

Workshop Manual

Audi A4 2001 ➤

Audi A4 Cabriolet 2003 ➤

Audi A6 2005 ➤

Servicing 6-speed manual gearbox 0A3, four-wheel drive

Edition 02.2012

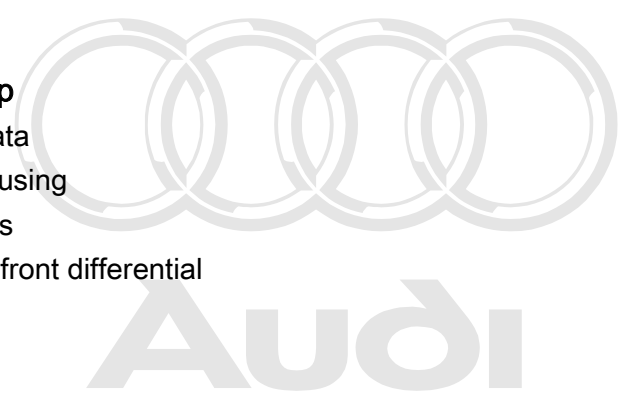


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 34 - Controls, housing
- 35 - Gears, shafts
- 39 - Final drive - front differential

A large, faint watermark of the Audi logo (four interlocking rings and the word "Audi") is centered in the background of the page.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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.

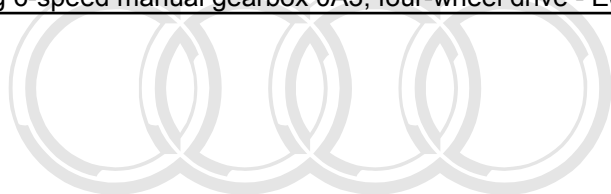
Contents

00 - Technical data	1
1 Gearbox identification	1
1.1 Location on gearbox	1
2 General repair instructions	3
2.1 Special tools	3
2.2 Components	3
34 - Controls, housing	8
1 Dismantling and assembling gearbox	8
1.1 General layout of gearbox	8
1.2 Exploded view - dismantling and assembling gearbox	10
1.3 Exploded view - removing and installing centre differential housing and centre differential	11
1.4 Servicing bearings for centre differential	12
1.5 Exploded view - removing and installing gearbox cover and selector shaft	15
1.6 Exploded view - removing and installing 1st, 2nd and reverse gear	19
1.7 Exploded view - removing and installing input shaft, hollow shaft, pinion shaft and selector rods	21
1.8 Assembly sequence - dismantling and assembling gearbox	25
1.9 Renewing grooved ball bearing for input shaft with gearbox removed (gearbox remains assembled)	46
2 Dismantling and assembling centre differential housing	50
3 Servicing gearbox cover	56
4 Servicing gearbox housing	61
35 - Gears, shafts	69
1 Input shaft	69
1.1 Exploded view - input shaft	69
1.2 Assembly sequence - dismantling and assembling input shaft	73
2 Pinion shaft and hollow shaft	83
2.1 Exploded view - pinion shaft and hollow shaft	83
2.2 Dismantling and assembling pinion shaft	87
2.3 Re-determining shim „S5“ for positioning tapered roller bearing inner race	91
2.4 Dismantling and assembling hollow shaft	92
2.5 Re-determining shim „S6“ for positioning 2nd speed selector gear	96
39 - Final drive - front differential	99
1 Renewing oil seals for flange shafts	99
2 Removing and installing differential	100
3 Dismantling and assembling differential	104
3.1 Exploded view - differential	104
3.2 Dismantling and assembling differential	106
4 Adjusting pinion shaft and crown wheel	112
4.1 Adjustment and marking of final drive gear set	112
4.2 Position of shims	115
4.3 Table of adjustments	115
4.4 Recommended sequence for adjusting gear set	116
4.5 Adjusting pinion shaft	116
4.6 Adjusting crown wheel	128



Audi A4 2001 ► , Audi A4 Cabriolet 2003 ► , Audi A6 2005 ►

Servicing 6-speed manual gearbox 0A3, four-wheel drive - Edition 02.2012



Audi

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

00 – Technical data

1 Gearbox identification



For detailed information on code letters, gearbox allocation, ratios and capacities please refer to the Workshop Manual ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 00.

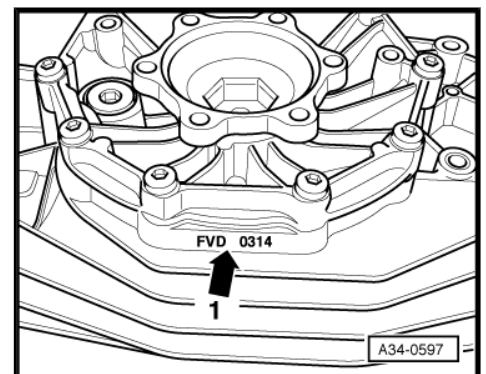
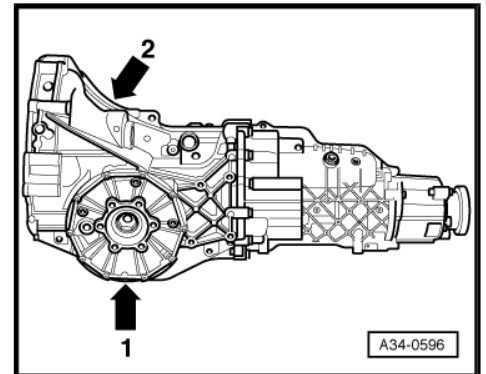
1.1 Location on gearbox

- ◆ Code letters, gearbox serial number and gearbox Part No. (if applicable) -arrow 1-
- ◆ Manual gearbox 0A3 -arrow 2-

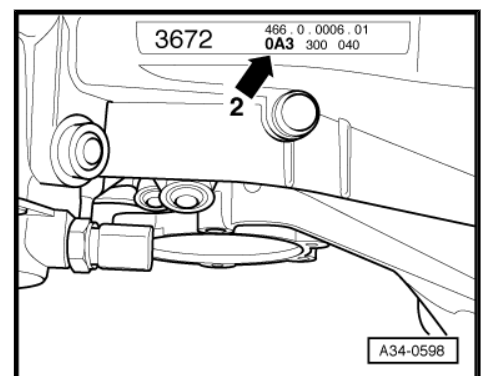
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Code letters and gearbox serial number -arrow 1-

Example:	FVD	0314
	Code letters	Gearbox serial number



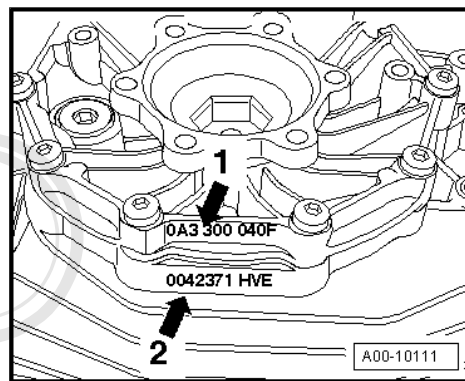
Manual gearbox 0A3 -arrow 2-





Identification from gearbox serial number 2097 onwards

- ◆ Manual gearbox 0A3 -arrow 1- with gearbox Part No. (e.g. 0A3 300 040 F) stamped on cover for final drive.
- ◆ Gearbox serial number and code letters -arrow 2-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 General repair instructions

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

To avoid unnecessary repetition, a number of generally applicable instructions for the various repair procedures are summarised here under the heading „Components“ ➔ [page 3](#) . They apply to the work described in this Manual.

2.1 Special tools

For a complete list of special tools used in this Workshop Manual ➔ „Special tools, Workshop equipment“ .

2.2 Components

Gearbox

- ◆ For detailed information on code letters, gearbox allocation, ratios and capacities please refer to the Workshop Manual ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 00 .
- ◆ Allocate bolts and other components according to gearbox code letters, refer to ➔ Electronic parts catalogue .
- ◆ Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- ◆ When exchanging or repairing the manual gearbox, check the oil level and fill with oil if necessary ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34 .
- ◆ Determine capacities and specifications via corresponding code letters ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 00 .

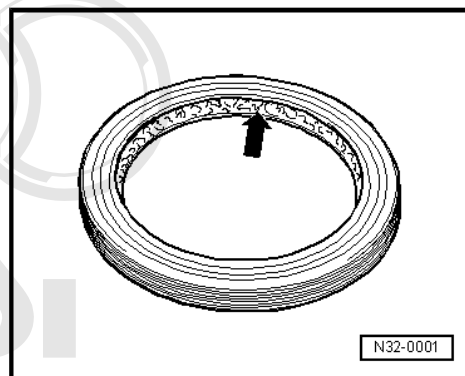
Sealants

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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

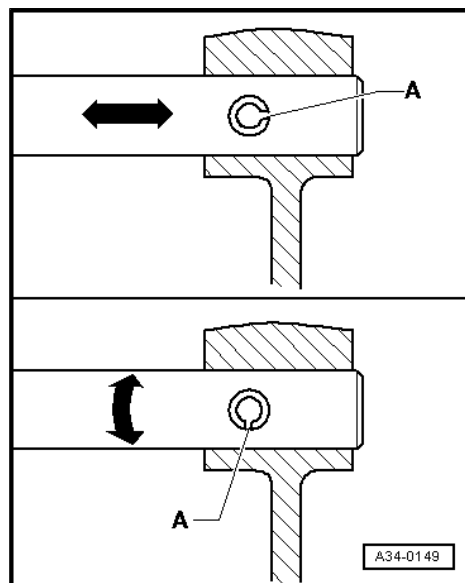
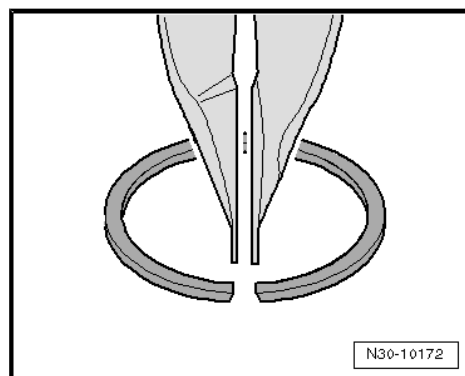
O-rings, oil seals and gaskets

- ◆ Always renew O-rings, oil seals and gaskets.
- ◆ After removing gaskets and oil seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- ◆ Thoroughly clean housing joint surfaces before assembling.
- ◆ Before installing oil seals, lightly oil the outer circumference of the seal and fill the space between the sealing lips -arrow- about half full with grease -G 052 128 A1- .
- ◆ The open side of the oil seal should face the side containing the fluid.
- ◆ When installing a new oil seal, position the seal such that the sealing lip does not contact the shaft in the same place as the old seal (make use of installation depth tolerances).
- ◆ Lightly lubricate O-rings before installation to prevent them from being trapped and damaged during assembly.
- ◆ The procedure for removing and installing oil seals with gearbox installed is described in ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34 and ➔ Rep. gr. 39 .
- ◆ After renewing gaskets and oil seals, check and, if necessary, top up oil level in gearbox ➔ 6-speed manual gearbox 0B3, four-wheel drive; Rep. gr. 34 .



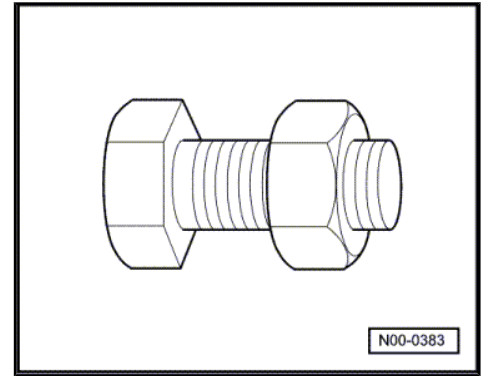
Locking elements

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



Nuts, bolts

- ◆ Loosen the nuts and bolts in reverse sequence to the specified tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- ◆ Loosen and tighten particularly sensitive parts in diagonal sequence and in stages, taking care to keep them straight.
- ◆ The tightening torques stated apply to non-oiled nuts and bolts.
- ◆ Always renew self-locking bolts and nuts.
- ◆ Use a wire brush to clean the threads of bolts which are secured with locking fluid. Then apply locking fluid - AMV 185 101 A1- to bolt threads before installing.
- ◆ Threaded holes which take self-locking bolts or bolts coated with locking fluid must be cleaned (using a thread tap or similar). Otherwise there is a danger of the bolts shearing off the next time they are removed.

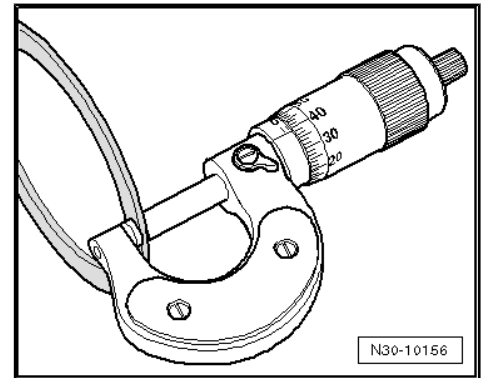


Shims

- ◆ 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.
- ◆ Do not install shims which are damaged or not in perfect condition.

Bearings

- ◆ Install needle bearings, ball sleeves and roller bearings so the lettering (side with thicker metal) faces towards the installing tool.
- ◆ 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.
- ◆ Before installing, heat inner races of needle and roller bearings to max. 130 °C using inductive heater -VAS 6414- .
- ◆ Do not interchange the outer or inner races of bearings of the same size (the bearings are paired).
- ◆ If required, renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Check the double angular contact ball bearing ⇒ Item 10 (page 9) for wear (running noises); pinion shaft remains installed and differential is removed. „The bearing should not catch and should run smoothly when rotating the pinion shaft“.
- ◆ Always renew the double angular contact ball bearing on the pinion shaft when renewing the final drive gear set.



Synchro-rings

- ◆ Do not interchange. When reusing synchro-rings, always fit to the same selector gear.
- ◆ Check for wear; renew if necessary.
- ◆ Check the coated contact surfaces -arrows 2- on intermediate ring -B- for damage (flattened sections, missing particles in carbon coating).
- ◆ Check inner contact surface -arrow 1- on synchro-ring -A- and outer contact surface -arrow 4- on inner ring -C- for grooves or scoring.
- ◆ Check coating on inner rings -C- with coated contact surface -arrow 3- for damage (missing particles in carbon coating).
- ◆ Lubricate with gear oil before installing.

Gear wheels and synchro-hubs

- ◆ Before installing, heat inner races of needle bearings for selector gears to approx. 100° C using inductive heater -VAS 6414- .
- ◆ Use inductive heater -VAS 6414- to heat gear wheels and synchro-hubs to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.
- ◆ Note correct installation position.

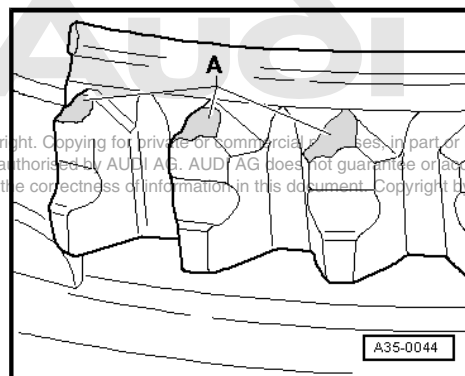
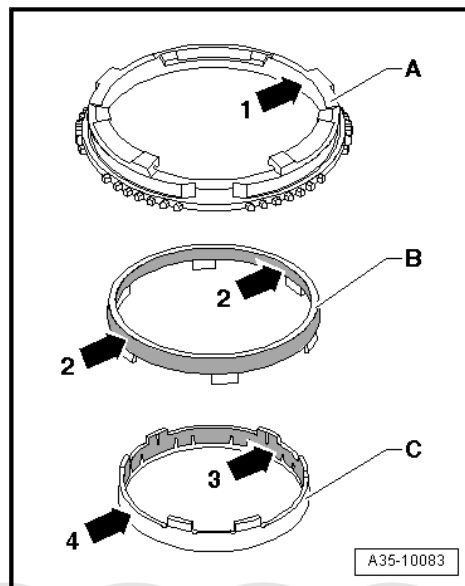
Selector gears

- ◆ After installing, check 1st to 6th speed selector gears for minimal axial play (min. 0.10 mm) and freedom of movement.

Abnormal wear on selector gears and locking collars

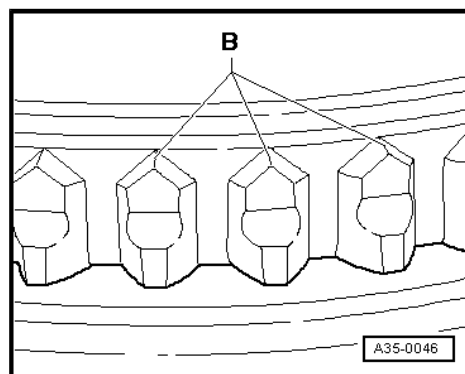
- ◆ Abnormal wear on synchro-ring or selector gear:

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



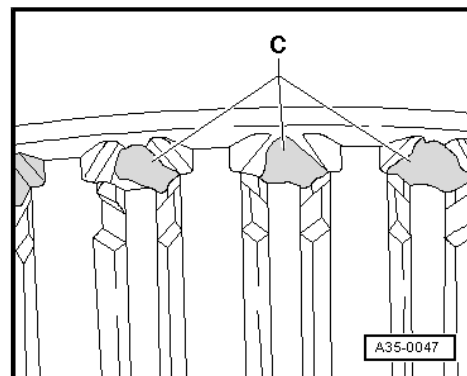
- ◆ In comparison: intact synchro-ring or selector gear:

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



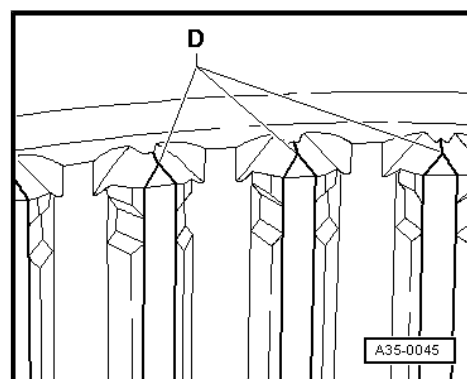
◆ Abnormal wear on locking collar:

C - Worn chamfer on internal splines of locking collar.



◆ In comparison: intact locking collar:

D - Intact chamfer on internal splines of locking collar.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

34 – Controls, housing

1 Dismantling and assembling gearbox

Overview

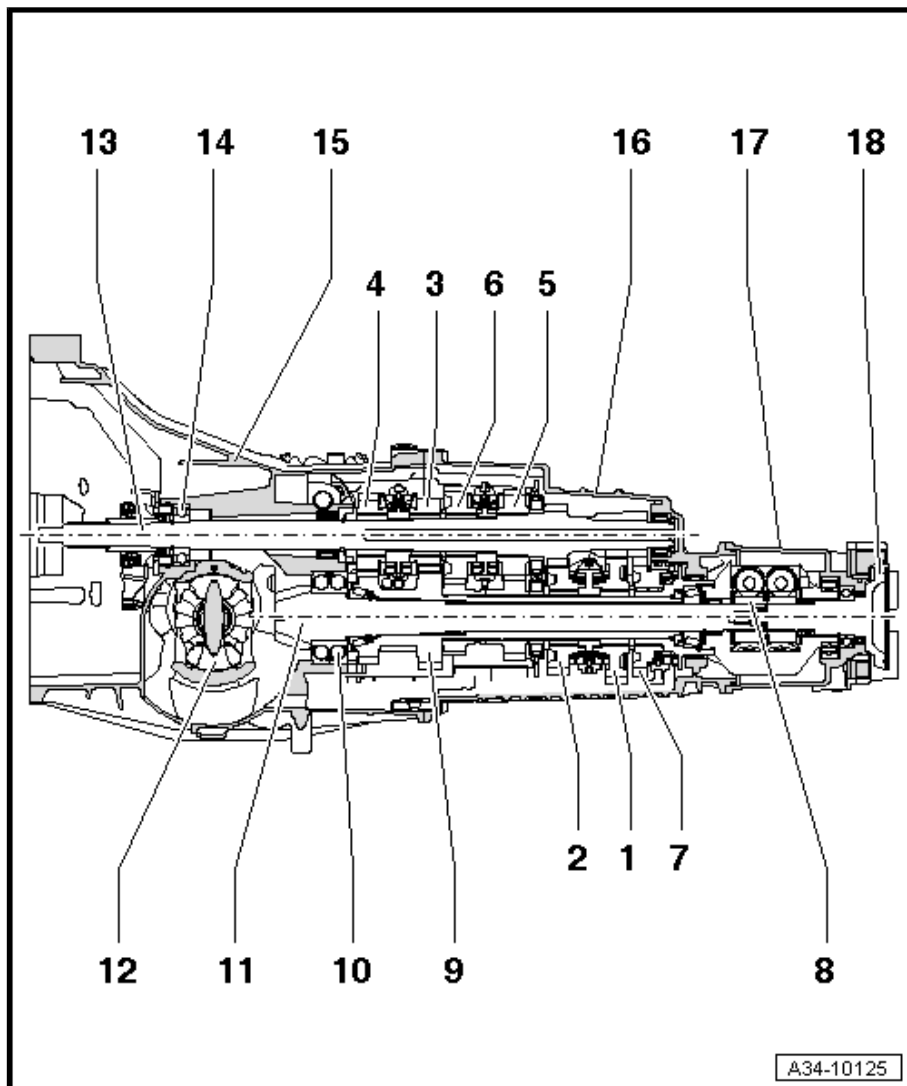
- ◆ ⇒ „1.1 General layout of gearbox“, page 8
- ◆ ⇒ „1.2 Exploded view - dismantling and assembling gearbox“, page 10
- ◆ ⇒ „1.3 Exploded view - removing and installing centre differential housing and centre differential“, page 11
- ◆ ⇒ „1.4 Servicing bearings for centre differential“, page 12
- ◆ ⇒ „1.5 Exploded view - removing and installing gearbox cover and selector shaft“, page 15
- ◆ ⇒ „1.6 Exploded view - removing and installing 1st, 2nd and reverse gear“, page 19
- ◆ ⇒ „1.7 Exploded view - removing and installing input shaft, hollow shaft, pinion shaft and selector rods“, page 21
- ◆ ⇒ „1.8 Assembly sequence - dismantling and assembling gearbox“, page 25
- ◆ ⇒ „1.9 Renewing grooved ball bearing for input shaft with gearbox removed (gearbox remains assembled)“, page 46

1.1 General layout of gearbox



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- 1 - 1st gear
- 2 - 2nd gear
- 3 - 3rd gear
- 4 - 4th gear
- 5 - 5th gear
- 6 - 6th gear
- 7 - Reverse gear
- 8 - Centre differential
- 9 - Hollow shaft
- 10 - Double angular contact ball bearing
- 11 - Pinion shaft (output shaft)
- 12 - Differential
- 13 - Input shaft
- 14 - Grooved ball bearing
 - ☐ For input shaft
- 15 - Gearbox housing
- 16 - Gearbox cover
- 17 - Centre differential housing
- 18 - Flange shaft



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

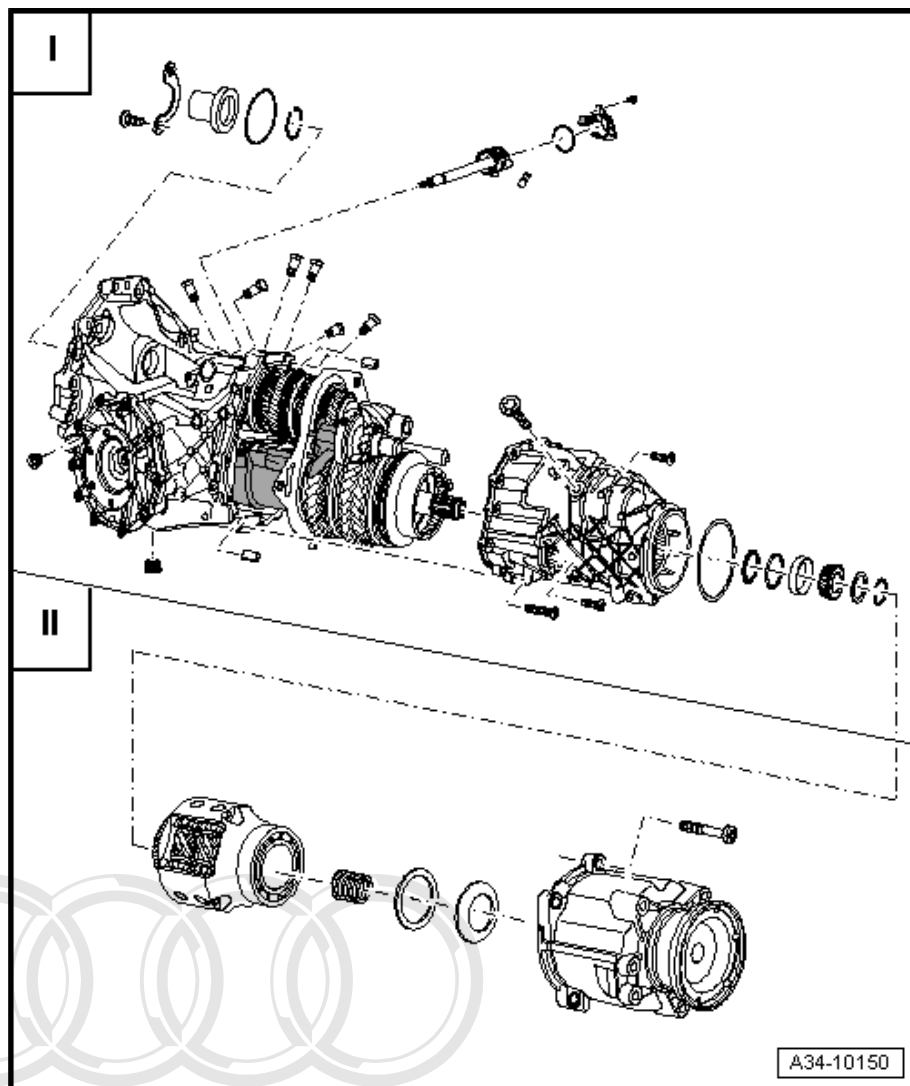
1.2 Exploded view - dismantling and assembling gearbox

I - Exploded view - removing and installing gearbox cover and selector shaft

⇒ [page 15](#)

II - Exploded view - removing and installing centre differential housing and centre differential

⇒ [page 11](#)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1.3 Exploded view - removing and installing centre differential housing and centre differential



Note

Removal is also possible with gearbox installed in vehicle ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34.

1 - Centre differential housing

- ☐ With or without vibration damper, depending on design
- ☐ Removing and installing ⇒ [page 12](#)
- ☐ Dismantling and assembling ⇒ [page 50](#)

2 - Bolt

- ☐ 24 Nm
- ☐ 6x

3 - Dished spring

- ☐ Installation position: inner diameter (convex side) faces flange shaft in centre differential housing

4 - Shim

- ☐ Re-determining thickness ⇒ [page 43](#)

5 - Spring

- ☐ Fit onto flange shaft in centre differential housing

6 - O-ring

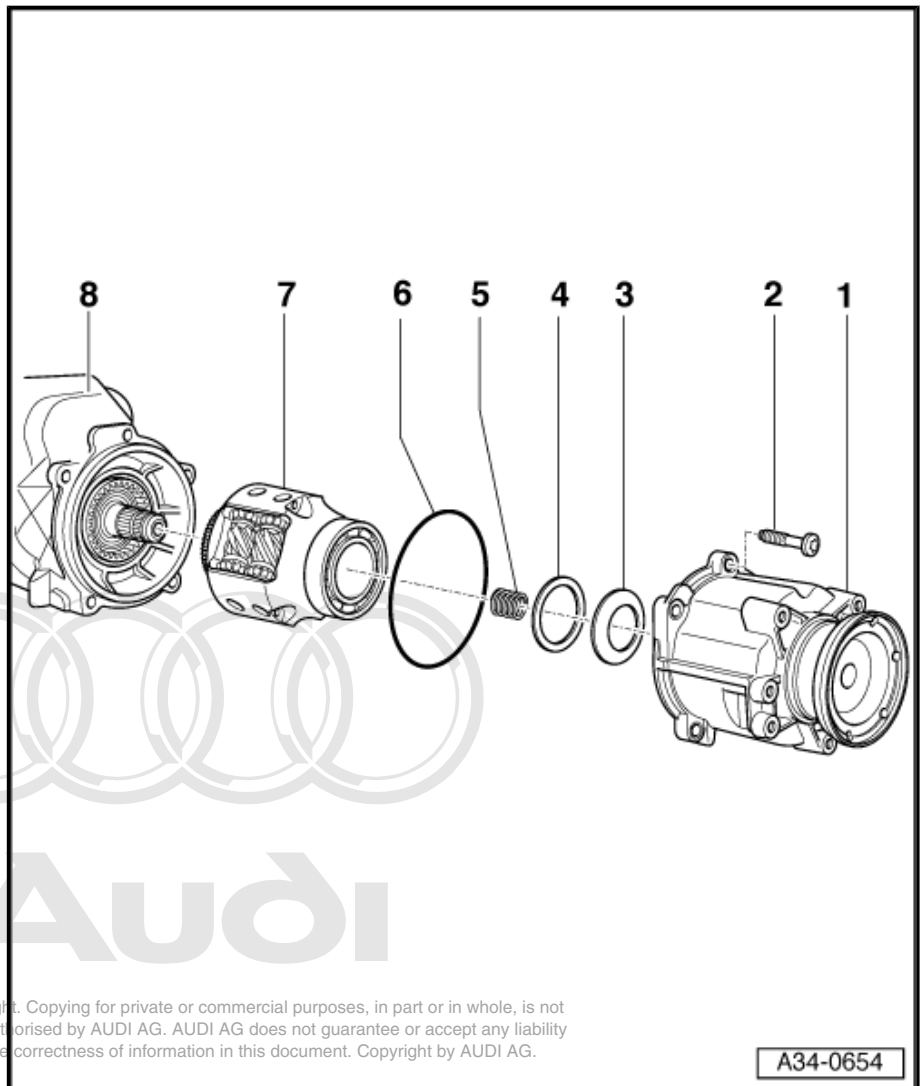
- ☐ Always renew
- ☐ Lubricate with gear oil
- ☐ Insert in circumferential groove in gearbox cover

7 - Centre differential

- ☐ Can only be serviced by manufacturer
- ☐ Removing and installing ⇒ [page 12](#)
- ☐ Servicing bearings for centre differential ⇒ [page 12](#)

8 - Gearbox

- ☐ Mounting on assembly stand ⇒ [page 25](#)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

A34-0654

1.3.1 Removing and installing centre differential and centre differential housing

Removing

- Place drip tray under gearbox.
- Drain off gear oil.
- Unscrew bolts -arrows- and detach centre differential housing.
- Remove centre differential from pinion shaft/hollow shaft.

Installing

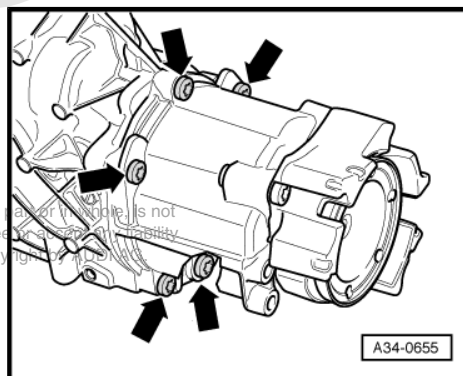
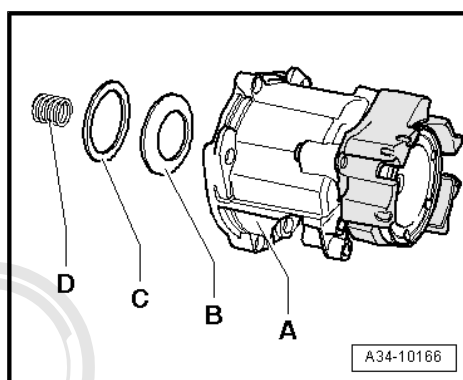
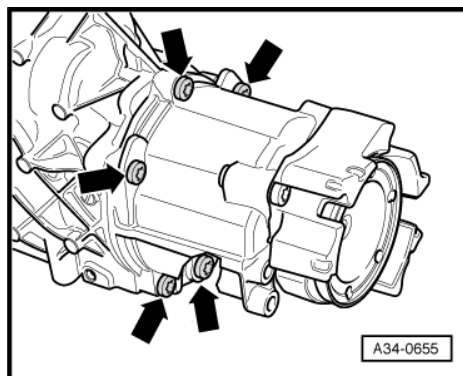
- Slide centre differential onto splines of hollow shaft.
- Insert dished spring -B- into centre differential housing -A-.
- Installation position of dished spring: inner diameter (convex side) faces flange shaft in centre differential housing.



Note

Re-determining thickness of shim -C- ➔ [page 43](#) .

- Position shim -C- on dished spring -B-.
- Fit spring -D- onto flange shaft in centre differential housing.
- Lubricate new O-ring ➔ [Item 6 \(page 11\)](#) with gear oil and insert into circumferential groove on gearbox cover.
- Then fit centre differential housing onto gearbox cover.
- Tighten bolts -arrows- to specified torque ➔ [Item 2 \(page 11\)](#) .
- Fill up with gear oil and check oil level in manual gearbox ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34 .

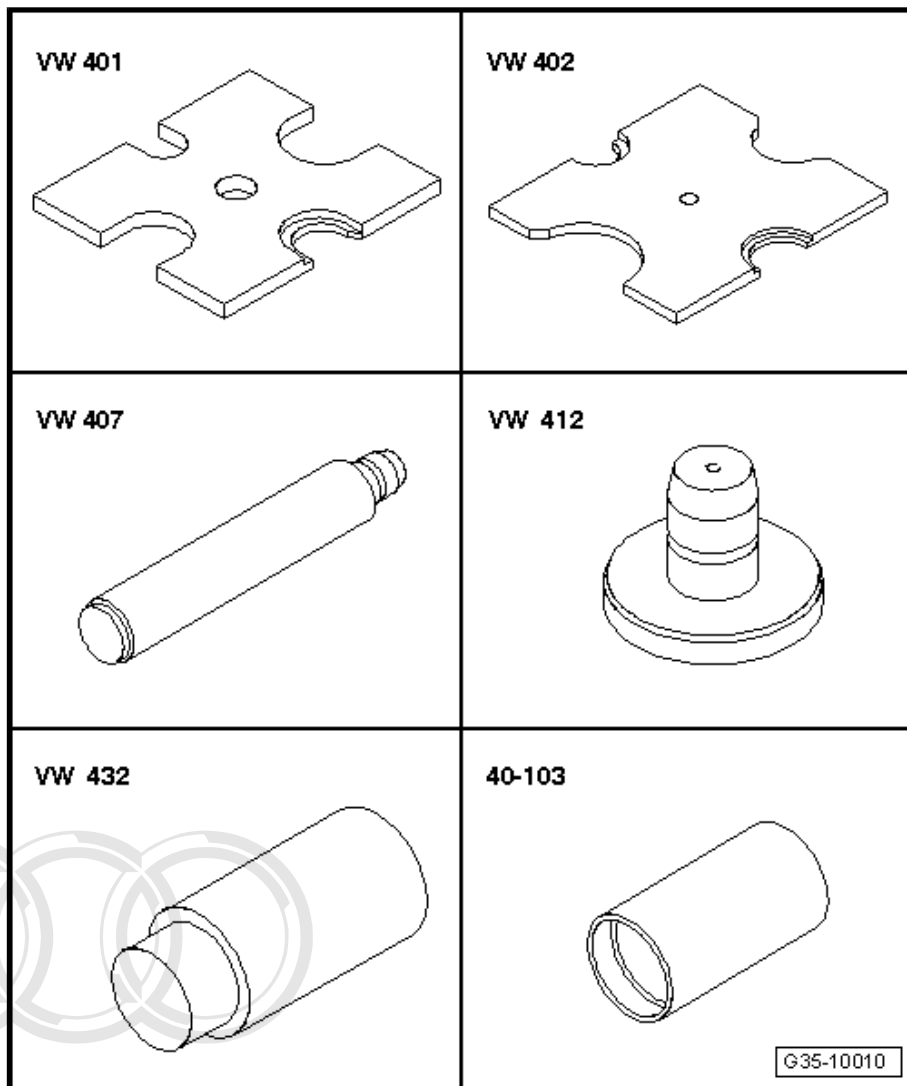


Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee the accuracy of the information with respect to the correctness of information in this document. Copyright © 2012 Audi AG

1.4 Servicing bearings for centre differential

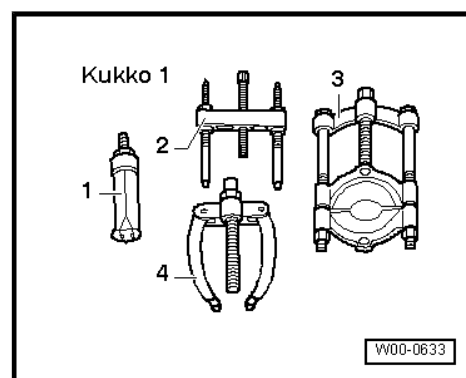
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 412-
- ◆ Press tool -VW 432-
- ◆ Support -40 - 103-



- ◆ -1- Internal puller -Kukko 21/5-

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ◆ -3- Splitter -Kukko 17/2-
- ◆ -4- Counter-support -Kukko 22/1-

1 - Grooved ball bearing

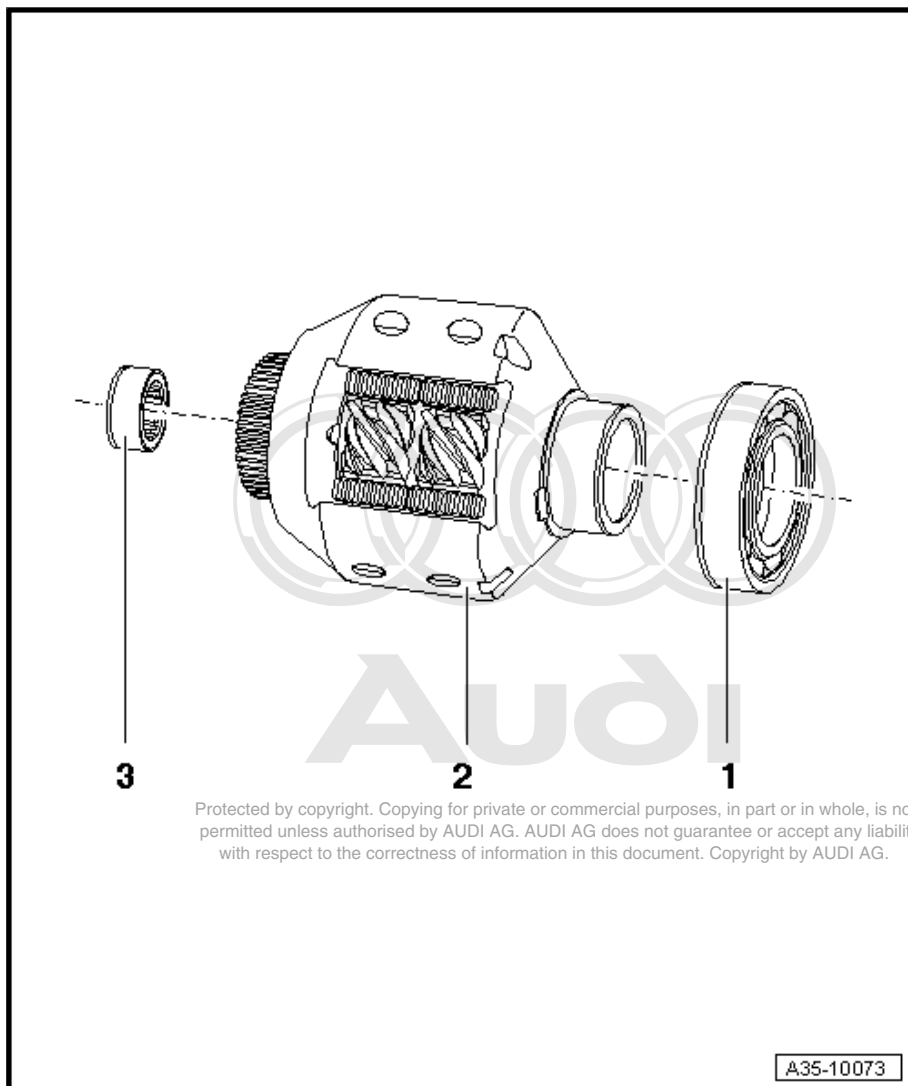
- ☐ Pressing off
⇒ [page 14](#)
- ☐ Pressing on
⇒ [page 15](#)

2 - Centre differential

- ☐ Do not dismantle
- ☐ Can only be serviced by manufacturer
- ☐ Renew if damaged

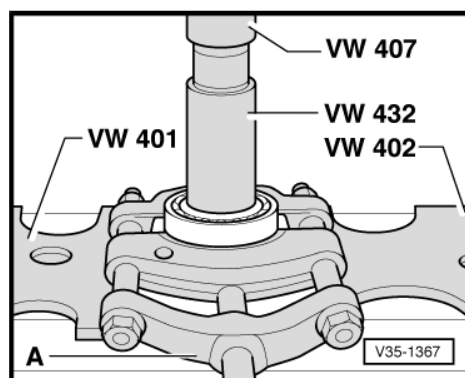
3 - Needle bearing

- ☐ For pinion shaft in centre differential
- ☐ Pulling out ⇒ [page 15](#)
- ☐ Pressing in
⇒ [page 15](#)

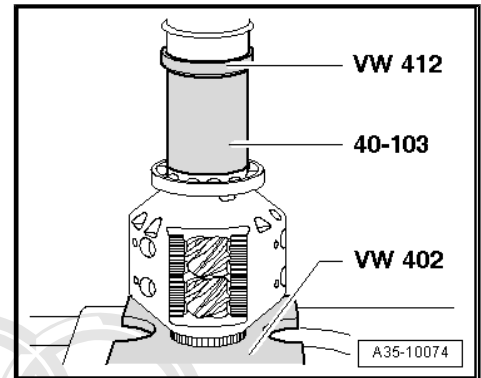


Pressing grooved ball bearing off centre differential

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



Pressing grooved ball bearing onto centre differential

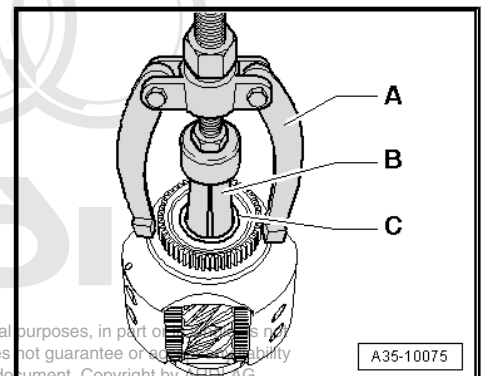


Pulling out needle bearing

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

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

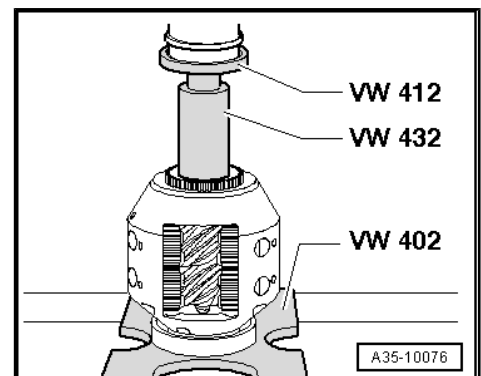
- Pull out needle bearing -C- for pinion shaft in centre differential.



Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or assume any liability with respect to the correctness of information in this document. Copyright by AUDI AG

Pressing in needle bearing

- Press needle bearing in flush (until press tool -VW 432- reaches stop).



1.5 Exploded view - removing and installing gearbox cover and selector shaft



Note

- ◆ Removing and installing 1st, 2nd and reverse gear ➔ [page 19](#)
- ◆ Removing and installing input shaft, pinion shaft, hollow shaft and selector rods ➔ [page 21](#) .
- ◆ Do not interchange locking bushes for selector shaft and selector rods. Apply marking prior to removal.

1 - Circlip

- ☐ Note thickness
- ☐ Re-determining thickness ➔ [page 42](#)

2 - Washer

- ☐ Note thickness
- ☐ Re-determining thickness ➔ [page 42](#)

3 - Tapered roller bearing inner race

- ☐ Can be removed and installed by hand

4 - Tapered roller bearing outer race

- ☐ Can be removed and installed by hand

5 - Spacer ring

- ☐ Secures 12-point nut ➔ [Item 6 \(page 16\)](#) on hollow shaft to prevent it from working loose

6 - Twelve-point nut

- ☐ 300 Nm
- ☐ Self-locking
- ☐ Renew

7 - O-ring

- ☐ Always renew
- ☐ Lubricate with gear oil
- ☐ Insert in circumferential groove in gearbox cover

8 - Bolt

- ☐ 27 Nm
- ☐ 2x
- ☐ Self-locking
- ☐ Renew

9 - Bolt

- ☐ 24 Nm
- ☐ 13x

10 - Gearbox cover

- ☐ Servicing ➔ [page 56](#)

11 - Dowel pin

- ☐ 2x
- ☐ Insert in gearbox cover

12 - Oil drain plug

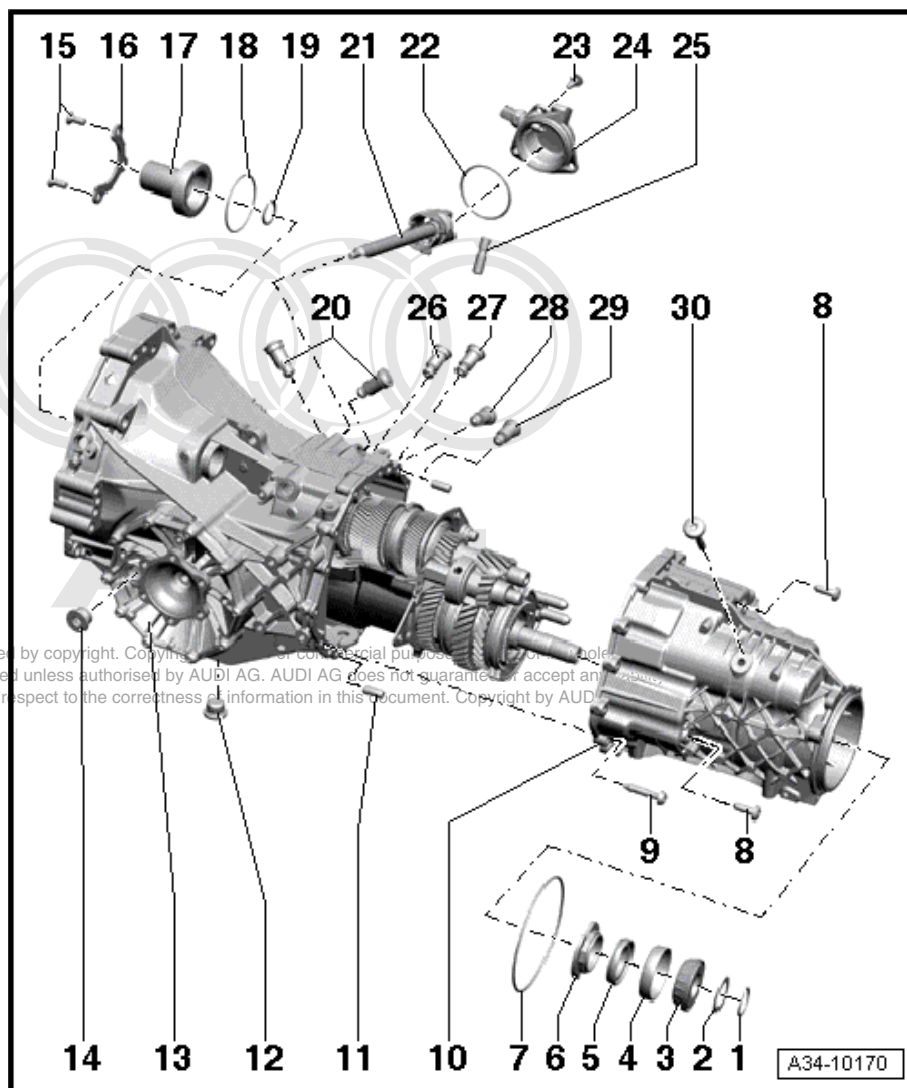
- ☐ 40 Nm

13 - Gearbox housing

- ☐ Removing and installing differential ➔ [page 100](#)
- ☐ Servicing gearbox housing ➔ [page 61](#)

14 - Oil filler plug

- ☐ 40 Nm



15 - Bolt

- ☐ 24 Nm
- ☐ 2x
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting

16 - Retaining piece

- ☐ For guide sleeve

17 - Guide sleeve

- ☐ With oil seal
- ☐ Removing and installing oil seal ⇒ [Item 7 \(page 22\)](#)

18 - O-ring

- ☐ Always renew
- ☐ Lubricate with gear oil
- ☐ Insert in circumferential groove in gearbox cover

19 - Circlip

- ☐ Always renew
- ☐ Insert in circumferential groove in input shaft

20 - Locking bush

- ☐ For selector shaft
- ☐ 2x
- ☐ Do not interchange locking bushes for selector shaft and selector rods
- ☐ Modification: with flanged edge on ball sleeve ⇒ [page 18](#)

21 - Selector shaft with selector cylinder

- ☐ Removing and installing ⇒ [page 25](#)

22 - O-ring

- ☐ For selector shaft cover
- ☐ Always renew
- ☐ Lubricate with gear oil
- ☐ Insert in circumferential groove in selector shaft cover

23 - Bolt

- ☐ 24 Nm
- ☐ 3x
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting

24 - Selector shaft cover

- ☐ With reversing light switch -F4-
- ☐ Removing and installing reversing light switch -F4- ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34
- ☐ Tightening torque for reversing light switch -F4- , 20 Nm

25 - Pin

- ☐ For selector shaft stop
- ☐ Insert in drilling in gearbox housing.



