Audi 100 1991 ➤

5 and 6-speed manual gearbox 01E, four-wheel drive									
Gearbox ID	CBD	CBL	CET	CMG	CYT	DGU	DPG	DPH	DPJ
	DPM								

Edition 11.1996

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 GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Audi 100 1991 ➢

5 and 6-speed manual gearbox 01E, four-wheel drive

Repair Group

00 - Technical data

30 - Clutch

34 - Controls, Housing

35 - Gears, Shafts

39 - Final drive, Differential rear

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.

All rights reserved.
No reproduction without prior agreement from publisher.

Copyright © 2010 Audi AG, Ingolstadt

Contents

00 - Technical data 1
1 Identification of gearbox 1
1.1 Identification of gearbox 1
2 Code letters, mechanical unit assignment, transmission ratios, capacities 2
2.1 Code letters, mechanical unit assignment, transmission ratios, capacities 2
3 Rear final drive identification 4
3.1 Rear final drive identification 4
4 Code letters, mechanical unit assignment, transmission ratios, capacities 5
4.1 Code letters, mechanical unit assignment, transmission ratios, capacities 5
5 Transmission layout 6
5.1 Transmission layout 6
6 Calculations 10
6.1 Calculations 10
6.2 Calculating transmission ratios "i" 10
6.3 Calculating speed "V" 10
7 Instructions for performance and brake check and for towing 10
7.1 Instructions for performance and brake check and for towing 10
8 Repair instructions 11
8.1 Repair instructions 11

30 - Clutch 14
1 Servicing clutch mechanism 14
1.1 Servicing clutch mechanism 14
1.2 Assembly overview, pedal cluster - LHD vehicles 14
1.3 Assembly overview, pedal cluster - RHD vehicles 22
1.4 Assembly overview, hydraulics 30
1.5 Bleeding clutch system 33
2 Servicing clutch release mechanism 35
2.1 Servicing clutch release mechanism 35
3 Servicing clutch 40
3.1 Servicing clutch 40

34 - Controls, Housing 46
1 Servicing shift mechanism 46
1.1 Servicing shift mechanism 46
1.2 Dismantling and assembling shift mechanism 47
1.3 Servicing selector rod and front push rod 48
1.4 Servicing gear stick and rear push rod 51
1.5 Removing and installing selector rods 55
1.6 Removing and installing push rods 55
1.7 Removing and installing boot 56
1.8 Replacing shaft seal for selector shaft 57
2 Adjusting and checking selector mechanism 58
2.1 Adjusting and checking selector mechanism 58
2.2 Basic adjustment (adjustment instructions) 58
2.3 Checking gear stick alignment 60
2.4 Fine adjustment instructions 61
3 Removing and installing gearbox - Vehicles with 5-cylinder engine 61
3.1 Removing and installing gearbox - Vehicles with 5-cylinder engine 61
4 Removing and installing gearbox - Vehicles with 8-cylinder engine 65
4.1 Removing and installing gearbox - Vehicles with 8-cylinder engine 65

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.

5 Removing and installing oil pressure pipes - Vehicles with 8-cylinder engine 75
5.1 Removing and installing oil pressure pipes - Vehicles with 8-cylinder engine 75
5.2 Removing and installing oil pump 78
6 Checking oil level in manual gearbox 81
6.1 Checking oil level in manual gearbox 81
7 Dismantling and assembling gearbox 82
7.1 Dismantling and assembling gearbox 82
7.2 Removing and installing bearing housing, Torsen differential and end cover 83
7.3 Removing and installing manual gearbox and selector shaft 85
7.4 Removing and installing 5th gear (5-speed gearbox) 87
7.5 Removing and installing 5th and 6th gear (6-speed gearbox) 91
7.6 Removing and installing input shaft, drive pinion, hollow shaft and internal selector mechanism from bearing plate 96
8 Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft - work sequence 99
8.1 Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft - work sequence 99
8.2 Removing 99
8.3 Installation 108
9 Dismantling and assembling bearing housing 122
9.1 Dismantling and assembling bearing housing 122
10 Servicing mounting for Torsen differential 127
10.1 Servicing mounting for Torsen differential 127
11 Servicing end cover 131
11.1 Servicing end cover 131
12 Servicing bearing plate 136
12.1 Servicing bearing plate 136
12.2 Re-determining shim "S4" 144
13 Servicing gearbox housing 148
13.1 Servicing gearbox housing 148
13.2 Dismantling and assembling complete selector shaft 163

35 - Gears, Shafts 167
1 Dismantling and assembling input shaft 167
1.1 Dismantling and assembling input shaft 167
2 Dismantling and assembling drive pinion and hollow shaft 178
2.1 Dismantling and assembling drive pinion and hollow shaft 178

39 - Final drive, Differential rear 193
1 Replacing flange shaft oil seal 193
1.1 Replacing flange shaft oil seal 193
2 Removing and installing speedometer sender -G22 and drive wheel for speedometer sender 194
2.1 Removing and installing speedometer sender -G22 and drive wheel for speedometer sender 194
3 Replacing oil seal and grooved ball bearing for flange of propshaft and gearbox 195
3.1 Replacing oil seal and grooved ball bearing for flange of propshaft and gearbox 195
4 Removing and installing differential 199
4.1 Removing and installing differential 199
5 Dismantling and assembling differential 201
5.1 Dismantling and assembling differential 201
6 Adjusting pinion shaft and crown wheel 212
6.1 Adjusting pinion shaft and crown wheel 212
6.2 Adjusting final drive sets; identification 212
6.3 Sequence for re-adjusting final drive set 213

Copyright by AUDI AG. Reproduction 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.

6.4 Adjustment overview 213
6.5 Position of shims 214
7 Adjusting drive pinion 214
7.1 Adjusting drive pinion 214
8 Adjusting crown wheel 221
8.1 Adjusting crown wheel 221
9 Servicing propshaft 227
9.1 Servicing propshaft 227
9.2 Removing and installing propshaft 229
9.3 Adjusting propshaft 233
9.4 Balancing propshaft/flange at rear final drive 236
10 Checking oil level in rear final drive 240
10.1 Checking oil level in rear final drive 240
11 Replacing seal and grooved ball bearing for propshaft flange 241
11.1 Replacing seal and grooved ball bearing for propshaft flange 241
11.2 Measuring and marking radial run-out at propshaft flange 252
12 Removing and installing flange shaft oil seals 253
12.1 Removing and installing flange shaft oil seals 253
12.2 Renewing flange shaft oil seal (right) 253
12.3 Renewing flange shaft oil seal (left) 255
13 Removing and installing rear final drive 260
13.1 Removing and installing rear final drive 260
14 Dismantling and assembling rear final drive 269
14.1 Dismantling and assembling rear final drive 269
14.2 Assembly overview 270
14.3 Removing and installing differential together with differential lock 272
14.4 Removing and installing differential without differential lock 277
14.5 Dismantling and assembling differential 283
14.6 Removing and installing drive pinion 294
15 Servicing mechanism of differential lock - Vehicles > 05.94 303
15.1 Servicing mechanism of differential lock - Vehicles > 05.94 303
15.2 Removing and installing differential lock control switch 303
15.3 Routing diagram for piping and hoses 304
15.4 Removing and installing vacuum element 307
15.5 Dismantling and assembling differential lock 309
15.6 Adjusting flange shaft, left 315
16 Adjusting drive pinion and crown wheel 316
16.1 Adjusting drive pinion and crown wheel 316
16.2 Adjusting final drive sets; identification 317
16.3 Sequence for re-adjusting final drive set 317
16.4 Adjustment overview 318
16.5 Position of shims 319
17 Adjusting drive pinion 319
17.1 Adjusting drive pinion 319
18 Adjusting crown wheel 326
18.1 Adjusting crown wheel 326

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.

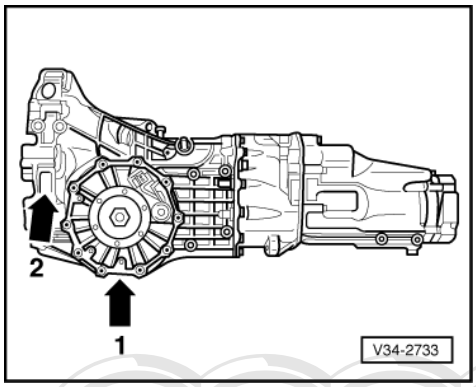
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

00 - Technical data

1 - Identification of gearbox

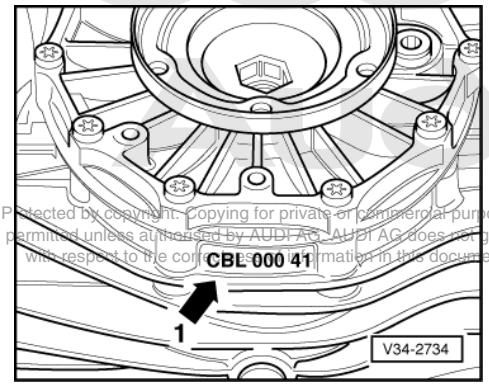
1.1 - Identification of gearbox

The 5 and 6-speed manual gearbox 01E four-wheel drive is installed from 08.91 in the Audi 100 S4, Audi 100 S4 4.2, Audi A6 TDI, Audi S6, Audi S6 4.2 and Audi S6 plus models. Assignment => Page 2



-> Location on gearbox

- Code letters and serial number -arrow 1-
- Manual gearbox 01E -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.

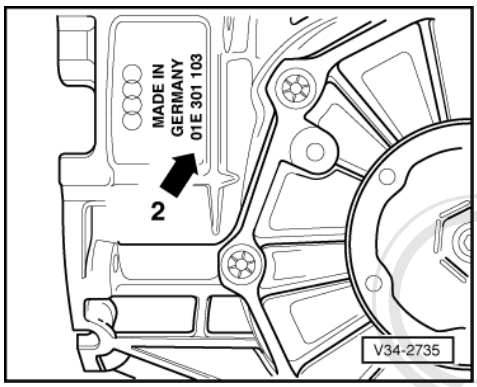
-> Code letters and gearbox consecutive serial number -arrow 1-

Example:	CBL	000 41
	I	I
	Code letters	Gearbox consecutive serial number

Additional data are production-related

Note:

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



-> Manual gearbox 01E -arrow 2-

2 - Code letters, mechanical unit assignment, transmission ratios, capacities

2.1 - Code letters, mechanical unit assignment, transmission ratios, capacities

Copyright by AUDI AG.
Reproduction or translation of this document or any part thereof 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.

Manual gearbox		5 and 6-speed 01E, four-wheel drive		
Code letters		CBD 1),DPM2)	CBL,DPH3)	CET,DPG4)
Production	from to	12.91	08.91	08.91
Assignment	Model	Audi 100 S4, Audi 100 Avant S4 Audi S6, Audi Avant S6		
	Engine	2.2 l - 169 kW - 4V-Turbo		
Ratio Z2 : Z1=i	Final drive	37 : 9 = 4.111	37 : 9 = 4.111	37 : 9 = 4.111
	1st gear	28 : 8 = 3.500	28 : 8 = 3.500	28 : 8 = 3.500
	2nd gear	34 : 18 = 1.889	34 : 18 = 1.889	34 : 18 = 1.889
	3rd gear	32 : 26 = 1.231	33 : 25 = 1.320	32 : 26 = 1.231
	4th gear	28 : 30 = 0.933	30 : 29 = 1.034	28 : 30 = 0.933
	5th gear	27 : 37 = 0.730	30 : 35 = 0.857	28 : 37 = 0.757
	6th gear	-	27 : 37 = 0.730	-
	Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

Code letters	CBD 1),DPM2)	CBL,DPH3)	CET,DPG4)
Speedometer	Electronic		
Capacity	2.7 litres 5)		
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic oil)		
Clutch mechanism	Hydraulic		
Clutch plate dia.	240 mm		
Drive shaft flange dia.	108 mm		
itotal in top gear	3.000	3.000	3.111

Assignment of rear final drive Code letters	AAT CKF

1) USA only

2) From 07.96 modified gearbox housing; code letters DPM replace CBD

3) From 07.96 (Gearbox serial number 112.613) modified gearbox housing; code letters DPH replace CBL

4) From 07.96 modified gearbox housing; code letters DPG replace CET

5) Gear oil additive Part No. 009 000 01 is no longer used

Manual gearbox		5 and 6-speed 01E, four-wheel drive		
Code letters		CMG	CYT,DPJ6)	DGU
Production	from	10.92	05.95	06.96
	to			
Allocation	Model	Audi 100 S4 4.2 Audi S6 4.2	Audi A6 TDI	Audi S6 plus
	Engine	4.2 l - 206/213 kW	2.5 l - 103 kW	4.2 l - 240 kW
Ratio	Final drive	37 : 9 = 4.111	37 : 9 = 4.111	37 : 9 = 4.111
Z2 : Z1=i	1st gear	28 : 8 = 3.500	28 : 8 = 3.500	28 : 8 = 3.500
	2nd gear	34 : 18 = 1.889	34 : 18 = 1.889	34 : 18 = 1.889
	3rd gear	32 : 26 = 1.231	33 : 26 = 1.231	33 : 25 = 1.320
	4th gear	29 : 30 = 0.967	27 : 31 = 0.871	30 : 29 = 1.034
	5th gear	29 : 36 = 0.806	26 : 39 = 0.667	30 : 35 = 0.875
	6th gear	26 : 38 = 0.684	23 : 41 = 0.561	27 : 37 = 0.730
	Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

Code letters	CMG	CYT,DPJ6)	DGU
Speedometer	Electronic		
Capacity	3.6 litres 5)7)	2.7 litres 4)	3.6 litres 5)7)
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic oil)		
Clutch mechanism	Hydraulic		
Clutch plate dia.	240 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.

Drive shaft flange dia.	108 mm	130 mm	108 mm
itotal in top gear	3.000	3.000	3.111
Assignment of rear final drive Code letters	AAT CKF	CKF	CKF

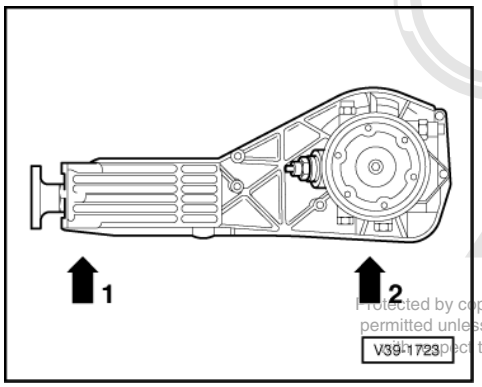
5) Gear oil additive Part No. 009 000 01 is no longer used

6) From 07.96 (Gearbox serial number 112 543) modified gearbox housing; code letters DPJ replace CYT

7) Oil capacity includes 0.3 l for gearbox oil cooler and oil pipe. When replacing gearbox, oil cooler and oil pipes have to be completely drained

3 - Rear final drive identification

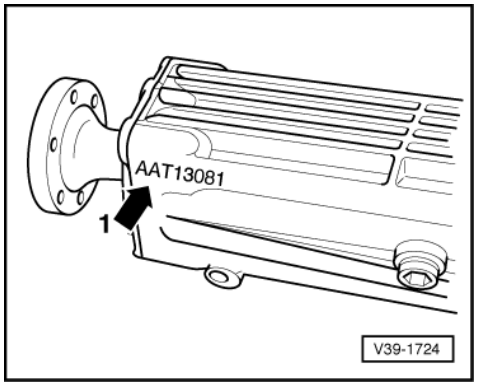
3.1 - Rear final drive identification



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.

-> Final drive 017 is assigned to manual gearbox 01E, four-wheel drive.

Assignment => Page 5 , Technical data

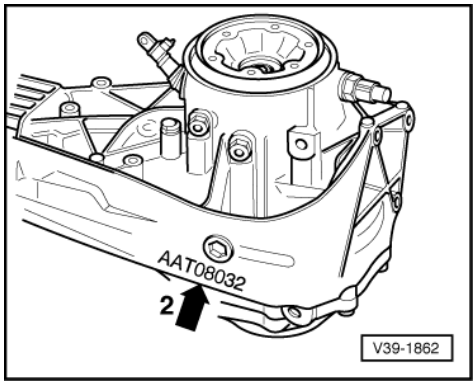


-> Code letters and date of manufacture of rear final drive ä 02.92 -arrow 1-

Example:	**AAT**	**13**	**08**	**1**
	I	I	I	I
	Code letters	Day	Month	Year (1991) of production

Note:

The code letters for the rear final drive are also given on the vehicle data plates.



-> Code letters and date of manufacture of rear final drive 02.92 ä -arrow 2-

Example:	AAT	08	03	2
	Code letters	Day	Month	Year (1992) of manufacture

Note:

The code letters for the rear final drive are also given on the vehicle data plates.

4 - Code letters, mechanical unit assignment, transmission ratios, capacities

4.1 - Code letters, mechanical unit assignment, transmission ratios, capacities

Rear final drive		017		
Code letters		AAT	CKF	
Production	from	12.90	04.94	
	to	04.94		
Allocation	Model	Audi 100 S4 Audi 100 S4 4.2	Audi A6 TDI Audi S6 Audi S6 4.2 Audi S6 plus	
	Engine	2.2 l - 169 kW 4.2 l - 206 kW	2.5 l - 103 kW 2.2 l - 169 kW 4.2 l - 206 kW 4.2 l - 213 kW 4.2 l - 240 kW	
Ratio	Final drive	37 : 9 = 4.111	37 : 9 = 4.111	
Capacity		1.5 litres		
Specification		Gear oil GL 5 SAE 90 (MIL-L 2105 B)		

Code letters	AAT	CKF	
Drive shaft flange dia.	108 mm	108 mm	

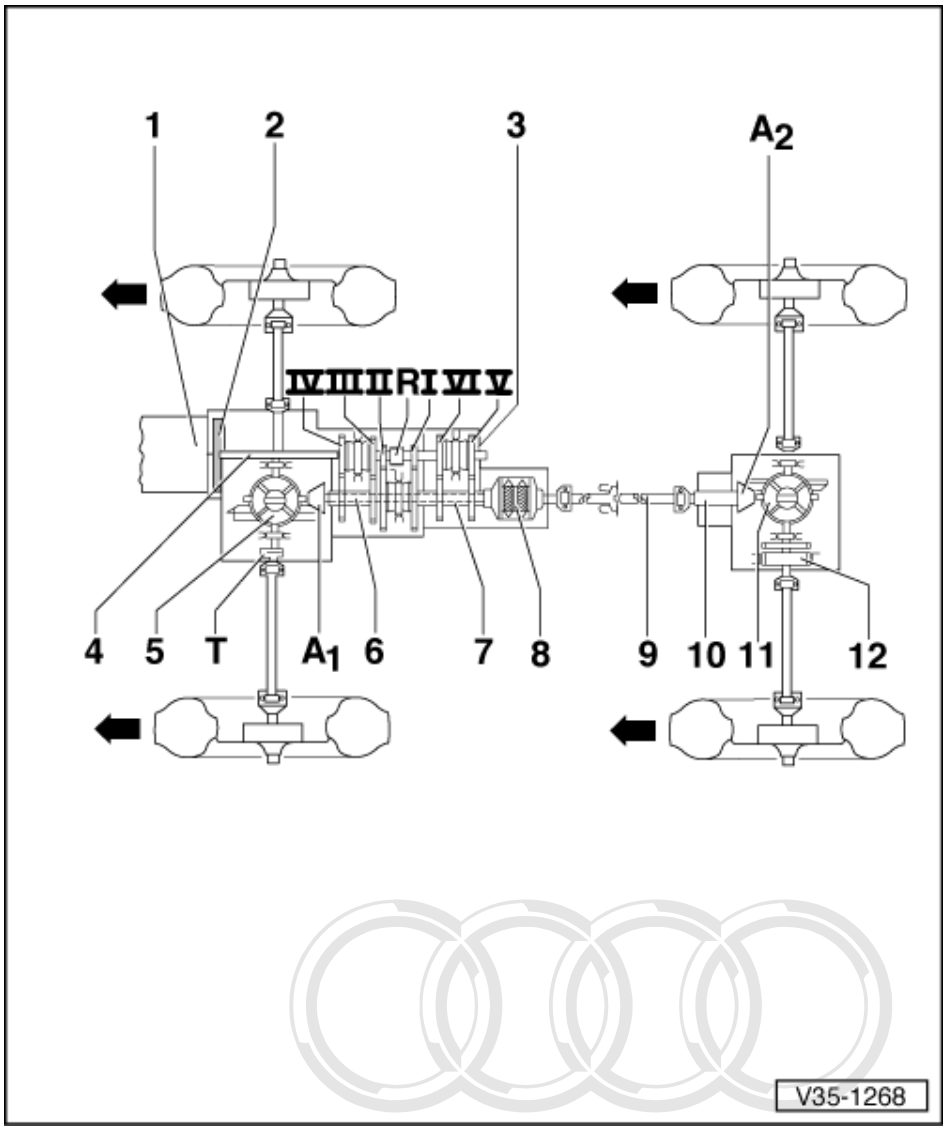
This document is copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Assignment of manual gearbox Code letters	CBD 1) CBL CET CMG DPG DPH DPM	CBD 1) CBL CET CMG CYT DGU DPJ

1) USA only

5 - Transmission layout

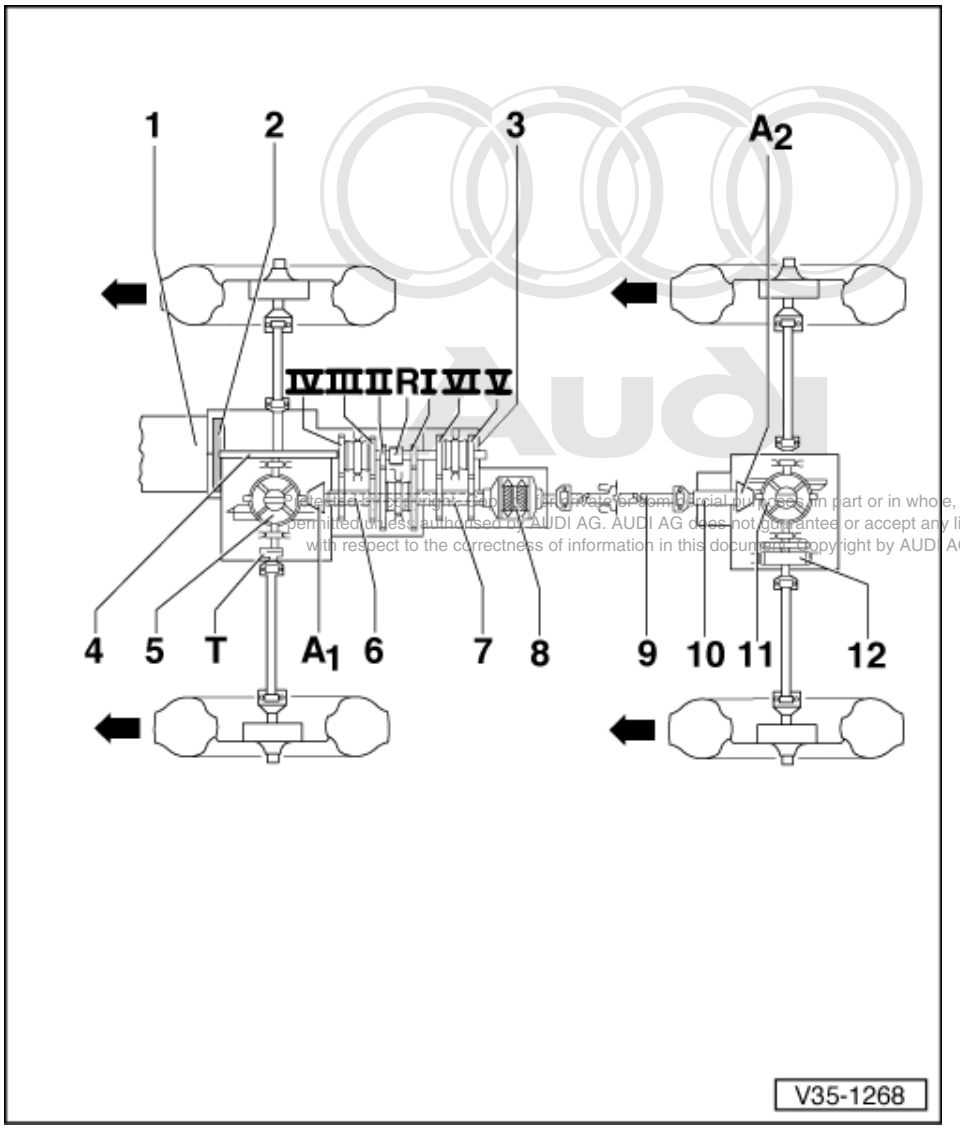
5.1 - Transmission layout



1 Engine
2 Clutch
3 Manual gearbox
4 Input shaft (main shaft)
5 Front differential
6 Front drive pinion (output shaft)
7 Hollow shaft

Audi
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.

8 Torsen differential

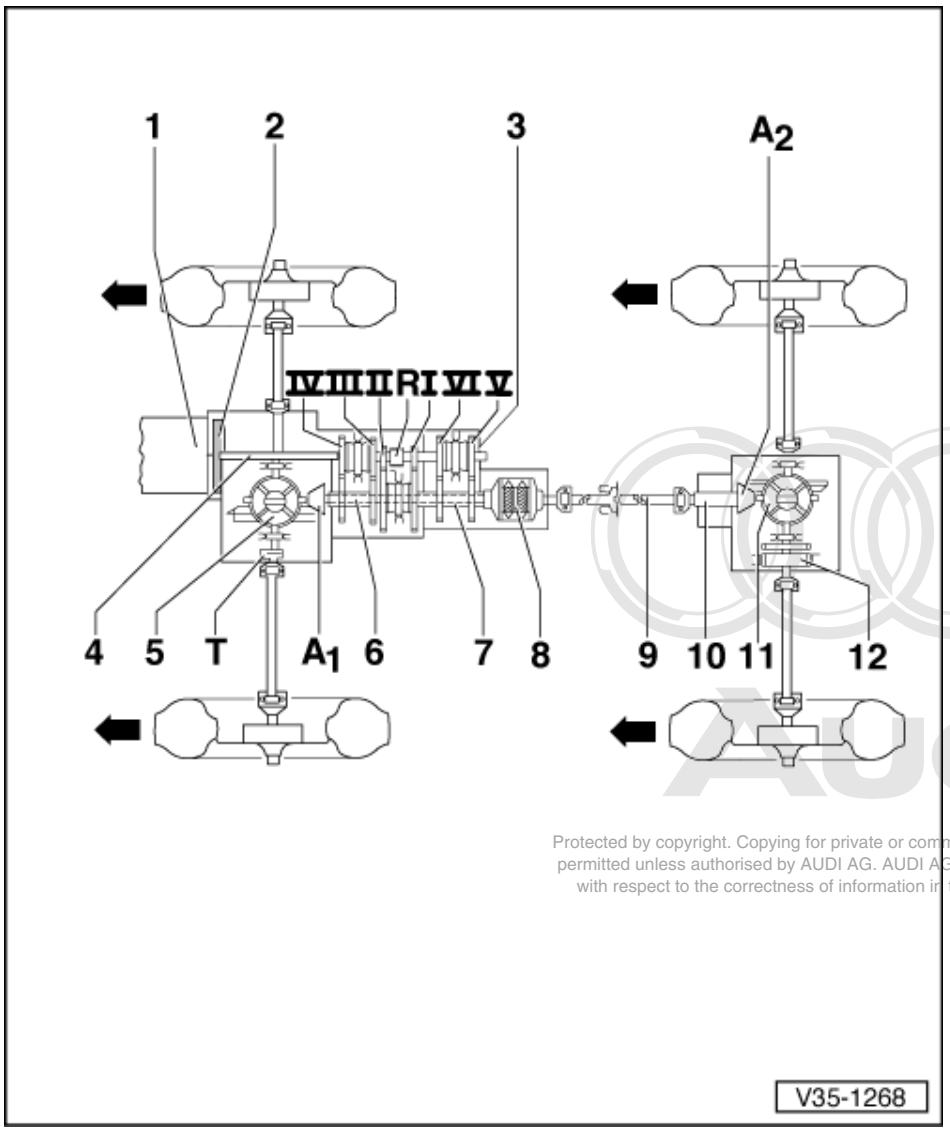


The reproduction, distribution and utilization of this document for commercial purposes in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

9 Propshaft
10 Rear drive pinion
11 Rear differential
12 Differential lock

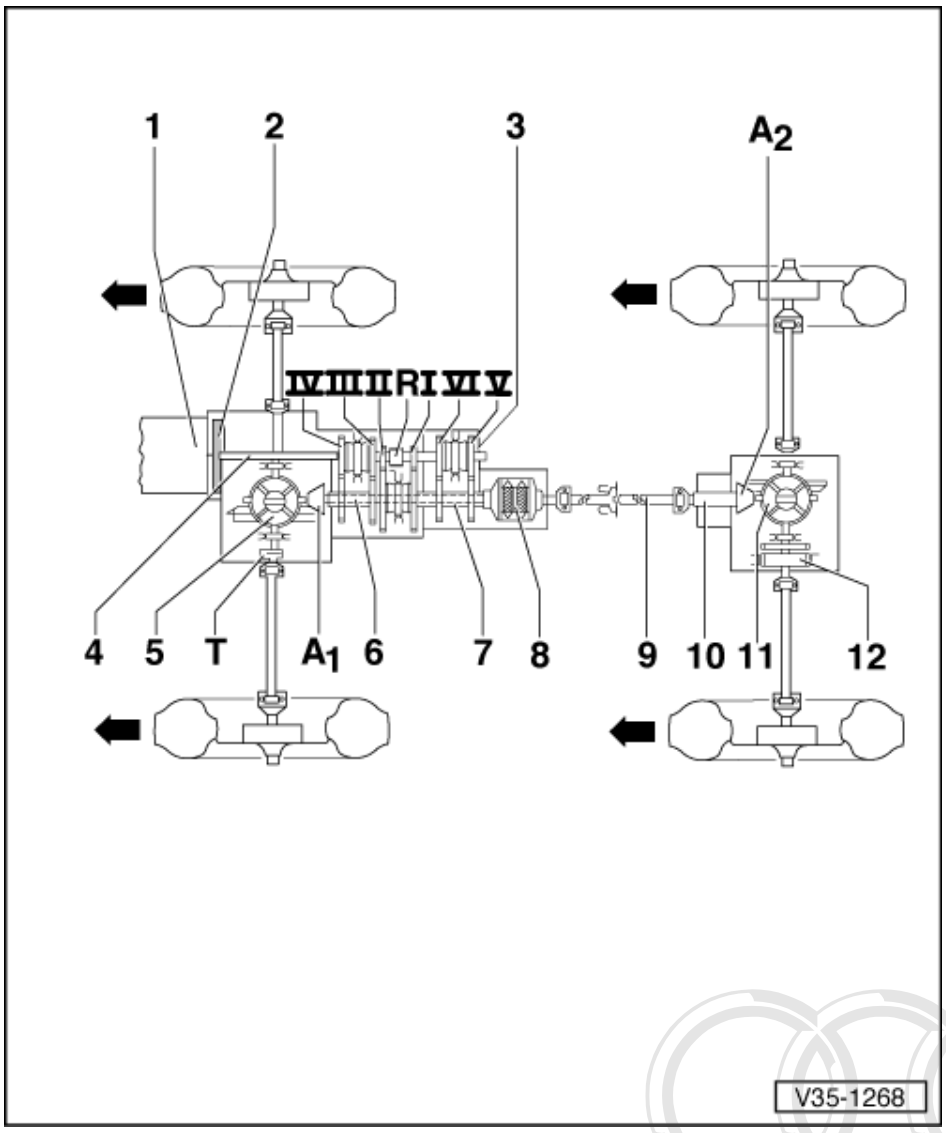
Note:

Arrows face in direction of travel.



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.

I - 1st gear
II - 2nd gear
II - 3rd gear
IV - 4th gear
V - 5th gear
VI - 6th gear
R - Reverse gear
A1 - Front final drive
A2 - Rear final drive
T - Speedometer drive, electronic



Note:

The 5-speed gearbox is derived from the 6-speed gearbox by modifying the latter as follows:

- Removal of the two 6th speed gear wheels.
- Fitting spacer washer (shift lock for 6th gear).
- Modified spacer sleeve between 5th gear wheel and small taper roller bearing.
- Use of selector cylinder for 5-speed 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.

6 - Calculations

6.1 - Calculations

6.2 - Calculating transmission ratios "i"

Transmission ratio

Transmission ratio	=	No. of teeth on driven gear	: No. of teeth on drive gear

Ratios			Formula
iG	=	Gear ratio	ZG2 : ZG1
iA	=	Axle ratio	ZA2 : ZA1
iov	=	Overall ratio	iG x iA

Example:

	6th gear	Final drive
Drive gear	ZG1 = 37	ZA1 = 9
Driven gear	ZG2 = 27	ZA2 = 37

Calculations:

iG = 27 : 37 = 0.730
iA = 37 : 9 = 4.111
itotal = (27 : 37) x (37 : 9) = 0.730 x 4.111 = 3.000

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.

6.3 - Calculating speed "V"

V	=	n : iovx UA x 0.06
n	=	Engine speed (rpm)
iov	=	Overall ratio
UA	=	Dynamic tyre roll circumference (m)
V	=	Speed (km/h)

Example:

V = 1000 : 3.100 x 1.93 x 0.06 = 37 km/h

The road speed at an engine speed of 1000 rpm in 5th gear is 37 km/h.

7 - Instructions for performance and brake check and for towing

7.1 - Instructions for performance and brake check and for towing

- Performance and brake check

=> Special information "Transmission" No. 8

- Tow-starting and towing car

=> Booklet "Maintenance"

8 - Repair instructions

8.1 - Repair instructions

The maximum possible care and cleanliness and proper tools are essential to ensure satisfactory and successful gearbox repairs. The usual basic safety precautions also naturally apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair operations, which are otherwise mentioned at various points in the Workshop Manual, are summarised here. They apply to this Workshop Manual.

Special tools

For a complete list of special tools used in this Workshop Manual

=> Booklet; Special tools, Workshop equipment

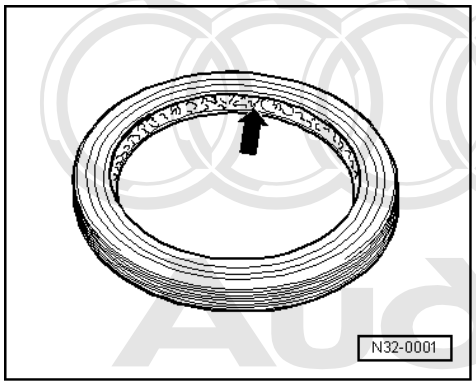
Gearbox

- Vehicles with 8-cylinder engine: When replacing manual gearbox, gear oil cooler and oil pipes should be completely drained.
- When fitting a new gearbox or rear final drive, the oil level must be checked and oil added if necessary => Page 240 .
- Capacities and specifications =>Page 5 .

- Thoroughly clean all connections and the surrounding areas before disconnecting.
- When installing gearbox, ensure that the dowel sleeves are fitted correctly.

O-rings, seals, gaskets

- Always renew O-rings, seals and gaskets.



- After removing gaskets and seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- Thoroughly clean housing joint surfaces before assembling.
- -> Before installing radial shaft oil seals, lightly oil outer circumference and pack space between sealing lips -arrow- with grease.
- The open side of the seals must face the fluid against which the seal is to serve.
- When replacing oil seals, always vary the point at which the sealing lips make contact (use insertion depth tolerances).
- Lightly oil O-rings before installing to prevent them being trapped and damaged when assembling.

- After replacing seals and gaskets check oil level =>Page 240 .

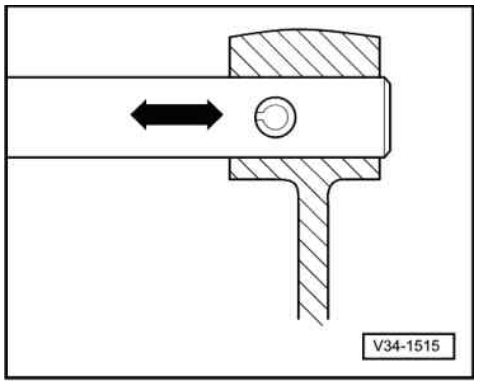
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness and completeness of this document.

Sealants

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

Locking elements

- Always replace circlips.
- Do not over-stretch circlips.



- Circlips must be properly seated in the base of the groove.
- -> Replace spring sleeves. Installation position: Slot longitudinal to line of force.
- 01.92 ä spring pins are used instead of spring sleeves. Installation position: Not dependant on direction of force.

Note:

The spring sleeve/spring pins for securing the selector fork or selector plate for 5th/6th gear must only be fitted or removed using the special tool.

Nuts, bolts

- Slacken the nuts and bolts in reverse sequence to the specified tightening sequence.
- Nuts and bolts which secure covers and housings should be slackened and tightened crosswise in stages if no tightening sequence is specified.
- The tightening torques stated apply to non-oiled nuts and bolts.
- Always replace self-locking nuts and bolts.
- Use a wire brush to clean the threads of bolts screwed in with a locking agent. Then apply AMV 185 101 A1 when inserting.
- Threaded holes into which self-locking bolts or bolts coated with locking fluid are screwed, must be cleaned (e.g. with a tap). Otherwise there is a danger of bolts shearing when subsequently being removed.

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.

- Install needle roller bearings with the lettering on the bearing (the side with thicker metal) facing towards the drift or other tool used for installing.
- Mark the needle roller bearings of 1st to 6th speed sliding gears when removing to ensure the same installation position when re-installing.
- Grease needle roller bearing for gearbox input shaft in rear of crankshaft.
- Lubricate all bearings in gearbox housing with gear oil before installing.
- Heat inner races of taper roller bearings to approx. 100 oC before installing. Press in onto stop when installing so there is no axial clearance.
- Do not interchange the outer or inner races of bearings of the same size.
- Always replace the taper roller bearings on one shaft together and use new bearings from a single manufacturer.
- The taper roller bearings for the output shaft and the differential in the gearbox are low-friction bearings. Do not additionally oil new taper roller bearings when measuring friction torque. The bearings are pre-treated at the factory with a special type of oil for this purpose.

Shims

- Use a micrometer to measure the shims at several points. Different tolerances make it possible to obtain exact shim thickness required.
- Check for burrs and damage. Install only shims which are in perfect condition.

Synchroniser rings

- Do not interchange synchroniser rings. When reusing always fit to the same gear.
- Check for wear; replace if necessary.
- Coat with gearbox oil when installing

Clutch mechanism

- When removing gearbox, remove clutch slave cylinder without disconnecting pipes.
- Do not depress clutch pedal after removing slave cylinder. Otherwise the piston will be pressed out of the slave cylinder.
- Do not cant clutch pressure plate, loosen and tighten in a diagonal sequence and in stages.

Gears, synchro-hubs, inner races for sliding gears

- Heat gears and synchro-hubs to approx. 100oC before installing. Press in onto stop when installing so there is no axial clearance.
- Heat inner races for sliding gears to approx. 100 oC when installing.
- Temperature can be checked with temperature tester V.A.G 1558.
- Note installation position.

Sliding gears

- After installing, check 1st to 6th speed sliding gears for axial clearance of 0.15 ... 0.35 mm and check that they rotate freely.

Notes:

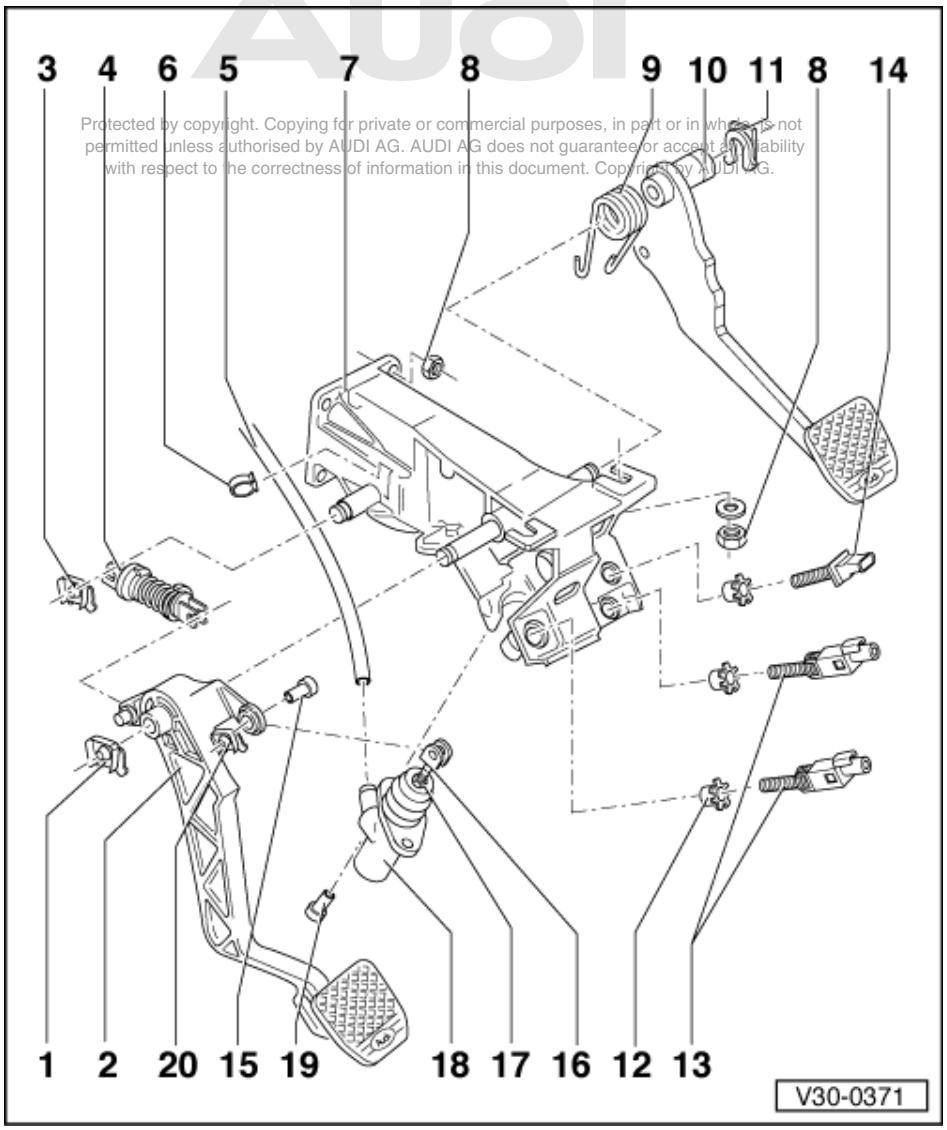
- A wider gearwheel and a wider sliding gear for 1st gear have been used from gearbox serial number 77645. At the same time, the bearing plate has been modified and a narrower inner race for cylinder roller bearings installed
- Components of old and new construction status must not be installed mixed.

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.

30 - Clutch

1 - Servicing clutch mechanism

1.1 - Servicing clutch mechanism



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.

