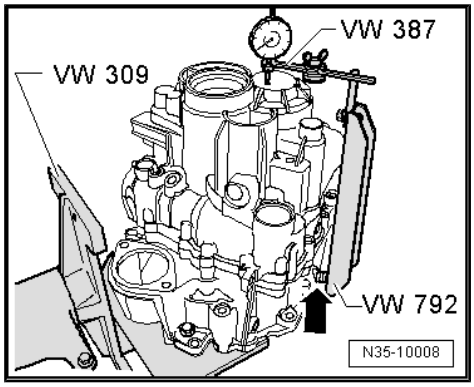
– Now insert complete 5th/6th/reverse gear output shaft in clutch housing.



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



– Attach measuring equipment. Put washers of a total thickness of 8 mm on bolt -arrow- securing assembly device -VW 792- to clutch housing.
– Set dial gauge -VAS 6080- (3 mm measuring range) to zero with 1 mm preload.
– Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
– Read off play on gauge and note reading (example: 0.25 mm).



Note

If no play is indicated on the dial gauge when the clutch housing/gearbox housing securing bolts are loosened, fit a 1.95 mm shim (part number -084 409 383 AS-), or if necessary a 2.20 mm shim (part number -084 409 383 BD-) for performing the measurement.

Determining thickness of shim

The specified bearing preload is attained by subtracting the measured value (0.25 mm) from the inserted shim (1.70 mm) and adding a constant value for preload (0.20 mm).

Example:

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

– Select a shim of the required thickness from the table. For part number refer to ⇒ Electronic parts catalogue .

The following shims are available:

Thickness of shims in mm			
1.50	1.70	1.90	2.10
1.55	1.75	1.95	2.15
1.60	1.80	2.00	2.20
1.65	1.85	2.05	2.25

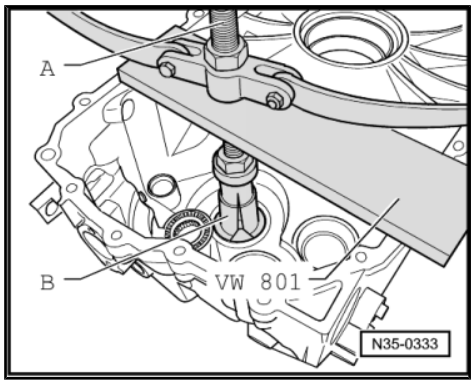
The exact shim thickness required can be obtained by combining shims of different thicknesses.

– Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing.

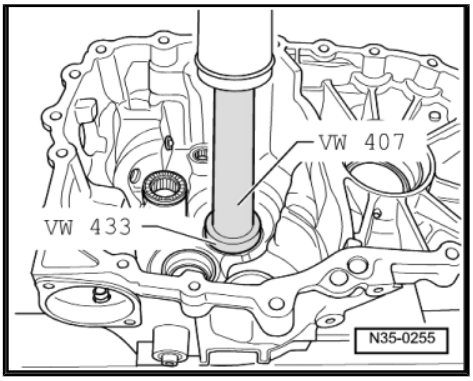
A - Counter-support , e.g. -Kukko 22/2-

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

– Remove inserted shim (1.70 mm thick) from gearbox housing.



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



Checking adjustment

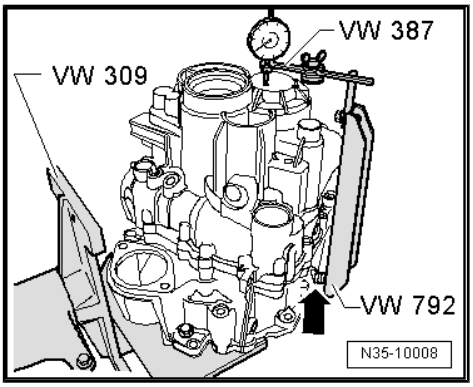
- Required shim installed (thickness as determined above)

– Attach measuring equipment. Put washers of a total thickness of 8 mm on bolt -arrow- securing assembly device -VW 792- to clutch housing.

– Set dial gauge -VAS 6080- (3 mm measuring range) to zero with 1 mm preload.

– Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.

- If the correct shim has been selected, the dial gauge should now indicate a value between 0.15 and 0.25 mm.



39 – Final drive - front differential

1 Exploded view - flange shaft and oil seals on gearbox

1 - Oil seal
- ❑ Between bevel box and gearbox
- ❑ Renewing with manual gearbox installed ⇒ page 253

2 - Oil seal for selector shaft
- ❑ Renewing ⇒ page 201

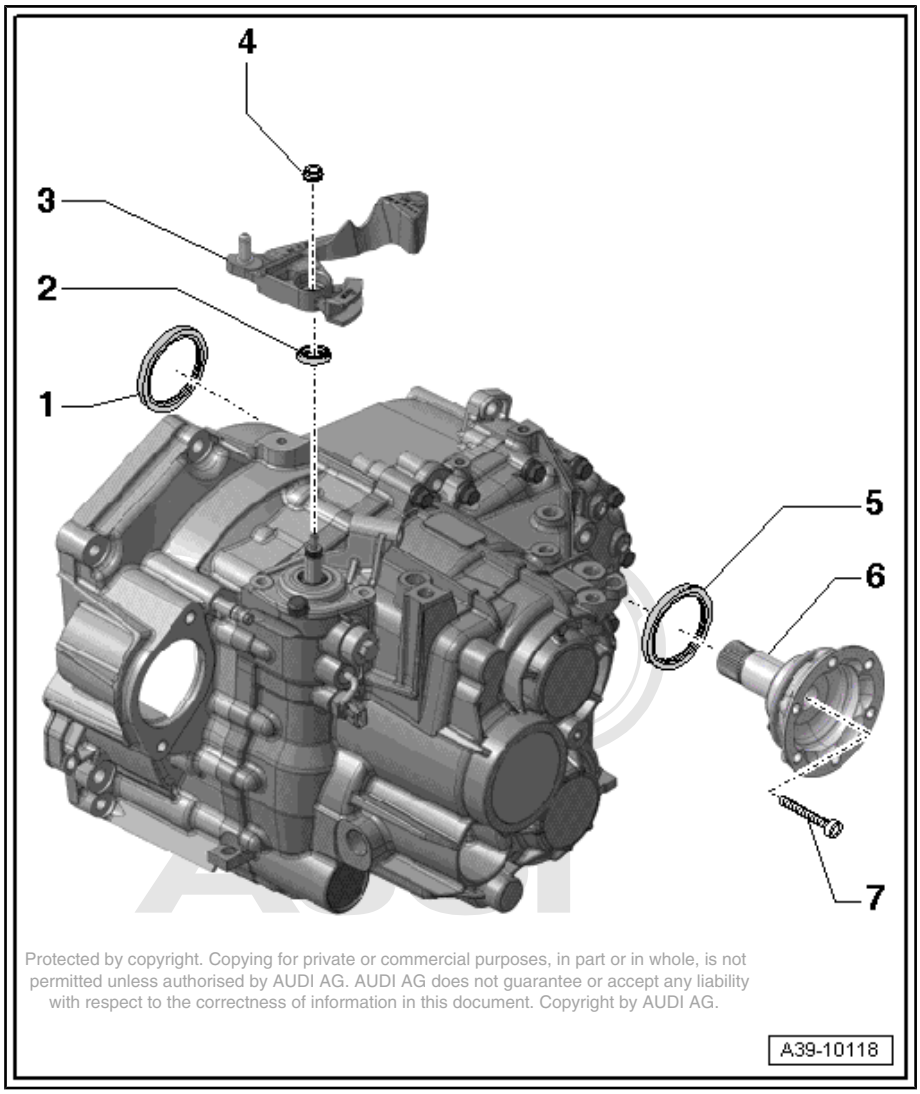
3 - Gearbox selector lever

4 - Nut
- ❑ Tightening torque ⇒ Item 8 (page 70)

5 - Oil seal for flange shaft (left-side)
- ❑ Renewing ⇒ page 251

6 - Flange shaft (left-side)
- ❑ Removing and installing ⇒ page 250

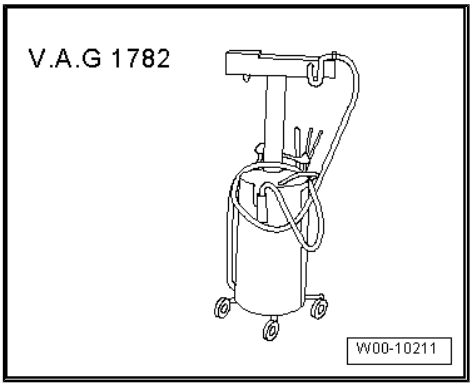
7 - Bolt
- ❑ 33 Nm
- ❑ Renew



1.1 Removing and installing flange shaft (left-side)

Special tools and workshop equipment required

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



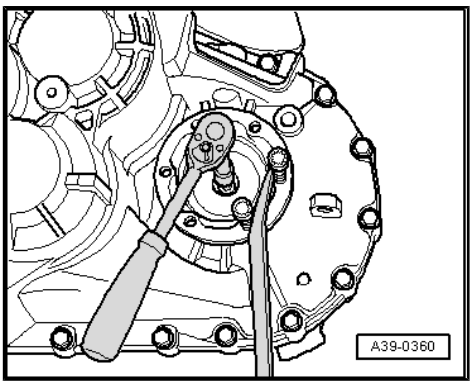
Removing

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

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

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

– Pull out flange shaft and spring.



Installing

• Tightening torque ⇒ page 250

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

– Push flange shaft in against spring pressure securing bolt.

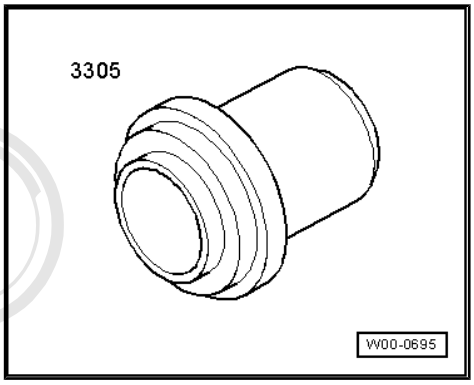
– Install drive shaft (left-side) ⇒ Rep. Gr. 40 .

– Check gear oil level in manual gearbox and top up as required ⇒ page 138 .

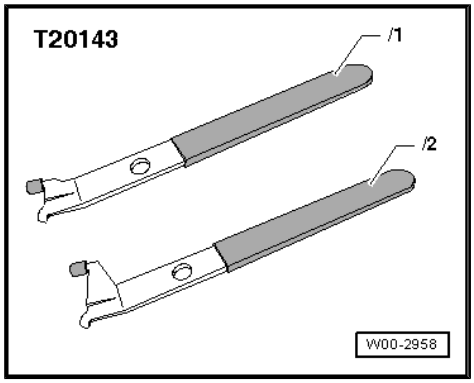
1.2 Renewing oil seal for flange shaft (left-side)

Special tools and workshop equipment required

♦ Thrust piece -3305-



♦ Extractor tool -T20143/2-



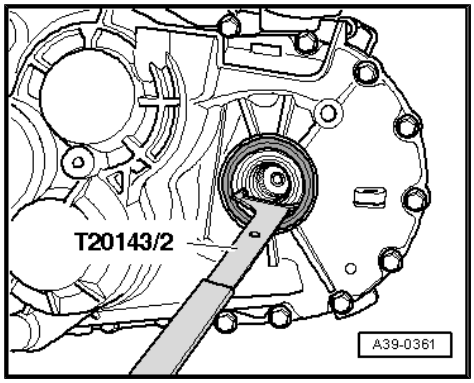
♦ Sealing grease -G 052 128 A1-

Procedure

• Gearbox in vehicle

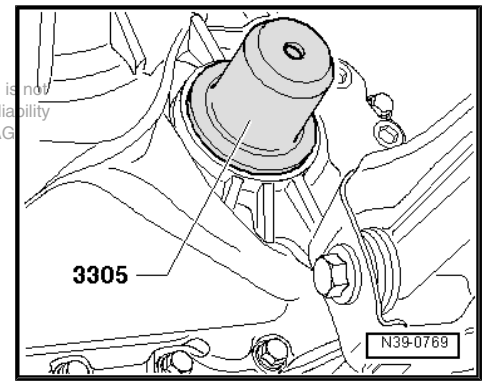
– Remove flange shaft (left-side) ⇒ page 250 .