Note

- ◆ *There are two versions of pins: with or without a lug. Please refer to ⇒ Electronic parts catalogue for correct version.*
- ◆ *Installation position of pin with lug: insert end with lug into gearbox housing.*

26 - Locking bush

- ☐ For 5th and 6th gear selector rod

27 - Locking bush

- ☐ For 3rd and 4th gear selector rod

28 - Locking bush

- ☐ For 1st and 2nd gear selector rod

29 - Locking bush

- ☐ For reverse gear selector rod

30 - Bolt

- ☐ 24 Nm

Locking bushes for selector shaft modified

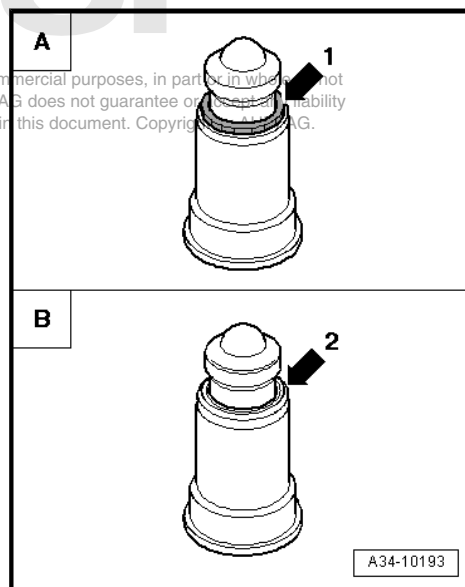
A - The previous type of selector shaft locking bushes had no flanged edge on the ball sleeve -arrow 1-. This type of locking bush must always be replaced, unless version-B- is fitted already.

B - The new type of selector shaft locking bushes with flanged edge on ball sleeve -arrow 2- can be re-installed.



Note

- ◆ If the gearbox is fitted with selector shaft locking bushes of type -A-, these must always be replaced with locking bushes of type -B-. For part number, refer to ⇒ *Electronic parts catalogue* .
- ◆ Version -B- can be re-used if already installed.
- ◆ Locking bushes for selector shaft can also be renewed with gearbox installed in vehicle ⇒ *6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34* .



1.6 Exploded view - removing and installing 1st, 2nd and reverse gear



Note

- ◆ Items 8 and 11 to 18 were modified on 1st and 2nd gear selector rod version with spring-loaded selector fork ⇒ [page 21](#) . Select correct components from ⇒ *Electronic parts catalogue* .
- ◆ Selector gears should have an axial play of min. 0.10 mm after installing.

1 - Clutch unit

- ☐ Removing and installing
 ⇒ [page 25](#)

2 - Needle bearing

- ☐ For reverse selector gear

3 - Inner ring for reverse gear

- ☐ Installation position
 ⇒ [page 38](#)
- ☐ Renew if scored or if there are visible traces of wear

4 - Intermediate ring for reverse gear

- ☐ Installation position
 ⇒ [page 38](#)
- ☐ Checking for wear
 ⇒ [page 37](#)

5 - Synchro-ring for reverse gear

- ☐ Installation position
 ⇒ [page 38](#)
- ☐ Checking for wear
 ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

6 - Reverse selector gear

- ☐ With locking collar for reverse gear
- ☐ Assembling locking collar and reverse selector gear ⇒ [page 39](#)

7 - Thrust washer

- ☐ For 1st speed and reverse selector gears

8 - 1st speed selector gear

9 - Needle bearing

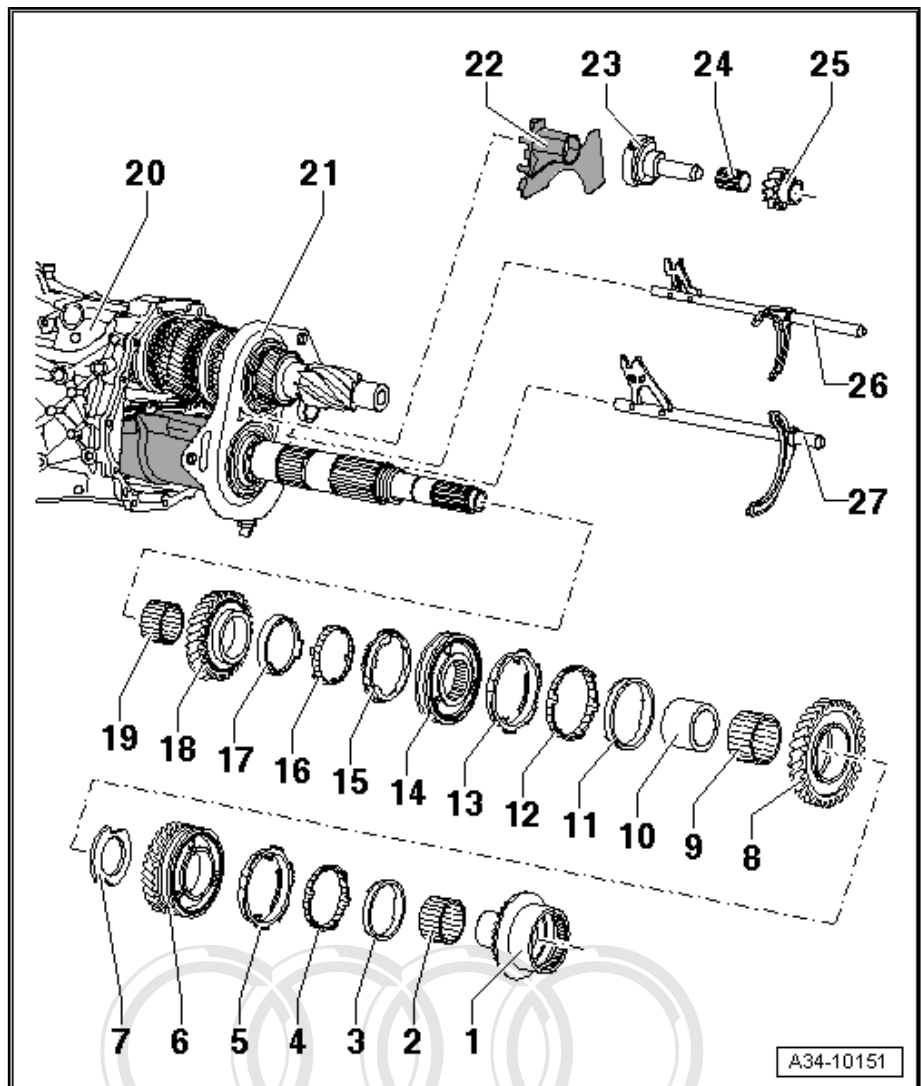
- ☐ For 1st gear

10 - Needle bearing inner race

- ☐ For 1st speed selector gear

11 - Inner ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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

12 - Intermediate ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

13 - Synchro-ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

14 - Locking collar/synchro-hub for 1st and 2nd gear

- ☐ Note correct installation position of locking collar ⇒ [page 38](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 38](#)

15 - Synchro-ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

16 - Intermediate ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

17 - Inner ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

18 - 2nd speed selector gear

19 - Needle bearing

- ☐ For 2nd gear

20 - Gearbox housing

- ☐ Removing and installing input shaft, hollow shaft and pinion shaft ⇒ [page 21](#)

21 - Bearing mounting

- ☐ Supports bearings for input shaft and hollow shaft in gearbox cover

22 - Mounting for reverse shaft

- ☐ Clip into bearing mounting ⇒ [Item 21 \(page 20\)](#)

23 - Reverse shaft

- ☐ With support for reverse shaft
- ☐ Assembling reverse shaft and support for reverse shaft ⇒ [page 21](#)

24 - Needle bearing

- ☐ For reverse gear wheel

25 - Reverse gear wheel

- ☐ Installation position: teeth face mounting for reverse shaft

26 - Selector rod for 1st and 2nd gear

- ☐ Installation position ⇒ [page 25](#)
- ☐ Only to be renewed complete with pinned selector fork for 1st and 2nd gear
- ☐ Modification: with spring-loaded selector fork ⇒ [page 21](#) , allocate via ⇒ Electronic parts catalogue

27 - Reverse gear selector rod

- ☐ Installation position ⇒ [page 25](#)
- ☐ Only to be renewed complete with pinned selector fork for reverse gear

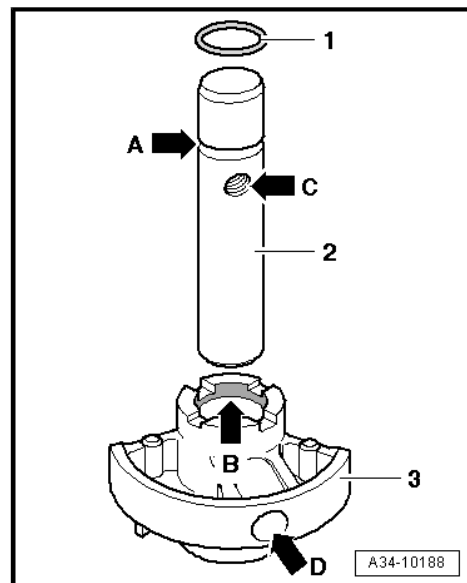


Copyright © 2012 Audi AG. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

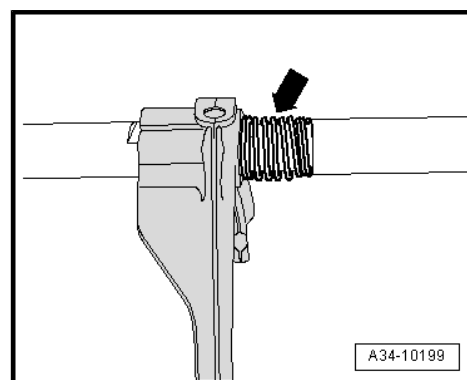
Assembling reverse shaft and support for reverse shaft

- Insert O-ring -1- in circumferential groove -arrow A- on reverse shaft -2-.
- Lubricate O-ring with gear oil and then push reverse shaft into support for reverse shaft -3- (from side with chamfer -arrow B-).

Tapped hole -arrow C- must align with hole -arrow D-.



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



1.7 Exploded view - removing and installing input shaft, hollow shaft, pinion shaft and selector rods

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Bolt

- ☐ 24 Nm
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting

2 - Leaf spring

3 - Intermediate piece

- ☐ Insert in hole in gearbox housing.

4 - Clutch release lever

- ☐ With release bearing

5 - Bolt

- ☐ 24 Nm
- ☐ 2x
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting

6 - Retaining piece

- ☐ For guide sleeve

7 - Guide sleeve

- ☐ With oil seal
- ☐ Pulling oil seal for input shaft out of guide sleeve
 ⇒ [page 23](#)
- ☐ Installation depth of oil seal in guide sleeve
 ⇒ [page 24](#)
- ☐ Pressing oil seal for input shaft into guide sleeve
 ⇒ [page 24](#)

8 - O-ring

- ☐ Always renew
- ☐ Lubricate with gear oil
- ☐ Insert in circumferential groove in gearbox cover

9 - Circlip

- ☐ Always renew
- ☐ Insert in circumferential groove in input shaft

10 - Selector rod for 5th and 6th gear

- ☐ Installation position ⇒ [page 25](#)
- ☐ Only to be renewed complete with pinned selector fork for 5th and 6th gear

11 - Selector rod for 3rd and 4th gear

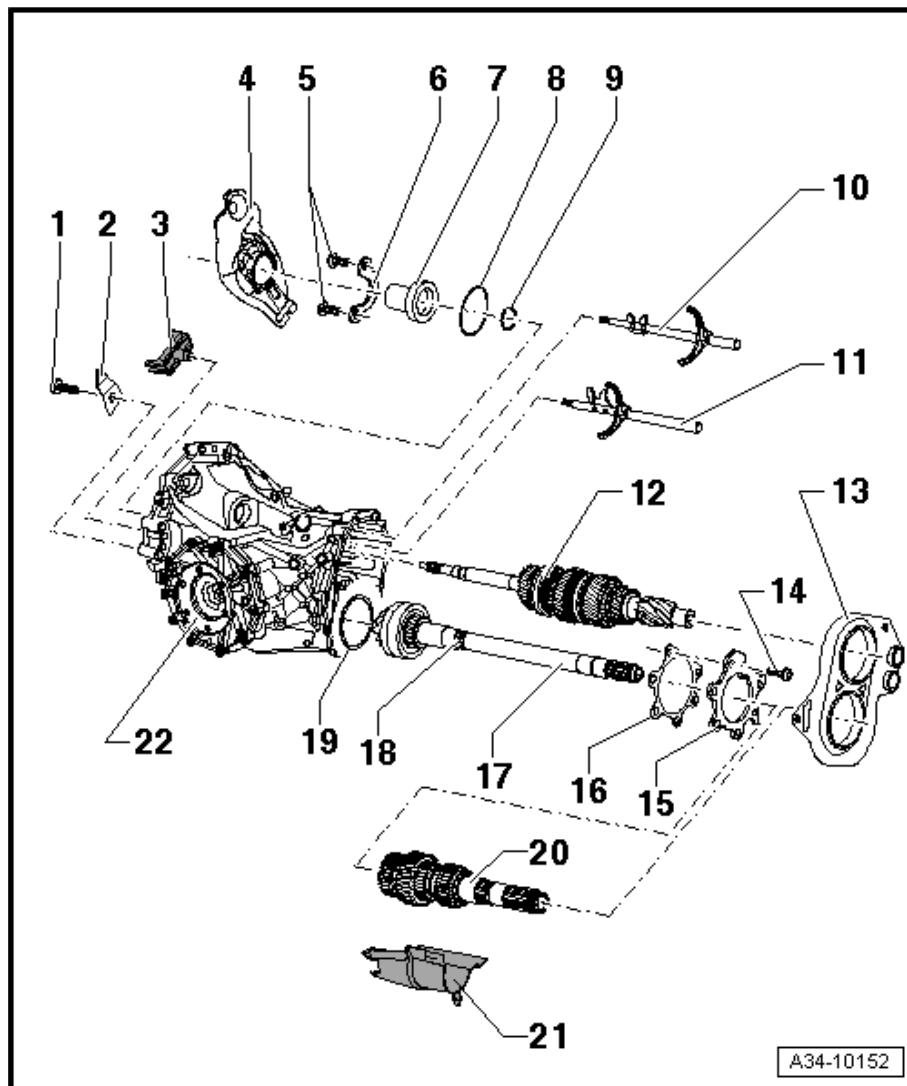
- ☐ Installation position ⇒ [page 25](#)
- ☐ Only to be renewed complete with pinned selector fork for 3rd and 4th gear
- ☐ Modification: with spring-loaded selector fork ⇒ [page 24](#) , allocate via ⇒ Electronic parts catalogue

12 - Input shaft

- ☐ Dismantling and assembling ⇒ [page 69](#)

13 - Bearing mounting

- ☐ Clean locking fluid out of tapped holes (using thread tap or similar)
- ☐ Pressing out and pressing in ball sleeves for selector rods ⇒ [page 24](#)





Note

- ◆ *The roller bearing outer races on the input shaft and hollow shaft cannot be renewed individually.*
- ◆ *The roller bearing outer races must not have any radial clearance in the bearing mounting.*

14 - Bolt

- ☐ 30 Nm
- ☐ 6x
- ☐ Clean thread and apply locking fluid -AMV 185 101 A1- when fitting

15 - Plate

- ☐ Installation position: machined side faces towards gearbox housing (can only be installed in one position).

16 - Shim „S4“

- ☐ Table of adjustments ⇒ [page 115](#)

17 - Pinion shaft

- ☐ With double angular contact ball bearing and tapered roller bearing inner race
- ☐ Dismantling and assembling ⇒ [page 83](#)

18 - Needle bearing

- ☐ For pinion shaft/hollow shaft

19 - Shim „S3“

- ☐ Table of adjustments ⇒ [page 115](#)

20 - Hollow shaft

- ☐ With pressed-on gears for 5th and 6th gear
- ☐ Dismantling and assembling ⇒ [page 83](#)

21 - Oil guide panel

22 - Gearbox housing

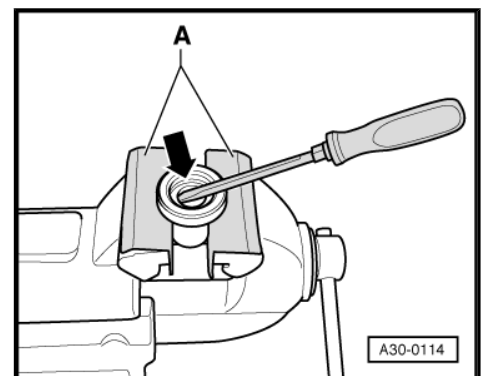
- ☐ With differential and flange shafts

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for errors or omissions. Copyright by AUDI AG.

Pulling oil seal for input shaft out of guide sleeve

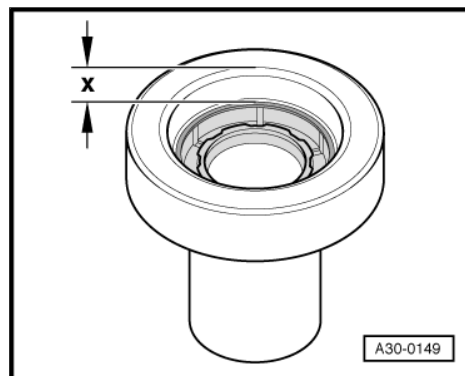
A - Counter-support , e.g. -Kukko 22/1-

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



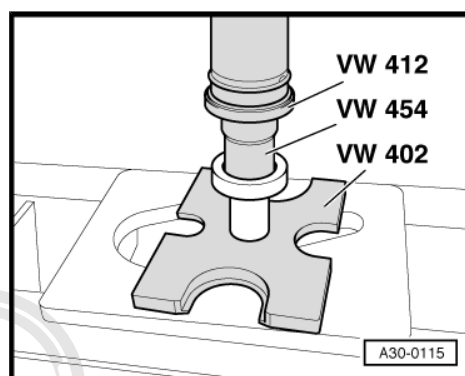
Installation depth - oil seal for input shaft

Dimension x = 7.75 mm ± 0.5 mm

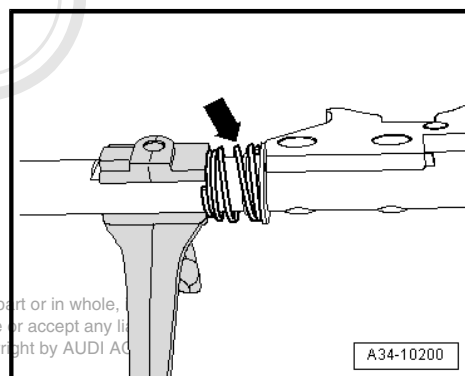


Pressing oil seal for input shaft into guide sleeve

- Lightly lubricate outer circumference of oil seal with gear oil.
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .
- The open side of the oil seal faces towards press tool -VW 454- .
- Carefully press in oil seal for input shaft as far as it will go.
- Press in oil seal for input shaft
⇒ Fig. „Installation depth - oil seal for input shaft“ , page 24 .
Make sure oil seal remains straight.



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



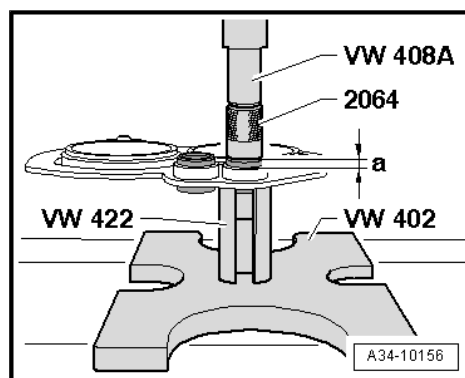
Pressing out and pressing in ball sleeves for selector rods

- Support bearing mounting with tube -VW 422- .
- Fit the small Ø of locking pin -2064- in the ball sleeve.
- Press out old ball sleeve.
- Press in new ball sleeve to dimension -a- (approx. 4 mm).



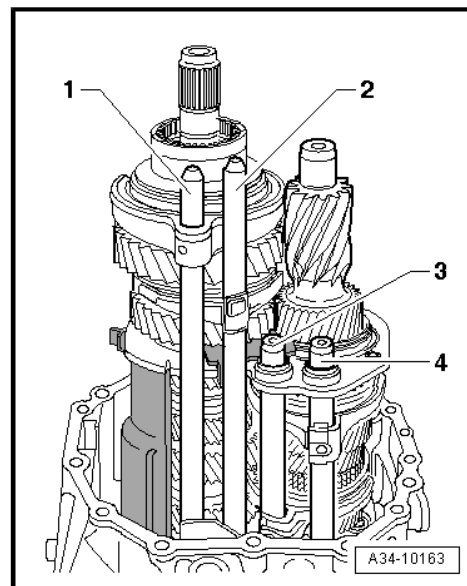
Note

Fit ball sleeve so that side with lettering (thicker metal) faces locking pin -2064- .



Installation position of selector rods in gearbox

- 1 - Selector rod with reverse gear selector fork
- 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



1.8 Assembly sequence - dismantling and assembling gearbox

Removing and installing centre differential housing, centre differential, gearbox cover, gearbox selector mechanism, input shaft, pinion shaft and hollow shaft



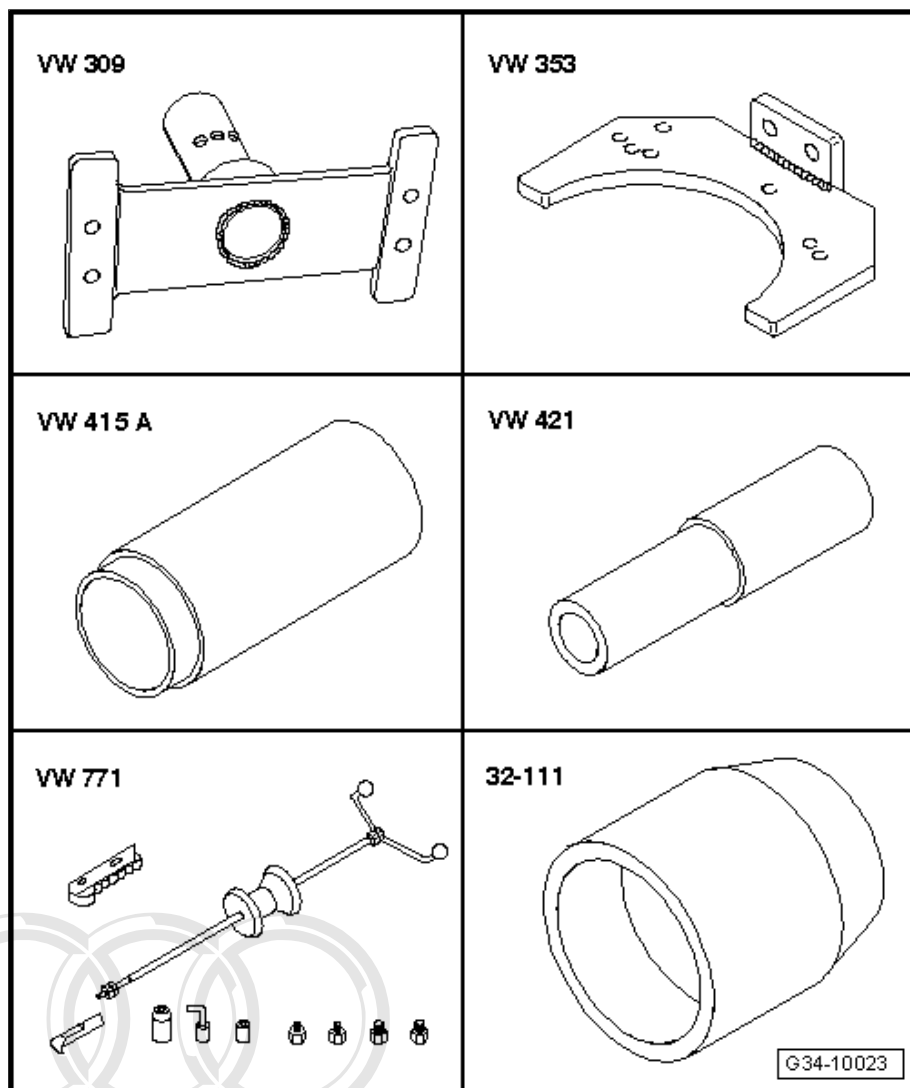
Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ *The differential does not have to be removed in order to remove the above-mentioned components.*
- ◆ *Removal is only necessary when adjustment work has to be carried out ➔ [page 115](#).*

Special tools and workshop equipment required

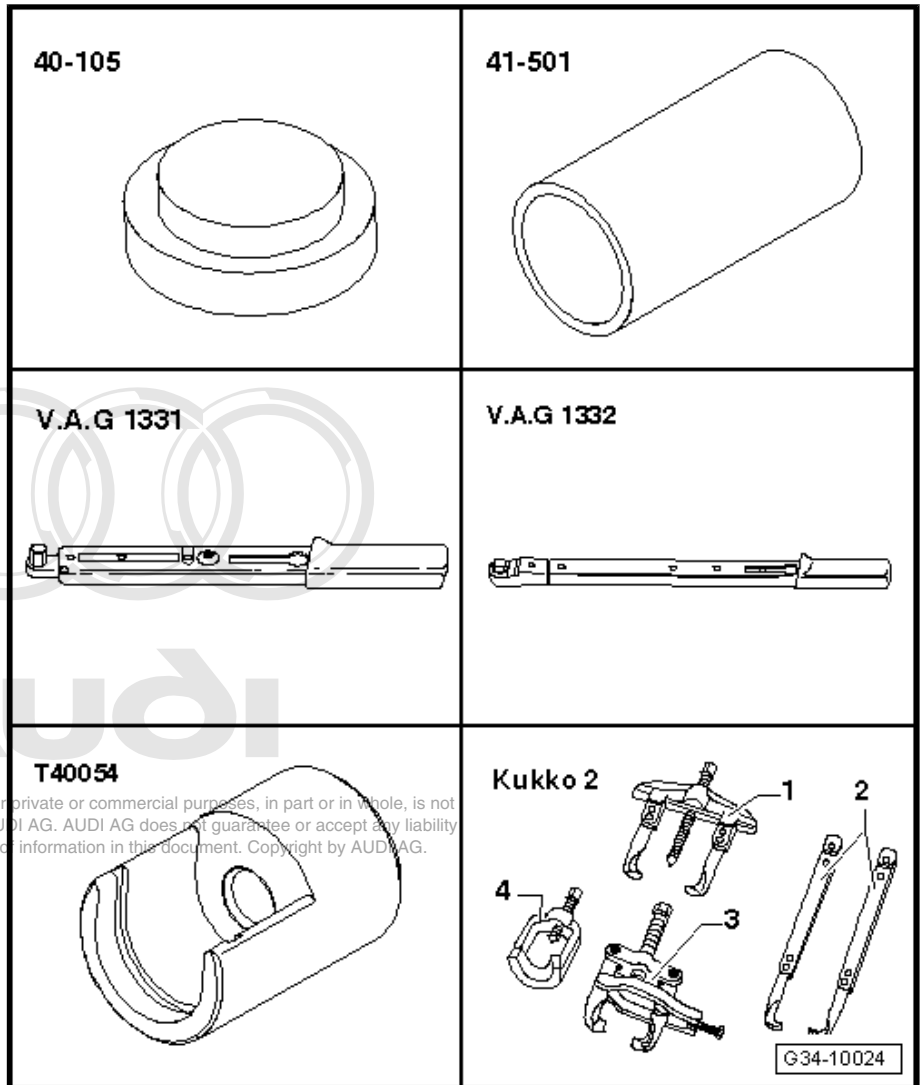
- ◆ Support plate -VW 309-
- ◆ Gearbox support -VW 353-
- ◆ Tube -VW 415 A-
- ◆ Tube -VW 421-
- ◆ Multi-purpose tool -VW 771-
- ◆ Thrust piece -32 - 111-



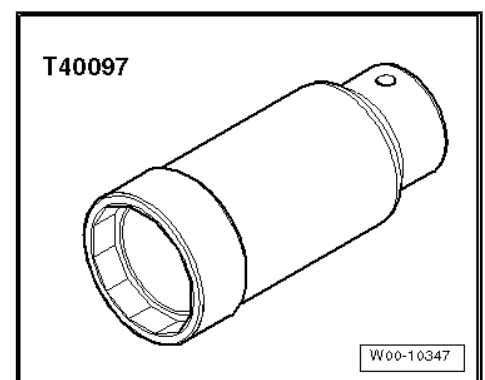
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Thrust plate -40 - 105-
- ◆ Drift sleeve -41 - 501-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Torque wrench -V.A.G 1332-
- ◆ Puller -T40054-
- ◆ -1- Two-arm puller -Kukko 20/10-
- ◆ -2- Puller hook, length 250 mm
- ◆ -Fühlerblattlehre-
- ◆ Sealing paste -AMV 188 001 02-
- ◆ Assembly sleeve -01E 311 120-
- ◆ Locking fluid - AMV 185 101 A1-
- ◆ Sealing grease - G 052 128 A1-
- ◆ Drip tray

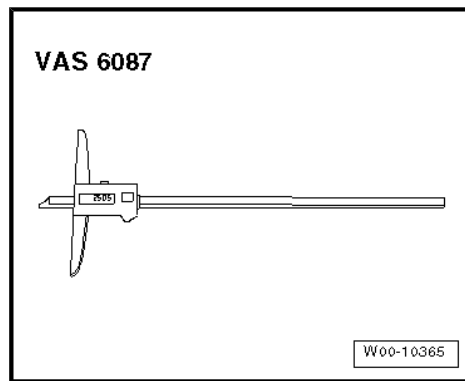
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ◆ Socket -T40097-

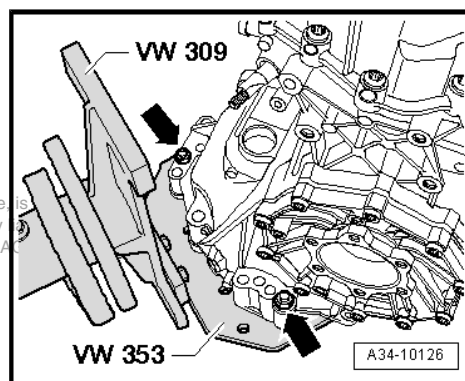


- ◆ Digital depth gauge , e.g. -VAS 6087-



1.8.1 Dismantling gearbox

- Place drip tray beneath gearbox.
- Drain gear oil.
- Secure gearbox to assembly stand with bolts -arrows-.

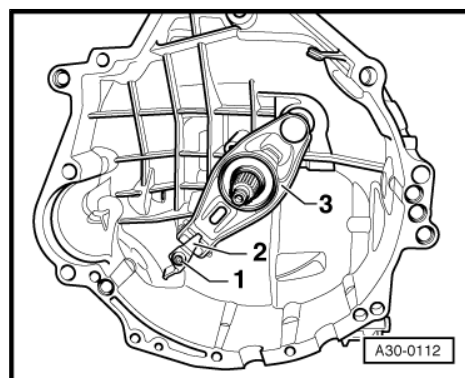
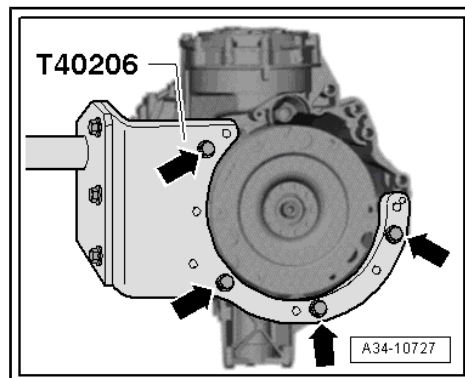


Protected by copyright. Copying for private or commercial purposes, in part or in whole is permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

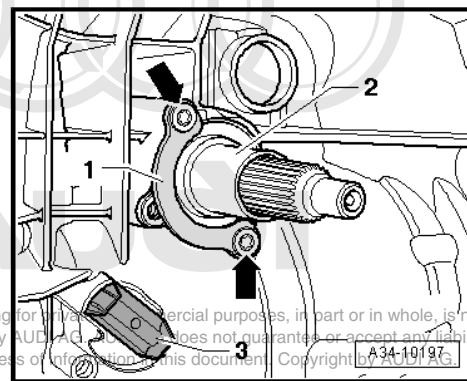


Note

- ◆ *The gearbox can also be bolted to gearbox support -T40206- (-arrows-) and mounted on engine and gearbox support -VAS 6095- .*
- ◆ *The illustration shows gearbox 0B1. The mounting points for the gearbox support are similar on gearbox 0A3.*
- Turn gearbox in assembly stand so that it is in horizontal position.
- Slacken off bolt -1- and remove leaf spring -2-.
- Remove clutch release lever -3- with release bearing.
- Fit a thin insulating hose or shrink hose tightly over splines of input shaft.

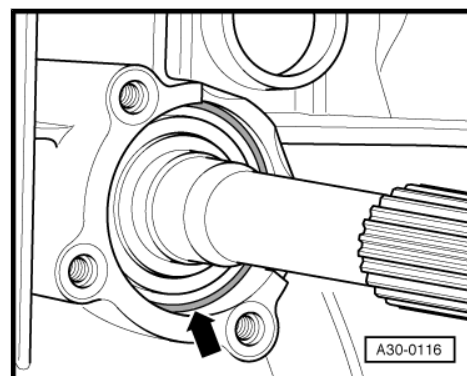


- Unscrew bolts -arrows- and remove retaining piece -1-.
- Pull guide sleeve -2- out of gearbox housing.
- Remove intermediate piece -3- from gearbox housing.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Pry out O-ring -arrow- using a small screwdriver.

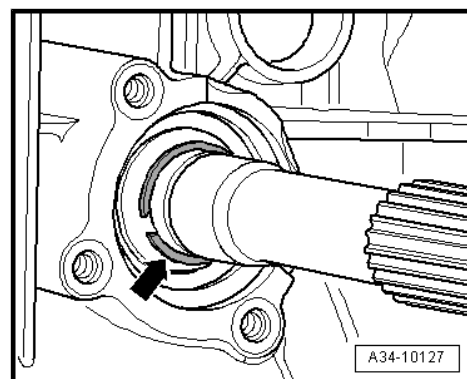


- Then remove circlip -arrow- in front of grooved ball bearing for input shaft.



Note

- ◆ It is not necessary to remove the grooved ball bearing for input shaft to dismantle the gearbox.
- ◆ A defective input shaft bearing can be renewed with gearbox removed (gearbox remains assembled); the required procedure is described on [page 46](#).



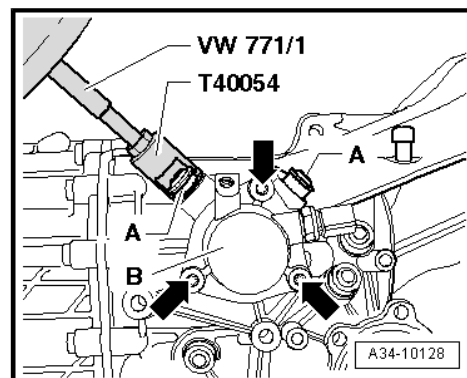
- Put selector shaft in neutral position.
- Pull out the two locking bushes -A- for selector shaft.



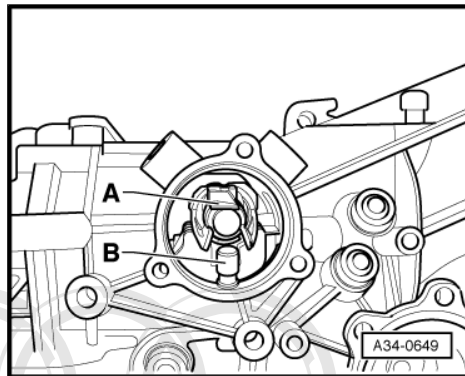
Note

- ◆ Mark the locking bushes to make sure that they are not interchanged with the locking bushes for the selector rods.
- ◆ The locking bushes were modified shortly after start of production [page 18](#).

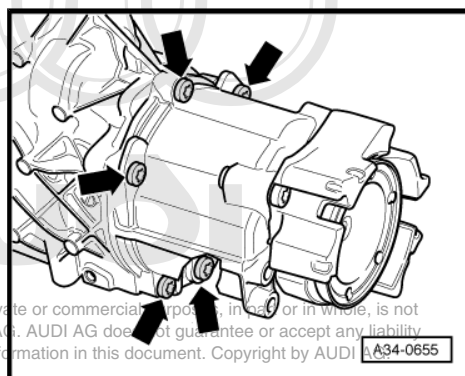
- Remove bolts -arrows- and take off selector shaft cover -B-.



- Push selector shaft -A- into gearbox as far as it will go, simultaneously removing pin -B-.
- Pull out selector shaft.



- Unscrew bolts -arrows- and detach centre differential housing.
- Remove centre differential from pinion shaft/hollow shaft.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG

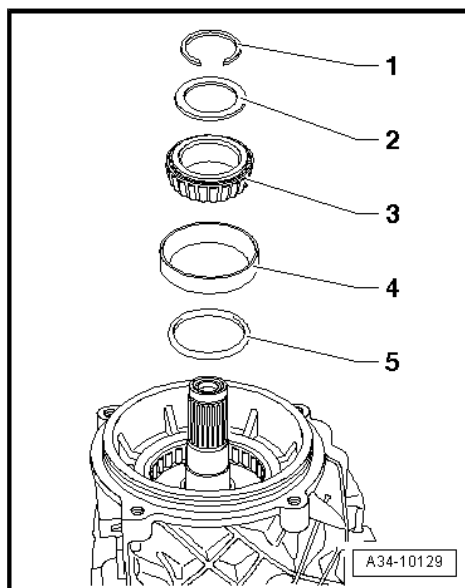
- Remove circlip -1- and shim(s) -2- from pinion shaft.



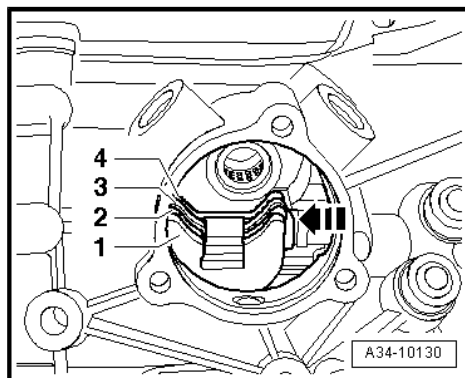
Note

Note down thickness of circlip and shim(s).

- Remove inner race -3- and outer race -4-. These components are a push fit and can be removed by hand.
- Remove spacer ring -5- from 12-point nut on hollow shaft.



- Lock hollow shaft in position by moving selector rods -1- to -4- in direction of -arrow-.



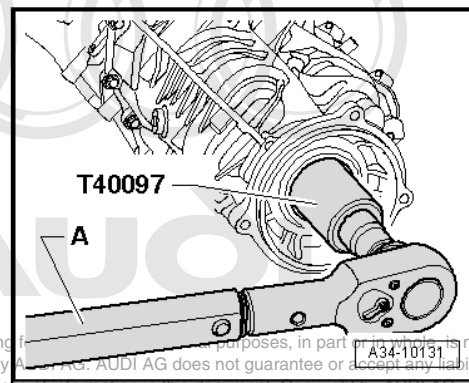
- Now slacken 12-point nut on hollow shaft using socket - T40097- .

A - Handle with $\frac{3}{4}$ " drive



Note

- ◆ *The twelve-point nut may have a very high release torque (up to approx. 500 Nm).*
- ◆ *If necessary, place engine and gearbox jack -V.A.G 1383 A- and gearbox support -T10337- underneath to prevent the tools from slipping off the twelve-point nut when loosening it.*

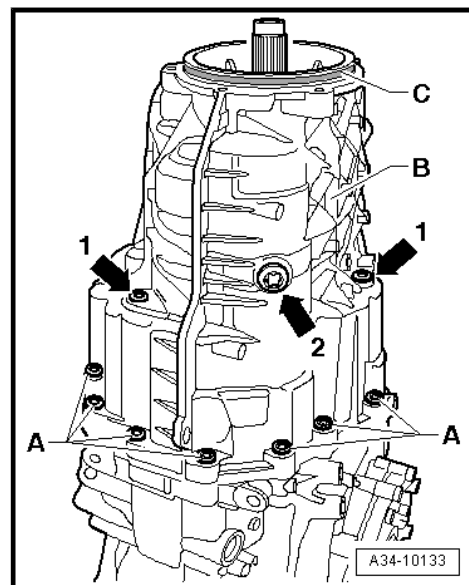


- Set selector rods to neutral position.
- Then turn the gearbox in the assembly stand so that the gearbox cover faces upwards.
- Unscrew bolts -arrows 1- (securing bearing mounting), bolt -arrow 2- (securing reverse shaft) and bolts -A- securing gearbox cover to gearbox housing.



Note

Always renew O-ring -C-.



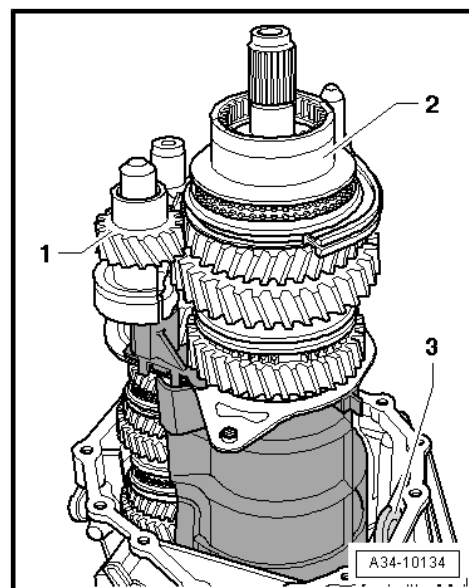
- Remove reverse gear wheel -1- and reverse shaft.
- Detach clutch unit -2- with reverse gear synchro-rings by hand.



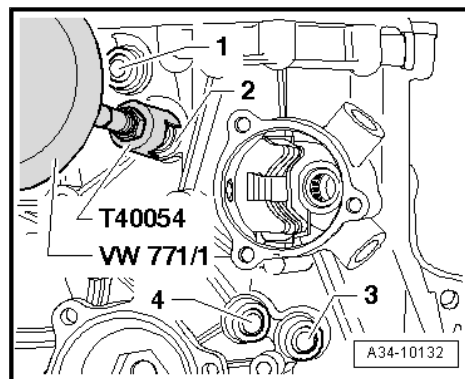
Note

On some gearboxes, the clutch unit may be seated tightly on the hollow shaft. In this case, carefully press the clutch unit free using two screwdrivers (on opposite sides), taking care not to damage the synchro-ring for reverse gear.

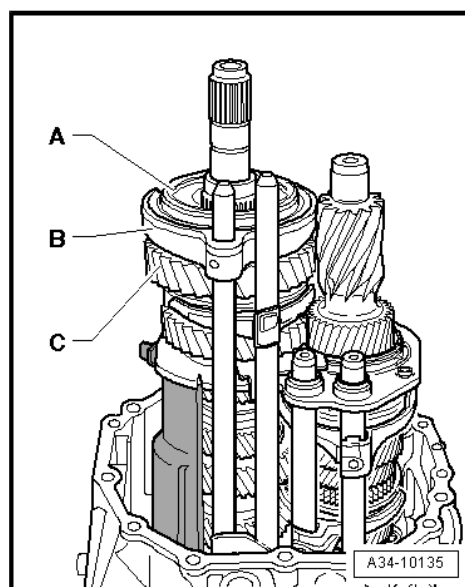
- Remove magnet -3- from gearbox housing.
- Mark locking bushes -1- to -4- for selector rods.



- Remove locking bushes -1- to -4-.

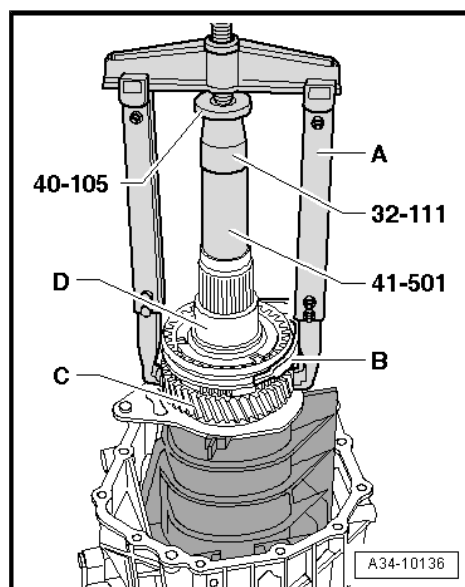


- Remove locking collar -A- with selector fork -B- and reverse selector gear -C-.
- Detach thrust washer for reverse and 1st speed selector gears.
- Remove 1st speed selector gear with needle bearing and synchro-rings.



- Detach 2nd speed selector gear -C- together with inner ring for 1st speed selector gear -D- and 1st/2nd speed selector fork -B- from hollow shaft.

A - Two-arm puller , e.g. -Kukko 20/10- with 250 mm hooks



Audi

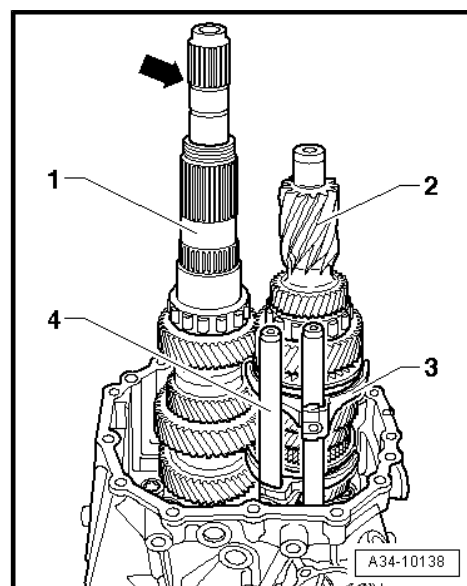
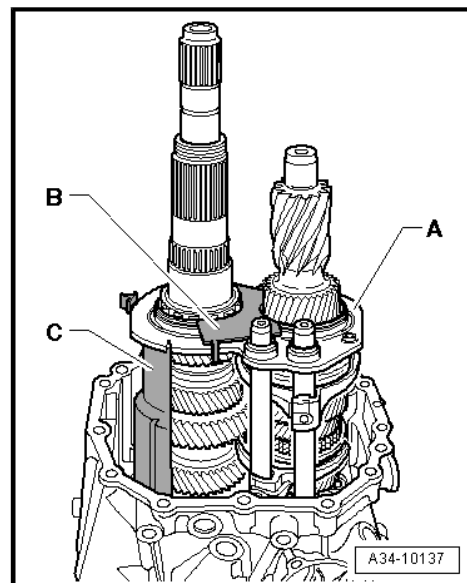
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove bearing mounting -A- with mounting for reverse shaft -B-.
- Pull oil guide panel -C- out of gearbox housing.



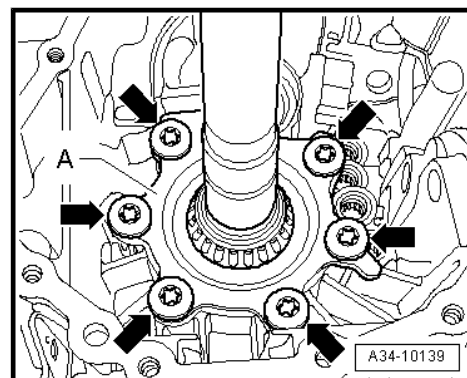
- Then guide hollow shaft -1- together with input shaft -2- and selector rods -3- and -4- upwards and over pinion shaft -arrow-.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



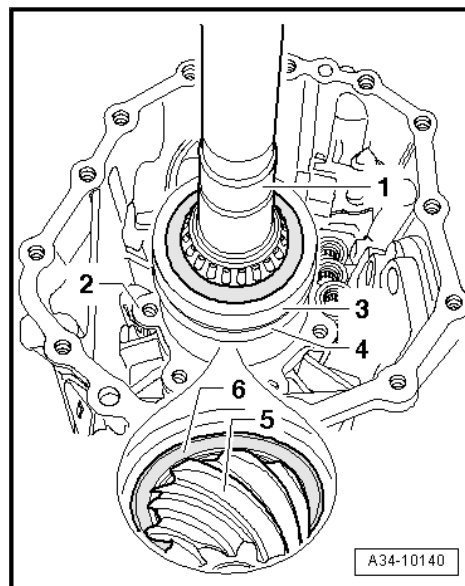
Check double angular contact ball bearing ➔ [Item 10 \(page 9\)](#) for wear (running noises) as described below.

- Remove differential.
- Turn pinion shaft several times.
- The double angular contact ball bearing should not catch and should run smoothly when rotating the pinion shaft (renew bearing if necessary).
- Remove bolts -arrows- and detach retaining plate -A- and shim „S4“ located below retaining plate.



- Carefully pull pinion shaft -1- out of opening in gearbox housing -2-.

Take care not to pull apart the outer races -3- and -4- of the double angular contact ball bearing, otherwise the seal -6- of the double angular contact ball bearing can be damaged by the pinion gear -5-. If this should happen, the double angular contact ball bearing must be renewed.



1.8.2 Assembling gearbox

If the gearbox housing, the final drive gear set or the hollow shaft have been renewed, you must first re-determine the thickness of the shim „S6“ ➔ [page 96](#) . The shim is located on the hollow shaft and is responsible for the proper positioning of the 2nd speed selector gear.

Always renew the double angular contact ball bearing on the pinion shaft when renewing the final drive gear set.

The differential must be removed to check the double angular contact ball bearing for wear (running noises). The bearing should not »catch« and should run smoothly when the installed pinion shaft is rotated.



Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ *Carefully use thread tap to remove any remaining locking fluid from all threaded holes which will accommodate self-locking bolts.*
- ◆ *Clean the thread for the 12-point nut on the hollow shaft.*
- ◆ *Lubricate all needle bearings and synchro-rings with gear oil before fitting.*
- ◆ *Clean housing flanges thoroughly.*
- ◆ *Checking synchro-rings for wear ➔ [page 83](#)*
- Fit shim „S3“ in gearbox housing.