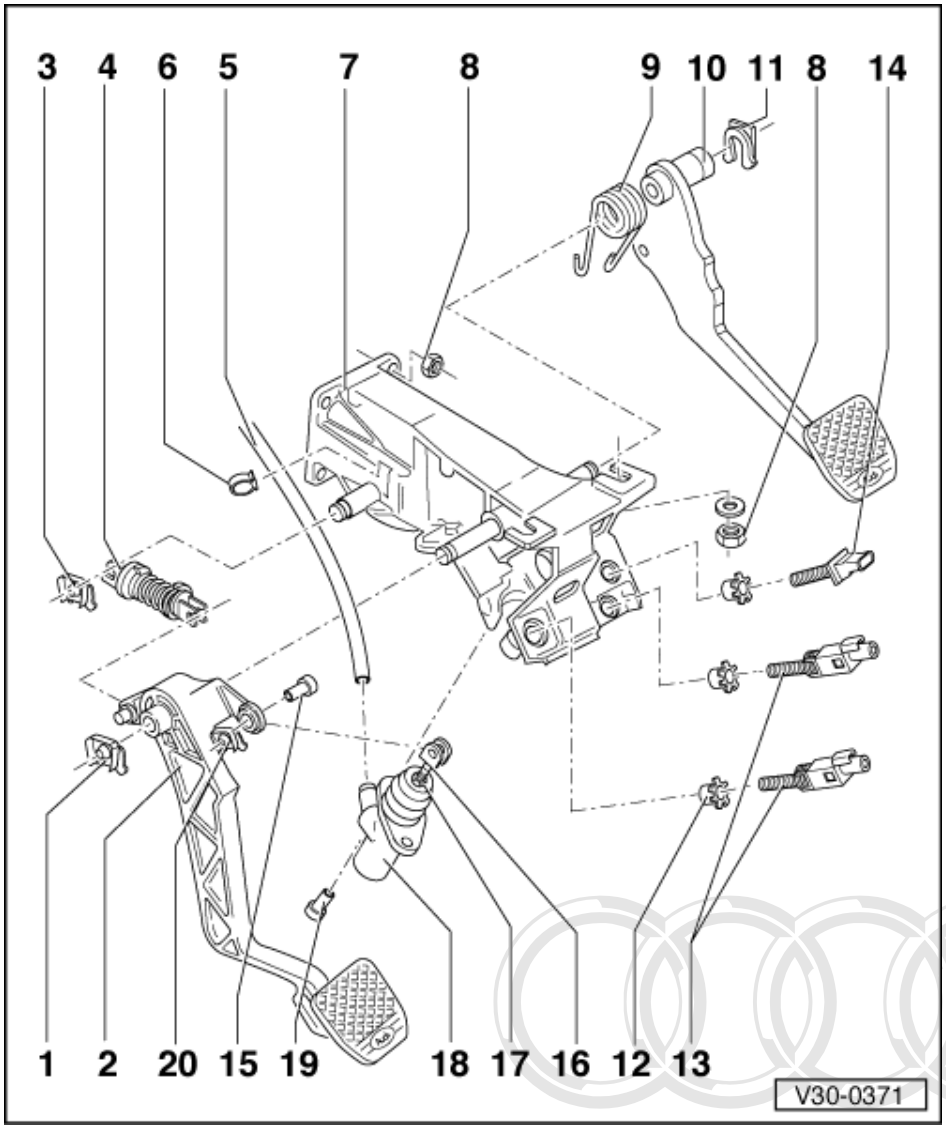
1.2 - Assembly overview, pedal cluster - LHD vehicles

Notes:

- Grease all bearing points with polycarbamide grease G 052 142 A2 before assembling.
- The clutch pedal travel must not be shortened by additional floor coverings.

1 Locking clip
- Always replace

- Fit onto shaft on pedal bracket



2 Clutch pedal

- Can be replaced with pedal bracket installed
- Is located in correct position by clevis adjustment
- Fit onto shaft on pedal bracket
- Bearing bush cannot be replaced separately; pedal is supplied as replacement part with integral bush.

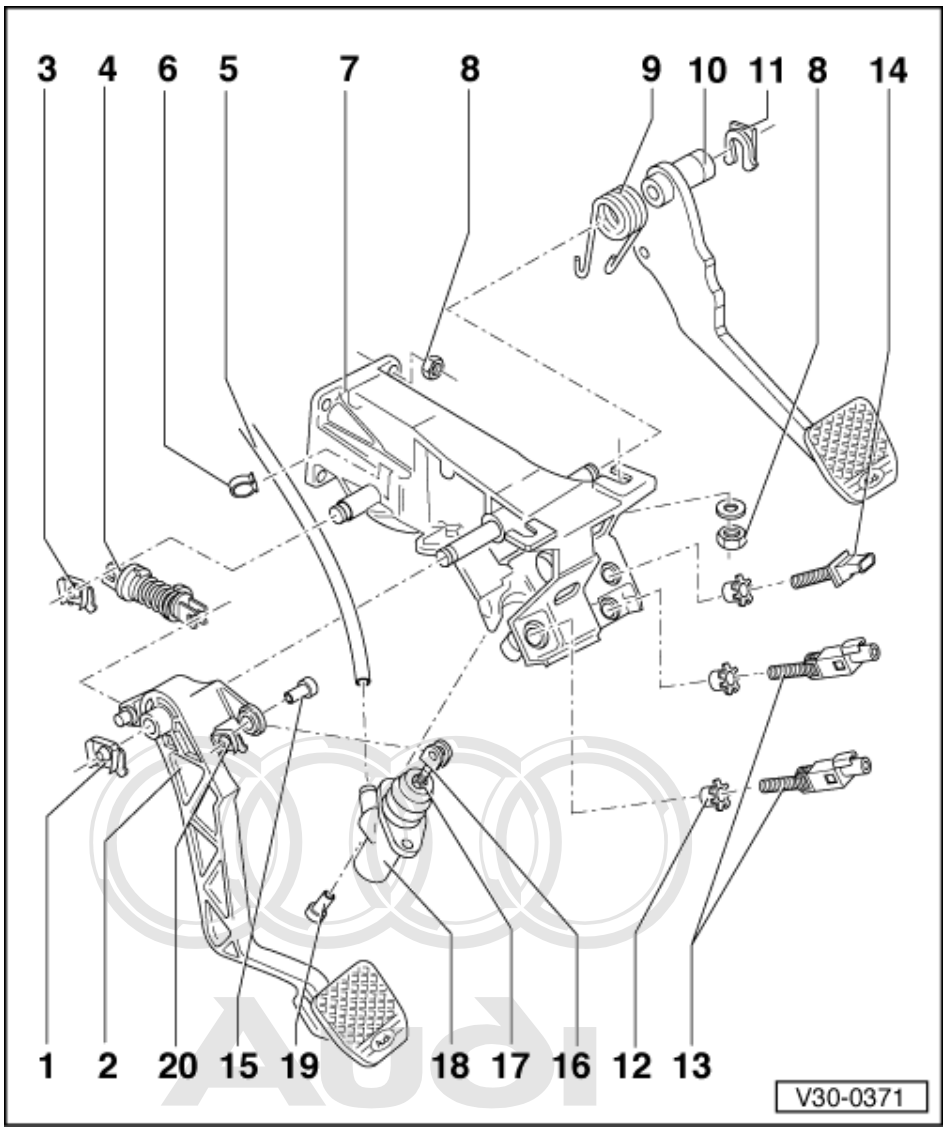
3 Locking clip

- Does not have to be removed in order to remove over-centre spring

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 Over-centre spring

- Lubricate with polycarbamide grease G 052 142 A2 before assembling
- Removing and installing => Page 3



5 Supply hose
- For master cylinder
- Must not touch over-centre spring
- Locate accordingly on pedal bracket and secure with cable clip

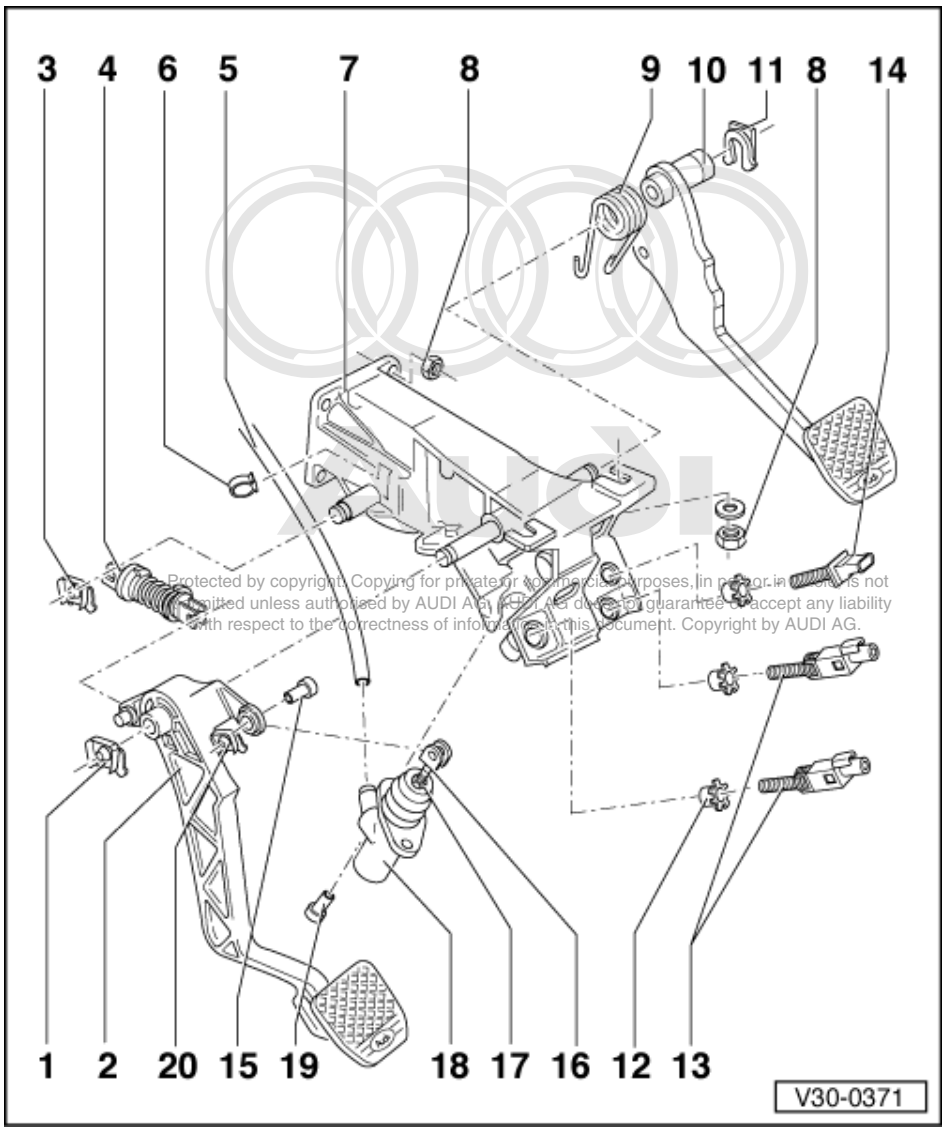
6 Cable clip
- Secures supply hose to pedal bracket

7 Pedal bracket

8 Nut - 25 Nm
- Self-locking
- Always replace

9 Torsion spring
- Installation position => Fig. 2

Copyright by 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.



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.

10 Brake pedal

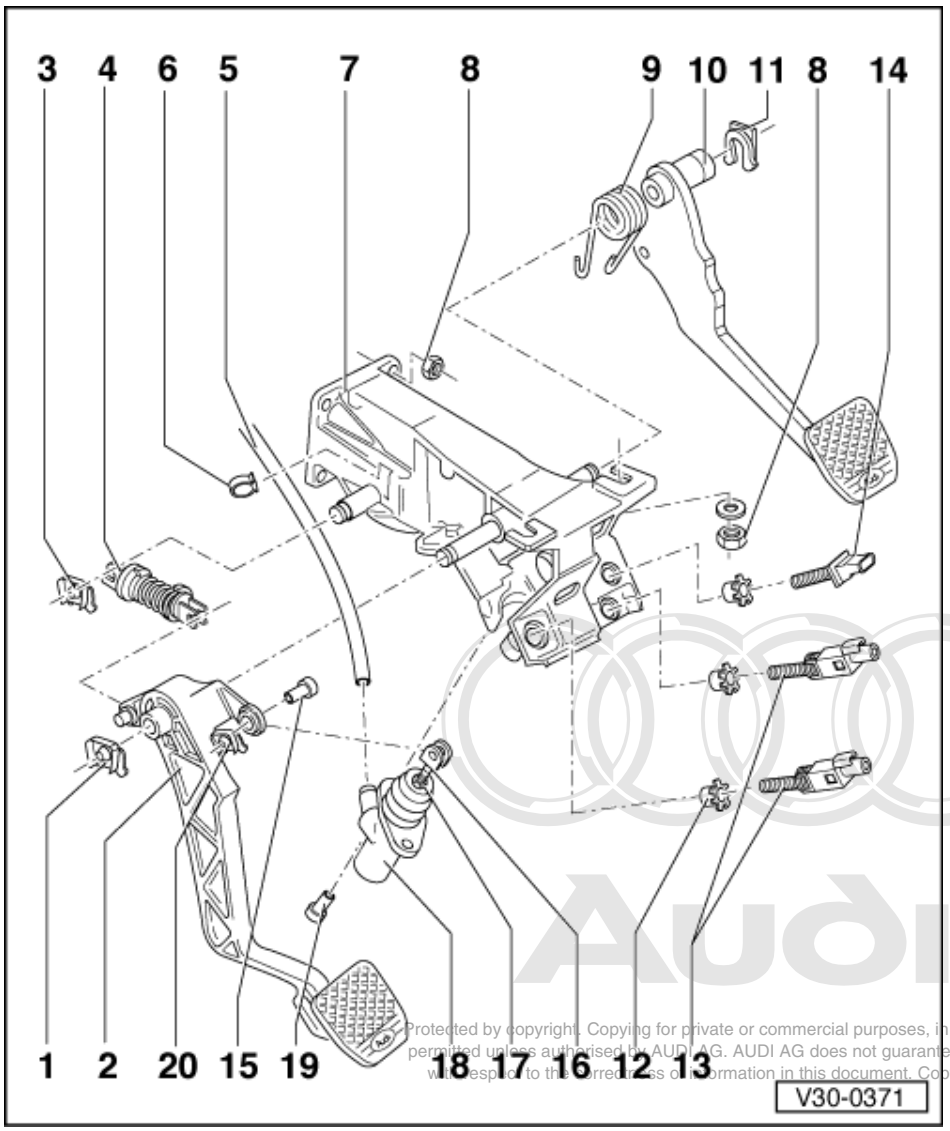
- Fit onto shaft on pedal bracket
- Bearing bush cannot be replaced separately; pedal is supplied as replacement part with integral bush.
- Remove/install pedal bracket before removing/installing pedal.

11 Locking clip

- Always replace
- Fit onto shaft on pedal bracket

12 Clip

- For cruise control system vent valves and brake light switch
- Using pliers, press clip into appropriate holes in pedal bracket until fully home



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.

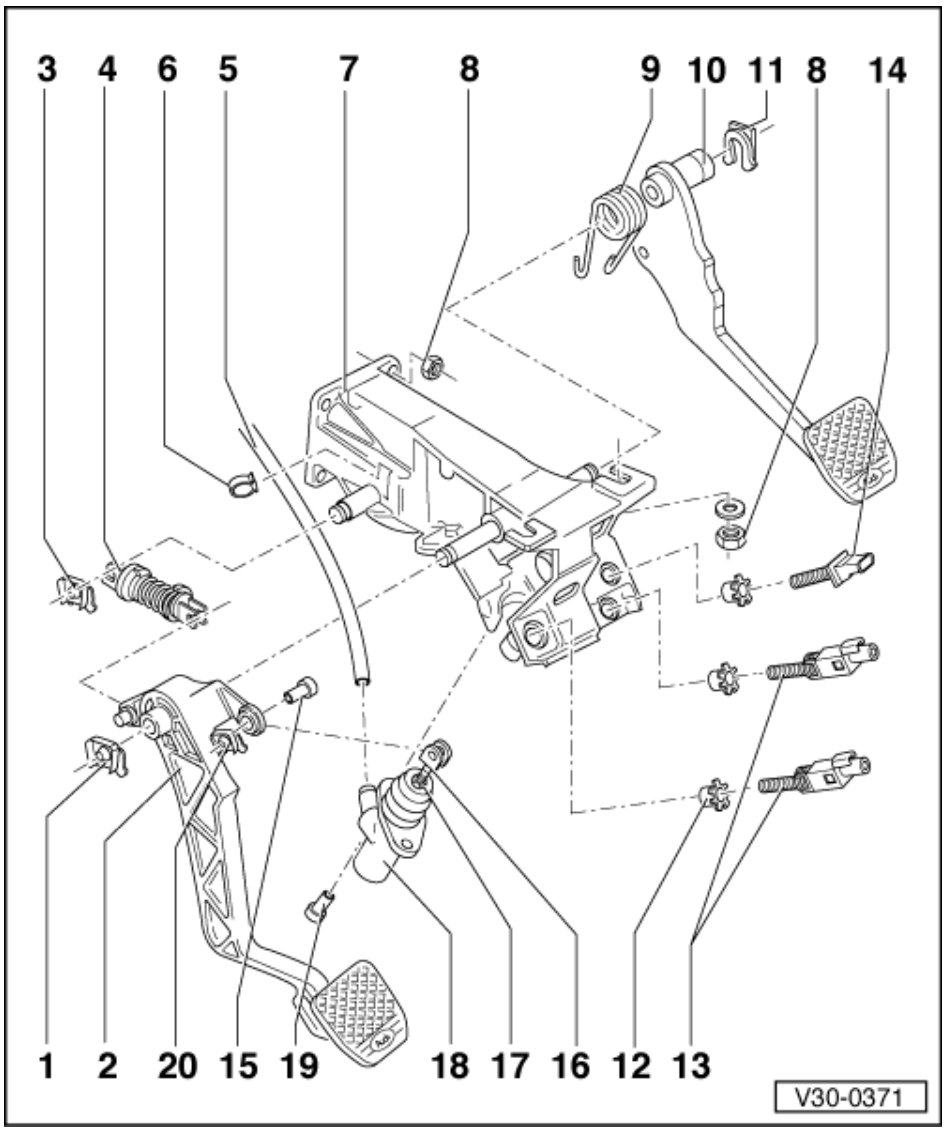
13 Vent valves

- For cruise control system
- Always replace
- Press in switch after fitting clip
- Adjust with clevis connected:

- Depress clutch pedal or brake pedal.
- Press in vent valves onto stop.
- Pull clutch pedal or brake pedal all the way back by hand.

14 Brake light switch

- Always replace
- Press in switch after fitting clip



- Adjust with clevis connected:
- Depress brake pedal.
- Press in brake light switch onto stop
- Pull brake pedal all the way back by hand.

Note:

Adjusting clevis for brake pedal

=> Running gear, Four-wheel drive; Repair group 47; Removing and installing brake master cylinder/vacuum brake servo unit Removing and installing brake master cylinder/vacuum brake servo unit

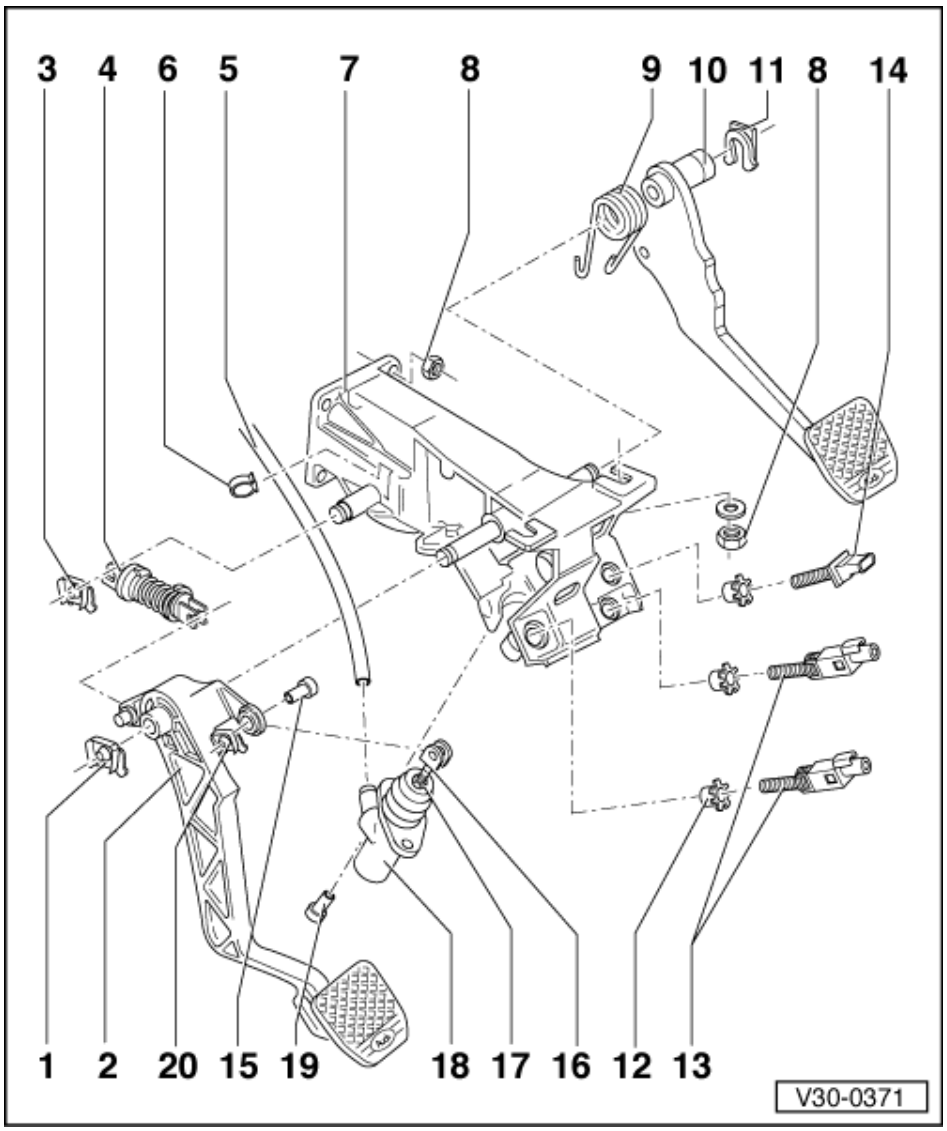
15 Bolt

- Secure clevis to clutch pedal

16 Clevis

- Adjusting => Fig. 1

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.



17 Lock nut - 10 Nm

- Tighten after adjusting clevis

18 Master cylinder

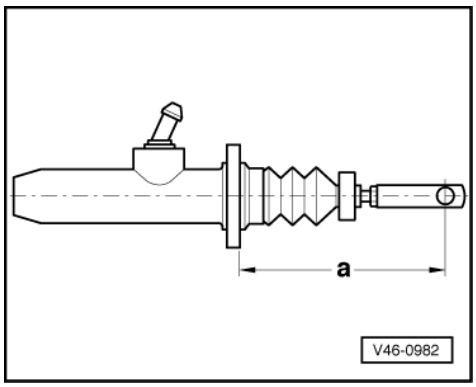
- Replace if leaking

19 Bolt - 20 Nm

20 Locking clip

- Always replace
- Fit onto bolt

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.



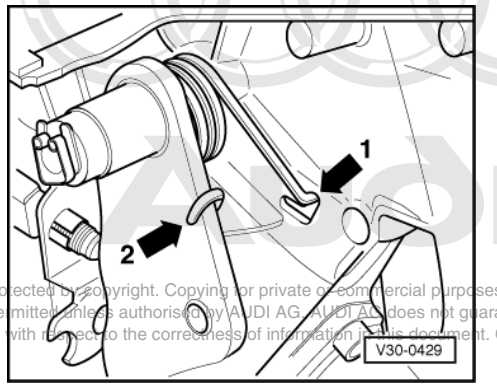
-> Fig.1 Adjusting clevis

- To adjust, turn clevis.
  - Dimension a = 109.5 ± 0.5 mm
  - When measuring, clevis must be at right angles to mounting surface of clutch master cylinder.

Notes:

If the clevis is correctly adjusted and the clutch pedal does not return properly by itself, this can be caused by the following:

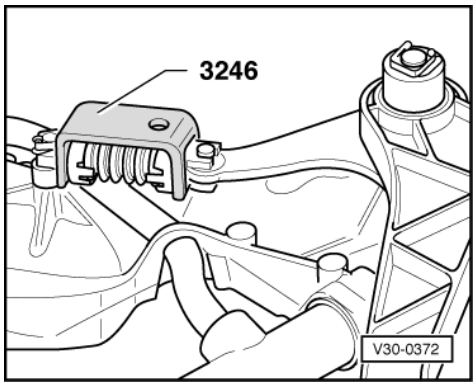
- Air in hydraulic system.
- Pedal bearing or over-centre spring not moving freely.



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.

-> Fig.2 Installation position of torsion spring for brake pedal

- Hook long end of spring -arrow 1- into pedal bracket and short end -arrow 2- onto brake pedal.



-> Fig.3 Removing and installing over-centre spring

- Remove left-hand storage compartment

=> General body repairs; Repair group 70; Dash panel; Removing and installing storage compartment and glove compartment Dash panel Removing and installing storage compartment and glove compartment

- Remove left-hand footwell vent

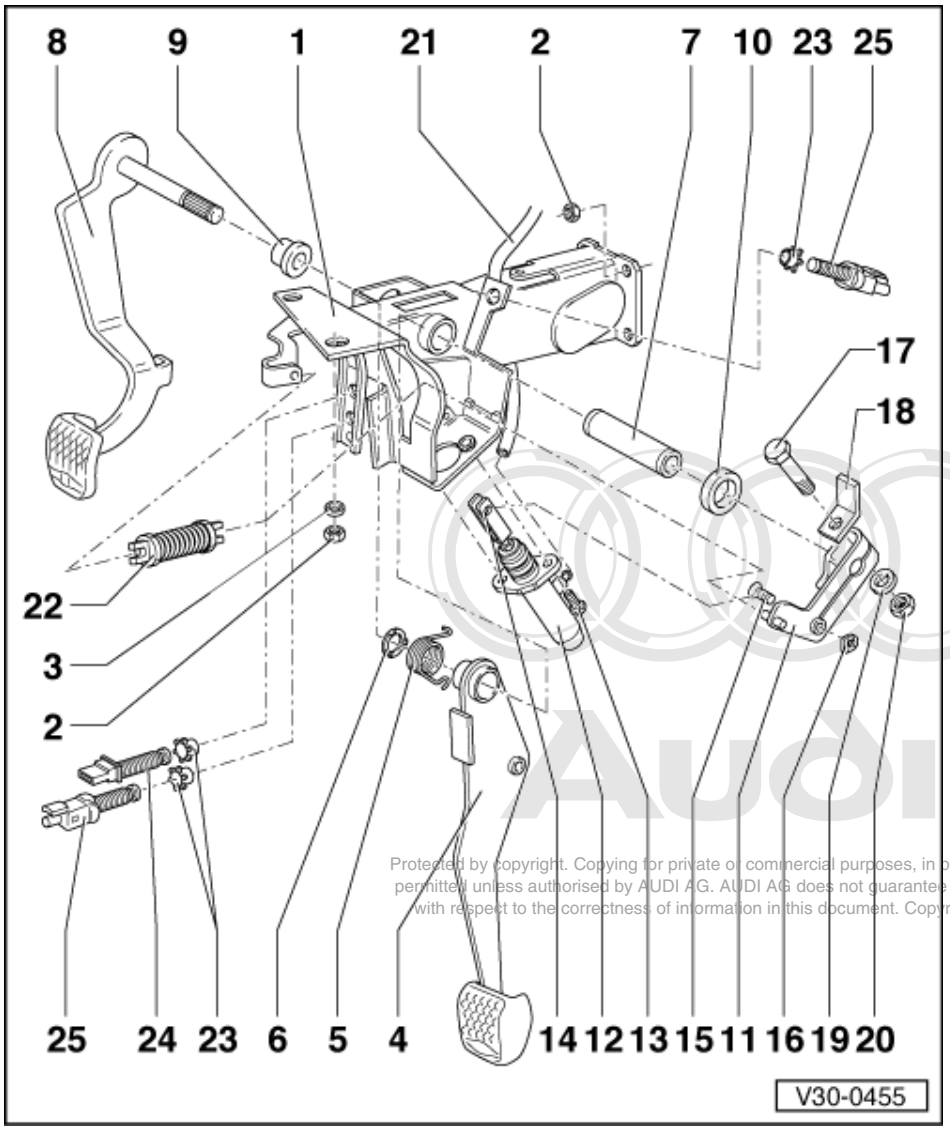
=> Heating, air conditioner; Repair group 80; Servicing heating system Servicing heating system

- Remove protective plate between connector for electrical wiring and pedal cluster.
- Push retaining clip 3246 on over-centre spring sideways.
- Depress clutch pedal and remove over-centre spring together with installation clamp.

Notes:

- Retaining clip 3246 is shown in diagram with pedal bracket removed.
- Grease all bearing journals with polycarbamide grease G 052 142 A2 before assembling

1.3 - Assembly overview, pedal cluster - RHD vehicles



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.

Notes:

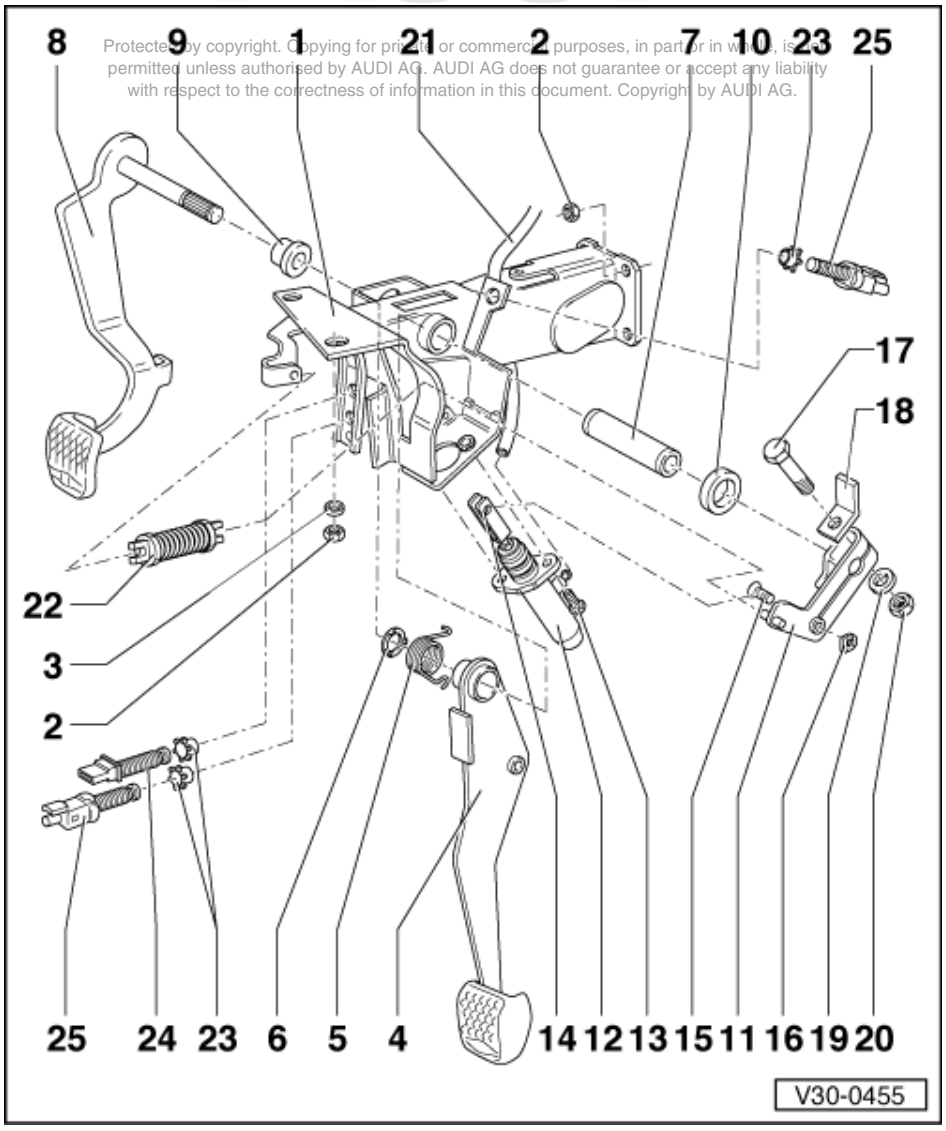
- Grease all bearing points with polycarbamide grease G 052 142 A2 before assembling.
- The clutch pedal travel must not be shortened by additional floor coverings.

1 Pedal bracket

2 Nut - 25 Nm

- Self-locking
- Always replace

3 Washer



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 Brake pedal

- Bearing bush cannot be replaced separately; pedal is supplied as replacement part with integral bush.
- Remove/install pedal bracket before removing/installing pedal.

5 Torsion spring

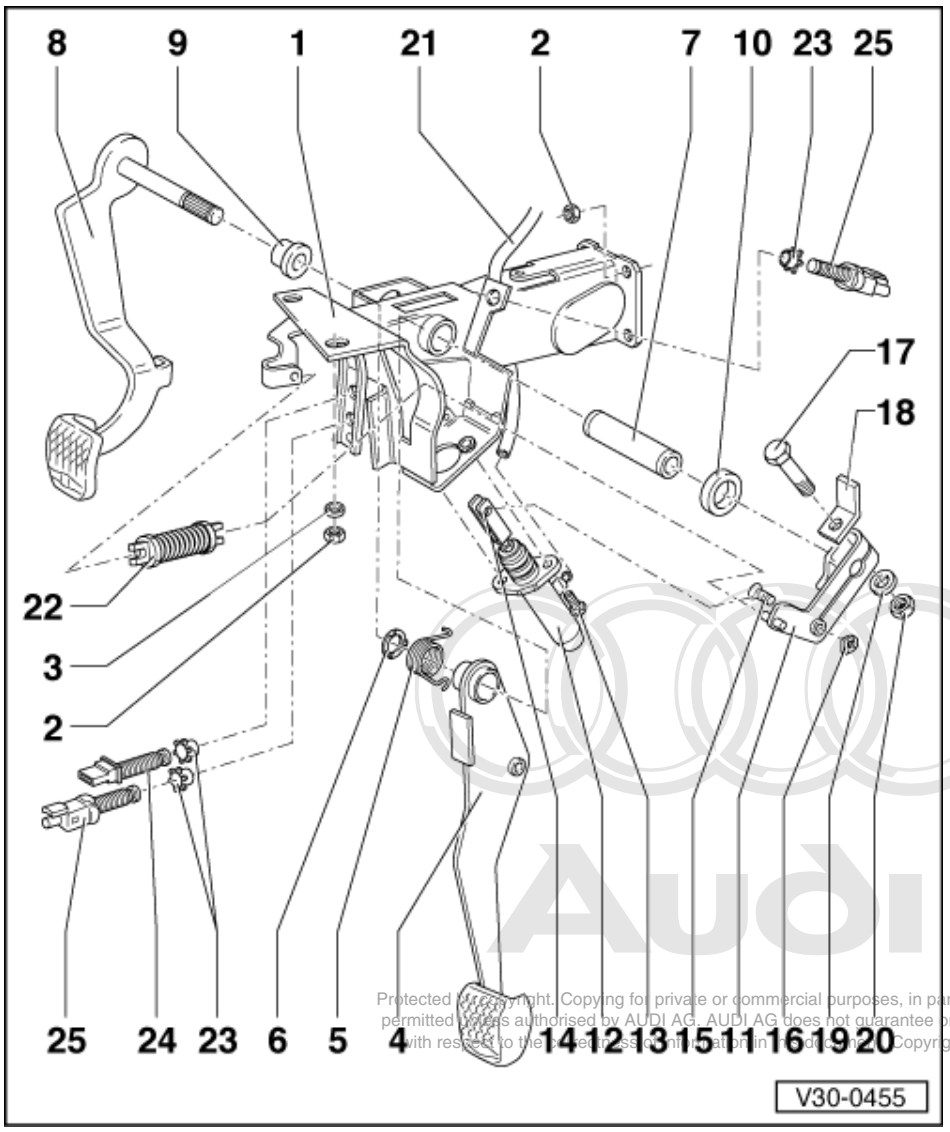
- Fit onto brake pedal before installing
- Installation position => Fig. 1

6 Shim

- Fit onto brake pedal before installing
- Lugs towards brake pedal

7 Bearing tube

- Fitted into pedal bracket and bearing bush of brake pedal after assembling brake pedal



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 [illegible] contained in this document. Copyright by AUDI AG.

8 Clutch pedal

- Remove/install pedal bracket before removing/installing pedal.
- Insert pedal shaft into bearing tube
- Is located in correct position by clevis adjustment

9 Spacer bush

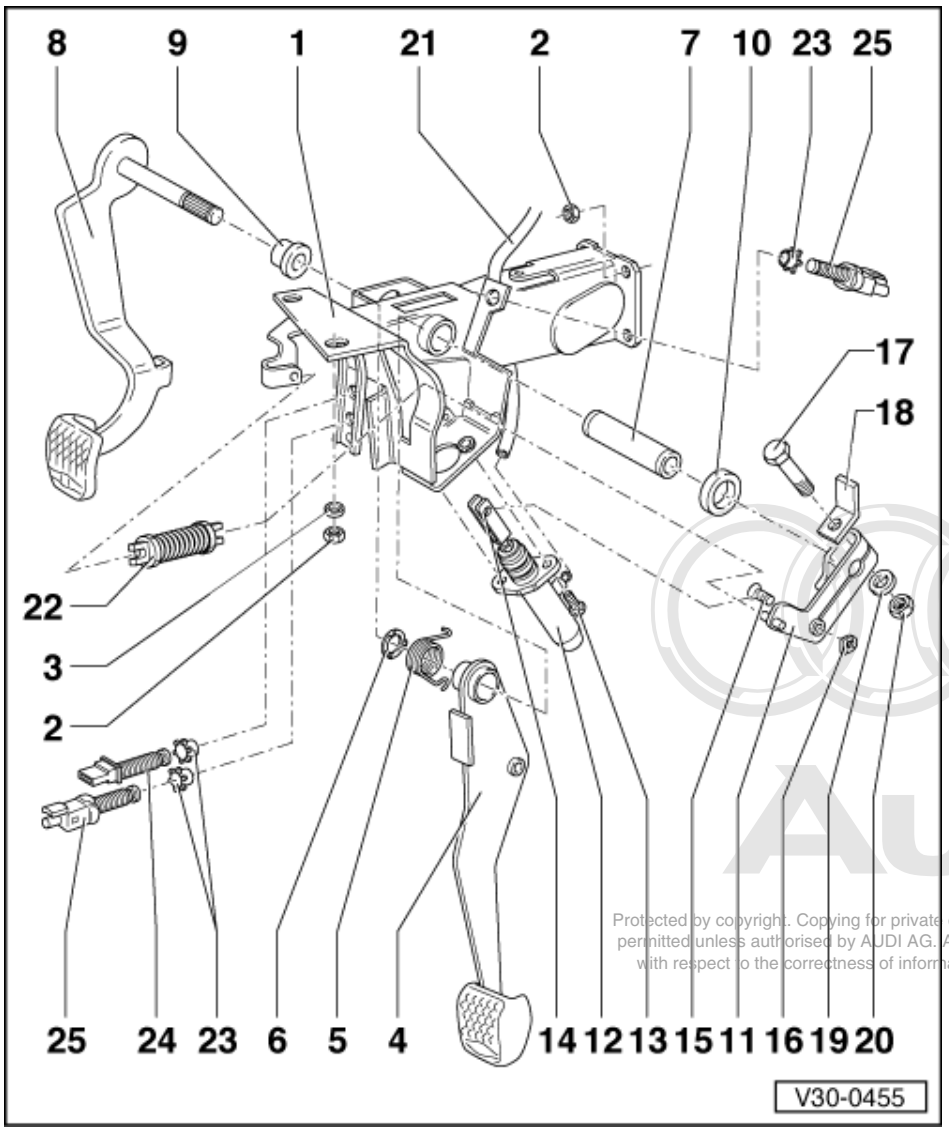
10 Spacer

11 Lever

12 Master cylinder

- Replace if leaking

13 Bolt - 20 Nm



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.

14 Clevis

- Adjusting => Fig. 21
- After adjusting clevis, tighten lock nut to 10 Nm

15 Bolt

- Secure clevis to lever

16 Locking clip

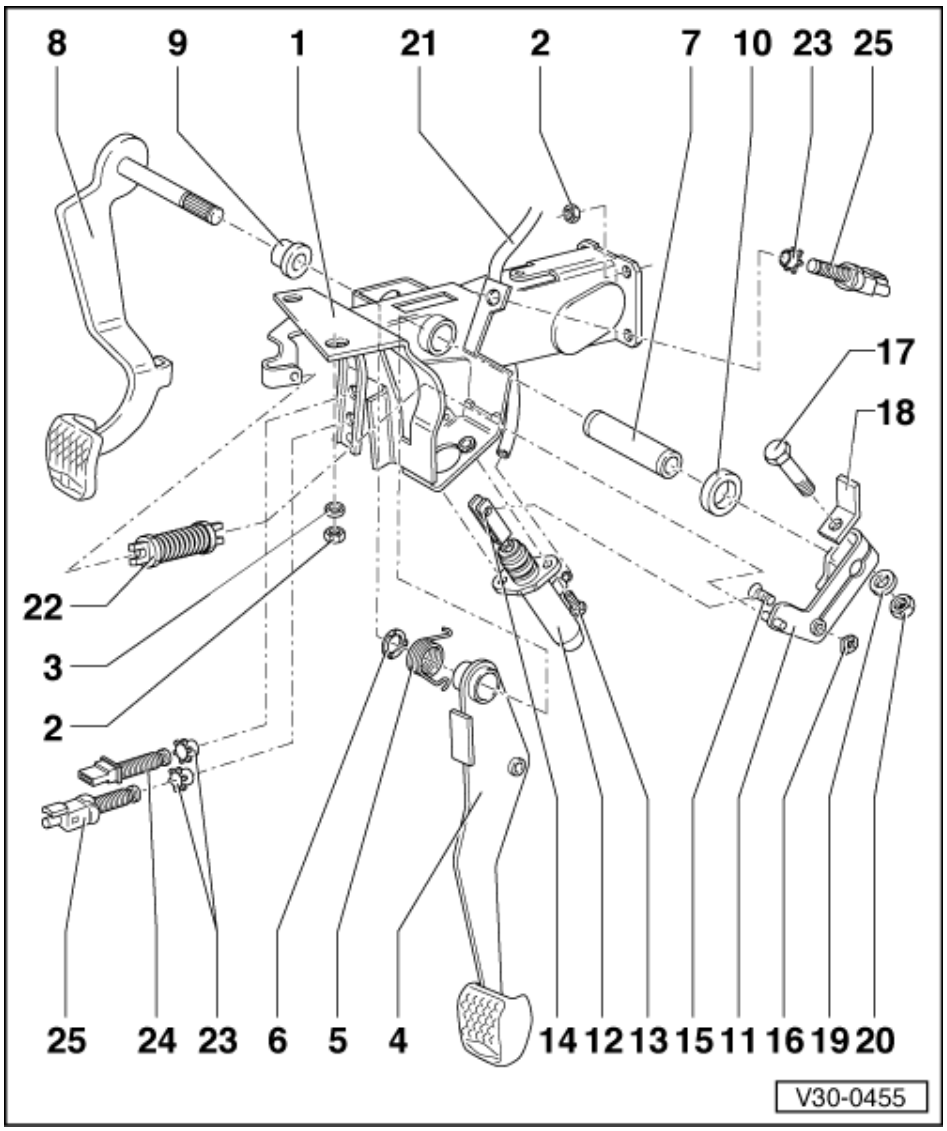
- Always replace
- Fit onto bolt

17 Bolt

18 Bracket

- Operates vent valve
- For vehicles with cruise control (CC) only

19 Washer



20 Nut - 40 Nm

21 Supply hose

- For master cylinder
- Must not touch over-centre spring
- Route along pedal bracket, as shown
- Allocate hose length from Parts Catalogue

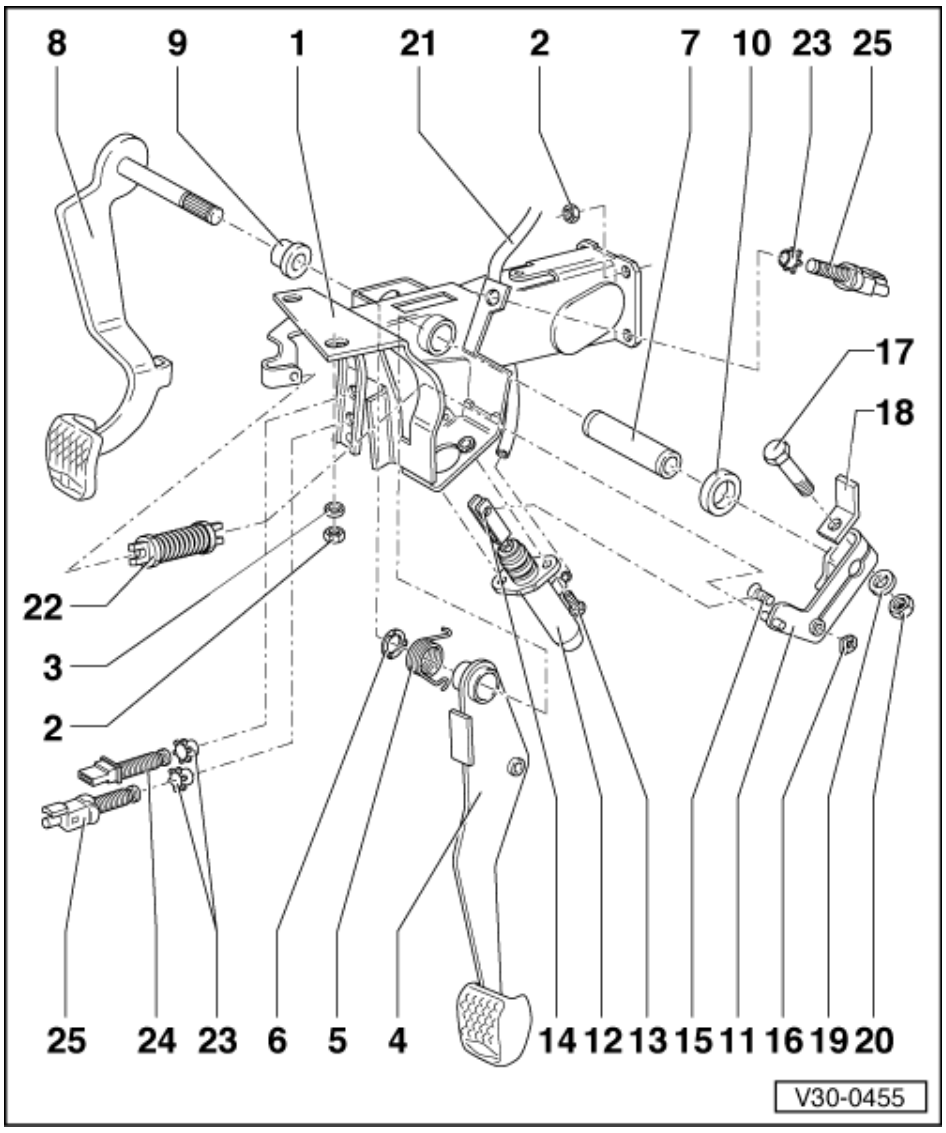
22 Over-centre spring

- Lubricate with polycarbamide grease G 052 142 A2 before assembling
- Removing and installing => Fig. 2

23 Clip

- For cruise control system vent valves and brake light switch
- Using pliers, press clip into appropriate holes in pedal bracket until fully home

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.