– Pull out flange shaft oil seal using extractor tool -T20143/2- .



– Lightly oil outer circumference of new oil seal.

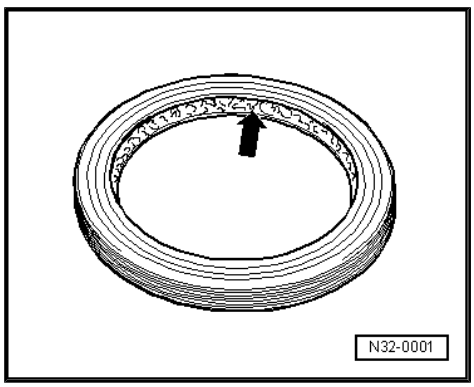
– Drive in new oil seal onto stop (take care to keep oil seal straight).



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

– Install flange shaft (left-side) ⇒ page 250 .

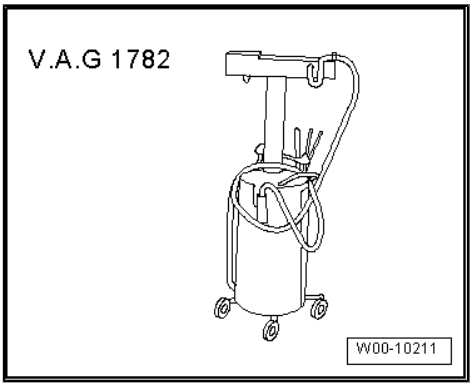
– Check gear oil level in manual gearbox and top up as required ⇒ page 138 .



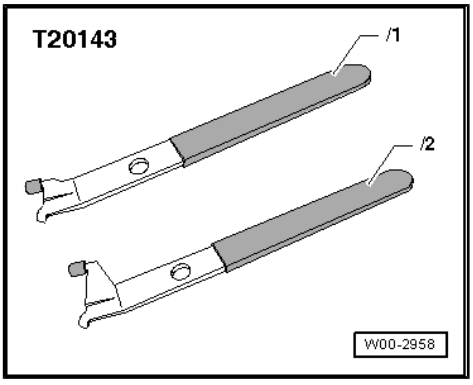
1.3 Renewing oil seal for bevel box with gearbox installed

Special tools and workshop equipment required

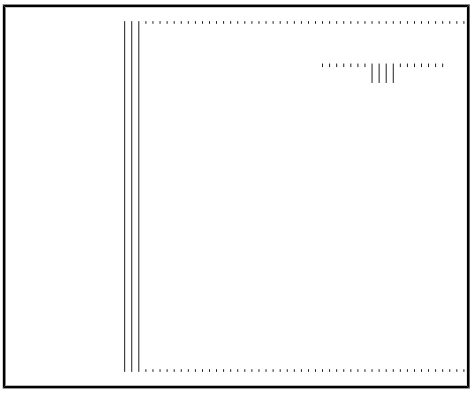
- Used oil collection and extraction unit -V.A.G 1782-



- Extractor tool -T20143/2-



- Thrust piece -T10243-



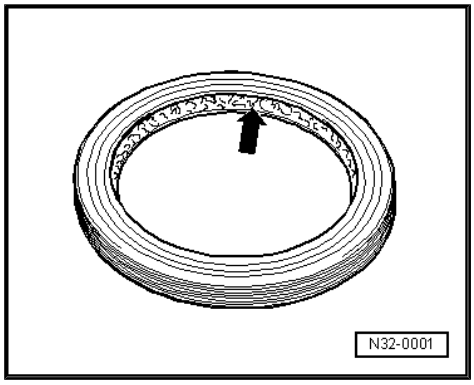
Procedure

- Bevel box removed ⇒ page 140 .

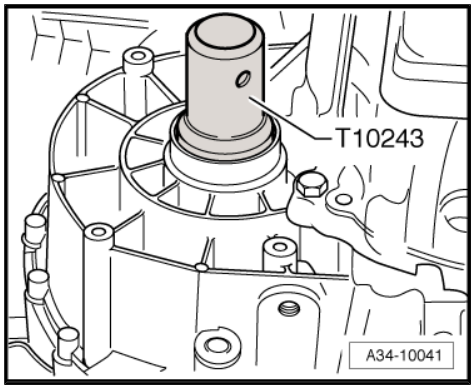
– Place drip tray -VAS 6208- underneath.

– Pry out oil seal for bevel box using extractor tool -T20143/2- or oil seal extractor lever -VW 681- .

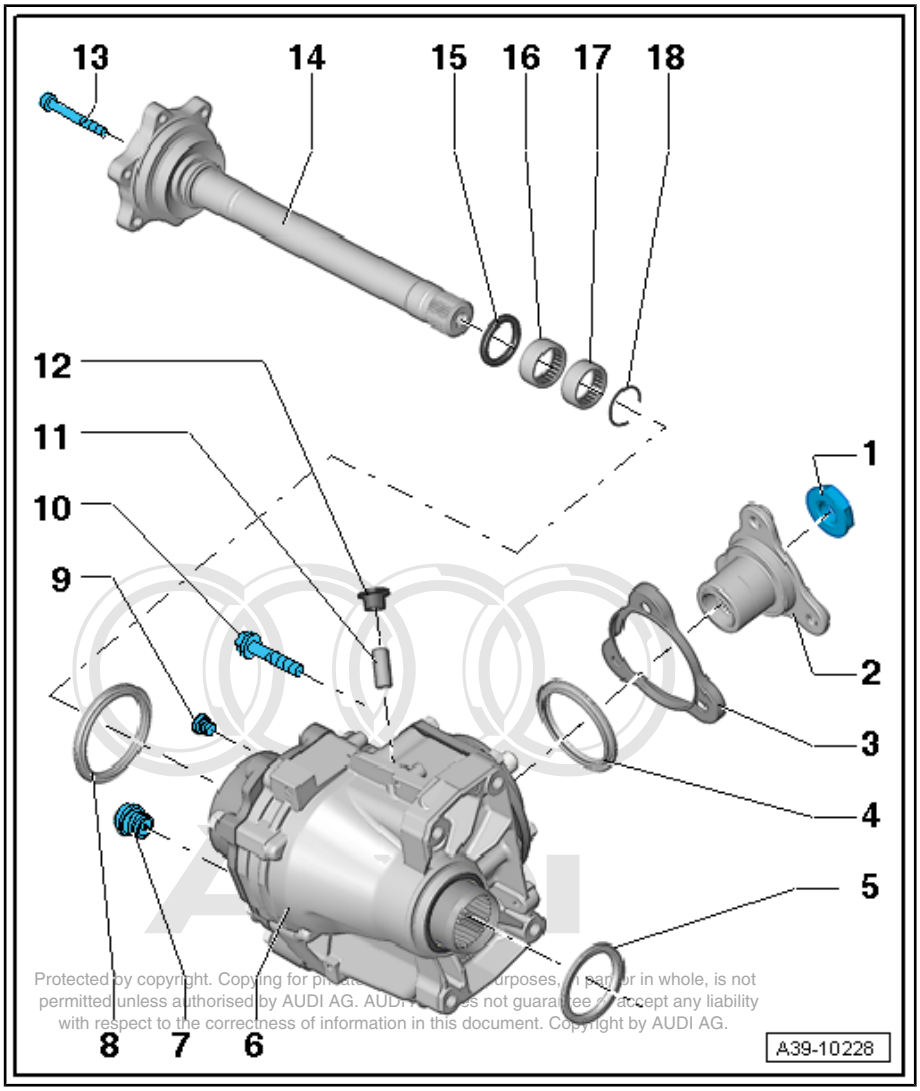
– Pack space between sealing lip and dust lip -arrow- half-full with sealing grease -G 052 128 A1- .
– Lightly oil outer circumference of new oil seal.



– Drive in oil seal onto stop.
– Check gear oil level in manual gearbox and top up as required ⇒ page 138 .



2 Exploded view - flange shaft and oil seals on bevel box



1 - Nut
- ❑ 480 Nm
- ❑ Renew

2 - Output flange on bevel box

3 - Output flange cap
- ❑ Renew if damaged

4 - Oil seal
- ❑ For output flange on bevel box
- ❑ Renewing ⇒ page 262

5 - Oil seal on bevel box
- ❑ Between gearbox and bevel box
- ❑ Renewing ⇒ page 260

6 - Bevel box
- ❑ Removing and installing ⇒ page 140

7 - Screw plug
- ❑ For oil drain hole on bevel box
- ❑ 60 Nm

8 - Oil seal
- ❑ For flange shaft (right-side) on bevel box (outer)
- ❑ Renewing ⇒ page 258

9 - Screw plug
- ❑ For oil filler hole at bevel box
- ❑ Tightening torque ⇒ page 150

10 - Bolt
- ❑ Bevel box to gearbox
- ❑ 40 Nm and then turn 45° further
- ❑ 4x
- ❑ Renew

11 - Breather pipe

12 - Breather cap

13 - Bolt
- ❑ 33 Nm
- ❑ Renew

14 - Flange shaft (right-side)
- ❑ Removing and installing ⇒ page 256

15 - Oil seal
- ❑ Renew

16 - Needle bearing (polygon bearing)

- ❑ Does not turn easily when flange shaft is removed; this does not indicate a fault
- ❑ Acoustic check can only be performed when installed
- ❑ Check for damage such as cracking in outer race
- ❑ Renewing ⇒ page 259

17 - Needle bearing (polygon bearing)

- ❑ Does not turn easily when flange shaft is removed; this does not indicate a fault
- ❑ Acoustic check can only be performed when installed
- ❑ Check for damage such as cracking in outer race
- ❑ Renewing ⇒ page 259