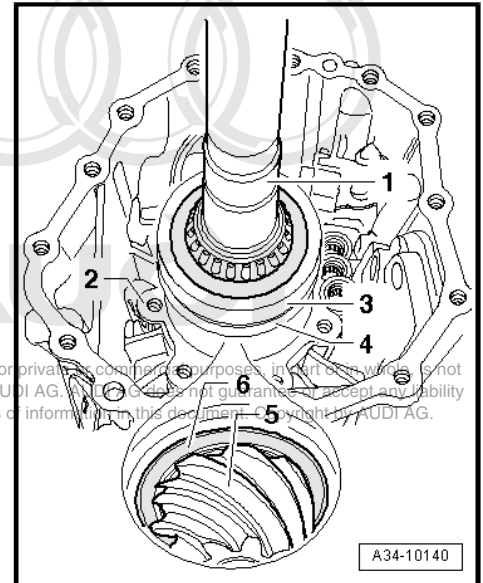
- Lubricate outer races -3- and -4- with gear oil.
- Carefully push pinion shaft -1- with double angular contact ball bearing into gearbox housing -2- by hand (press down top outer race -3-).

 Note

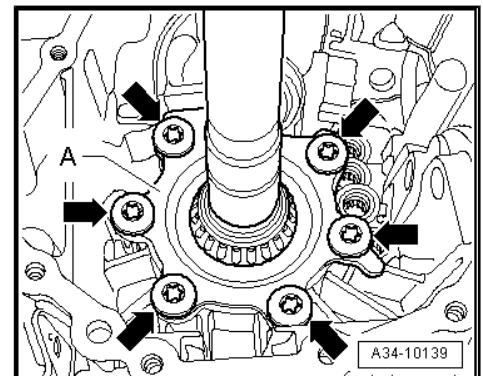
Using hot air blower, heat area around seat of bearing in gearbox housing if necessary.

Make sure that outer races -3- and -4- are kept straight when inserting and that they remain attached to each other. Otherwise the seal -6- can be damaged by the pinion gear -5-.

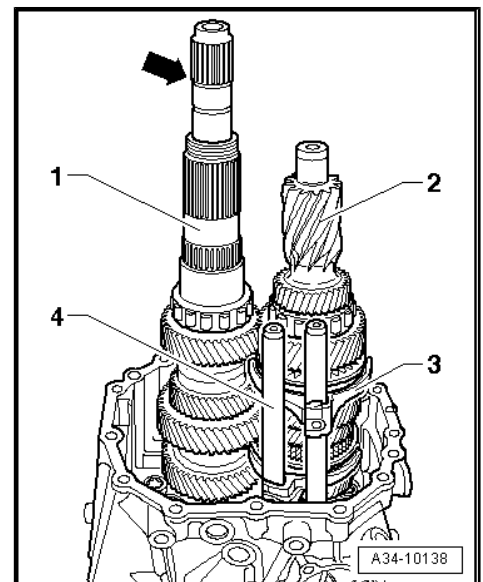
The bearing must be renewed if the seal of the double angular contact ball bearing is damaged.



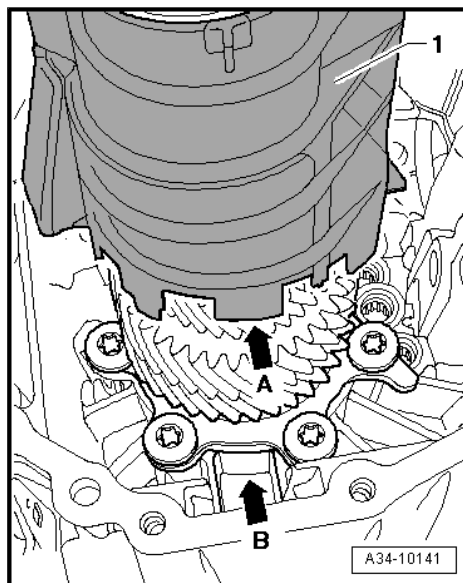
- Fit shim „S4“ and retaining plate -A- (can only be fitted in one position).
- Clean threads of old bolts -arrows- with a wire brush. Then install bolts with locking fluid -AMV 185 101 A1- and tighten diagonally to specified torque ➔ [Item 14 \(page 23\)](#) .
- Fit hollow shaft needle bearing onto pinion shaft.



- Then insert hollow shaft -1- together with input shaft -2- and selector rods -3- and -4- in gearbox housing (guide hollow shaft over pinion shaft -arrow-).

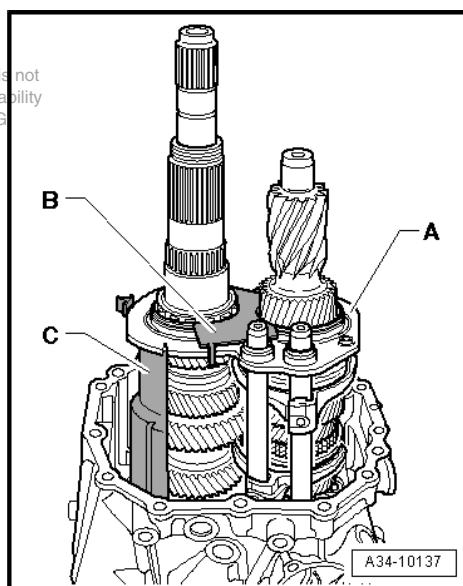


- Fit lug -arrow A- on oil guide panel -1- into recess -arrow B- in gearbox housing.



- Guide bearing mounting -A- over input shaft and hollow shaft and fit onto oil guide panel -C-.

The mounting -B- for reverse shaft must be fitted on the bearing mounting.



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

- Check outer friction surface of inner ring for grooves or scoring and renew if necessary.
- Check inner friction surface of synchro-ring for grooves or scoring and renew if necessary.
- Fit inner ring, intermediate ring and synchro-ring onto cone of selector gear/clutch unit and rotate rings to achieve proper seating.

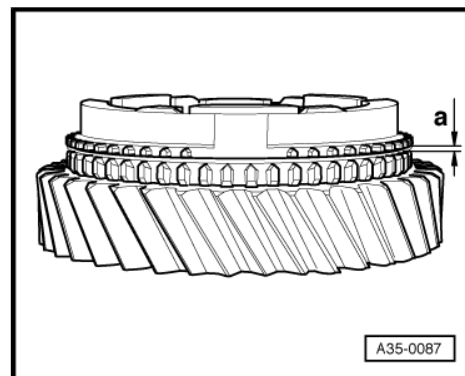


Note

To achieve proper seating, rotate synchro-rings approx. one turn while pressing down rings simultaneously.

- Then measure gap -a- using a feeler gauge .

Gap -a-	Wear limit
1st and 2nd gear	0.7 mm
Reverse gear	0.7 mm



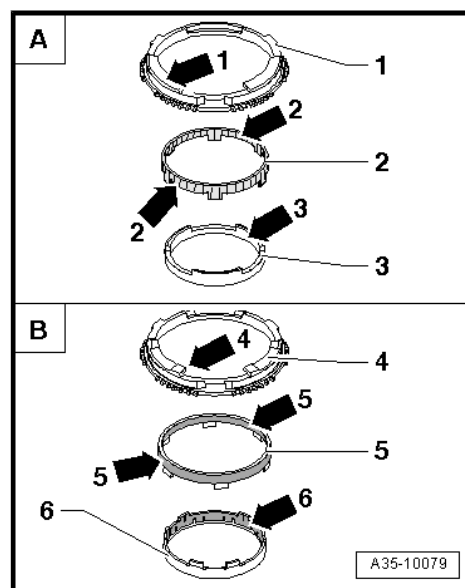
Note

Renew inner ring, intermediate ring and synchro-ring for the corresponding gear together.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Identification of reverse gear synchro-rings -A- and 1st/2nd gear synchro-rings -B-

- 1 - Reverse gear synchro ring: the lugs -arrow 1- have a smooth surface.
- 2 - Reverse gear intermediate ring: the friction surfaces -arrows 2- are coated with sintered particles (brass colour).
- 3 - Reverse gear inner ring: has no inner friction surface -arrow 3-.
- 4 - Synchro-ring for 1st and 2nd gear: the lugs are fitted with 2 projections each -arrow 4-.
- 5 - Intermediate ring for 1st and 2nd gear: the friction surfaces -arrows 5- are carbon-coated (black coating).
- 6 - Inner ring for 1st and 2nd gear: the inner friction surface -arrow 6- is carbon-coated (black coating).

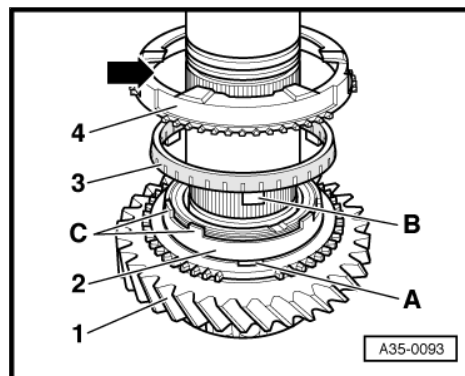


Installation position of synchro-rings for 1st, 2nd and reverse gear



Note

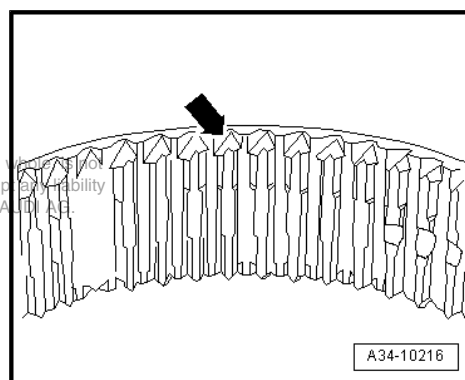
- ◆ If components are not being renewed, make sure they are re-installed on the same gear.
- ◆ Do not interchange synchro-rings for reverse gear with synchro-rings for 1st and 2nd gear ⇒ [page 37](#).
- Fit inner ring -2- onto selector gear -1-/clutch unit.
- Fit intermediate ring -3-. Lug -B- must be inserted into recess -A-.
- Fit synchro-ring -4-. Guide lugs -C- through recess -arrow-.
- Place 2nd speed selector gear with needle bearing and synchro-rings onto hollow shaft.
- Then fit synchro-hub for 1st and 2nd gear.



Installation position of locking collar for 1st and 2nd gear

- The side with asymmetric splines -arrow- must point towards 2nd gear.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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

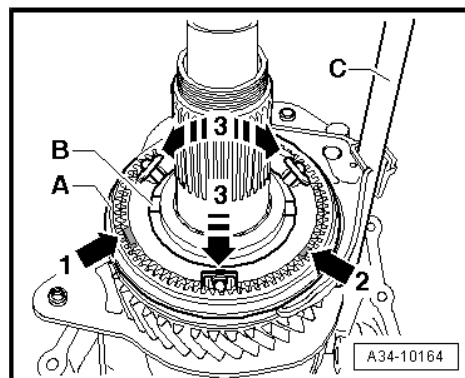
- Fit locking collar -A- (in installation position ⇒ [page 38](#)) together with selector fork for 1st and 2nd gear -C- over synchro-hub -B-.



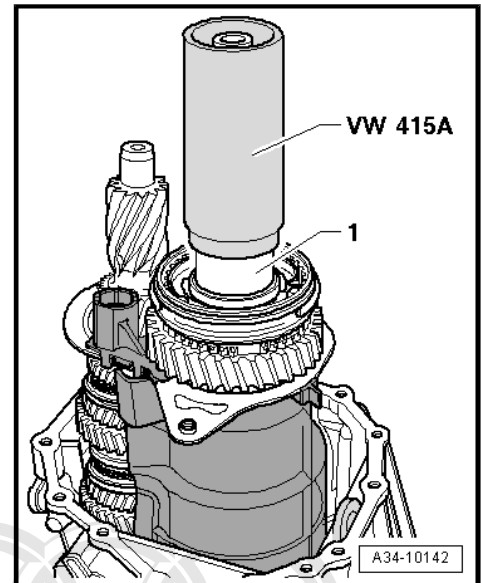
Note

The locking collar can only be fitted over synchro-hub in one position, gaps in splines -arrow 1- and -arrow 2- have different widths. Detach synchro-hub -B- from hollow shaft and turn upside down if necessary.

- Then position thrust blocks in recesses in synchro-hub and press thrust blocks in direction of -arrow 3- into recesses in locking collar. The locking collar must be held in the centre position.



- Heat needle bearing inner race -1- for 1st speed selector gear to approx. 100 °C, fit and drive onto stop.



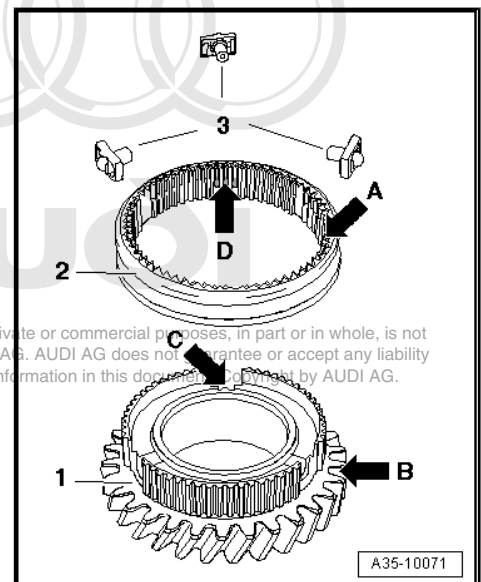
Assembling locking collar and reverse selector gear

- 1 - Reverse selector gear
- 2 - Locking collar
- 3 - Thrust blocks

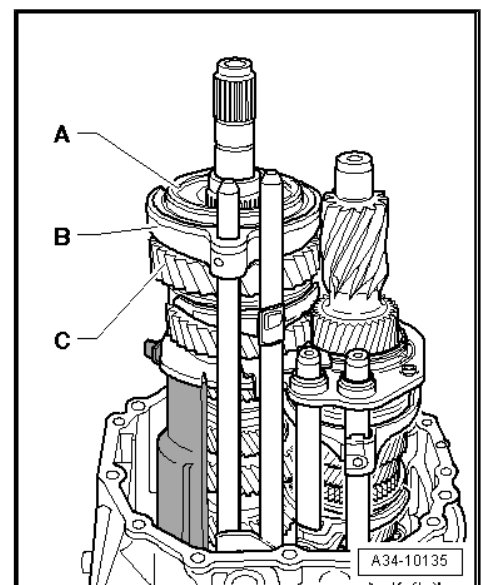
- Push locking collar over reverse selector gear.

Installation position:

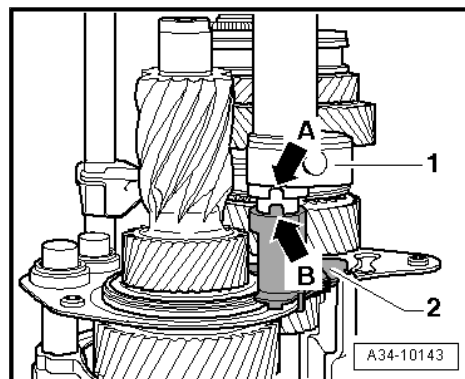
- The pointed teeth -arrow A- of the locking collar point away from the driving teeth -arrow B- of the reverse selector gear.
- Recesses for thrust blocks -3- in reverse selector gear -arrow C- and locking collar -arrow D- must align.
- Then position thrust blocks in recesses on reverse selector gear and press thrust blocks into recesses in locking collar.



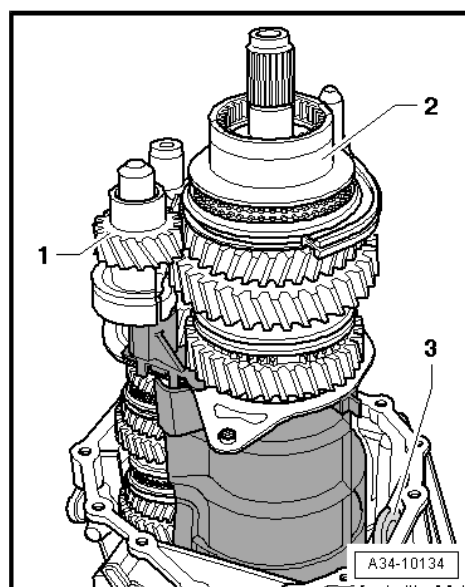
- Place 1st speed selector gear -C- with needle bearing and synchro-rings onto needle bearing inner race.
- Fit thrust washer for 1st gear and reverse gear onto hollow shaft.
- Fit reverse selector gear -A- (with locking collar fitted) together with reverse gear selector rod -B-.



- Fit reverse shaft -1- with recess -arrow A- onto lug -arrow B- of reverse shaft mounting -2-.



- Fit reverse gear wheel -1- with needle bearing onto reverse shaft; teeth of reverse gear wheel must point towards reverse selector gear.
- Fit clutch unit -2- with needle bearing and synchro-rings onto hollow shaft.
- Fit magnet -3- into rib in gearbox housing.



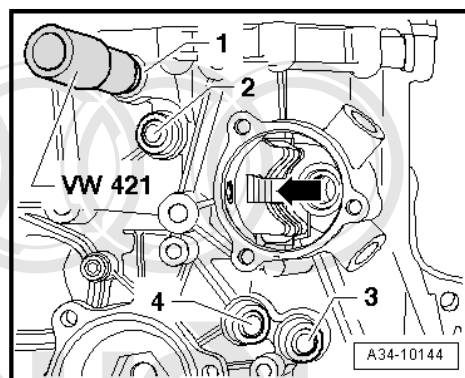
- Move selector rods to neutral -arrow-.
- Drive in locking bushes -1- to -4- for selector rods as far as stop using tube -VW 421- .



Note

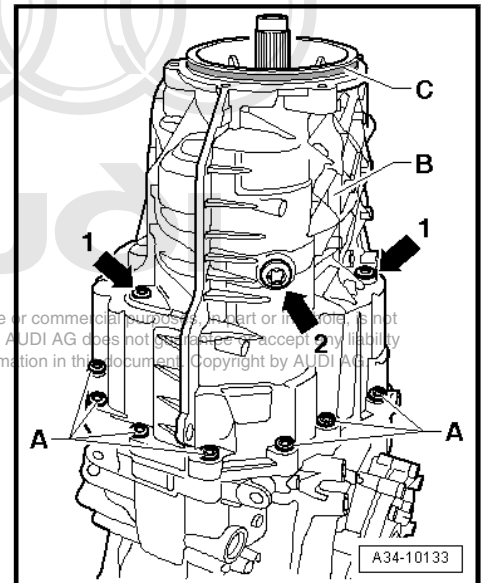
Do not interchange locking bushes for selector rods and selector shaft.

- Check whether the two dowel sleeves for centring gearbox cover to gearbox housing are fitted in gearbox cover.
- Apply sealing paste -AMV 188 001 02- evenly and not too thickly onto contact surfaces between gearbox housing and gearbox cover.

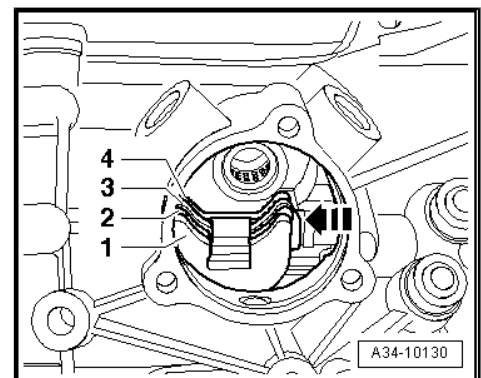


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Fit gearbox cover -B- onto gearbox housing. Do not screw in bolts -A- at this stage.
- Screw in bolt -arrow 2- into reverse shaft hand-tight.
- Screw new bolts -arrows 1- into bearing mounting and tighten hand-tight.
- Then tighten the 13 bolts -A- to specified torque
 ⇒ [Item 9 \(page 16\)](#) .
- Then tighten bolts -arrow 1- to specified torque
 ⇒ [Item 8 \(page 16\)](#) and tighten bolt -arrow 2- to specified torque
 ⇒ [Item 30 \(page 18\)](#) .
- Lubricate new O-ring -C- with gear oil and insert into circumferential groove on gearbox cover.
- Then turn gearbox in assembly stand in horizontal position.



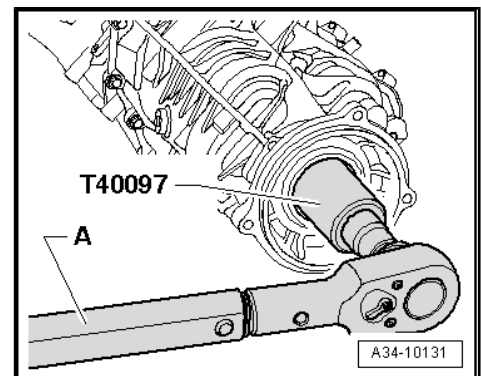
- Lock hollow shaft in position by moving selector rods -1- to -4- in direction of -arrow-.



- Now tighten new twelve-point nut on hollow shaft to specified torque ⇒ [Item 6 \(page 16\)](#) .

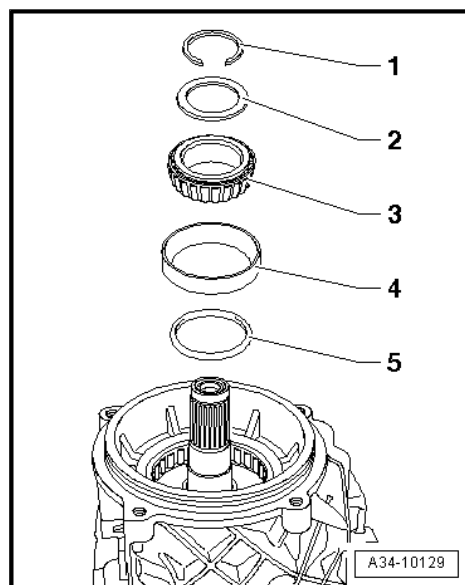
A - Torque wrench

- Then set selector rods to neutral position.
- Turn gearbox on assembly stand so that gearbox cover faces upwards.



- Fit spacer ring -5- over twelve-point nut on hollow shaft.
- Install outer race -4- and inner race -3-. These components are a push fit and can be installed by hand.

If you have renewed the pinion shaft (final drive gear set), you must now re-determine the thickness of the circlip -1- and the shim(s) -2- for the tapered roller bearing on the pinion shaft
 ⇒ [page 42](#) .



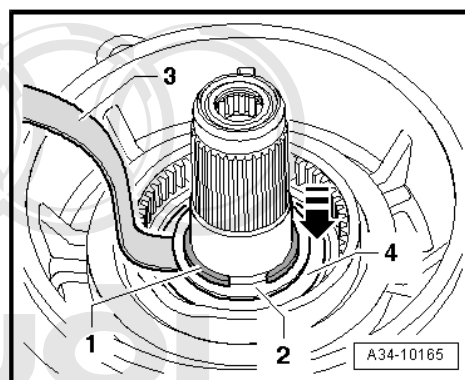
The thickness of the circlip -1- and the shim(s) -2- is determined according to the following procedure:

- The gap after fitting shim(s) and circlip available as spare parts must be max. 0.10 mm (measured between shim -2- and tapered roller bearing inner race -4-).
- Check the gap with a feeler gauge -3-.



Note

The circlip -1- must be properly seated in the base of the groove and the tapered roller bearing inner race -4- must be pressed in direction of -arrow-.



- Determine shim(s) and circlip from table. For part numbers, refer to ⇒ Electronic parts catalogue .

The following shims are available:

Shim thickness (mm) 1)		
0.7	1.1	1.5
0.8	1.2	1.6
0.9	1.3	
1.0	1.4	
• 1) The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.		

The following circlips are available:

Circlip thickness (mm)		
1.70	1.80	1.90
1.75	1.85	

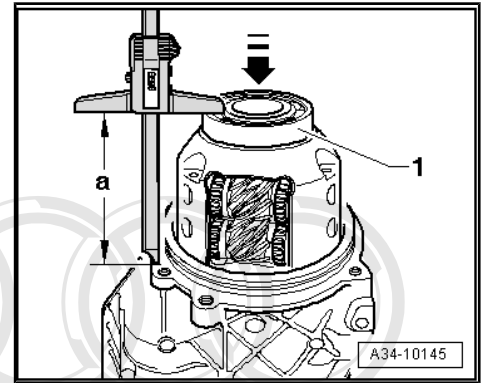
- Install determined shim(s) and circlip.

- Push centre differential onto splines on hollow shaft and press in direction of -arrow-.
- When doing this, measure distance -a- between flat surface of grooved ball bearing outer race -1- and flat surface of gearbox cover flange.

Determine required shim from table ➤ [page 43](#) .

The following shims are available:

Measuring range	Shim
Measured value (mm)	Thickness (mm)
109.88 ... 110.00	1.65
109.91 ... 110.15	1.45
110.16 ... 110.45	1.20
110.41 ... 110.70	0.95
110.66 ... 110.95	0.70
110.91 ... 111.20	0.45

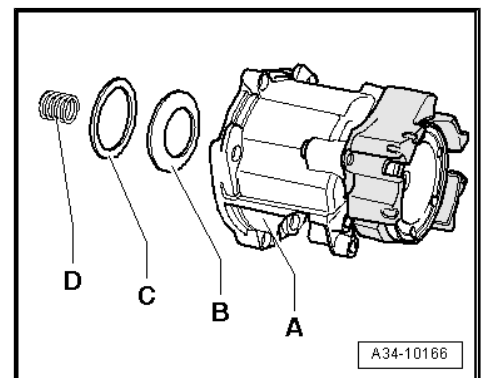


Note

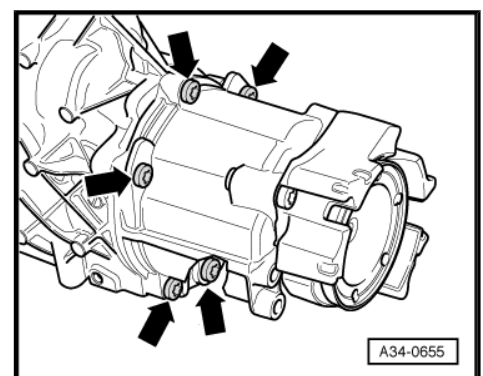
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Select correct shims from ➤ *Electronic parts catalogue* .

- Turn gearbox in assembly stand into horizontal position.
- Insert dished spring -B- into centre differential housing -A-.
- Installation position of dished spring: inner diameter (convex side) faces flange shaft in centre differential housing.
- Position determined shim -C- on dished spring -B-.
- Fit spring -D- onto flange shaft in centre differential housing.
- Then fit centre differential housing onto gearbox cover.



- Tighten bolts -arrows- to specified torque ➤ [Item 2 \(page 11\)](#) .



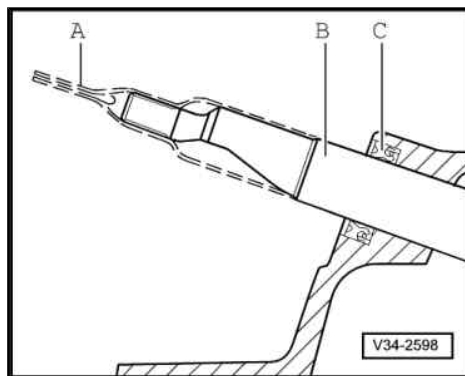
- Push assembly sleeve -01E 311 120- -A- onto selector shaft -B-.



Note

To avoid damaging oil seal -C-, always use assembly sleeve -01E 311 120- -A- when installing oil seal and selector shaft.

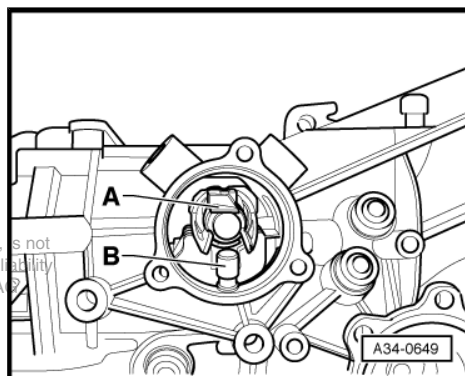
- Selector rods must be in neutral position.
- Install complete selector shaft.
- Installation position: Chamfer of selector shaft points downwards.
- Push selector shaft -A- into gearbox as far as it will go, simultaneously inserting pin -B-.



Note

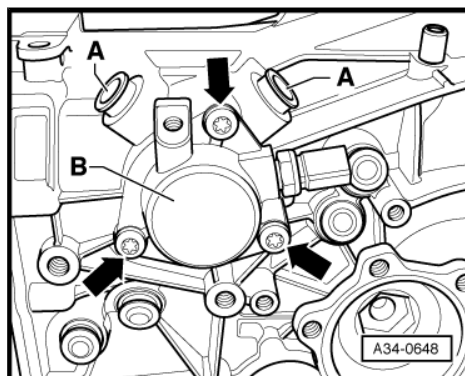
On pins with lug, the end with the lug must be inserted into the gearbox housing drilling.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



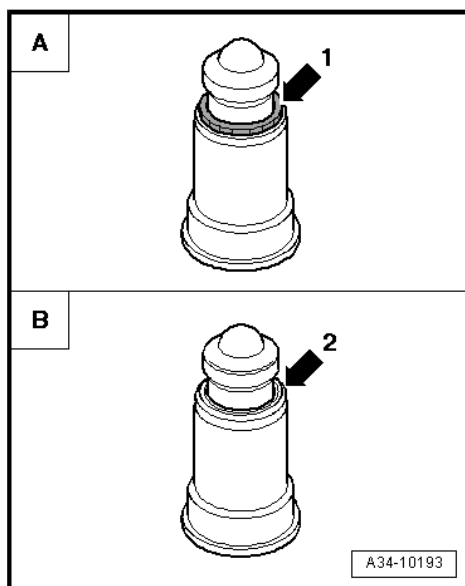
- Install cover -B- with new O-ring.
- Clean threads of bolts -arrows- with a wire brush. Then install bolts with locking fluid -AMV 185 101 A1- and tighten to specified torque ➔ [Item 23 \(page 17\)](#) .

A -
 Locking bushes for selector shaft

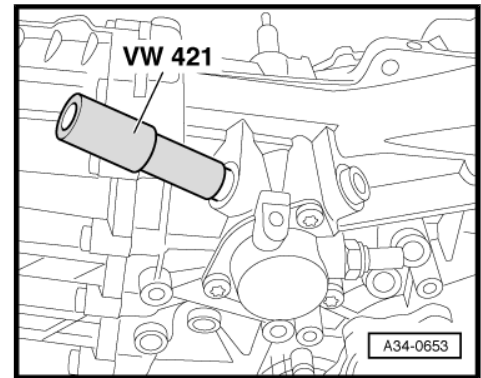


Note

- ◆ *Install only version -B- of locking bushes for selector shaft with flanged edge -arrow 2-.*
- ◆ *If the gearbox is fitted with selector shaft locking bushes of type -A-, these must always be replaced with locking bushes of type -B-. For part number, refer to ➔ Electronic parts catalogue .*
- ◆ *Version -B- can be re-used if already installed.*



- Drive in selector shaft locking bushes ➔ [page 44](#) using tube - VW 421- .



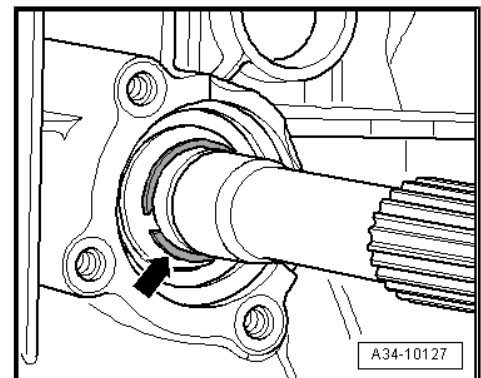
- Install new circlip -arrow- in front of grooved ball bearing for input shaft.



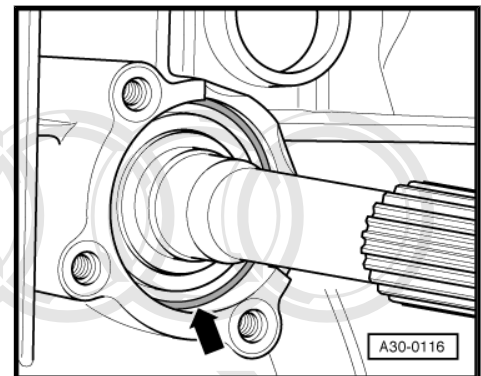
Caution

The circlip -arrow- can become dislodged from the groove in the input shaft.

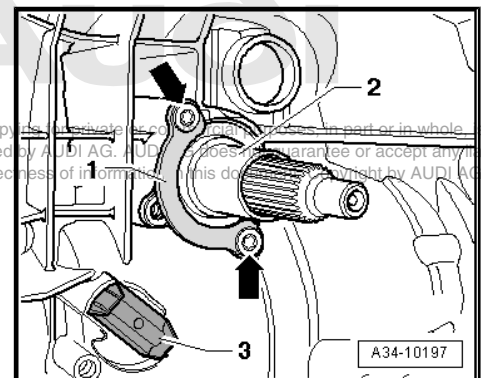
- Use a new circlip.
- The circlip must be properly seated in the base of the groove and must still be under tension when it is in position.



- Lubricate new O-ring -arrow- with gear oil before fitting into circumferential groove on gearbox housing.
- Fit a thin insulating hose or shrink hose onto input shaft splines.
- Pack space between sealing lip and dust lip of oil seal in guide sleeve half-full with sealing grease -G 052 128 A1- .
- Lightly oil outer circumference of guide sleeve.

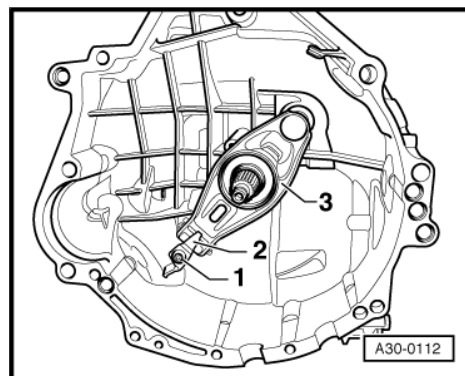


- Push guide sleeve -2- over input shaft and into gearbox housing.
- Remove insulating hose/shrink hose.
- Fit retaining piece -1-.
- Clean threads of bolts -arrows- with a wire brush. Then install bolts with locking fluid -AMV 185 101 A1- and tighten to specified torque ➔ [Item 15 \(page 17\)](#) .
- Insert intermediate piece -3- in gearbox housing.
- Check release bearing for wear and grease bearing surfaces on release bearing assembly ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 30 .



Protected by copyright. Copying, distributing, copying, or using in part or in whole is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

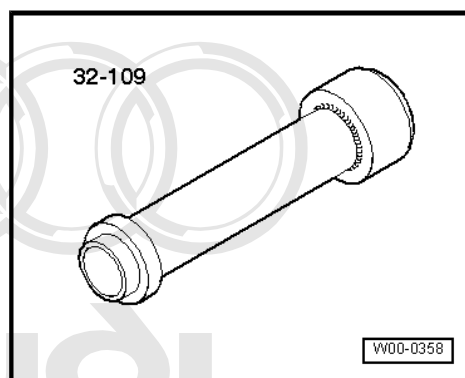
- Before installing clutch release lever -3-, apply a thin coat of copper grease (commercially available) to contact surface for plunger of clutch slave cylinder.
- Install clutch release lever together with release bearing.
- Clean thread of bolt -1- with a wire brush.
- Position leaf spring -2- onto bolt -1-.
- Then install bolt -1- with locking fluid -AMV 185 101 A1- and tighten to specified torque ➔ [Item 1 \(page 22\)](#) .
- Select all gears.



1.9 Renewing grooved ball bearing for input shaft with gearbox removed (gearbox remains assembled)

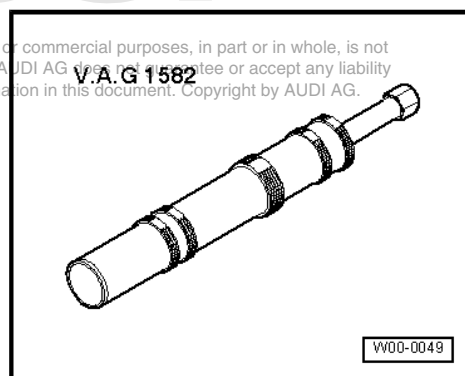
Special tools and workshop equipment required

- ◆ Tube -32 - 109-

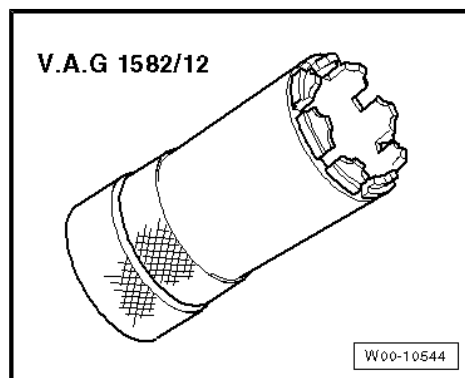


- ◆ Tapered roller bearing puller -V.A.G 1582-

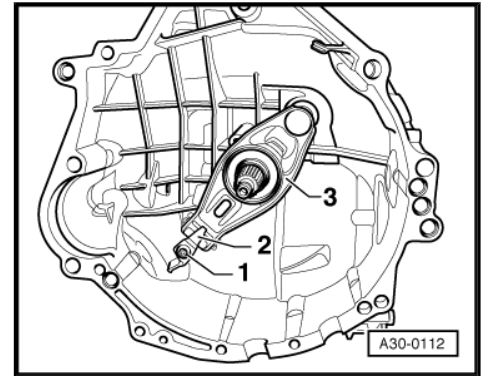
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



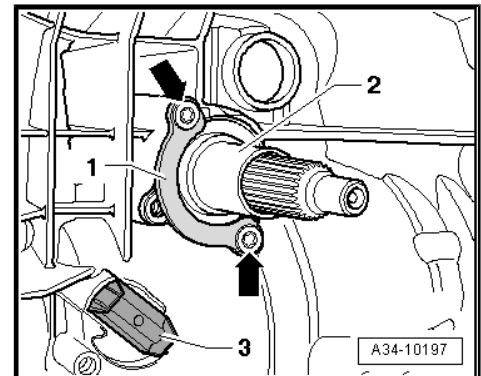
- ◆ Adapter -V.A.G 1582/12-



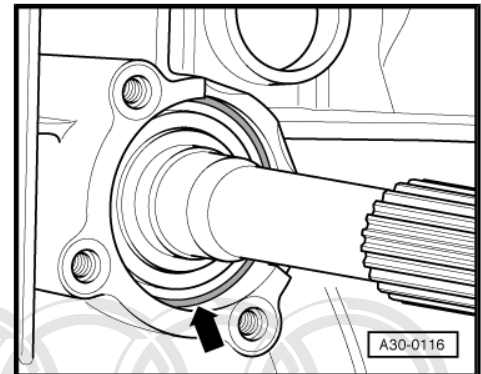
- Slacken off bolt -1- and remove leaf spring -2-.
- Remove clutch release lever -3- with release bearing.



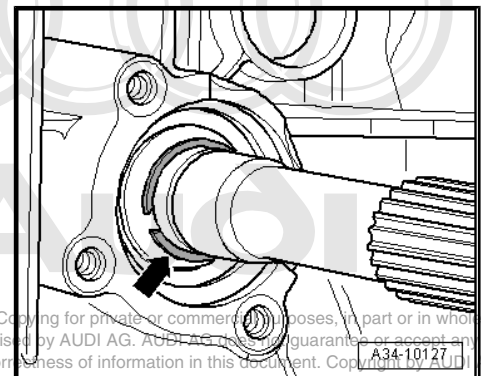
- Unscrew bolts -arrows- and remove retaining piece -1-.
- Fit a thin insulating hose or shrink hose onto input shaft splines.
- Pull guide sleeve -2- out of gearbox housing.
- Remove intermediate piece -3- from gearbox housing.



- Pry out O-ring -arrow- using a small screwdriver.



- Then remove circlip -arrow- in front of grooved ball bearing for input shaft.

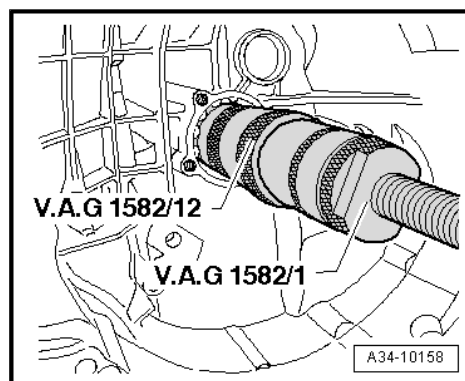


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

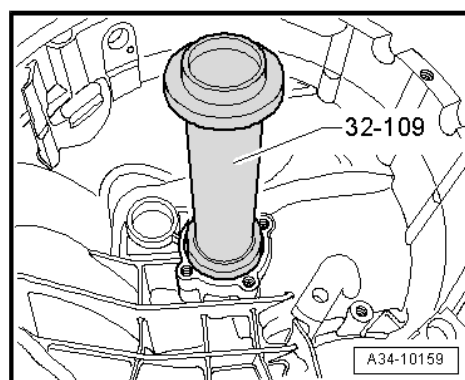
- Pull grooved ball bearing for input shaft out of gearbox housing.
- Then push new grooved ball bearing onto input shaft.

Installation position:

The closed side of the ball cage faces the gearbox housing.



- Drive grooved ball bearing onto stop in gearbox housing.



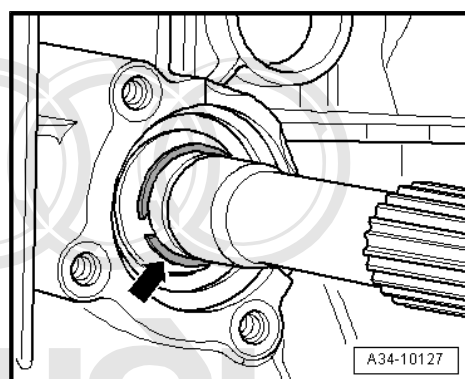
- Install new circlip -arrow- in front of grooved ball bearing for input shaft.



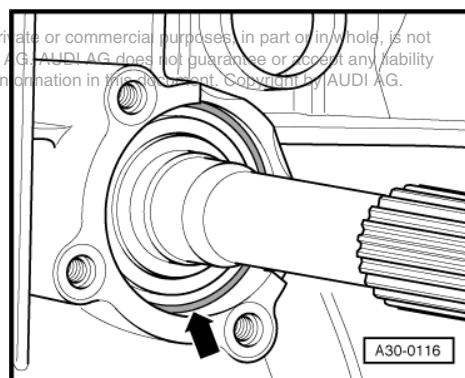
Caution

The circlip -arrow- can become dislodged from the groove in the input shaft.

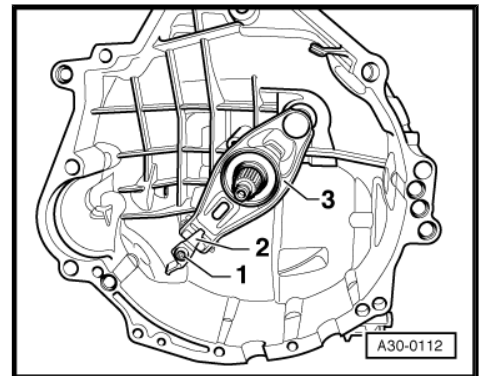
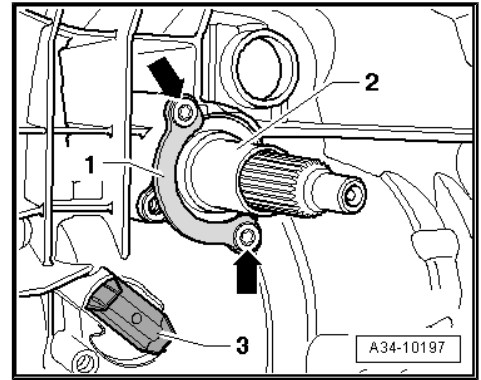
- Use a new circlip.
- The circlip must be properly seated in the base of the groove and must still be under tension when it is in position.



- Lubricate new O-ring -arrow- with gear oil before fitting into circumferential groove on gearbox housing.
- Pack space between sealing lip and dust lip of oil seal in guide sleeve half-full with sealing grease -G 052 128 A1- .
- Lightly oil outer circumference of guide sleeve.



- Push guide sleeve -2- over input shaft and into gearbox housing.
- Remove insulating hose/shrink hose.
- Fit retaining piece -1-.
- Clean threads of bolts -arrows- with a wire brush. Then install bolts with locking fluid -AMV 185 101 A1- and tighten to specified torque ⇒ [Item 15 \(page 17\)](#) .
- Insert intermediate piece -3- in gearbox housing.
- Check release bearing for wear and grease bearing surfaces on release bearing assembly ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 30 .
- Before installing clutch release lever -3-, apply a thin coat of copper grease (commercially available) to contact surface for plunger of clutch slave cylinder.
- Install clutch release lever together with release bearing.
- Clean thread of bolt -1- with a wire brush.
- Position leaf spring -2- onto bolt -1-.
- Then install bolt -1- with locking fluid -AMV 185 101 A1- and tighten to specified torque ⇒ [Item 1 \(page 22\)](#) .

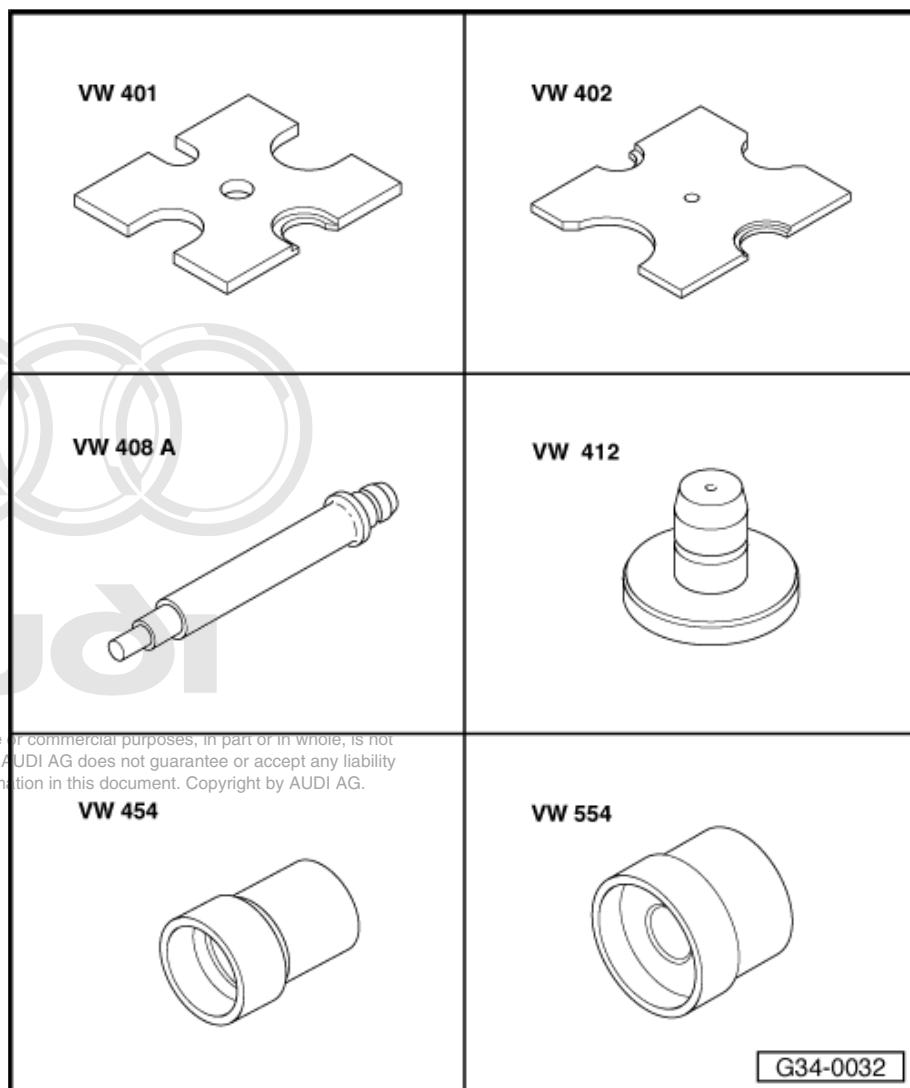


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Dismantling and assembling centre differential housing

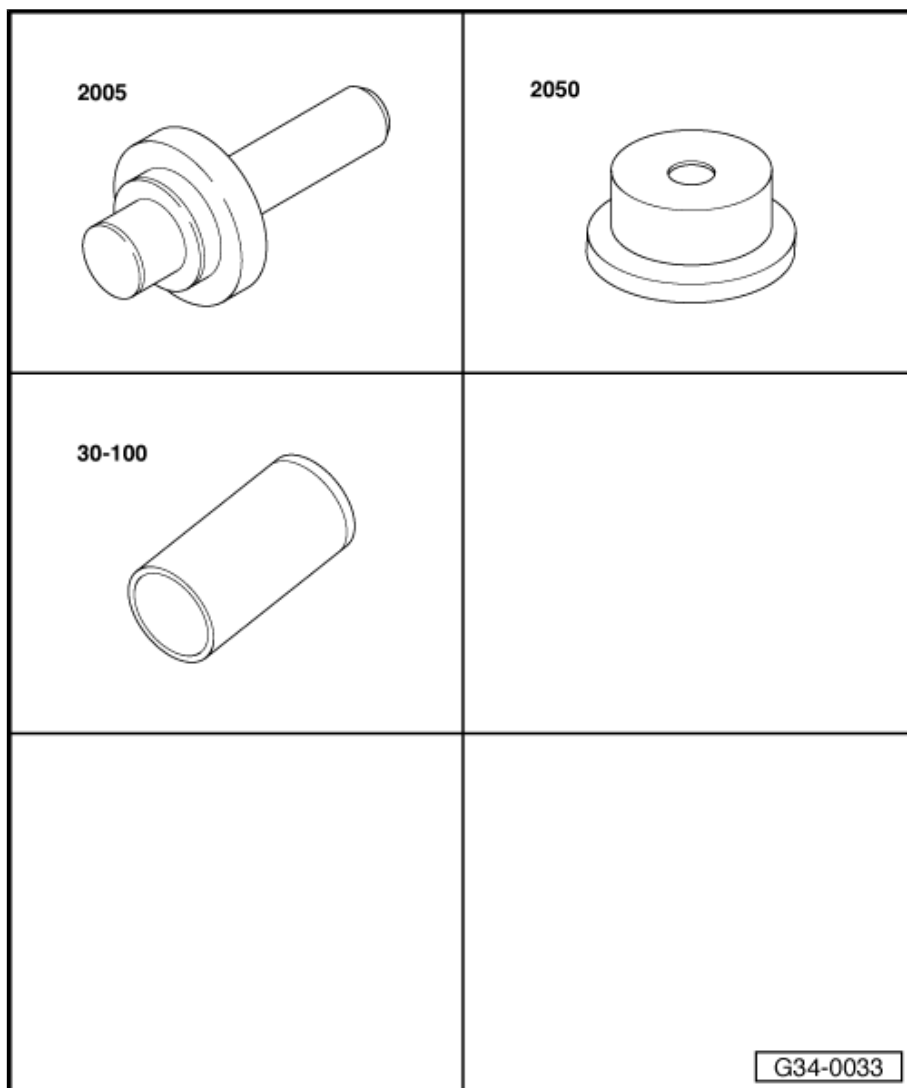
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 412-
- ◆ Press tool -VW 454-
- ◆ Press tool -VW 554-

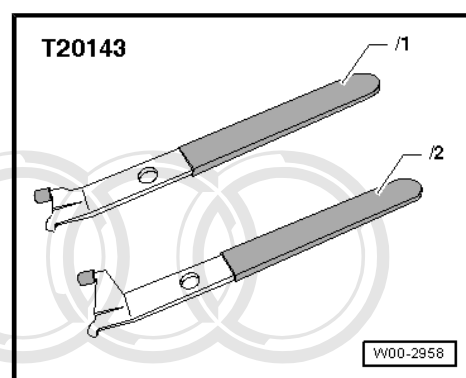


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Punch -2005-
- ◆ Thrust piece -2050-
- ◆ Drift sleeve -30 - 100-
- ◆ Thrust piece -T40106-
- ◆ Shim -016 311 391 A-
- ◆ Locking fluid -AMV 185 101 A1-
- ◆ Sealing grease -G 052 128 A1-

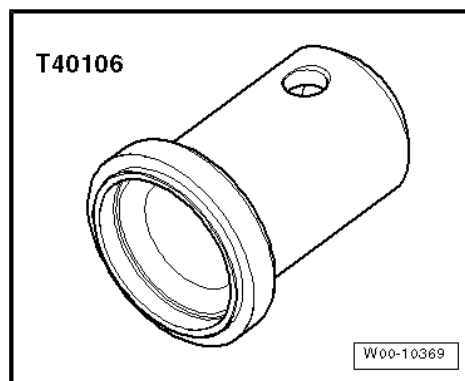


- ◆ Extractor tool -T20143-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

◆ Thrust piece -T40106-



Note

Due to the introduction of an oil seal with additional dust lip (from serial no. 42987) ⇒ [page 54](#) , the flange shaft ⇒ [Item 1 \(page 52\)](#) was fitted with a groove. Select correct components from ⇒ *Electronic parts catalogue* .