24 Brake light switch

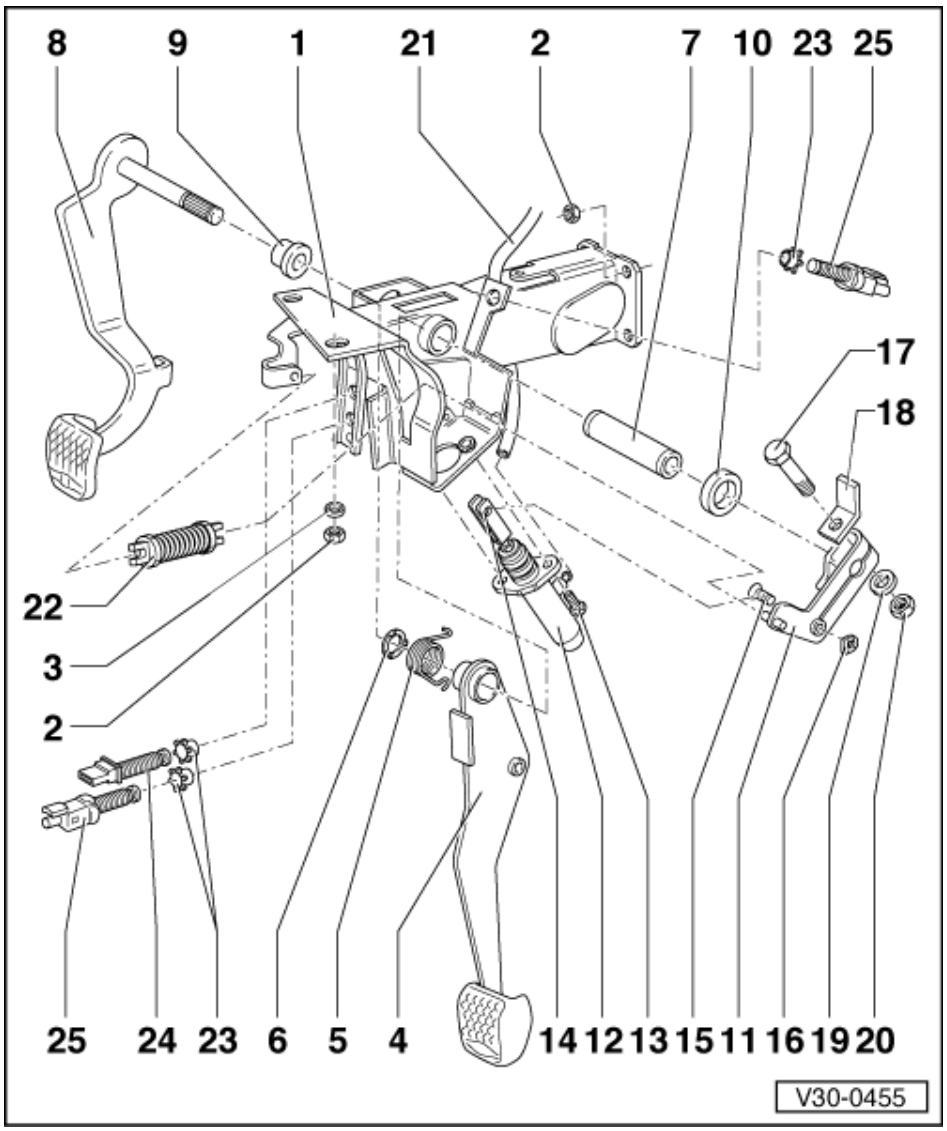
- ◆ Always replace
- ◆ Press in switch after fitting clip
- ◆ Adjust with clevis connected:
- - Depress brake pedal.
- - Press in brake light switch onto stop
- - Pull back brake pedal all the way back by hand.

Note:

Adjusting clevis for brake pedal

=> Running gear, Four-wheel drive; Repair group 47; Removing and installing brake master cylinder/vacuum brake servo unit Removing and installing brake master cylinder/vacuum brake servo unit

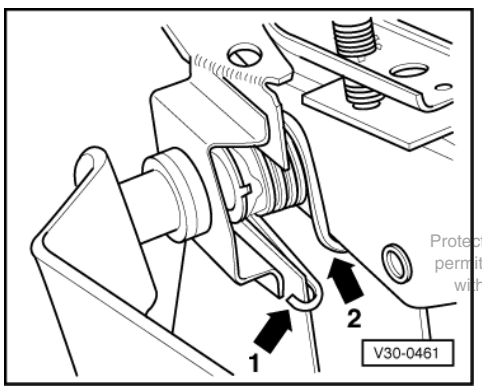
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



25 Vent valve

- For cruise control system
- Always replace
- Press in switch after fitting clip
- Adjust with clevis connected:

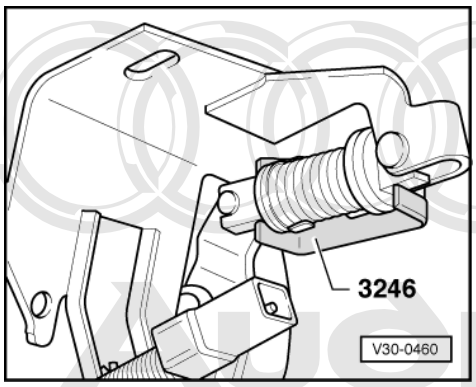
- Depress clutch pedal or brake pedal.
- Press in vent valves onto stop
- Pull clutch pedal or brake pedal all the way back by hand.



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.

-> Fig.1 Installation position of torsion spring for brake pedal

- Hook long end of spring -arrow 1- into pedal bracket and short end -arrow 2- onto brake pedal.



-> Fig.2 Removing and installing over-centre spring

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 storage compartment on right

=> General body repairs; Repair group 70; Dash panel; Removing and installing storage compartment and glove compartment Dash panel Removing and installing storage compartment and glove compartment

- Remove right-hand footwell vent

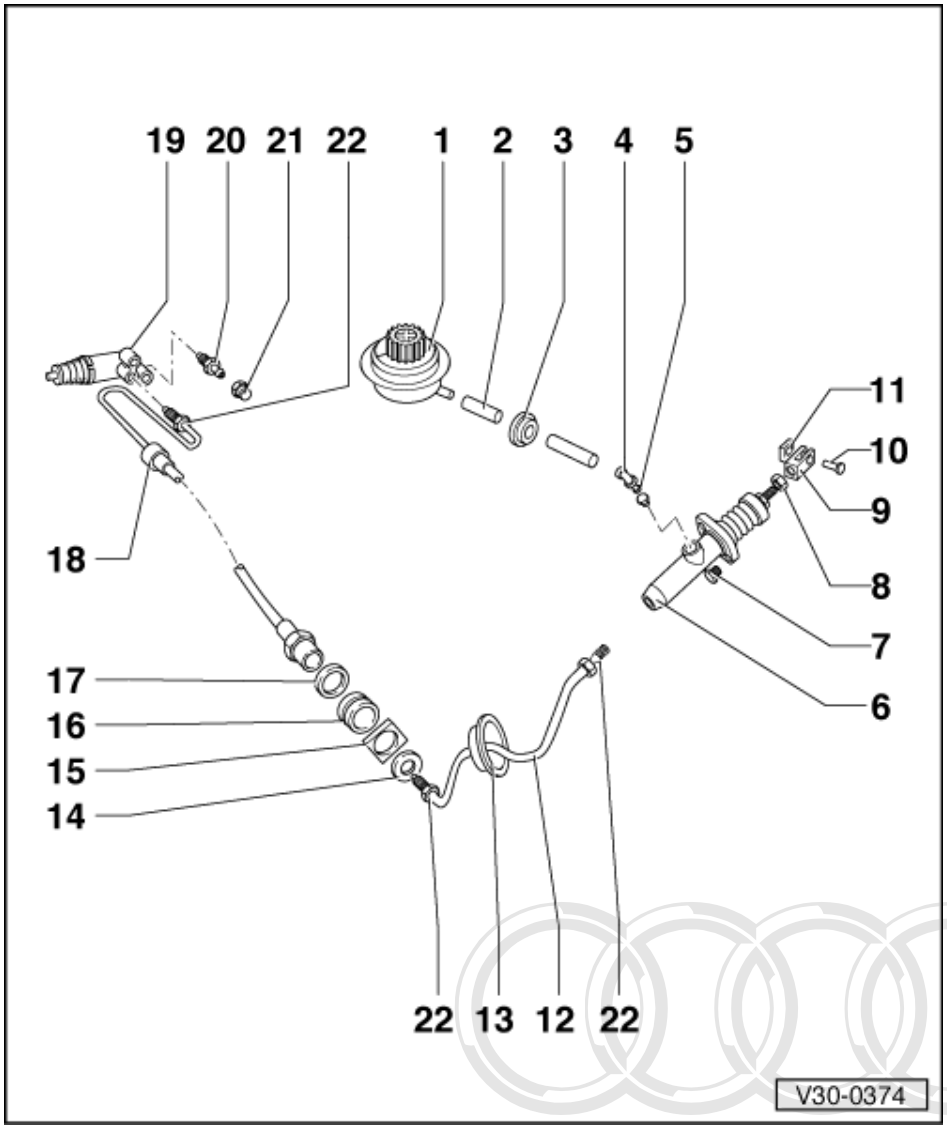
=> Heating, air conditioner; Repair group 80; Servicing heating system Servicing heating system

- Remove protective plate between connector for electrical wiring and pedal cluster.
- Push retaining clip 3246 on over-centre spring sideways.
- Depress clutch pedal and remove over-centre spring together with installation clamp.

Notes:

- Retaining clip 3246 is shown in diagram with pedal bracket removed.
- Grease all bearing journals with polycarbamide grease G 052 142 A2 before assembling

1.4 - Assembly overview, hydraulics

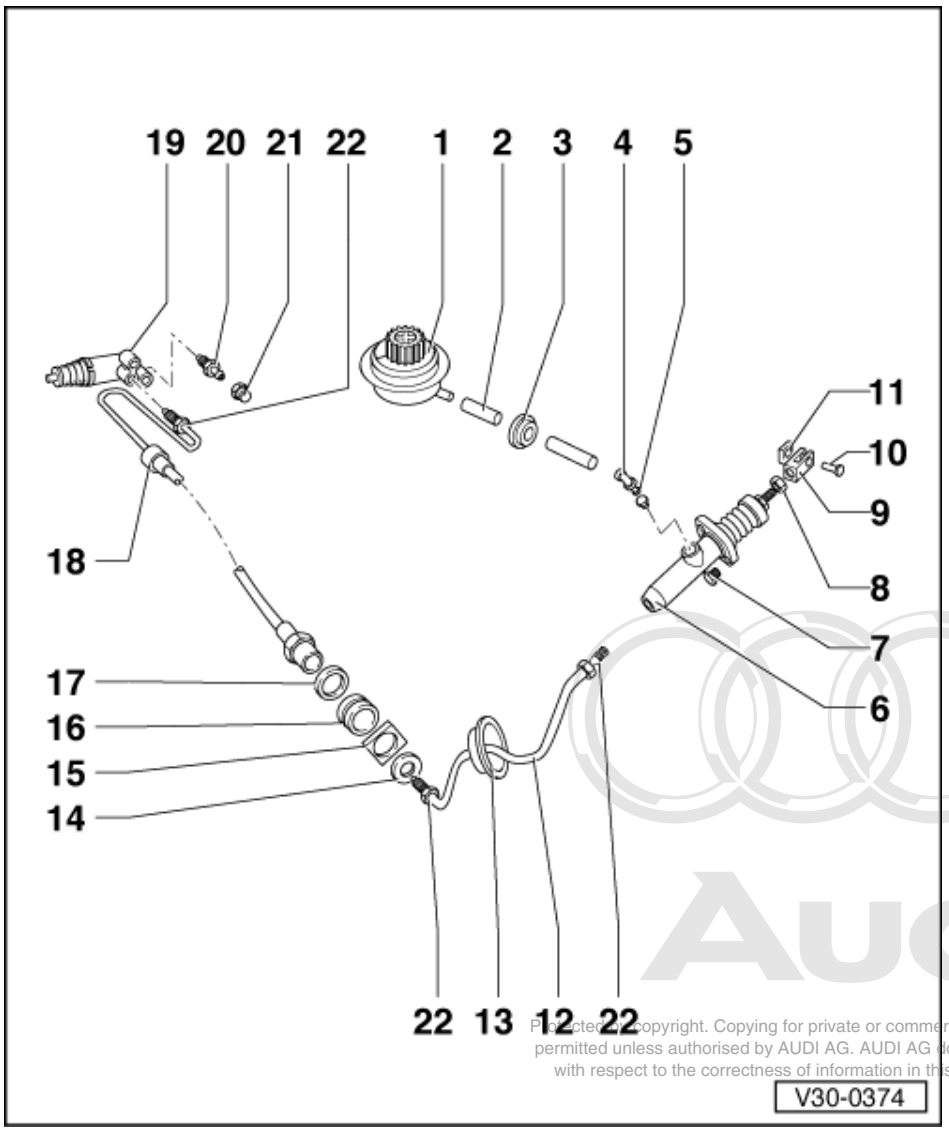


1 Brake fluid reservoir
2 Supply hose
- For pedal cluster on right-hand drive vehicles, determine length of hose needed using Parts Catalogue

3 Grommet
4 Angle piece
5 Sealing plug
- Lubricate lightly with brake fluid before inserting

6 Master cylinder

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.

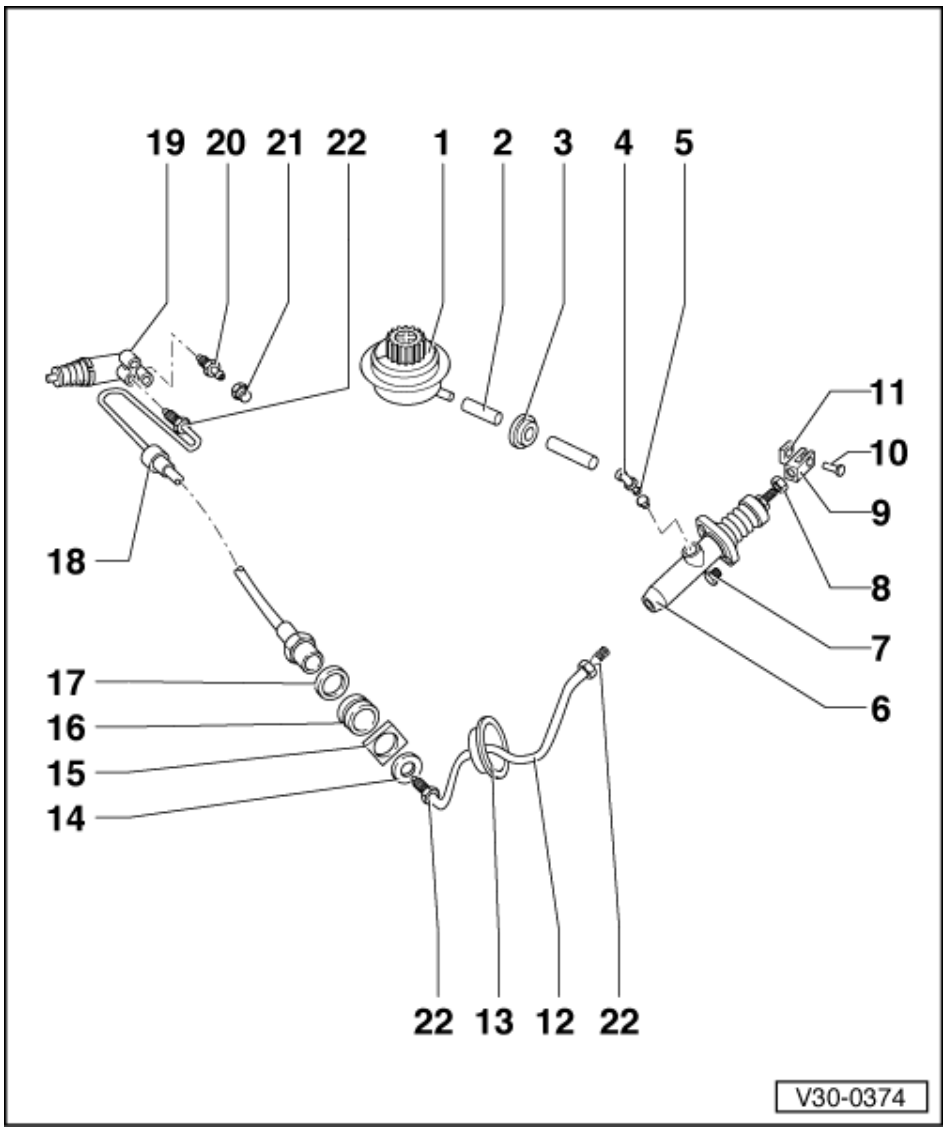


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

7 Bolt - 20 Nm
8 Lock nut - 10 Nm
9 Clevis
- Adjusting => Fig. 21

10 Bolt
11 Locking clip
12 Pipe
- For pedal cluster on right-hand drive vehicles, determine length needed using Parts Catalogue

13 Grommet
14 Washer
- Small internal diameter



15 Bracket

16 Bush

17 Washer

- Large internal diameter

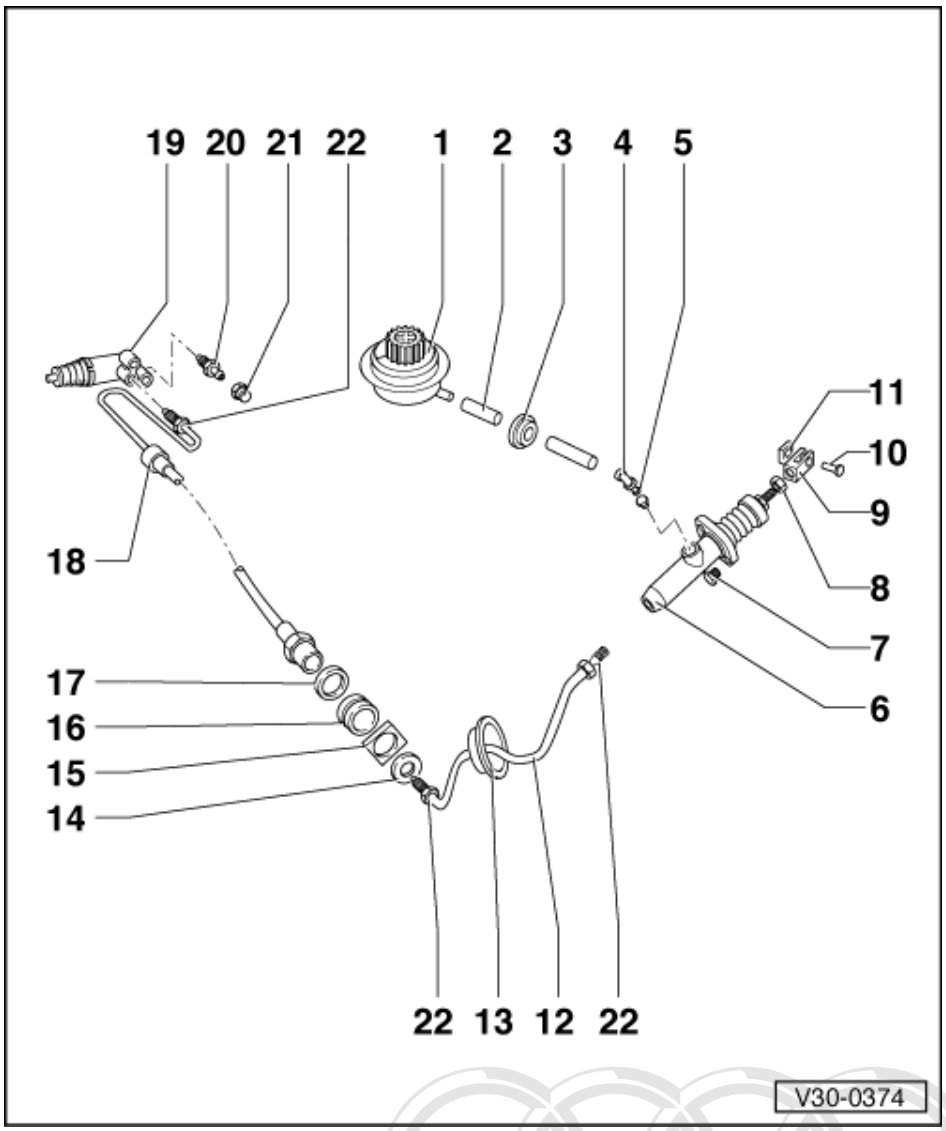
18 Pressure hose

- Must not contact gearbox or surrounding parts
- Correct hose is determined according to engine version using Parts Catalogue

19 Slave cylinder

- Installing => Page 39
- After working on hydraulic clutch mechanism, bleed slave cylinder => Page 33
- Do not depress clutch pedal after removing slave cylinder

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.



20 Bleeder valve

- Bleeding => Page 33

21 Dust cap

22 Pipe union nut - 15 Nm

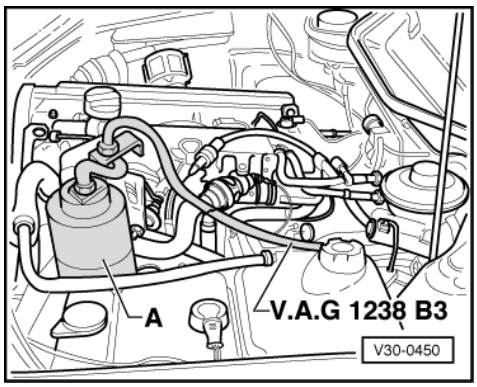
1.5 - Bleeding clutch system

Notes:

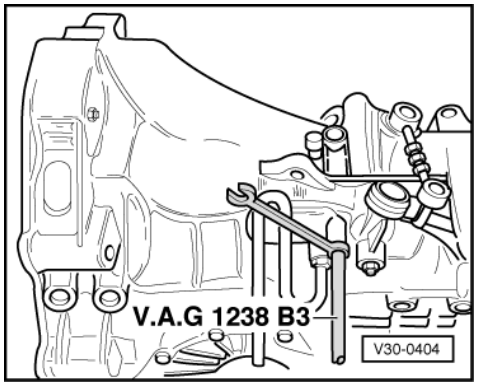
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. ©Copyright by AUDI AG.

- The clutch system must be bled after performing work on the hydraulic clutch mechanism.
- Top up brake fluid reservoir to "max" marking with brake fluid before bleeding clutch system.

- Bleed clutch system only with a brake bleeding unit.
  - Working pressure 2.5 bar



- -> To bleed system, use bleed hose V.A.G 1238 B3 - 670 mm long.
- Connect bleed hose to pressure hose on collector bottle -A- of brake bleeding appliance.



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 and completeness of this document. Copyright by AUDI AG.

- -> Fit ring spanner and hose V.A.G 1238 B3 onto bleed valve and open bleed valve.

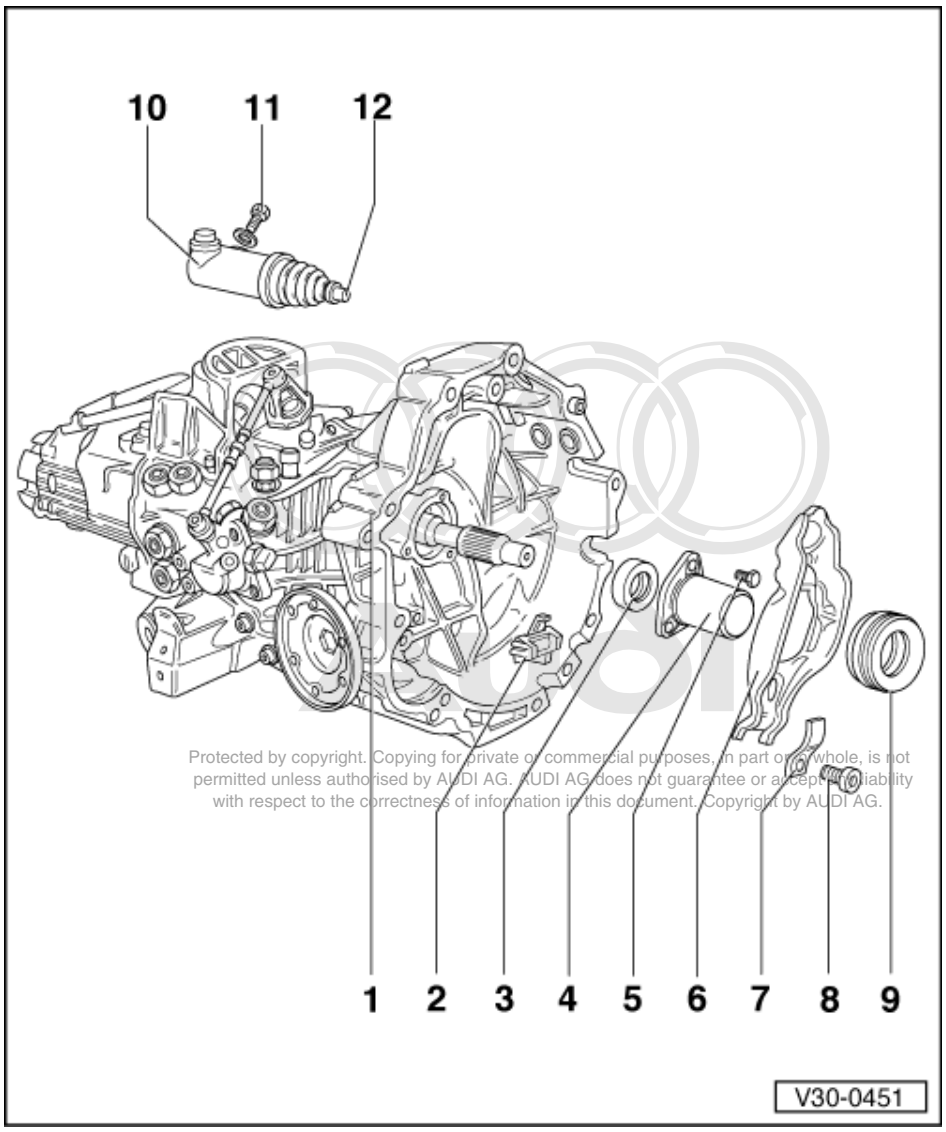
Note:

Ensure bleeder hose is correctly fitted during bleeding operation.

- Depress clutch pedal several times after completion of bleeding process.
- Bleed again if necessary.

2 - Servicing clutch release mechanism

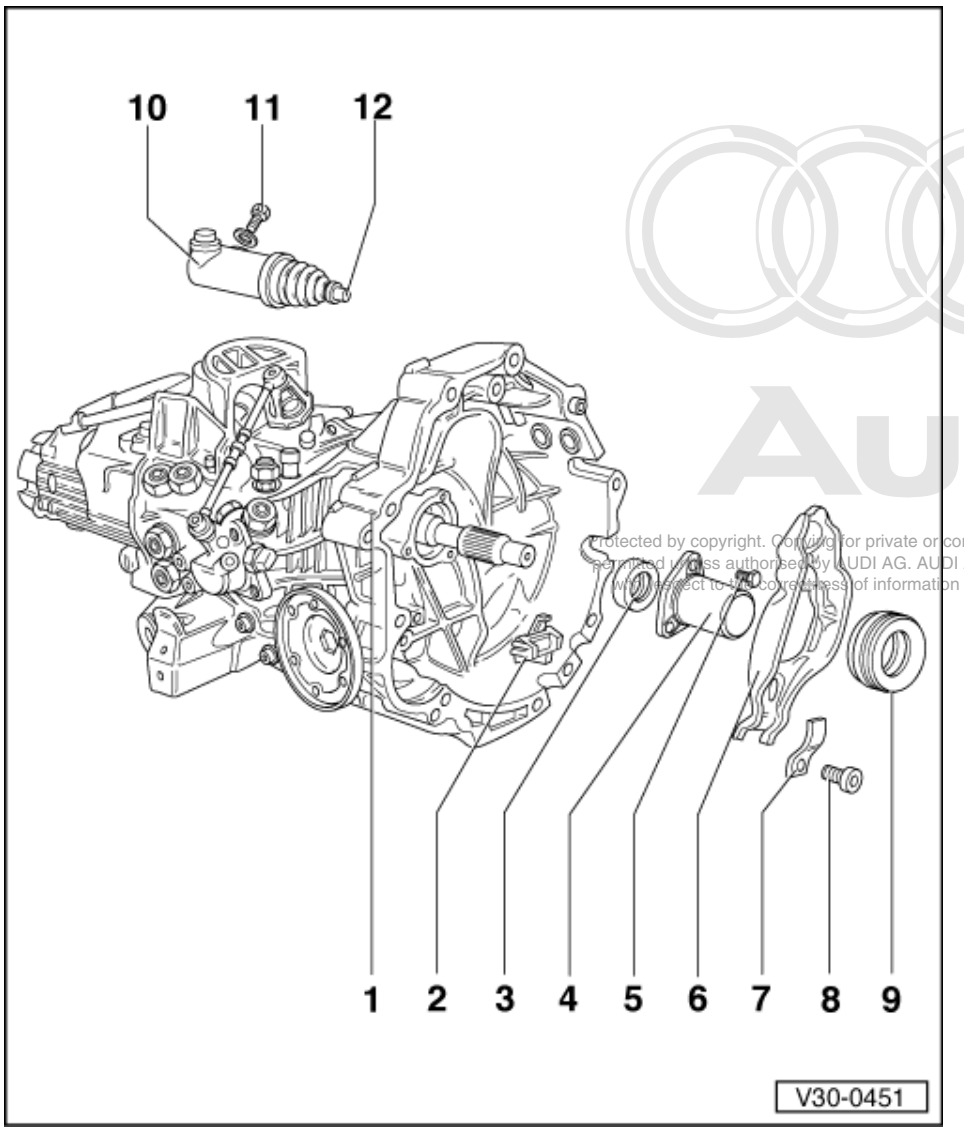
2.1 - Servicing clutch release mechanism



Protected by copyright. Copying for private or commercial purposes, in part or 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**
2 **Intermediate piece**
3 **Shaft seal**
- For input shaft
- Removing => Fig. 1
- Installing => Fig. 2
- Insertion depth 3.5 mm

4 **Guide sleeve**
5 **Bolt - 15 Nm**
- Qty. 3



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.

6 Clutch release lever

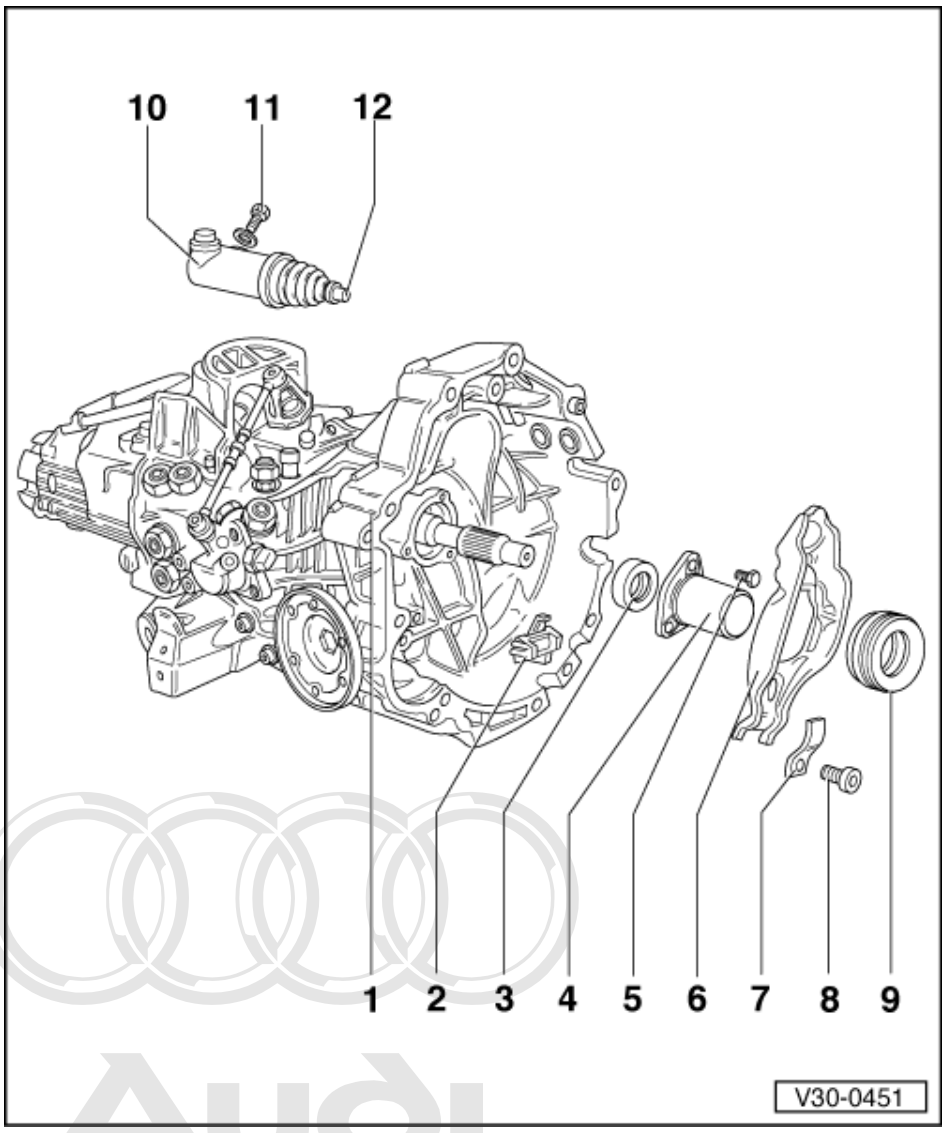
- Must engage in lugs in intermediate piece when installed => Fig. 3
- Before installing, coat contact surface of clutch slave cylinder push rod with thin layer of copper grease.

7 Leaf spring

8 Bolt - 25 Nm

9 Release bearing

- Do not wash out, wipe clean only
- Replace noisy bearings
- Fit bearing onto release lever turned approx. 45o to installation position and engage by turning into position



10 Clutch slave cylinder

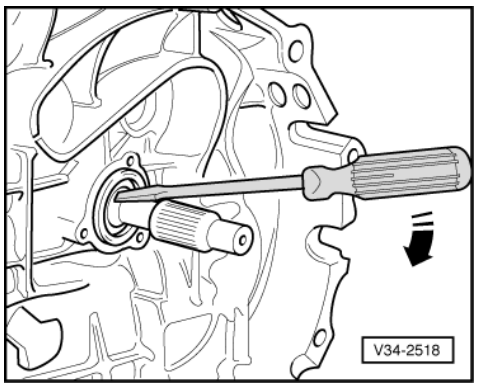
- Bleeding clutch system => page 33
- Installing => Fig. 4
- When installing, push on until the securing bolt can be fitted
- To aid installation, the securing bolt with pointed end listed in Parts Catalogue may be used

11 Bolt - 25 Nm

- Always replace

12 Push rod

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 and completeness of this document. Copyright by AUDI AG.

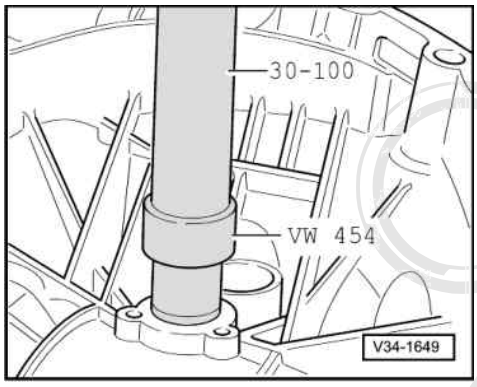


-> Fig.1 Removing shaft seal for input shaft

- Lever out seal carefully with a screwdriver.

Note:

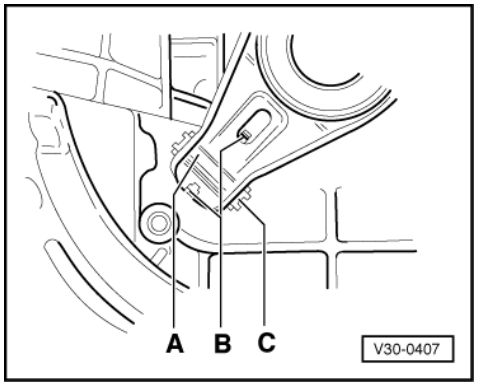
Do not damage bearing surface on input shaft for shaft seal.



-> Fig.2 Installing shaft seal for input shaft

- Pack space between sealing and dust lip of new seal for input shaft with multi-purpose grease.
- Pull a thin protective hose tightly onto splines of input shaft.
- Tap in input shaft oil seal.
  - Insertion depth: 3.5 mm
- Remove protective hose.

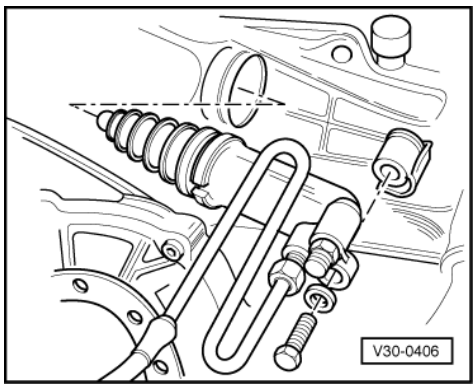
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.3 Installing clutch release lever

A - Clutch release lever
B - Lugs on intermediate piece

C - Intermediate piece



-> Fig.4 Installing clutch slave cylinder

- When inserting the clutch slave cylinder into the mounting hole of the gearbox housing, keep it as far as possible in line with the direction of operation of the push rod.

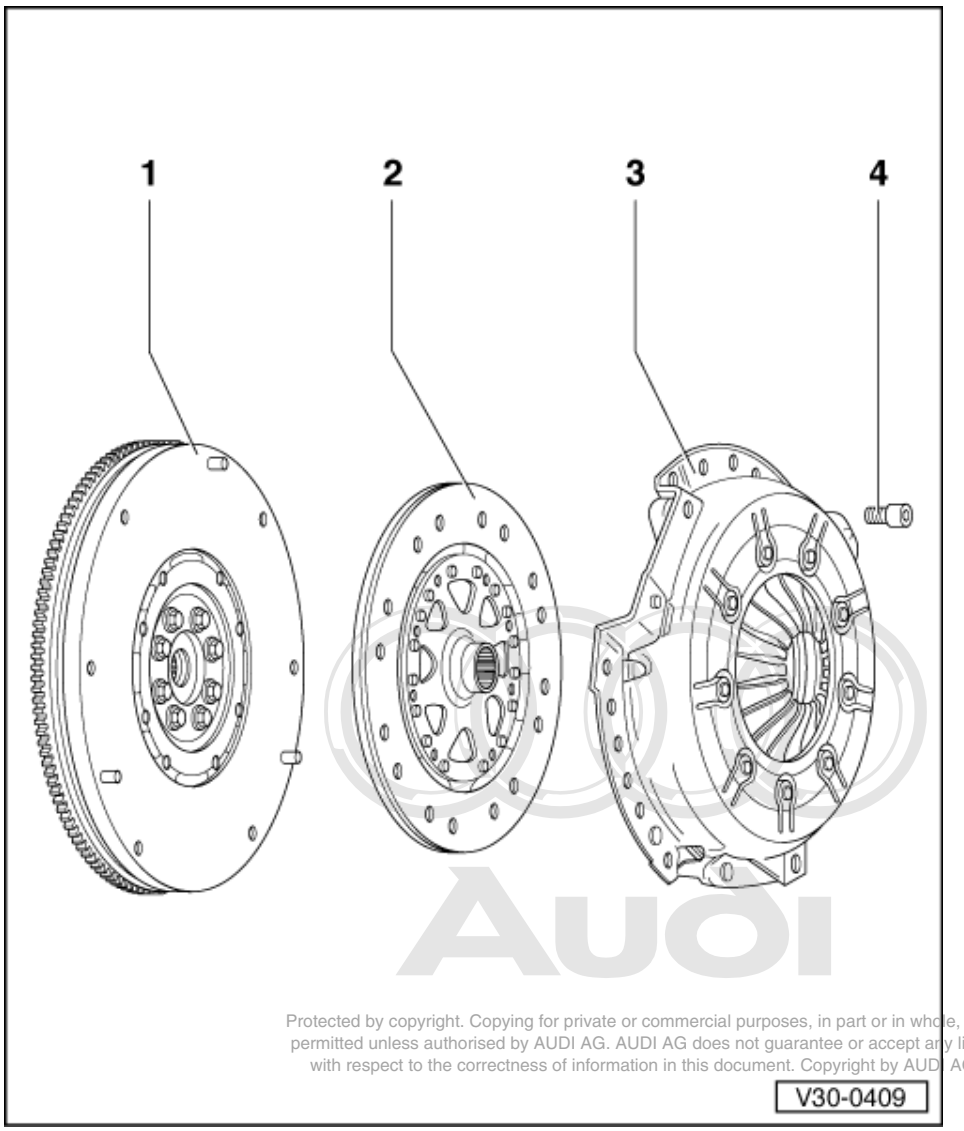
Notes:

- If the clutch slave cylinder is inserted off-line there is a danger that the push rod will be guided past the clutch release lever.
- To facilitate installation, engage 6th gear (6-speed gearbox) or 5th gear (5-speed gearbox) before fitting the slave cylinder.
- When installing, press in the clutch slave cylinder far enough so that the securing bolt can be fitted easily.
- Always replace securing bolt. To aid installation, the securing bolt with pointed end listed in Parts Catalogue may be used.