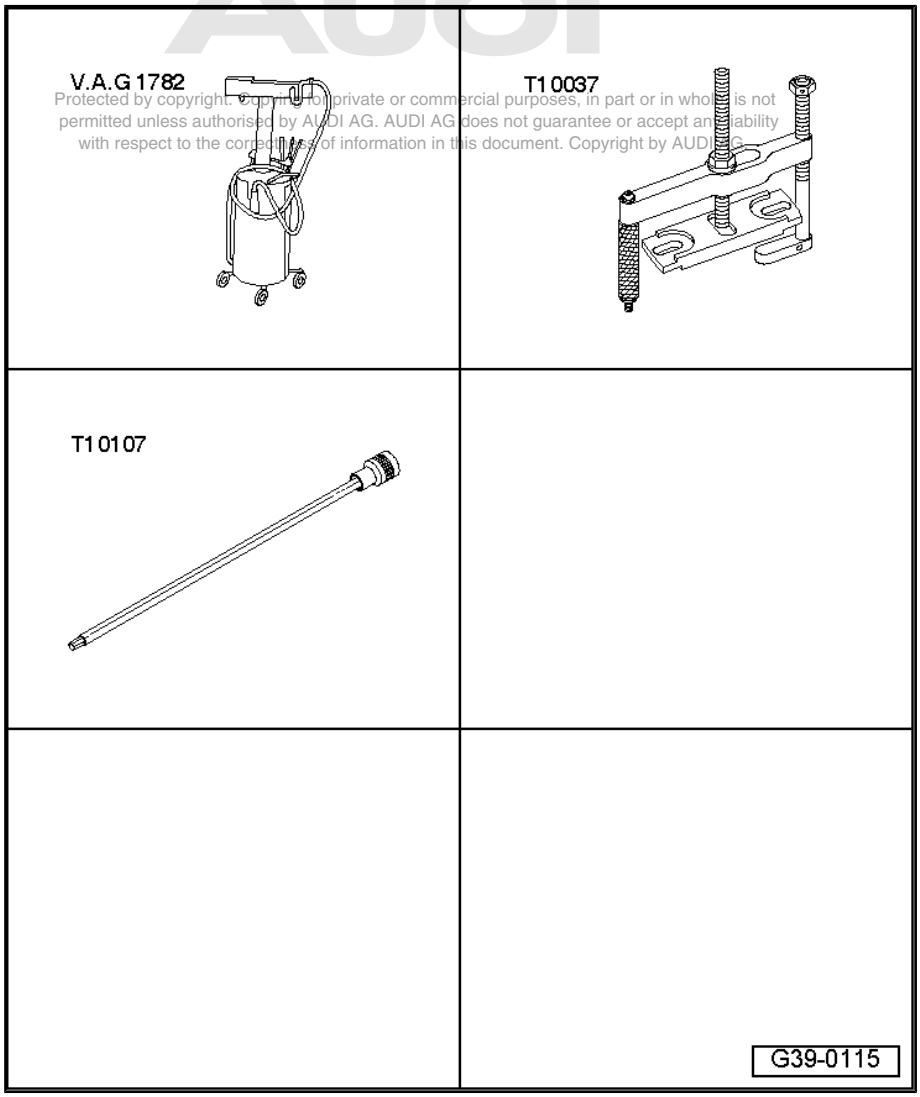
18 - Circlip

- ❑ Renew

2.1 Removing and installing flange shaft (right-side)

Special tools and workshop equipment required

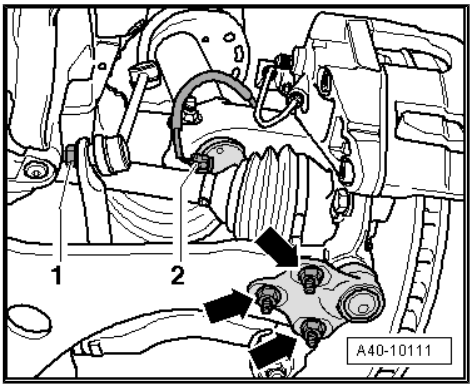
- ♦ Used oil collection and extraction unit -V.A.G 1782-
- ♦ Puller -T10037-
- ♦ Socket and extended bit -T10107 A-



Removing

– Mark installation position of nuts -arrows- with a felt-tip pen.

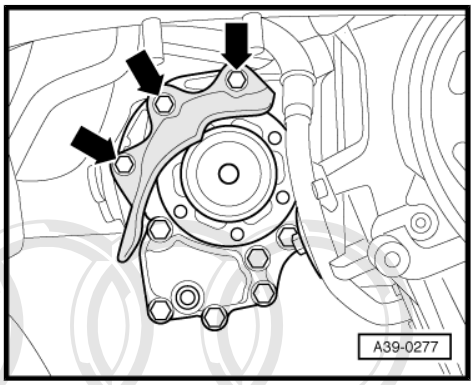
– Remove drive shaft (right-side) ⇒ Rep. Gr. 40 .



– Unbolt heat shield for drive shaft (right-side) from bevel box -arrows-.

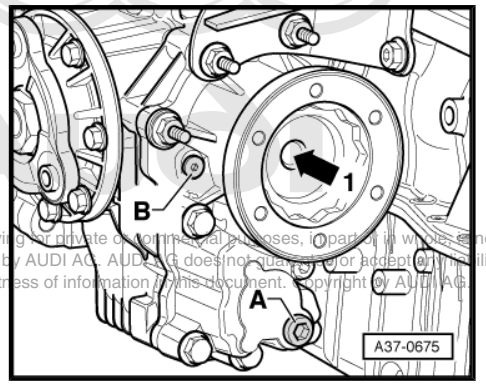
Note

Illustration shows 3.2 ltr. MPI engine.



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

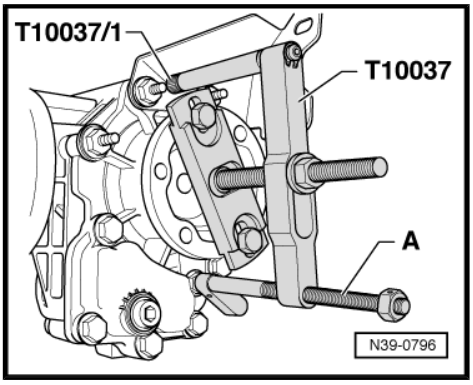
– Using socket and extended bit -T10107 A- , remove bolt -arrow 1- securing flange shaft (right-side). To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.



– Attach puller -T10037- to flange shaft (right-side).

– Use knurled nut -T10037/1- and lower support -A- to align puller -T10037- parallel with flange.

– Pull out flange shaft.



Installing

• Tightening torque ⇒ page 255

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

– Carefully drive in flange shaft (while turning).

– Secure flange shaft.

– Install heat shield for drive shaft (right-side) ⇒ page 122 .

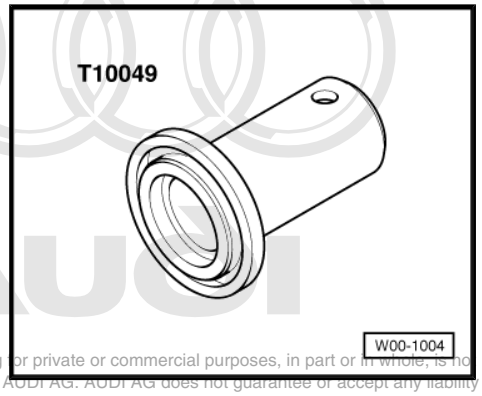
– Install drive shaft (right-side) ⇒ Rep. Gr. 40 .

– Check gear oil level in manual gearbox and top up as required ⇒ page 138 .

2.2 Renewing flange shaft oil seal (right-side) at bevel box (outer seal)

Special tools and workshop equipment required

- Thrust piece -T10049-



Procedure

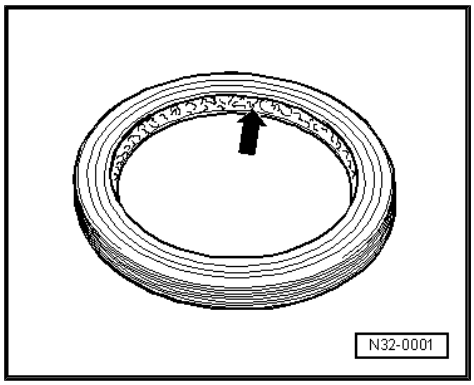
- Gearbox in vehicle

– Remove flange shaft (right-side) ⇒ page 256 .

– Pry out flange shaft oil seal using assembly lever.

– Lightly oil outer circumference of new oil seal.

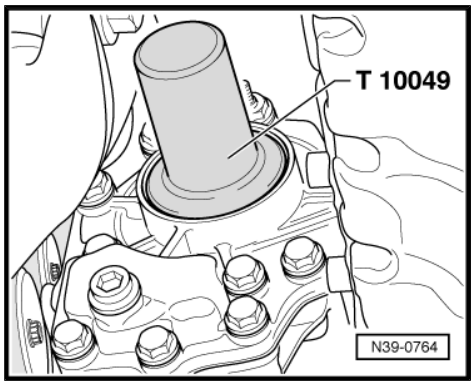
– Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .



– Drive oil seal in onto stop using thrust piece -T10049- .

– Install flange shaft (right-side) ⇒ page 256 .

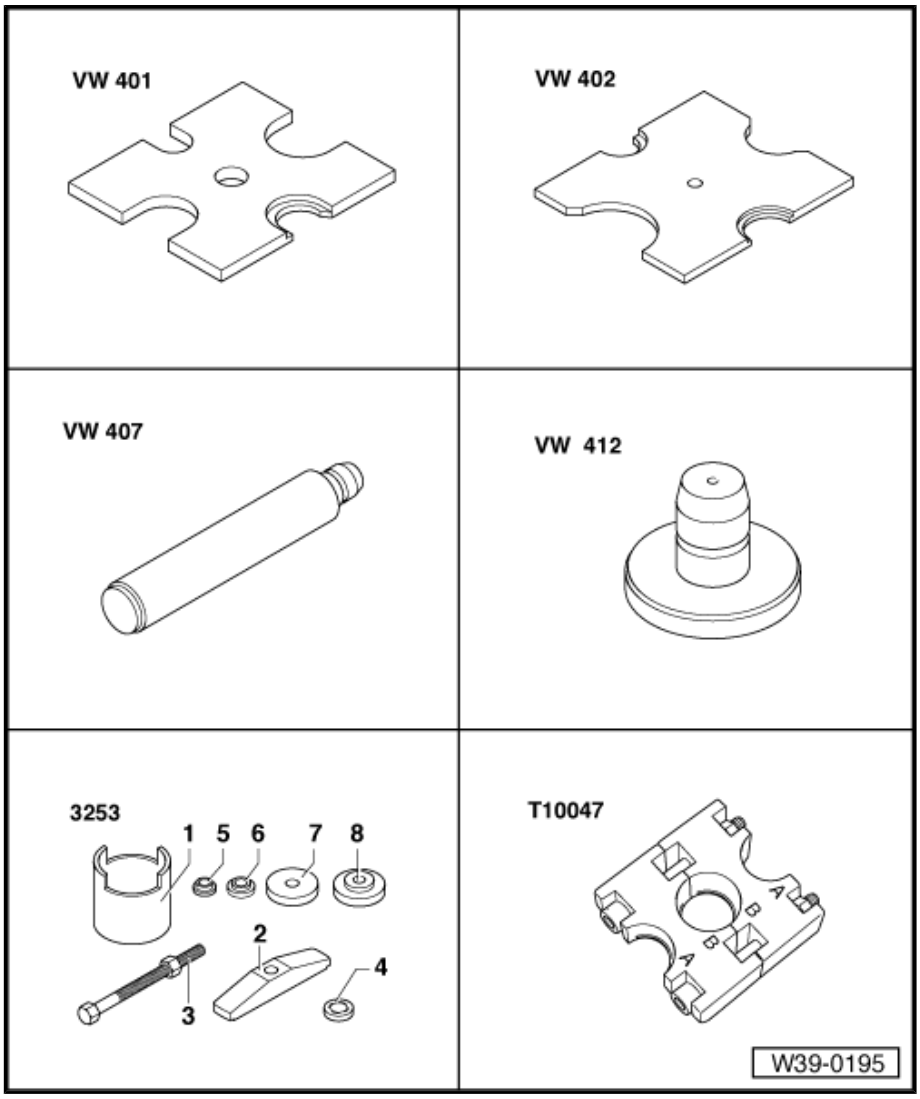
– Check gear oil level in bevel box and top up as required ⇒ page 138 .