1 - Flange shaft

- ☐ Pressing out
⇒ [page 53](#) or
⇒ [page 53](#)
- ☐ Pressing in
⇒ [page 53](#)
- ☐ Modification: from serial
no. 42987 with groove
⇒ [page 54](#)
- ☐ Select correct compo-
nents from ⇒ *Electronic
parts catalogue*

2 - Bolt

- ☐ 20 Nm + 90°
- ☐ For vibration damper
- ☐ 3x
- ☐ Self-locking
- ☐ Renew

3 - Vibration damper

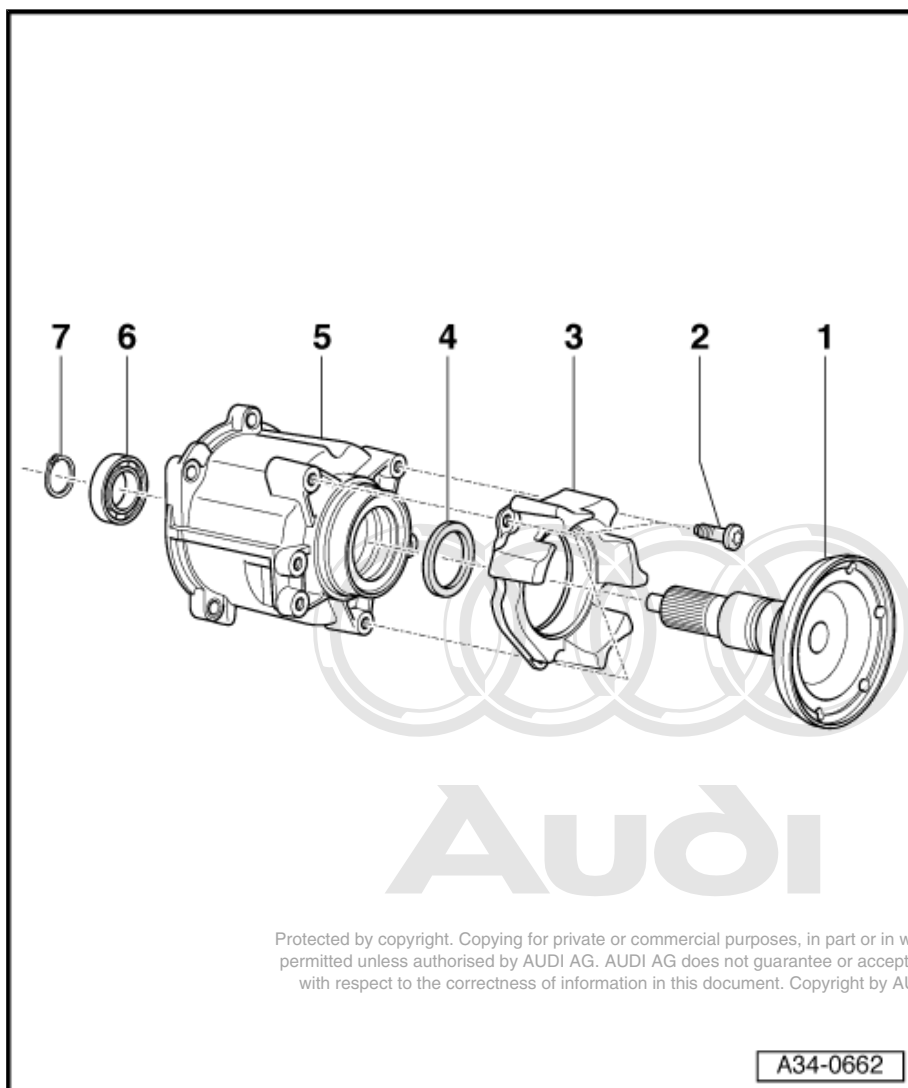
- ☐ Not fitted on all versions

4 - Oil seal

- ☐ Removing ⇒ [page 54](#)
- ☐ Installation up to serial
no. 42986 ⇒ [page 54](#)
- ☐ Modification: with addi-
tional dust lip from serial
no. 42987 onwards
⇒ [page 54](#)
- ☐ Installation from serial
no. 42987 onwards
⇒ [page 55](#)

5 - Centre differential housing

- ☐ Removing and installing
(with gearbox removed) ⇒ [page 11](#)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ❑ Removing and installing is also possible with gearbox installed in vehicle ➔ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34

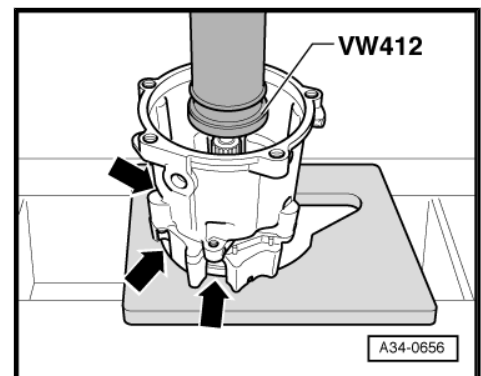
6 - Ball bearing

- ❑ For flange shaft
- ❑ Pressing out ➔ [page 55](#)
- ❑ Pressing in ➔ [page 55](#)

7 - Circlip

Pressing out flange shaft (centre differential housing with vibration damper)

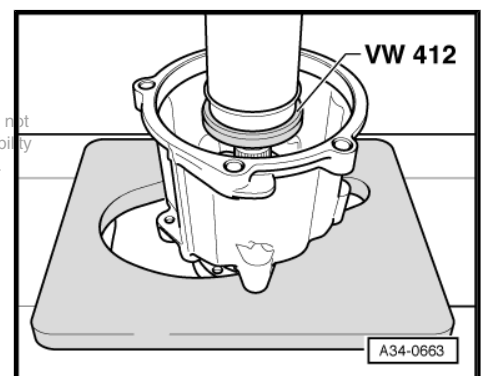
- Remove circlip before pressing out flange shaft.
- Set up centre differential housing so that flange shaft does not make contact with press plate -arrows- when it is pressed out.



Pressing out flange shaft (centre differential housing without vibration damper)

- Remove circlip before pressing out flange shaft.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Pressing in flange shaft

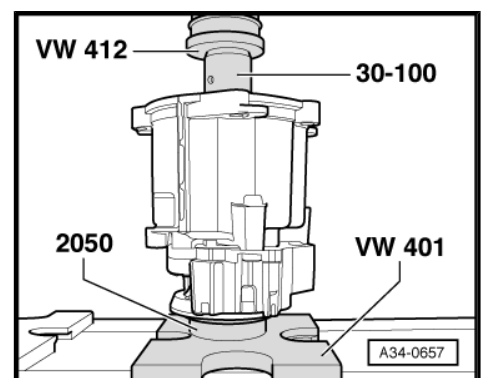
- Secure vibration damper before pressing in flange shaft.



Note

*Fit a flange shaft with a groove ➔ [page 54](#) if an oil seal with additional dust lip ➔ [page 54](#) is installed. Select correct components from ➔ *Electronic parts catalogue*.*

- Fit circlip.

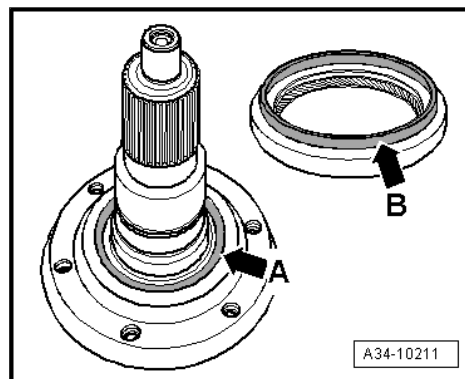


From serial no. 42987 onwards: flange shaft with groove
-arrow A- and oil seal with additional dust lip -arrow B-

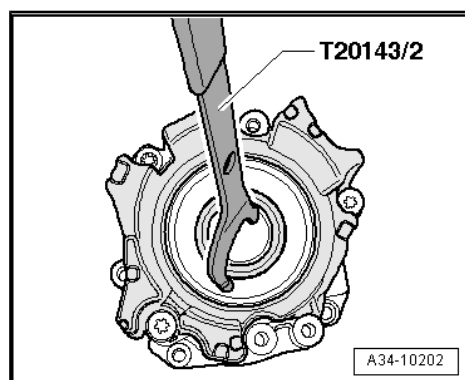


Note

An oil seal with additional dust lip -arrow B- must be fitted in conjunction with a flange shaft which has a groove -arrow A-.



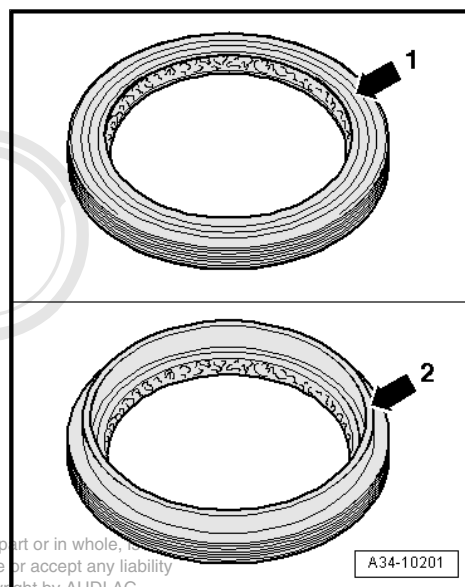
Levering out oil seal



Identification of oil seals

A - Oil seal up to serial no. 42986 - without additional dust lip
-arrow 1-

B - Oil seal - from serial No. 42987 onwards - with additional dust lip
-arrow 2-.



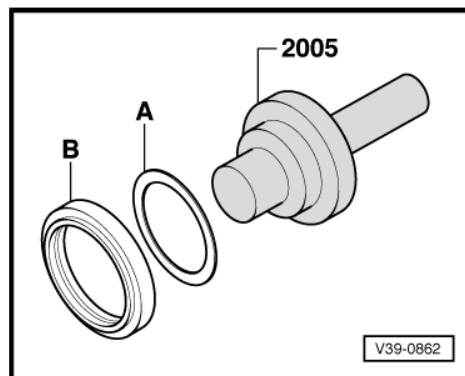
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Installing oil seal - up to serial no. 42986

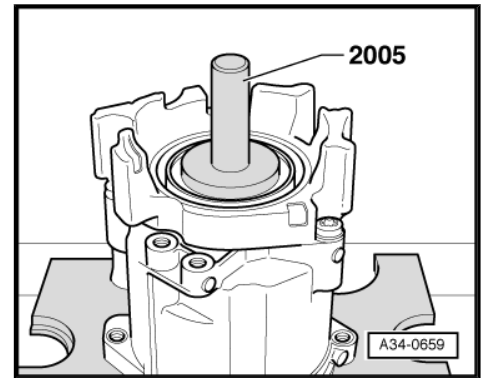
A - Shim -016 311 391 A- (1.4 mm thick)

B - Oil seal

- Place shim and oil seal on tool as shown.
- Installation position: open side of oil seal points towards centre differential housing.
- Lightly oil outer circumference of new oil seal.

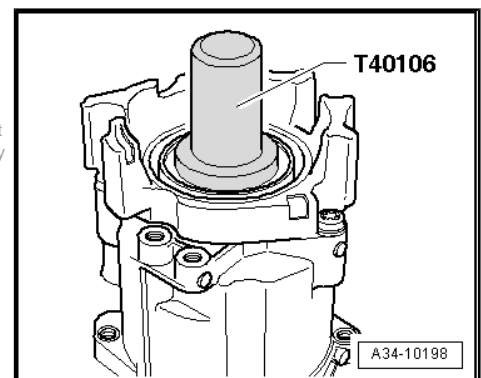


- Knock in new flange shaft oil seal as far as stop; keep seal straight when installing.
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .
- Remove tool and shim.

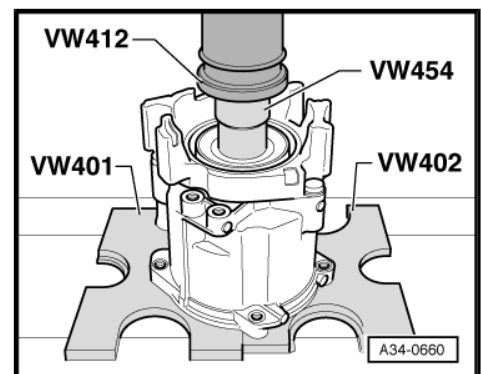


Installing oil seal - from serial no. 42987 onwards - with additional dust lip

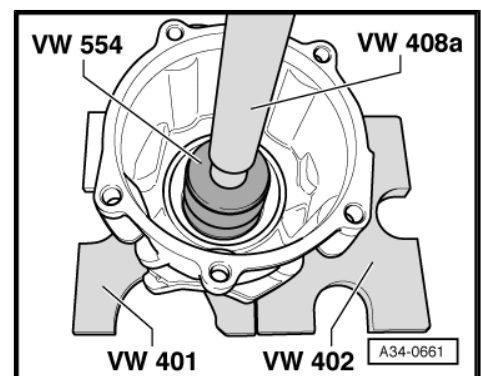
- Installation position: open side of oil seal points towards centre differential housing.
- Lightly oil outer circumference of new oil seal.
- Knock in new flange shaft oil seal as far as stop; keep seal straight when installing.
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .



Pressing out ball bearing for flange shaft



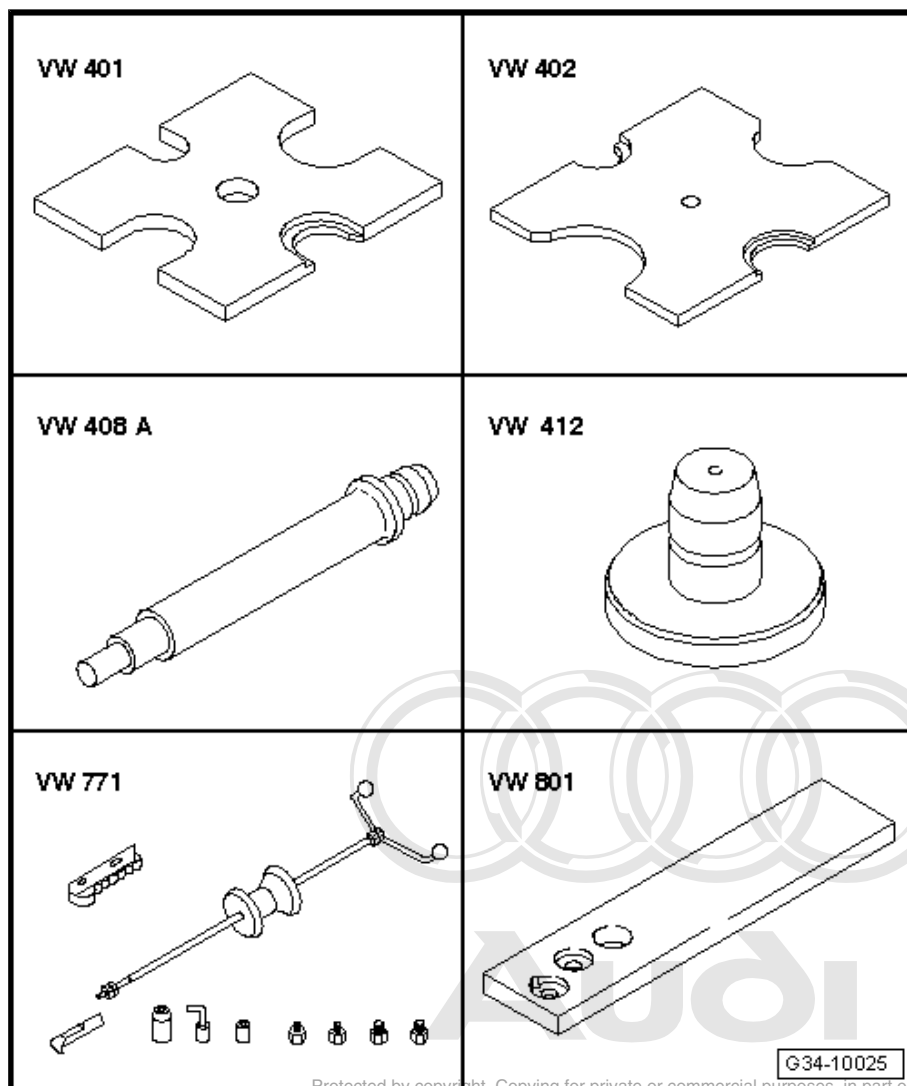
Pressing in ball bearing for flange shaft



3 Servicing gearbox cover

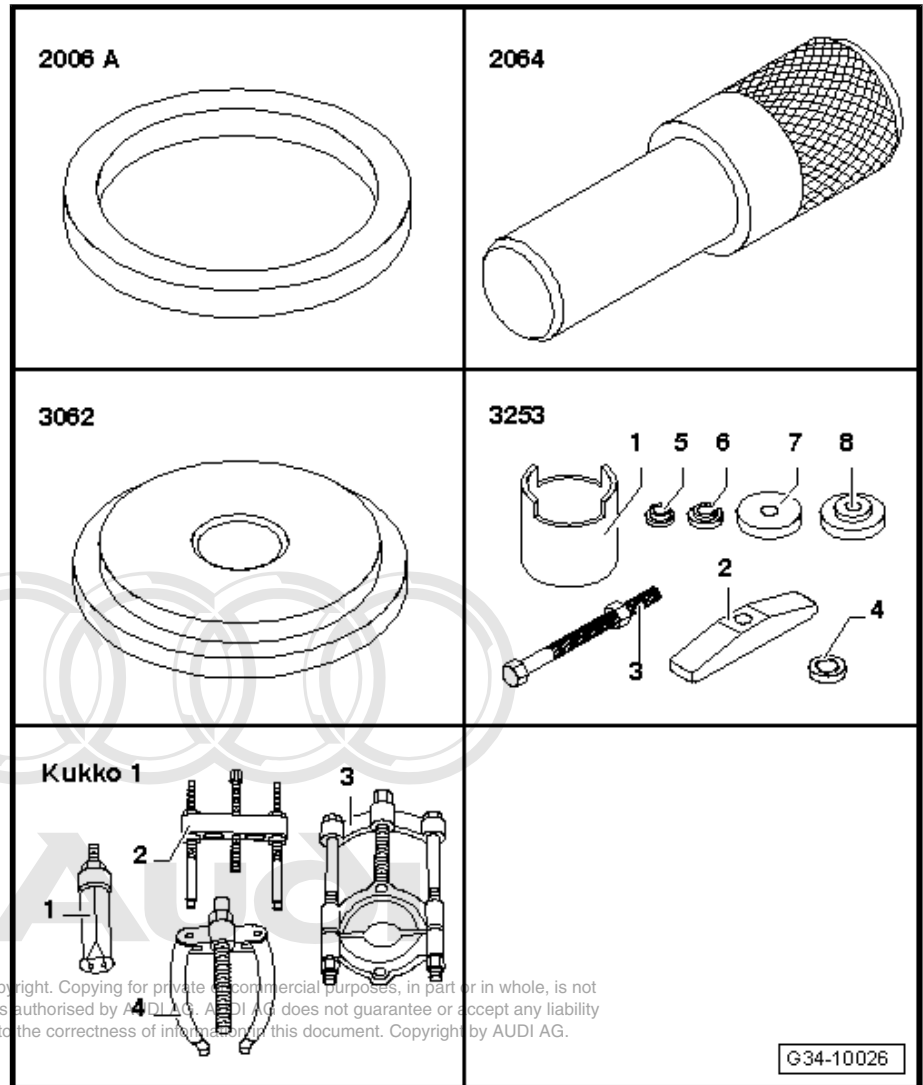
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 412-
- ◆ Multi-purpose tool -VW 771-
- ◆ Support plate -VW 801-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Thrust ring -2006 A-
- ◆ Locking pin -2064-
- ◆ Thrust pad -3062-
- ◆ Assembly tool -3253-
- ◆ -1- Internal puller -Kukko 21/2-
- ◆ -1- Internal puller -Kukko 21/4-
- ◆ -4- Counter-support -Kukko 22/2-
- ◆ Depth gauge
- ◆ Stud M10



1 - Gearbox cover

2 - Dowel pin

- ☐ 2x
- ☐ Insert in gearbox cover
- ☐ Drive in until flush with rear surface of housing flange

3 - Needle bearing

- ☐ Bearing for hollow shaft in gearbox cover
- ☐ Pressing out
⇒ [page 58](#)
- ☐ Pressing in
⇒ [page 59](#)
- ☐ Peen to secure after installing ⇒ [page 60](#)

4 - Ball sleeve

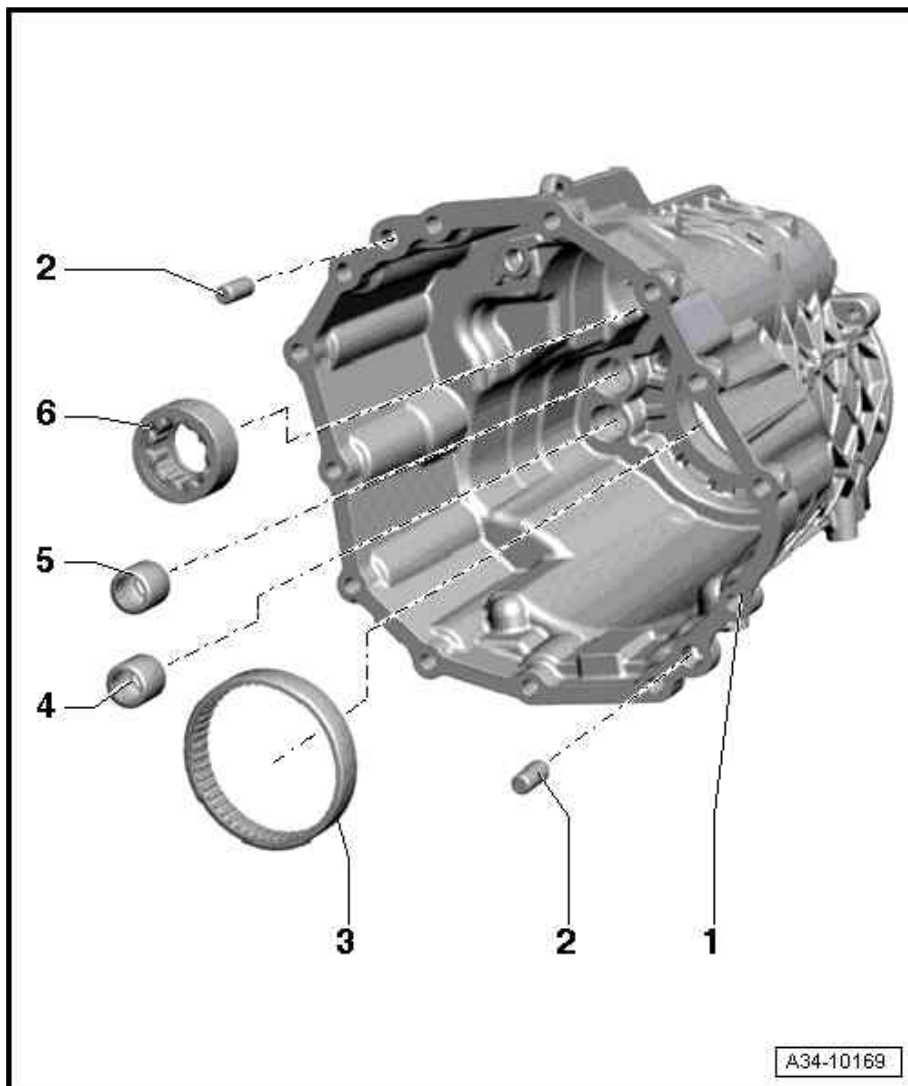
- ☐ For reverse gear selector rod
- ☐ Pulling out ⇒ [page 59](#)
- ☐ Pressing in
⇒ [page 59](#)
- ☐ Measuring installation depth ⇒ [page 59](#)

5 - Ball sleeve

- ☐ For selector rod for 1st and 2nd gear
- ☐ Pulling out ⇒ [page 59](#)
- ☐ Pressing in
⇒ [page 59](#)
- ☐ Measuring installation depth ⇒ [page 59](#)

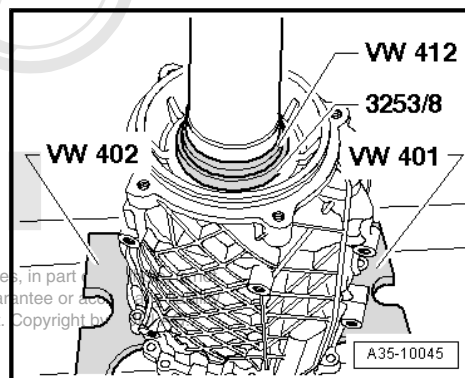
6 - Roller bearing

- ☐ Bearing for input shaft in gearbox cover
- ☐ Always renew
- ☐ Pulling out ⇒ [page 60](#)
- ☐ Pressing in ⇒ [page 60](#)
- ☐ Peen to secure after installing ⇒ [page 60](#)



Pressing needle bearing out of gearbox cover

- Eliminate peening depressions if necessary.

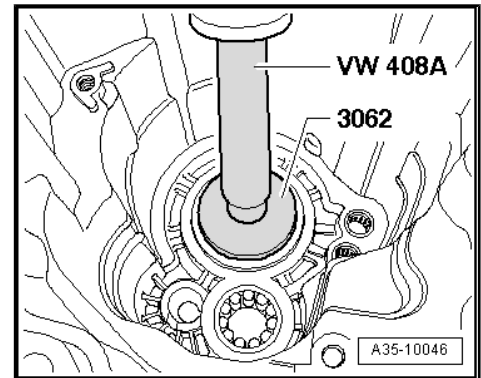


Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Audi AG

Pressing needle bearing into gearbox cover

Install needle bearing so the lettering (side with thicker metal) faces towards the thrust pad -3062- .

- Press in needle bearing to installation depth = 262 ± 0.5 mm, measured from housing flange to needle bearing (similar to illustration A34-10190 ➤ [page 59](#)).
- Secure needle bearing after pressing in by peening into gearbox cover ➤ [page 60](#) .



Pulling out ball sleeve from gearbox cover

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

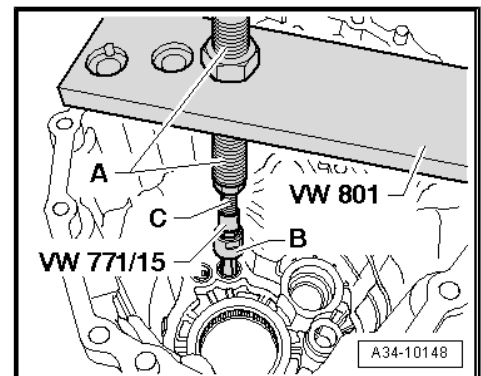
B - Internal puller 14.5 ... 18.5 mm , e.g. -Kukko 21/2-

C - Stud M10



Note

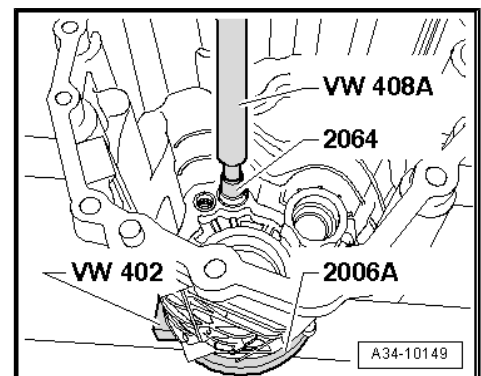
Adapter -VW 771/44- can also be used instead of stud M10 and -VW 771/15- .



Pressing ball sleeve into gearbox cover

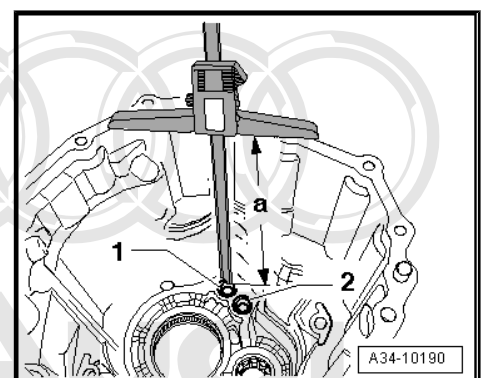
- Fit ball sleeve so that side with lettering (thicker metal) faces locking pin -2064- . Fit the small $\varnothing$ of locking pin -2064- in the ball sleeve.
- Support gearbox cover below bearing seat using thrust ring -2006 A- .

Installation depth of ball sleeve ➤ [page 59](#) .



Installation depth of ball sleeve in gearbox cover

- Press in ball sleeve for reverse gear selector rod -1- and for 1st/2nd gear selector rod -2- to dimension -a- = 250.5 ± 0.5 mm.



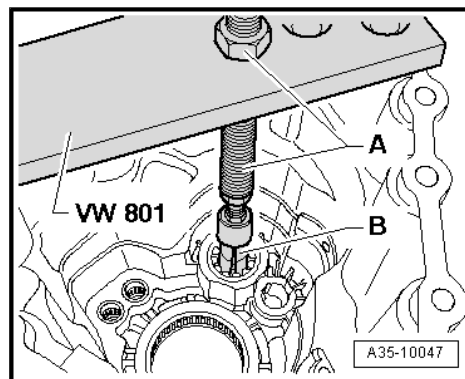
Pulling out roller bearing from gearbox cover

- A - Counter-support , e.g. -Kukko 22/2-
- B - Internal puller 30 ... 37 mm , e.g. -Kukko 21/4-
- Eliminate peening depressions if necessary.



Note

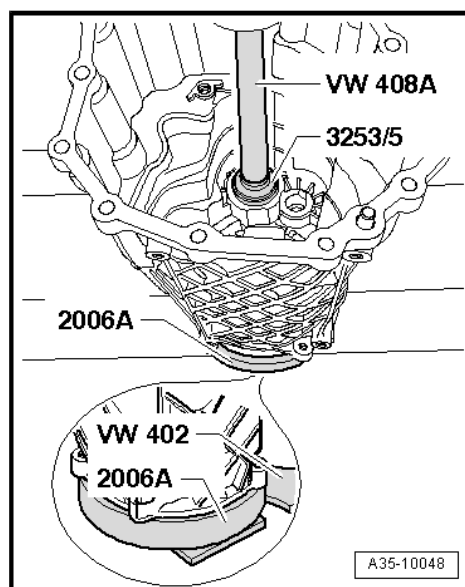
Always renew roller bearing after pulling out.



Carefully press in new roller bearing into gearbox cover until limit stop.

Support gearbox cover below bearing seat using thrust ring -2006 A- .

- Secure roller bearing after pressing in by peening into gearbox cover ⇒ [page 60](#) .

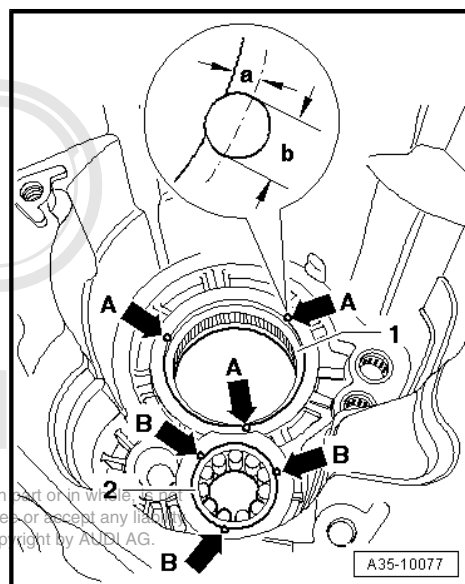


Securing needle bearing and roller bearing in gearbox cover by peening.

- Use a blunt punch with a ball shaped end (ball Ø approx. 5 mm) to peen in position.
- Needle bearing -1- and roller bearing -2- are secured with 3 peening positions each which are offset by 120° -arrows A- and -arrows B-.

Observe position and diameter of peening marks:

- ◆ Dimension -a- = 2 mm
- ◆ Dimension -b- = 3 mm

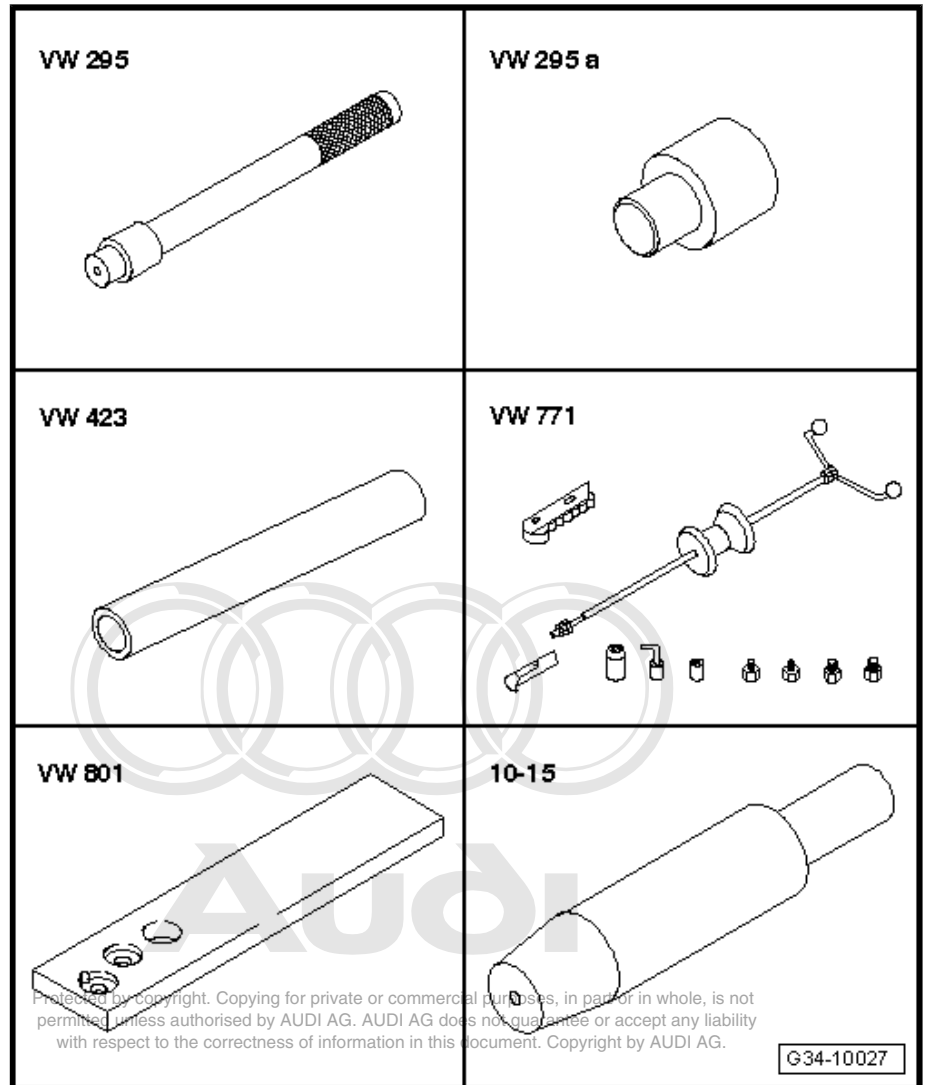


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

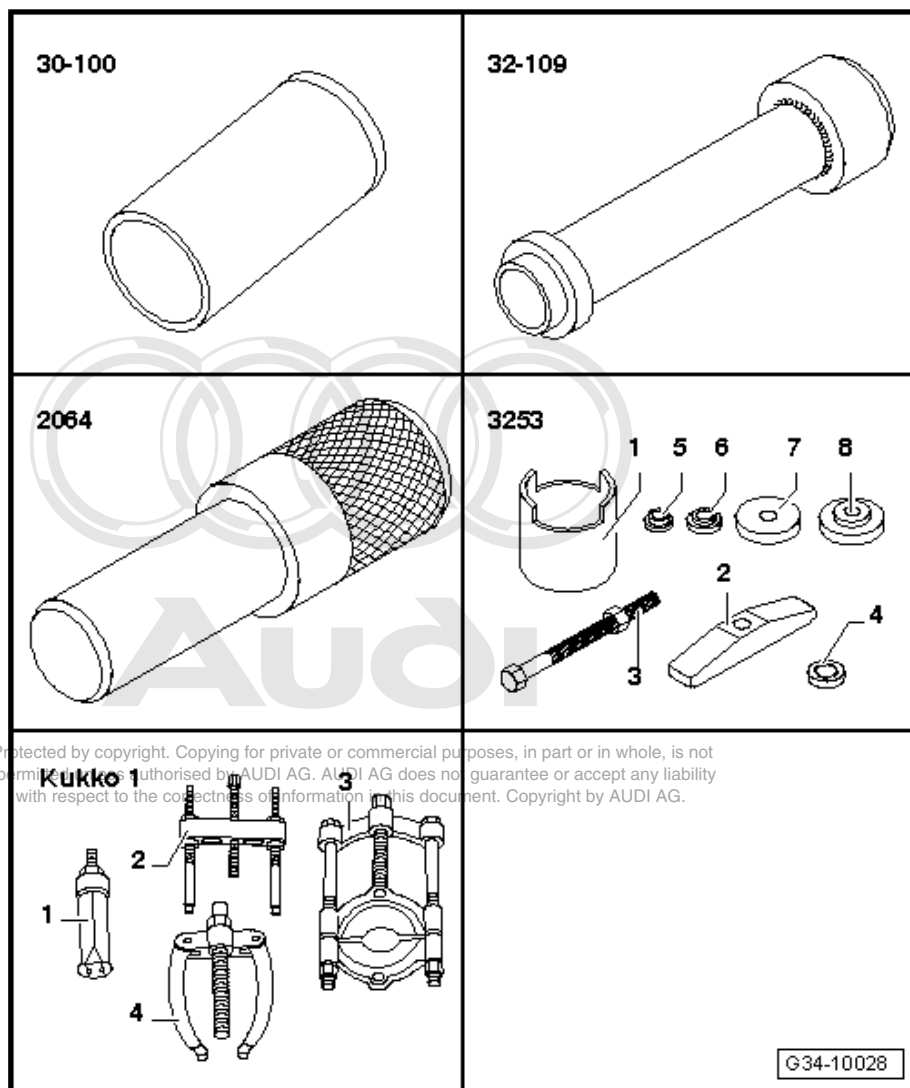
4 Servicing gearbox housing

Special tools and workshop equipment required

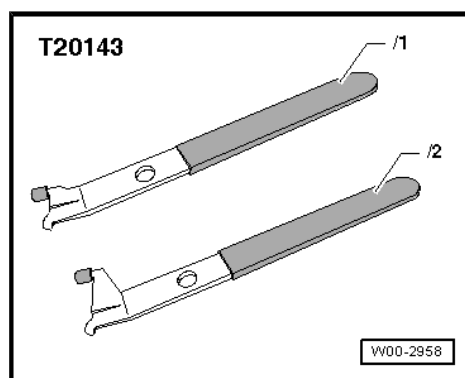
- ◆ Drift -VW 295-
- ◆ Adapter -VW 295 A-
- ◆ Tube -VW 423-
- ◆ Multi-purpose tool -VW 771-
- ◆ Support plate -VW 801-
- ◆ Guide pin -10 - 15-



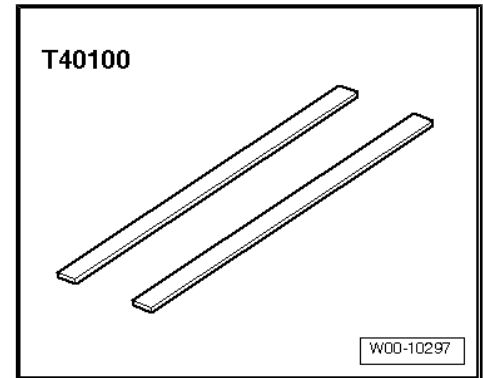
- ◆ Drift sleeve -30 - 100-
- ◆ Tube -32 - 109-
- ◆ Locking pin -2064-
- ◆ Assembly tool -3253-
- ◆ Internal puller -3275-
- ◆ -1- Internal puller -Kukko 21/2-
- ◆ -4- Counter-support -Kukko 22/1-
- ◆ -4- Counter-support -Kukko 22/2-
- ◆ Depth gauge



- ◆ Extractor tool -T20143-



◆ Straightedge -T 40100-



1 - Needle bearing

- ☐ For input shaft
- ☐ Always renew
- ☐ Pulling out ⇒ [page 65](#)
- ☐ Driving in ⇒ [page 65](#)
- ☐ Measuring installation depth ⇒ [page 65](#)
- ☐ Peen to secure after installing ⇒ [page 65](#)

2 - Ball sleeve

- ☐ For selector shaft
- ☐ Pulling out ⇒ [page 65](#)
- ☐ Driving in and securing ⇒ [page 66](#)

3 - Cap

- ☐ For gearbox breather

4 - Breather pipe

- ☐ Installation depth ⇒ [page 66](#)
- ☐ Clip in cap ⇒ [Item 3 \(page 63\)](#) for gearbox breather

5 - Gearbox housing

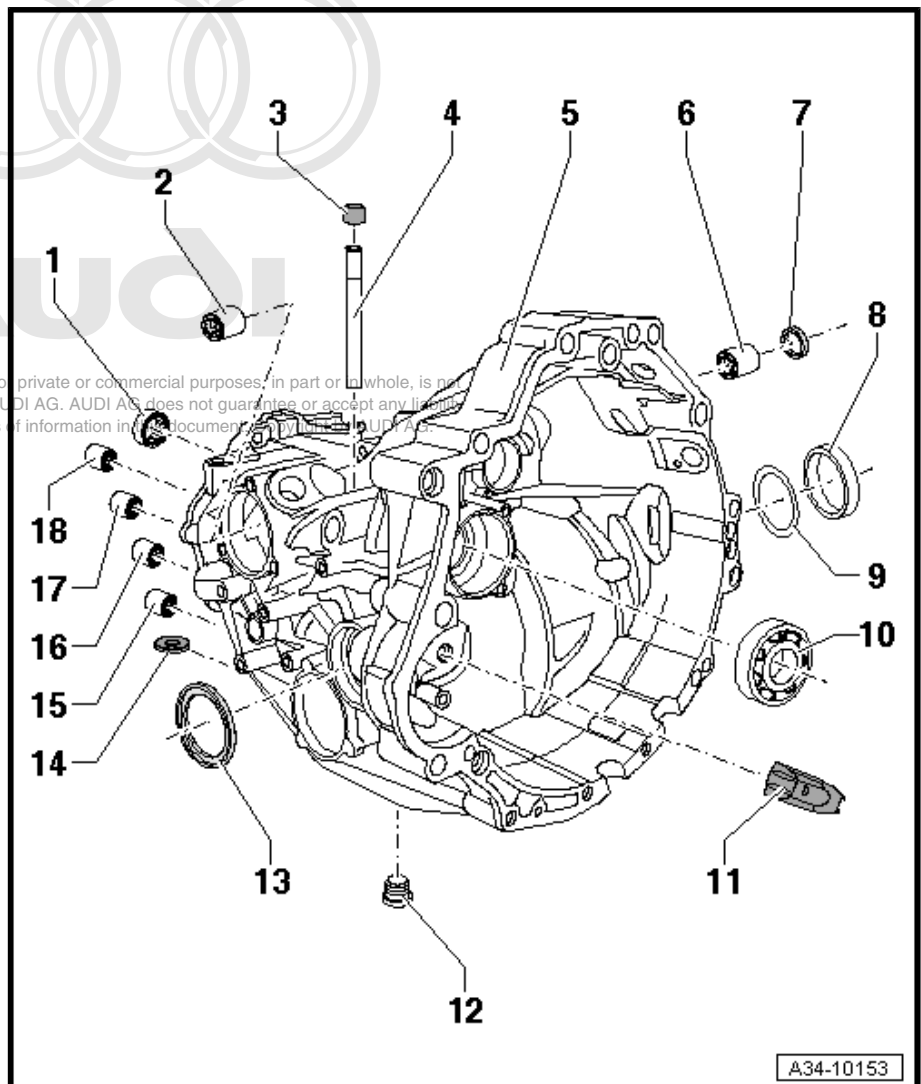
- ☐ When renewing: re-determine positioning of 2nd speed selector gear ⇒ [page 96](#), adjust pinion shaft and differential (final drive gear set) ⇒ [page 115](#)

6 - Ball sleeve

- ☐ For selector shaft
- ☐ Pulling out ⇒ [page 67](#)
- ☐ Driving in ⇒ [page 67](#)

7 - Oil seal for selector shaft

- ☐ Renewing is also possible with gearbox installed in vehicle ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 34
- ☐ Always renew
- ☐ Pulling out with selector shaft removed ⇒ [page 66](#)
- ☐ Pulling out with selector shaft remaining installed ⇒ [page 66](#)





- ☐ Driving in ⇒ [page 67](#)
- ☐ Always use assembly sleeve -01E 311 120- to fit oil seal (if selector shaft remains installed in gearbox) ⇒ [page 44](#)

8 - Tapered roller bearing outer race (right-side)

- ☐ For differential
- ☐ If renewing: adjust differential (crown wheel) ⇒ [page 128](#)
- ☐ Removing and installing ⇒ [Item 3 \(page 104\)](#)

9 - Shim „S2“

- ☐ Note thickness
- ☐ Table of adjustments ⇒ [page 115](#)

10 - Grooved ball bearing

- ☐ For input shaft
- ☐ Removing (gearbox dismantled) ⇒ [page 67](#)
- ☐ Removing (gearbox removed but not dismantled) ⇒ [page 46](#)
- ☐ Installing ⇒ [page 68](#)

11 - Intermediate piece

- ☐ Renew if damaged

12 - Oil drain plug

- ☐ Tightening torque ⇒ [Item 12 \(page 16\)](#)

13 - Oil seal

- ☐ For flange shaft (right-side)
- ☐ Renewing ⇒ [page 99](#)

14 - Magnet

- ☐ Clean
- ☐ Insert in gearbox housing rib

15 - Ball sleeve

- ☐ For reverse gear selector rod
- ☐ Pulling out ⇒ [page 68](#)
- ☐ Driving in ⇒ [page 68](#)
- ☐ Measuring installation depth ⇒ [page 68](#)

16 - Ball sleeve

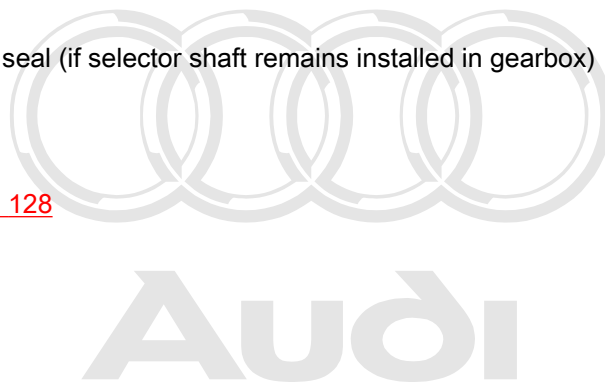
- ☐ For selector rod for 1st and 2nd gear
- ☐ Pulling out ⇒ [page 68](#)
- ☐ Driving in ⇒ [page 68](#)
- ☐ Measuring installation depth ⇒ [page 68](#)

17 - Ball sleeve

- ☐ For selector rod for 3rd and 4th gear
- ☐ Pulling out ⇒ [page 68](#)
- ☐ Driving in ⇒ [page 68](#)
- ☐ Measuring installation depth ⇒ [page 68](#)

18 - Ball sleeve

- ☐ For selector rod for 5th and 6th gear
- ☐ Pulling out ⇒ [page 68](#)
- ☐ Driving in ⇒ [page 68](#)
- ☐ Measuring installation depth ⇒ [page 68](#)

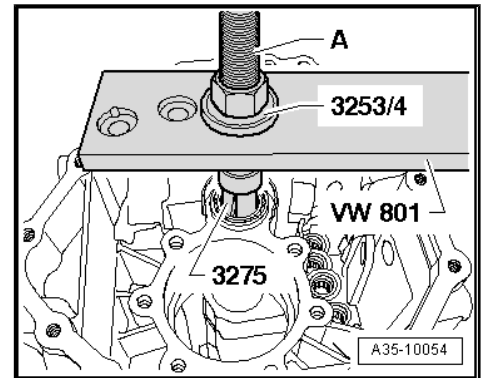


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Pulling out input shaft needle bearing from gearbox housing

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

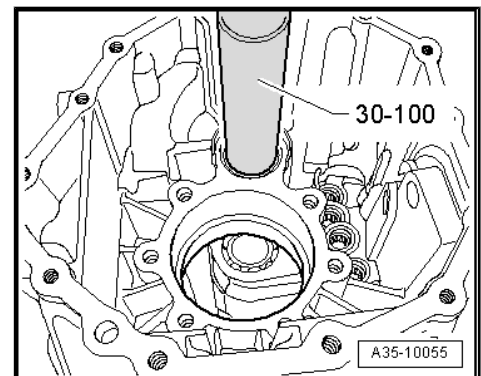
- Eliminate peening depressions if necessary.