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 - Servicing clutch

3.1 - Servicing clutch



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.

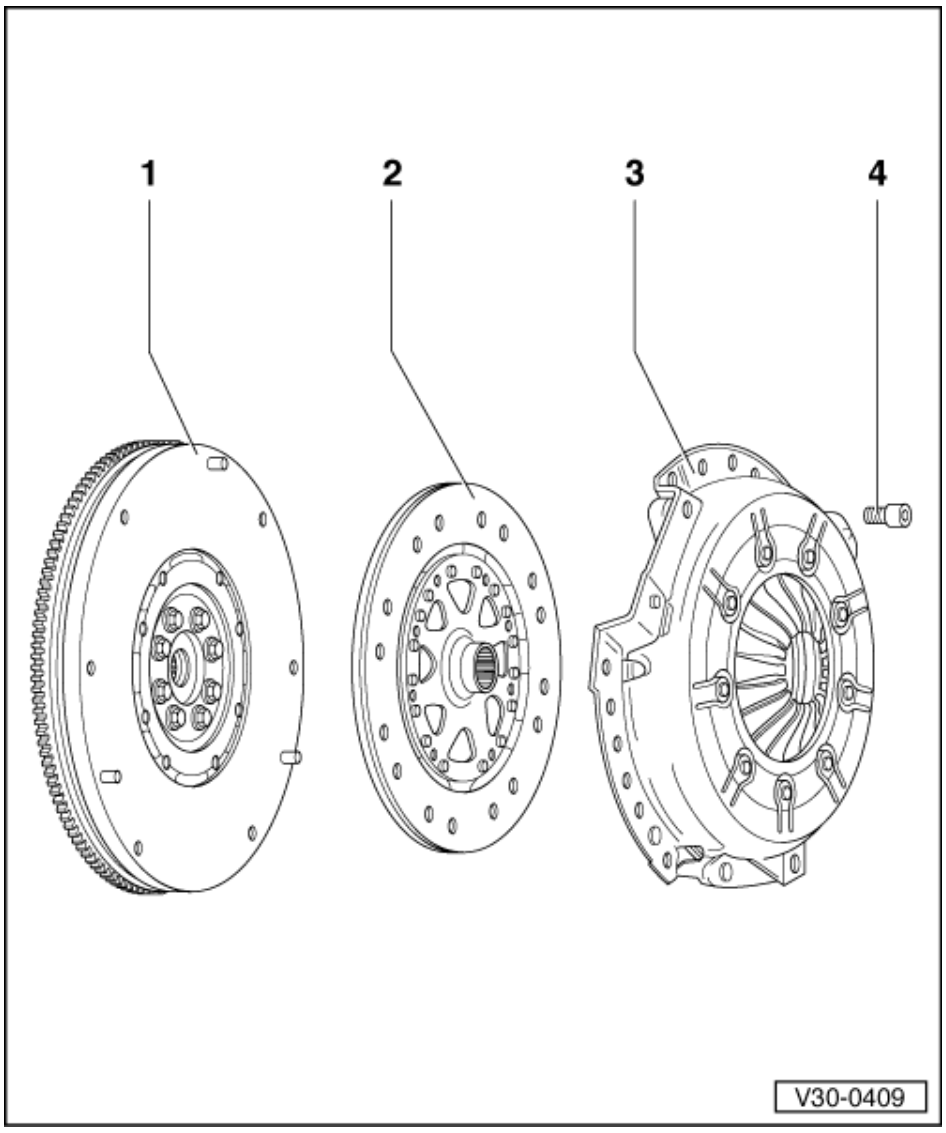
- Remove gearbox to work on clutch => Page 61 .

1 Flywheel

- Make sure that centring pins are a tight fit.
- Contact surface for clutch lining must be free of grooves, oil and grease
- Removing and installing

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 13; Dismantling and assembling cylinder block, crankshaft and flywheel Dismantling and assembling cylinder block, crankshaft and flywheel

=> 8-cyl. fuel injection engine, Mechanics; Repair group 13



- Removing and inserting needle roller bearing in flywheel

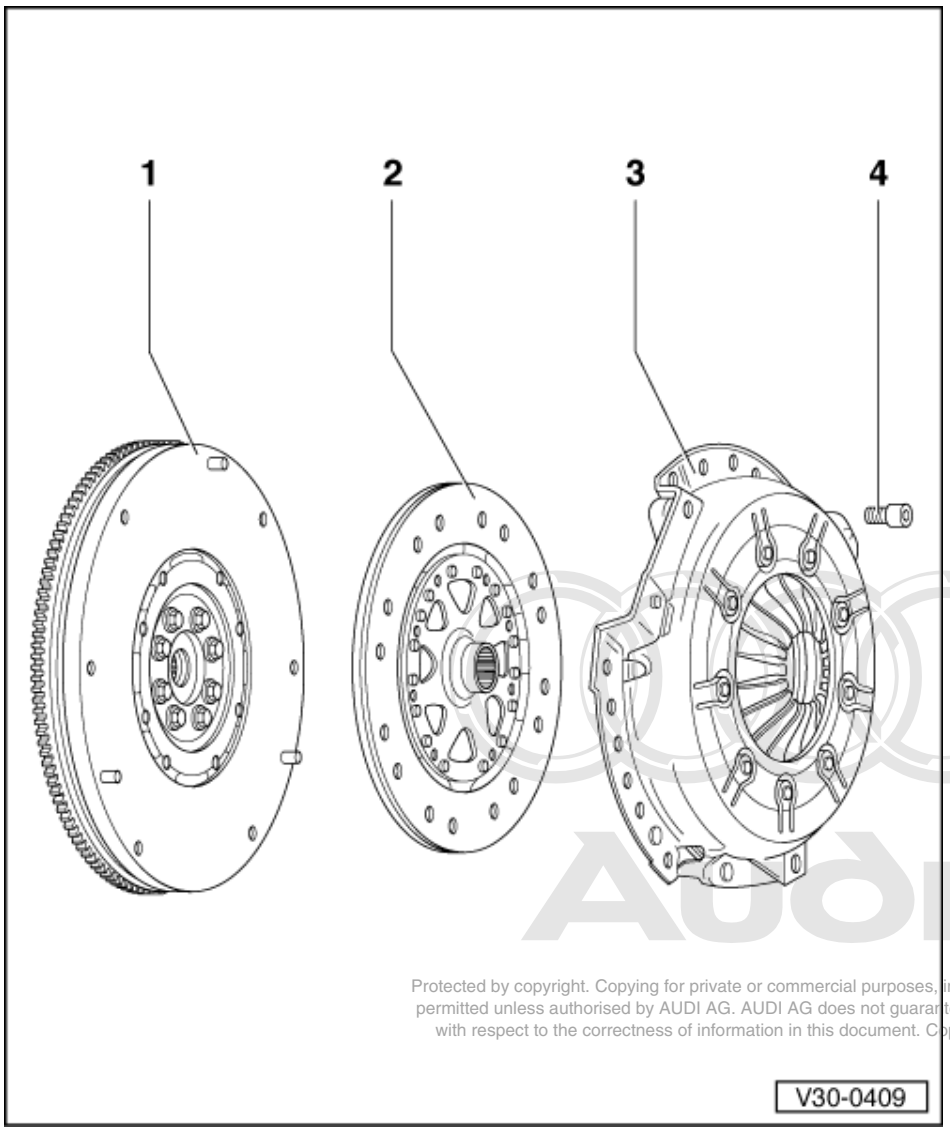
=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 13; Dismantling and assembling cylinder block, crankshaft and flywheel Dismantling and assembling cylinder block, crankshaft and flywheel

=> 8-cyl. fuel injection engine, Mechanics; Repair group 13

2 Clutch plate

- Installation position on 5-cylinder engine: Longer hub side towards pressure plate and gearbox
- Installation position on 8-cylinder engine: Spring pack (coil springs) towards pressure plate and 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.



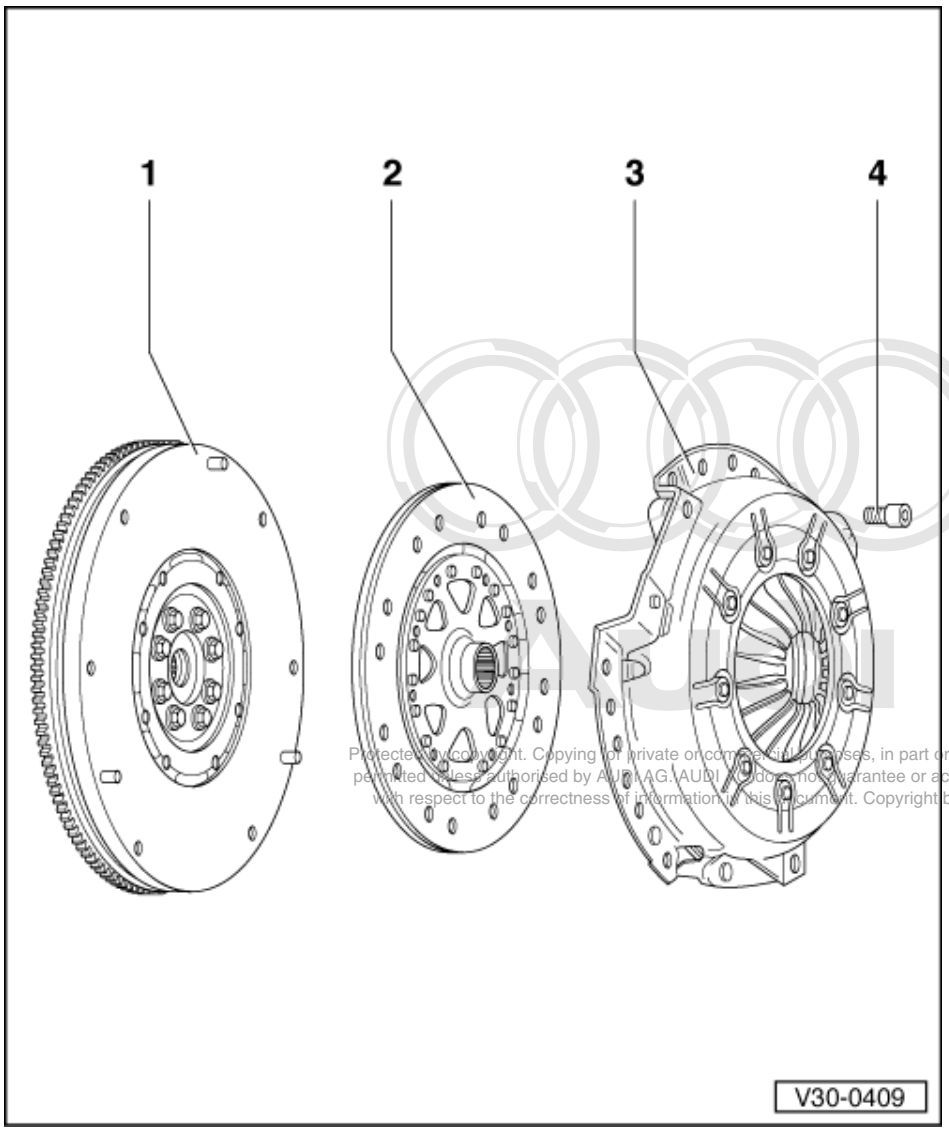
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Centring =>Fig. 1
- Do not grease
- => Notes
- Clutch plate diameter => Page 2 onwards

Notes:

- Clean input shaft splines and (in the case of used clutch plates) the hub splines. Remove corrosion and apply only a very thin coating of grease G 000 100 to the splines. Then move clutch plate to and fro on input shaft until hub moves freely on shaft. Excess grease must be removed.
- Before replacing clutch plate

=> Fault-finding No. 9 - Defects on the clutch and clutch mechanism



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 Pressure plate

- Removing and installing => Fig. 1
- Check ends of diaphragm spring => Fig. 2
- Check spring connection and riveted fastenings => Fig. 3

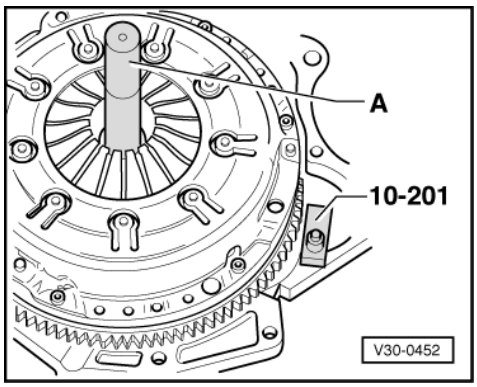
Notes:

- Pressure plates are protected against corrosion and greased. Only the contact surface may be cleaned, otherwise the service life of the clutch will be considerably reduced.
- Before replacing pressure plate

=> Fault-finding No. 9 - Defects on the clutch and clutch mechanism

4 Bolt - 25 Nm

- Tighten in stages and in diagonal sequence



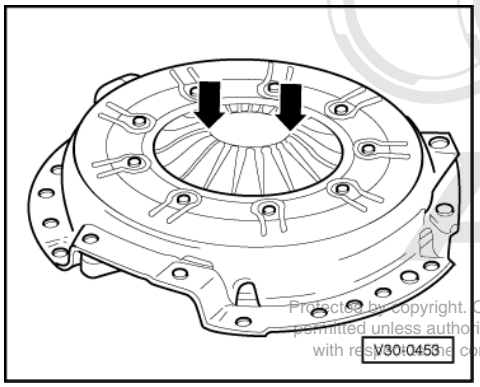
-> Fig.1 Removing and installing clutch

- Loosen and tighten bolts in stages and diagonally - 25 Nm.
- Reverse position of counter-hold tool 10-201 when removing.

A - Mandrel 3176

Notes:

- Pressure plate must make full contact with flywheel before the securing bolts are inserted.
- Do not pull down the pressure plate as this would damage the centring holes in the pressure plate and the centring pins on the flywheel



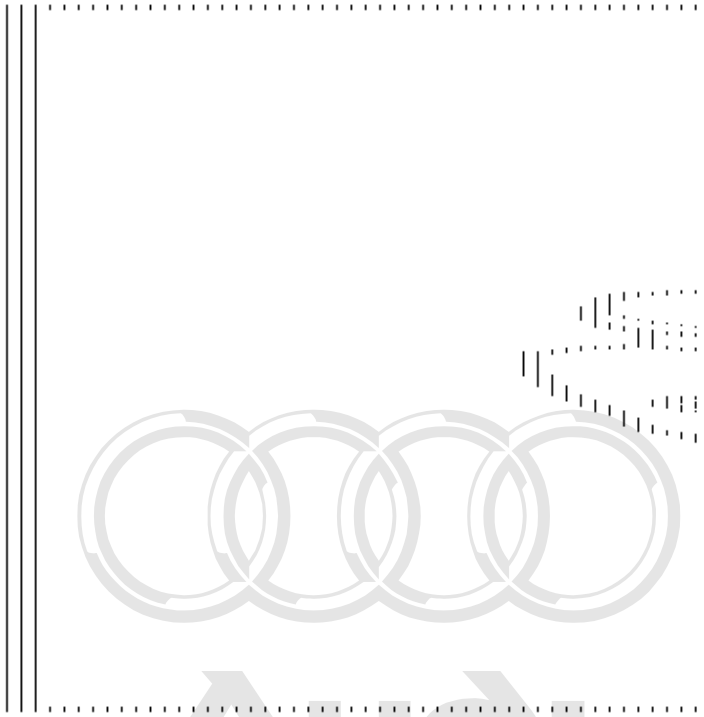
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.2 Checking ends of diaphragm spring

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

Note:

When performing repairs always match up clutch pressure plate and clutch plate by checking engine code (see Parts Catalogue).



-> Fig.3 Checking spring connection and riveted fastenings

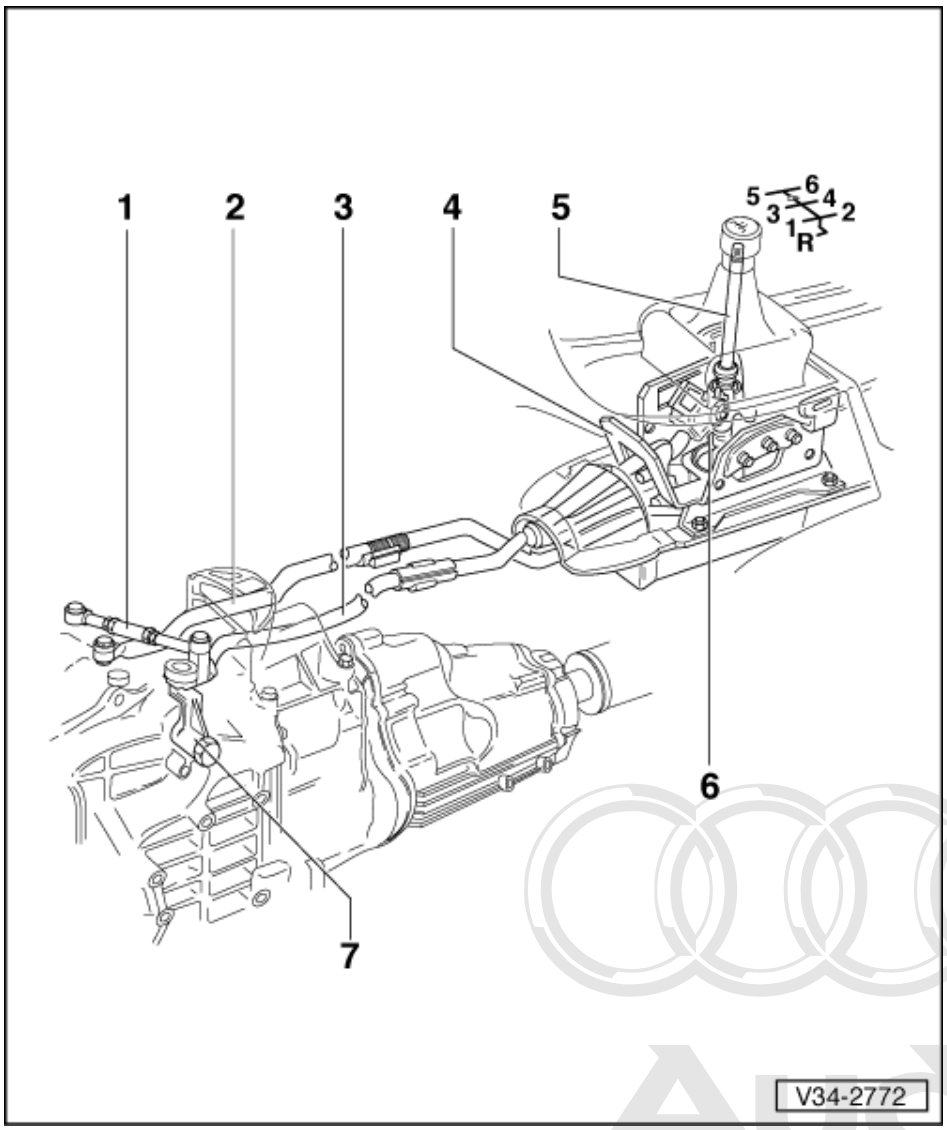
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not
with respect to the correctness of information in this document. Copyright by AUDI AG.

- Check spring connection between pressure plate and cover for cracks and make sure rivet fastenings are seated tightly.
- Replace clutches with damaged springs or loose riveted fastenings -arrows-.

34 - Controls, Housing

1 - Servicing shift mechanism

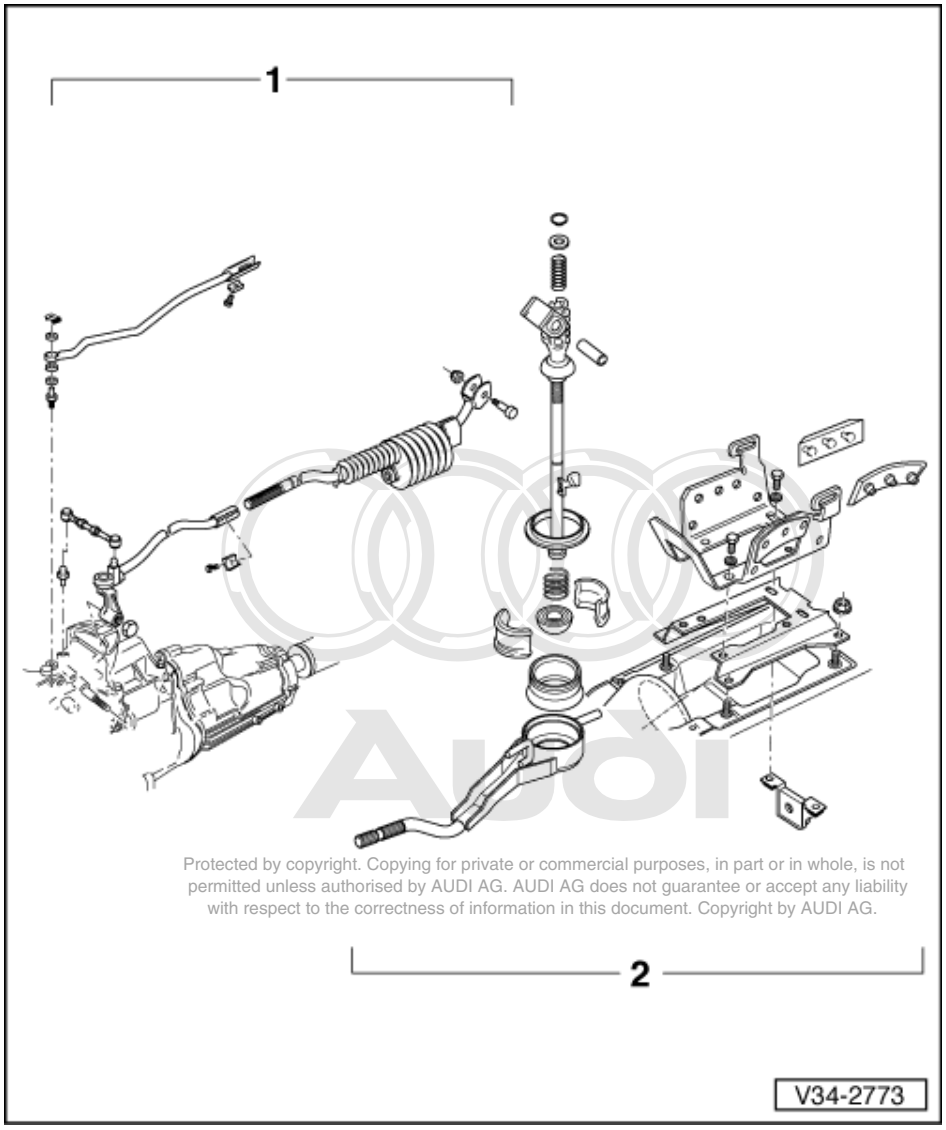
1.1 - Servicing shift mechanism



1 Adjusting rod
2 Push rod
3 Selector rod
4 Stop plate
5 Gear stick
6 Gear stick mounting
7 Selector lever on 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.

1.2 - Dismantling and assembling shift mechanism



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:

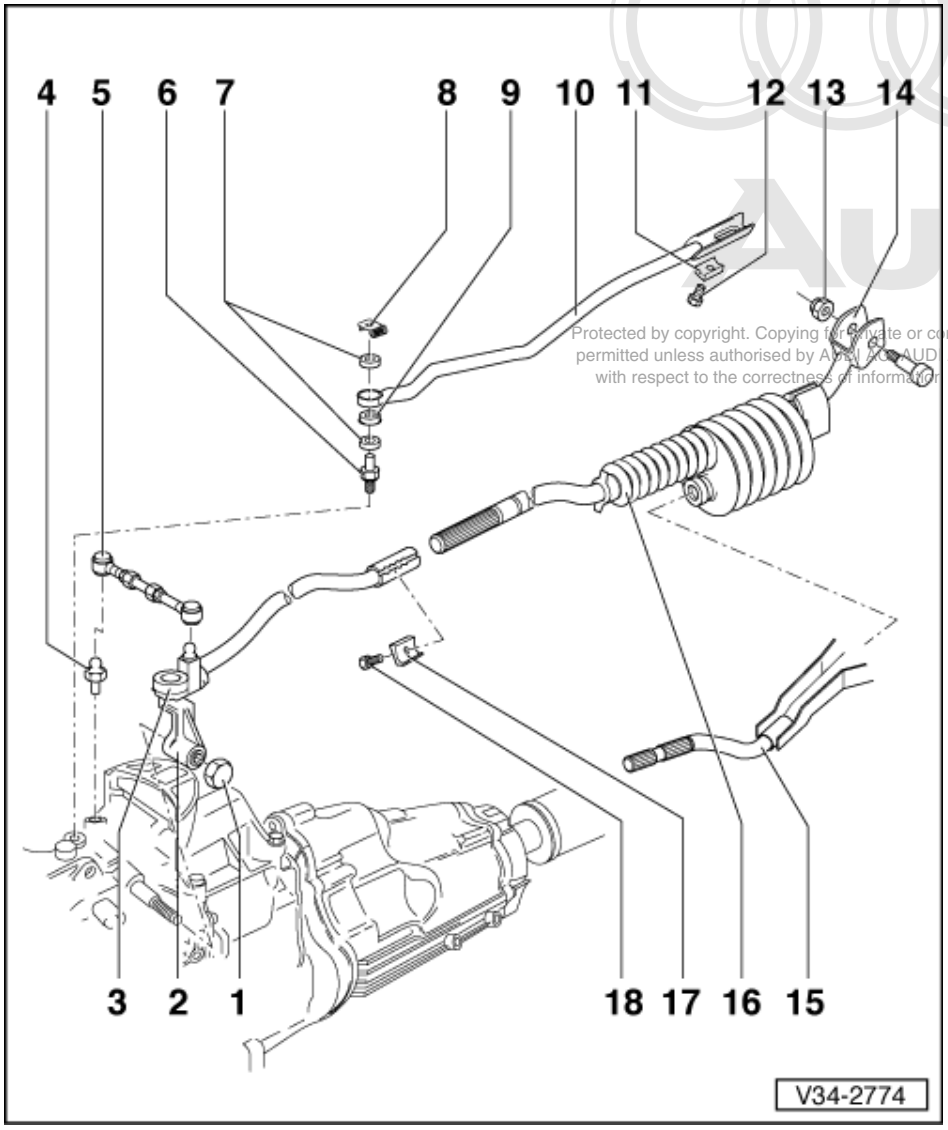
Grease all joints and sliding surfaces with polycarbamide grease G 052 142 A2.

- Removing and installing selector rods => Page 55
- Removing and installing push rods => Page 55
- Adjusting and checking shift mechanism => Page 58 .

1 Selector rod and front push rod
- Servicing => Page 48

2 Gear stick and rear push rod
- Servicing => Page 51

1.3 - Servicing selector rod and front push rod

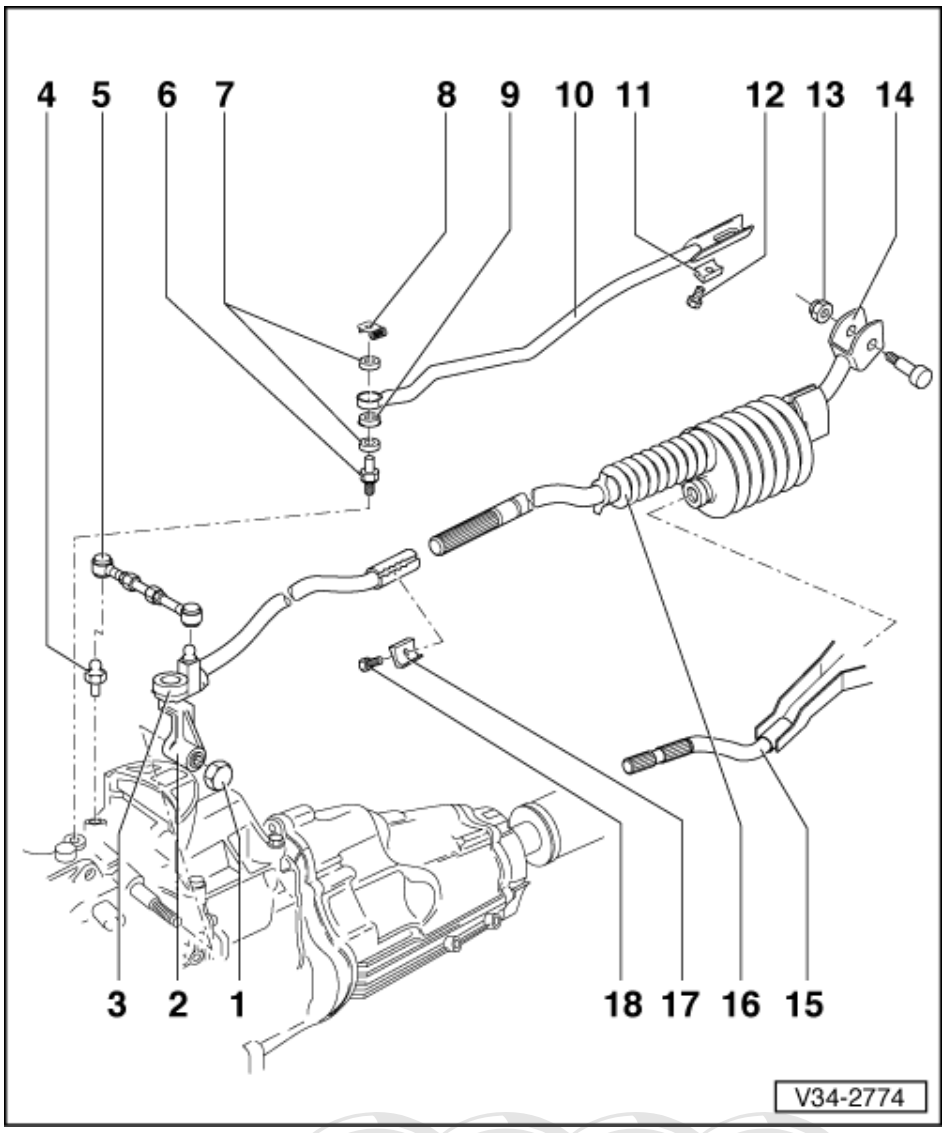


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 Cap nut - 25 Nm
2 Selector lever on gearbox
- Dismantle together with front selector rod

3 Front selector rod
- Dismantle together with selector lever -Item 2 -
- Do not dismantle from selector lever -Item 2 -

4 Ball stud - 20 Nm
5 Connecting rod
- Adjusting => Page 58

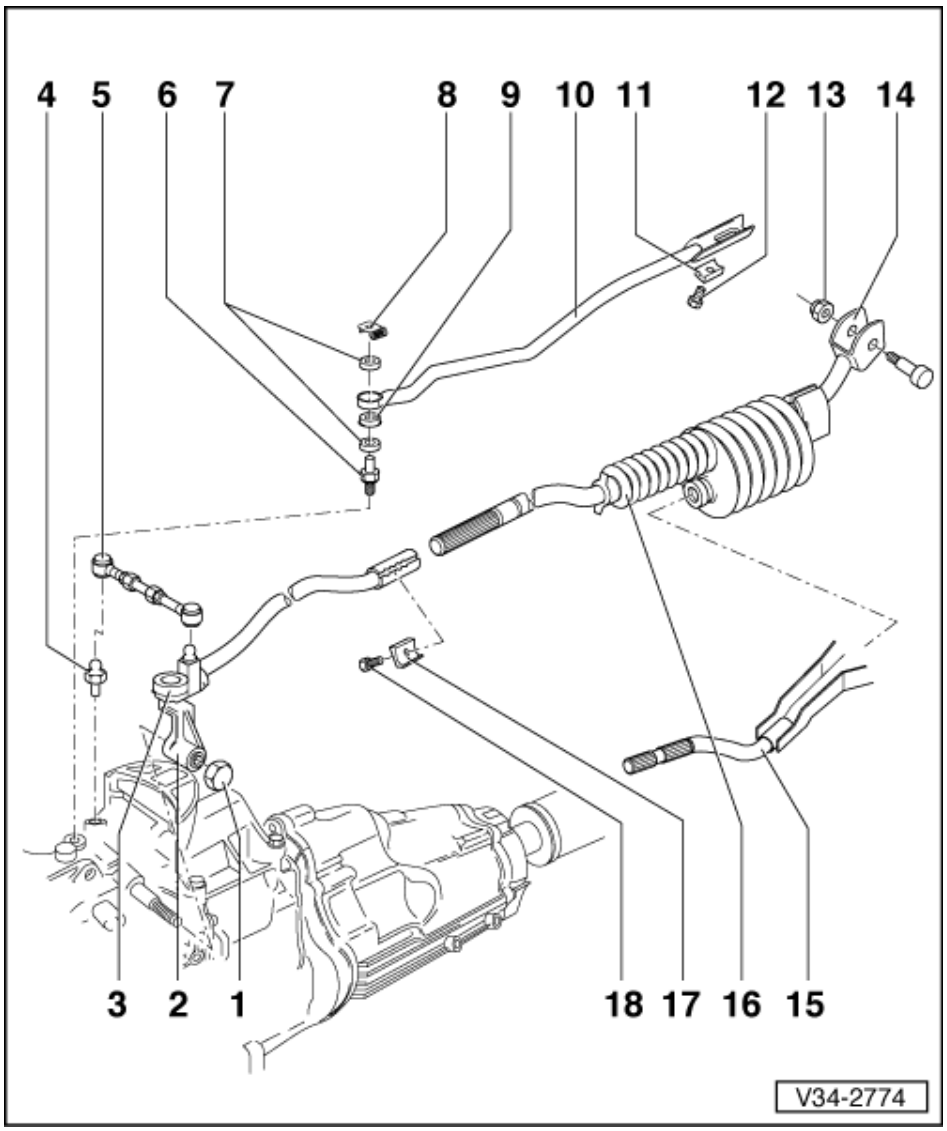


6 Trunnion bolt - 40 Nm
7 Washer
8 Circlip
9 Bush
10 Front push rod
- Removing and installing => Page 55

11 Clamp
12 Bolt - 25 Nm
13 Lock nut - 10 Nm
- Always replace

14 Rear selector rod
- Removing and installing => Page 55

Reproduction, 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.



15 Rear push rod

- Removing and installing => Page 55

16 Boot

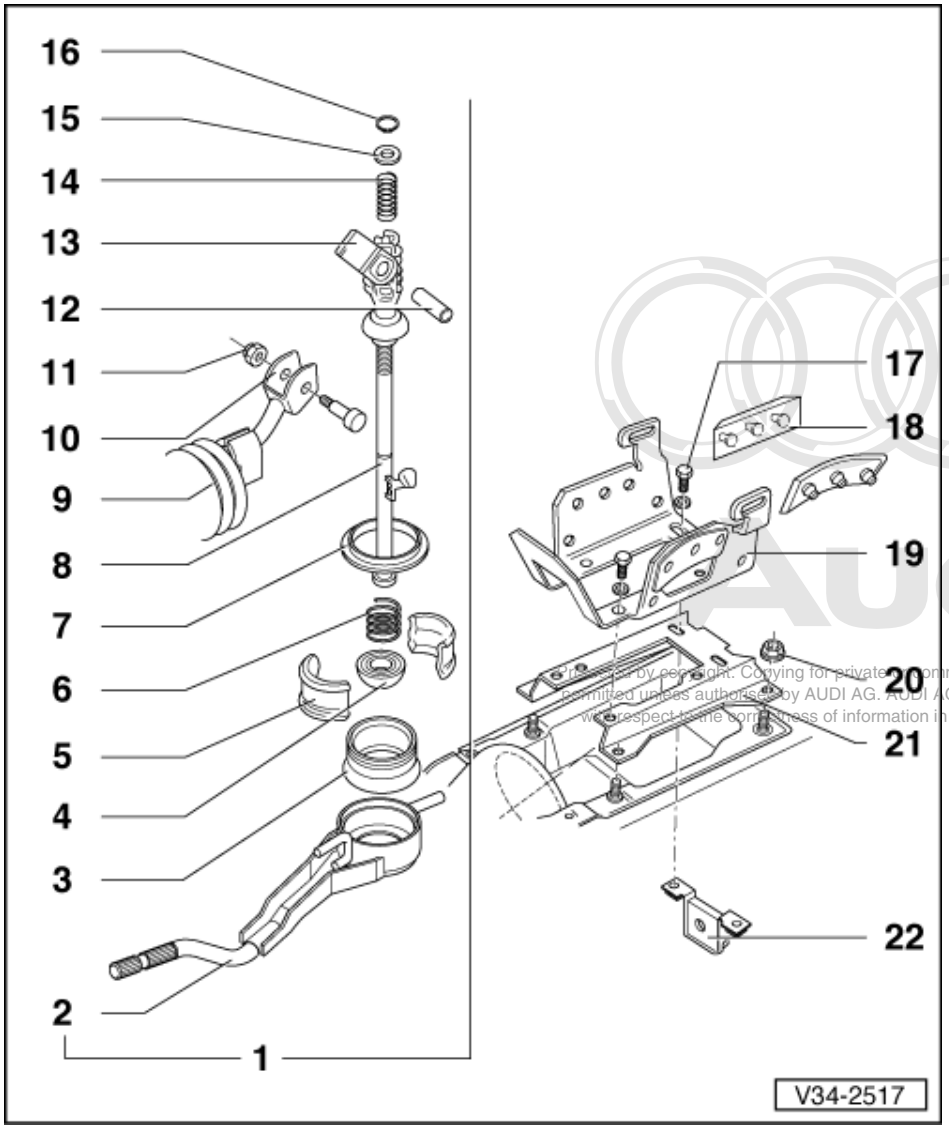
- Install so that marking lug is facing up

17 Clamp

18 Bolt - 25 Nm

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.