2.3 Renewing needle bearings (polygon bearings) for flange shaft (right-side)

Special tools and workshop equipment required

- Thrust plate -VW 401-
- Thrust plate -VW 402-
- Press tool -VW 407-
- Press tool -VW 412-
- Assembly tool -VAS 3253-
- Clamp -T10047-



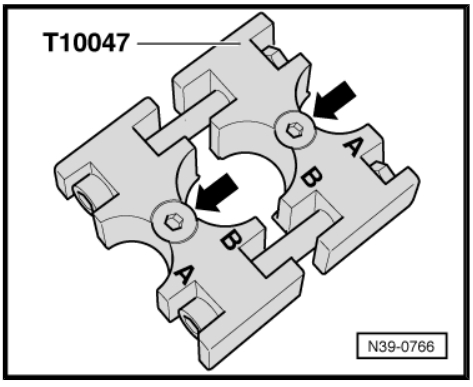
Procedure

– Remove flange shaft (right-side) ⇒ page 256 .

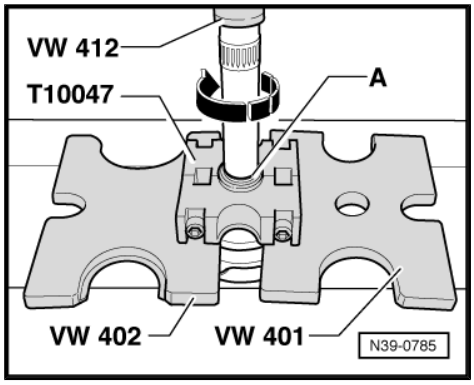
– Assemble assembly tool -T10047- , as shown in illustration.

- Marks “B” on both parts of tool face each other.
- The stepped shoulders -arrows- must then be below the bearing.

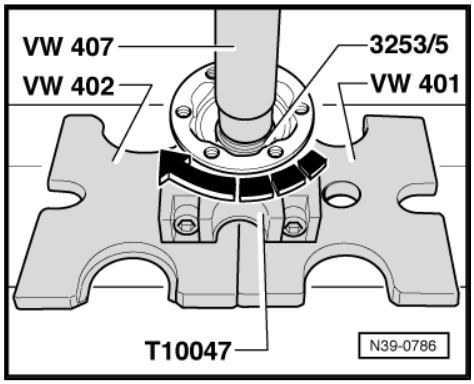
– Screw parts together as far as stop.



– Remove circlip -A-.
– Rotate shaft when pressing off -arrow- to prevent contact surface of needle bearings on shaft from being damaged.



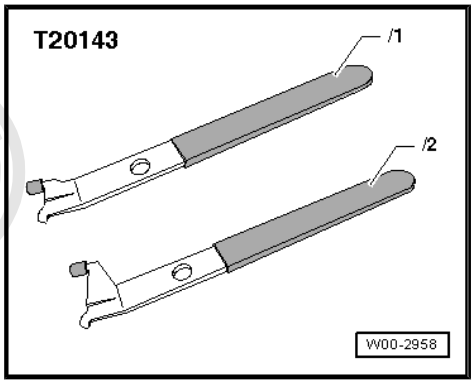
– Rotate shaft when pressing on -arrow- to prevent contact surface of needle bearings on shaft from being damaged.
– Secure needle bearings in position with new circlip.
– Install flange shaft (right-side) ⇒ page 256 .



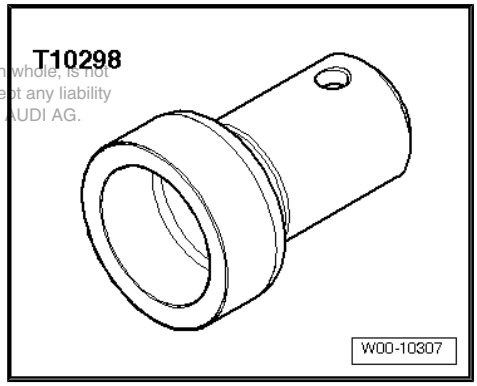
2.4 Renewing oil seal between gearbox and bevel box (on bevel box)

Special tools and workshop equipment required

♦ Extractor tool -T20143-



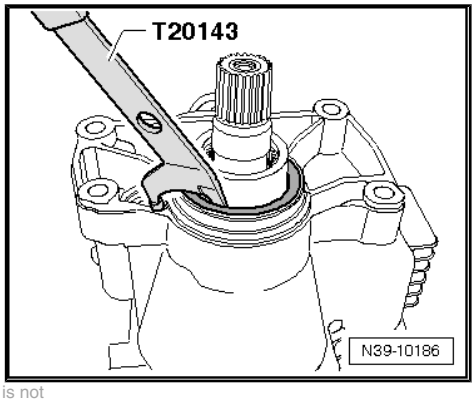
♦ Thrust piece -T10298-



Procedure

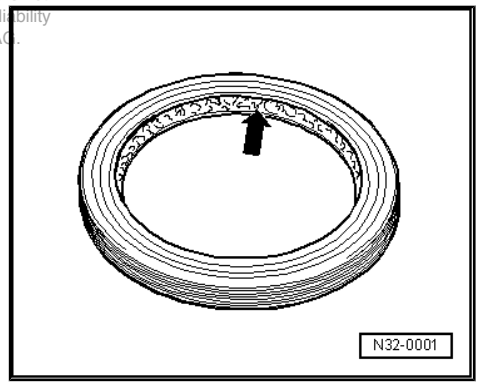
- Bevel box removed ⇒ page 140 .

– Pry out oil seal from bevel box with extractor tool -T20143/1- or -T20143/2- .

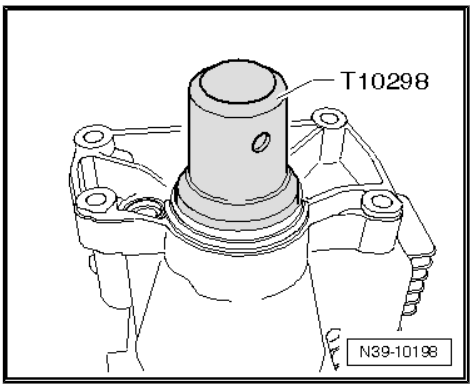


– Lightly oil outer circumference of new oil seal.

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



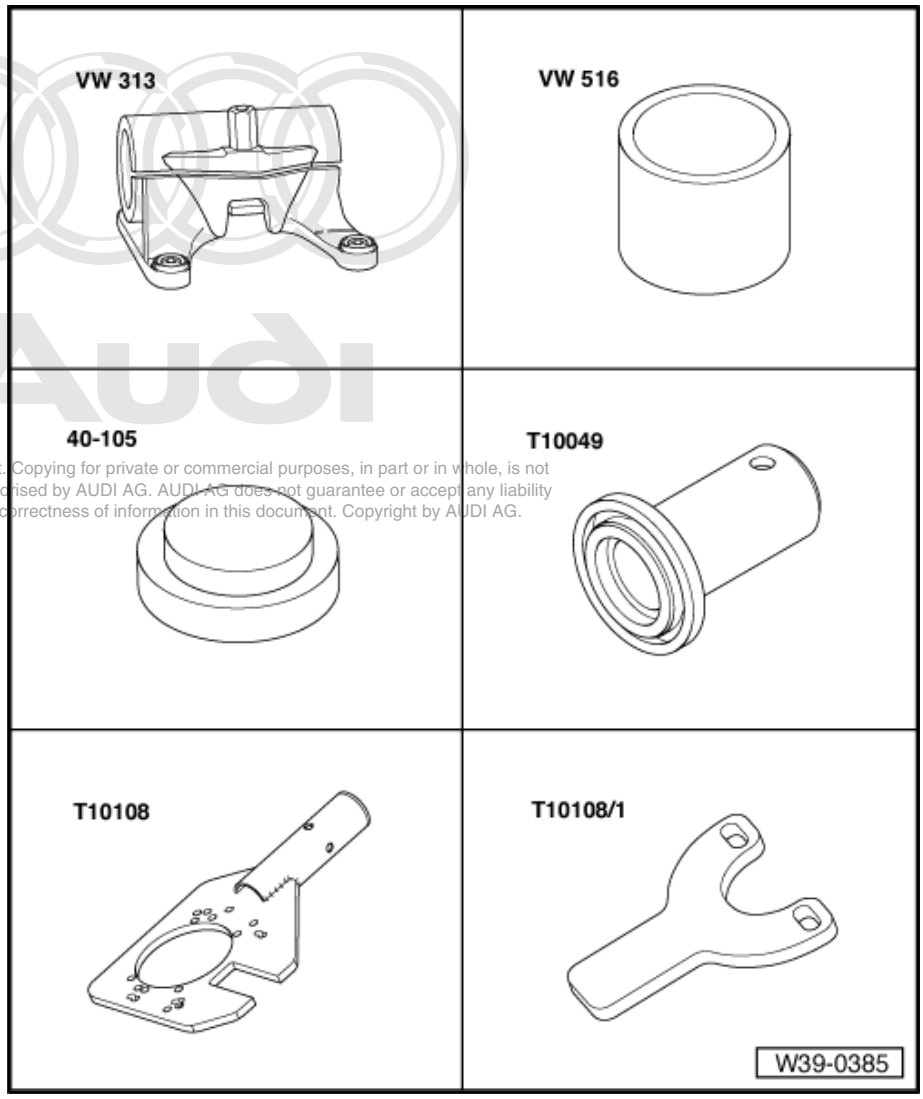
– Drive in oil seal as far as stop using thrust piece -T10298- .



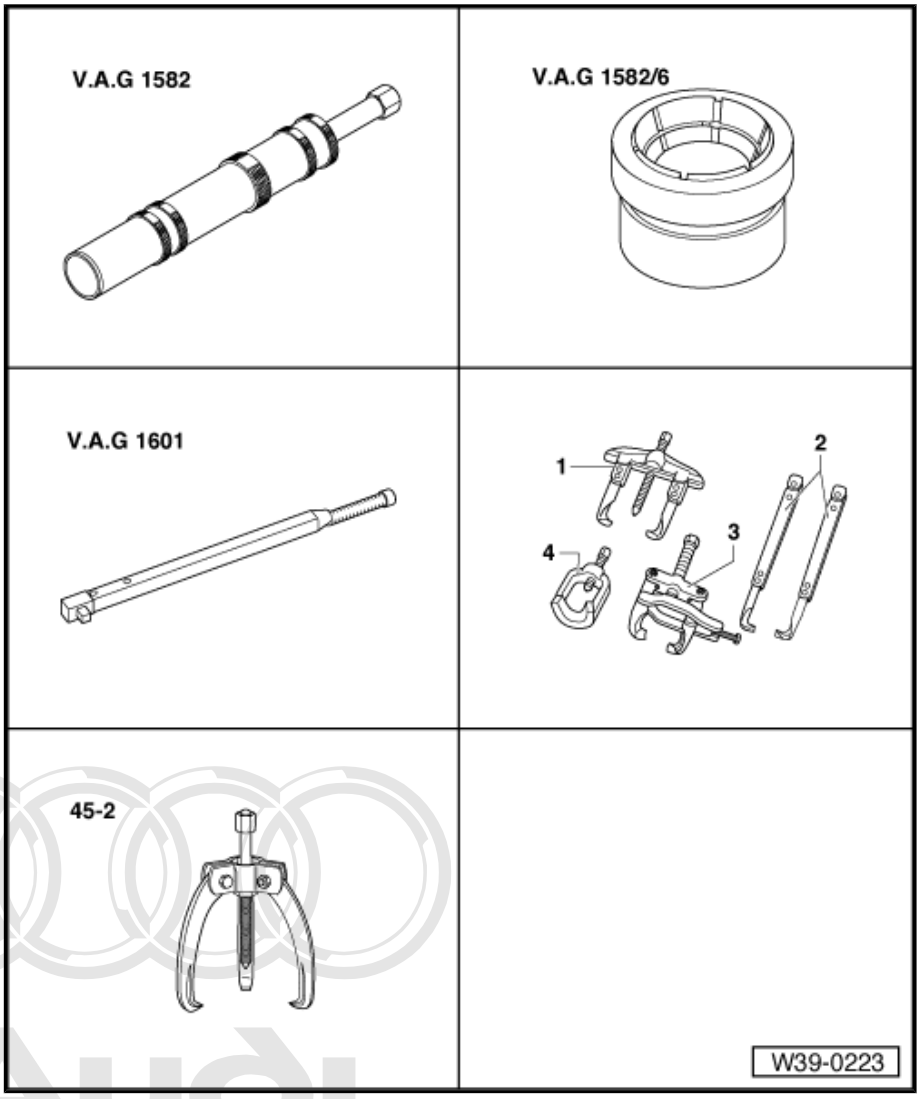
2.5 Renewing oil seal for output flange on bevel box