Driving input shaft needle bearing into gearbox housing

Install needle bearing so the lettering (side with thicker metal) faces towards the drift sleeve -30 - 100- .

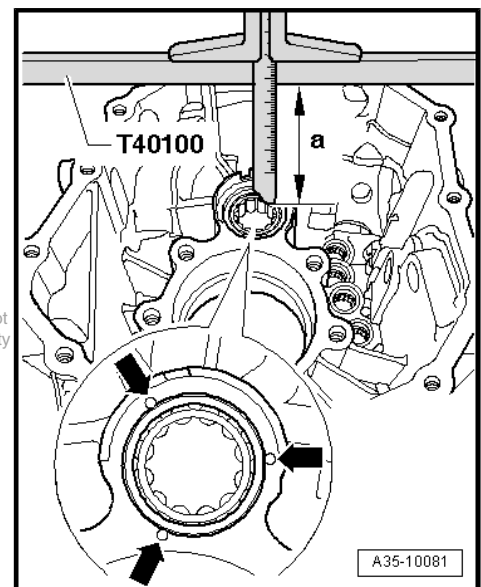
Insertion depth of needle bearing ⇒ [page 65](#) .



Measuring insertion depth of needle bearing and peening needle bearing

- Dimension for pressing in -a- = 88.0 ± 0.5 mm
- Use a blunt punch with a ball shaped end (ball $\varnothing$ approx. 5 mm) to peen in position.
- The needle bearing is secured with 3 peening positions offset by 120° -arrows-.

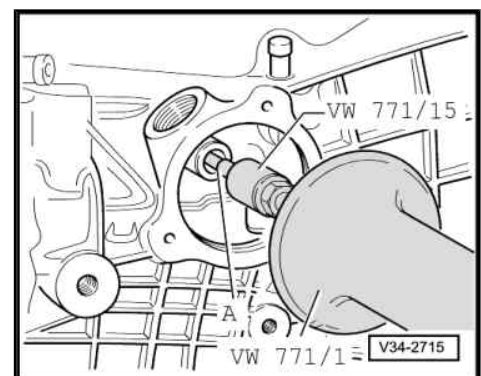
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Pulling out selector shaft ball sleeve

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

- Eliminate peening depressions if necessary.



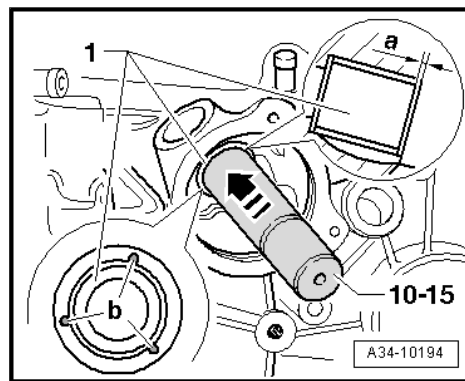
Driving in ball sleeve for selector shaft and securing by peening

Fit ball sleeve so that side with lettering (thicker metal) faces guide pin -10 - 15- .

- Drive in ball sleeve -1- to depth -a- = 1.5 ± 0.5 mm below surface of housing.

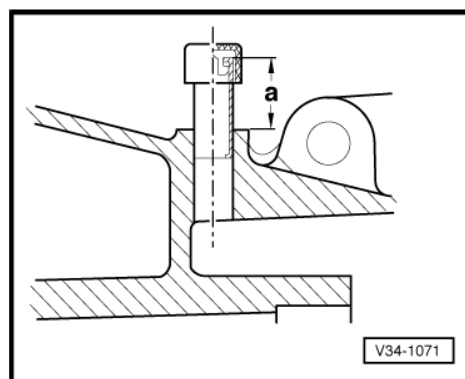
Perform the following procedure to secure by peening after driving in:

- Use a blunt punch with a ball shaped end to peen ball sleeve in position.
- The ball sleeve is secured with 3 peening positions -b- offset by 120° .



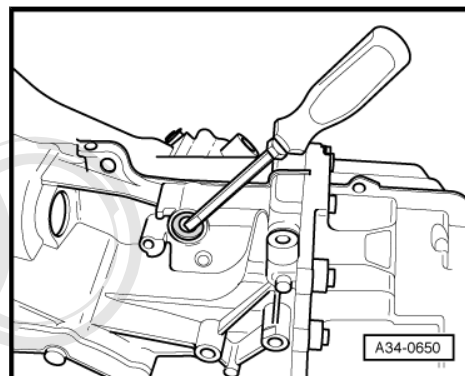
Installation dimension of breather pipe

Dimension -a- = 16.8 mm



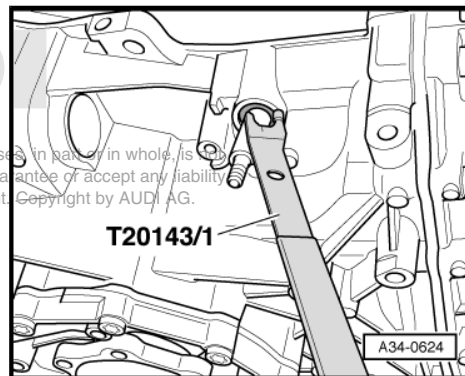
Pulling out oil seal for selector shaft with gearbox dismantled

- Carefully lever out oil seal, taking care not to damage shaft.



Pulling out oil seal for selector shaft with selector shaft remaining installed

- Carefully lever out oil seal using extractor tool -T20143/1- or a screwdriver.



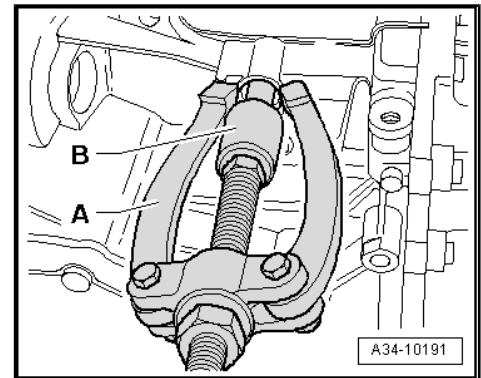
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Pulling out selector shaft ball sleeve

First remove selector shaft oil seal ➤ [page 66](#) .

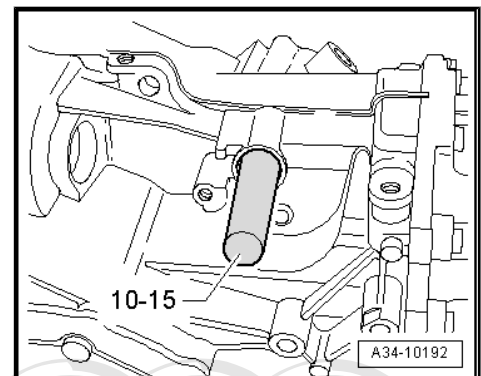
A - Counter-support , e.g. -Kukko 22/1-

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



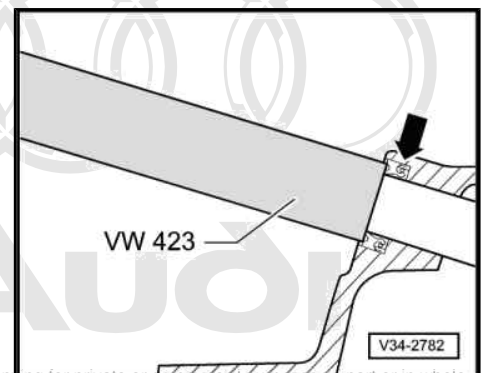
Driving in ball sleeve for selector shaft

- Insertion depth: 8.5 ± 0.5 mm below surface of housing.



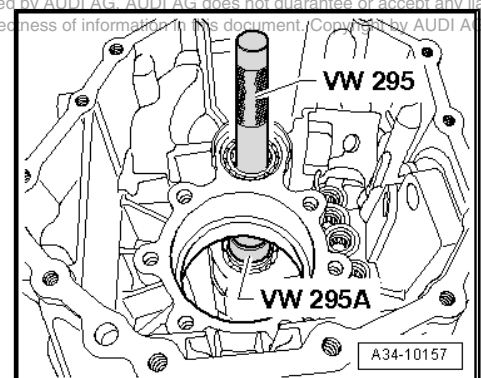
Driving in oil seal for selector shaft

- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .
- Lightly oil outer circumference of oil seal.
- Knock in new oil seal -arrow- to a depth of 1.0 ± 0.2 mm below surface of housing; keep seal straight when installing.



Removing grooved ball bearing for input shaft when gearbox is dismantled

- Fit smaller diameter of adapter -VW 295 A- into grooved ball bearing.
- Drive out grooved ball bearing.



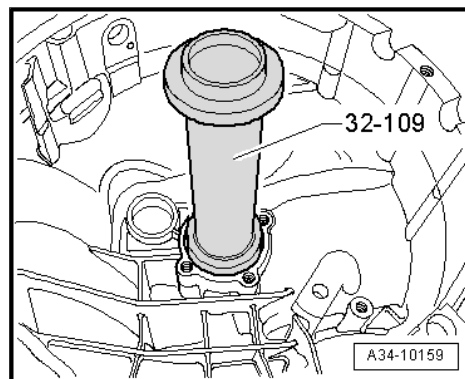
Protected by copyright. Copying or reproduction in any form is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for the correctness of information in this document. Copyright by AUDI AG.

Driving in grooved ball bearing for input shaft as far as stop

Installation position:

The closed side of the ball cage faces the gearbox housing.

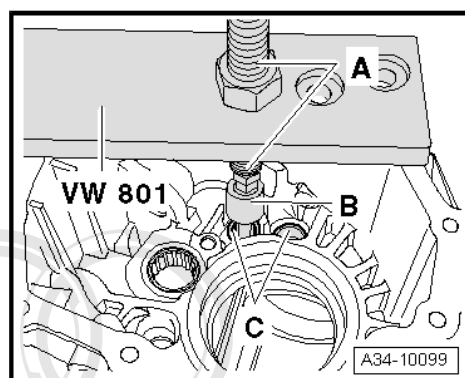
- Drive grooved ball bearing onto stop in gearbox housing.



Pulling out ball sleeve -C- for selector rod

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

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

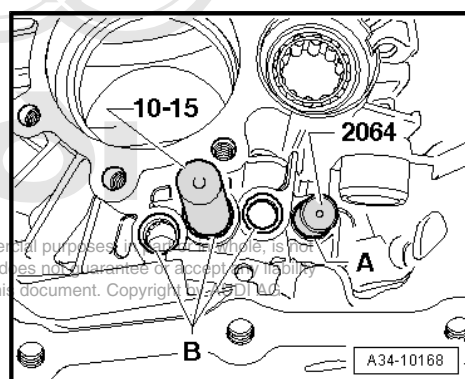


Driving in ball sleeve for selector rod

- Drive in ball sleeve -A- for 5th and 6th speed selector rod to installation depth ➔ [page 68](#) using locking pin -2064- .
- Drive in remaining three ball sleeves -B- to installation depth ➔ [page 68](#) using guide pin -10 - 15- .

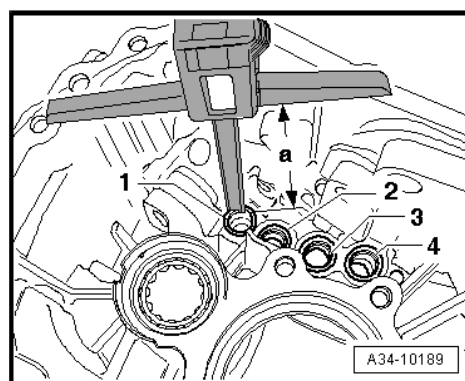
Fit ball sleeve so that side with lettering (thicker metal) faces guide pin -10 - 15- or locking pin -2064-

Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © 2012 Audi AG.



Insertion depth of ball sleeves in gearbox housing

- Press in ball sleeve for 5th/6th gear selector rod -1- to dimension -a- = 143.5 ± 0.5 mm.
- Press in ball sleeve for 3rd/4th gear selector rod -2- to dimension -a- = 133.5 ± 0.5 mm.
- Press in ball sleeve for 1st/2nd gear selector rod -3- to dimension -a- = 116.5 ± 0.5 mm.
- Press in ball sleeve for reverse gear selector rod -4- to dimension -a- = 116.5 ± 0.5 mm.



Note

Measure distance between surface of housing to respective ball sleeve using depth gauge.

35 – Gears, shafts

1 Input shaft

Overview

- ◆ ⇒ „1.1 Exploded view - input shaft“, page 69
- ◆ ⇒ „1.2 Assembly sequence - dismantling and assembling input shaft“, page 73

1.1 Exploded view - input shaft



Note

- ◆ *Refer to technical data when installing new gears ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 00.*
- ◆ *Before installing, heat needle bearing inner races and synchro-hubs to approx. 100 °C (max.) using inductive heater -VAS 6414- (wear protective gloves).*
- ◆ *When renewing synchro-rings, renew inner ring, intermediate ring and synchro-ring for the corresponding gear together.*
- ◆ *Lubricate all bearings and synchro-rings on input shaft with gear oil before installing.*
- ◆ *The 12-point nut ⇒ [Item 7 \(page 70\)](#) has a left-hand thread; turn nut clockwise to unfasten.*
- ◆ *Items 8, 11 to 14, 18 to 21, 25, 28 to 31 and 34 to 37 were modified on gearboxes with spring-loaded selector forks ⇒ [page 24](#). Select correct components from ⇒ *Electronic parts catalogue*.*

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Circlip

2 - Grooved ball bearing

- ☐ Renewing (gearbox removed but not dismantled) ⇒ [page 46](#)
- ☐ Renewing (gearbox dismantled) ⇒ [Item 10 \(page 64\)](#)

3 - Gearbox housing

4 - Needle bearing

- ☐ Removing and installing ⇒ [Item 1 \(page 63\)](#)

5 - Circlip

- ☐ Re-determining thickness ⇒ [page 82](#)

6 - Shim

- ☐ Re-determining thickness ⇒ [page 82](#)

7 - Twelve-point nut

- ☐ 75 Nm
- ☐ Self-locking
- ☐ Renew
- ☐ With left-hand thread

8 - 4th speed selector gear

9 - Needle bearing

- ☐ For 4th gear

10 - Needle bearing inner race

- ☐ For 4th speed selector gear

11 - Inner ring for 4th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

12 - Intermediate ring for 4th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)

13 - Synchro-ring for 4th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

14 - Locking collar for 3rd and 4th gear

- ☐ Assembling locking collar/synchro-hub ⇒ [page 80](#)

15 - Locking piece

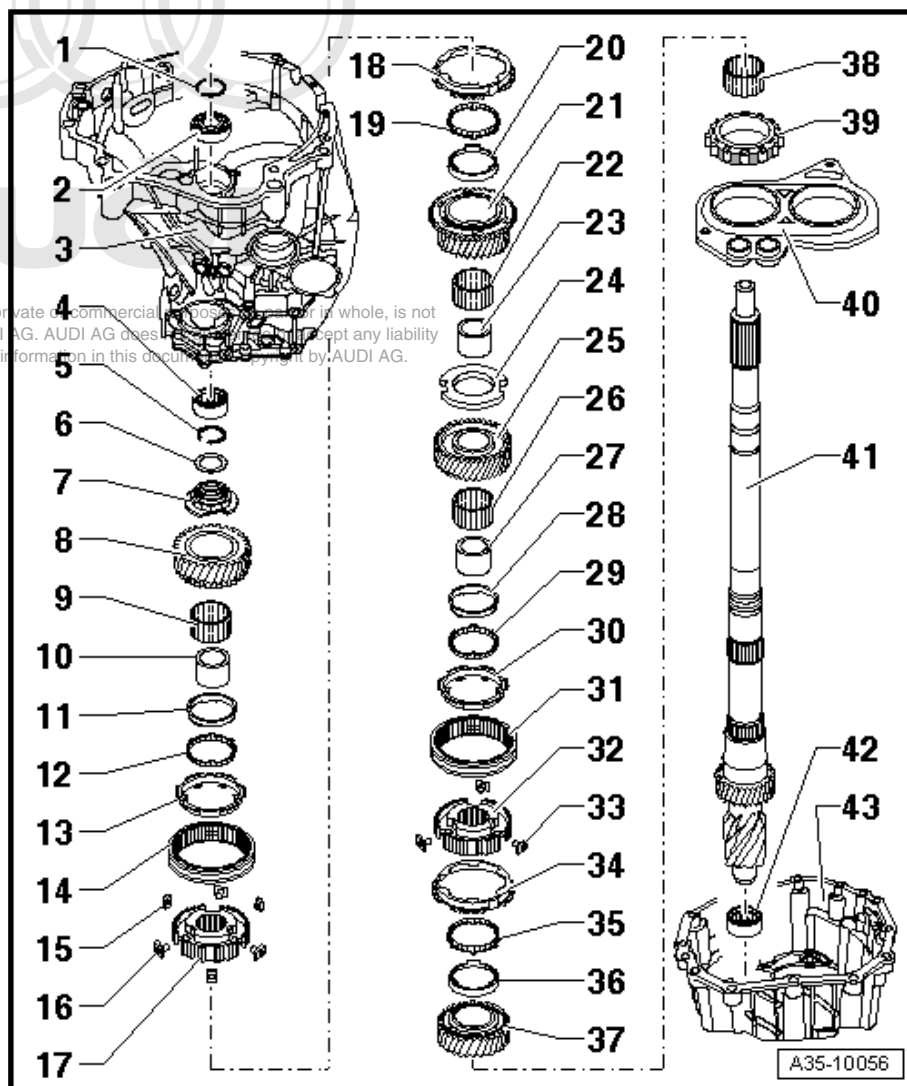
- ☐ Installation position: insert locking piece into locking collar with convex side first ⇒ [page 80](#)
- ☐ Installing locking pieces (3x) ⇒ [page 80](#)

16 - Thrust block

- ☐ Installing thrust blocks (3x) ⇒ [page 80](#)

17 - Synchro-hub for 3rd and 4th gear

- ☐ Pressing off ⇒ [page 76](#)
- ☐ Pressing on ⇒ [page 80](#)



- ☐ Installation position: small shoulder on inside collar faces 3rd gear ⇒ [page 79](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 80](#)

18 - Synchro-ring for 3rd gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

19 - Intermediate ring for 3rd gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)

20 - Inner ring for 3rd gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

21 - 3rd speed selector gear

22 - Needle bearing

- ☐ For 3rd gear

23 - Needle bearing inner race

- ☐ For 3rd speed selector gear

24 - Thrust washer

- ☐ For 3rd speed and 6th speed selector gears

25 - 6th speed selector gear

26 - Needle bearing

- ☐ For 6th gear

27 - Needle bearing inner race

- ☐ For 6th speed selector gear

28 - Inner ring for 6th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

29 - Intermediate ring for 6th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)

30 - Synchro-ring for 6th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

31 - Locking collar for 5th and 6th gear

- ☐ Assembling locking collar/synchro-hub ⇒ [page 78](#)

32 - Synchro-hub for 5th and 6th gear

- ☐ Installation position: high inside collar faces 5th speed selector gear
- ☐ Pressing off ⇒ [page 76](#)
- ☐ Pressing on ⇒ [page 78](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 78](#)

33 - Thrust block

- ☐ Installing thrust blocks (3x) ⇒ [page 78](#)

34 - Synchro-ring for 5th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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

35 - Intermediate ring for 5th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Checking for wear ⇒ [page 77](#)

36 - Inner ring for 5th gear

- ☐ Installation position ⇒ [page 77](#)
- ☐ Renew if scored or if there are visible traces of wear

37 - 5th speed selector gear

38 - Needle bearing

- ☐ For 5th gear

39 - Roller bearing

- ☐ For input shaft
- ☐ Do not interchange with roller bearing for hollow shaft
- ☐ Pressing off ⇒ [page 76](#)
- ☐ Pressing on ⇒ [page 77](#)

40 - Bearing mounting

- ☐ The roller bearing outer race ⇒ [Item 39 \(page 72\)](#) cannot be renewed individually; renew bearing mounting if signs of wear are found.
- ☐ The roller bearing outer race must not have any radial clearance in the bearing mounting

41 - Input shaft

- ☐ Identification of input shafts ⇒ [page 72](#)
- ☐ Modification: with additional »PTFE element« for positioning needle bearing for 5th gear ⇒ [page 72](#) ; select components from ⇒ Electronic parts catalogue

42 - Roller bearing

- ☐ Bearing for input shaft in gearbox cover
- ☐ Always renew
- ☐ Removing and installing ⇒ [Item 6 \(page 58\)](#)

43 - Gearbox cover

Identification of input shafts

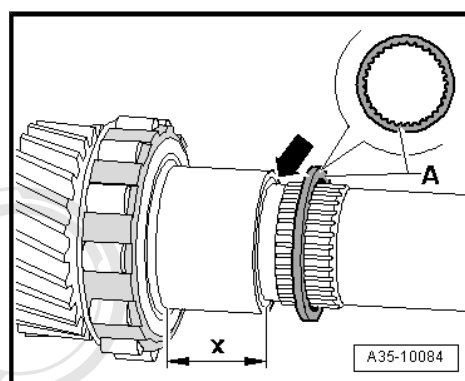
Dimension x = 31 mm for input shafts without »PTFE element«

Dimension x = 29 mm for input shafts with »PTFE element« -A-



Note

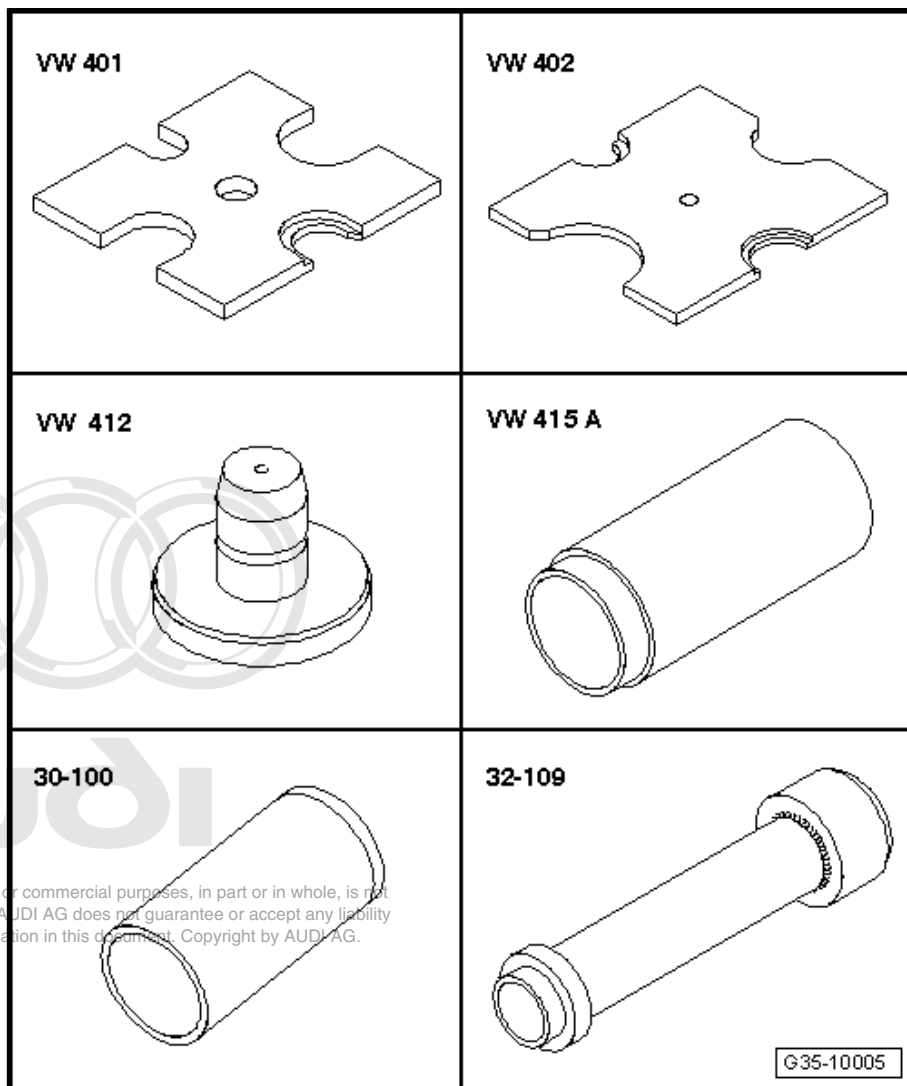
Push »PTFE element« -A- onto input shaft -arrow- as far as stop after fitting needle bearing for 5th gear.



1.2 Assembly sequence - dismantling and assembling input shaft

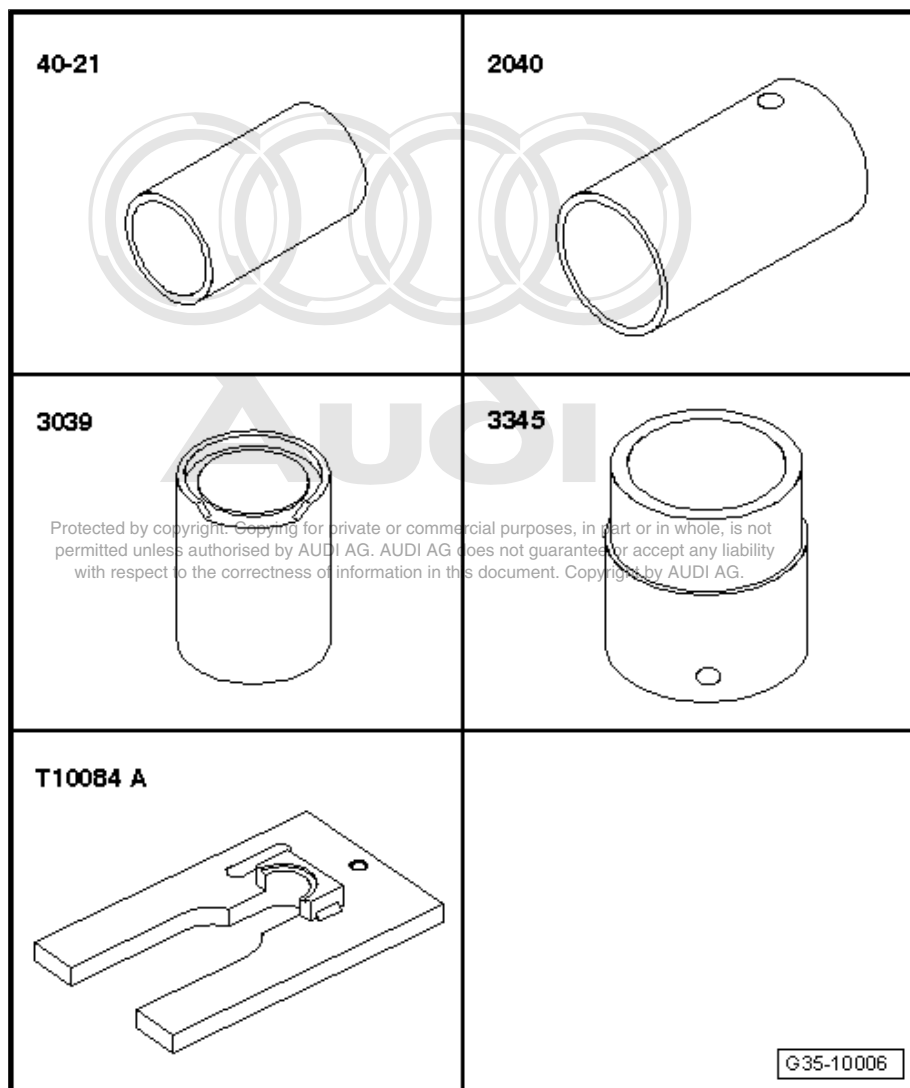
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415 A-
- ◆ Drift sleeve -30 - 100-
- ◆ Tube -32 - 109-

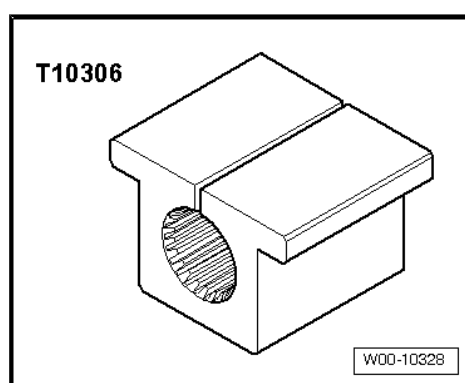


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

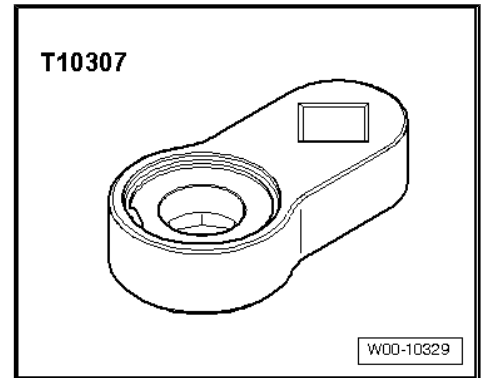
- ◆ Drift sleeve -40 - 21-
- ◆ Tube -2040-
- ◆ Guide sleeve -3039-
- ◆ Wheel bearing tube -3345-
- ◆ Thrust plate -T10084 A-
- ◆ Feeler gauge



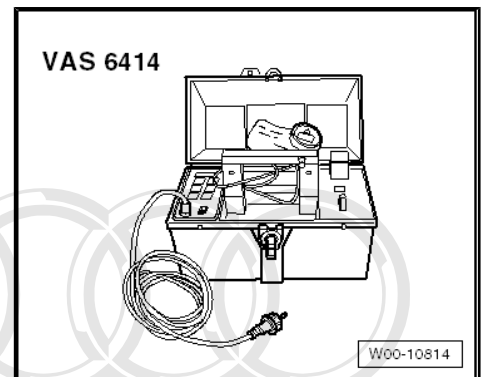
- ◆ Clamping device -T10306-



◆ Angled ring spanner -T10307-



◆ Inductive heater -VAS 6414-



Dismantling input shaft

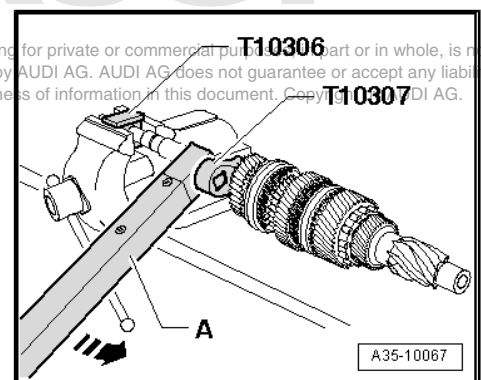
- First remove circlip ⇒ [Item 5 \(page 70\)](#) and washer ⇒ [Item 6 \(page 70\)](#) in front of 12-point nut on removed input shaft.
- Apply angled ring spanner -T10307- to 12-point nut.
- For the next step, the end of the input shaft with the clutch plate splines must be placed in clamping device -T10306- and clamped in a vice.

A - Torque wrench



Note

- ◆ *Because the input shaft is clamped at one end only, it must be supported at the opposite end (e.g. by a second mechanic).*
- ◆ *The twelve-point nut has a left-hand thread; turn the tool clockwise to slacken this nut.*
- Unfasten twelve-point nut by turning in direction of -arrow-.
- Remove 4th speed selector gear with needle bearing and synchro-rings.

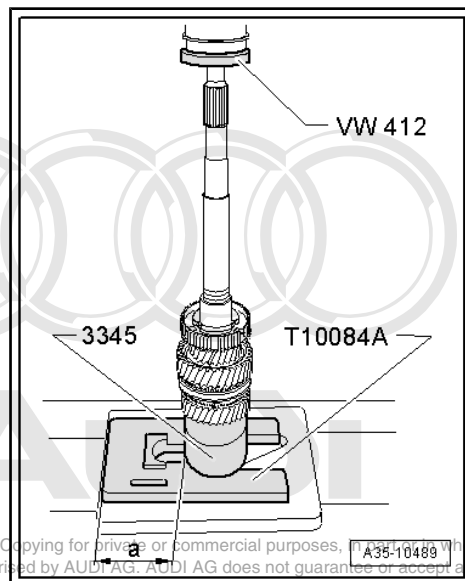


- Press off 3rd speed, 5th speed and 6th speed selector gears together with synchro-hub and needle bearing inner races.



Note

- ◆ *It may be necessary to exert a pressure of up to 200 kN (20 t).*
- ◆ *Maintain distance -a- = 110 mm to ensure that input shaft does not make contact with thrust plate -T10084 A- .*



Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

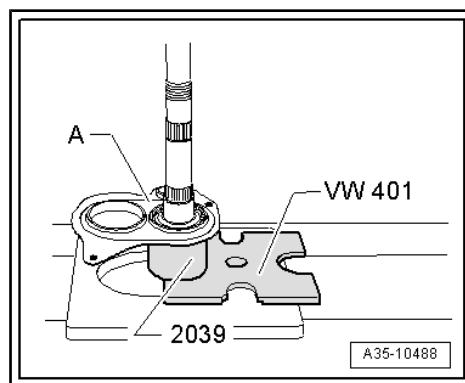
- Position bearing mounting -A- over input shaft roller bearing to prevent the rollers from being pressed out of the bearing cage.
- Press roller bearing off input shaft.
- Clean thread for 12-point nut on input shaft to remove any residue of locking fluid.

Assembling input shaft



Note

- ◆ *Clean the input shaft thread.*
- ◆ *Lubricate all needle bearings and synchro-rings with gear oil before fitting.*
- ◆ *Using inductive heater -VAS 6414- , heat needle bearing inner races to 130 °C (max.) before pressing on (wear protective gloves).*
- ◆ *Using inductive heater -VAS 6414- , heat synchro-hub to 100 °C (max.) before pressing on (wear protective gloves).*
- ◆ *Always press on roller bearing, needle bearing inner races and synchro-hubs as far as stop to make sure the axial clearance of the selector gears meets the specification.*



Checking 3rd to 6th gear synchro-rings for wear

- Check outer friction surface of inner ring for grooves or scoring and renew if necessary.
- Check inner friction surface of synchro-ring for grooves or scoring and renew if necessary.
- Fit inner ring, intermediate ring and synchro-ring onto cone of selector gear and rotate to achieve proper seating.



Note

To achieve proper seating, rotate synchro-rings approx. one turn while pressing down rings simultaneously.

- Then measure gap -a- using a feeler gauge .

Gap -a-	Wear limit
3rd to 6th gear	0.7 mm



Note

Renew inner ring, intermediate ring and synchro-ring for the corresponding gear together.

Installation position of synchro-rings for 3rd to 6th gear

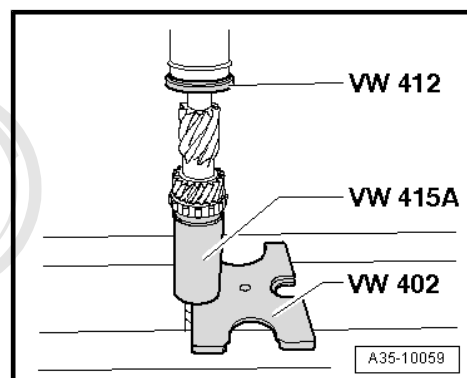
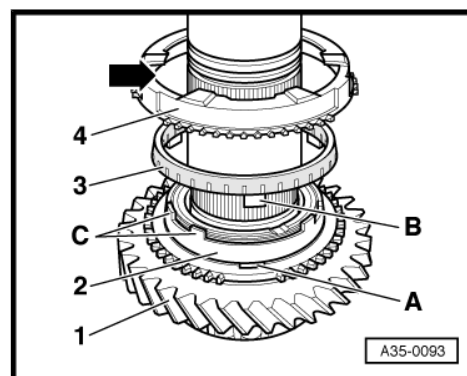
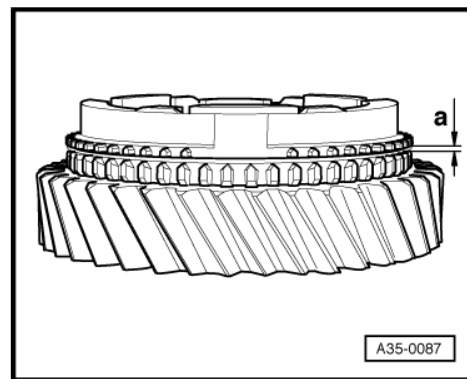


Note

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

- Fit inner ring -2- onto selector gear -1-.
- Fit intermediate ring -3-. Lug -B- must be inserted into recess -A-.
- Fit synchro-ring -4-. Guide lugs -C- through recess -arrow-.
- Press roller bearing onto input shaft as far as stop (shoulder on tube -VW 415 A- faces roller bearing).
- Install 5th speed selector gear with needle bearing and synchro-rings.

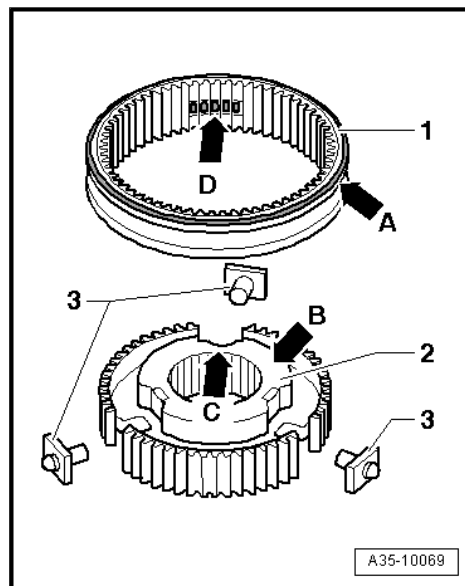
Now fit PTFE element if the input shaft is supplied with additional »PTFE element« ➔ [page 72](#) .



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

- Slide locking collar -1- over synchro-hub -2-.
- The groove -arrow A- on the locking collar and the high inside collar -arrow B- on the synchro-hub must face 5th speed selector gear.
- The recesses -arrow C- for the thrust blocks -3- in the synchro-hub must align with the recesses -arrow D- in the locking collar.
- Then position thrust blocks -3- in synchro-hub and press thrust blocks into recesses in locking collar.

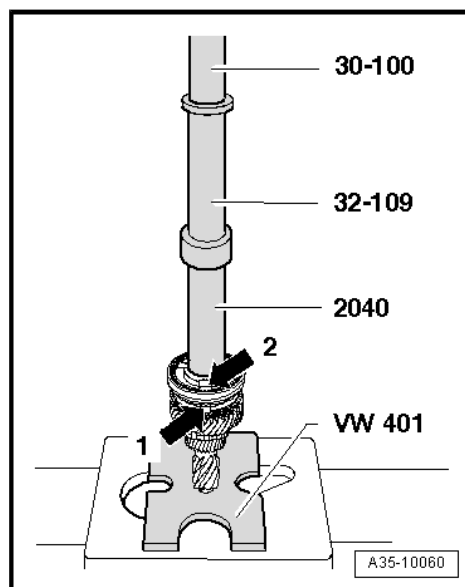
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



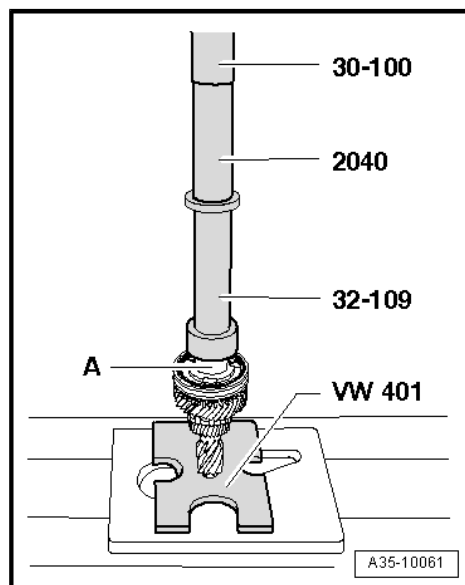
Pressing on 5th and 6th gear synchro-hub with locking collar

Note the following when performing the following steps:

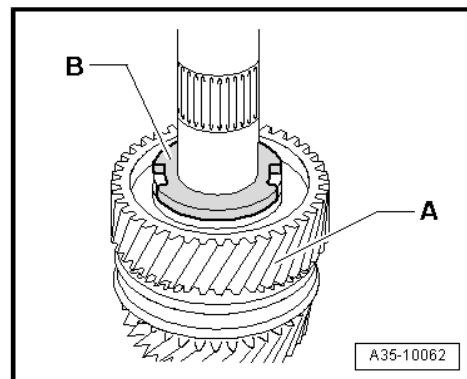
- Installation position of synchro-hub: high inside collar faces 5th speed selector gear
- Fit input shaft in drilling of thrust plate -VW 401- .
- Position drift sleeves on centre of heated components (synchro-hub and needle bearing inner races).
- First press on components just briefly, then stop exerting pressure and check whether drift sleeves are still positioned properly and press on as far as stop.
- On an input shaft with »PTFE element«, the »PTFE element« must be fitted before pressing on the synchro-hub for 5th and 6th gear.
- When pressing on, lugs on synchro-ring -arrow 1- must line up with recesses in synchro-hub -arrow 2-.



Pressing on needle bearing inner race -A- for 6th speed selector gear



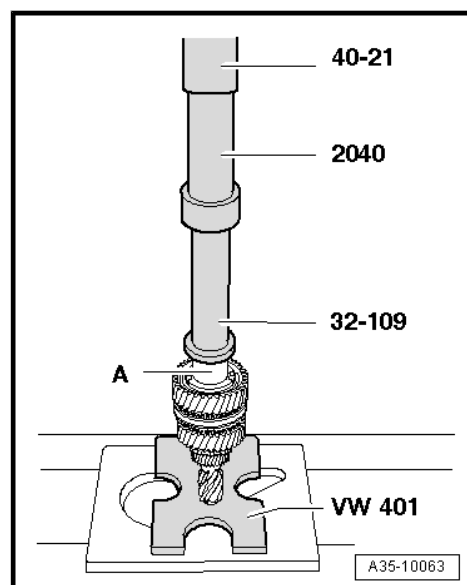
- Install 6th speed selector gear -A- with needle bearing and synchro-rings.
- Position thrust washer -B- for 3rd speed and 6th speed selector gears on 6th speed selector gear.



Pressing on needle bearing inner race -A- for 3rd speed selector gear

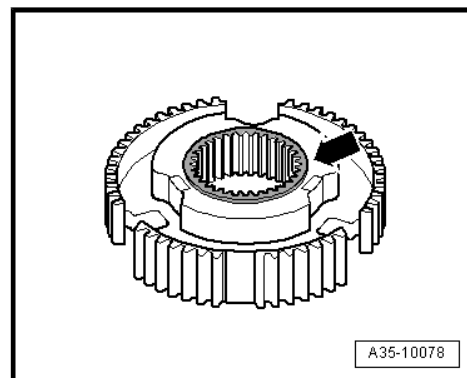
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Fit 3rd speed selector gear with needle bearing and synchro-rings.



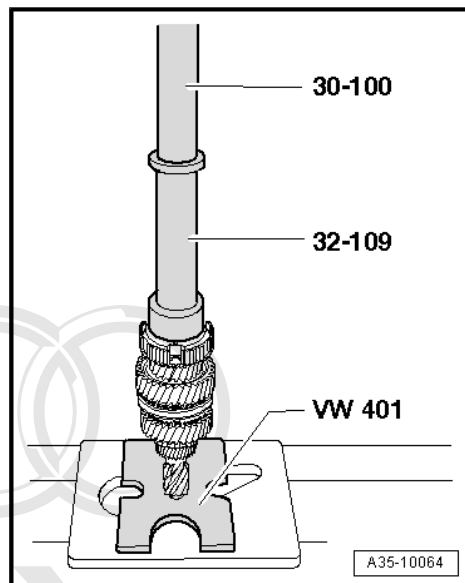
Installation position of 3rd and 4th gear synchro-hub

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



Pressing on synchro-hub for 3rd and 4th gear

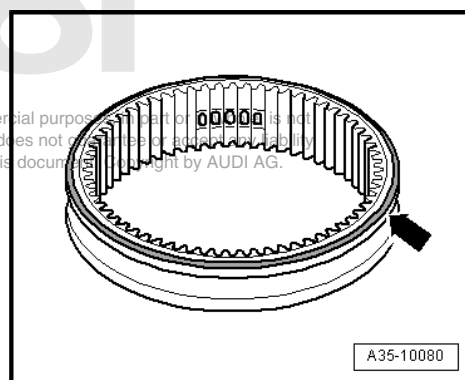
- Note installation position of synchro-hub ➤ [page 79](#) .
- When pressing on, lugs on synchro-rings must line up with recesses in synchro-hub.



Installation position of 3rd and 4th gear locking collar

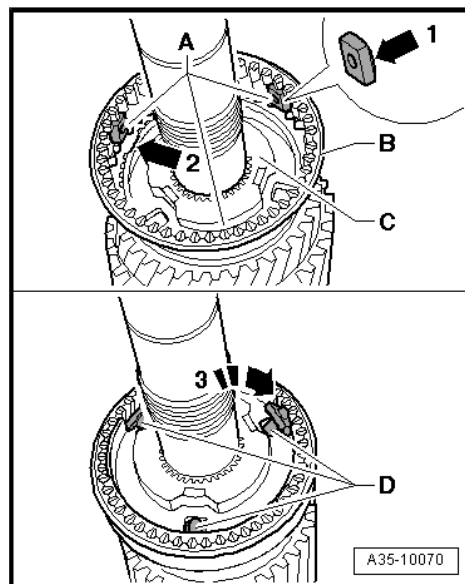
- The groove -arrow- on the locking collar faces towards 3rd speed selector gear.

Protected by copyright. Copying for private or commercial purposes without the written permission of Audi AG is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



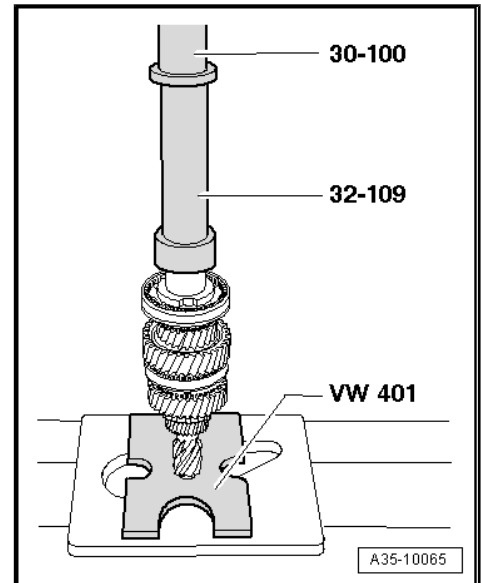
Assembling 3rd and 4th gear locking collar/synchro-hub

- 3rd and 4th gear synchro-hub is pressed on.
- Apply a small amount of grease to convex side -arrow 1- of each of the three locking pieces -A-.
- Fit the three locking pieces with convex side first into recesses in locking collar -B-.
- Note installation position of locking collar ➤ [page 80](#) .
- Then position locking collar over synchro-hub -C- so that recesses on synchro-hub -arrow 2- align with locking pieces.
- Then position thrust blocks -D- in synchro-hub and press thrust blocks in direction of -arrow 3- into recesses in locking collar. The locking collar must be held in the centre position.



Pressing on needle bearing inner race for 4th speed selector gear

- Fit 4th speed selector gear with needle bearing and synchro-rings.
- Clean thread of used 12-point nut.
- Screw 12-point nut hand-tight onto input shaft.