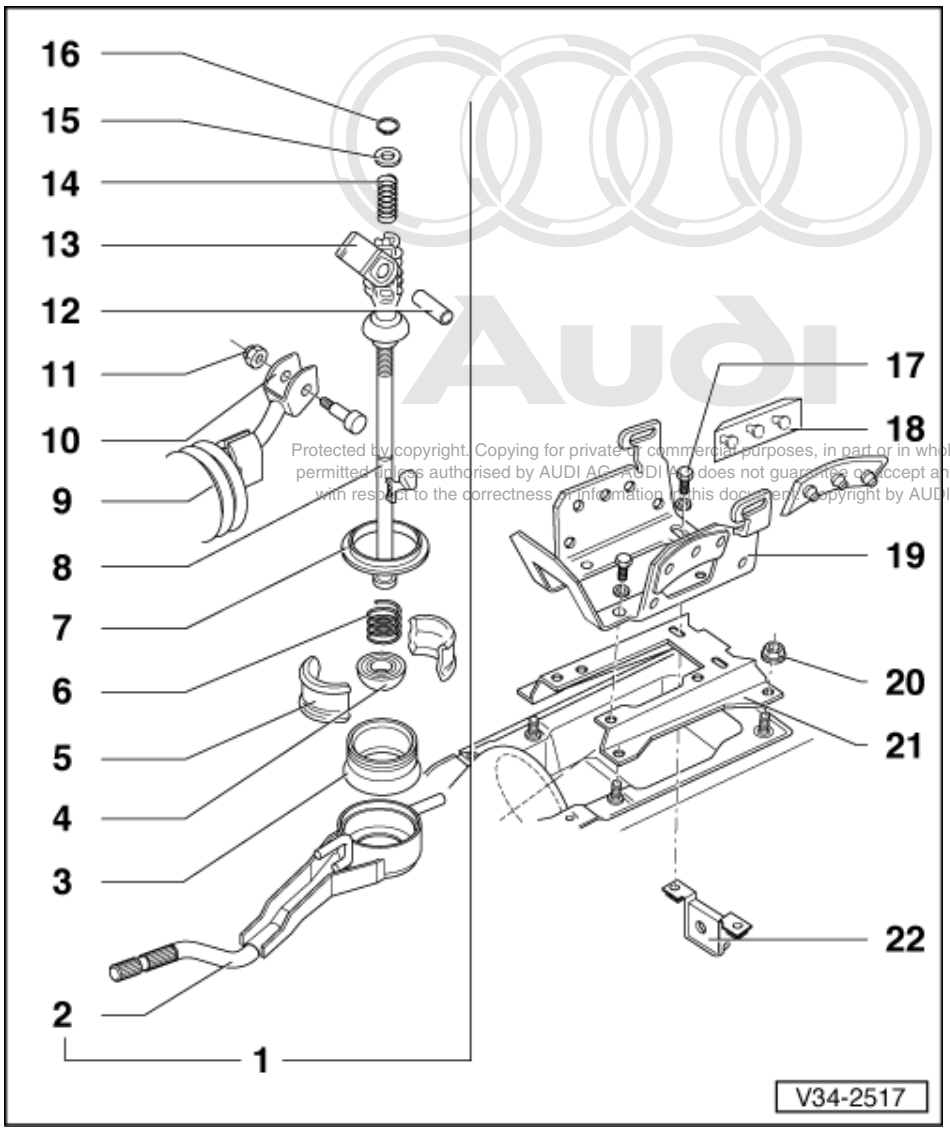
1.4 - Servicing gear stick and rear push rod



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 **Complete gear stick**

- ◆ Dismantle only to grease
- ◆ Assembling:
- - Pre-assemble rubber guide, shell sections and bottom hemispherical ball.
- - Insert gear stick with spring, intermediate plate and top hemispherical ball into shell sections.
- - Press rubber guide into gear stick mounting.
- - Fit intermediate plate and peen gear stick mounting at three points so that intermediate plate is secure => Fig. 1 .
- ◆ Adjusting => Page 58

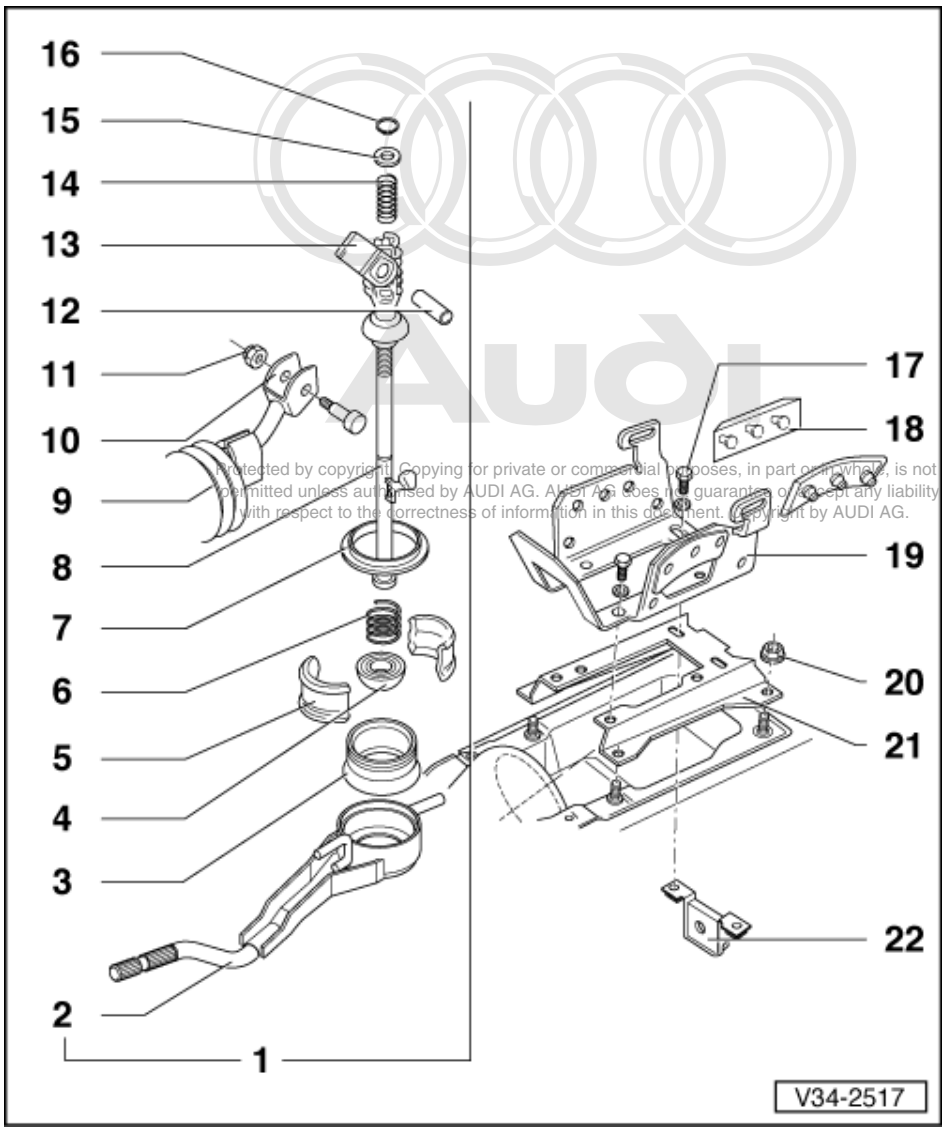


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

2 Rear push rod
- With gear stick mounting, bearing pin and catch pin
- Adjusting => Page 60

3 Rubber guide
- Installation position: Shoulder faces up

4 Lower hemispherical ball
5 Shell section
6 Spring
7 Intermediate plate
8 Gear stick
9 Boot

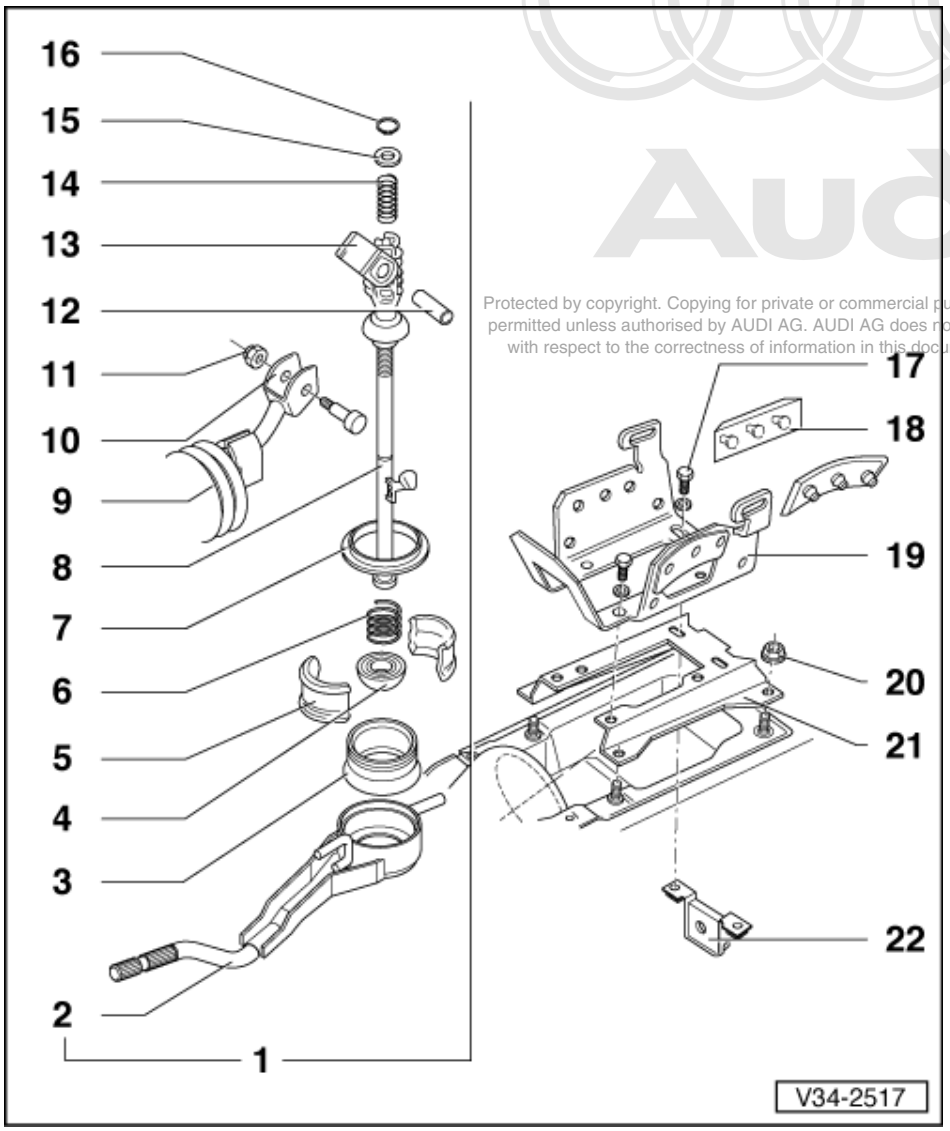


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

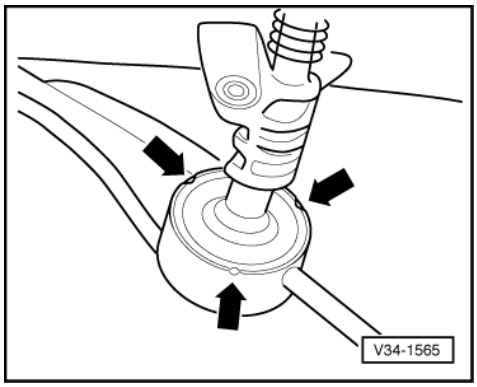
10 Rear selector rod
11 Lock nut - 10 Nm
- Always replace

12 Tube
13 Guide for gear stick
14 Spring
15 Spacer bush
16 Circlip
17 Bolt - 10 Nm
18 Buffer left and right
- When replacing after assembling shorten 6 studs by approx. 7 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.



19 Upper stop piece
20 Combi nut
21 Lower stop piece
22 Mounting bracket



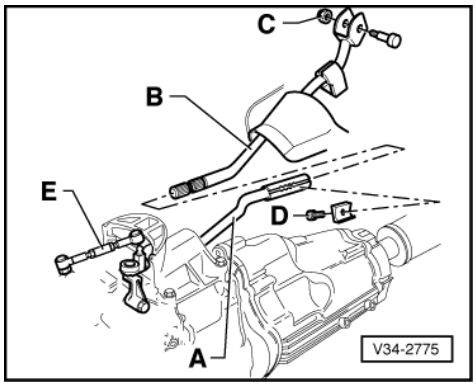
-> Fig.1 Peening gear stick mounting

- Fit intermediate plate and peen heartsick mounting at three points -arrows- so that intermediate plate is secure.

1.5 - Removing and installing selector rods

- Gearbox installed

Removing:



- -> Release clamping piece -D-.
- Unscrew rear selector rod -B- from selector lever and slide forward over the push rod catch pin.
- Lift out selector rod.
- Lever connecting rod -E- off front selector rod -A-.
- Remove selector lever on gearbox and pull out selector rod underneath cable arrester for procon-ten-system.

Installation:

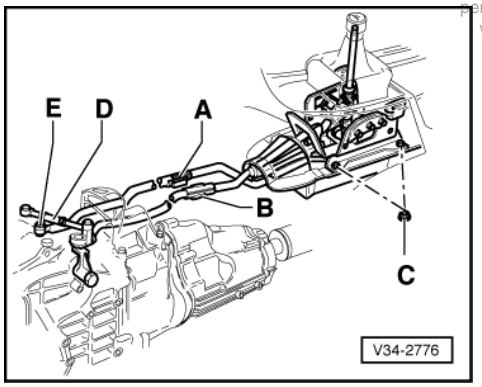
- First attach front selector rod -A- with selector lever to gearbox, connect to rear selector rod -B- and bolt onto gear stick.
- When installing front and rear selector rods, ensure that boot is correctly seated.
- Press on connecting rod using an assembly lever.
- Re-adjusting selector mechanism => Page 58

1.6 - Removing and installing push rods

- Gearbox installed

Removing:

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:

The rear push rod is removed complete with gear stick and rear selector rod.

- -> Unscrew clamping pieces -A- and -B-.
- Remove centre console front and rear sections

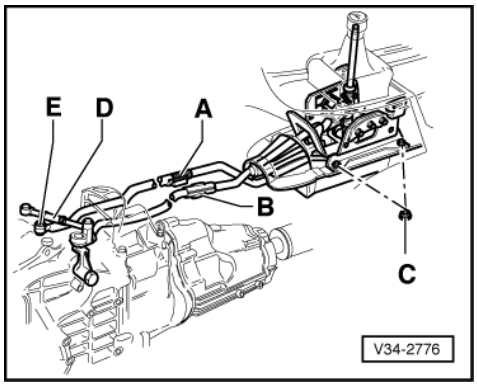
=> General body repairs; Repair group 70; Dash panel, Removing and installing centre console rear section and removing and installing centre console front section Dash panel, Removing and installing centre console rear section and removing and installing centre console front section

- Unscrew stop piece -C-.
- Lift out rear push rod, gear stick, selector rod and boot.
- Lever off connecting rod -D-, remove circlip -E-.
- Take off front push rod.

Installation:

- Replace circlip and ensure it is correctly seated =>Page 49 .
- Ensure boot is correctly seated => Page 56 .
- Re-adjusting selector mechanism => Page 58

1.7 - Removing and installing boot



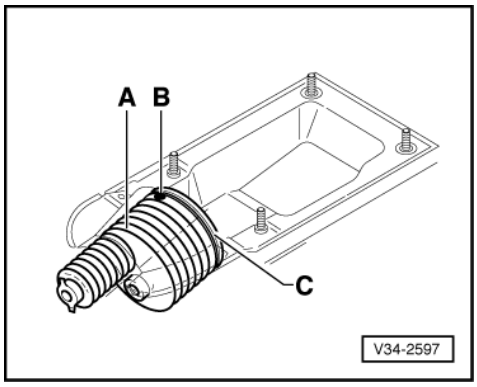
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing:

- -> Unscrew clamping pieces -A- and -B-.
- Remove gear stick knob and cover.

=> General body repairs; Repair group 70; Dash panel, Removing and installing centre console rear section Dash panel, Removing and installing centre console rear section

- Unscrew rear selector rod from gear stick and slide forward over the push rod catch pin => Page 51 .
- Lift out selector rod.



- -> Pull out boot -A- downwards over push rod.

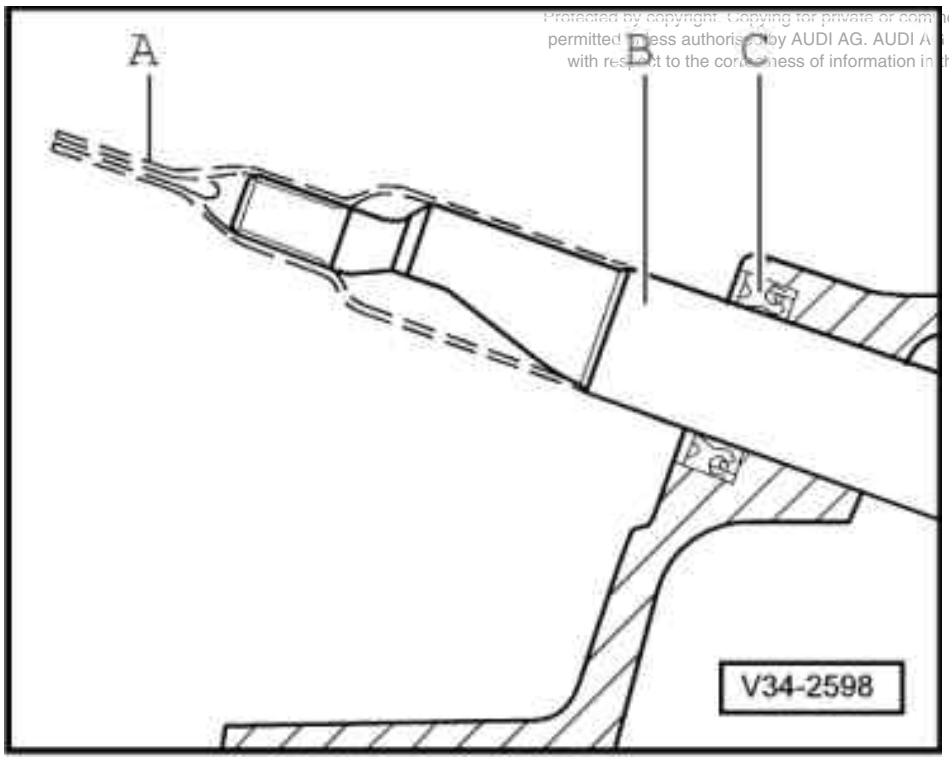
Installation:

- When installing ensure that marking lug -B- is facing up and that edge of boot -C- is correctly fitted in place.

1.8 - Replacing shaft seal for selector shaft

- Gearbox removed but not dismantled

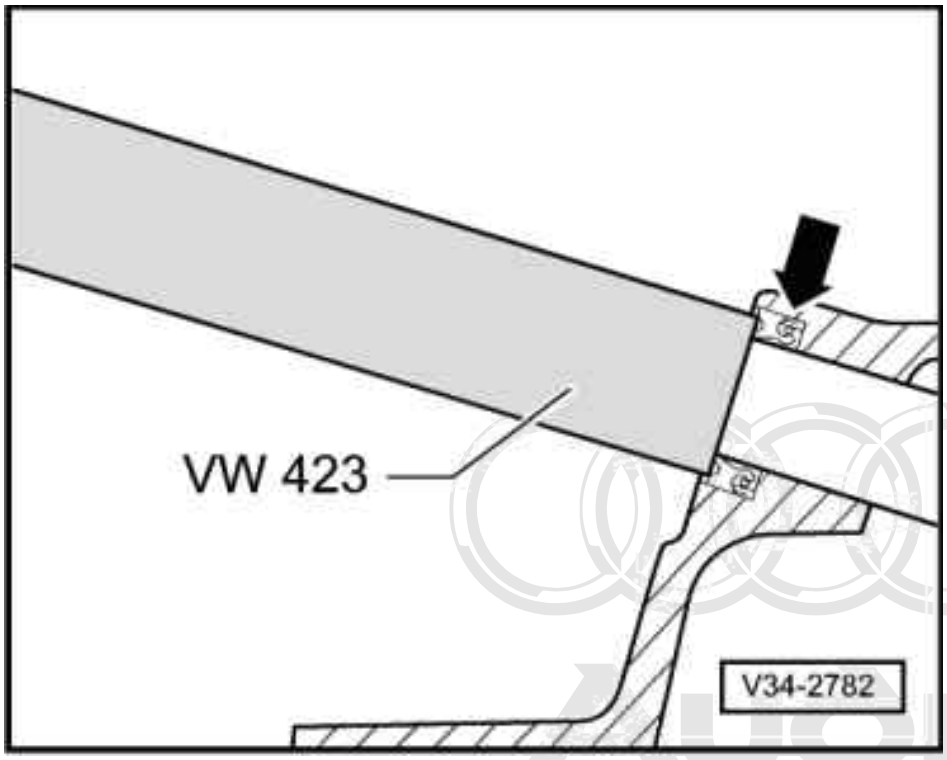
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Carefully lever out shaft seal -C- with a small screwdriver.
- Slide assembly sleeve -A-, Part No. 01E 311 120, over selector shaft -B-.

Notes:

- Lightly oil seal.
- Pack space between sealing and dust lips with multi-purpose grease.
- Always use fitting sleeve to install shaft seal.



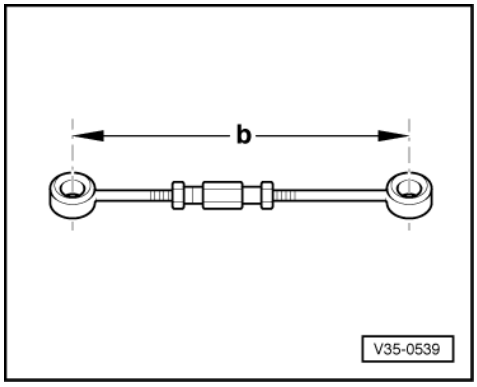
- -> Drive new shaft seal -arrow- into housing onto stop with press piece VW 423.

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 - Adjusting and checking selector mechanism

2.1 - Adjusting and checking selector mechanism

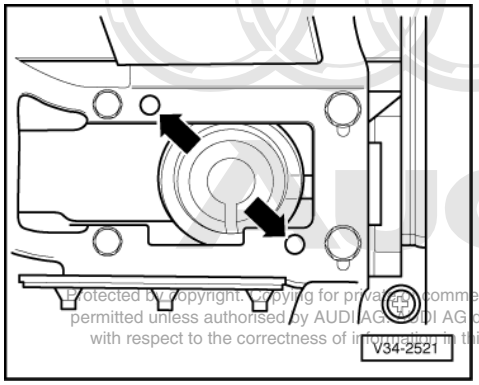
2.2 - Basic adjustment (adjustment instructions)



The basic adjustment must be performed if the fine adjustment is not sufficient or if the clamping pieces have been loosened when performing repairs.

- -> Adjust connecting rod, ball sockets must align.
  - Dimension b = 168.5 mm
- Removing and installing connecting rod => Page 55
- Remove gear stick knob and cover.

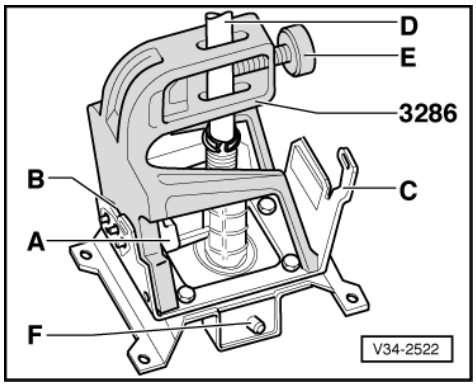
=> General body repairs; Repair group 70; Dash panel, Removing and installing centre console rear section
Dash panel, Removing and installing centre console rear section



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.

- -> Align centring holes -arrows- of upper and lower stop pieces .
- Tighten bolts to 10 Nm.
- Position gear stick in neutral position in 3rd/4th gear gate.
- Install clamps for selector and push rods so that they can still be turned and moved relative to one another easily.
- Adjust gear stick and rear push rod.

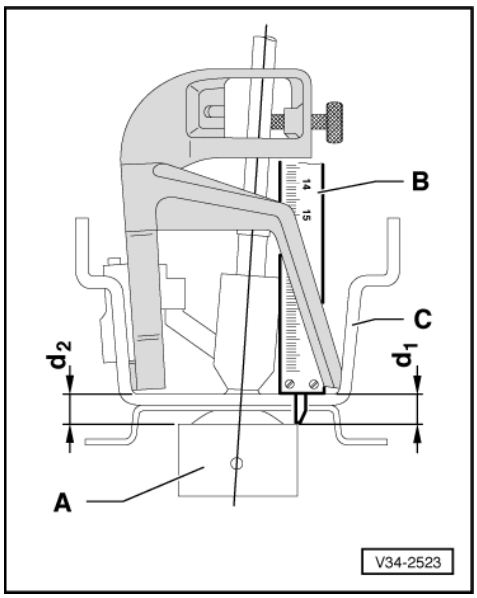
Adjusting gear stick



- Fit gear stick jig 3286 over gear stick -D- and snap into position.
- Insert gear stick jug 3286 on left-hand side into free holes and then into holes on right-hand side of stop upper part -C-.
- Tighten knurled screw -E- lightly until the stop head -A- lies against the gear stick jig 3286.

B - Left stop buffer
F - Locating pin

Adjusting rear push rod



Note:

-> When adjusting the rear push rod the gear stick mounting -A- is aligned with the upper stop piece -C-.

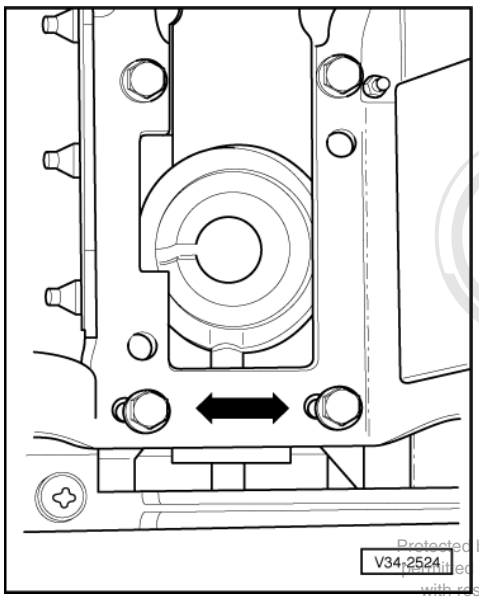
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Determine distances d1 and d2 on left and right-hand edges of gear stick mounting -A- with calliper gauge -B-.
- Align gear stick mounting to a permissible difference of 1 mm between d1 and d2.
- Tighten clamp joint of selector and push rods => Page 55 .
- After turning back knurled screw, take gear stick jig 3286 out of upper stop piece -C-.
- Install gear stick knob and cover.

=> General body repairs; Repair group 70; Dash panel, Removing and installing centre console rear section Dash panel, Removing and installing centre console rear section

2.3 - Checking gear stick alignment

- Engage 2nd gear and push gear stick to the left against stop.
- Reduce pressure on gear stick until it moves back to pressure point.
  - Return spring travel must be 3 ... 9 mm, measured at gear stick knob.
- Check that all gears can be engaged.



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 operation of reverse gear lock.
  - It must be possible to move the gear stick, without pushing and without force, forwards from the reverse gear lock to the 3rd/4th gear plane
- Check fine adjustment if necessary.

2.4 - Fine adjustment instructions

- -> If the return spring travel is not correct, perform a correction in the lateral direction by moving sideways in the elongated holes -arrow- of the upper stop piece.

3 - Removing and installing gearbox - Vehicles with 5-cylinder engine

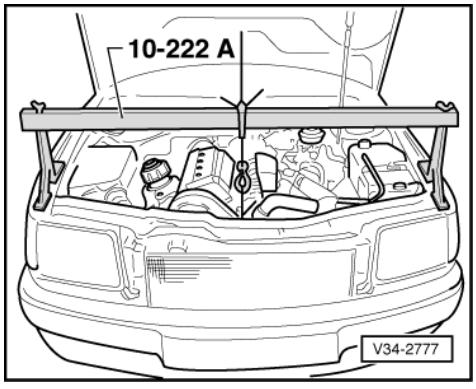
3.1 - Removing and installing gearbox - Vehicles with 5-cylinder engine

Removing

Note:

Before disconnecting the battery, determine radio security coding.

- Detach battery earth strap.
- -> Remove upper engine/gearbox upper connecting bolts => Page 65 , apply full steering lock if necessary.
- Pull connector off reversing light switch and speedometer sender.



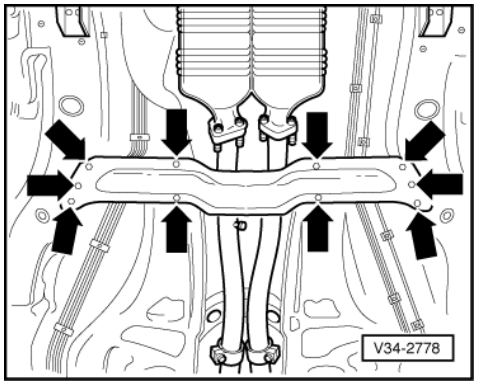
- Unscrew cover for injectors

=> 5-cyl. fuel injection engine (4-valve, turbo); Repair group 10; Dismantling and assembling engine Dismantling and assembling engine

- Pull securing clip off wiring for reversing lights.
- Pull off buffer for engine bonnet.
- -> Mount engine support bracket 10-222 A and take up weight of engine via the spindle.

Note:

Do not place engine support bracket 10-222 A upon headlamps.



- Remove noise insulation and unbolt bracket for noise insulation

=> 5-cyl. fuel injection engine (4-valve, turbo), Mechanics; Repair group 10; Dismantling and assembling engine Dismantling and assembling engine

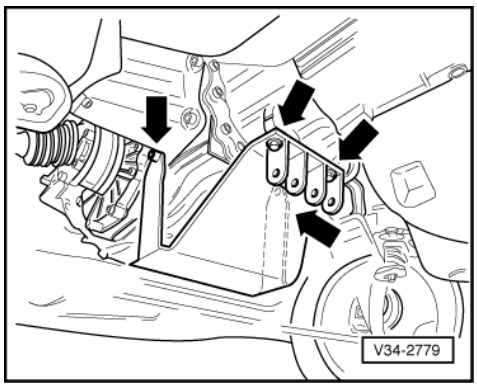
=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 10; Dismantling and assembling engine Dismantling and assembling engine

- -> Remove cross member below exhaust system -arrows-
- Remove exhaust system as from front exhaust pipe

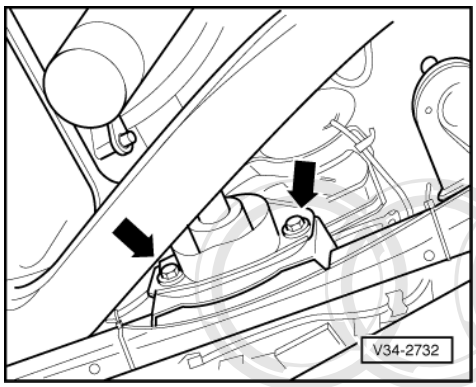
=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

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.

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system



- -> Unscrew cover panel -arrows-.
- Remove starter and place to one side in engine compartment.



- Remove propshaft => Page 229 .
- Engage 3rd gear and unscrew the push rod and selector rod clamping pieces.

Note:

The selector rod can be disconnected by pulling back the gear stick towards 4th gear.

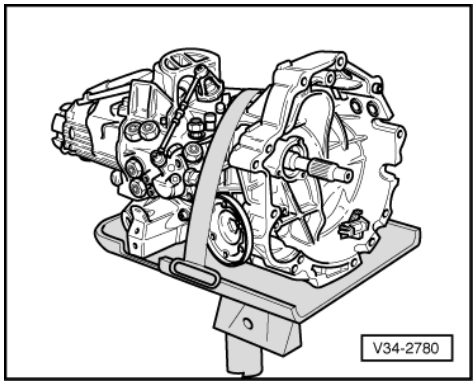
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Slacken bolts securing torque reaction support -arrows-.
- Take heat shield for inner right-hand joint off gearbox.
- Detach drive shafts (left and right), lift clear and secure with wire or similar.
- Remove left and right-hand gearbox support/subframe bolts.
- Remove cable holder for procon-ten system from gearbox

Note:

To disengage procon-ten-cables from cable guide on gearbox, take up more weight on support bracket, to lower gearbox.

- Remove clutch slave cylinder, do not disconnect pipes.



Note:

Do not depress clutch pedal after removing slave cylinder.

- -> Support gearbox with gearbox jack V.A.G 1383 A.
- Remove lower engine/gearbox connecting bolts => Page 65 .
- Press gearbox off dowel sleeves and lower gearbox carefully.

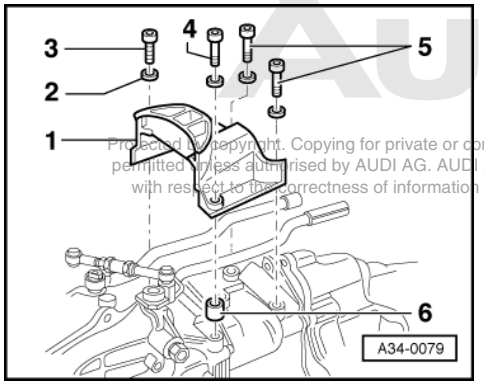
Note:

When lowering gearbox ensure there is sufficient clearance to drive shafts.

Installation

Installing gearbox is carried out in reverse order of removal.

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.

-> When installing an exchange gearbox with new gearbox housing version in a vehicle equipped with procon-ten, use a longer bolt M10 x 50 -4- and spacer bush -6- (available as replacement part) at fastening point of front left cable arrester-1-. Use previous bolts -3- and -5- and washers -2- at other mounting points.

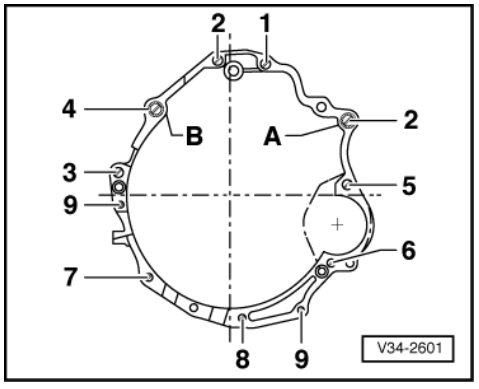
- It is essential to remove any residue of locking fluid with a thread tap from threaded holes in flanged shafts for propshaft of manual gearbox and rear final drive and also in threaded holed for attaching clutch slave cylinder before installing gearbox.
- Check whether dowel sleeves for aligning gearbox with engine are in the gearbox flange. Insert if necessary => Page 65 .
- Lightly lubricate push rod contact surface on release lever with copper grease.

- Gearbox must be installed before installing clutch slave cylinder => Page 39 .
- Replace gaskets at connection points of propshaft => Page 229 and of drive shafts.
- Install propshaft => Page 233 .
- Ensure that clearance between exhaust system front pipe and subframe is sufficient and align exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

- Checking oil level in manual gearbox => Page 81 .



Tightening torques
-> Securing engine to gearbox

Item	Bolt	Qty.	Nm
1	M12 x 67	1	65
2	M12 x 80	2	65
3	M12 x 80	1	65
4	M12 x 110	1	65
5	M12 x 110	1	65
6	M10 x 135	1	45
7	M10 x 50	1	45
8	M10 x 45	1	45
9 1)	M8 x 40	2	25

1) New gearbox version use: M10 x 45 bolt, tightening torque 45 Nm
Centring sleeves, item -A- and -B-.

Note:
When installing an exchange gearbox with new gearbox housing version, the M8 bolt in engine oil sump area must be replaced with an M10 bolt. Drill out hole in engine oil sump to a dia. of 11.5 mm for this purpose. Use M10 bolt according to Parts Catalogue and a tightening torque of 45 Nm.

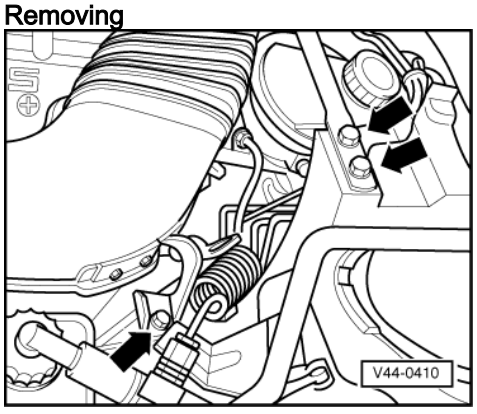
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Component		Nm
Clutch slave cylinder to gearbox		25
Cable holder for procon-ten system		40
Gearbox support to subframe		45
Drive shaft to flange shaft	M10	80
Drive shaft heat shield		25
Torque reaction support to body		40
Selector rod and push rod clamping piece		25
Prop shaft to manual gearbox or final drive	M8	55
Propshaft centre mounting to body		23
Cross member with heat shield to body		25
Cover panel to gearbox housing	M8 M10	20 45
Heat shield for propshaft to gearbox		25
Front cross member below exhaust system to body		25

4 - Removing and installing gearbox - Vehicles with 8-cylinder engine

4.1 - Removing and installing gearbox - Vehicles with 8-cylinder engine

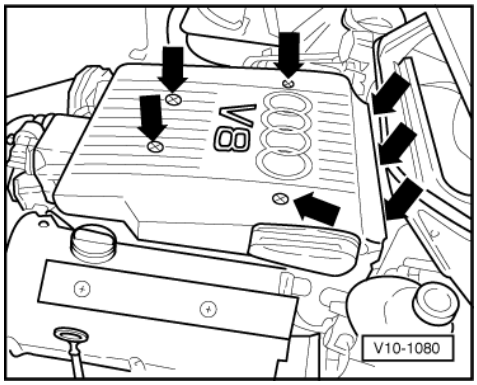
Removing



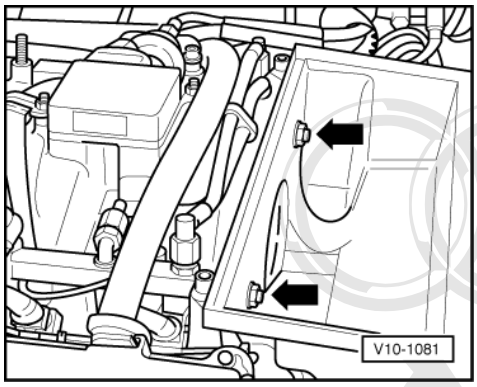
Note:

Before disconnecting the battery, determine radio security coding.

- Detach battery earth strap (below rear seat).
- -> Remove anti-roll bar -top arrows-.
- Remove bracket for air guide pipe on left and right -bottom arrow-.



- -> Unscrew top part of air filter housing (4 bolts on housing, 3 bolts on rear of housing).

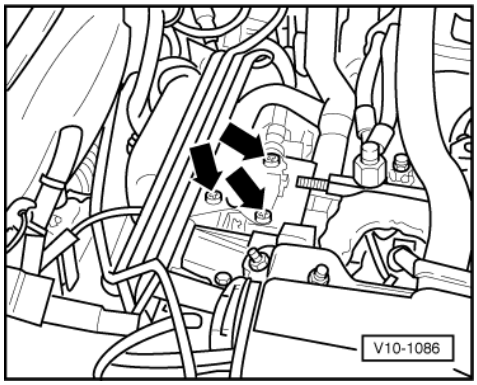


- -> Unscrew bottom part of air filter housing -arrows-, press to rear and lift out upwards.

Note:

Replace self-locking nuts.

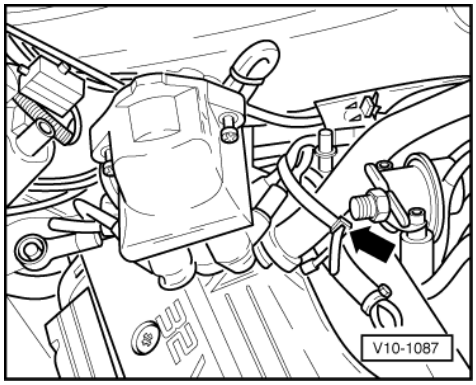
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



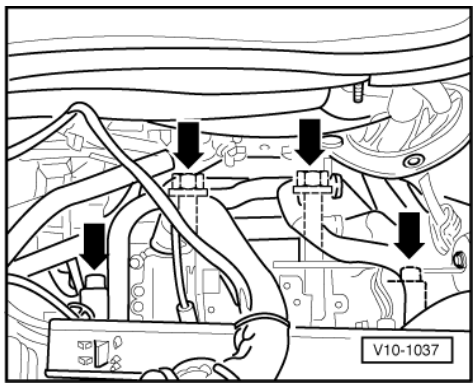
- -> Remove plate for attaching ignition cable bracket -arrows-.

Note:

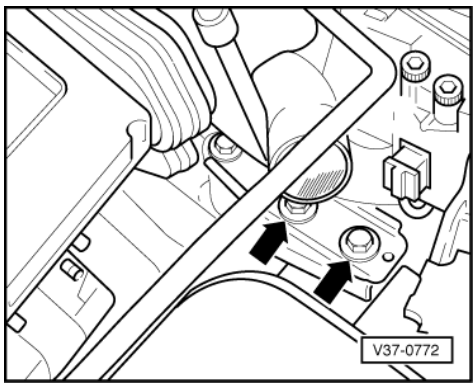
Replace self-locking bolts.



- Unscrew distributor caps on left and right (cables remain connected).
- -> Attach both distributor caps to crankcase breather hose with cable strap -arrow- as a protection when removing.

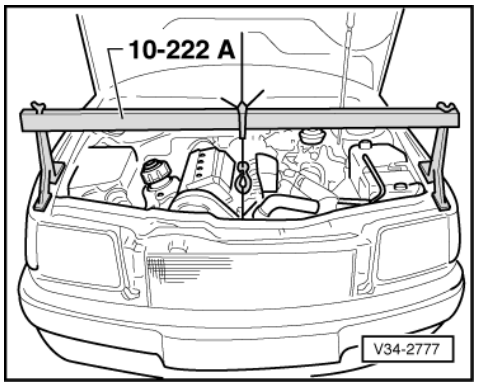


- -> Remove upper engine/gearbox connecting bolts -arrows-.



- -> Unscrew bolts attaching engine mount/right torque reaction support at body -arrows-.

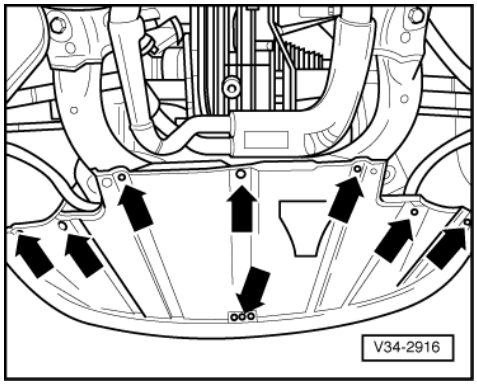
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



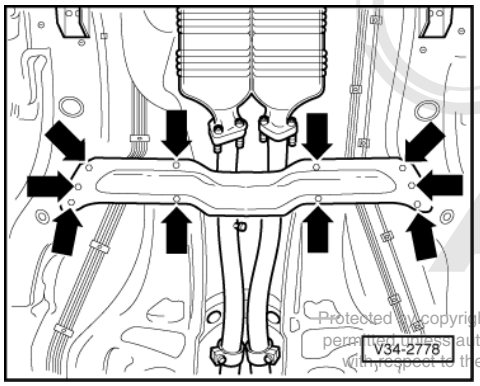
- Pull off buffer for engine bonnet.
- -> Mount engine support bracket 10-222 A and take up weight of engine via the spindle.

Note:

Do not place engine support bracket 10-222 A upon headlamps.

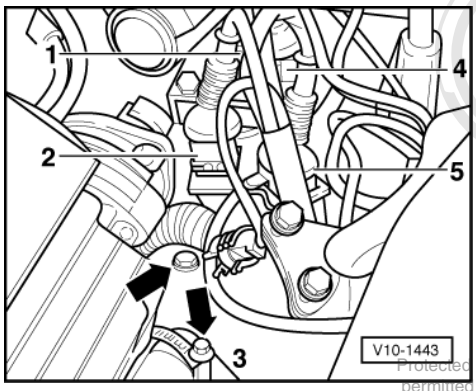


- -> Remove noise insulation -arrows-.
- Unbolt mounting for noise insulation from cross member.



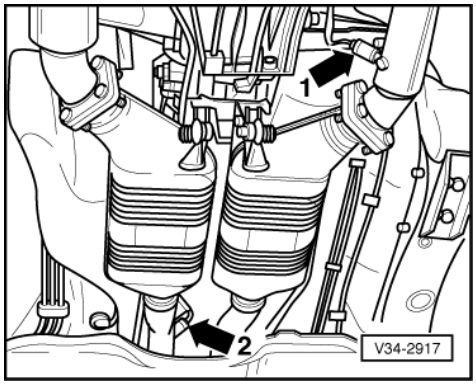
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Remove cross member below exhaust system -arrows-

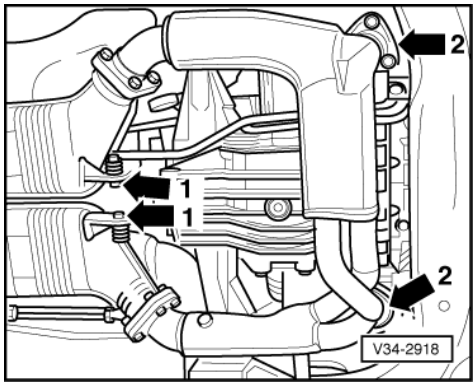


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

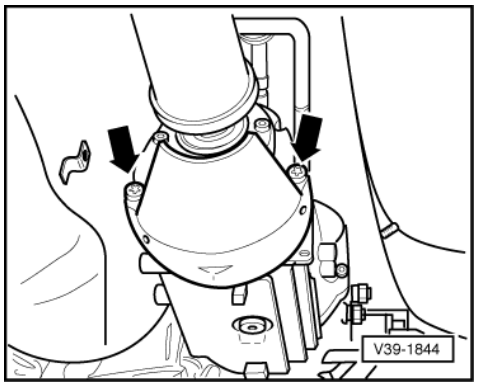
- -> Unplug connector of Lambda-probe heater -2- and Lambda probe -3-.
- Unbolt cable bracket -top arrow-.
- Cut open both cable ties on protective tube and release cables.



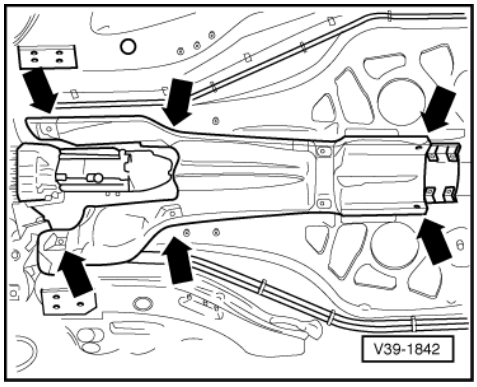
- Pull cables of Lambda probe and of Lambda probe heater down and through.
- -> Unscrew Lambda probe -arrow 1- and thermo sensor -arrow 2-.
- Carefully bend open retaining clips for cable for left and right Lambda probe on gearbox housing and at heat shield for thermo sensor. Move wiring clear.



- -> Unscrew spring-tensioned bolts attaching catalytic converters to mounting lugs -arrows 1- and collar nuts of front exhaust pipe at exhaust manifolds -arrows 2-.
- Detach complete exhaust system from retaining loops.

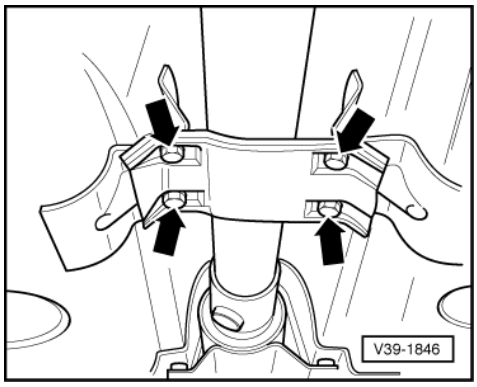


- -> Remove heat shield for propshaft -arrows-.