Special tools and workshop equipment required

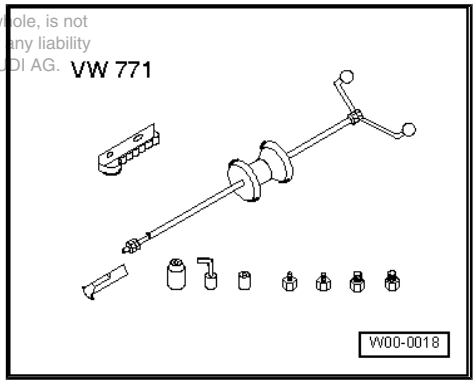
- Support clamp -VW 313-
- Tube -VW 516-
- Thrust plate -40-105-
- Thrust piece -T10049-
- Gearbox support -T10108-
- Support plate -T10108/1-



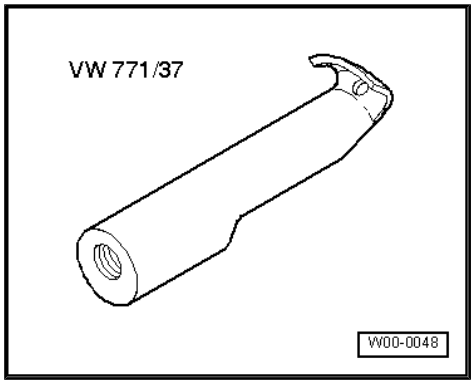
- Tapered roller bearing puller -V.A.G 1582-
- Adapter -V.A.G 1582/6A-
- Torque wrench -V.A.G 1601-
- -1- Two-arm puller Kukko 20/10
- Three-arm puller Kukko 45/2



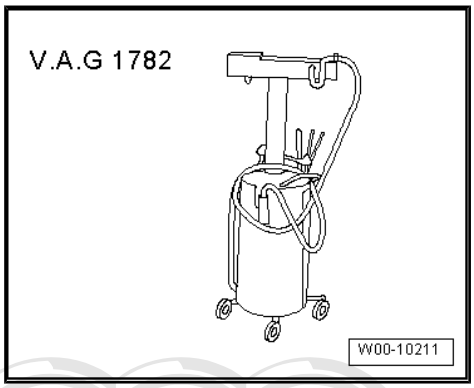
- Multi-purpose tool -VW 771-



♦ Extractor tool -VW 771/31-



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



♦ Bolt M10x30 (2x)

♦ Nut M12x10 (4x)

Procedure

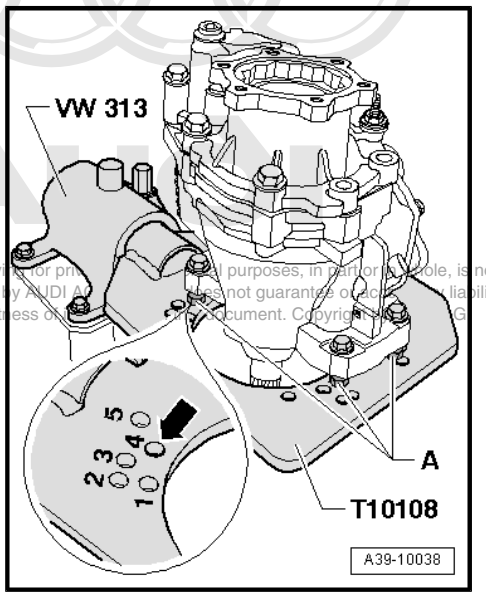
- Tightening torque ⇒ page 255
- Bevel box removed ⇒ page 140 .

– Place nut M12x10 -item A- between bevel box and gearbox support -T10108- and fit bevel box on hole marked “4” -arrow- in gearbox support.

– Then align the bevel box with the three remaining holes and secure (place nuts -A- in between).

– Place used oil collection and extraction unit -V.A.G 1782- underneath.

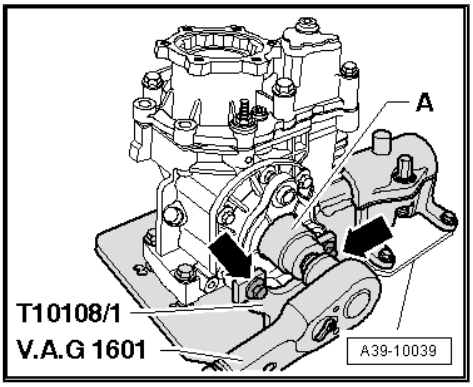
– Drain gear oil out of bevel box.



– Lock output flange for bevel box in position using support plate -T10108/1- and bolts M10x30 (2x) -arrows-.
– Unscrew nut for output flange.

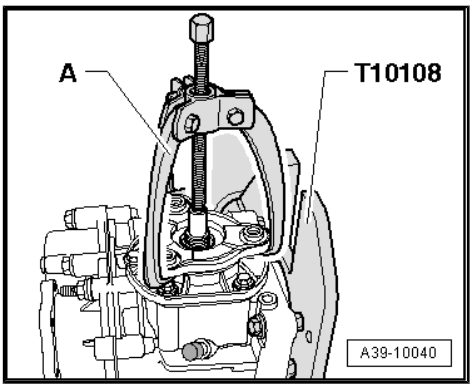
A - 36 mm socket for $^{3}/_{4}$" drive

– Swing bevel box so that output flange points upwards.



– Remove output flange from shaft bevel gear of bevel box.

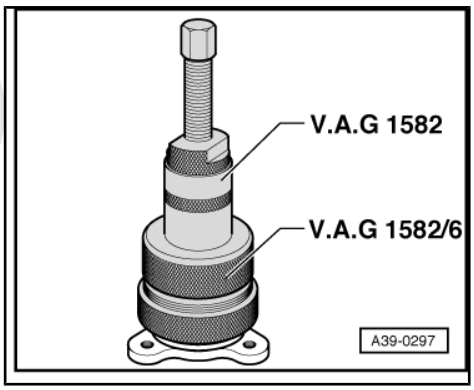
A - Three-arm puller Kukko 45/2



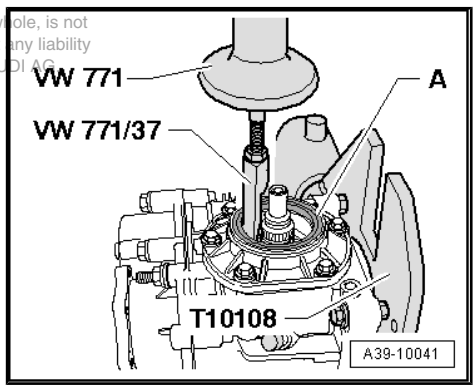
Note

When pulling off the output flange, the tapered roller bearing inner race remains fitted on the output flange and must be pulled off the output flange separately.

– Place thrust plate -40 - 105- on output flange.
– Pull off inner race for tapered roller bearing from output flange using tapered roller bearing puller -V.A.G 1582- and adapter -V.A.G 1582/6A- .



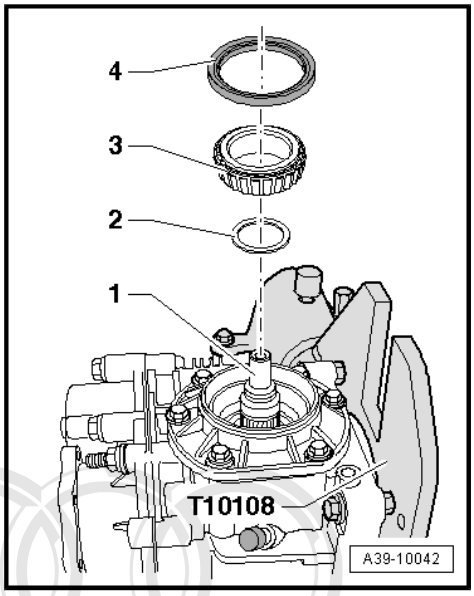
– Pull out oil seal -A- for output flange.
– Clean residual locking fluid from thread of shaft bevel gear.



- Make sure that the shim -2- adjusting the bearing preload of the shaft bevel gear -1- is still fitted.

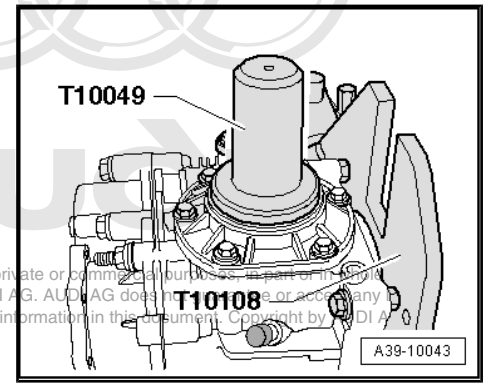
– Insert inner race for tapered bearing roller -3- into outer race in bevel box.

– Lightly lubricate outer circumference of new oil seal -4- for output flange.



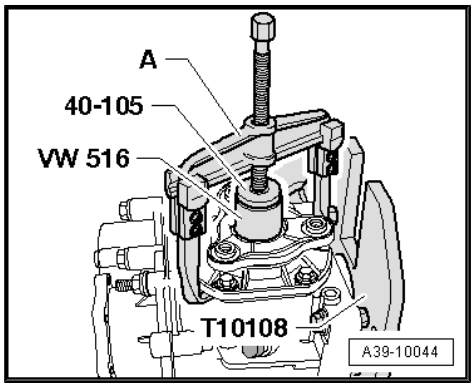
– Drive in oil seal as far as stop using thrust piece -T10049- .

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



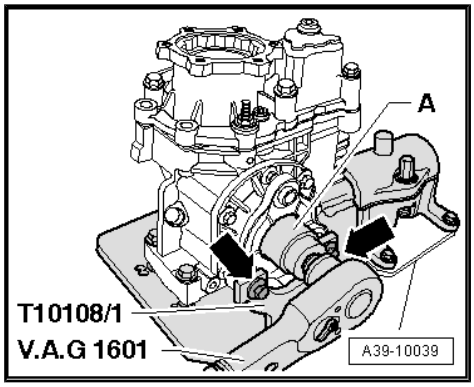
– Apply puller hooks to bottom of pinion housing and draw in output flange.

A - Two-arm puller Kukko 20/10



– Coat thread of new nut for output flange with locking fluid and tighten; for locking fluid refer to ⇒ Electronic parts catalogue .