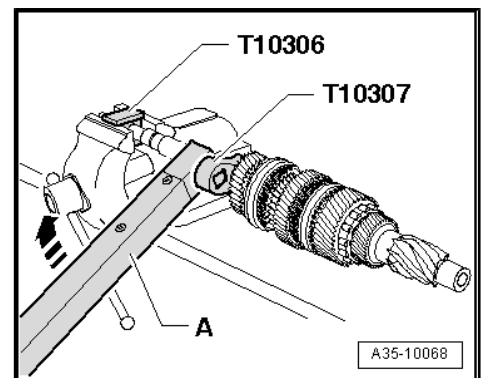


- Apply angled ring spanner -T10307- to 12-point nut.
- For the next step, the end of the input shaft with the clutch plate splines must be placed in clamping device -T10306- and clamped in a vice.



Note

- ◆ *Because the input shaft is clamped at one end only, it must be supported at the opposite end (e.g. by a second mechanic).*
- ◆ *The twelve-point nut has a left-hand thread; turn this nut anti-clockwise to tighten it.*



A - Torque wrench

- Turn new twelve-point nut in direction of -arrow- and tighten to specified torque ➔ [Item 7 \(page 70\)](#).
- Then check all selector gears for freedom of movement and axial play.
- The axial play of the selector gears must be at least 0.10 mm.

Audi

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

The thickness of the circlip -1- and the shim -2- is determined according to the following procedure:

- The gap after fitting shim and circlip available as spare parts must be max. 0.10 mm (measured between circlip and shim).
- Check the gap with a feeler gauge -3-.



Note

The circlip -1- must be properly seated in the base of the groove when checking the gap.

- Determine shim and circlip from table. For part numbers, refer to ➔ Electronic parts catalogue .

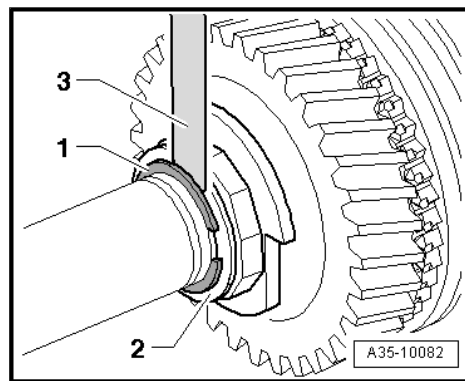
The following circlips are available:

Circlip thickness (mm)		
1.70	1.80	1.90
1.75	1.85	

The following shims are available:

Shim thickness (mm)		
0.9	1.1	1.3
1.0	1.2	

- Install shim and circlip of the correct thickness as determined above.



Audi

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Pinion shaft and hollow shaft

Overview

- ◆ [⇒ „2.1 Exploded view - pinion shaft and hollow shaft“, page 83](#)
- ◆ [⇒ „2.2 Dismantling and assembling pinion shaft“, page 87](#)
- ◆ [⇒ „2.3 Re-determining shim S5 for positioning tapered roller bearing inner race“, page 91](#)
- ◆ [⇒ „2.4 Dismantling and assembling hollow shaft“, page 92](#)
- ◆ [⇒ „2.5 Re-determining shim S6 for positioning 2nd speed selector gear“, page 96](#)

2.1 Exploded view - pinion shaft and hollow shaft



Note

- ◆ *Refer to technical data when installing new gears or final drive gear set ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 00.*
- ◆ *Before installing, heat tapered roller bearing inner races and synchro-hubs to approx. 100 °C (max.) using inductive heater -VAS 6414- (wear protective gloves).*
- ◆ *Always renew the double angular contact ball bearing ⇒ [Item 5 \(page 84\)](#) when renewing the pinion shaft (final drive gear set) ⇒ [Item 3 \(page 84\)](#).*
- ◆ *Lubricate all needle bearings and synchro-rings with gear oil before installing.*
- ◆ *When renewing synchro-rings, renew inner ring, intermediate ring and synchro-ring for the corresponding gear together.*
- ◆ *If synchro-rings are not being renewed, make sure they are re-installed on the same gear. Do not interchange synchro-rings for reverse gear with synchro-rings for 1st and 2nd gear ⇒ [page 37](#).*
- ◆ *Items 22 to 29, 32 and 49 were modified on 1st and 2nd gear selector rod version with spring-loaded selector fork ⇒ [page 21](#). Select correct components from ⇒ *Electronic parts catalogue*.*
- ◆ *Adjustment work is required when renewing the parts marked with ¹⁾. Table of adjustments ⇒ [page 115](#)*



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 - Gearbox housing ¹⁾

2 - Shim „S3“

- ❑ Table of adjustments
⇒ [page 115](#)

3 - Pinion shaft ¹⁾

- ❑ Is mated with crown wheel, always renew together as a set
- ❑ Dismantling and assembling ⇒ [page 87](#)
- ❑ Adjusting pinion shaft and crown wheel
⇒ [page 112](#)

4 - Needle bearing

- ❑ Bearing for flange shaft in pinion shaft
- ❑ Pulling out ⇒ [page 89](#)
- ❑ Driving in ⇒ [page 89](#)

5 - Double angular contact ball bearing

- ❑ If only this bearing is renewed, re-adjustment is not necessary
- ❑ Pressing off
⇒ [page 90](#)
- ❑ Pressing on
⇒ [page 90](#)
- ❑ Installation position: shoulder on outer race faces towards pinion gear

6 - Shim „S5“

- ❑ To position tapered roller bearing inner race ⇒ [Item 7 \(page 84\)](#)
- ❑ Re-determining thickness ⇒ [page 91](#)

7 - Tapered roller bearing inner race

- ❑ Pressing off ⇒ [page 90](#)
- ❑ Pressing on ⇒ [page 91](#)

8 - Shim

9 - Circlip

- ❑ Re-determining thickness ⇒ [page 91](#)

10 - Needle bearing

- ❑ For pinion shaft in hollow shaft
- ❑ Lubricate with gear oil

11 - Shim „S4“

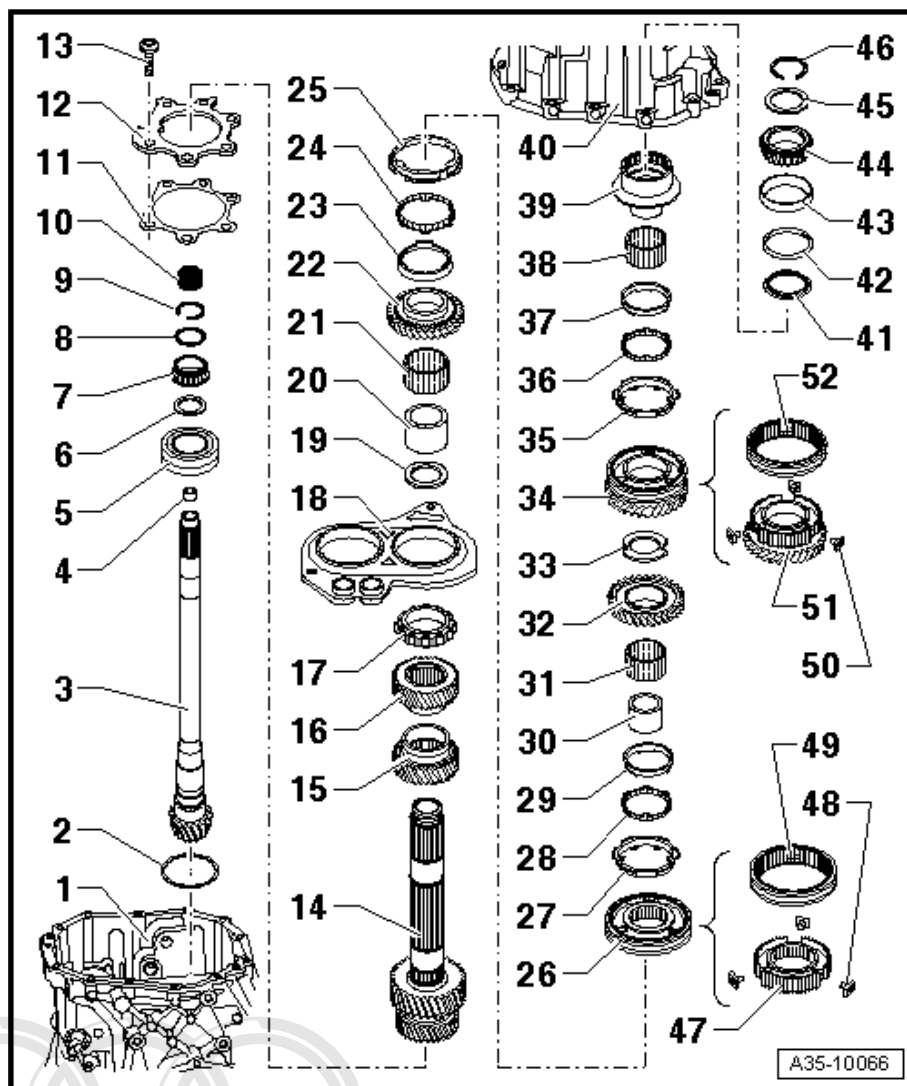
- ❑ Table of adjustments ⇒ [page 115](#)

12 - Retaining plate

- ❑ Installation position: machined side faces towards gearbox housing (can only be installed in one position).

13 - Bolt

- ❑ Tightening torque ⇒ [Item 14 \(page 23\)](#)
- ❑ 6x
- ❑ Apply locking fluid -AMV 185 101 A1- when fitting



14 - Hollow shaft

- ☐ With 3rd and 4th gear wheels
- ☐ Dismantling and assembling ⇒ [page 92](#)

15 - 6th gear wheel

- ☐ Pressing off ⇒ [page 94](#)
- ☐ Pressing on ⇒ [page 94](#)
- ☐ Installation position: high inside collar faces 5th gear wheel

16 - 5th gear wheel

- ☐ Pressing off ⇒ [page 94](#)
- ☐ Pressing on ⇒ [page 95](#)
- ☐ Installation position: high inside collar faces towards 6th gear wheel

17 - Roller bearing

- ☐ For hollow shaft
- ☐ Do not interchange with roller bearing for input shaft
- ☐ Pressing off with 5th gear wheel ⇒ [page 94](#)
- ☐ Pressing on ⇒ [page 95](#)

18 - Bearing mounting

- ☐ The roller bearing outer race ⇒ [Item 17 \(page 85\)](#) cannot be renewed individually; renew bearing mounting if signs of wear are found.
- ☐ The roller bearing outer race must not have any radial clearance in the bearing mounting.

19 - Shim „S6“

- ☐ To position 2nd speed selector gear
- ☐ Re-determining thickness ⇒ [page 96](#)

20 - Needle bearing inner race

- ☐ For 2nd speed selector gear
- ☐ Pressing off with 5th gear wheel ⇒ [page 94](#)
- ☐ Pressing on ⇒ [page 95](#)

21 - Needle bearing

- ☐ For 2nd gear

22 - 2nd speed selector gear

23 - Inner ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

24 - Intermediate ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

25 - Synchro-ring for 2nd gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

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

- ☐ Removing and installing ⇒ [page 25](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 38](#)

27 - Synchro-ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

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

28 - Intermediate ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

29 - Inner ring for 1st gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

30 - Needle bearing inner race

- ☐ For 1st speed selector gear

31 - Needle bearing

- ☐ For 1st gear

32 - 1st speed selector gear

33 - Thrust washer

- ☐ For 1st speed and reverse selector gears

34 - Reverse selector gear

- ☐ With locking collar for reverse gear
- ☐ Removing and installing ⇒ [page 25](#)
- ☐ Dismantling and assembling locking collar and reverse selector gear ⇒ [page 39](#)

35 - Synchro-ring for reverse gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)
- ☐ Renew if scored or if there are visible traces of wear

36 - Intermediate ring for reverse gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Checking for wear ⇒ [page 37](#)

37 - Inner ring for reverse gear

- ☐ Installation position ⇒ [page 38](#)
- ☐ Renew if scored or if there are visible traces of wear

38 - Needle bearing

- ☐ For reverse selector gear

39 - Clutch unit

- ☐ Removing and installing ⇒ [page 25](#)

40 - Gearbox cover

41 - Twelve-point nut

- ☐ Tightening torque ⇒ [Item 6 \(page 16\)](#)
- ☐ Self-locking
- ☐ Renew

42 - Spacer ring

- ☐ Secures 12-point nut ⇒ [Item 41 \(page 86\)](#) on hollow shaft to prevent it from working loose

43 - Tapered roller bearing outer race

- ☐ Can be removed and installed by hand

44 - Tapered roller bearing inner race

- ☐ Can be removed and installed by hand

45 - Shim

- ☐ Note thickness



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ☐ Re-determining thickness ⇒ [page 42](#)

46 - Circlip

- ☐ Note thickness
- ☐ Re-determining thickness ⇒ [page 42](#)

47 - Synchro-hub for 1st and 2nd gear

48 - Thrust block

- ☐ Installing thrust blocks (3x) ⇒ [page 38](#)

49 - Locking collar for 1st and 2nd gear

50 - Thrust block

- ☐ Installing thrust blocks (3x) ⇒ [page 39](#)

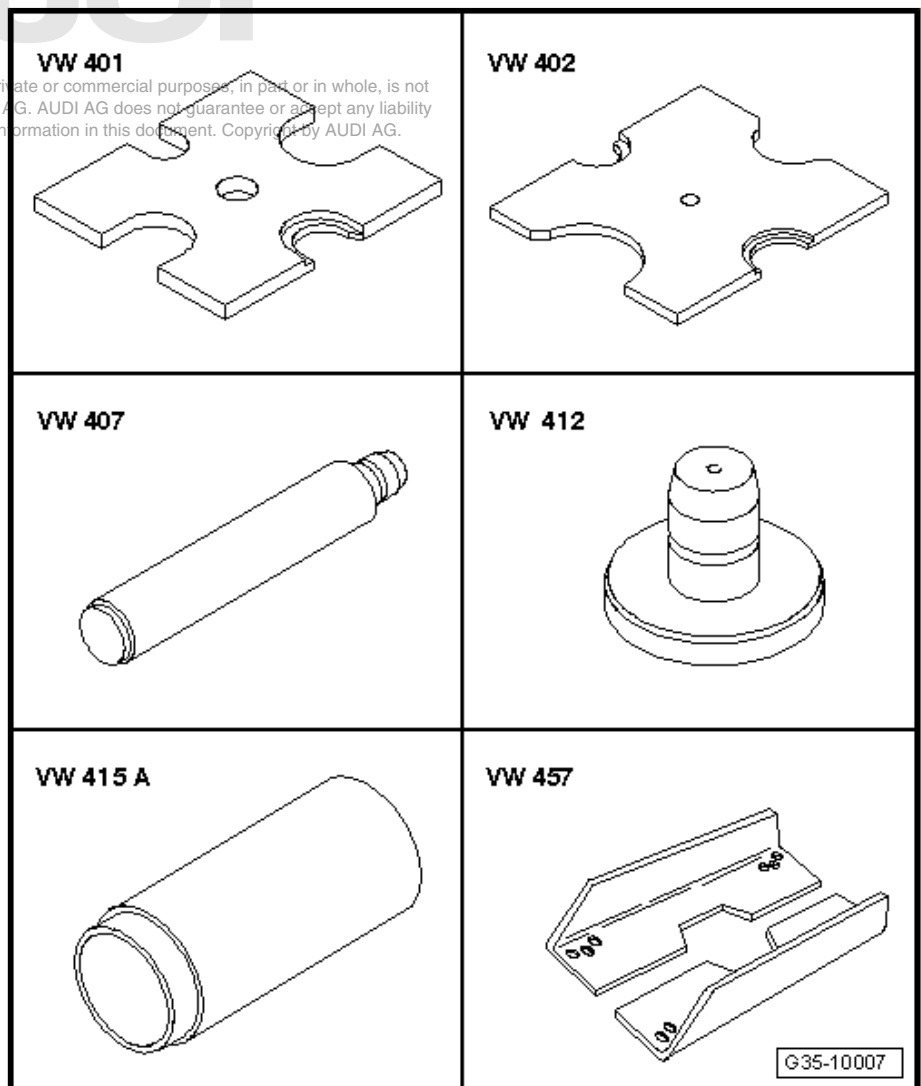
51 - Reverse selector gear

52 - Locking collar for reverse selector gear

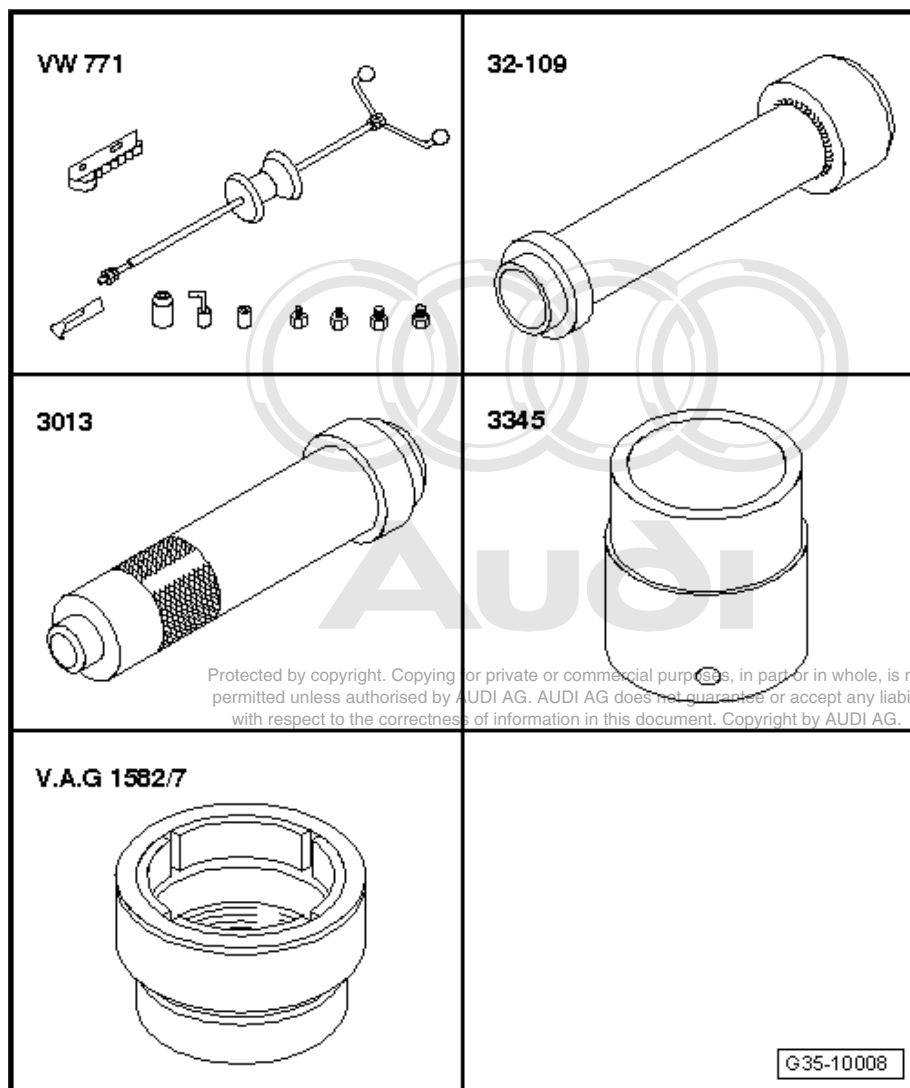
2.2 Dismantling and assembling pinion shaft

Special tools and workshop equipment required

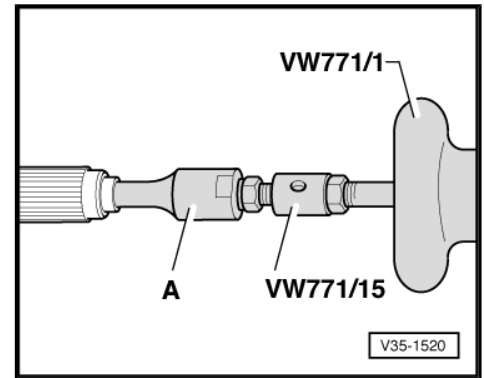
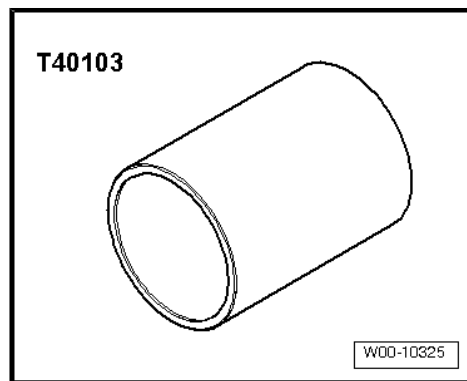
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415 A-
- ◆ Support rails -VW 457-



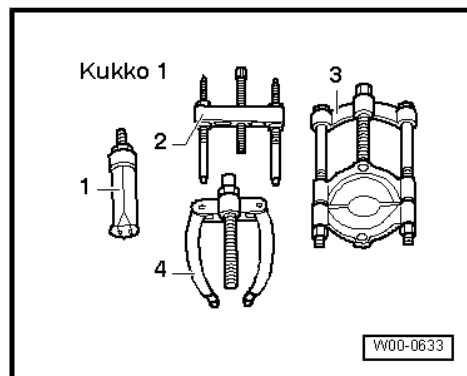
- ◆ Multi-purpose tool -VW 771-
- ◆ Tube -32 - 109-
- ◆ Press tool -40 - 21-
- ◆ Punch -3013-
- ◆ Wheel bearing tube -3345-
- ◆ Adapter -V.A.G 1582/7-



- ◆ Pressure sleeve - T40103-



- ◆ -1- Internal puller - Kukko 21/2-

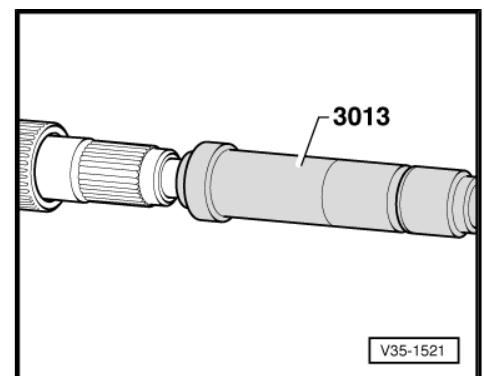


Pulling out needle bearing for flange shaft in pinion shaft

A - Internal puller 12 ...
14.5 mm , e.g. -Kukko
21/1-

Driving in needle bearing for flange shaft in pinion shaft until flush

Install needle bearing so the lettering (side with thicker metal) faces towards the punch -3013- .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

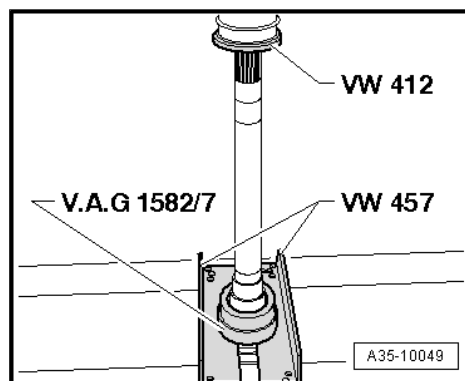
Pressing off tapered roller bearing inner race

- Remove circlip and washer before pressing off.
- Set up adapter -V.A.G 1582/7- behind bearing rollers.
- Then carefully press off tapered roller bearing inner race.
- Remove shim „S5“ from pinion shaft.

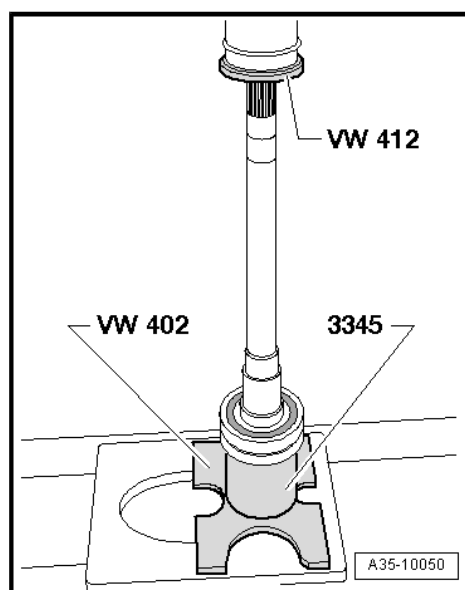


Note

Tapered roller bearing inner race can also be pressed off together with the double angular contact ball bearing ⇒ [page 90](#) .

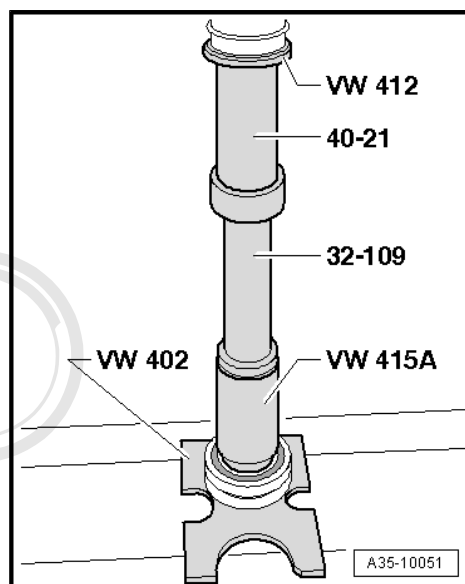


Pressing off double angular contact ball bearing



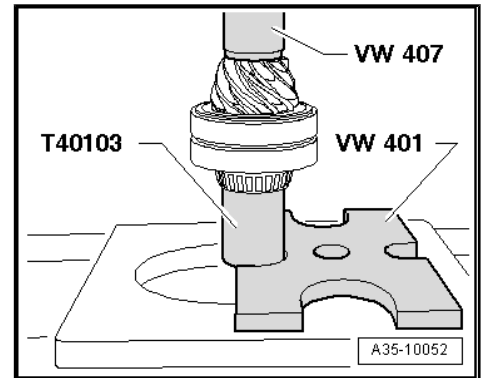
Pressing on double angular contact ball bearing

- Installation position: shoulder on bearing outer race faces towards pinion gear.
- Place smaller diameter of tube -VW 415 A- on bearing inner race.
- Press on double angular contact ball bearing as far as it will go.
- Now re-determine thickness of shim „S5“ ⇒ [page 91](#) if pinion shaft (final drive gear set) is being renewed.



Pressing on tapered roller bearing inner race

- First place shim „S5“ onto double angular contact ball bearing on pinion shaft.
- Then heat inner race to approx. 100 °C and press on.
- Then position washer -A- ➔ [page 91](#) onto inner race.
- Afterwards determine required thickness of circlip -B- ➔ [page 91](#) and insert.

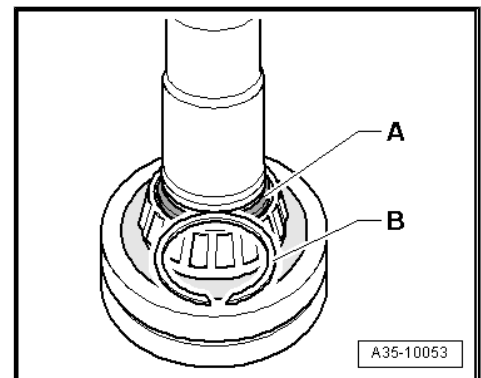


Determining thickness of circlip -B-

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

The following circlips are available:

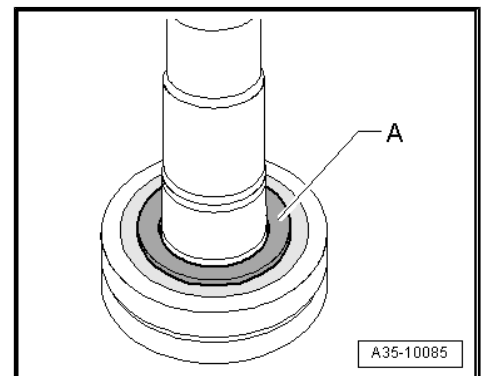
Circlip thickness (mm)		
1.50	1.90	2.30
1.55	1.95	2.35
1.60	2.00	2.40
1.65	2.05	2.45
1.70	2.10	2.50
1.75	2.15	2.55
1.80	2.20	2.60
1.85	2.25	



2.3 Re-determining shim „S5“ for positioning tapered roller bearing inner race

This adjustment is necessary when renewing the final drive gear set.

This shim -A- is responsible for the proper positioning of the tapered roller bearing inner race (on the pinion shaft) and thus the positioning of the hollow shaft in the gearbox.



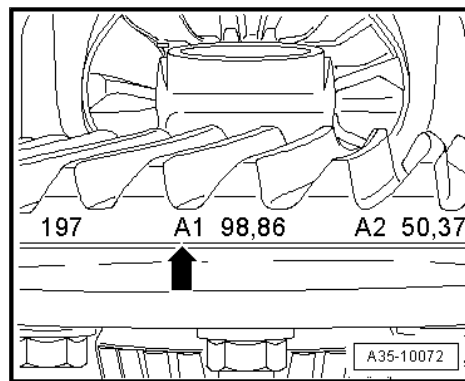
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

The nominal dimension „A1“ -arrow- indicating the actual required shim thickness for „S5“ is marked on the crown wheel of the final drive gear set. In this example: dimension „A1“ = 98.86 mm.

Determine required shim from table.

The following shims are available:

Nominal dimension „A1“	Shim „S5“
Marked dimension (mm)	Thickness (mm)
99.30 ... 99.21	2.30
99.20 ... 99.11	2.40
99.10 ... 99.01	2.50
99.00 ... 98.91	2.60
98.90 ... 98.81	2.70
98.80 ... 98.70	2.80



Note

Select correct shims from ⇒ *Electronic parts catalogue* .

- The determined shim thickness „S5“ in this example is 2.70 mm.

2.4 Dismantling and assembling hollow shaft



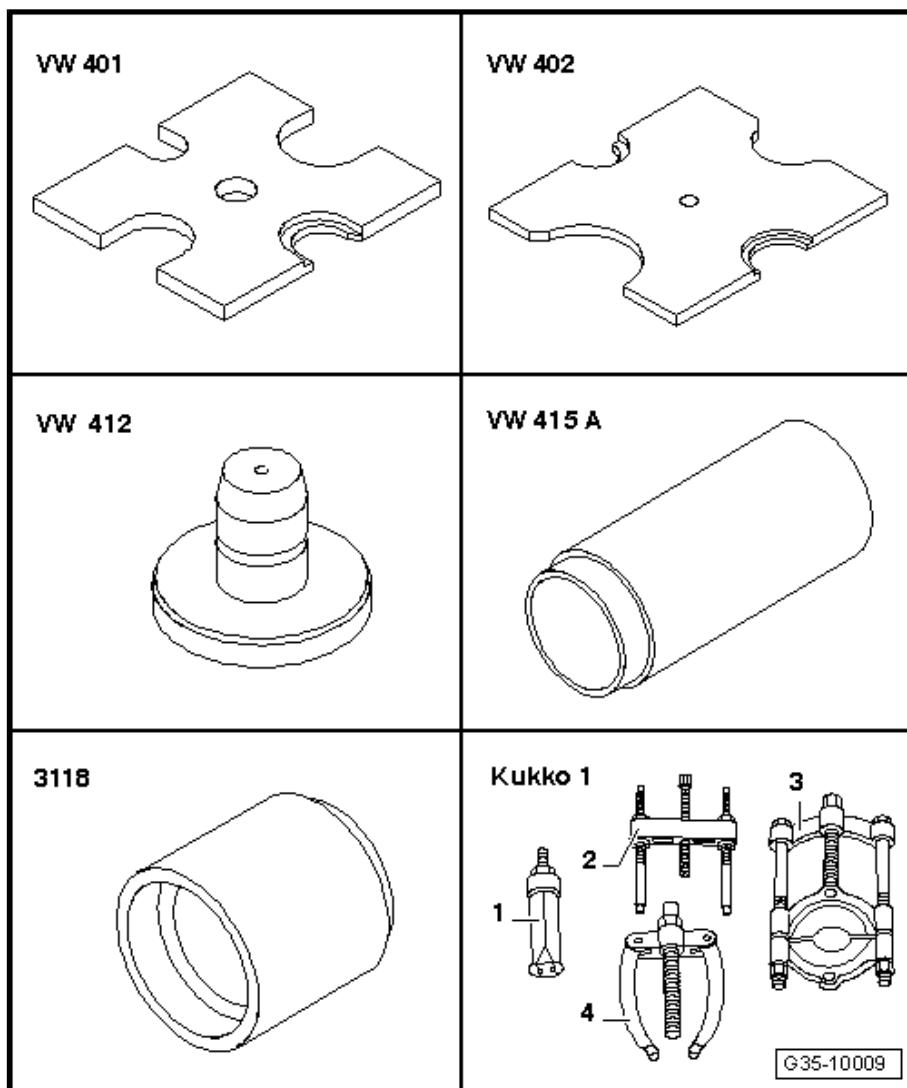
Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing and installing selector gears for 1st and 2nd gear and the reverse selector gear is described in chapter on dismantling and assembling gearbox ⇒ [page 25](#) .

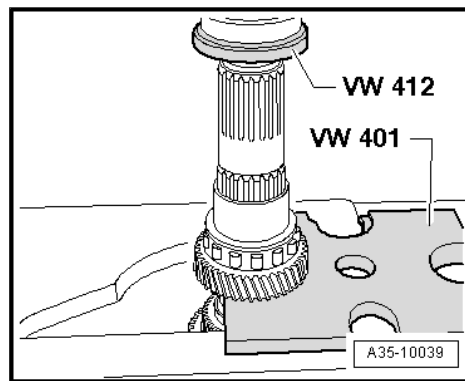
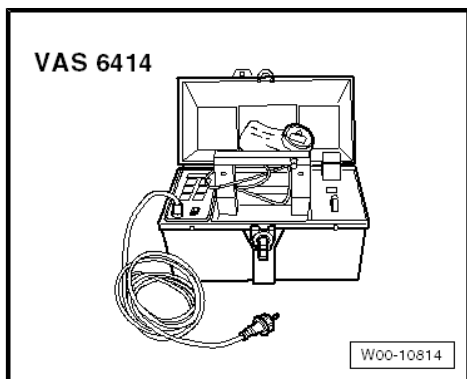
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415 A-
- ◆ Press tool -3118-
- ◆ -3- Splitter -Kukko 17/2-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Inductive heater - VAS 6414-



- ◆ Feeler gauge

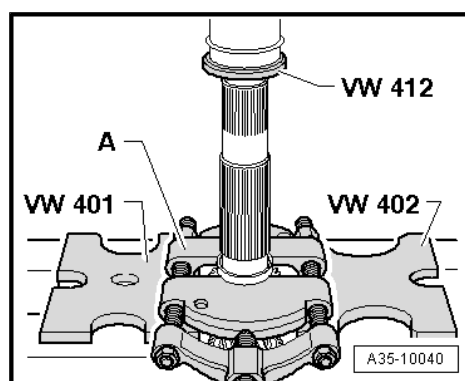
Pressing off 5th gear wheel

- Press off 5th gear wheel together with roller bearing and needle bearing inner race for 2nd speed selector gear from hollow shaft.

Pressing off 6th gear wheel

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

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

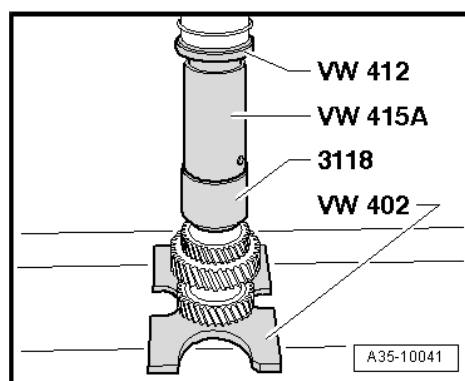


Heat 6th gear wheel and press on.

- ◆ Installation position:

Higher inside collar faces 5th gear.

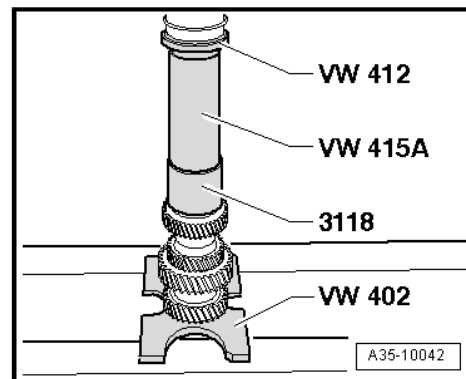
- Shoulder of press tool -3118- faces towards 6th gear wheel.



Heating 5th gear wheel and pressing on

◆ Installation position:

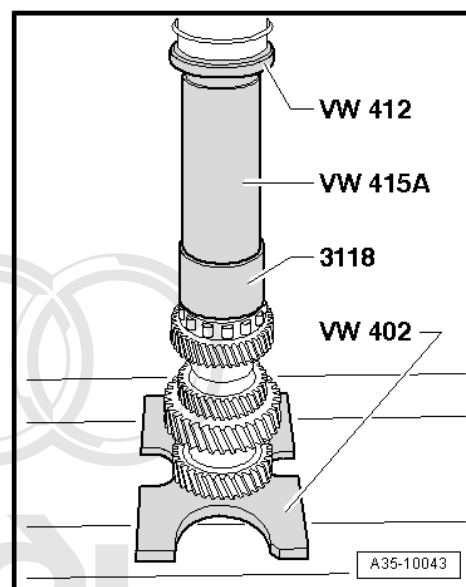
Higher inside collar faces 6th gear.



Pressing on roller bearing for hollow shaft

- Shoulder of press tool -3118- faces towards roller bearing.

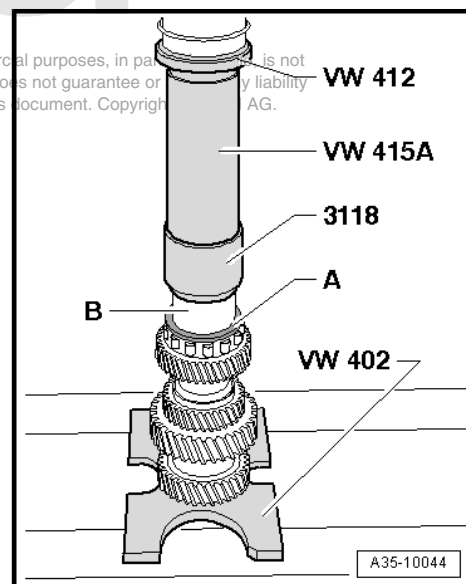
If gearbox housing, final drive gear set, hollow shaft or gear wheels on hollow shaft are being renewed, re-determine shim „S6“ for positioning 2nd speed selector gear ➔ [page 96](#) .



Pressing on needle bearing inner race for 2nd speed selector gear

- First place shim „S6“ -A- onto roller bearing
- Then press on needle bearing inner race -B- for 2nd speed selector gear

Protected by copyright. Copying for private or commercial purposes, in part or in full, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for the correctness of information in this document. Copyright © 2012 Audi AG.



2.5 Re-determining shim „S₆“ for positioning 2nd speed selector gear

Shim -A- is responsible for the correct positioning of 2nd speed selector gear and thus the positioning of the gear cluster in the gearbox.

This adjustment is necessary when the following components are renewed:

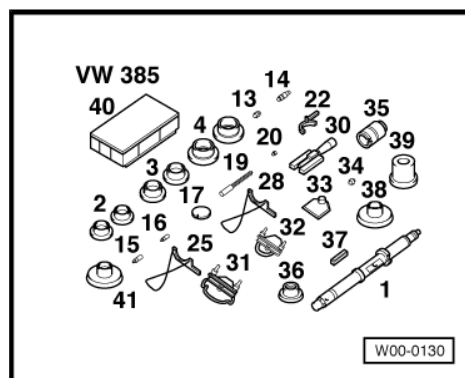
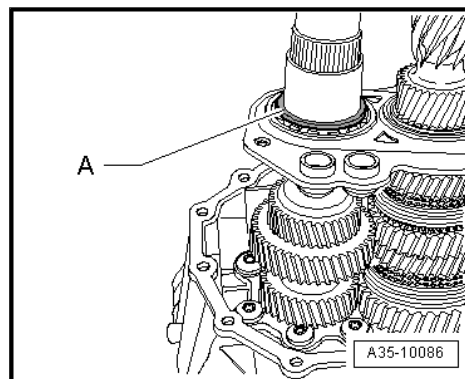
- ◆ Gearbox housing
- ◆ Final drive gear set
- ◆ Hollow shaft

or the

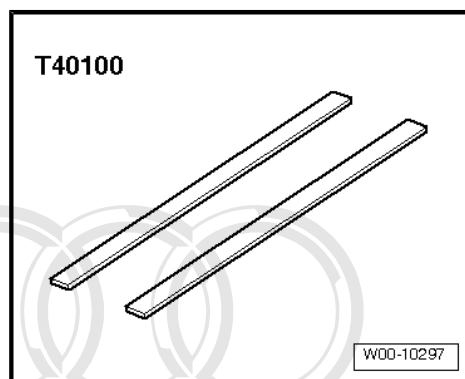
- ◆ Gear wheels on hollow shaft

Special tools and workshop equipment required

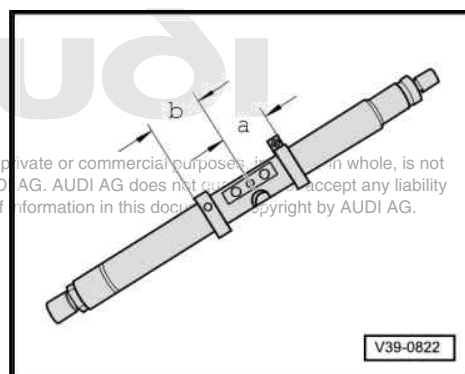
- ◆ Universal measuring tool -VW 385-



- ◆ Straightedge -T 40100-



- ◆ Depth gauge, digital 300 mm , e.g. -VAS 6594-
- Set adjustment rings of universal measuring tool -VW 385/1- to the following values:
- ◆ Dimension -a- = 45 mm
- ◆ Dimension -b- = 60 mm



Protected by copyright. Copying for private or commercial purposes, in whole or in part, is not permitted unless authorised by AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Assemble universal measuring tool -VW 385/1- as illustrated:

Determining dimension -A-

- Tapered roller bearing outer races for differential bearings are installed in gearbox housing and cover for final drive.
- Insert universal measuring tool -VW 385/1- with centring disc -VW 385/4- facing towards gearbox housing.
- Fit cover for final drive with O-ring installed and tighten four bolts to 24 Nm.
- Using the adjustable ring, move the centring disc outwards until it is no longer possible to turn the universal measuring tool by hand.
- Round side of universal measuring tool must point up towards depth gauge during this procedure.
- Position straightedge -T 40100- onto cleaned joint surface of gearbox housing.
- Measure depth between straightedge and highest point on universal measuring tool -VW 385/1- using digital depth gauge -1- (e.g. depth gauge, digital 300 mm -VAS 6594-).

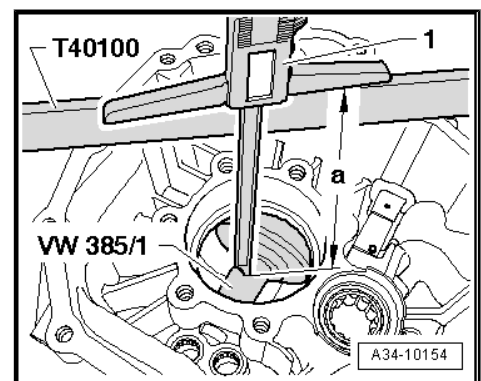
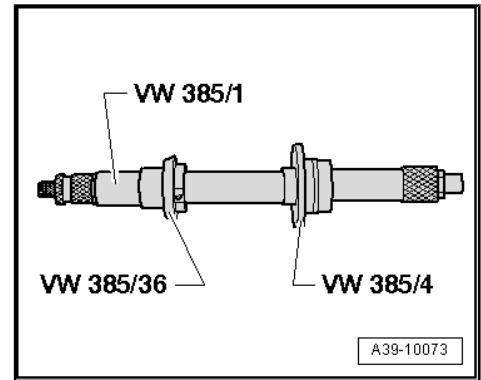
In example: measurement -a- = 236.80 mm.

- Subtract height of straightedge -T 40100- from this measurement and add half the $\varnothing$ of universal measuring tool -VW 385/1- to this calculation. This value is 16 mm.

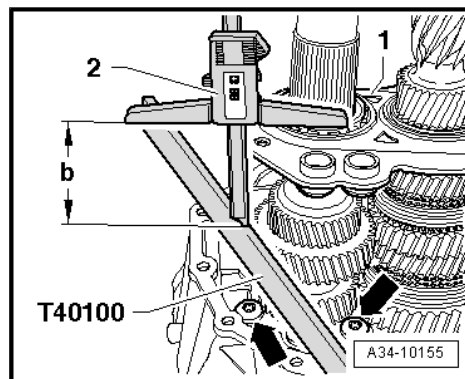
Example:

Depth as measured with digital depth gauge	236.80 mm
- Height of straightedge -T 40100-	40.70 mm
+ Half the $\varnothing$ of universal measuring tool -VW 385/1-	16.00 mm
= Dimension -A-	212.10 mm

Determining dimension -B-



- Pinion shaft is fitted with shims „S3“ and „S4“.
- The securing bolts -arrows- for the retaining plate are tightened to 30 Nm.
- Install input shaft, hollow shaft with pressed-on roller bearings and bearing mounting -1-.
- Position straightedge -T 40100- onto cleaned joint surface of gearbox housing.
- Measure depth between roller bearing inner race and straightedge using digital depth gauge -2- (e.g. digital depth gauge -VAS 6087-).



In example: measurement -b- = 79.00 mm.

- Add the height of straightedge -T 40100- to this measurement.

Example:

Depth as measured with digital depth gauge	79.00 mm
+ Height of straightedge -T 40100-	40.70 mm
= Dimension -B-	119.70 mm

Determining thickness of shim „S6“

Formula: measuring range (overall dimension) = dimension -A- + dimension -B-

Example:

Dimension -A-	212.10 mm
+ Dimension -B-	119.70 mm
= Measuring range (overall dimension)	331.80 mm

Select required shim from table ⇒ [page 98](#) .

Measuring range (overall dimension)	Shim „S6“
Measured value (mm)	Thickness (mm)
331.38 ... 331.43	4.70
331.44 ... 331.53	4.60
331.54 ... 331.63	4.50
331.64 ... 331.73	4.40
331.74 ... 331.83	4.30
331.84 ... 331.93	4.20
331.94 ... 332.03	4.10
332.04 ... 332.08	4.00



Note

Select correct shims from ⇒ *Electronic parts catalogue* .

- The shim thickness „S6“ in this example is 4.30 mm.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

39 – Final drive - front differential

1 Renewing oil seals for flange shafts

Overview

- ◆ Renewing flange shaft oil seals (left and right) with gearbox installed in vehicle ⇒ 6-speed manual gearbox 0A3, four-wheel drive; Rep. gr. 39 .
- ◆ Renewing flange shaft oil seals (left and right) with gearbox removed ⇒ [page 100](#) .