- -> Remove heat shield below propshaft -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.



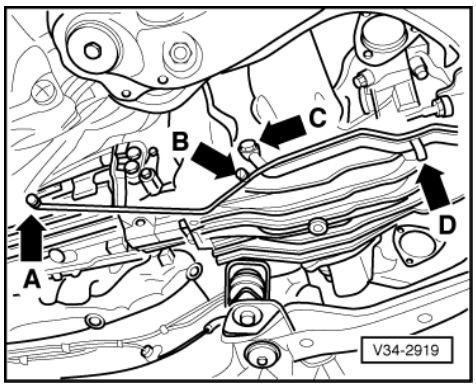
- -> Remove cross member with heat shield below propshaft -arrows-
- Mark installation position of propshaft at flanged shafts before removing.
- Removing propshaft => Page 229 .

- Engage 3rd gear. Mark installation position of selector rods (front/rear) to one another.
- Unbolt clamp for push rod and selector => Page 55 .

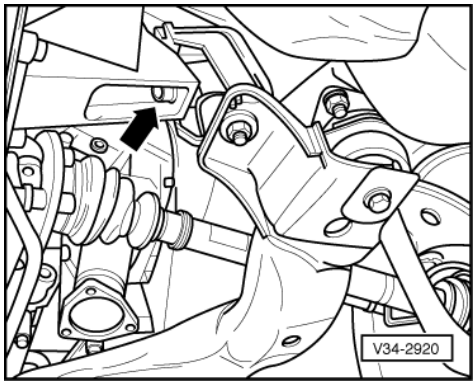
Note:

Front selector rod can be taken out past right-hand side of engine with gearbox installed.

- Remove heat shields for drive shafts.
- Unbolt drive shafts and tie up.

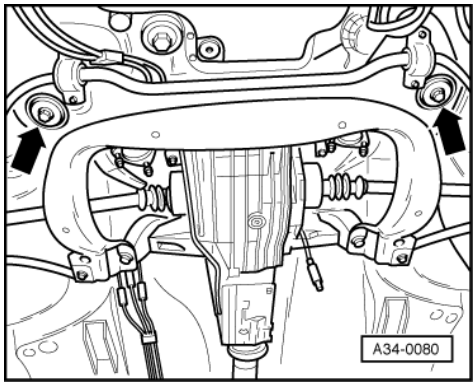


- -> Slacken bolt -arrow D- attaching angle bracket for oil pressure pipe (supply, at rear of oil sump).
- -> Unscrew bolt at oil pump cover -arrow B- attaching angle bracket for oil pressure pipe (return flow, at rear).
- Unscrew banjo bolt -arrow A- at end cover for oil pressure pipe (return flow, at rear) and close hole with plug.
- Unscrew banjo bolt at oil pump cover -arrow C- for oil pressure pipe (supply, at rear) and close hole with plug.



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.

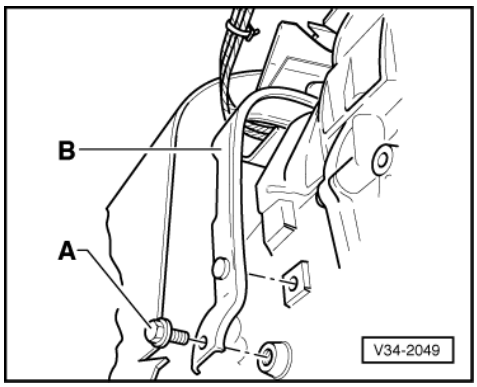
- -> Unscrew securing bolt -arrow- on left and right of gearbox mount at gearbox support.



- Support subframe with gearbox jack V.A.G 1383 A.
- -> Unscrew front bolts attaching subframe -arrows-.
- Slowly lower gearbox jack.

Notes:

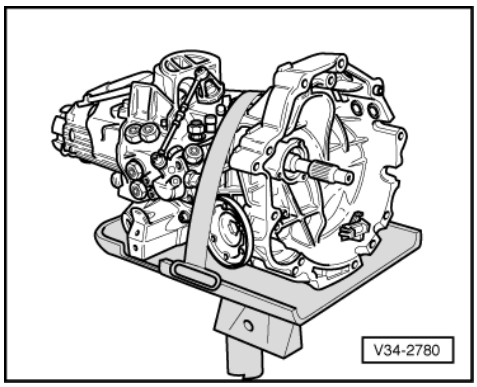
- When lowering subframe ensure pressure and cooling pipes are not damaged not damaged.
- Gearbox is lowered further by re-tightening engine support bracket V.A.G 10-222 A.



- -> Unscrew bolt -A- attaching cable bracket for procon-ten system -B-.
- Push cable bracket together procon-ten-cable over cable arrester.
- Remove clutch slave cylinder, do not disconnect pipes.

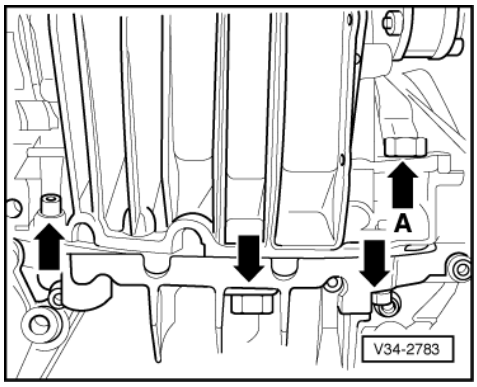
Notes:

- Move selector lever on gearbox into 6th gear position to facilitate removal.
- Do not depress clutch pedal after removing slave cylinder.



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.

- -> Support gearbox with gearbox jack V.A.G 1383 A.



- -> Unscrew starter -arrow A- and pull off only to point where it touches oil filter.
- Remove lower engine/gearbox connecting bolts -arrows-.
- Press gearbox off dowel sleeves and carefully lower gearbox with gearbox jack V.A.G 1383 A.

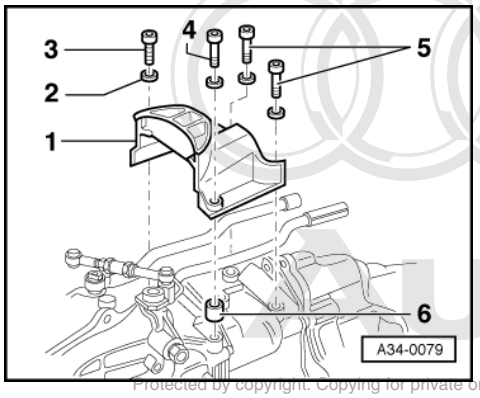
Note:

When lowering gearbox ensure there is sufficient clearance to drive shafts.

Installation

Installing gearbox is carried out in reverse order of removal.

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.

-> When installing an exchange gearbox with new gearbox housing version in a vehicle equipped with procon-ten, use a longer bolt M10 x 50 -4- and spacer bush -6- (available as replacement part) at fastening point of front left cable arrester -1-. Use previous bolts -3- and -5- and washers -2- at other mounting points.

- It is essential to remove any residue of locking fluid with a thread tap from threaded holes in flanged shafts for propshaft of manual gearbox and rear final drive and also in threaded holes for attaching clutch slave cylinder before installing gearbox.
- Check whether centring sleeves for aligning gearbox with engine are in the gearbox flange. Insert if necessary => Page 73 .
- Carefully clean splines of input shaft and clutch hub and apply a very thin film of grease => Page 41 .

- Gearbox must be installed before installing clutch slave cylinder with bracket. Bracket must be positioned in groove of clutch slave cylinder => Page 39 .
- Replace gaskets at connection points of propshaft => Page 229 and of drive shafts.
- Install propshaft => Page 233 .
- Adjust selector and push rod after installing => Page 58 .
- Align exhaust system free of stress

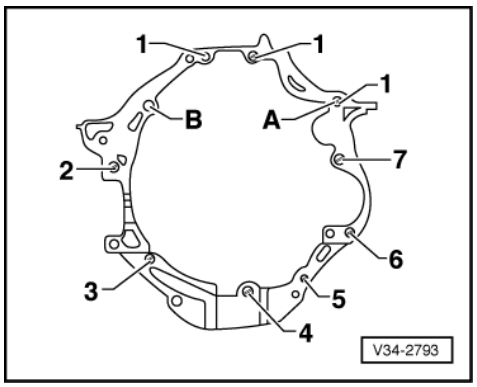
=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

- Checking oil level in manual gearbox => Page 81 .

Note:

If only 2 attaching bolts of subframe have been slackened, it is not necessary to adjust wheel toe.

Tightening torques



-> Securing engine to gearbox

Item	Bolt	Qty.	Nm
1	M12 x 75	3	65
2	M12 x 90	1	65
3	M10 x 40	1	45
4	M10 x 45	1	45
5	M 8 x 45	1	25
6	M10 x 120	1	45
7	M12 x 110	1	65

Centring sleeves, Item -A- and -B-.

Note:

When installing an exchange gearbox with new gearbox housing version, the M8 bolt in engine oil sump area must be replaced with an M10 bolt. Drill out hole in engine oil sump to a dia. of 11.5 mm for this purpose. Use M10 bolt according to Parts Catalogue and a tightening torque of 45 Nm.

Component	Nm
Clutch slave cylinder to gearbox	25
Gearbox support to gearbox housing	40
Cable holder for procon-ten system	40
Front sub-frame to body	110 + 90o 1)
Gearbox support to gearbox mounting	40
Drive shaft to flange shaft M10	80
Drive shaft heat shield	25
Block for front oil pressure pipe to rear oil pressure pipe 2)	25
Banjo bolt to oil pump cover 3)	25
Banjo bolt to end cover 3)	25
Mounting bracket of return flow pipe to oil pump cover	25

1) Replace bolts

2) Replace O-rings

3) Replace seals

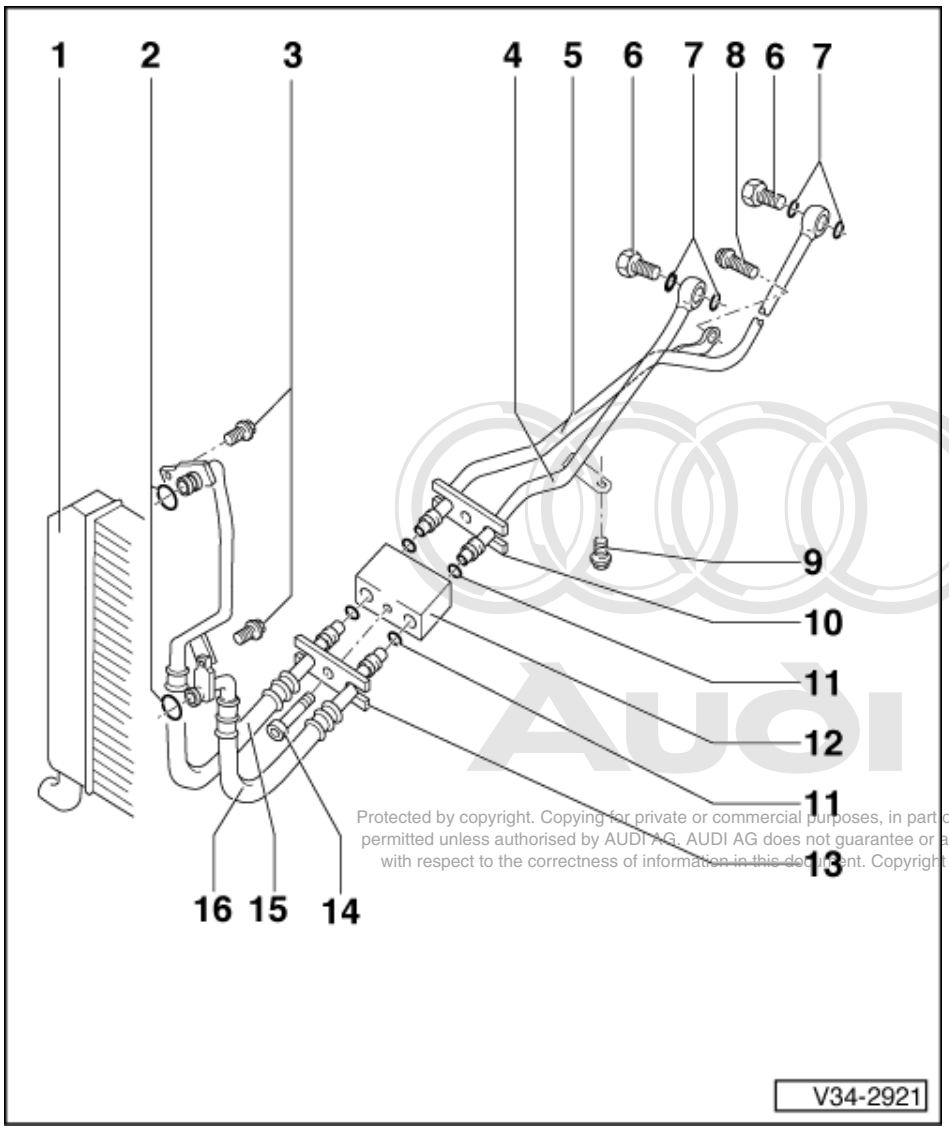
Component	Nm
Angled bracket of rear supply flow oil pressure pipe to oil sump	25
Selector rod and push rod clamping piece	25
Prop shaft to gearbox/final drive	55
Heat shield for propshaft to gearbox	25
Catalytic converters to mounting lugs	25
Front exhaust pipe to exhaust manifold	25
Lambda probe in catalytic converter 4)	50
Thermo sensor to exhaust pipe	30
Cross member to body	40
Torque reaction support to body	40

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) Grease thread with G5, hot bearing grease must not enter slots on probe body

5 - Removing and installing oil pressure pipes - Vehicles with 8-cylinder engine

5.1 - Removing and installing oil pressure pipes - Vehicles with 8-cylinder engine



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 Oil cooler

- Installation position: Below radiator
- Removing and installing

=> 8-cyl. fuel injection engine, Mechanics; Repair group 17; Removing and installing parts of lubrication system Removing and installing parts of lubrication system

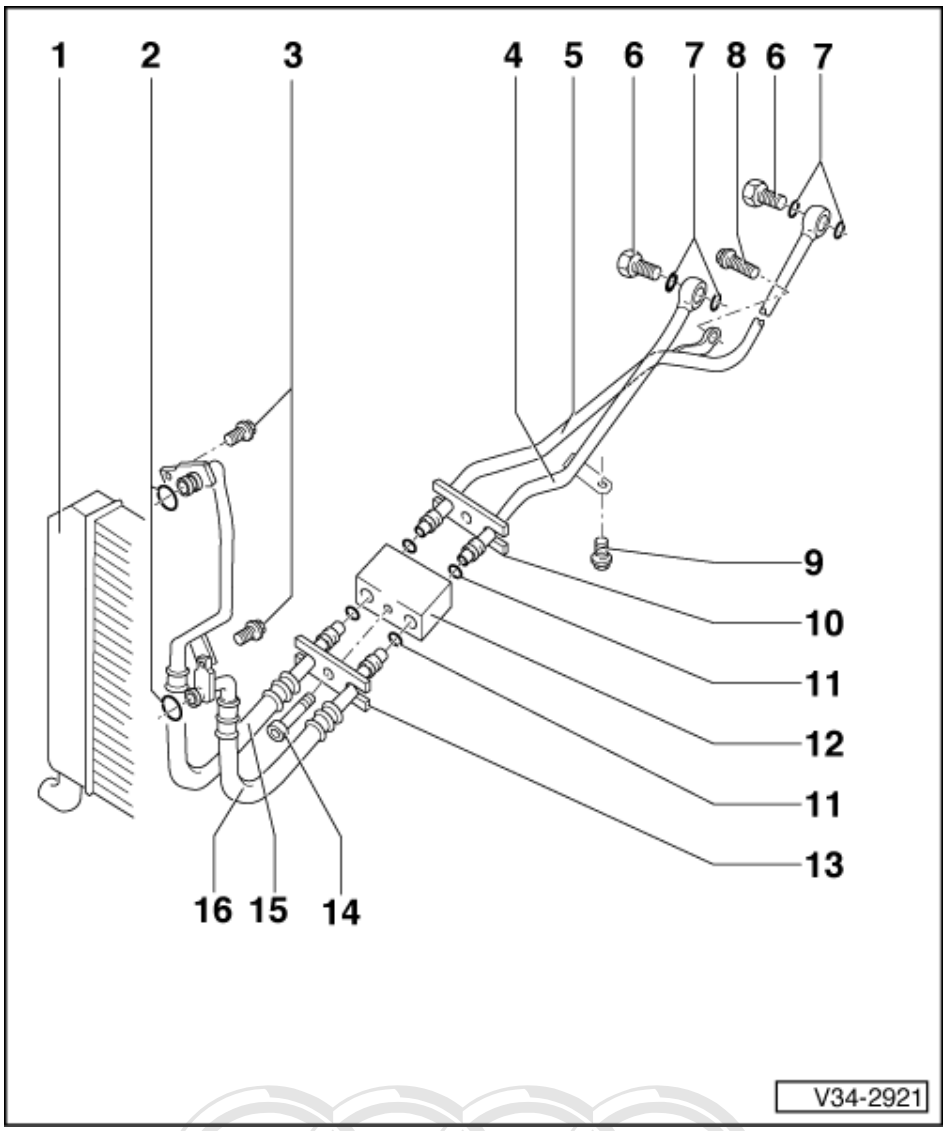
2 O-ring

- Always replace

3 Combi bolt M6 x 17 - 5 Nm

- Oil pressure pipe to oil cooler

4 Rear return flow oil pressure pipe



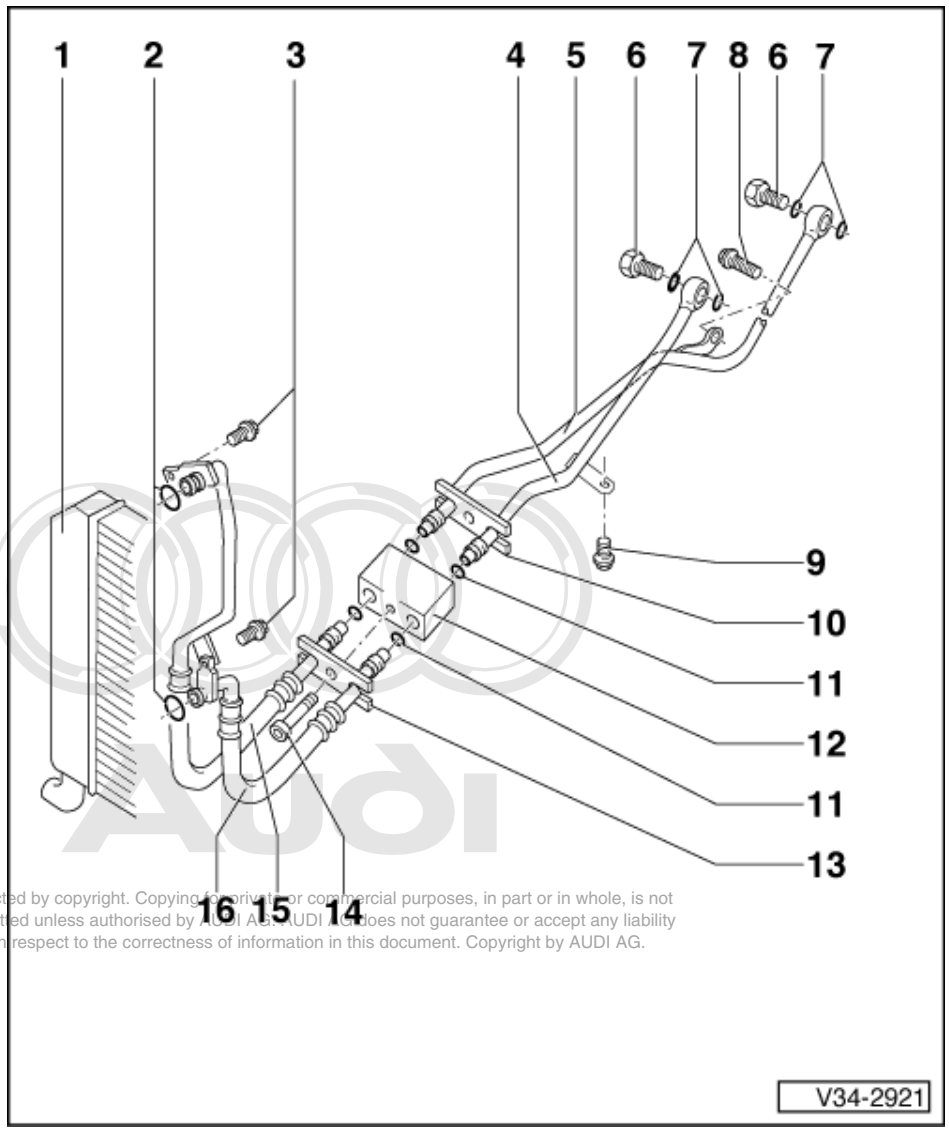
5 Rear supply flow oil pressure pipe
6 Banjo bolt - 25 Nm
7 Oil seal
- Qty. 2
- Always replace

8 Securing bolt - 25 Nm
- Oil pressure pipe to oil pump cover

9 Securing bolt M8 x 22 - 25 Nm
- Oil pressure pipe to oil sump

10 Retaining plate with thread
11 O-ring
- Qty. 4
- Always replace

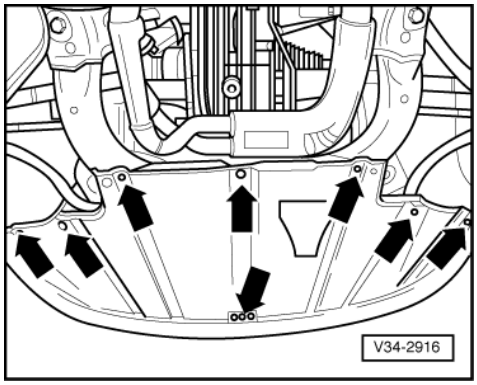
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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.

12 Plug block
13 Retaining plate
14 Socket-head cap screw M8 x 55 - 25 Nm
15 Front return flow oil pressure pipe
16 Front feed oil pressure pipe

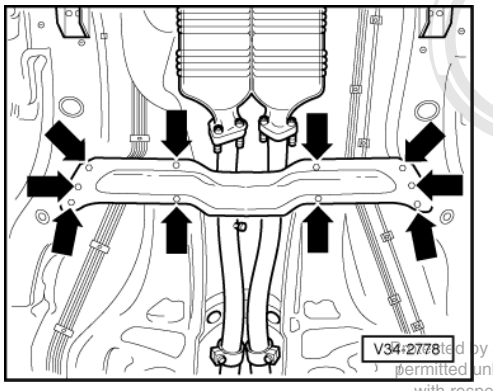
5.2 - Removing and installing oil pump



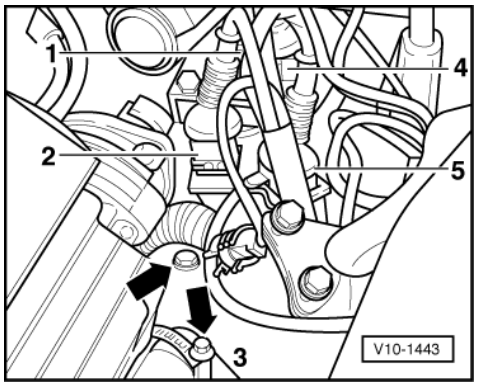
- Gearbox installed

Removing

- -> Remove noise insulation -arrow-.

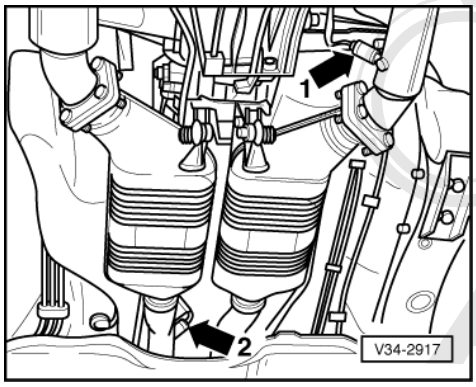


- -> Remove cross member below exhaust system -arrows-



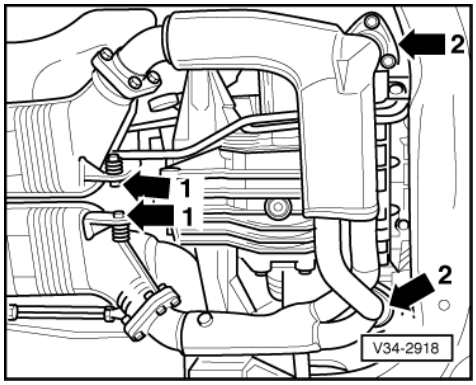
- -> Unplug connector of Lambda-probe heater -2- and Lambda probe -3-.
- Unbolt cable bracket -top arrow-.
- Cut open both cable ties at protective tube and release cables.

Audi
Copyrighted 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.

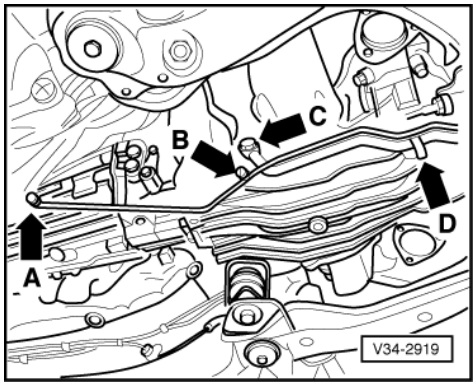


- Pull cables of Lambda probe and of Lambda probe heater down and through.
- -> Unscrew Lambda probe -arrow 1- and thermo sensor -arrow 2-.

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.

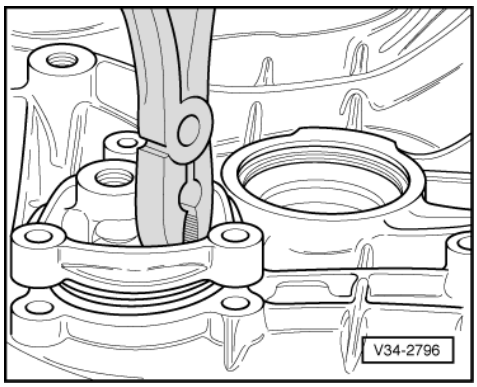


- -> Unscrew spring-tensioned bolts attaching catalytic converters to mounting lugs -arrows 1- and collar nuts of front exhaust pipe at exhaust manifolds -arrows 2-.
- Detach complete exhaust system from retaining loops.
- Place drip tray underneath and drain gearbox oil.



- -> Slacken bolt -arrow D- attaching angle bracket for oil pressure pipe (supply, at rear of oil sump).
- Unscrew bolt at oil pump cover -arrow B- attaching angle bracket for oil pressure pipe (return flow, at rear).
- Unscrew banjo bolt -arrow A- at end cover for oil pressure pipe (return flow, at rear) and close hole with plug.
- Unscrew banjo bolt at oil pump cover -arrow C- for oil pressure pipe (supply, at rear) and close hole with plug.

- Unbolt the heat shield for drive shaft (right).
- Unbolt right drive shaft and tie up.
- Unbolt right flange shaft and pull out =>Page 199 .
- Unscrew remaining securing bolt of oil pump cover.



- -> Use pliers to grasp oil pump at stiffener web of oil pump cover and pull out axially.

Installation

Installing oil pump is carried out in reverse order of removal.

- When replacing oil pump, ensure that drive pinion meshes into drive gear.
  - Oil pump cover must make full contact with housing flange
- Replace O-ring
- Replace gasket between drive shaft and flange shaft (remove protective sheet and bond gasket to joint).
- Align exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

- Checking oil level in manual gearbox => Page 81 .

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.

Tightening torques

Component	Nm
Oil pump cover to gearbox housing	25
Flange shaft to gearbox	10 + 90o
Drive shaft to flange shaft M10	80
Drive shaft heat shield	25
Banjo bolt to oil pump cover 1)	25
Banjo bolt to end cover 1)	25
Mounting bracket of return flow pipe to oil pump cover	25
Angled bracket of rear supply flow oil pressure pipe to oil sump	25
Catalytic converters to mounting lugs	25
Front exhaust pipe to exhaust manifold	25
Lambda probe in catalytic converter 2)	50
Front cross member below exhaust system to body	25
Oil drain plug	40

1) Replace seals

2) Grease thread with G5, hot bearing grease must not enter slots on probe body

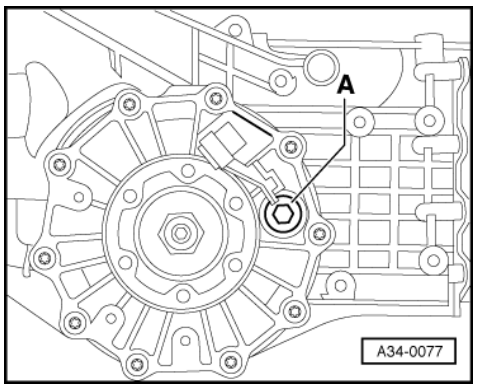
6 - Checking oil level in manual gearbox

6.1 - Checking oil level in manual gearbox

Notes:

- The vehicle must be absolutely level to check the gearbox oil level, e.g. over a workshop pit or on a 4-column lift. A 2-column lift is not suitable.
- The prescribed oil level is to be adhered to exactly; the gearbox reacts very sensitively to overfilling.
- There are two different procedures for checking the gearbox oil level, according to the type of final drive cover fitted:
- Older version: Oil filler hole behind flange shaft.
- Newer version: Oil filler hole in front of flange shaft.
- Gear oil specifications =>Page 2 onwards.

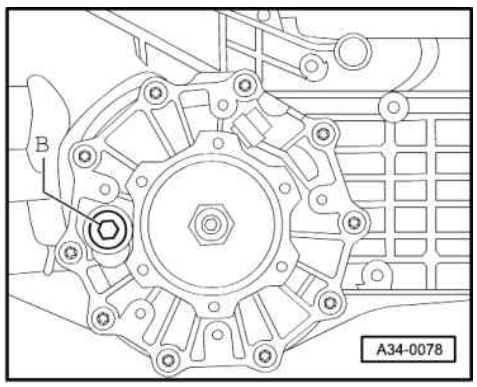
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Older version:

- -> Remove oil filler plug -A- (behind flange shaft) to check gearbox oil level.
- Check oil level with a suitable tool (such as a length of wire bent to shape).
  - Specification: Oil level 7 mm below bottom edge of oil filler hole

Newer version:



- -> Remove oil filler plug -B- (in front of flange shaft) to check gearbox oil level.
- Check oil level using a shop-built tool, e.g. a piece of angled wire.
  - Specification: Oil level 1 mm below bottom edge of oil filler hole

Tightening torque

Component	Nm
Oil filler plug	40

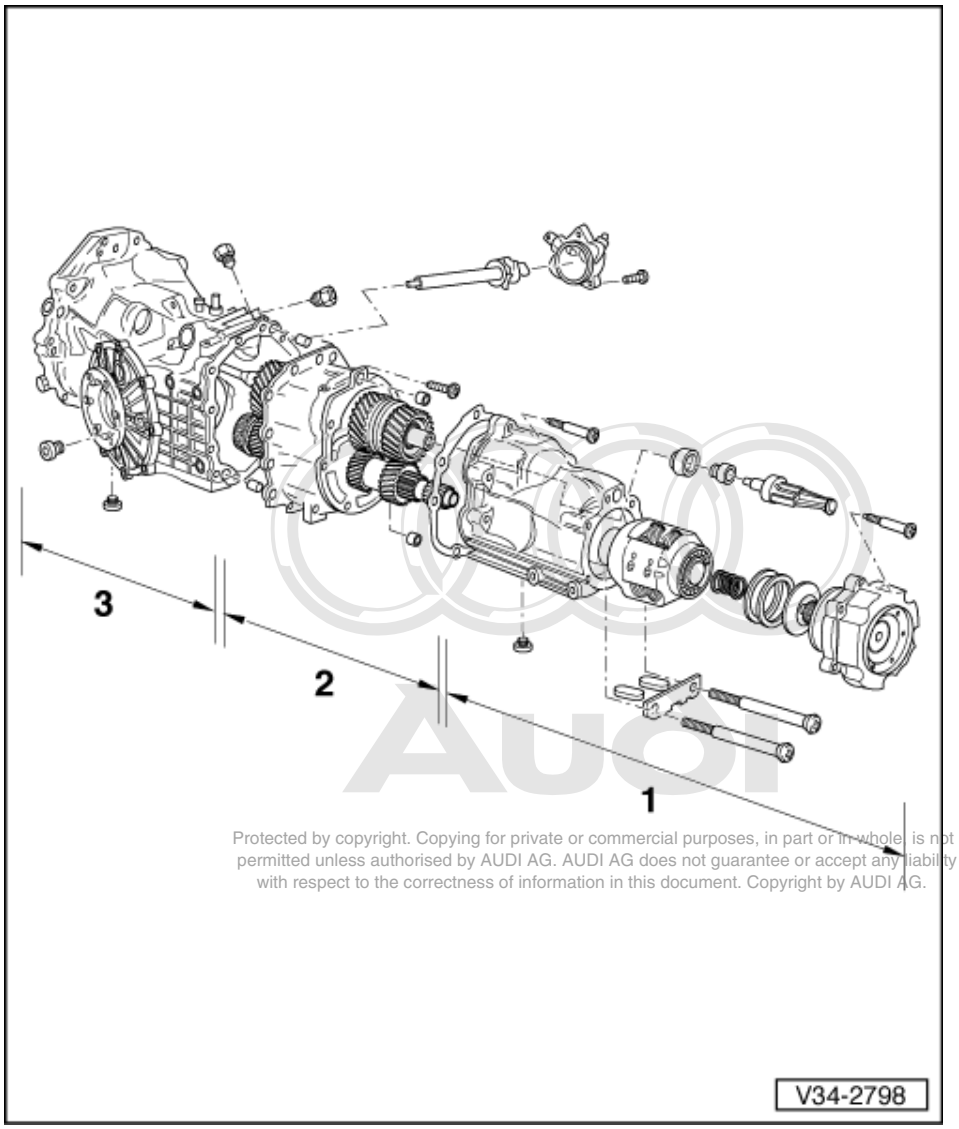
7 - Dismantling and assembling gearbox

7.1 - Dismantling and assembling gearbox

Assembly sequence =>Page 87

Notes:

- A wider gearwheel => Page 143 .
- Components of old and new construction status must not be installed mixed.



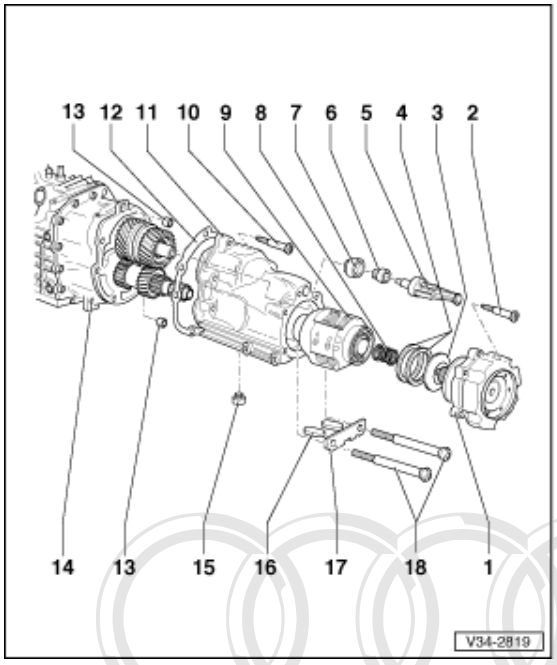
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 **Bearing housing, Torsen differential and end cover**
   - Removing and installing => Page 83

2 **Manual gearbox and selector shaft**
   - Removing and installing => Page 85

3 **Differential**
   - Removing and installing => Page 199

7.2 - Removing and installing bearing housing, Torsen differential and end cover



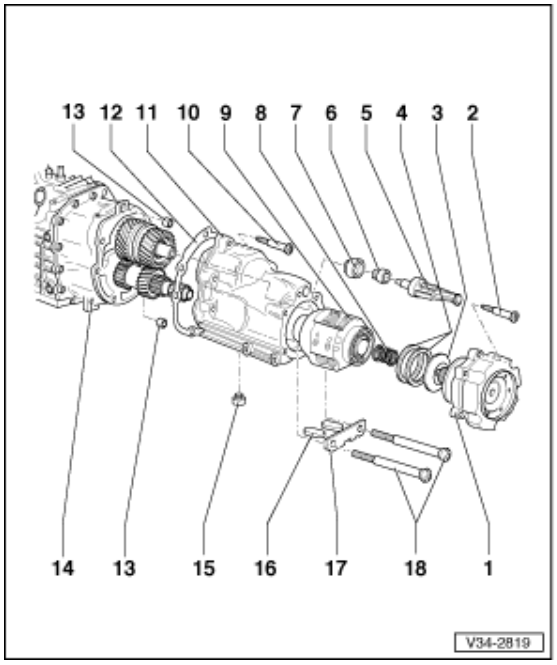
1 Bearing housing
- Dismantling and assembling =>Page 122

2 Bolt M8 x 60 - 25 Nm
- Qty. 6

3 Dished washer
- Installation position: Large diameter (concave side) facing shims

4 Washer
- Qty. 2 or 3
- Re-determining thickness => Page 119

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.



5 Oil collector
- Dismantling and assembling =>Page 118

6 Multi-point socket head bolt - 150 Nm
- Removing => Page 102

- Inserting => Page 118

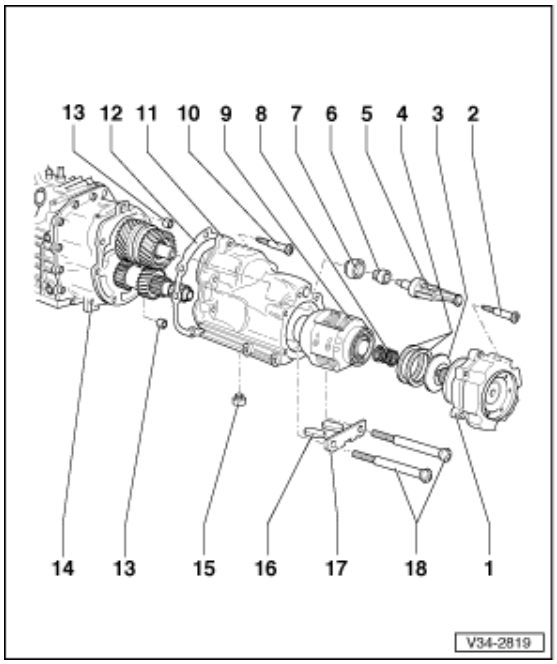
7 2nd inner race for ball bearing for input shaft

- Removing => Page 103
- Installing => Page 118

8 Spring

9 Torsen differential

- Servicing only possible at manufacturer
- Servicing mounting for Torsen differential => Page 127



10 Bolt M8 x 60 - 25 Nm

- Qty. 5

11 End cover

- Servicing => Page 131

12 Gasket

- Always replace

13 Dowel sleeve

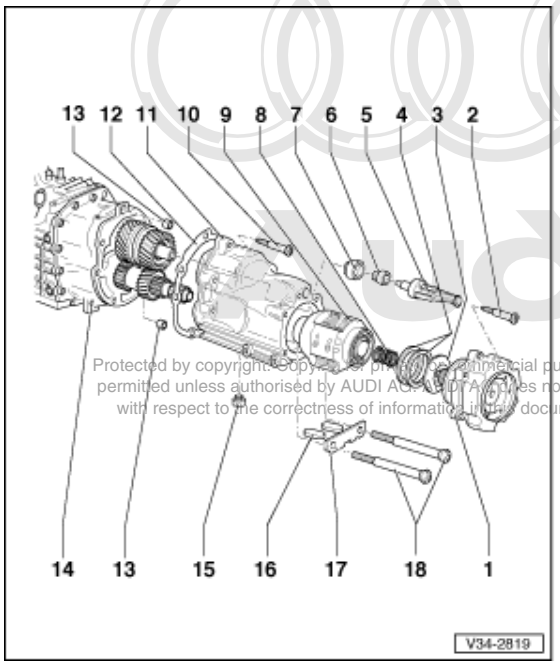
- Qty. 2

14 Manual gearbox

- Removing and installing => Page 65

15 Oil drain plug - 40 Nm

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.



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.