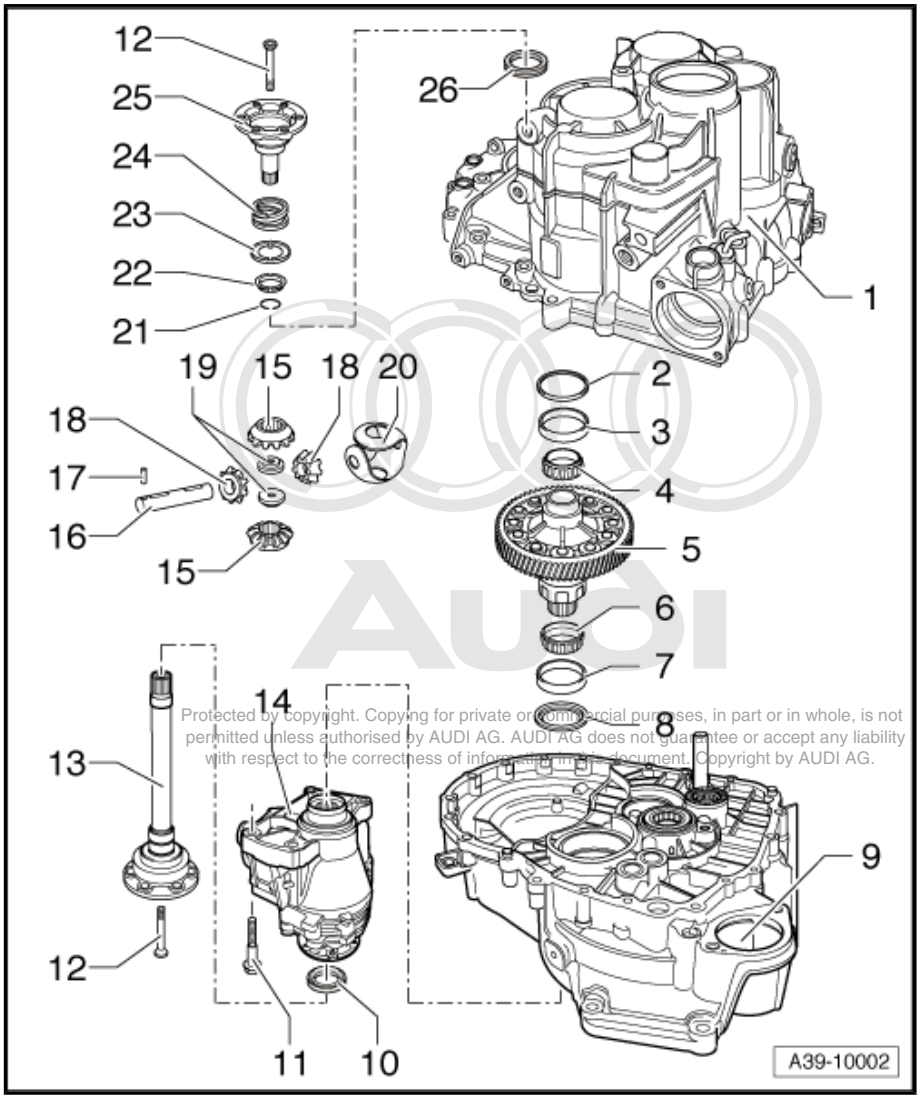
– Top up gear oil after installing bevel box ⇒ page 151 .



3 Exploded view - differential

Note

- *Mounting gearbox on assembly stand ⇒ page 125 .*
- *Heat tapered roller bearing inner race to 100°C before installing.*
- *Always renew both tapered roller bearings together.*
- *Adjust differential if tapered roller bearings, differential cage, gearbox housing or clutch housing are renewed ⇒ page 274 .*



1 - Gearbox housing

2 - Shim

- ❑ For differential
- ❑ Determining thickness ⇒ page 274

3 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 272
- ❑ Pressing in ⇒ page 273

4 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 271
- ❑ Pressing on ⇒ page 272

5 - Differential cage

- ❑ With riveted final drive gear

6 - Tapered roller bearing inner race

- ❑ Pulling off ⇒ page 272
- ❑ Pressing on ⇒ page 272

7 - Tapered roller bearing outer race

- ❑ Pulling out ⇒ page 271
- ❑ Pressing in ⇒ page 271

8 - Shim

- ❑ 0.65 mm thick
- ❑ Installation position: Shoulder on inside diameter faces towards bevel box ⇒ Item 14 (page 268)

9 - Clutch housing

10 - Oil seal

- ❑ For flange shaft (right-side)
- ❑ Renewing with gearbox installed ⇒ page 258

11 - Bolt

- ❑ 40 Nm
- ❑ Renew

12 - Bolt

- ❑ Screws into threaded piece ⇒ Item 19 (page 268)
- ❑ Tightening torque ⇒ Item 13 (page 255)

13 - Flange shaft (right-side)

- ❑ Removing and installing ⇒ page 256

14 - Bevel box

- ❑ Removing and installing (with gearbox installed) ⇒ page 140
- ❑ Removing and installing (with gearbox removed) ⇒ page 159

15 - Sun wheel

- ❑ Installing ⇒ page 273

16 - Differential pinion pin

- ❑ Removing ⇒ page 273
- ❑ Installing ⇒ page 273

17 - Spring pin

- ❑ Secures differential pinion pin
- ❑ Removing ⇒ page 273
- ❑ Drive new spring pin in flush ⇒ page 273

18 - Planet pinion

- ❑ Removing and installing ⇒ page 273

19 - Threaded piece

- ❑ Installing ⇒ page 273

20 - One-piece thrust washer

- ❑ Lubricate with gear oil before installing

21 - Circlip

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

22 - Tapered ring

- ❑ With grooves to engage on thrust washer
- ❑ Installation position: Taper towards differential cage

23 - Thrust washer

- ❑ Installation position: Shoulder towards spring, lugs towards tapered ring

24 - Spring for flange shaft (left-side)

- ❑ Installed behind flange shaft (left-side)

25 - Flange shaft (left-side)

- ❑ Removing and installing ⇒ page 250

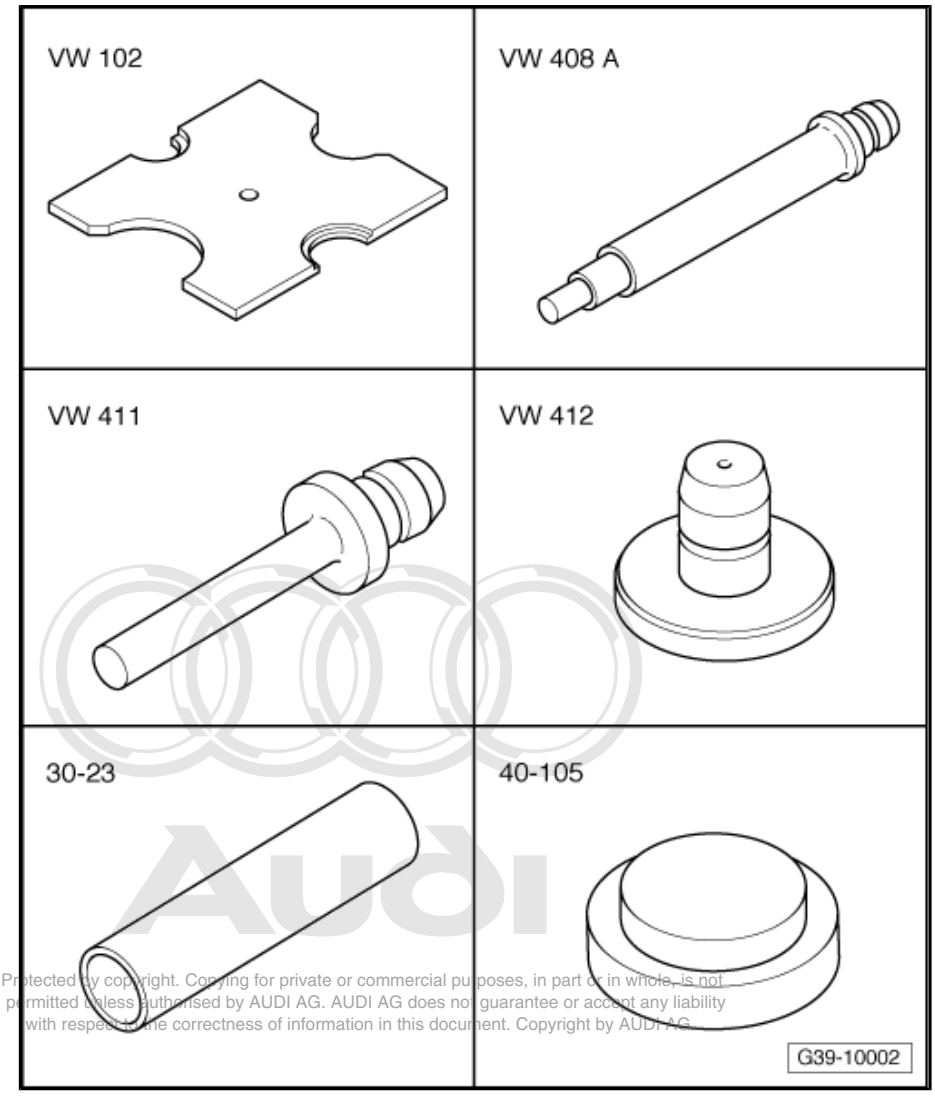
26 - Oil seal

- ❑ For flange shaft (left-side)
- ❑ Renewing with gearbox installed ⇒ page 251

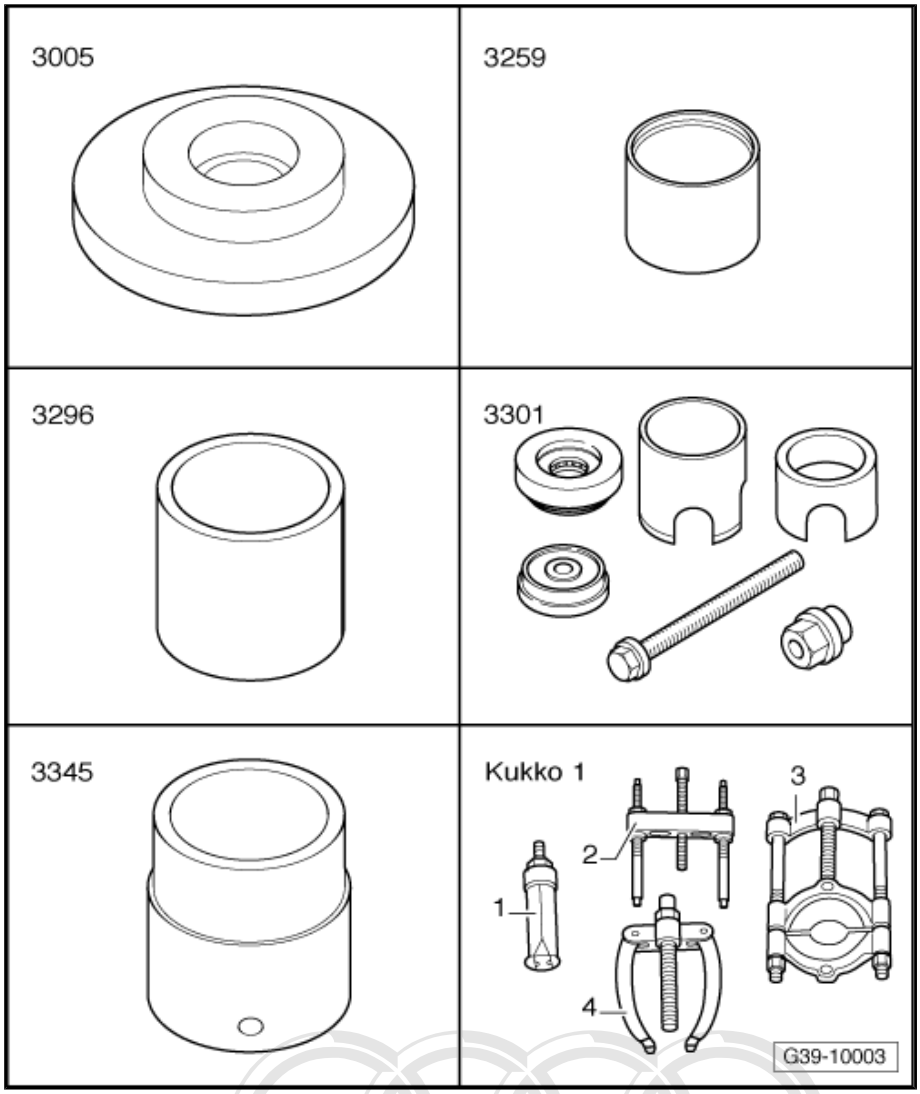
3.1 Dismantling and assembling differential