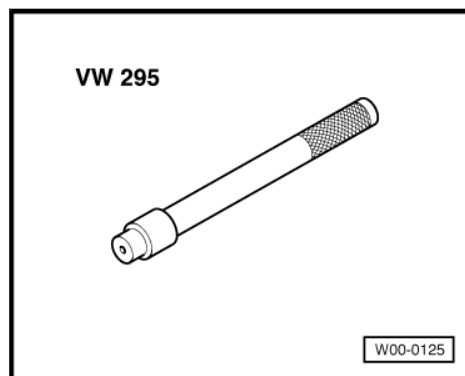


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

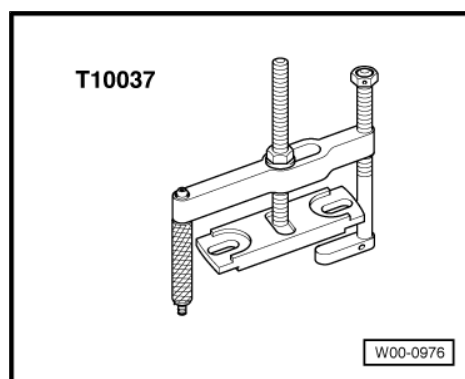
2 Removing and installing differential

Special tools and workshop equipment required

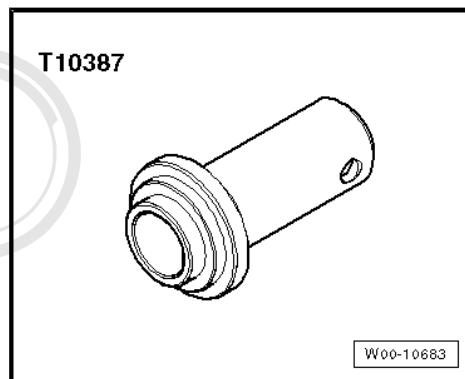
◆ Drift -VW 295-



◆ Puller -T10037-

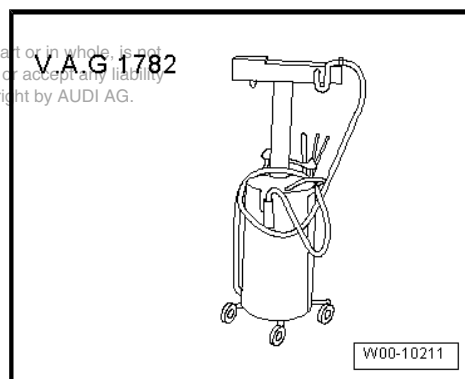


◆ Thrust piece -T10387-



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

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



◆ Sealing grease -G 052 128 A1-



Note

- ◆ Removing and installing is possible with the gearbox installed.
- ◆ The differential can be removed and installed without removing the selector mechanism, input shaft, pinion shaft/hollow shaft or gearbox cover. These components must be removed if the differential needs to be adjusted.
- ◆ Adjustment work is required when renewing the parts marked with ¹⁾. Table of adjustments ⇒ [page 115](#)

1 - Gearbox housing ¹⁾

2 - Oil seal

- ☐ For flange shaft
- ☐ Removing ⇒ [page 102](#)
- ☐ Installing (left-side) ⇒ [page 103](#)
- ☐ Installing (right-side) ⇒ [page 103](#)

3 - Circlip

- ☐ Renew
- ☐ Removing and installing ⇒ [page 102](#)

4 - Flange shaft

- ☐ Removing (left-side) ⇒ [page 101](#)
- ☐ Removing (right-side) ⇒ [page 102](#)
- ☐ Drive in with drift -VW 295-

5 - Differential with crown wheel ¹⁾

- ☐ Dismantling and assembling ⇒ [page 104](#)

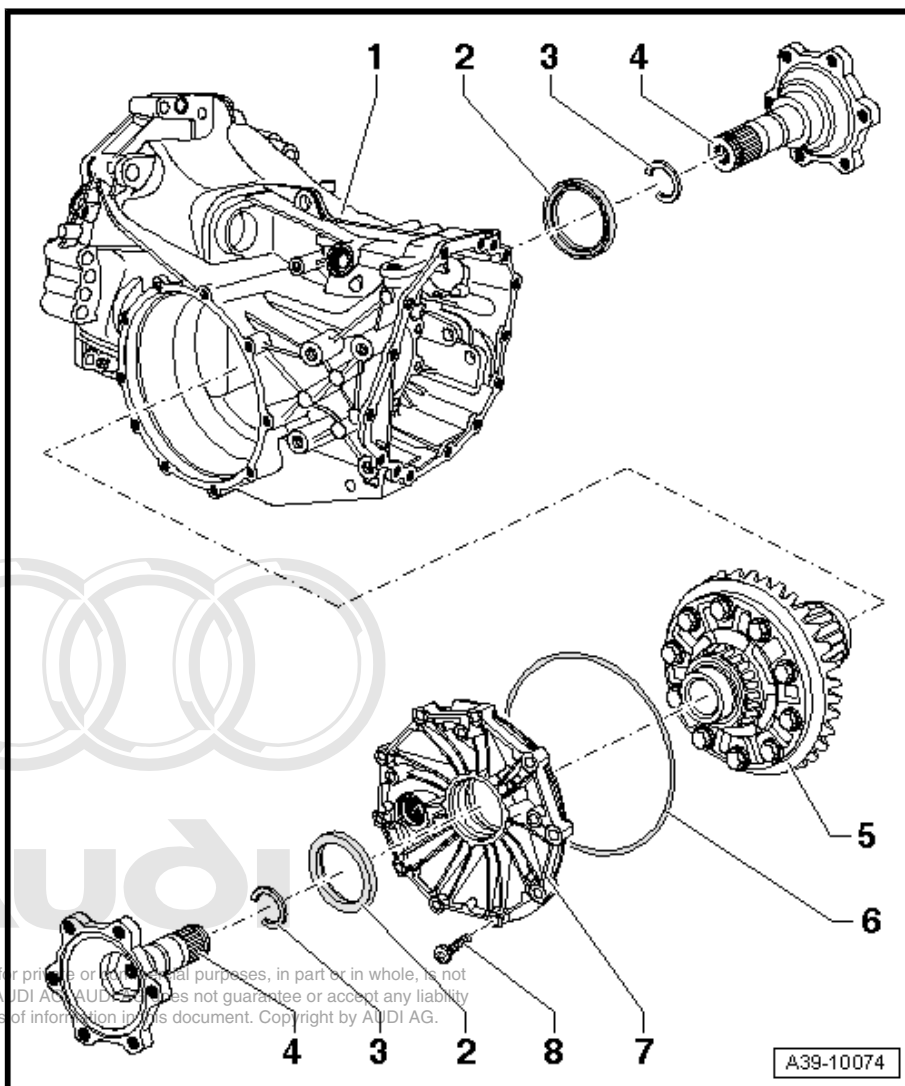
6 - O-ring

- ☐ Always renew
- ☐ Lubricate with gear oil

7 - Cover for final drive ¹⁾

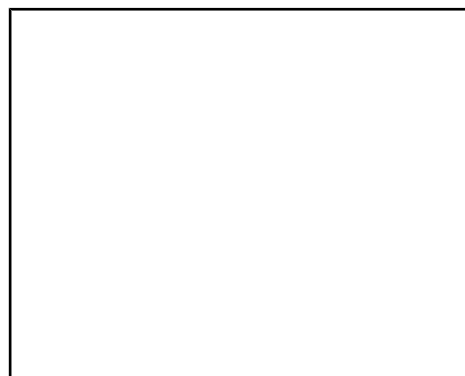
8 - Bolt

- ☐ 24 Nm



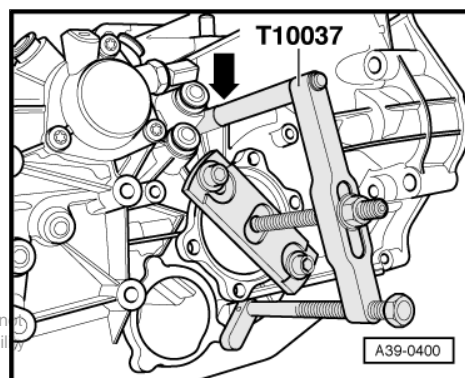
Removing flange shaft (left-side)

- Remove flange shaft (left-side); to do so, secure puller - T10037- to cover for final drive -arrow-.



Removing flange shaft (right-side)

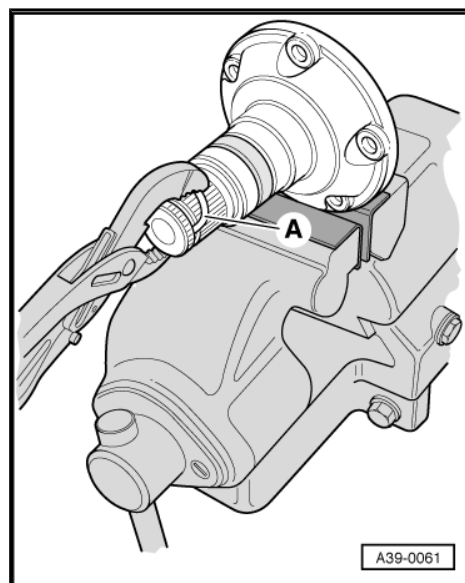
- Remove flange shaft (right-side); to do so, secure puller - T10037- to gearbox housing -arrow-.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

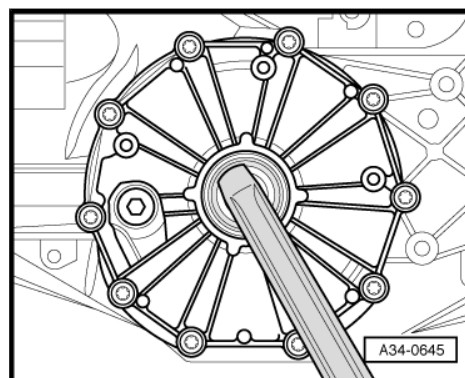
Removing and installing circlip

- Clamp flange shaft in vice, using jaw protectors. Use new circlip -A- to press old circlip out of groove in flange shaft.



Removing flange shaft oil seal

- Lever out flange shaft oil seal using an assembly lever.



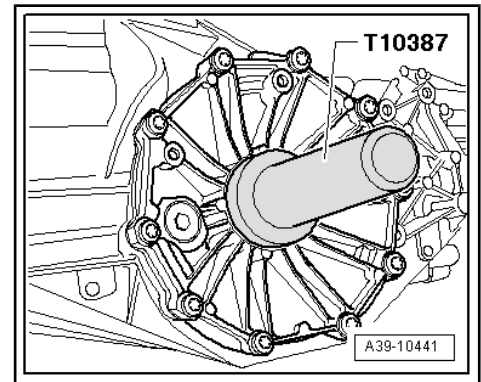
Installing oil seal for flange shaft (left-side)

- Lightly oil outer circumference of new oil seal.
- Drive in new flange shaft oil seal using thrust piece -T10387- until thrust piece reaches stop; keep seal straight when installing.



Note

- ◆ *Driving-in depth (standard): 5.5 mm beneath surface of cover*
- ◆ *When carrying out a repair, the oil seal is driven in to a depth of 6.5 mm using thrust piece -T10387-, so that the new seal does not bear on the same contact surface on the used flange shaft.*
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .



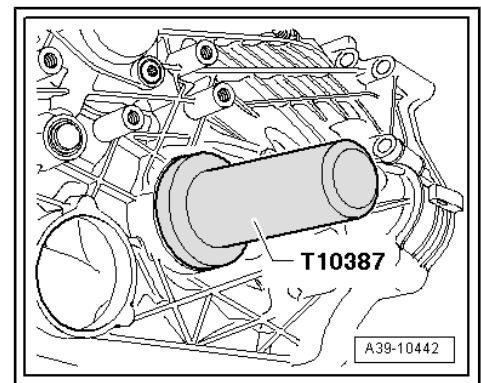
Installing flange shaft oil seal (right-side)

- Lightly oil outer circumference of new oil seal.
- Drive in new flange shaft oil seal using thrust piece -T10387- until thrust piece reaches stop; keep seal straight when installing.



Note

- ◆ *Driving-in depth (standard): 5.5 mm beneath surface of housing*
- ◆ *When carrying out a repair, the oil seal is driven in to a depth of 6.5 mm using thrust piece -T10387-, so that the new seal does not bear on the same contact surface on the used flange shaft.*
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3 Dismantling and assembling differential

Overview

- ♦ ⇒ „3.1 Exploded view - differential“, page 104
- ♦ ⇒ „3.2 Dismantling and assembling differential“, page 106

3.1 Exploded view - differential

Removing and installing differential ⇒ [page 100](#)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Note

- ♦ Use inductive heater -VAS 6414- to heat tapered roller bearing inner races and crown wheel to 100°C before installing.
- ♦ Always renew both tapered roller bearings together.
- ♦ Adjustment work is required when renewing the parts marked with ¹⁾. Table of adjustments ⇒ [page 115](#)

1 - Gearbox housing ¹⁾

2 - Shim „S2“

- ☐ Note thickness
- ☐ Table of adjustments
⇒ [page 115](#)

3 - Outer race for tapered roller bearing (right-side) ¹⁾

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

4 - Inner race for tapered roller bearing (right-side) ¹⁾

- ☐ Pulling off ⇒ [page 109](#)
- ☐ Pressing on
⇒ [page 110](#)

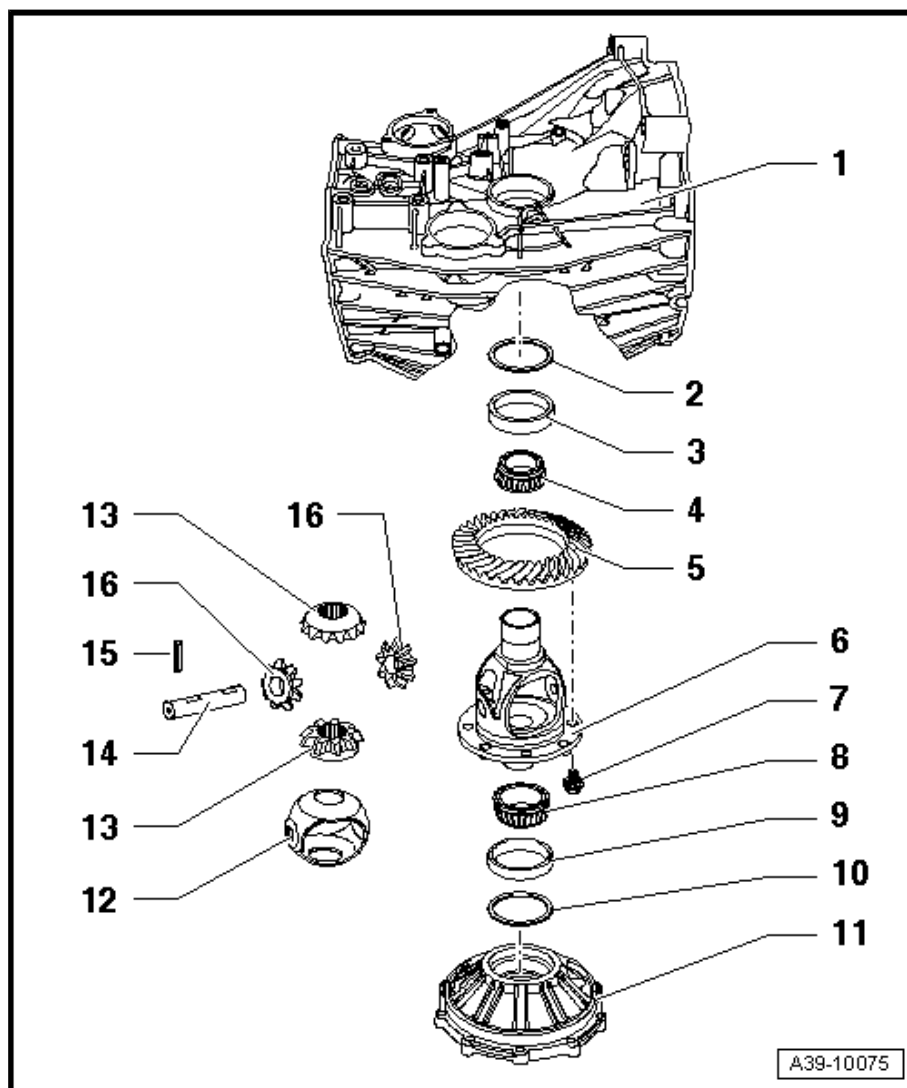
5 - Crown wheel ¹⁾

- ☐ Is paired with pinion shaft (final drive gear set)
- ☐ Select correct version according to gearbox code letters ⇒ Electronic parts catalogue
- ☐ Drive crown wheel off differential cage using a punch ⇒ [page 110](#)
- ☐ Fitting on differential cage ⇒ [page 111](#)

6 - Differential cage ¹⁾

7 - Bolt

- ☐ 60 Nm and turn 45° further
- ☐ Always renew
- ☐ Tighten bolts in stages and in diagonal sequence until crown wheel makes full contact with differential cage. Then tighten to specified torque.



8 - Inner race for tapered roller bearing (left-side) ¹⁾

- ☐ Pulling off ⇒ [page 109](#)
- ☐ Pressing on ⇒ [page 110](#)

9 - Outer race for tapered roller bearing (left-side) ¹⁾

- ☐ Pulling out ⇒ [page 110](#)
- ☐ Pressing in ⇒ [page 110](#)

10 - Shim „S1“

- ☐ Note thickness
- ☐ Table of adjustments ⇒ [page 115](#)

11 - Cover for final drive ¹⁾

- ☐ With O-ring

12 - One-piece thrust washer

- ☐ Lubricate with gear oil before installing

13 - Sun wheel

- ☐ Installing ⇒ [page 111](#)

14 - Differential pinion pin

- ☐ Drive out with drift after removing spring pin

15 - Spring pin

- ☐ Secures differential pinion pin
- ☐ Is sheared off on removal ⇒ [page 111](#)
- ☐ Drive in flush

16 - Planet pinion

- ☐ Installing ⇒ [page 111](#)

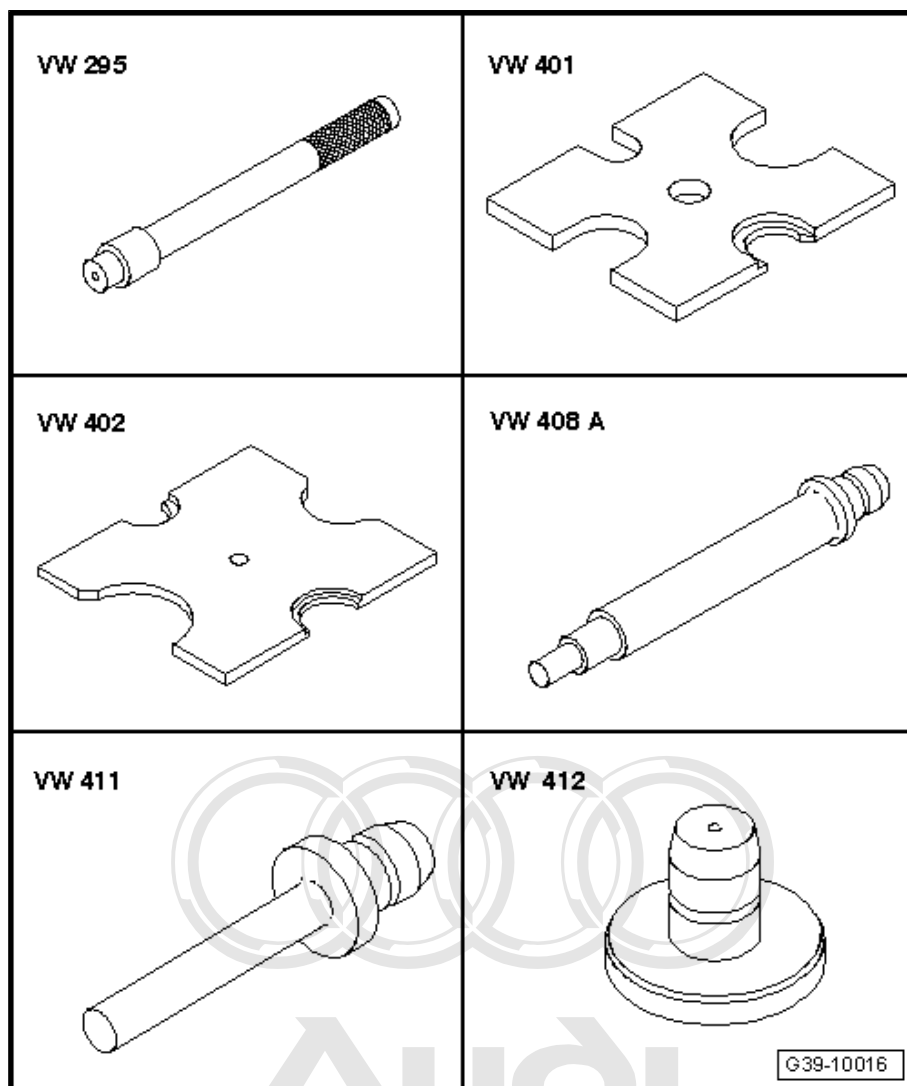


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3.2 Dismantling and assembling differential

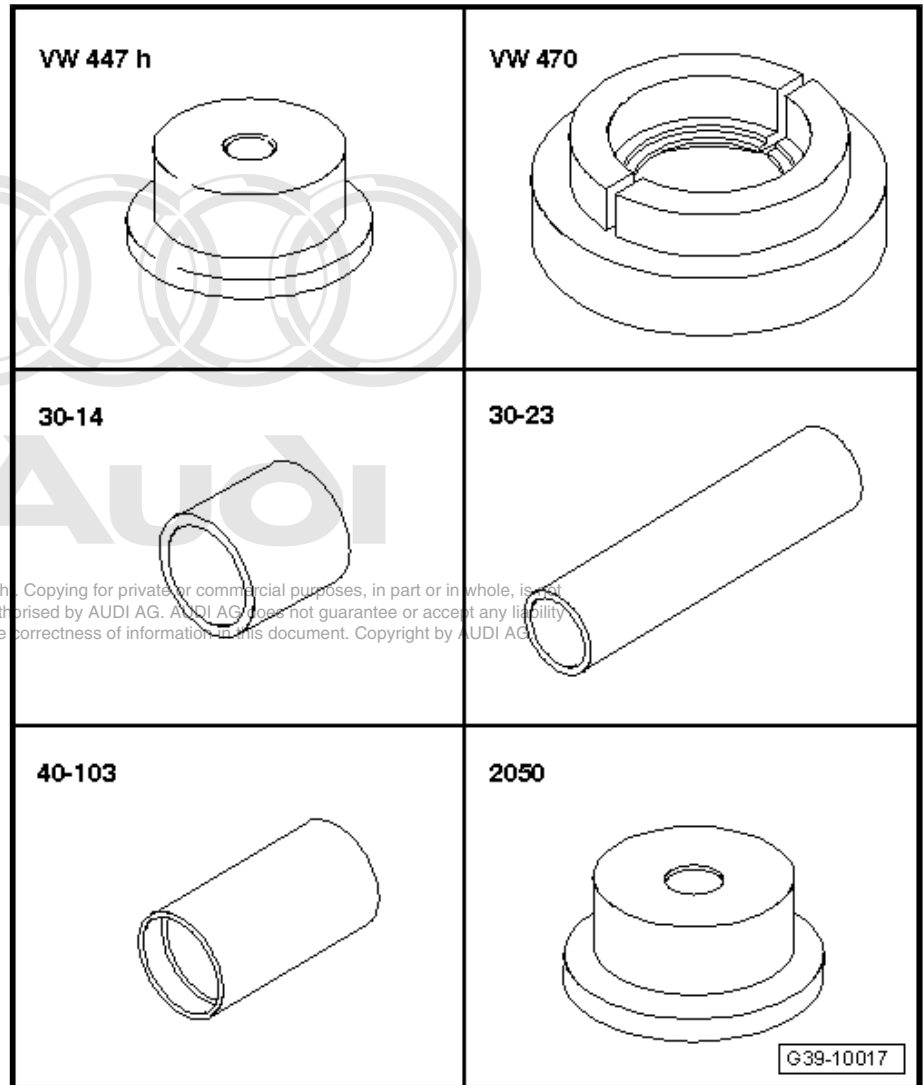
Special tools and workshop equipment required

- ◆ Drift -VW 295-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 411-
- ◆ Press tool -VW 412-



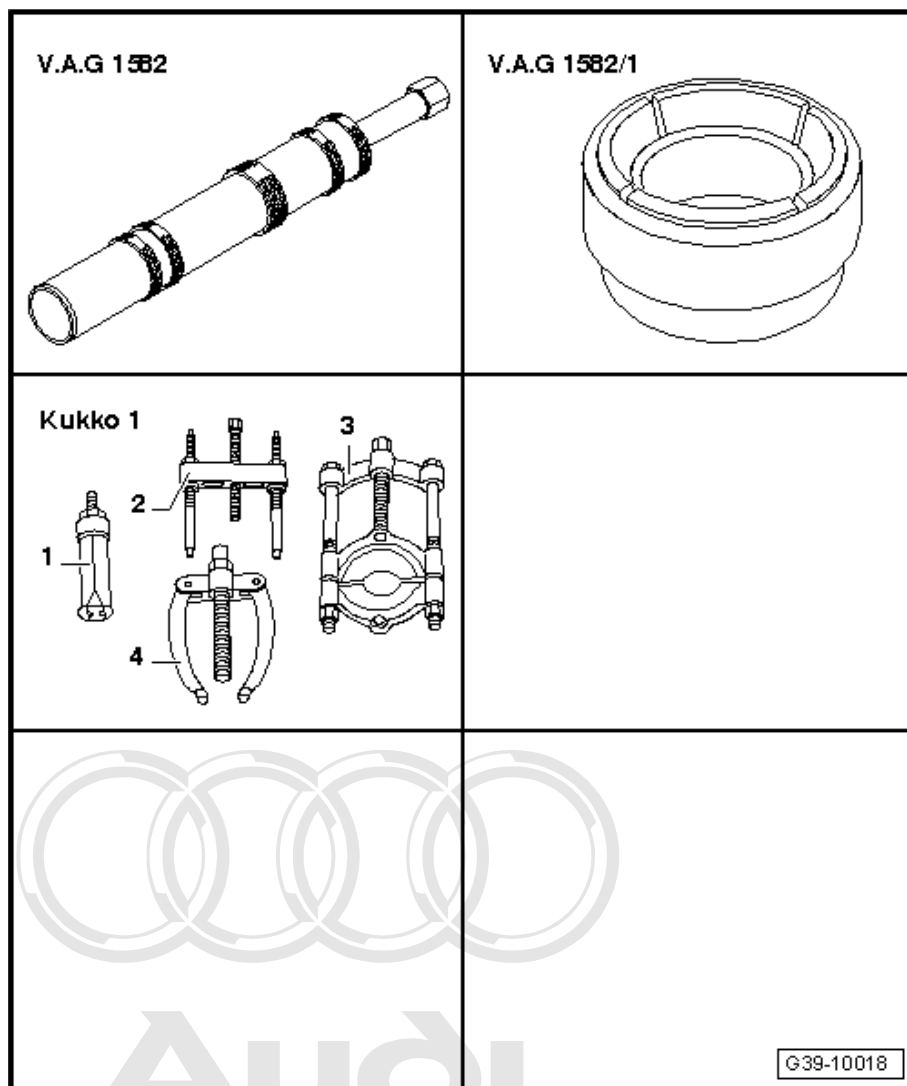
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Thrust plate -VW 447 H-
- ◆ Thrust pieces for pinion shaft bearing -VW 470-
- ◆ Tube -30 - 14-
- ◆ Extension -30 - 23-
- ◆ Support -40 - 103-
- ◆ Thrust piece -2050-



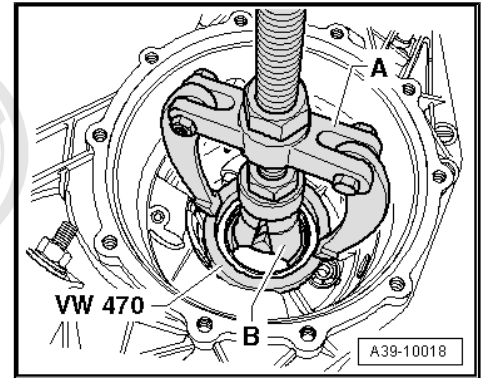
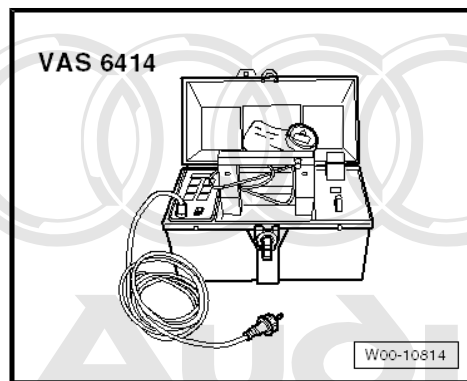
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Tapered roller bearing puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/1-
- ◆ -1- Internal puller -Kukko 21/8-
- ◆ -4- Counter-support -Kukko 22/2-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Inductive heater - VAS 6414-



Pulling tapered roller bearing outer race (right-side) out of gearbox housing

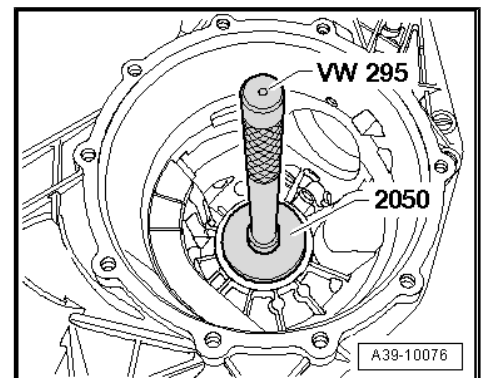
Provided by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express written permission of Audi AG. Audi AG does not guarantee or accept any liability for the correctness of information in this document. Copyright by Audi AG.

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

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

- After removing,
 check shims for damage.

Driving outer race for tapered roller bearing (right-side) into gearbox housing



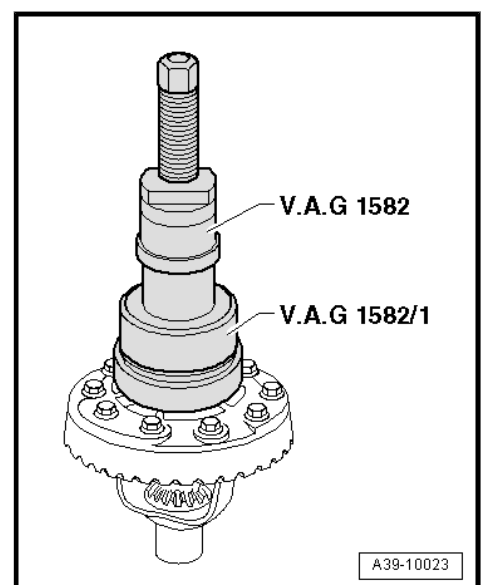
Pulling off tapered roller bearing inner races

- Before setting up puller, place thrust pad -VW 447 H- on differential cage.



Note

The procedure for pulling tapered roller bearing inner races (left and right) off differential is the same for both sides.



Pressing on tapered roller bearing inner race (left and right)



Note

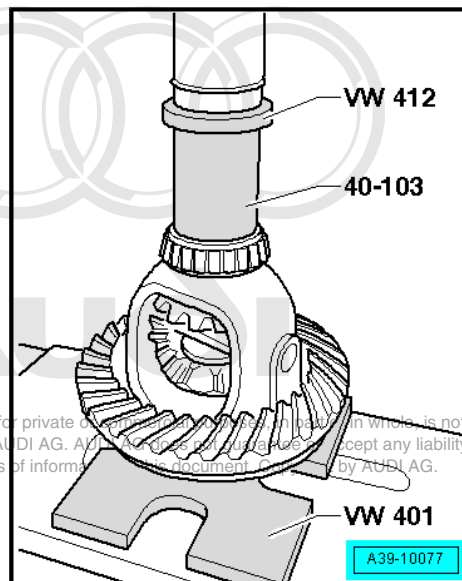
Use the same tools for pressing on tapered roller bearing inner race on left side and right side.



WARNING

Wear protective gloves.

- Heat inner race to approx. 100 °C, fit in position and press home.

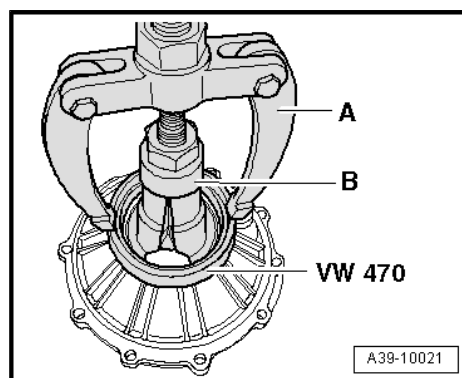


Pulling tapered roller bearing outer race (left-side) out of cover for final drive

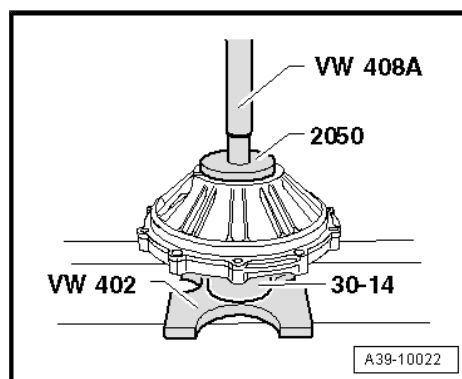
A - Counter-support , e.g. -Kukko 22/2-

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

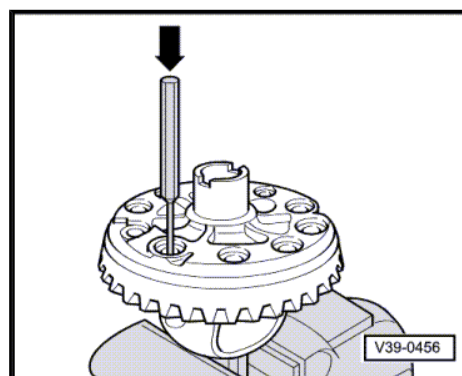
- After removing, check shims for damage.



Pressing tapered roller bearing outer race (left-side) into cover for final drive.



Driving crown wheel off cage



Heating crown wheel to approx. 100 °C and installing

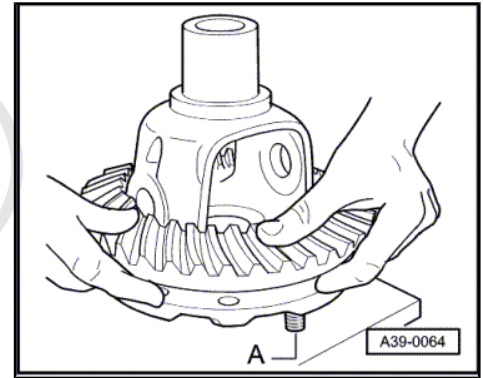
- When fitting crown wheel, use centralising pins -A- (shop-made tool) to locate.



WARNING

Wear protective gloves.

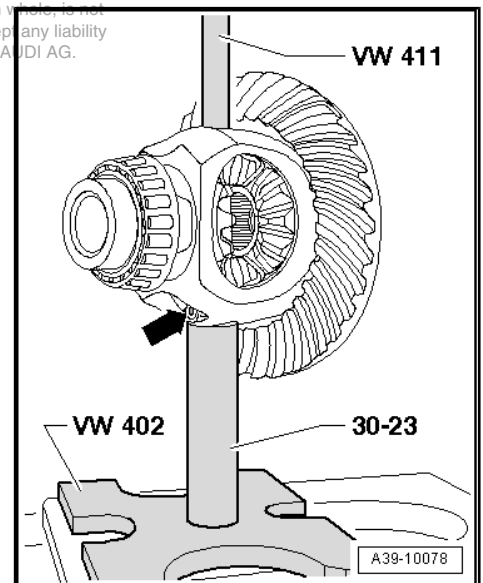
- Allow to cool slightly before screwing in new securing bolts.
- Then tighten bolts in stages and in diagonal sequence until crown wheel makes full contact with differential cage.
- Then tighten bolts to specified torque ➔ [Item 7 \(page 104\)](#).



Removing differential pinion pin

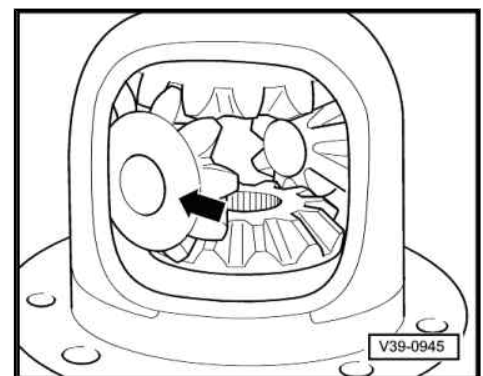
The spring pin is sheared off when pressing out.

- Drive out parts of spring pin remaining in differential cage and differential pinion pin.



Installing differential bevel gears

- Lubricate one-piece thrust washer with gear oil and install.
- Fit both sun wheels.
- Insert planet pinions (spaced 180° apart) and pivot into position -arrow-.
- Align drillings of one-piece thrust washer, planet pinions and differential cage.
- Drive differential pinion pin into final position and secure.



4 Adjusting pinion shaft and crown wheel



Note

- ♦ *Careful adjustment of the crown wheel and pinion shaft is essential to ensure that the final drive gives long service and runs silently. For this reason, the pinion shaft and crown wheel are matched together during manufacture, and checked to ensure a good mesh pattern and quiet running in both directions of rotation. The position of quietest running is found by moving the pinion shaft in an axial direction and at the same time lifting the crown wheel out of the zero-play mesh position by the amount necessary to maintain the backlash within the specified tolerance.*
- ♦ *The object of the adjustment is to reproduce the setting for quietest possible running, as obtained on the test machine in production.*
- ♦ *The final drive gear set (pinion shaft and crown wheel) may only be renewed together as a matched pair.*
- ♦ *Observe the general repair instructions for bearings and shims ⇒ [page 3](#).*
- ♦ *Always renew the double angular contact ball bearing on the pinion shaft when renewing the final drive gear set.*

4.1 Adjustment and marking of final drive gear set

There are two different versions of the final drive gear set, with different markings and different methods of adjustment

- 1 - Final drive gear sets with the distance „E“ marked on the outer circumference of the crown wheel ⇒ [page 112](#).
- 2 - Final drive gear sets with the allowance „e“ marked on the outer circumference of the crown wheel ⇒ [page 114](#).

4.1.1 Adjustment of final drive gear sets marked with dimension „E“



Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Distance -E- refers to the length for this final drive gear set which has to be set on master gauge -VW 385/30-.

1 - „197“ number of matched pair of gears

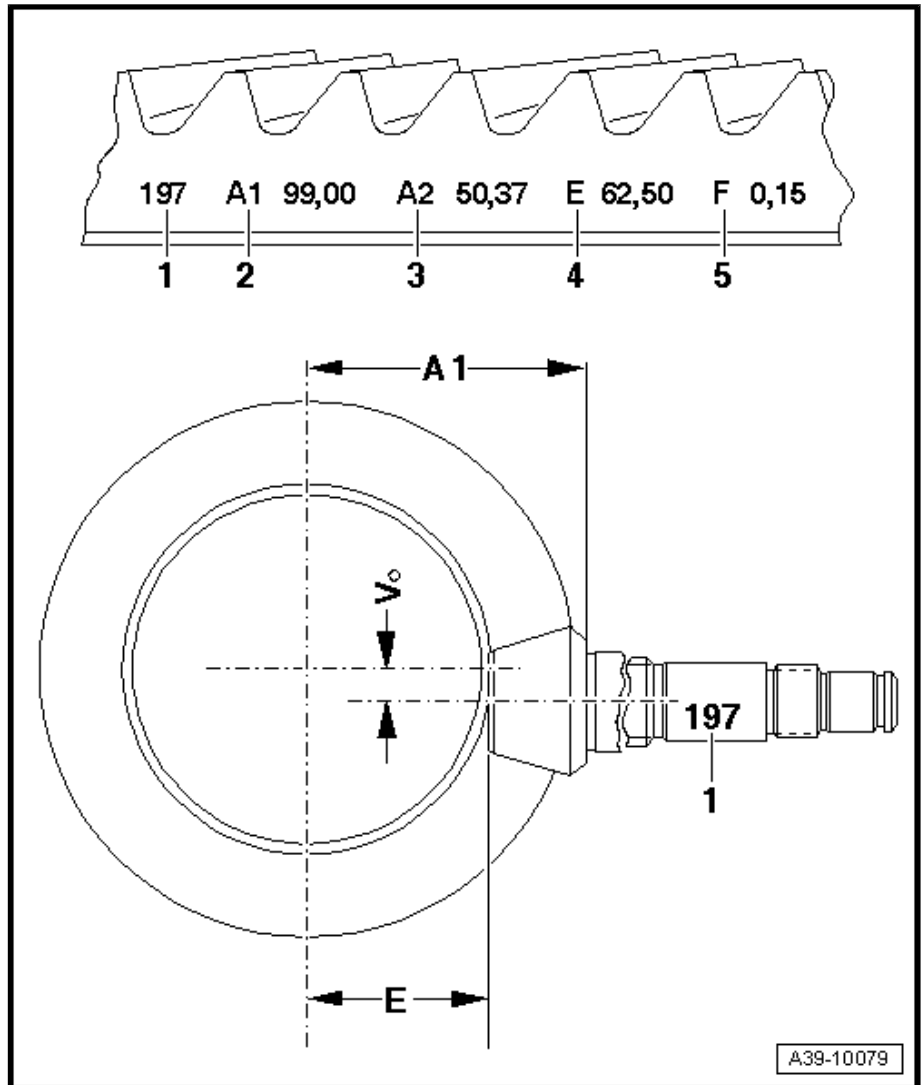
2 - Distance „A1“ is the distance measured between the centre axis of the crown wheel and the reverse side of the pinion gear. This distance is required for determining shim „S5“ for positioning tapered roller bearing inner race
⇒ [page 91](#) .

3 - Distance „A2“ is not required when adjusting the final drive gear set.

4 - Distance „E“: Actual distance between centre axis of crown wheel and face of pinion shaft at point of smoothest meshing for this particular final drive gear set; in example: distance „E“ = 62.50 mm. Distance „E“ is set on master gauge -VW 385/30- .

5 - Distance „F“ is not required when adjusting the final drive gear set.

Vo - Hypoid offset



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

4.1.2 Adjustment of final drive gear sets marked with allowance „e“



Note

On this type of final drive gear set, always set length 62.17 mm (= distance Eo) on master gauge -VW 385/30- .

1 - „1211“ number of matched pair of gears

2 - Distance „A1“ is the distance measured between the centre axis of the crown wheel and the reverse side of the pinion gear. This distance is required for determining shim „S5“ for positioning tapered roller bearing inner race
⇒ [page 91](#) .

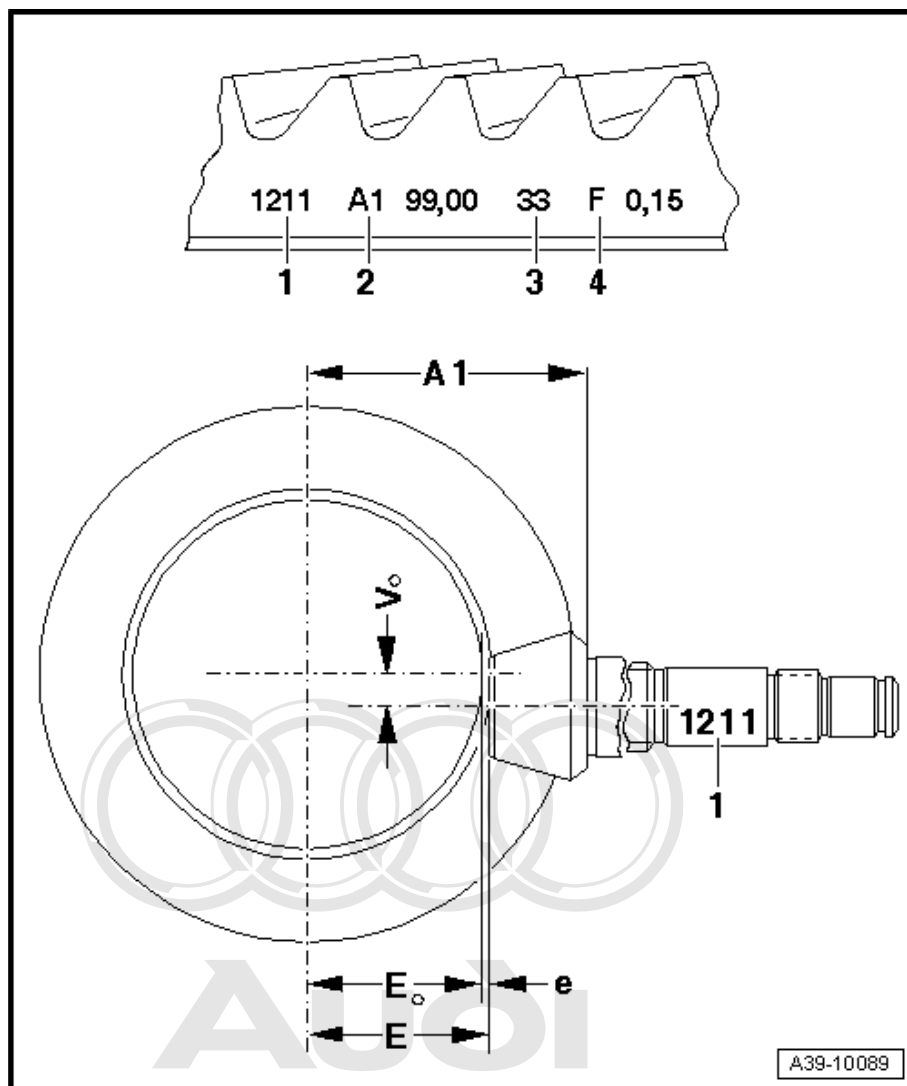
3 - Allowance „e“ in relation to the master gauge used on the test machine in production. The allowance „e“ is always given in 1/100 mm. For example: „33“ indicates „e“ = 0.33 mm

4 - Distance „F“ is not always given and is not required when adjusting the final drive gear set.

Eo - Length of master gauge used on test machine „Eo“ = 62.17 mm.

E - Actual distance between centre axis of crown wheel and face of pinion shaft at point with quietest running for this gear set.

Vo - Hypoid offset



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

4.2 Position of shims



Table of adjustments when renewing individual components of gearbox ➔ [page 115](#).

S1 - Shim for crown wheel in cover for final drive

S2 - Shim for crown wheel in gearbox housing

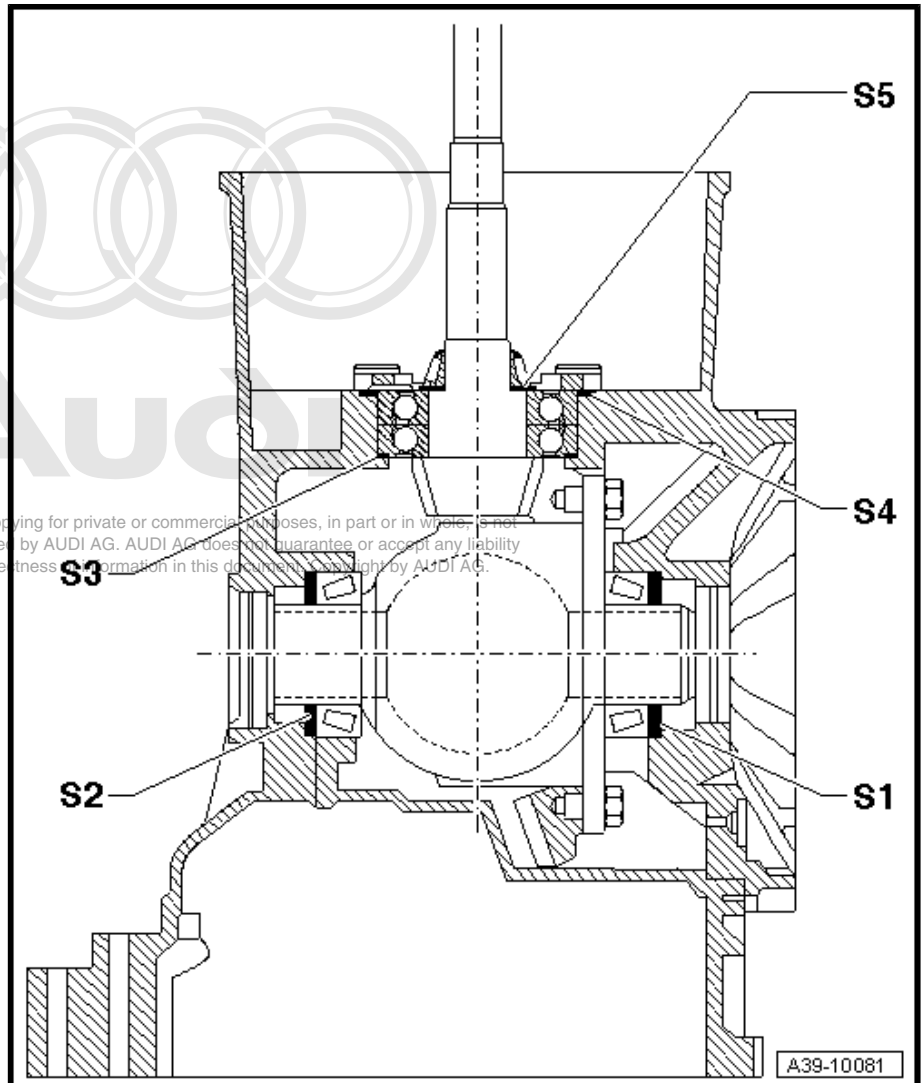
S3 - Shim for correct positioning of pinion shaft in gearbox housing

S4 - Shim for preload of double angular contact ball bearing on pinion shaft

S5 - Shim for correct positioning of tapered roller bearing inner race on pinion shaft

- ☐ Determining thickness of shim ➔ [page 91](#).

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



4.3 Table of adjustments



- ◆ If repairs have been carried out to the gearbox, it is only necessary to adjust the pinion shaft, crown wheel or final drive set if components have been renewed which have a direct effect on the adjustment of the final drive.
- ◆ No adjustments are required when renewing the double angular contact ball bearing on the pinion shaft.
- ◆ Refer to the following table to avoid unnecessary adjustment work:

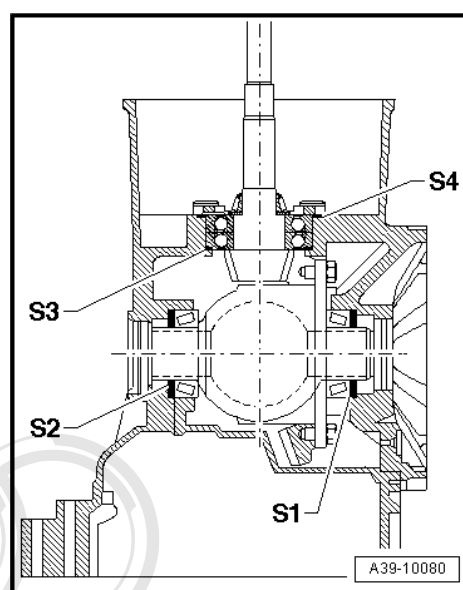
Components requiring adjustment:	Pinion shaft	Crown wheel	Backlash
----------------------------------	--------------	-------------	----------

	(„S3“ + „S4“) ⇒ page 116	(„S1“ + „S2“) ⇒ page 128	0.12 - 0.22 ⇒ page 132
Component renewed			
Gearbox housing	X	X	X
Differential cage		X	X
Tapered roller bearings for differential		X	X
Final drive gear set ¹⁾	X	X	X
Cover for final drive		X	X
¹⁾ Pinion shaft and crown wheel; always renew together			

4.4 Recommended sequence for adjusting gear set

The following work sequence is recommended to save time when the crown wheel and pinion shaft have to be adjusted:

- ◆ Determine shim thickness „S3“ so that the dimension from the centre of the crown wheel to the face of the pinion shaft corresponds to the dimension determined during production.
- ◆ Determine shim „S4“ for preloading of double angular contact ball bearing.
- ◆ Determine total shim thickness „S_{total}“ (S1 plus S2) to obtain specified preload on differential tapered roller bearings.
- ◆ Distribute total shim thickness „S_{total}“ (S1 plus S2) so that the specified backlash between crown wheel and pinion shaft is obtained.



4.5 Adjusting pinion shaft

Repairs after which the pinion shaft must be adjusted
⇒ „4.3 Table of adjustments“, [page 115](#) .