16 Magnet

- Qty. 2
- Clean

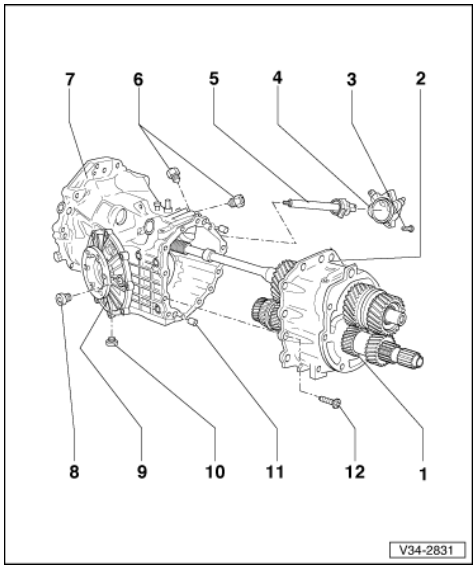
17 Supporting plate

- Installation position: Lug faces magnet

18 Bolts M8 x 140 - 25 Nm

- Qty. 2

7.3 - Removing and installing manual gearbox and selector shaft



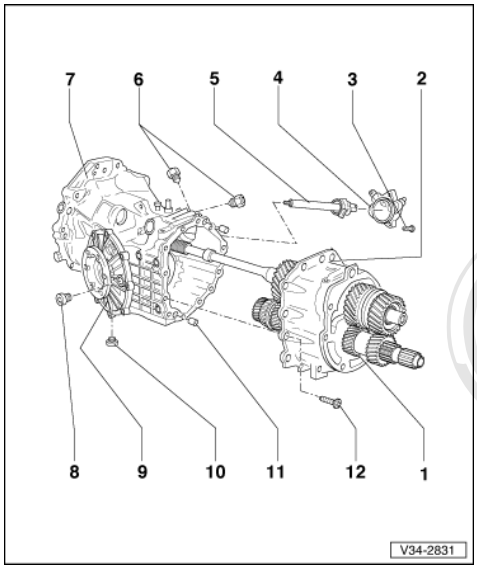
1 5th and 6th gear

- Gearbox remains flanged to gearbox housing
- Removing and installing 5-speed gearbox => Page 87
- Removing and installing 6-speed gearbox => Page 91

2 Bearing plate complete

- Modified bearing plate from gearbox serial number 77645

- Removing and installing input shaft, drive pinion hollow shaft and internal selector mechanism from bearing plate => Page 96



3 Bolt M8 x 20 - 25 Nm

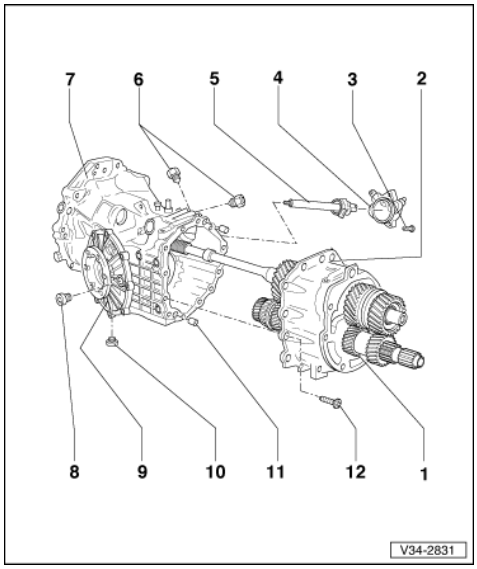
- Qty. 3
- Inserted with sealing paste AMV 188 200 03

4 Cover for selector shaft

- Removing => Page 101
- Installing => Page 119

5 Selector shaft complete

- Different versions for 5-speed and 6-speed gearboxes => Page 165
- Removing => Page 101
- Installing => Page 119
- Dismantling and assembling =>Page 163



6 Locking bolt

- For aluminium bolt: 50 Nm
- For steel bolt: 70 Nm

7 Gearbox housing

- Servicing => Page 148

8 Oil filler plug - 40 Nm

9 Differential

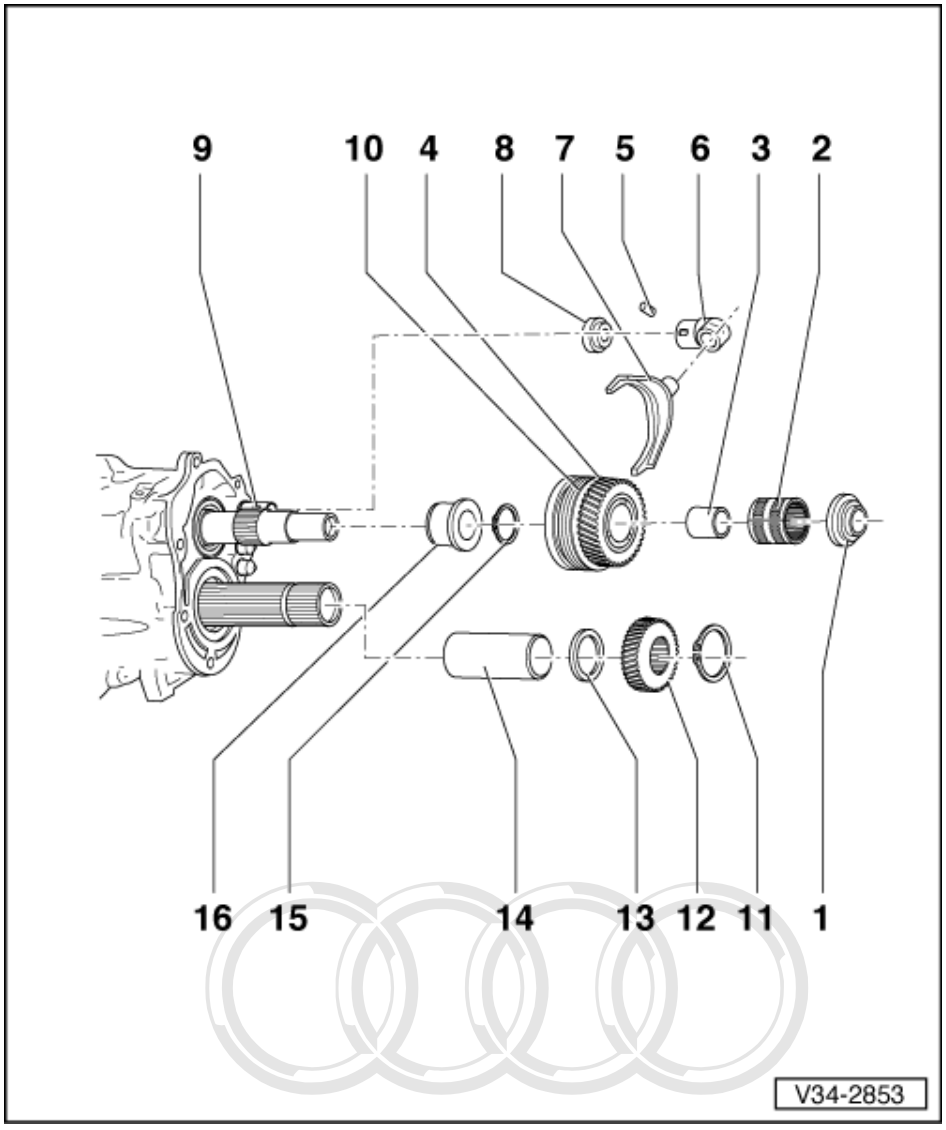
- Removing and installing => Page 199

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.

10 Oil drain plug - 40 Nm
11 Dowel sleeve
- Qty. 2

12 Bolt M8 x 35 - 25 Nm
- Qty. 12

7.4 - Removing and installing 5th gear (5-speed gearbox)



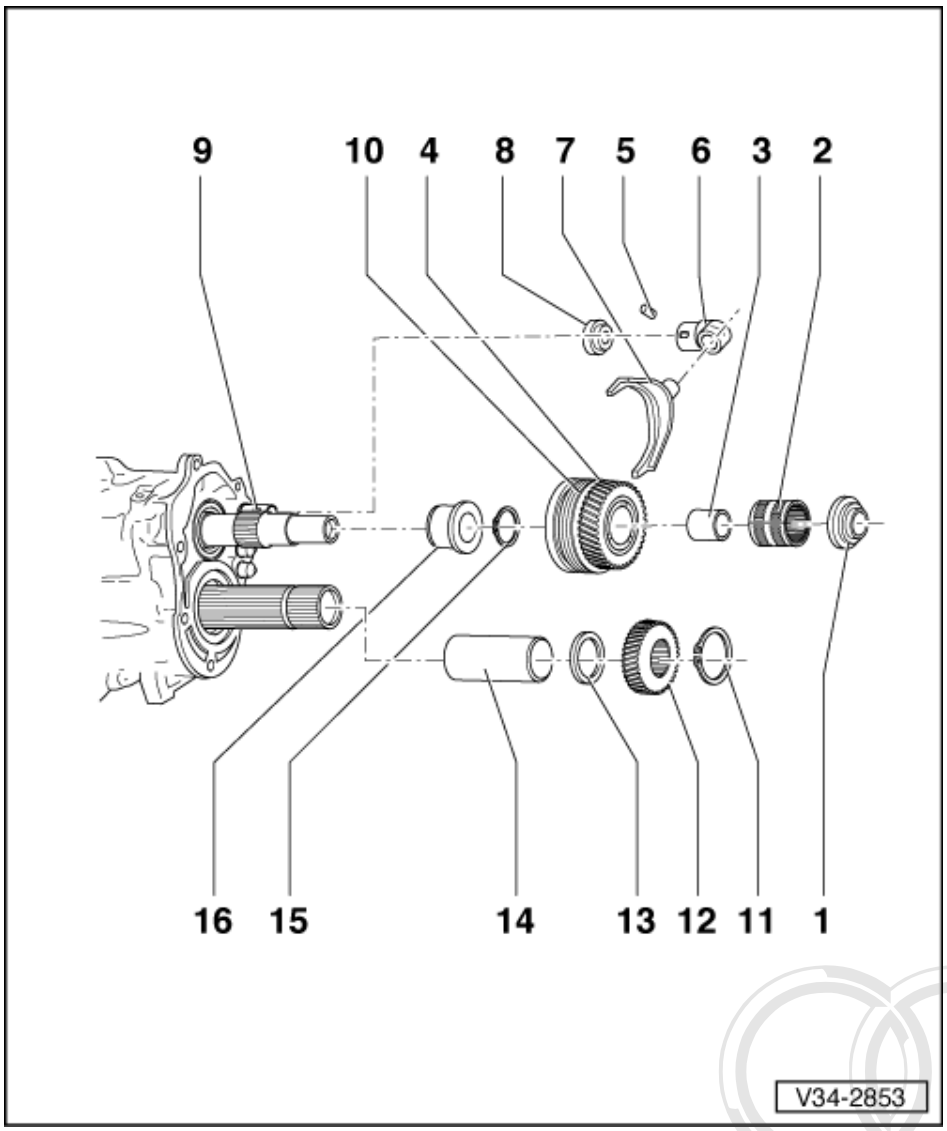
1 1st inner race for ball bearing for input shaft
- Pulling off => Page 103
- Installing => Page 117

2 Needle roller bearing for 5th gear

3 Inner race for 5th speed sliding gear
- Pulling off => Page 105
- Driving on => Page 117

4 5th speed sliding gear
- Pulling off => Page 103
- Installing => Page 117

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.



5 Spring sleeve

- 01.92 ä: Replaced by spring pin
- Pressing out => Page 104
- Pressing in => Page 114

6 Follower

- Only replace complete with selector rod for 5th and 6th gear -Item 9 -
- Pulling off => Page 105
- Fitting => Page 113

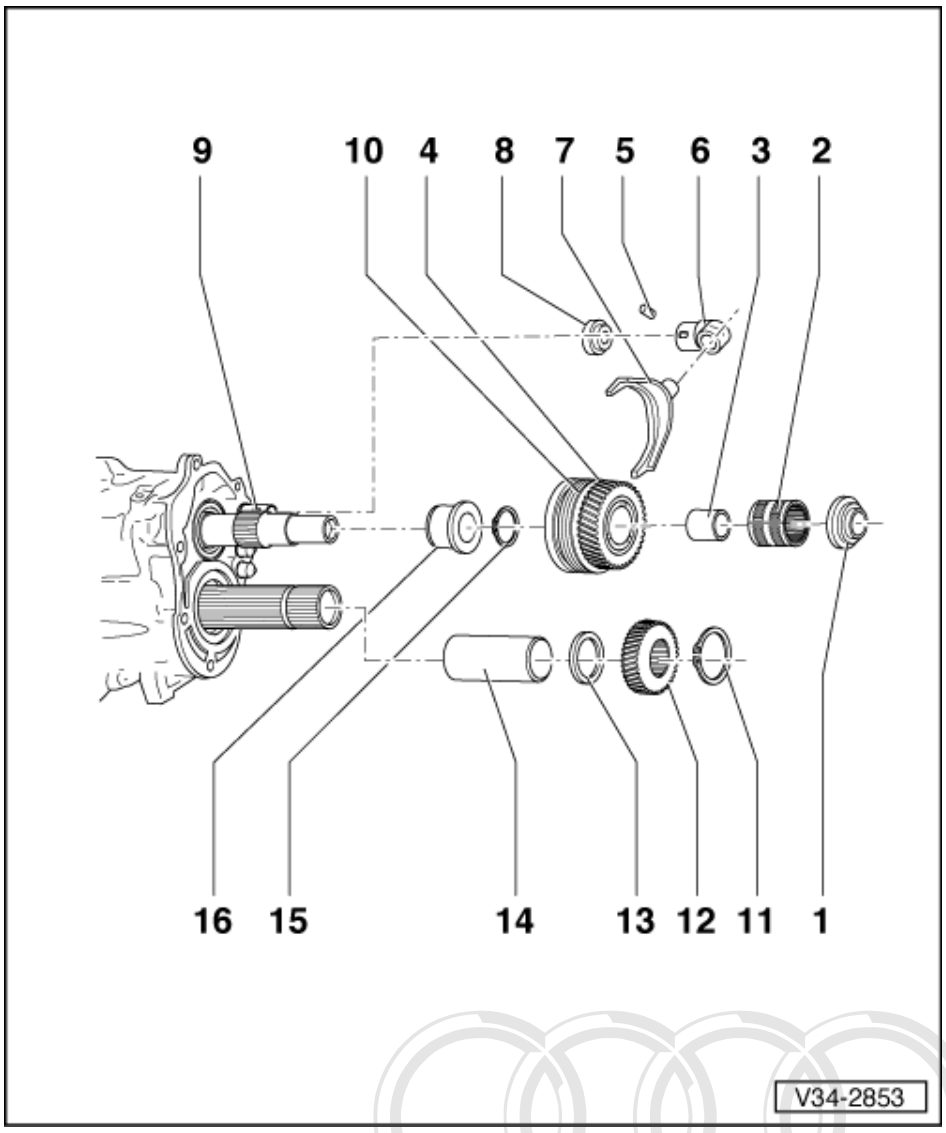
7 Selector fork, 5th gear

- Can be replaced separately.

8 Spacer

- Installation position: Wider end facing bearing flange
- Installing => Page 113

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.



9 Selector rod for 5th gear

- Replace only together with follower -Item 6 -
- Removing => Page 104
- Installing => Page 111

10 Locking collar, synchro-ring, synchro-hub for 5th gear

- Removing => Page 104
- Installing => Page 113

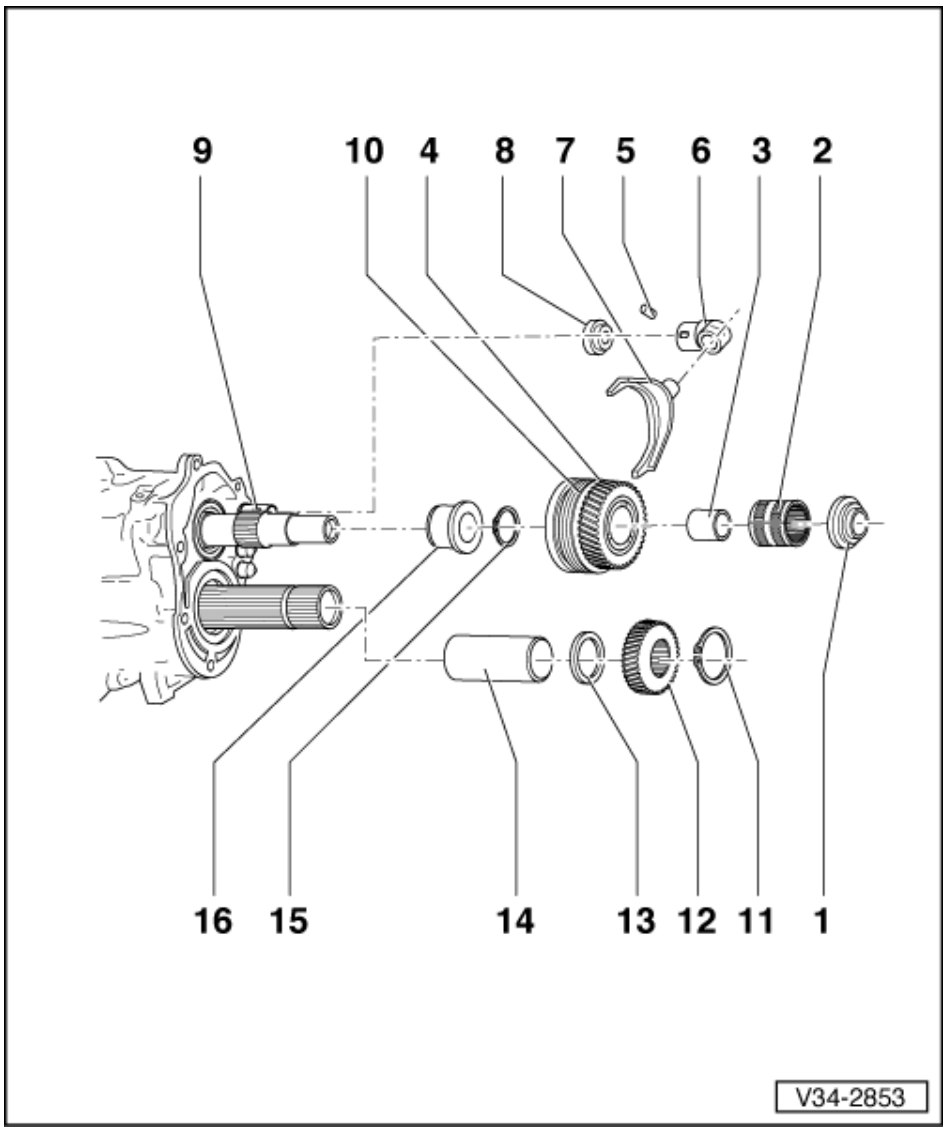
11 Circlip

- Re-determining thickness => Page 116

12 5th gear wheel

- Pulling off => Page 103
- Pressing on => Page 116

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.



13 Shim

- Re-determining thickness => Page 115

14 Spacer sleeve

- Length 72.5 mm

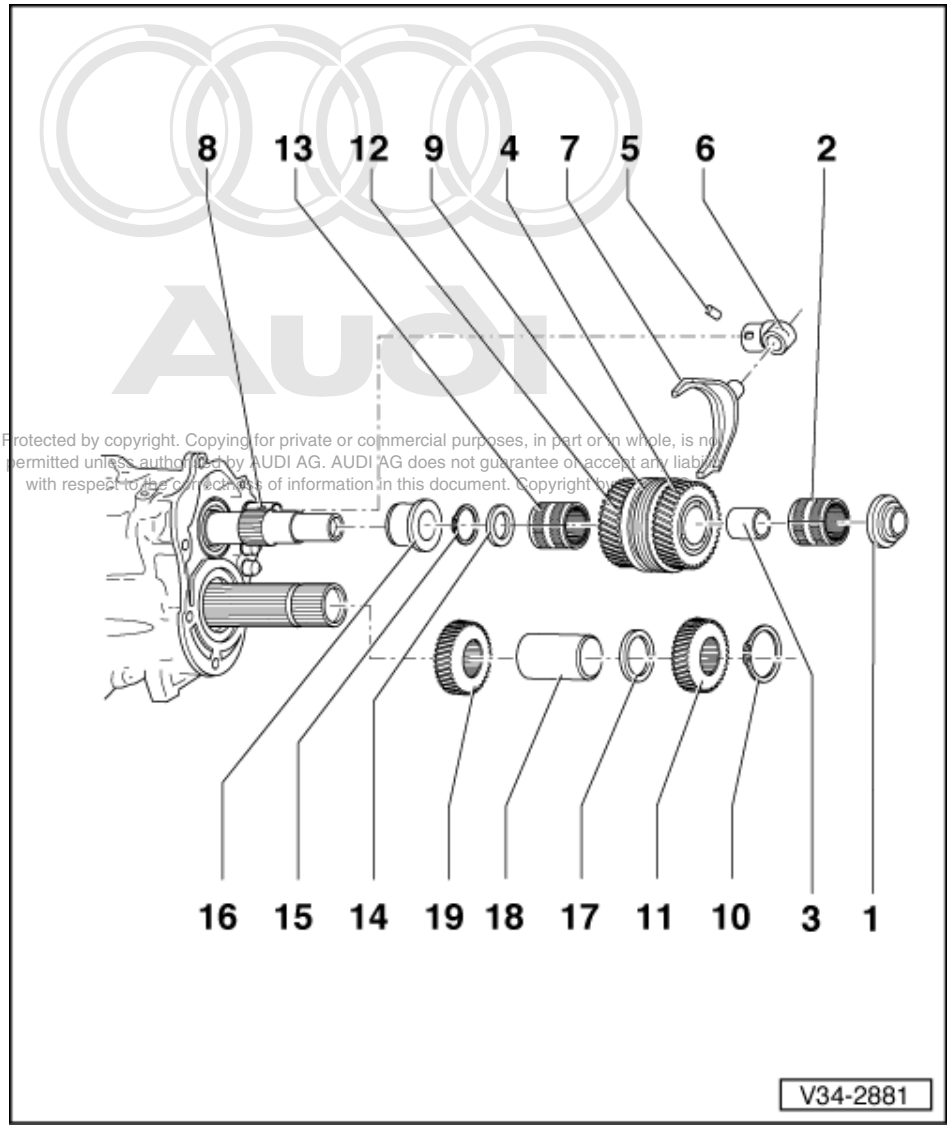
15 Circlip

16 Inner race for cylinder roller bearing

- Take off by hand => Page 106
- Modified insertion depth from gearbox serial number 77645 Assignment => Fig. 178

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.

7.5 - Removing and installing 5th and 6th gear (6-speed gearbox)



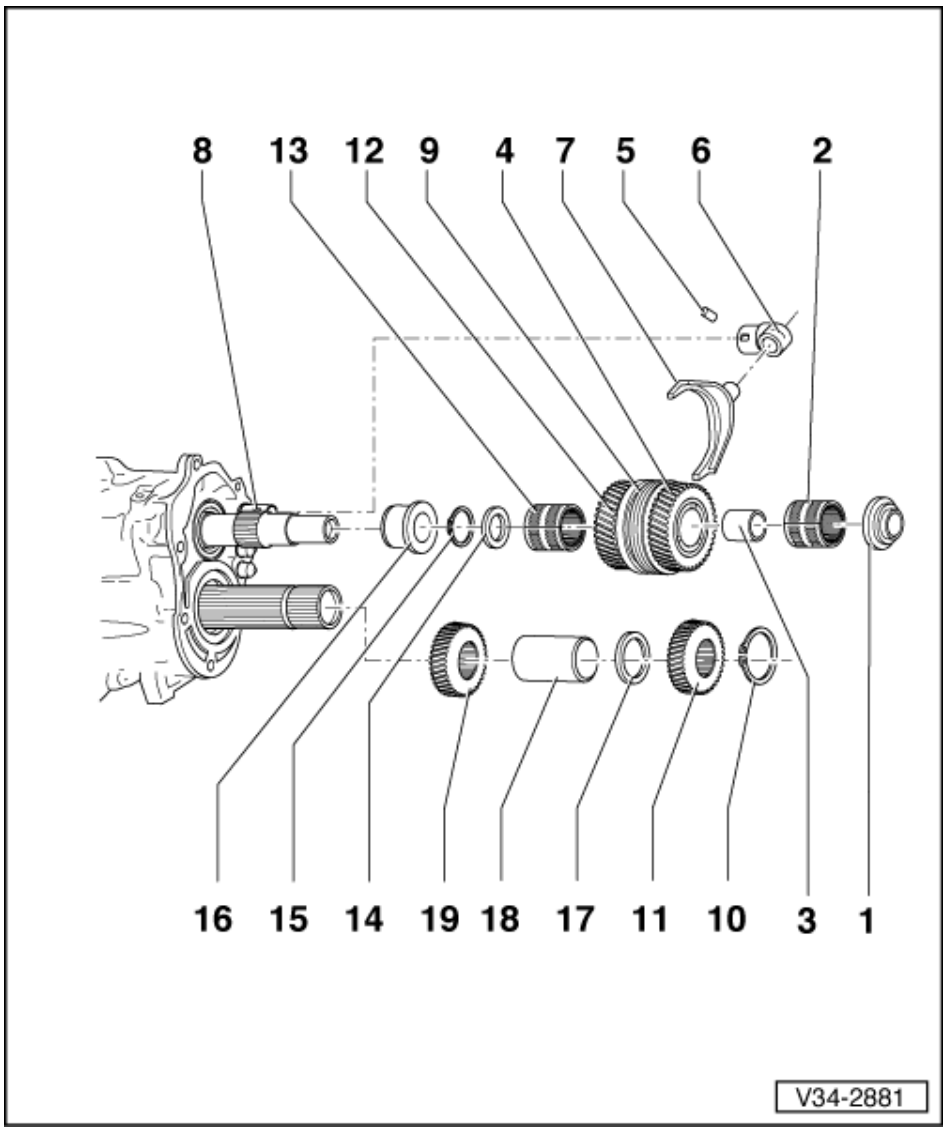
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 1st inner race for ball bearing for input shaft
- Pulling off => Page 103
- Installing => Page 117

2 Needle roller bearing for 5th gear

3 Inner race for 5th speed sliding gear
- Pulling off => Page 105
- Driving on => Page 117

4 5th speed sliding gear
- Pulling off => Page 103
- Installing => Page 117



5 Spring sleeve

- 01.92 ä: Replaced by spring pin
- Pressing out => Page 104
- Pressing in => Page 114

6 Follower

- Only replace complete with selector rod for 5th and 6th gear -Item 8 -
- Pulling off => Page 105
- Fitting => Page 113

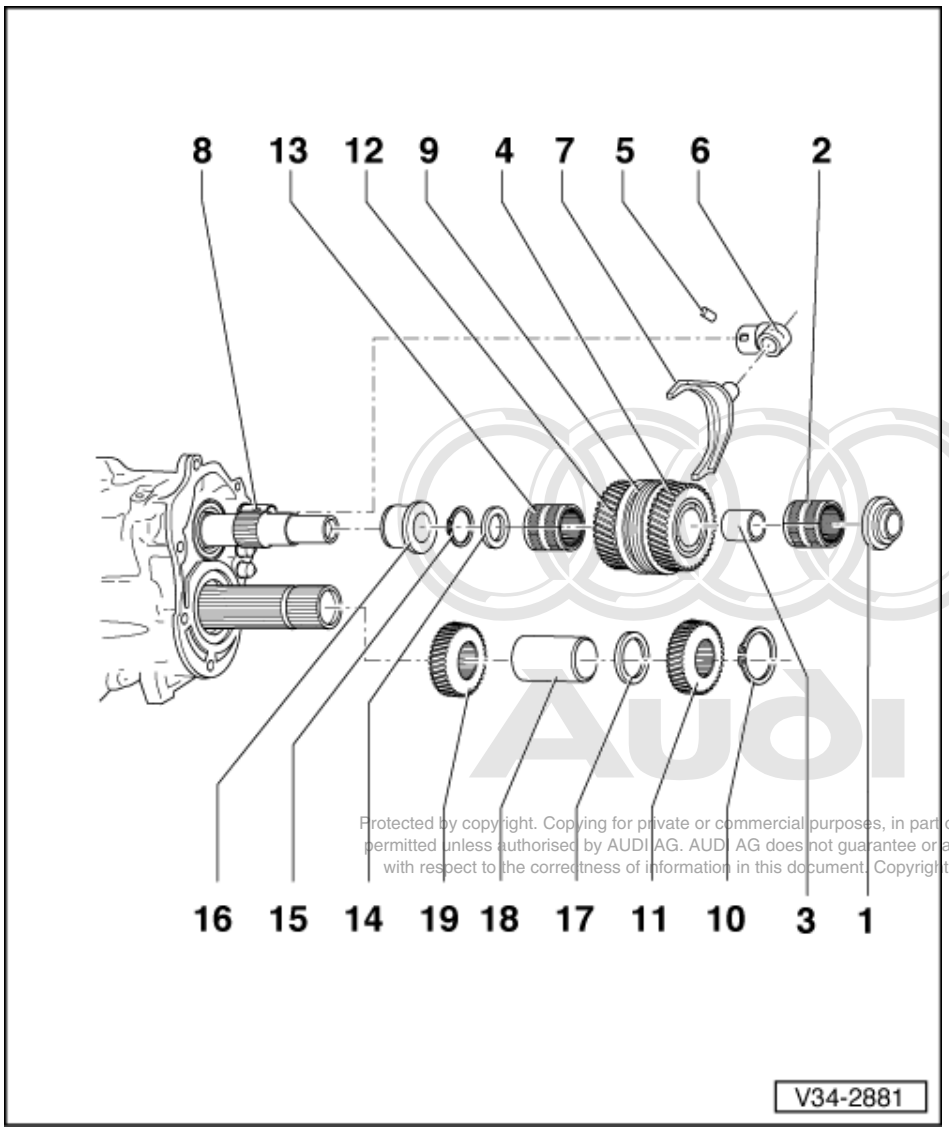
7 Selector fork, 5th and 6th gear

- Can be replaced separately

8 Selector rod for 5th and 6th gear

- Replace only together with follower -Item 6 -
- Removing => Page 104
- 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.



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.

9 Locking collar, synchro-ring, synchro-hub for 5th and 6th gear

- Removing => Page 104
- Installing => Page 113

10 Circlip

- Re-determining thickness => Page 116

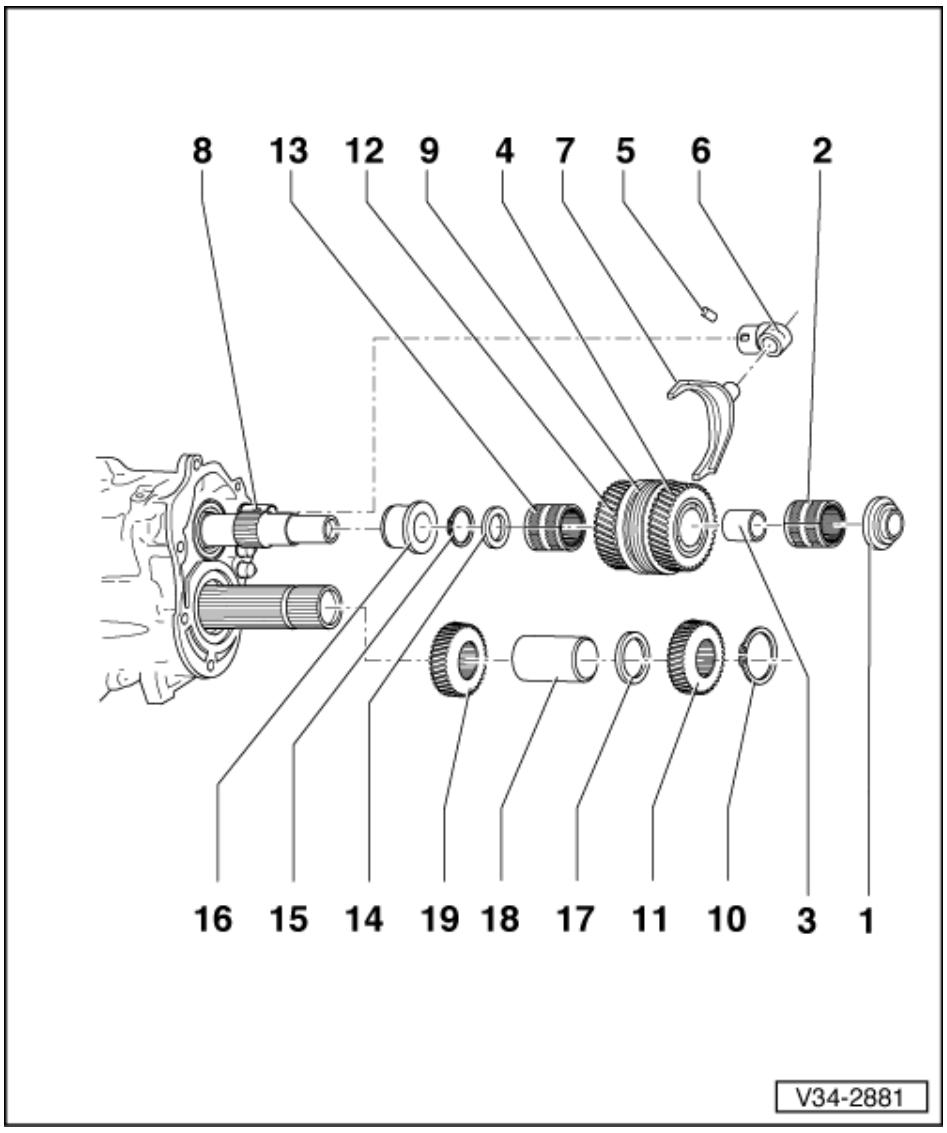
11 5th gear wheel

- Pulling off => Page 103
- Pressing on => Page 116

12 6th speed sliding gear

- Pull off together with synchro-hub and inner race for 5th gear => Page 105

13 Needle roller bearing for 6th gear



14 Thrust washer for needle roller bearing for 6th gear

- Installation position: Grooves face circlip, smooth face contact surface towards needle roller bearing

15 Circlip

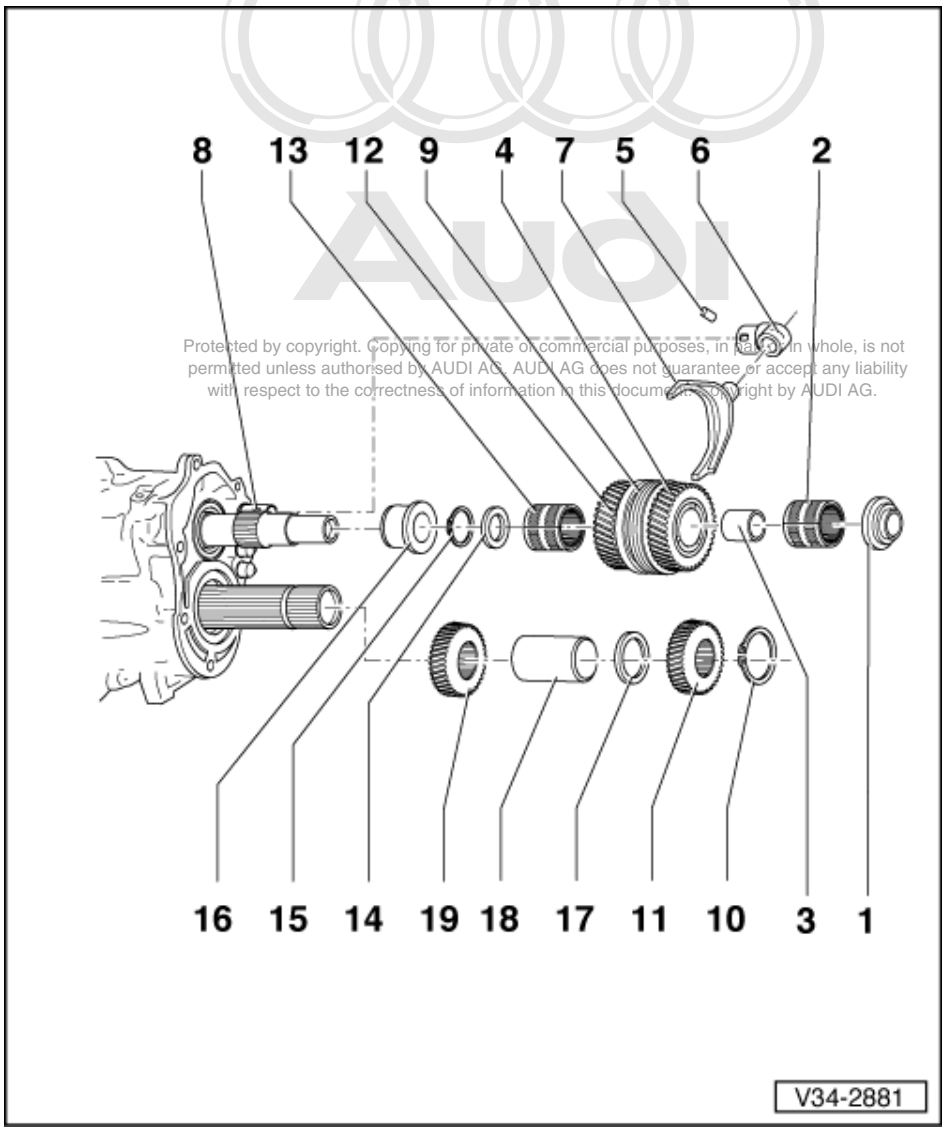
16 Inner race for cylinder roller bearing

- Take off by hand => Page 106
- Modified insertion depth from gearbox serial number 77645 Assignment => Fig. 178

17 Shim

- Re-determining thickness => 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.



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.

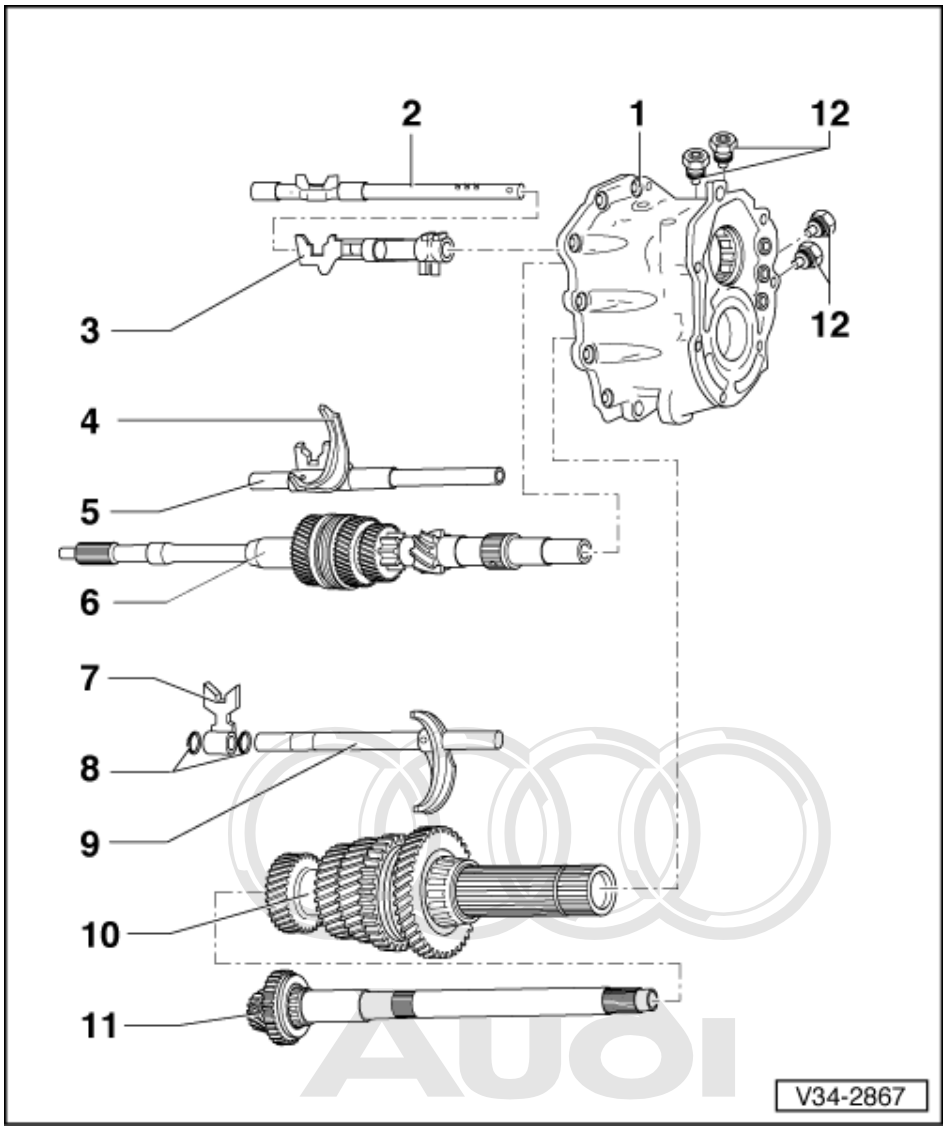
18 Spacer sleeve

- Length 39.6 mm

19 6th gear wheel

- To press off, remove bearing plate => Plate 105
- Pressing off => Page 108
- Pressing on => Page 108

7.6 - Removing and installing input shaft, drive pinion, hollow shaft and internal selector mechanism from bearing plate

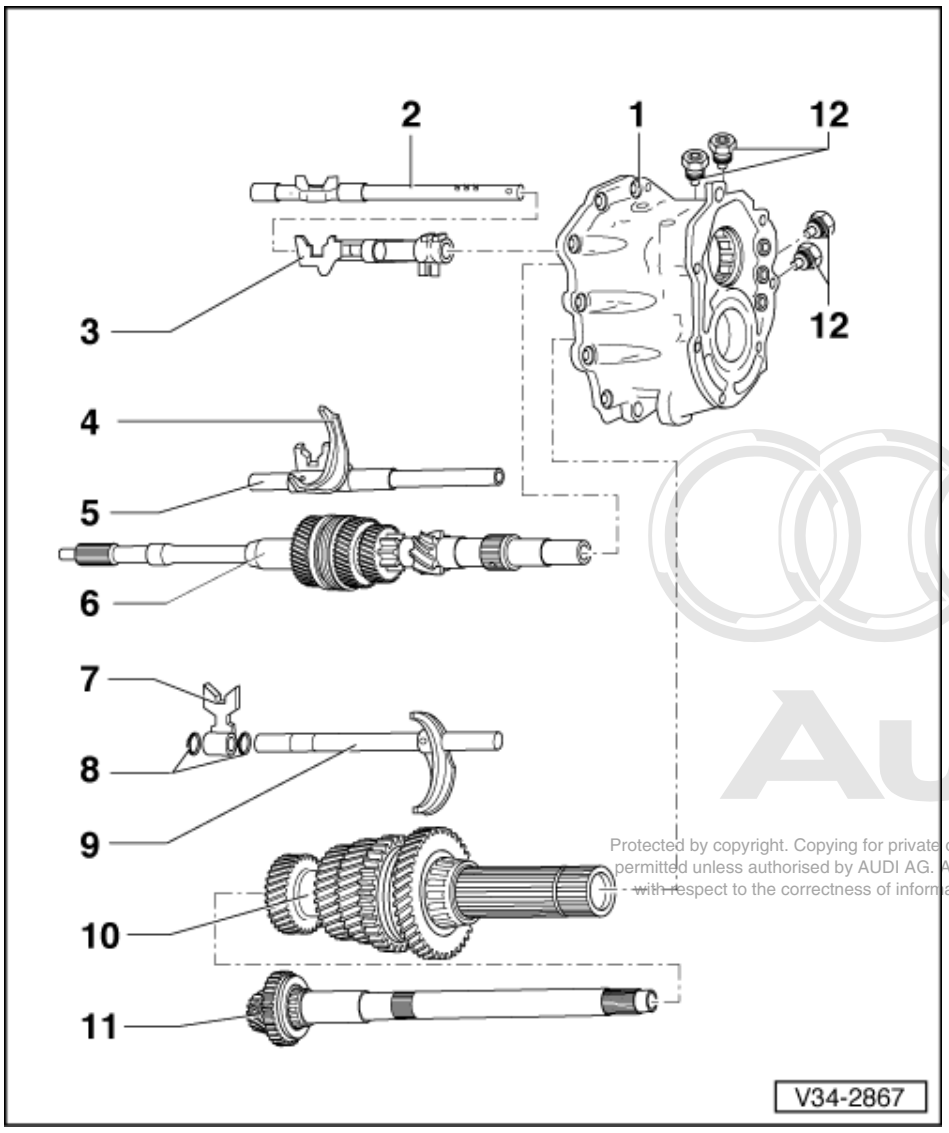


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 **Bearing plate**
- Modified bearing plate from gearbox serial number 77645
- Servicing => Page 137

2 **Selector rod for 5th and 6th gear**
- Only replace complete with follower for 5th and 6th gear => Page 92

3 **Follower for reverse gear**
- Pulling out ball sleeve => Page 142
- Driving in ball sleeve => Page 142



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 Selector fork, 3rd and 4th gear

- Can be replaced separately.
- Installation position: Rib towards follower

5 Selector rod for 3rd and 4th gear

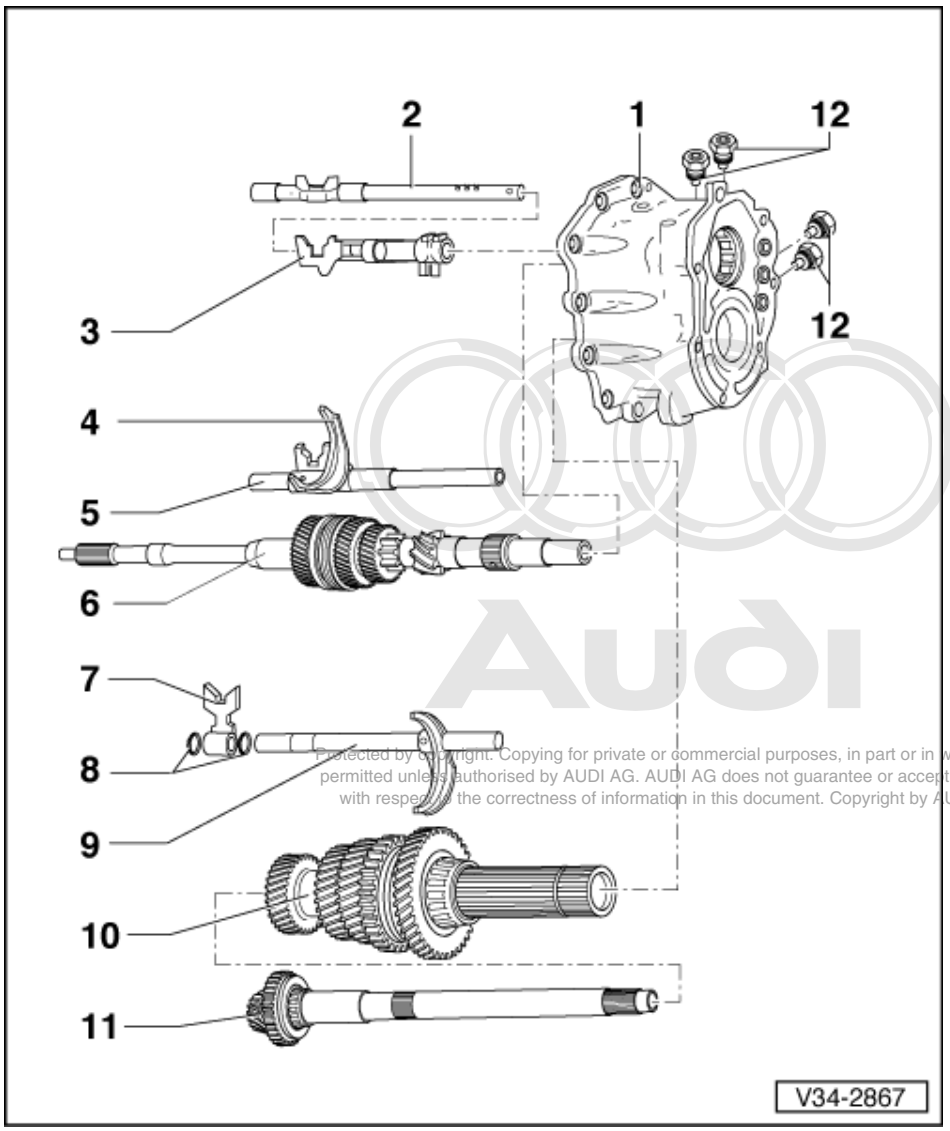
- Only replace complete with follower for 3rd and 4th gear

6 Input shaft

- With wider gearwheel for 1st speed from gearbox serial number 77645 =>Fig. 178
- Dismantling and assembling =>Page 167

7 Follower for 1st and 2nd gear

- Can be replaced separately.