Special tools and workshop equipment required

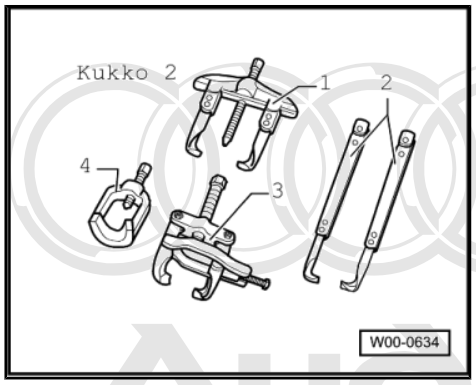
- Thrust plate -VW 402-
- Press tool -VW 408 A-
- Press tool -VW 411-
- Press tool -VW 412-
- Extension -30 - 23-
- Thrust plate -40-105-

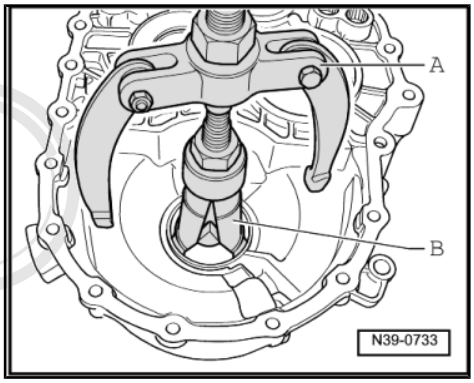


- Thrust plate -3005-
- Tube -3259-
- Tube -3296-
- Assembly tool -3301-
- Tube -3345-
- -1- Kukko internal puller 21/7
- -2- Kukko 18/1 puller
- -3- Splitter 17/1
- -4- Kukko 22/2 counter-support



♦ -3- Puller Kukko 204/2





Pulling tapered roller bearing outer race out of clutch housing

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

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

– Clamp internal puller -B- firmly between tapered roller bearing outer race and shim.

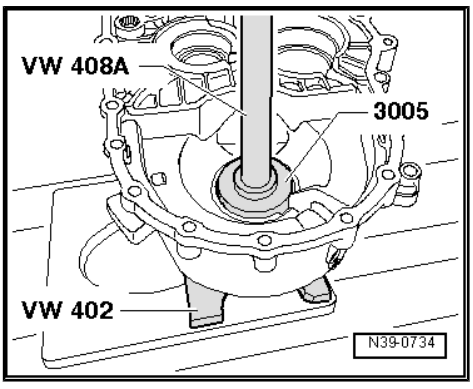
Note

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

Pressing tapered roller bearing outer race into clutch housing

– First install shim.

• Collar on inside diameter of thrust plate -3005- faces towards outer race.



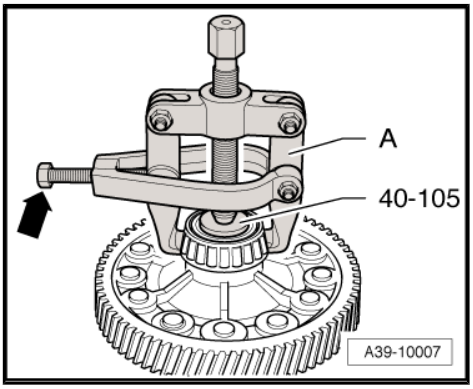
Pulling off tapered roller bearing inner race

– Fit thrust plate -40-105- onto differential cage.

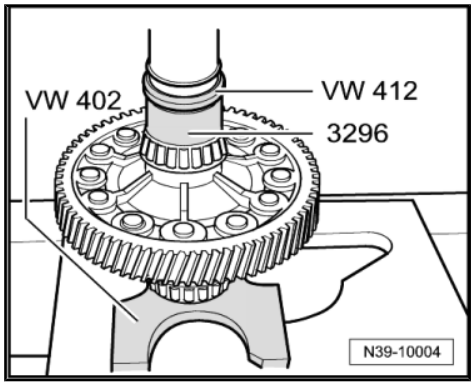
– Clamp jaws of puller (e.g. -Kukko 204/2-) under inner race on flat surfaces of differential cage.

Note

When pulling off the inner race ensure that the hooks do not bend outwards, if necessary tighten screw -arrow-.



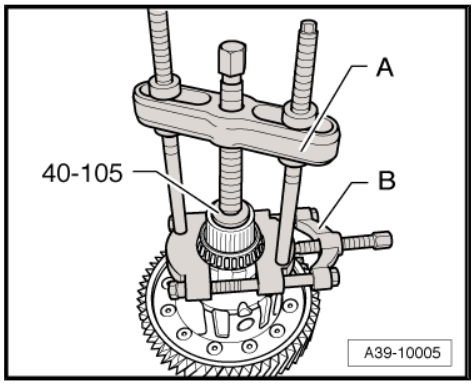
Pressing on tapered roller bearing inner race



Pulling off tapered roller bearing inner race

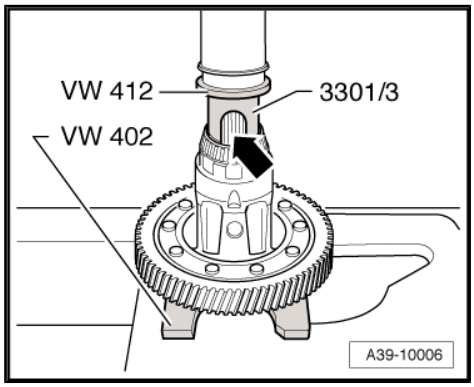
A - Puller , e.g. -Kukko 18/1-

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



Pressing on tapered roller bearing inner race

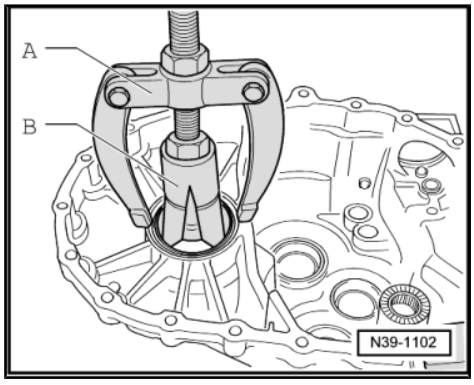
– Fit sleeve -3301/3- of assembly device -3301- onto tapered roller bearing inner race with recess -arrow- (larger inner diameter) facing downwards.



Pulling tapered roller bearing outer race out of gearbox housing

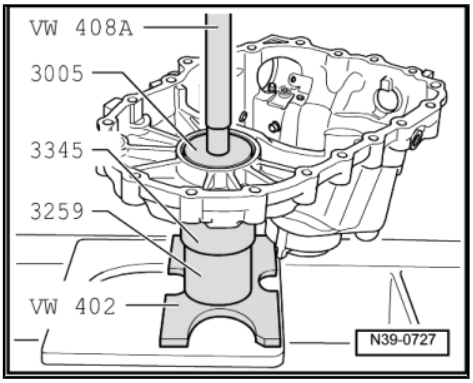
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

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



Removing differential pinion pin and spring pin for differential pinion pin

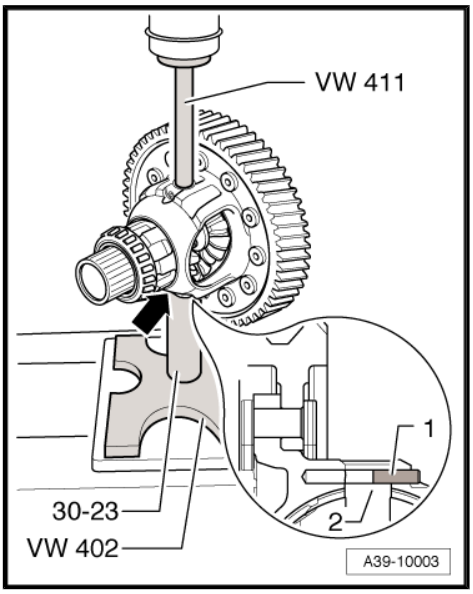
– First drive spring pin -1- into differential pinion pin -2- so it is flush.

– Fit differential under press, with spring pin -arrow- facing towards extension -30 - 23- .

– Now press out differential pinion pin.

Note

Remove any sheared off parts of the spring pin from the differential cage.



Installing bevel gears

– Lubricate one-piece thrust washer with gear oil and install.

– Install both sun wheels and secure (e.g. with flange shaft).

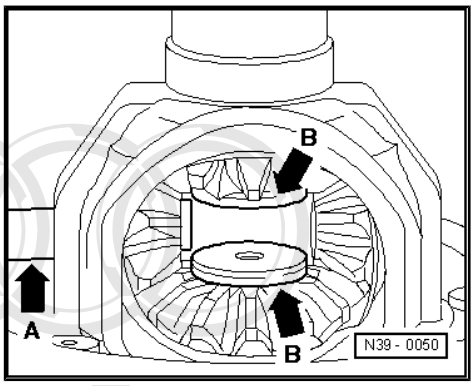
– Insert planet pinions (180° apart) and pivot into position.

– Push differential pinion pin -arrow A- in as far as first planet pinion.

– Fit threaded pieces -arrows B- in sun wheels.

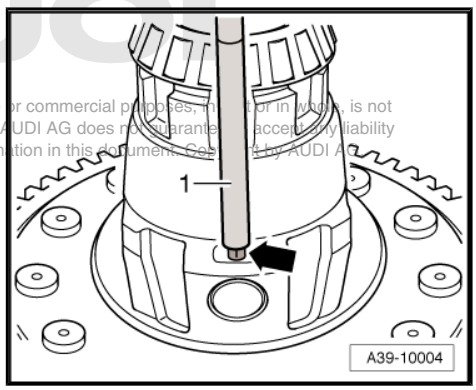
• Installation position: Stepped shoulder towards sun wheel

– Drive differential pinion pin into final position and secure with spring pin ⇒ page 273 .



Installing spring pin

– Use a punch -1- to drive new spring pin -arrow- in flush with differential cage.