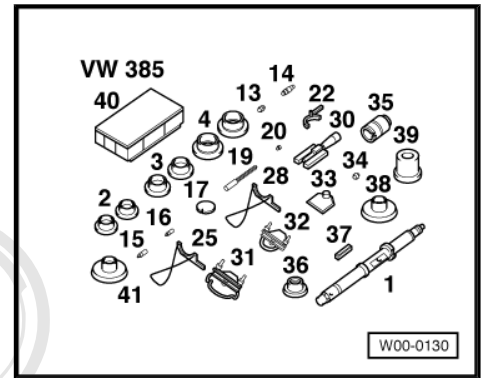
Note the different procedures required when adjusting the pinion shaft.

- 1 - Adjusting pinion shaft when dimension „E“ is marked on the outer circumference of the crown wheel ⇒ [page 116](#) .
- 2 - Adjusting pinion shaft when allowance „e“ is marked on the outer circumference of the crown wheel ⇒ [page 122](#) .

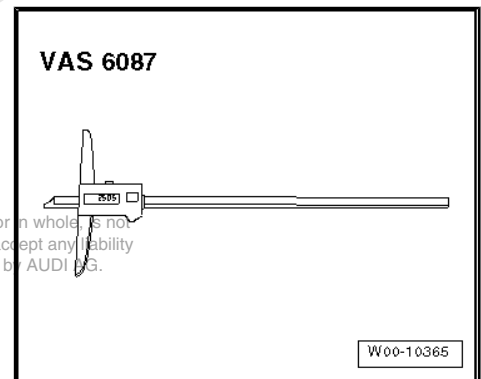
4.5.1 Adjusting pinion shaft when dimension „E“ is marked on outer circumference of crown wheel

Special tools and workshop equipment required

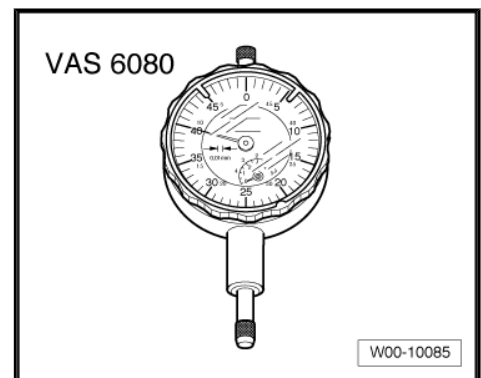
- ◆ Universal measuring tool -VW 385-



- ◆ Depth gauge (e.g. digital depth gauge -VAS 6087-)



- ◆ Dial gauge , e.g. -VAS 6080-



Determining thickness of provisional shims „S3“ and „S4.“

- Differential removed
- Double angular contact ball bearing pressed onto the pinion shaft.



Note

For measurement purposes a shim „S3“ with a thickness of 1.00 mm is inserted provisionally. This is referred to in the following as „S3“. „S3*“ is exchanged with the final shim „S3“ after determining distance „E“.*

- Secure gearbox housing onto gearbox support -VW 353- or gearbox support -T40206- (gearbox housing must be in vertical position) ➔ [page 28](#) .
- Fit shim „S3*“ in the gearbox housing.

- Lubricate outer races -3- and -4- of double angular contact ball bearing with gear oil.
- Carefully push pinion shaft -1- with double angular contact ball bearing into gearbox housing -2- by hand (press down top outer race -3-).



Note

Using hot air blower, heat area around seat of bearing in gearbox housing if necessary.

Make sure that outer races -3- and -4- are kept straight when inserting and that they remain attached to each other. Otherwise the seal -6- can be damaged by the pinion gear -5-.

The bearing must be renewed if the seal of the double angular contact ball bearing is damaged.

Determine the provisional shim „S4“ as follows:

- Measure depth between double angular contact ball bearing outer race -1- and joint flange -2- for the retaining plate using digital depth gauge (e.g. digital depth gauge -VAS 6087-).

In example: measurement -a- = 1.14 mm. Determine the provisional shim „S4“ from table ➔ [page 121](#).



Note

For measurement purposes a shim „S4“ with a thickness of 0.95 mm is inserted provisionally. This is referred to in the following as „S4*“. „S4*“ is exchanged with the final shim „S4“ after determining distance „E“.

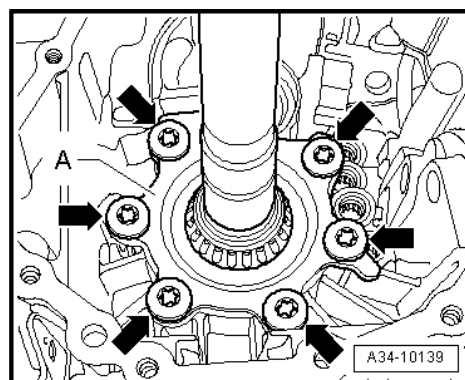
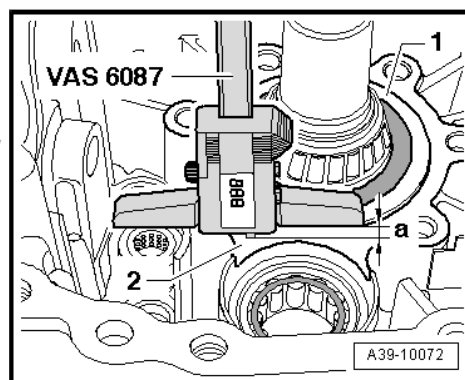
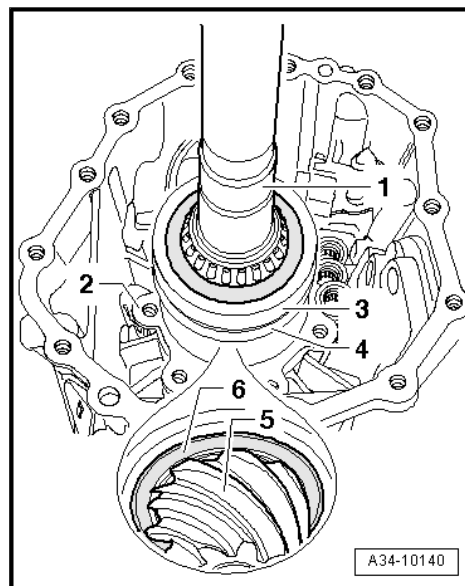
- Position provisional shim „S4*“ (0.95 mm in example) and the retaining plate -A- (only fits in one position) on joint flange in gearbox housing.
- Clean threads of old bolts -arrows- with a wire brush. Then tighten bolts in diagonal sequence to 30 Nm.

Setting dimension „E“



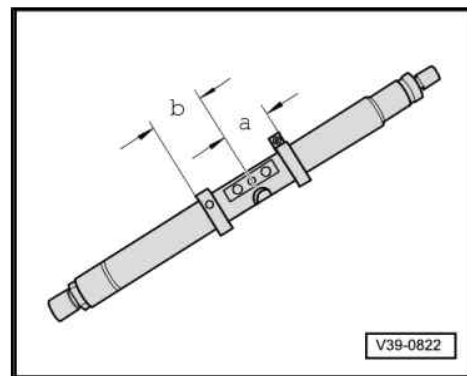
Note

Dimension „E“ must be set on master gauge -VW 385/30- to determine the final shim thickness of „S3“ and „S4“.



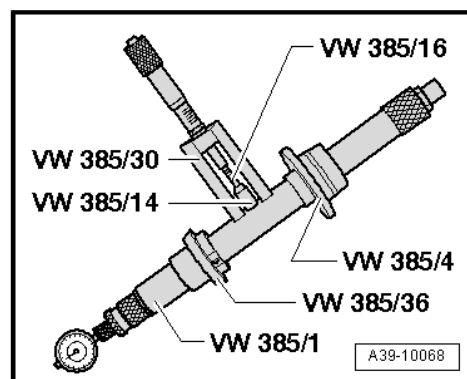
- Set adjustment rings of universal measuring tool -VW 385/1- to the following values:

- ◆ Dimension -a- = 45 mm
- ◆ Dimension -b- = 60 mm



- Assemble universal measuring tool -VW 385/1- as illustrated:

- ◆ Dial gauge extension -VW 385/16- , 12.3 mm long
- Set master gauge -VW 385/30- to dimension „E“ (62.50 mm in example) and place onto universal measuring tool -VW 385/1- .
- Set dial gauge (3 mm measuring range) to „0“ with 2 mm pre-load.

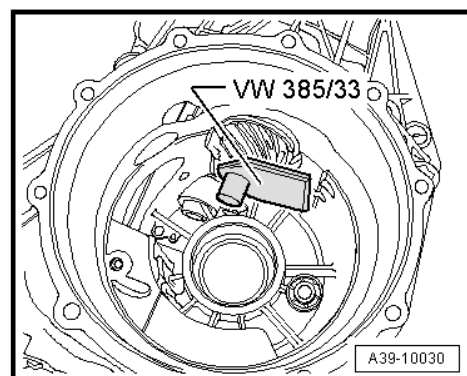


- Place end measuring plate -VW 385/33- on face of pinion gear.



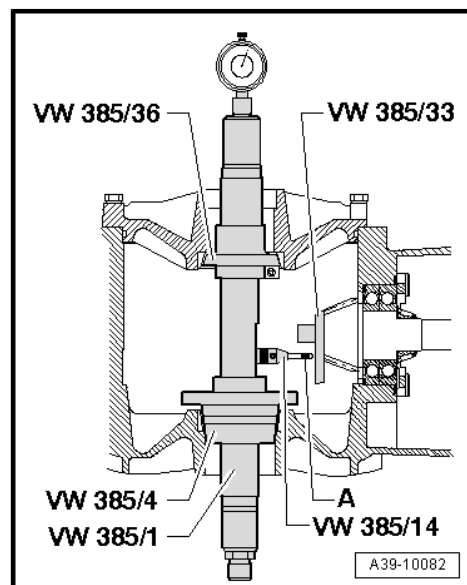
Note

Ensure contact surface of end measuring plate -VW 385/33- fits exactly and is free of oil.



- Detach master gauge -VW 385/30- and insert universal measuring tool in gearbox housing.
- ◆ Dial gauge extension -A- (length = 12.3 mm) must be screwed in.
- ◆ The dial gauge faces towards the final drive cover.
- The O-ring is fitted into cover for final drive.
- Fit cover for final drive and tighten 4 bolts to 24 Nm.
- Using the adjustable ring, pull 2nd centring disc -VW 385/36- out as far as possible so that the universal measuring tool can still just be turned by hand.

This document is not to be used for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

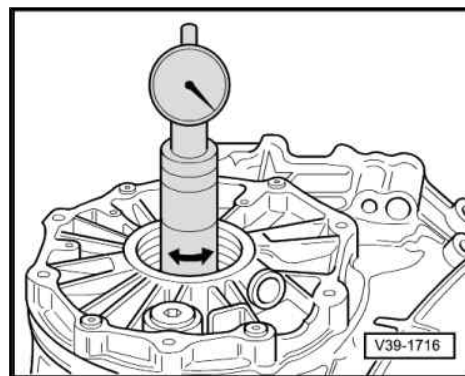


- Turn universal measuring tool until the dial gauge pointer touches the end measuring plate on pinion gear, then measure maximum deflection (return point).
- ◆ Measurement in following example: = 0.15 mm (in red scale)



Note

Then (after removing universal measuring tool), check once again that the dial gauge indicates „0“ with 2 mm preload when master gauge -VW 385/30- is in place.



Determining thickness of shim „S3“

- ◆ Subtract value if measurement is obtained on red scale.
- ◆ Add value if measurement is obtained on black scale.

Example:

Inserted shim „S3“	1.00 mm
- Determined value (in red scale)	0.15 mm
= Thickness of shim „S3“	0.85 mm

- Determine shim(s) according to table. For part numbers, refer to ⇒ Electronic parts catalogue .

Available shims for „S3“

Shim thickness (mm) ¹⁾		
0.55	0.75	0.95
0.60	0.80	1.00
0.65	0.85	1.05
0.70	0.90	
• ¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.		

- Remove provisional shims „S3“ and „S4“.
- Fit determined shim „S3“ (0.85 mm in example) in gearbox housing.

Determining thickness of shim „S4“

- Determined shim „S3“ is fitted in gearbox housing.

- Lubricate outer races -3- and -4- of double angular contact ball bearing with gear oil.
- Carefully push pinion shaft -1- with double angular contact ball bearing into gearbox housing -2- by hand (press down top outer race -3-).

 Note

Using hot air blower, heat area around seat of bearing in gearbox housing if necessary.

Make sure that outer races -3- and -4- are kept straight when inserting and that they remain attached to each other. Otherwise the seal -6- can be damaged by the pinion gear -5-.

The bearing must be renewed if the seal of the double angular contact ball bearing is damaged.

Determine the shim „S4“ as follows:

- Measure depth between double angular contact ball bearing outer race -1- and joint flange -2- for the retaining plate using digital depth gauge (e.g. digital depth gauge -VAS 6087-).

In example: measurement -a- = 0.99 mm. Determine the shim „S4“ from table ➤ [page 121](#) .

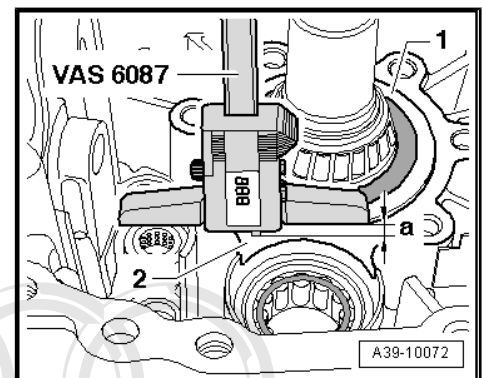
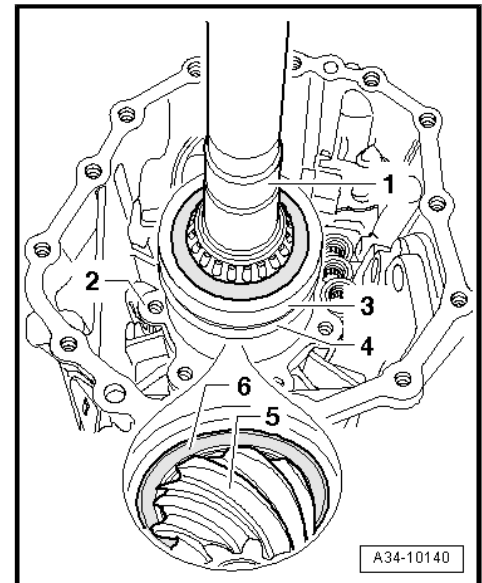
Shims available for „S4“

Gap -a-	Shim „S4“ ¹⁾
Measured value (mm)	Thickness (mm)
0.67 ... 0.71	0.50
0.72 ... 0.76	0.55
0.77 ... 0.81	0.60
0.82 ... 0.86	0.65
0.87 ... 0.91	0.70
0.92 ... 0.96	0.75
0.97 ... 1.01	0.80
1.02 ... 1.06	0.85
1.07 ... 1.11	0.90
1.12 ... 1.16	0.95
1.17 ... 1.21	1.00
1.22 ... 1.26	1.05
1.27 ... 1.31	1.10
1.32 ... 1.36	1.15
1.37 ... 1.41	1.20
1.42 ... 1.46	1.25
1.47 ... 1.51	1.30
1.52 ... 1.56	1.35
1.57 ... 1.61	1.40

• ¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.

 Note

Select correct shims from ➤ *Electronic parts catalogue* .

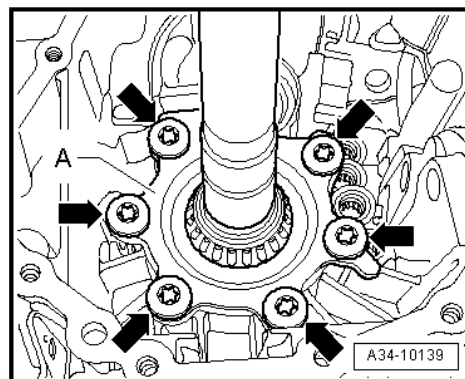


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Position determined shim „S4“ (0.80 mm in example) and the retaining plate -A- (only fits in one position) on joint flange in gearbox housing.
- Then tighten bolts -arrows- in diagonal sequence to 30 Nm.

Checking dimension „E“

- Install pinion shaft with appropriate measured shims „S3“ and „S4“.

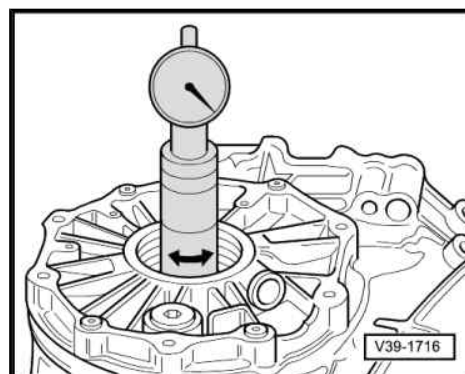


- Insert universal measuring tool and check adjustment.
- Read off dial gauge anti-clockwise (red scale).
- ♦ If the shims have been correctly selected, the dimension „E“ should be indicated within a tolerance of ± 0.04 mm.



Note

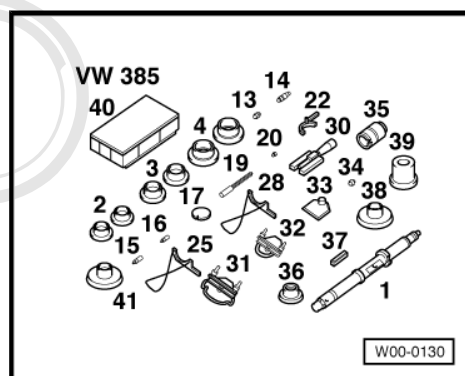
Then (after removing universal measuring tool), check once again that the dial gauge indicates „0“ with 2 mm preload when master gauge -VW 385/30- is in place.



4.5.2 Adjusting pinion shaft when allowance „e“ is marked on outer circumference of crown wheel

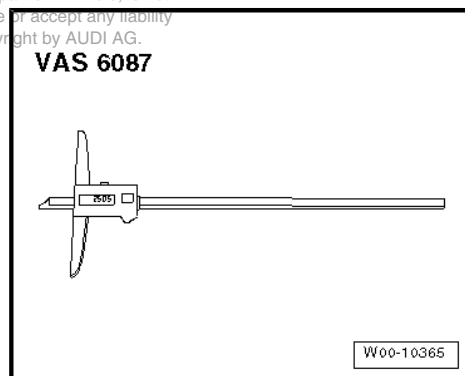
Special tools and workshop equipment required

- ♦ Universal measuring tool -VW 385-

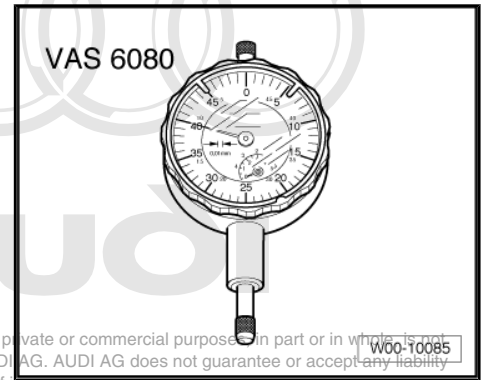


- ♦ Depth gauge (e.g. digital depth gauge -VAS 6087-)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ◆ Dial gauge , e.g. -VAS 6080-



Determining thickness of provisional shims „S3“ and „S4.“

- Differential removed
- Double angular contact ball bearing pressed onto the pinion shaft.



Note

For measurement purposes a shim „S3“ with a thickness of 1.00 mm is inserted provisionally. This is referred to in the following as „S3*“. „S3*“ is exchanged with the final shim „S3“ after setting allowance „e“.

- Secure gearbox housing onto gearbox support -VW 353- or gearbox support -T40206- (gearbox housing must be in vertical position) ⇒ [page 28](#) .
- Fit shim „S3*“ in the gearbox housing.
- Lubricate outer races -3- and -4- of double angular contact ball bearing with gear oil.
- Carefully push pinion shaft -1- with double angular contact ball bearing into gearbox housing -2- by hand (press down top outer race -3-).



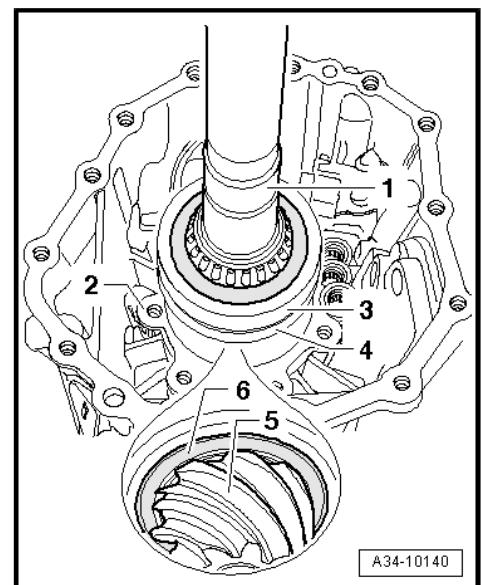
Note

Using hot air blower, heat area around seat of bearing in gearbox housing if necessary.

Make sure that outer races -3- and -4- are kept straight when inserting and that they remain attached to each other. Otherwise the seal -6- can be damaged by the pinion gear -5-.

The bearing must be renewed if the seal of the double angular contact ball bearing is damaged.

Determine the provisional shim „S4“ as follows:



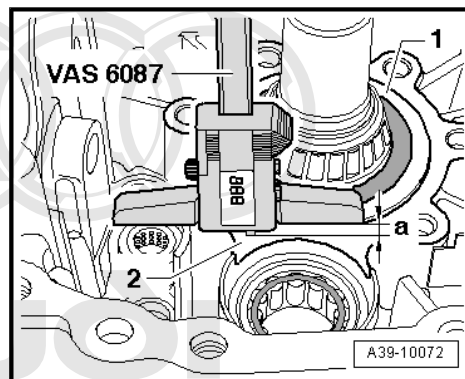
- Measure depth between double angular contact ball bearing outer race -1- and joint flange -2- for the retaining plate using digital depth gauge (e.g. digital depth gauge -VAS 6087-).

In example: measurement -a- = 1.14 mm. Determine the provisional shim „S4“ from table ➔ [page 127](#) .



Note

For measurement purposes a shim „S4“ with a thickness of 0.95 mm is inserted provisionally. This is referred to in the following as „S4*“. „S4*“ is exchanged with the final shim „S4“ after setting allowance „e“.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for the content of information in this document. Copyright by Audi AG.

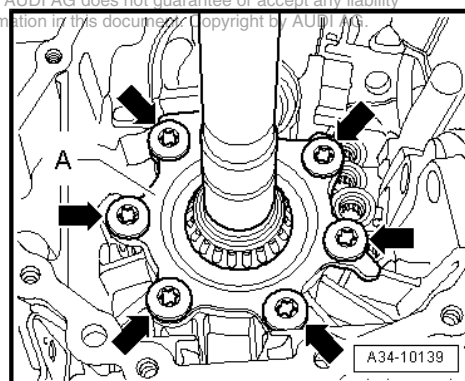
- Position provisional shim „S4*“ (0.95 mm in example) and the retaining plate -A- (only fits in one position) on joint flange in gearbox housing.
- Clean threads of old bolts -arrows- with a wire brush. Then tighten bolts in diagonal sequence to 30 Nm.

Setting allowance „e“

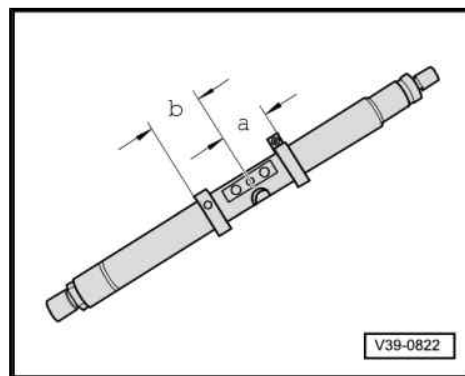


Note

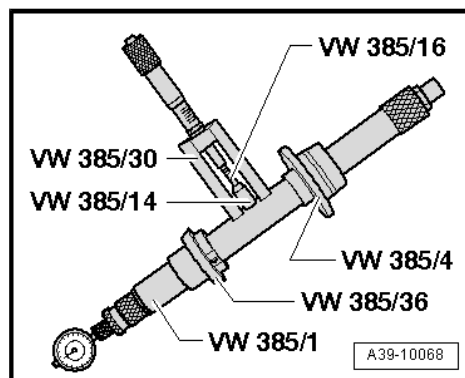
Allowance „e“ must be set to determine the final shim thickness of „S3“ and „S4“ for this particular final drive gear set.



- Set adjustment rings of universal measuring tool -VW 385/1- to the following values:
 - ◆ Dimension -a- = 60 mm
 - ◆ Dimension -b- = 45 mm



- Assemble universal measuring tool -VW 385/1- as illustrated:
 - ◆ Dial gauge extension -VW 385/16-, 12.3 mm long
 - Set master gauge -VW 385/30- to dimension „Eo“ = 62.17 mm and place onto universal measuring tool -VW 385/1- .
 - Set dial gauge (3 mm measuring range) to „0“ with 2 mm preload.

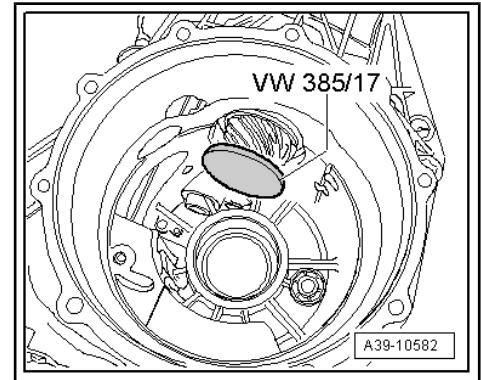


- Place end measuring plate -VW 385/17- on face of pinion gear.

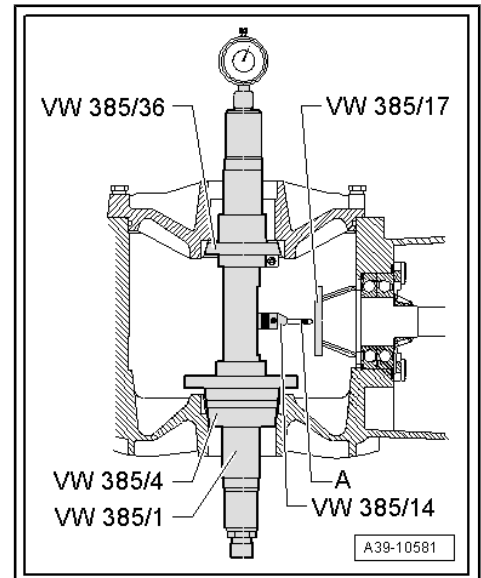


Note

Ensure contact surface of end measuring plate -VW 385/17- fits exactly and is free of oil.



- Detach master gauge -VW 385/30- and insert universal measuring tool in gearbox housing.
- ◆ Dial gauge extension -A- (length = 12.3 mm) must be screwed in.
- ◆ The dial gauge faces towards the final drive cover
- The O-ring is fitted into cover for final drive.
- Fit cover for final drive and tighten 4 bolts to 24 Nm.
- Using the adjustable ring, pull 2nd centring disc -VW 385/36- out as far as possible so that the universal measuring tool can still just be turned by hand.



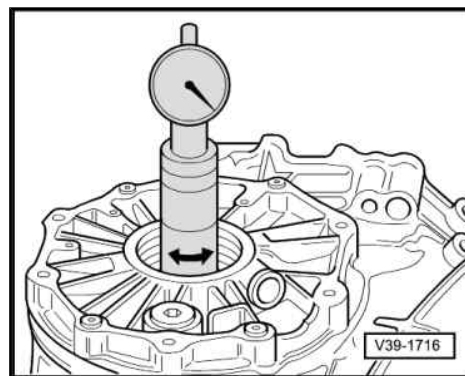
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Turn universal measuring tool until the dial gauge pointer touches the end measuring plate on pinion gear, then measure maximum deflection (return point).
- ◆ Measurement in following example: = 0.43 mm (in red scale)



Note

Then (after removing universal measuring tool), check once again that the dial gauge indicates „0“ with 2 mm preload when master gauge -VW 385/30- is in place.



Determining thickness of shim „S3“

- ◆ The allowance „e“ in relation to the master gauge „Eo“ is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the crown wheel ➔ [page 114](#).
- ◆ Subtract value if measurement is obtained on red scale.
- ◆ Add value if measurement is obtained on black scale.

Formula:

„S3“ = „S3*“ + „e“ + „measured value“ („measured value“ on black scale)

„S3“ = „S3*“ + „e“ - „measured value“ („measured value“ on red scale)

Example:

Inserted shim „S3*“	1.00 mm
+ Allowance „e“	0.33 mm
- Measured value (in red scale)	0.43 mm
= Thickness of shim „S3“	0.90 mm

- Determine shim(s) according to table. For part numbers, refer to ➔ Electronic parts catalogue.

Available shims for „S3“

Shim thickness (mm) ¹⁾		
0.55	0.75	0.95
0.60	0.80	1.00
0.65	0.85	1.05
0.70	0.90	

• ¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.

- Remove provisional shims „S3*“ and „S4*“.
- Fit determined shim „S3“ (0.90 mm in example) in gearbox housing.

Determining thickness of shim „S4“

- Determined shim „S3“ is fitted in gearbox housing.

- Lubricate outer races -3- and -4- of double angular contact ball bearing with gear oil.
- Carefully push pinion shaft -1- with double angular contact ball bearing into gearbox housing -2- by hand (press down top outer race -3-).

 Note

Using hot air blower, heat area around seat of bearing in gearbox housing if necessary.

Make sure that outer races -3- and -4- are kept straight when inserting and that they remain attached to each other. Otherwise the seal -6- can be damaged by the pinion gear -5-.

The bearing must be renewed if the seal of the double angular contact ball bearing is damaged.

Determine the shim „S4“ as follows:

- Measure depth between double angular contact ball bearing outer race -1- and joint flange -2- for the retaining plate using digital depth gauge (e.g. digital depth gauge -VAS 6087-).

In example: measurement -a- = 1.04 mm. Determine the shim „S4“ from table ➤ [page 127](#) .

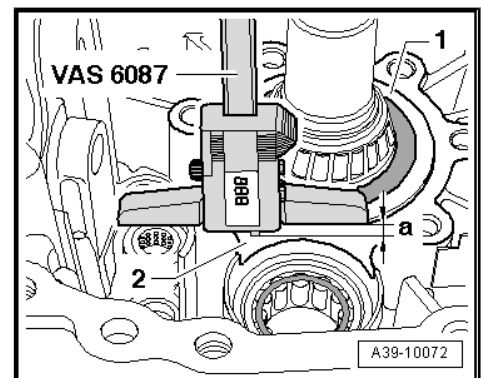
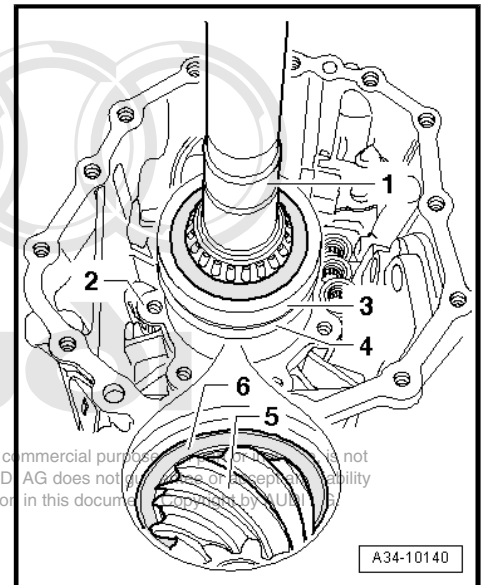
Shims available for „S4“

Gap -a-	Shim „S4“ ¹⁾
Measured value (mm)	Thickness (mm)
0.67 ... 0.71	0.50
0.72 ... 0.76	0.55
0.77 ... 0.81	0.60
0.82 ... 0.86	0.65
0.87 ... 0.91	0.70
0.92 ... 0.96	0.75
0.97 ... 1.01	0.80
1.02 ... 1.06	0.85
1.07 ... 1.11	0.90
1.12 ... 1.16	0.95
1.17 ... 1.21	1.00
1.22 ... 1.26	1.05
1.27 ... 1.31	1.10
1.32 ... 1.36	1.15
1.37 ... 1.41	1.20
1.42 ... 1.46	1.25
1.47 ... 1.51	1.30
1.52 ... 1.56	1.35
1.57 ... 1.61	1.40

• ¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.

 Note

Select correct shims from ➤ *Electronic parts catalogue* .

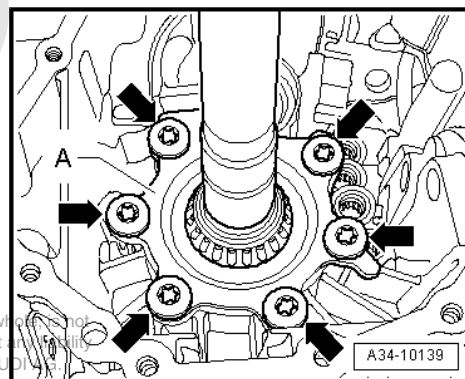


- Position determined shim „S4“ (0.85 mm in example) and the retaining plate -A- (only fits in one position) on joint flange in gearbox housing.
- Then tighten bolts -arrows- in diagonal sequence to 30 Nm.

Checking dimension „E“

- Install pinion shaft with appropriate measured shims „S3“ and „S4“.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

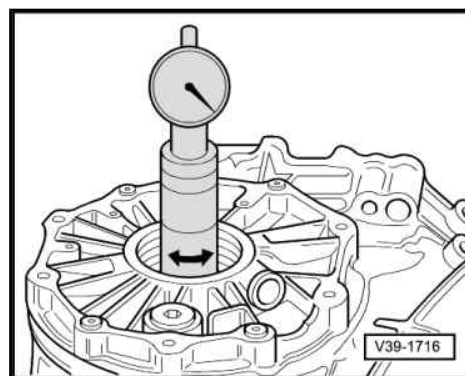


- Insert universal measuring tool and check adjustment.
- Read off dial gauge anti-clockwise (red scale).
- ♦ If the shims have been correctly selected, the allowance „e“ (marked on outer circumference of crown wheel) should be indicated within a tolerance of ± 0.04 mm.



Note

Then (after removing universal measuring tool), check once again that the dial gauge indicates „0“ with 2 mm preload when master gauge -VW 385/30- is in place.

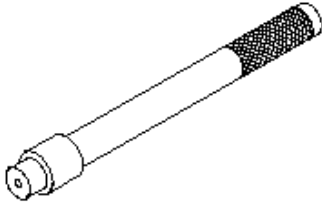
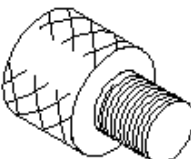
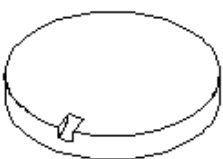
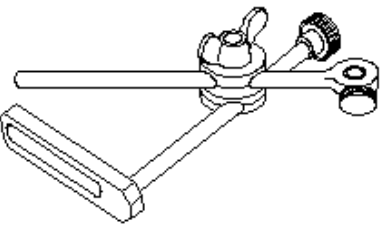
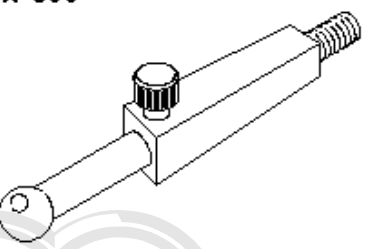
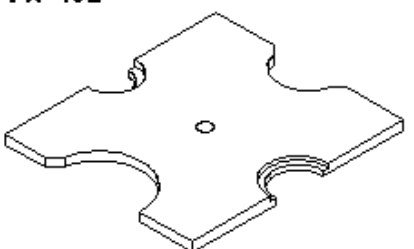


4.6 Adjusting crown wheel

(Adjusting differential)

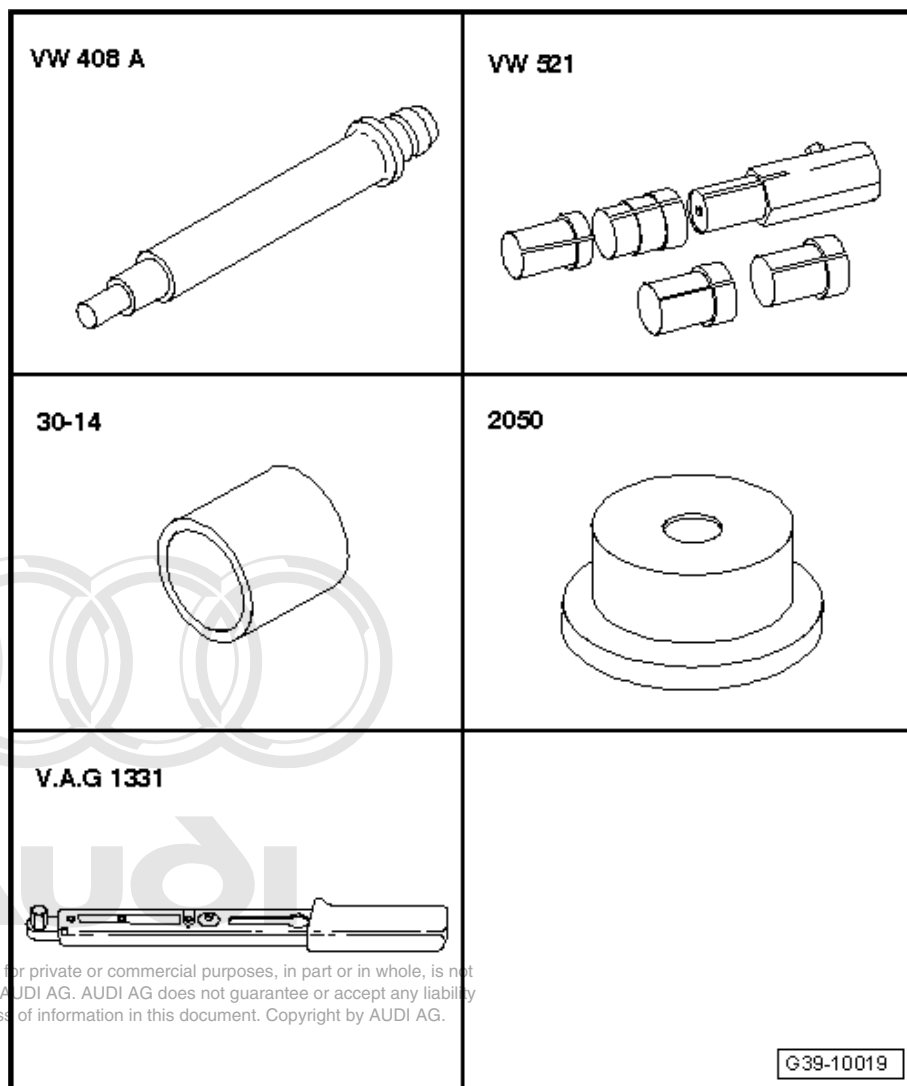
Special tools and workshop equipment required

- ◆ Drift -VW 295-
- ◆ Dial gauge extension - VW 382/10-
- ◆ End measuring plate - VW 385/17-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Adjustable measuring lever -VW 388-
- ◆ Thrust plate -VW 402-

VW 295 	VW 382/10 
VW 385/17 	VW 387 
VW 388 	VW 402  G39-10009

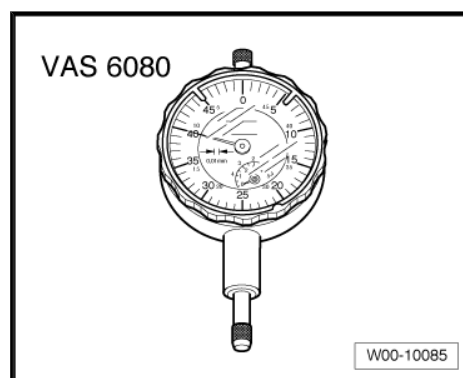
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Press tool -VW 408 A-
- ◆ Crown wheel adjusting tool -VW 521-
- ◆ Tube -30 - 14-
- ◆ Thrust piece -2050-
- ◆ Torque wrench - V.A.G 1331-



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ◆ Dial gauge , e.g. -VAS 6080-



- ◆ Dial gauge extension, 30 mm

It is necessary to readjust the crown wheel when the following components have been renewed:

Gearbox housing, cover for final drive, tapered roller bearings for differential, differential cage or final drive gear set

Table of adjustments ➡ [page 115](#)

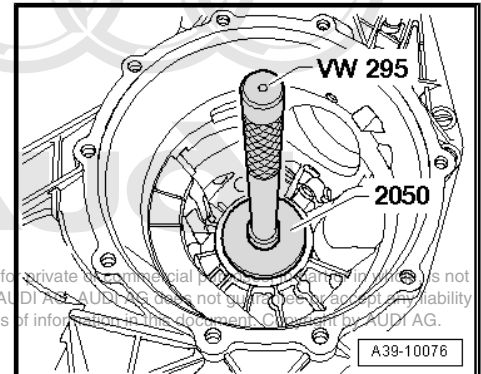
Determining total shim thickness „S_{total}“ for shims „S₁“ + „S₂“

(Setting preload of tapered roller bearings for differential)

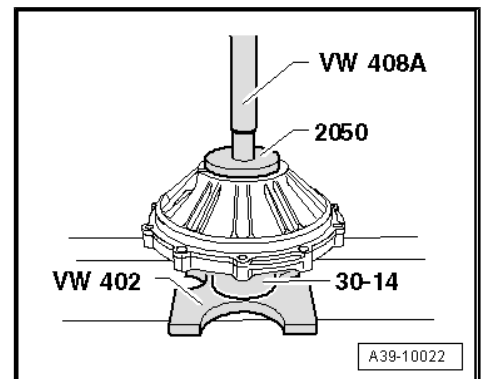
- Pinion shaft removed.
- If only the tapered roller bearings for the differential are being renewed, the crown wheel can be removed from the differential cage. The pinion shaft then does not have to be removed.
- Remove flange shaft oil seals.
- Remove tapered roller bearing outer races for differential and take out shims ➔ [page 104](#) .
- Drive outer race for tapered roller bearing (right-side) with shim „S₂“ into gearbox housing. For measurement purposes use a 1.30 mm thick „S₂“ shim (or 2 shims of 0.65 mm).

Note

For measurement purposes a 1.30 mm thick shim „S₂“ is inserted provisionally. This is referred to in the following as „S₂“. „S₂“ is exchanged with the final shim „S₂“ after determining backlash.



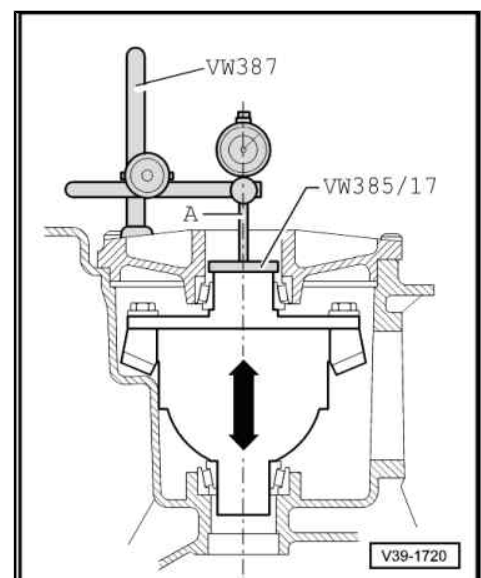
- Press outer race for tapered roller bearing (left-side) without shim „S₁“ into cover for final drive.
- Install differential in gearbox housing. The crown wheel is positioned on the left-hand side (same side as cover for final drive).
- The O-ring is fitted into cover for final drive.
- Oil seal is removed.
- Fit cover for final drive with 4 bolts (24 Nm).
- Turn gearbox so that cover for final drive points upwards.
- Turn differential 5 turns in both directions so that the tapered roller bearings settle.
- Place measuring plate -VW 385/17- on differential.
- Set up measuring tool using 30 mm dial gauge extension .
- Set dial gauge (3 mm measuring range) -A- to „0“ with 2 mm preload.



Note

The tip of the dial gauge must be applied to the centre of the differential.

- Raise differential without turning, read clearance off dial gauge and note down.
- Measurement in following example: 0.62 mm





Note

- ◆ To lift differential, secure crown wheel adjusting tool - VW 521/4- and -VW 521/8- on right side of differential (housing side).
- ◆ If the measurement has to be repeated, the differential must again first be turned 5 turns in each direction to settle the tapered roller bearings.

Formula: „S_{total}“ = „S₂“ + measured value + bearing preload

Example:

Inserted shim(s) „S ₂ “	1.30 mm
+ Measured value	0.62 mm
+ Bearing preload (constant value)	0.30 mm
= Total shim thickness „S _{total} “ for „S ₁ “ + „S ₂ “	2.22 mm

Determining thickness of shim „S₁“



Note

- ◆ Provisional shim „S₁“ is replaced with final shim „S₁“ after determining backlash.
- ◆ Total shim thickness „S_{total}“ remains unchanged.

Formula: „S₁“ = „S_{total}“ - „S₂“

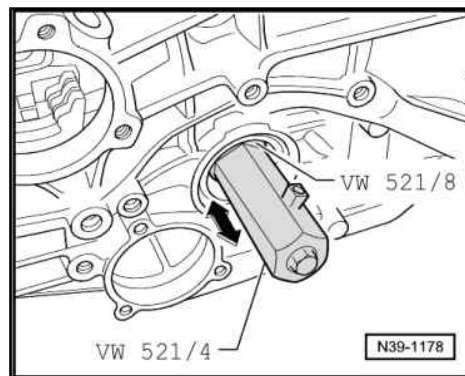
Example:

Total shim thickness „S _{total} “ for „S ₁ “ + „S ₂ “	2.22 mm
- Inserted shim(s) „S ₂ “	1.30 mm
= Thickness of shim „S ₁ “	0.92 mm

Select correct shims from ⇒ Electronic parts catalogue .

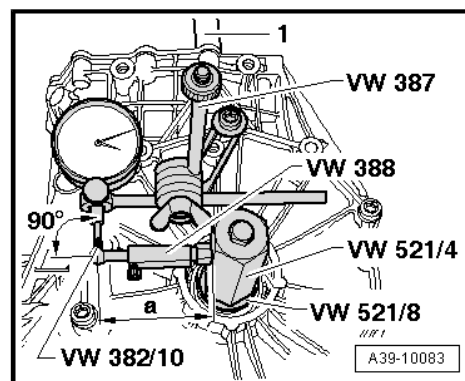
4.6.1 Measuring backlash

- Pinion shaft fitted with shims „S₃“ and „S₄“.
- The O-ring is fitted into cover for final drive.
- Install differential with crown wheel: „S₁“ is fitted on cover side, „S₂“ in gearbox housing.
- Fit cover for final drive and tighten bolts to 24 Nm.
- Insert crown wheel adjusting tool -VW 521/4- and -VW 521/8- .
- Turn differential 5 turns in both directions to settle tapered roller bearings.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Secure universal dial gauge bracket -VW 387- to gearbox housing.
- Fit dial gauge with dial gauge extension -VW 382/10- (6 mm flat).
- Adjust measuring lever -VW 388- to distance „a“ = 75 mm (for Ø 186 mm crown wheel).
- Measure play between teeth faces (backlash) as follows:
- Turn crown wheel until it makes contact with the face of one tooth (end of backlash travel).
- Preload dial gauge to 2 mm and set to „0“.
- Turn back crown wheel until it makes contact with opposite tooth face (backlash).
- Take backlash reading and note down measured value.
- Turn crown wheel through 90° and repeat measurements a further 3 times.



Note

If the pinion shaft -1- rotates during the measurements, counter-hold pinion shaft to make sure that the measured value of the backlash is correct.

Determining average backlash

- Add the four measured values together and divide by four.

Example:

1st measured value	0.28 mm
+ 2nd measured value	0.30 mm
+ 3rd measured value	0.30 mm
+ 4th measured value	0.28 mm
= Sum of measured values	1.16 mm

- Result: the average backlash is 1.16 mm : 4 = 0.29 mm



Note

If the individual measurements differ by more than 0.06 mm, this means that the installation of the crown wheel is not correct or that the final drive gear set itself is defective. Check the installation; renew the final drive gear set if necessary.

Determining thickness of shim „S2“

Formula: „S2“ = „S2*“ - measured backlash + specified backlash

Example:

Inserted shim „S2*“	1.30 mm
- Measured backlash	0.29 mm
+ Specification for backlash	0.15 mm
= Thickness of shim „S2“	1.16 mm

- Determine shim(s) according to table. For part numbers, refer to ⇒ Electronic parts catalogue .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior written authorisation by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Available shims for „S2“

Shim thickness (mm) ¹⁾		
0.45	0.61	0.77
0.49	0.65	0.81
0.53	0.69	0.85
0.57	0.73	
¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.		

Determining thickness of shim „S1“

Formula: „S1“ = „S_{total}“ - „S2“

Example:

Total shim thickness „S _{total} “ for „S1“ + „S2“	2.22 mm
- Thickness of shim „S2“	1.16 mm
= Thickness of shim „S1“	1.06 mm

- Determine shim(s) according to table. For part numbers, refer to ⇒ Electronic parts catalogue .

Available shims for „S1“

Shim thickness (mm) ¹⁾		
0.45	0.61	0.77
0.49	0.65	0.81
0.53	0.69	0.85
0.57	0.73	
¹⁾ The exact shim thickness required can be obtained by using the shim tolerance variations. Install two shims if necessary.		

Checking adjustment

- After installing shims „S1“ and „S2“, turn differential 5 turns in both directions so that the tapered roller bearings settle.
- Measure backlash four times on circumference.
- ◆ Specification: 0.12 ... 0.22 mm



Note

- ◆ *If the pinion shaft -1- rotates during the measurements, counter-hold pinion shaft to make sure that the measured value of the backlash is correct.*
- ◆ *Adjustment must be repeated if backlash is outside tolerance. The total shim thickness „S_{total}“ must remain unchanged.*
- ◆ *The discrepancy between individual measured values must not exceed 0.06 mm.*