3.2 Table of adjustments

Note

If repairs have been carried out on the gearbox, it is only necessary to adjust the output shaft for 1st - 4th gear, the output shaft for 5th, 6th and reverse gear or the 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:

Components renewed:	Components requiring adjustment:		
	Output shaft for 1st - 4th gear ⇒ page 230	Output shaft for 5th, 6th and reverse gear ⇒ page 245	Differential ⇒ page 274
Gearbox housing	x	x	x
Clutch housing	x	x	x
Output shaft for 1st - 4th gear	x		
Output shaft for 5th, 6th and reverse gears		x	
Differential cage			x
Tapered roller bearings for 1st - 4th gear output shaft	x		
Tapered roller bearings for 5th/6th and reverse gear output shaft		x	
Tapered roller bearings for differential			x

3.3 Adjusting differential

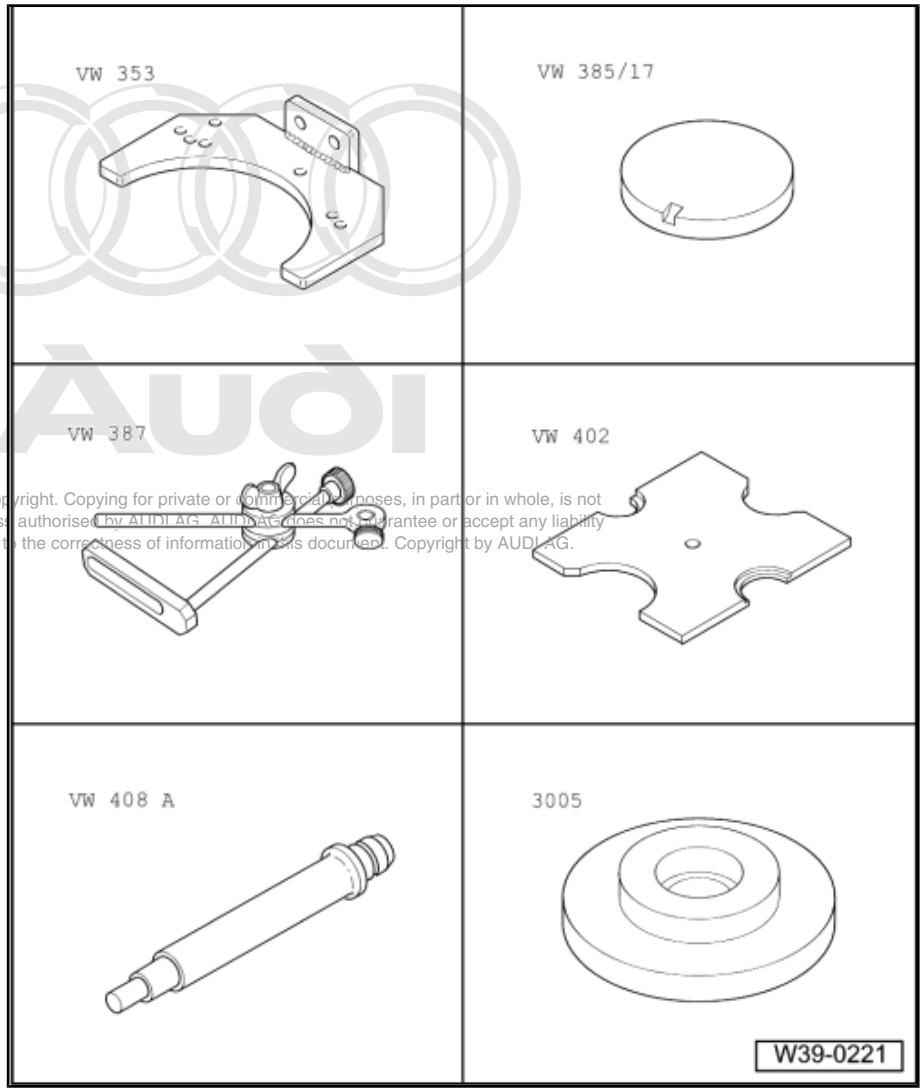
The differential has to be readjusted when the following components are renewed:

- Gearbox housing
- Clutch housing
- Differential cage
- Tapered roller bearings for differential

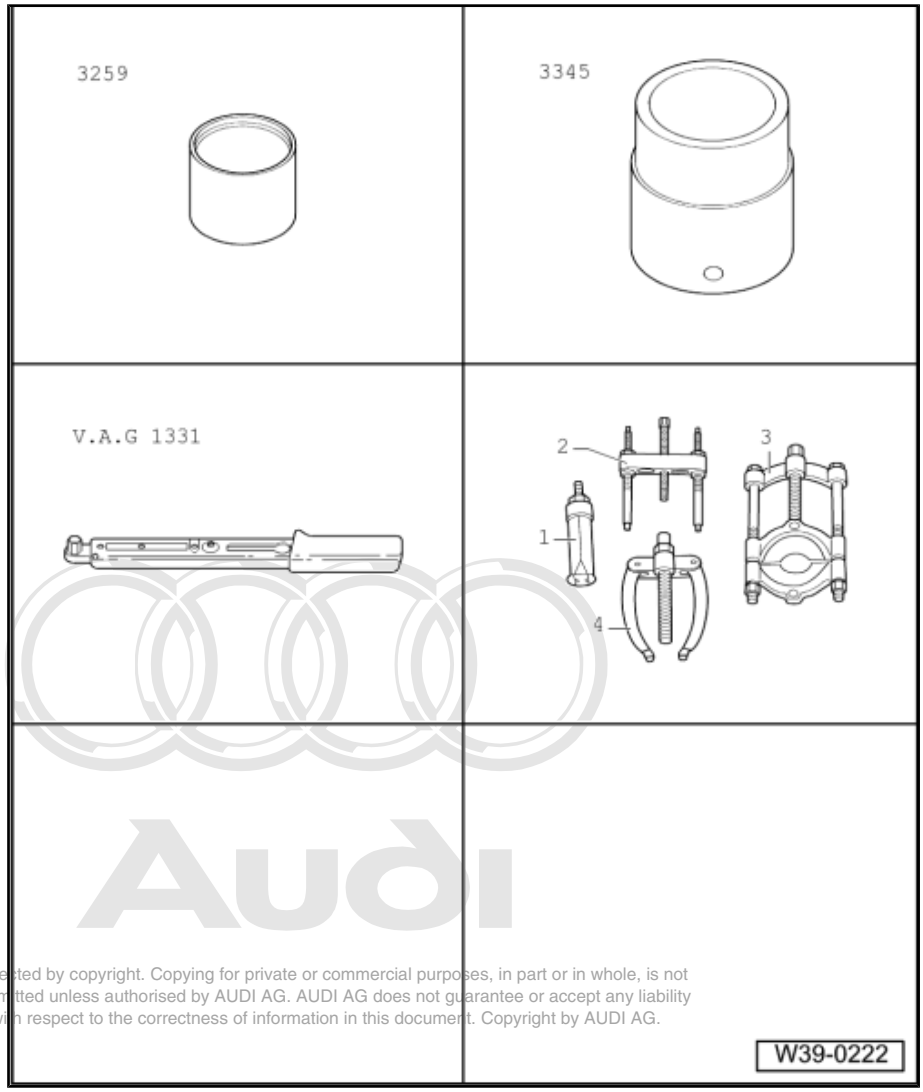
Table of adjustments ⇒ page 274

Special tools and workshop equipment required

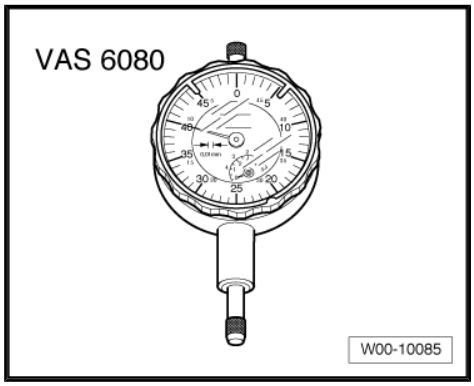
- Gearbox support -VW 353-
- End measuring plate - VW 385/17-
- Universal dial gauge bracket -VW 387-
- Thrust plate -VW 402-
- Press tool -VW 408 A-
- Thrust plate -3005-



- Tube -3259-
- Tube -3345-
- Torque wrench -V.A.G 1331-
- -1- Kukko internal puller 21/7
- -4- Kukko 22/2 counter-support



- Dial gauge -VAS 6080-

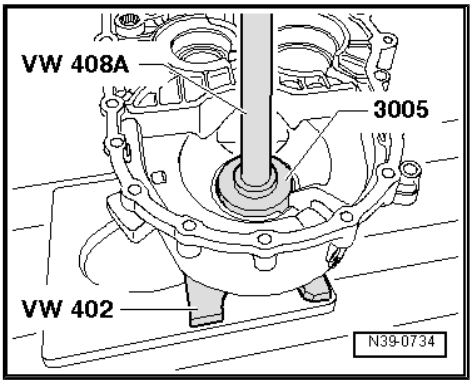


- Dial gauge extension, 30 mm

Procedure

– Press tapered roller bearing outer race with shim into clutch housing.

• Collar on inner diameter of thrust plate -3005- faces towards outer race.



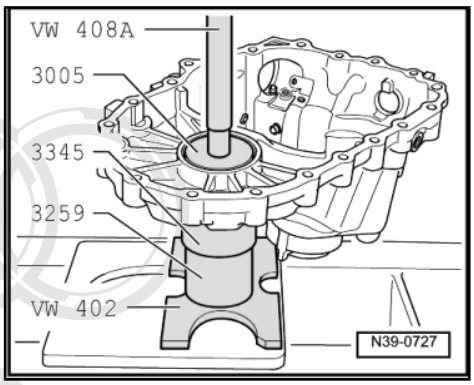
– Press tapered roller bearing outer race without shim into gearbox housing.

– Install differential in clutch housing.

– Fit gearbox housing and tighten 5 bolts to specified torque ⇒ Item 11 (page 156) and ⇒ Item 12 (page 156) .

– Press differential towards clutch housing; hold in this position and turn eight times.

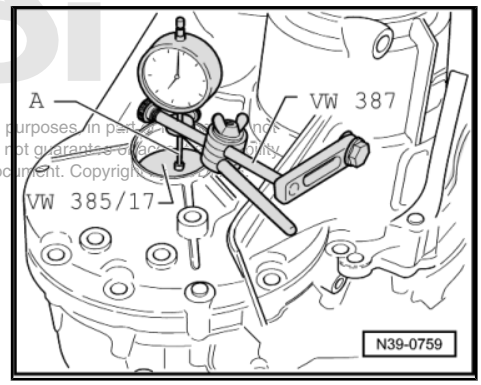
– Press differential towards gearbox housing; hold in this position and turn eight times.



– Attach dial gauge and set to “0” with a preload of 1 mm.

A - Dial gauge extension, 30 mm

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



Determining thickness of shim

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

Example:

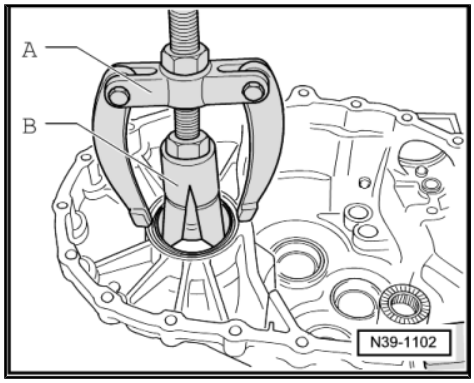
Measured value	0.70 mm
+ Preload (constant value)	0.25 mm
Thickness of shim =	0.95 mm

– Take off gearbox housing.

– Pull tapered roller bearing outer race out of gearbox housing.

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

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



– Select a shim of the required thickness from the table. For part numbers refer to ⇒ Electronic parts catalogue .

– Insert shim of correct thickness.

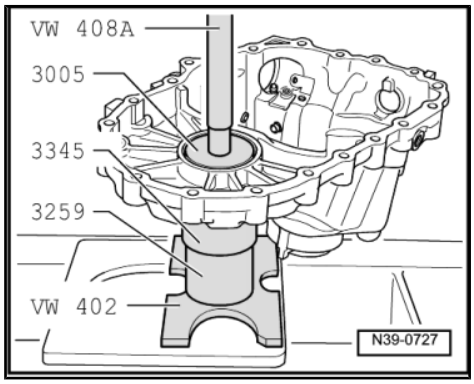
The following shims are available:

Thickness of shims in mm			
0.65	0.85	1.05	1.25
0.70	0.90	1.10	
0.75	0.95	1.15	
0.80	1.00	1.20	

The exact shim thickness required can be obtained by combining shims of different thicknesses.

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

– Press in outer race again and secure gearbox housing ⇒ page 156 .



4 Propshaft

Description of propshaft ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .

5 Rear final drive

Description of rear final drive ⇒ Rear final drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 .