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.

8 Circlip

- Qty. 2

9 Selector rod for 1st and 2nd gear

- Only replace complete with pinned selector fork for 1st and 2nd gear

10 Hollow shaft

- Dismantling and assembling =>Page 179

11 Drive pinion

- Dismantling and assembling =>Page 179

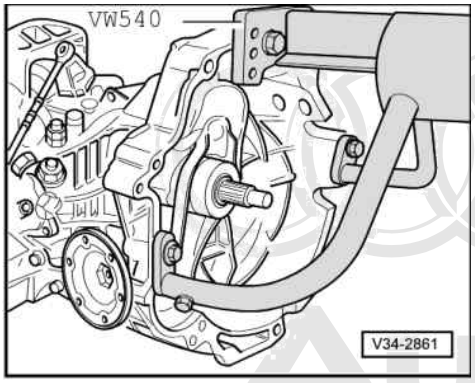
12 Locking bolts

- Qty. 4
- For aluminium bolt: 50 Nm
- For steel bolt: 70 Nm

8 - Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft - work sequence

8.1 - Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft - work sequence

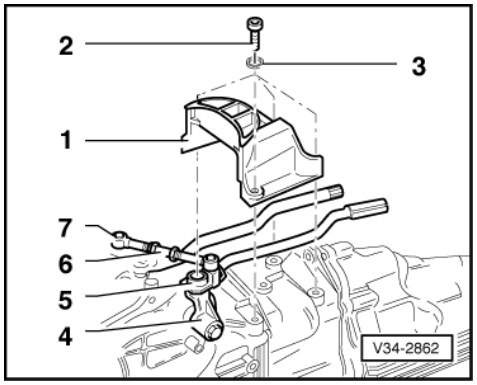
8.2 - Removing



- -> Secure gearbox in assembly stand VW 540.
- Place drip tray underneath and drain gearbox oil (2 oil drain plugs).
- Remove release bearing, clutch release lever and guide sleeve => Page 35 .

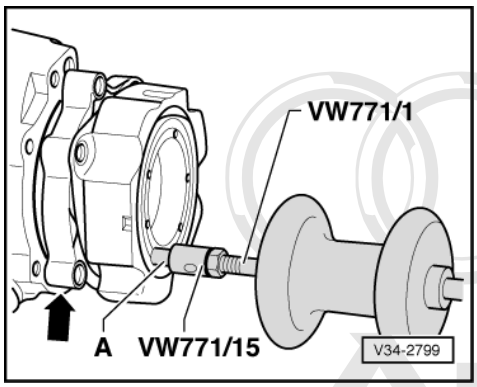
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Unbolt cable arrester for procon-ten system.



1 - -> Cable arrester
2 - Bolt
3 - Washer

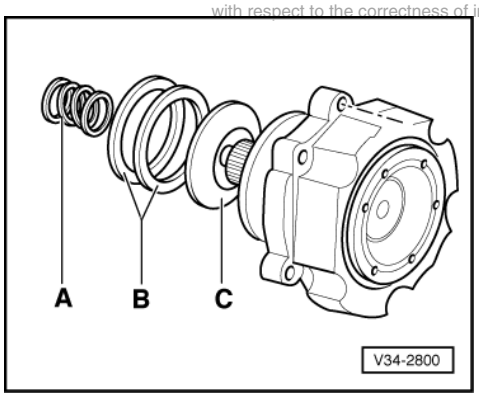
- Remove connecting rod -7- and front push rod -6-.
- Pull front selector rod -5- together with selector lever -4- off selector shaft after removing hexagon nut => Page 48 .



- -> Unscrew bearing housing -arrow- and pull off.

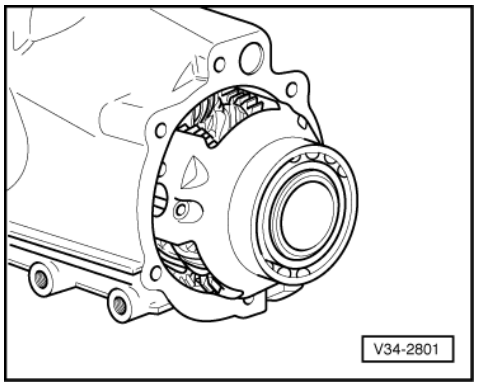
A - Stud M8/M10

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.

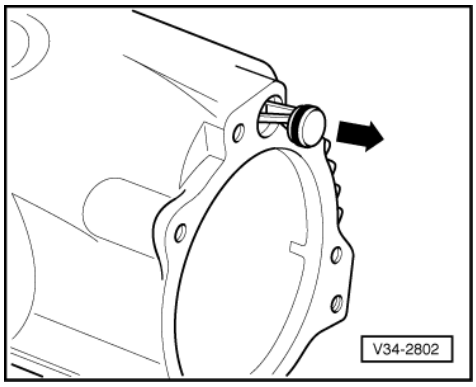


-> Bearing housing is pushed away slightly from end cover by coil spring -A- when it is being pulled off.

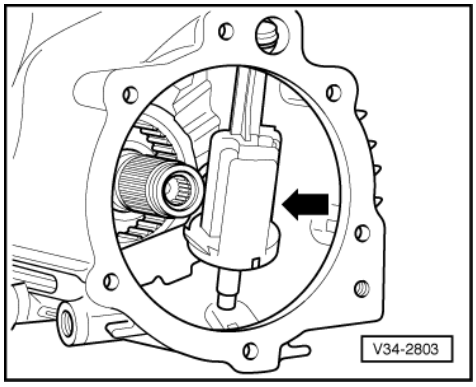
- When taking off bearing housing, observe installation position of dished washer -C-:
  - Outer diameter (concave side) facing shims
- Take off shims -B-, note thickness and re-determine if necessary => Page 119 .



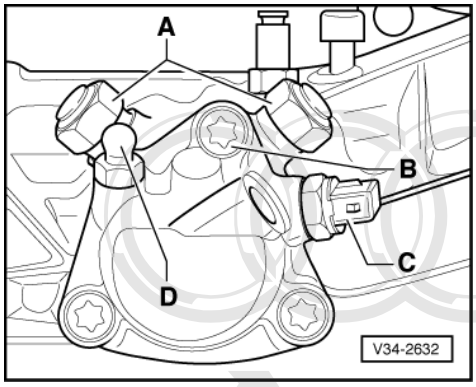
- -> Pull Torsen differential out of end cover.



- -> Pull oil collector sufficiently far out of end cover -arrow-, until it moves freely.

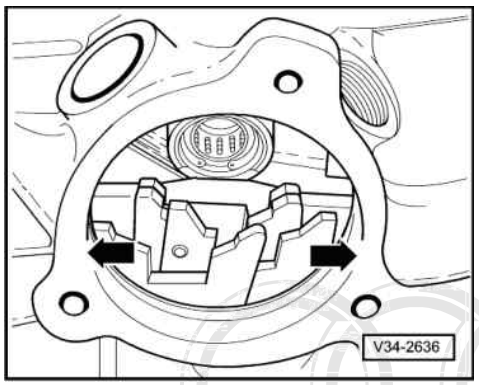


- -> Swivel oil collector -arrow- down and guide it out through hole of end cover.
- Take off oil collector.

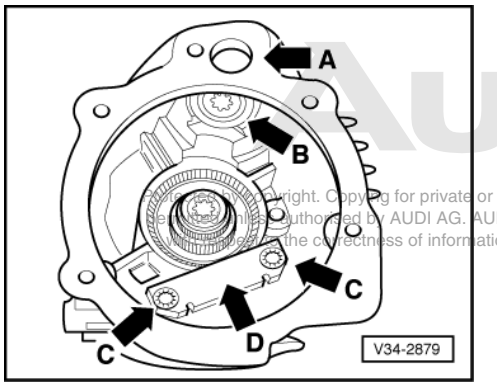


- -> Remove locking bolts -A- for selector shaft from gearbox housing.
- Remove 3 bolts -B- for cover for selector shaft, take off cover.
- Pull out selector shaft.

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.

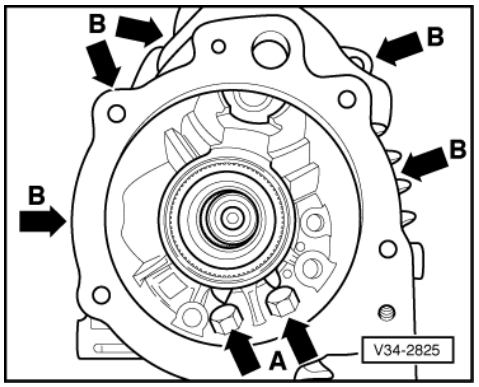


- -> Lock input shaft by engaging 2 gears (e.g. reverse and 2nd gear) do this by moving 2 selector plates -arrows-.

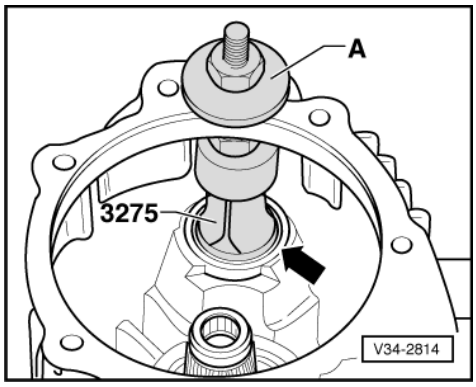


Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Slacken multi-point socket head bolt -arrow B- in input shaft through hole -arrow A- in end cover and unscrew.
- Slacken 2 securing bolts -arrow C- for end cover for manual gearbox at supporting plate for needle roller bearing -arrow D- and unscrew.
- Take off supporting plate.



- -> Take off 2 magnets -arrows A- and clean.
- Slacken 5 bolts -arrows B- for attaching end cover for manual gearbox and unscrew.



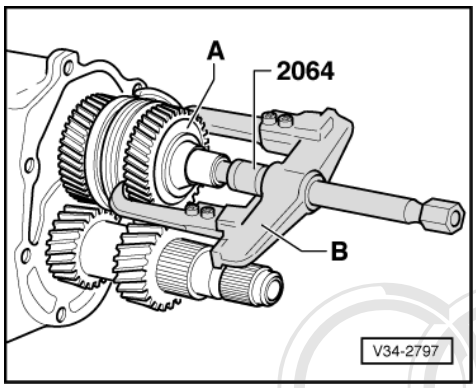
- -> Pull 2nd inner race for ball bearing for input shaft off input shaft.

A - Washer

Note:

Internal puller 3275 engages in a circular groove in the inner race when pulling off -arrow-.

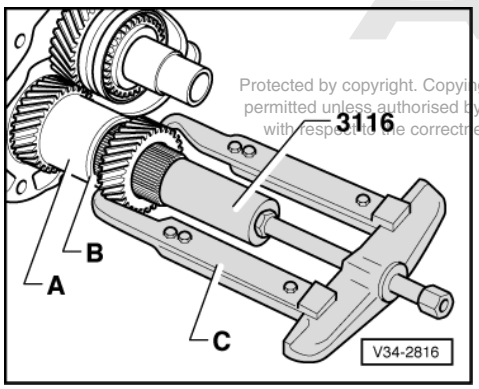
- Take off end cover together with end cover/bearing plate gasket.
- Pull dowel sleeves out of bearing plate.



- -> Pull off 5th speed sliding gear and spring together with 1st inner race -A- for ball bearing for input shaft.

B - Two arm puller, e.g. Kukko 20/10

- Take off 5th gear synchro-ring.
- Take off circlip for 5th gear wheel.



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.

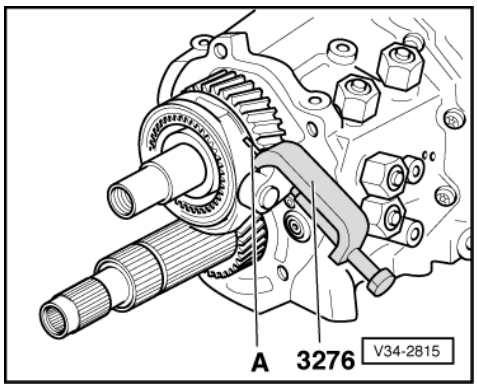
- -> Pull off 5th gear wheel; for this lock hollow shaft in position by engaging two gears => Page 102 .

Note:

Only use hexagon bolt of spring sleeve 3116, length 50 mm

C - Two arm puller, e.g. Kukko 20/10 with 200 mm long hooks

- Take off shim -B- for 5th gear wheel, note thickness and re-determine if necessary => Page 115 .
- Remove spacer sleeve.

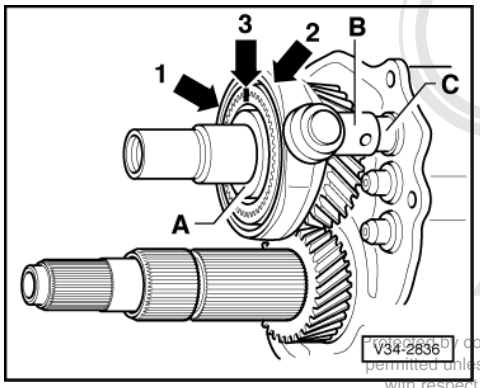


- -> Press out spring sleeve -A- (01.92 ä: spring pin) for selector fork for 5th and 6th gear.

Note:

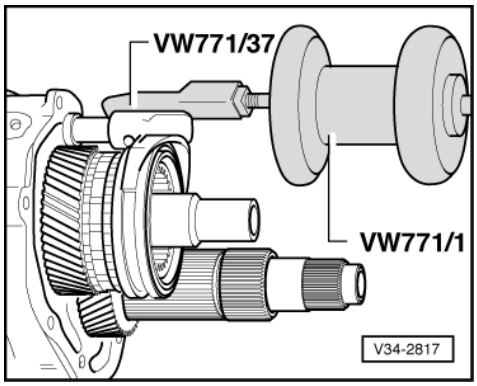
Do not drive out spring sleeve or spring pin, otherwise selector rod bearing will be damaged.

- Pull selector rod on follower together with selector fork for 5th and 6th gear and locking collar as far as possible away from bearing plate (until stop is felt).

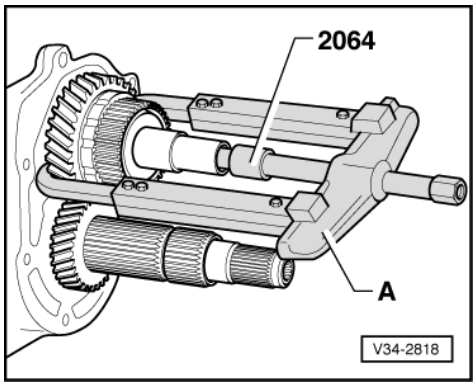


Copyright by AUDI AG.
Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Mark relative positions -arrow 3-.of locking collar for 5th and 6th gears -arrow 1- and synchro-hub -A- (paired) -arrow 1-.

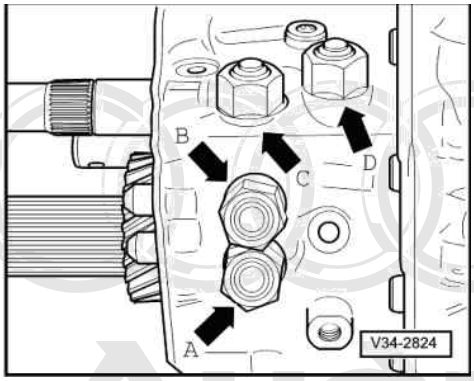


- -> Pull follower together with selector fork and locking collar off selector rod.



- -> Pull off 6th speed sliding gear, synchro-ring for 6th gear, synchro-hub for 5th and 6th speed gears and inner race for 5th speed sliding gear.

  A - Two arm puller, e.g. Kukko 20/10 with 200 mm long hooks

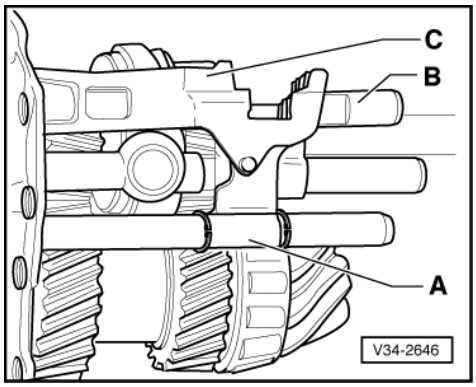


- -> Unscrew selector rod locking bolts.

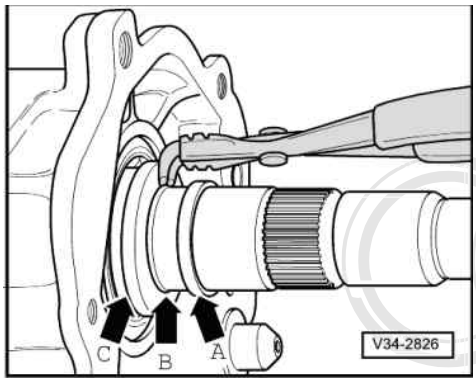
  A - 1st and 2nd gear
  B - 3rd and 4th gear
  C - 5th and 6th gear
  D - Reverse gear

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.

- Drive out dowel sleeves on bearing plate and remove bearing plate from gearbox housing.
- Secure drive pinion opposite hollow shaft e.g. with hose strap, to prevent it slipping out.
- Separate bearing plate with input shaft, drive pinion and hollow shaft and with internal selector mechanism (as a single unit) from gearbox housing.

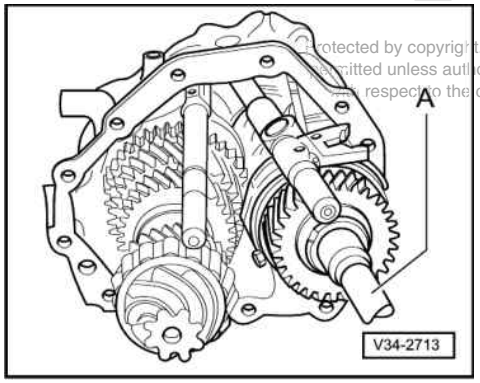


- -> Remove circlip from selector rod for 1st and 2nd gear and take off follower -A-.
- Pull out selector rod -B- for 5th and 6th gear.
- Remove follower -C- for reverse gear.

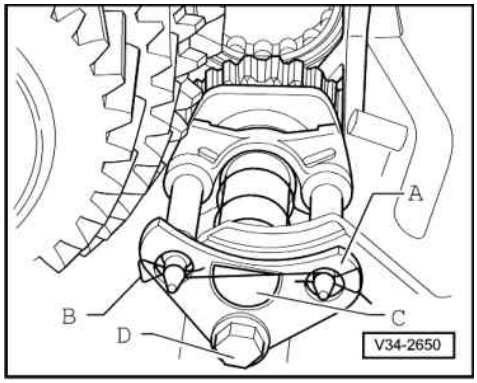


- -> Pull thrust washer -arrow A- for needle roller bearing for 6th gear off shaft.
- Use right-angled circlip pliers to remove circlip -arrow B- for inner race for cylinder roller bearing.
- Take out inner race -arrow C- for cylinder roller bearing (not a press fit).

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.



- -> Take input shaft -A- with selector rod and selector fork for 3rd and 4th gear out at an angle from bearing plate.

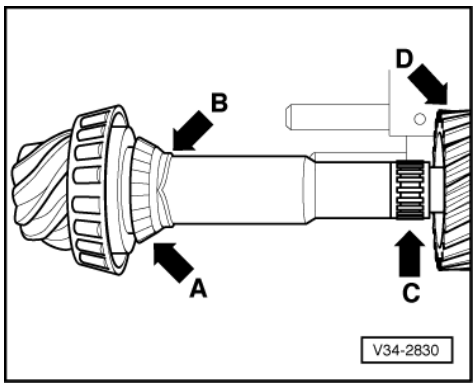


- -> Unscrew hexagon bolt -D-, take off spring clasp -B- and retaining plate -A-, pull out shaft -C- for reverse idler gear.
- Take out spring, synchro-ring and reverse idler gear.
- Take off relay lever for reverse gear.

Removing and installing reverse gear => Page 138 .

Notes:

- Drive pinion and hollow shaft can be removed complete if it is possible to easily lever off 6th gear wheel.

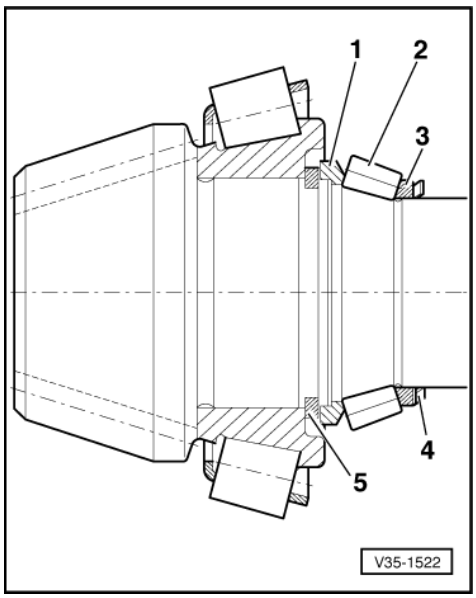


- If it is necessary to press off 6th gear wheel, then drive pinion should be pulled out from hollow shaft.

- Take off locking element of drive pinion
- -> Pull drive pinion out of hollow shaft -D- collect taper rollers -A- (Qty. 23) when carrying out this step.
- Take off corrugated spring -B- and needle roller assembly -C-.

Note:

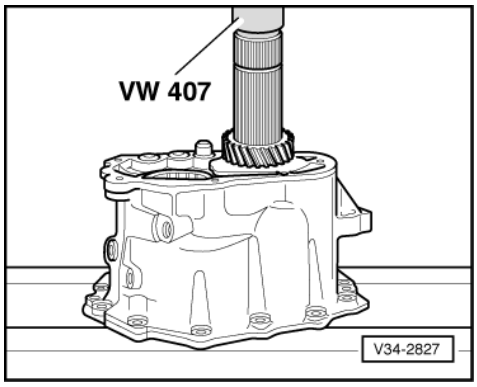
Carefully protect mounting from contamination, clean if necessary.



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.

- -> Inspect mounting to ensure it is complete:

1 - Flange ring (conical contact surface facing taper rollers)
2 - Taper rollers (Qty. 23) with large diameter facing drive pinion head
3 - Supporting ring (conical contact surface facing taper rollers)
4 - Corrugated spring
5 - Circlip for taper roller bearings for drive pinion



- -> Press off 6th gear wheel.

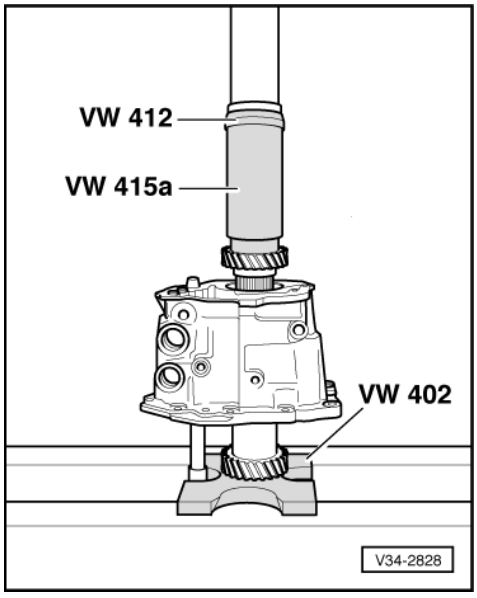
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

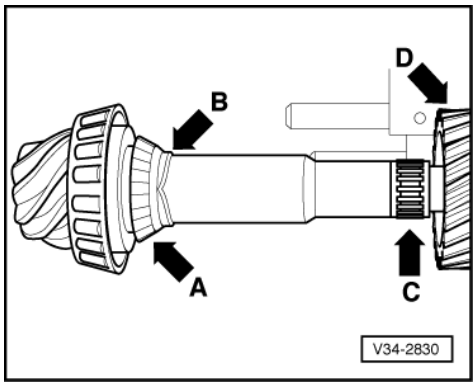
Because of the type of fit, it may be possible to press gear off easily.

- Remove hollow shaft or drive pinion and hollow shaft from bearing plate together with selector rod and selector fork for 1st and 2nd gears.

8.3 - Installation

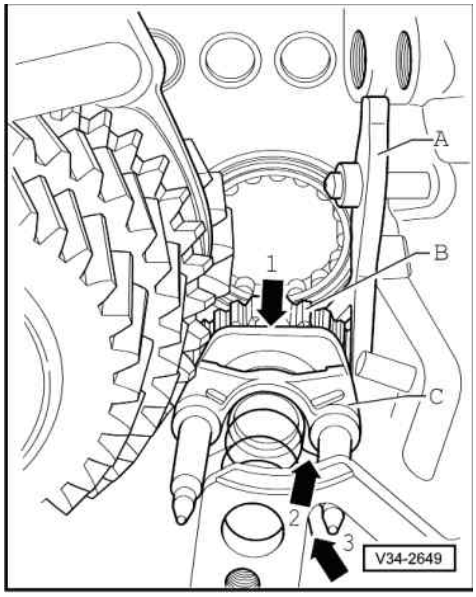


- Fit hollow shaft with selector fork and selector rod for 1st and 2nd gear (without follower) into bearing plate.
- -> Heat 6th gear to approx. 120 oC and fit on.
  - Installation position: Shoulder towards taper roller bearing
- Press fully in until zero play.
- Insert taper roller bearing of drive pinion/hollow shaft with multi-purpose grease.
  - Arrangement => Page 107



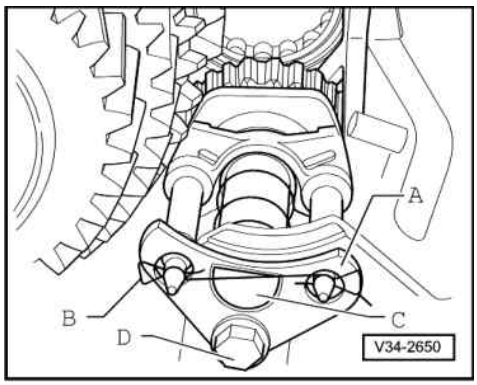
A - -> Flange ring, taper roller (Qty. 23) and supporting ring
B - Corrugated spring
C - Needle roller assembly
D - Hollow shaft

- Oil needle roller bearing well.
- Insert drive pinion into hollow shaft and secure e.g. with hose strap, to prevent it slipping out.



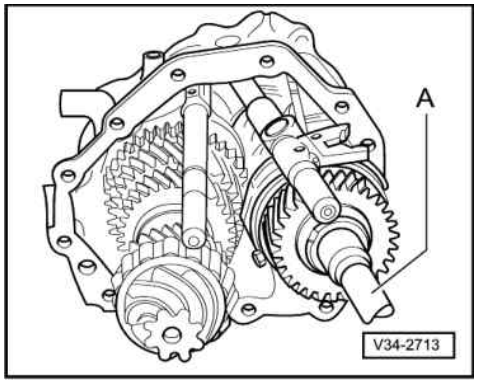
- -> Fit relay lever -A- for reverse gear over relay lever bolt, paying attention to pin (for limiting movement of relay lever relevant to synchro-ring).
- Insert sliding gear -B- and engage relay lever with groove on sliding gear.
- Insert synchro-ring -C-.
  - Installation position: Position flat on synchro-ring circumference to face input shaft (not as yet fitted) - arrow 1-
- Insert spring.
  - Installation position: Hook single angled end into recess on synchro-ring -arrow 2-. Turn double angled end anti-clockwise and hook into opening in bearing plate -arrow 3-

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.

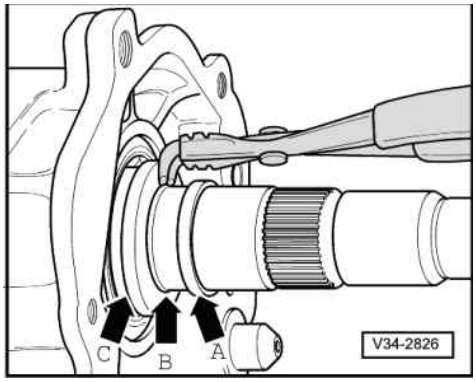


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

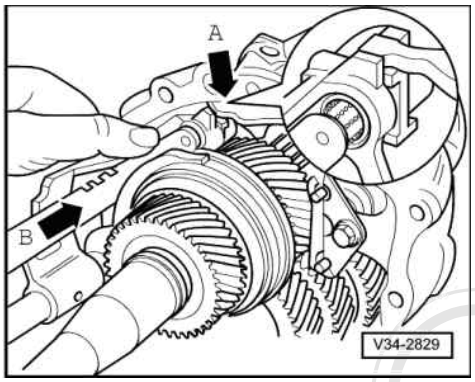
- -> Insert shaft -C-.
- Fit retaining plate -A-.
  - Installation position: Chamfers of holes for locking pins of synchro-ring face bearing plate
- Insert spring clasp -B- into locking pins of synchro-ring.
- Replace self-locking nut -D- and tighten to 25 Nm.



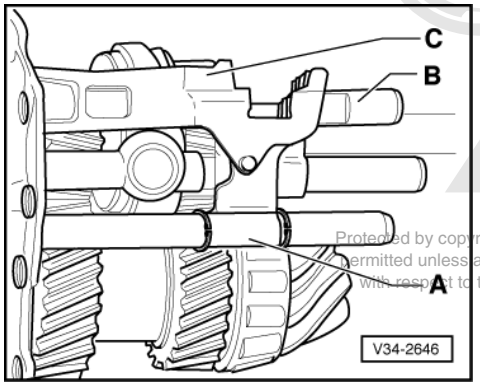
- -> Slide input shaft -A- with selector rod and selector fork for 3rd and 4th gear at an angle into bearing plate.
  - Selector fork installation position: Rib towards follower => Page 97



- -> Slide inner race -arrow C- for cylinder roller bearing onto main shaft at flange for end cover (clearance fit).
- Fit circlip -arrow B- using right-angled circlip pliers.

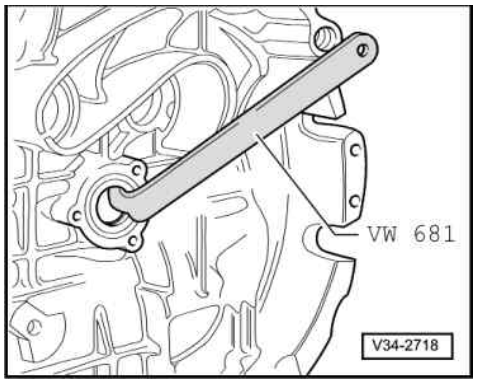


- -> Engage recess in follower for reverse gear with the free end of relay lever -arrow A-.
- Slide selector rod for 5th and 6th through follower for reverse gear in direction of -arrow B-.



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.

- -> Slide follower -A- for 1st and 2nd gear onto selector rod and secure with circlips.
- Lubricate selector rods and all bearings of input shaft and drive pinion/hollow shaft in gearbox housing and on bearing flange with gear oil.

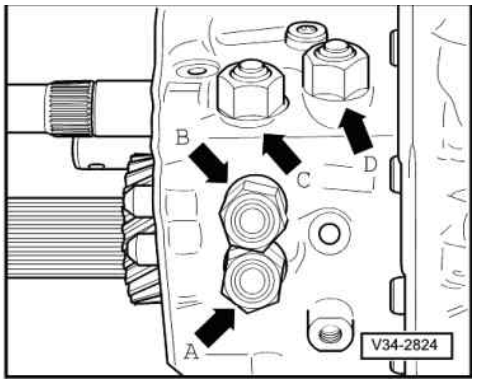


- -> Lever used input shaft oil seal carefully out of gearbox housing with screwdriver.
- Coat sealing surfaces between bearing plate and gearbox housing with sealing paste AMV 188 200 03.
- Insert complete bearing plate into gearbox housing.

Note:

When inserting the complete bearing plate, ensure that the selector rods align with their mounting points.

- Drive in 2 dowel sleeves for bearing flange/gearbox housing.
- Tighten 12 bolts in diagonal sequence.

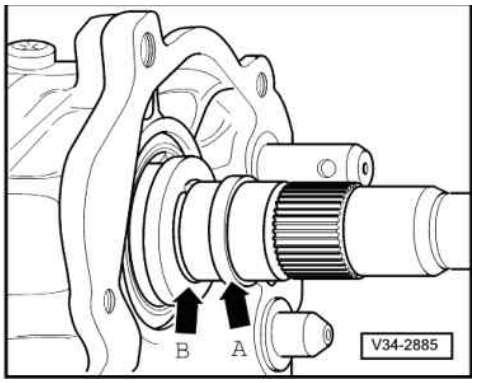


- -> Screw in selector rod locking bolts.

A - 1st and 2nd gear
B - 3rd and 4th gear
C - 5th and 6th gear
D - Reverse gear

Note:

Observe differing tightening torques: For aluminium locking bolts - 50Nm, for steel locking bolts - 70 Nm.

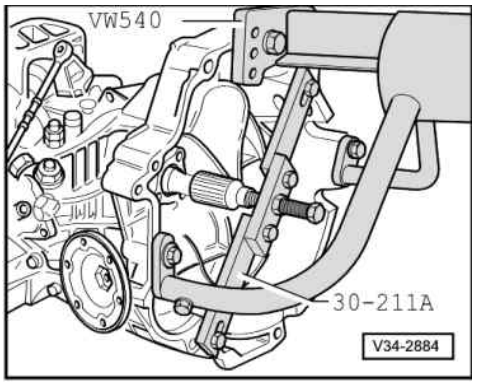


6-speed gearbox only:

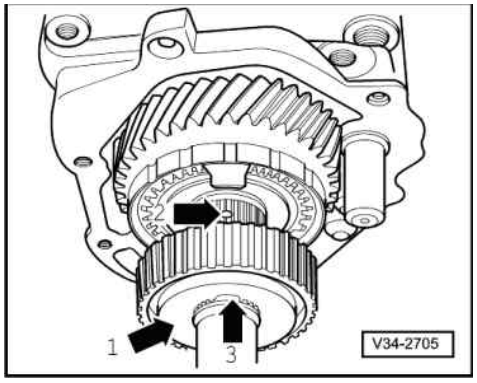
- -> Fit thrust washer -arrow A- for needle roller bearing for 6th speed gear.
  - Installation position: Shoulder towards circlip -arrow B-, smooth contact surface to shaft end
- Oil needle roller bearing for 6th speed sliding gear with gear oil and fit.
- Slide on 6th speed sliding gear with spring and synchro-ring.
  - Synchro-ring installation position: The lugs of synchro-ring engage into recesses below in sliding 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.

All gearboxes:

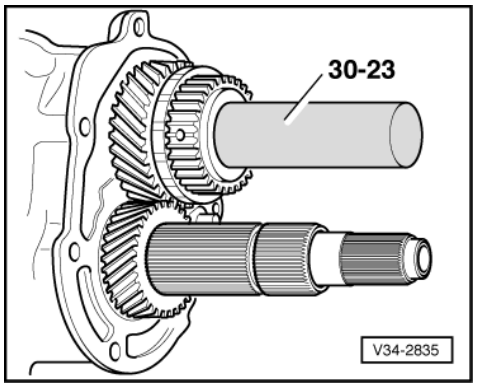


- -> Support input shaft with support bridge 30-211 A.

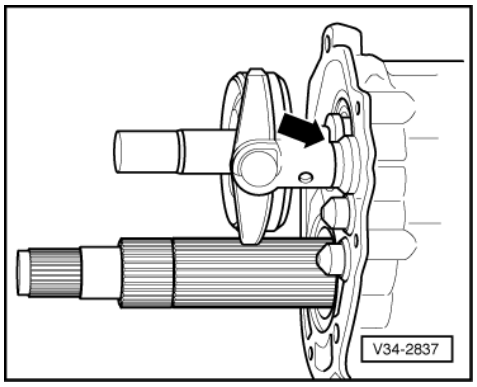


-> Installation position of 5th and 6th gear synchro-hubs:

- Side with projecting face -arrow 1- faces shaft end
- The oil drilling of input shaft -arrow 2- and the oil groove of synchro-hub -arrow 3- are in line



- -> Heat synchro-hub for 5th and 6th gears to approx. 100 oC, fit and drive onto stop so that it is free of play.
- Check 6th speed sliding gear for axial play.

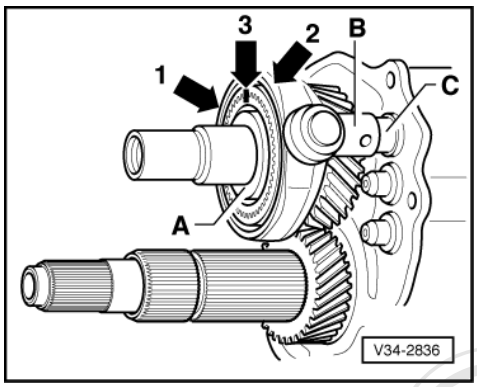


5-speed gearbox only:

- -> Fit spacer ring -arrow- between follower for 5th and 6th gear and bearing flange.
  - Installation position: Wider end facing bearing flange

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.

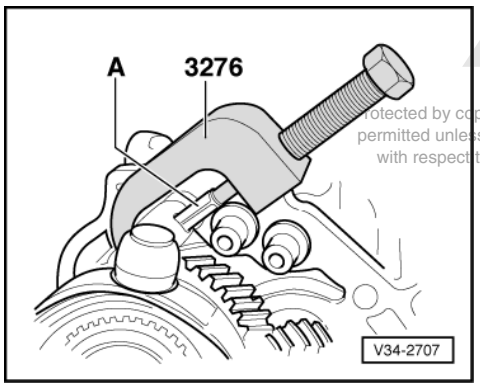
All gearboxes:



- -> Align markings on paired synchro -hub-A- and locking collar for 5th and 6th gears -arrow 1-.
- Fit locking collar -arrow 1- with selector fork -arrow 2- onto synchro-hub -A-, and at the same time fit follower for 5th and 6th gears -B- onto selector rod -C-.

Notes:

- Selector fork rib -arrow 2- must face towards shaft end.
- When sliding follower onto selector rod for 5th and 6th gear remember holes for spring sleeve (01.92 ▸: spring pin).

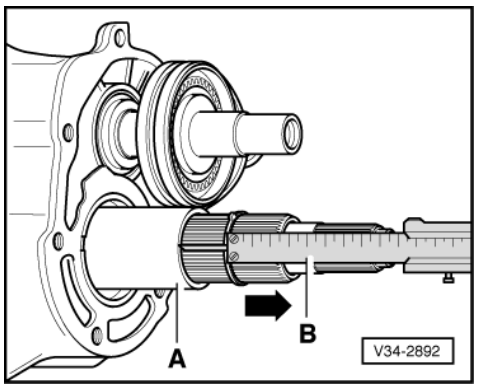


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Press in spring sleeve -A- (01.92 ä: spring pin) flush.

Notes:

- Do not drive in spring sleeve or spring pin, otherwise selector rod bearing will be damaged.
- Mount spring sleeve groove indirection of force, as illustrated. Installation position of spring pin is not dependent on direction of force.



5-speed gearbox only:

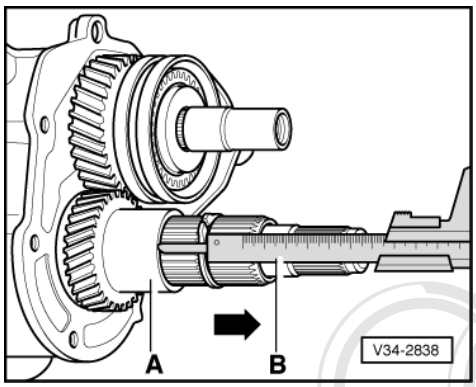
- Re-determine shim for 5th gear wheel:
  - -> Fit spacer sleeve -A- (length 72.5 mm) onto hollow shaft.

- When fitting circlip, press indirection of arrow until fully home.
- Measure size between sleeve and fitted circlip using depth gauge -B-.
- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available:

Measured range (mm)	Shim thickness (mm)
31.01 ... 31.11	1.05
31.11 ... 31.21	1.15
31.21 ... 31.31	1.25
31.31 ... 31.41	1.35



6-speed gearbox only:

- Re-determine shim for 5th gear wheel:
  - -> Fit spacer sleeve -A- (length 39.6 mm) onto hollow shaft.
  - When fitting circlip, press indirection of arrow until fully home.
  - Measure size between sleeve and fitted circlip using depth gauge -B-.
  - Determine shim from table. Part numbers

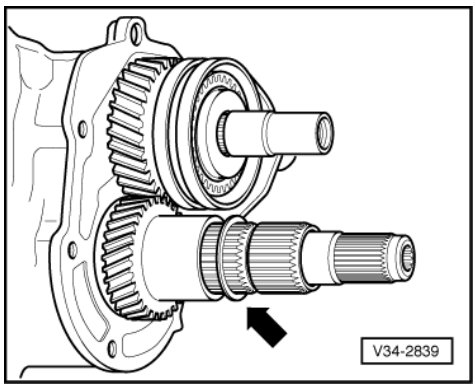
=> Parts Catalogue

The following shims are available:

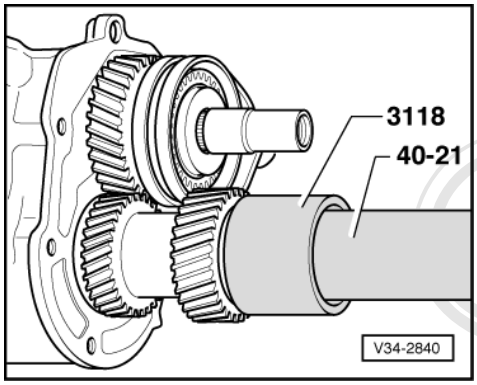
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Measured range (mm)	Shim thickness (mm)
31.01 ... 31.11	1.05
31.11 ... 31.21	1.15
31.21 ... 31.31	1.25
31.31 ... 31.41	1.35

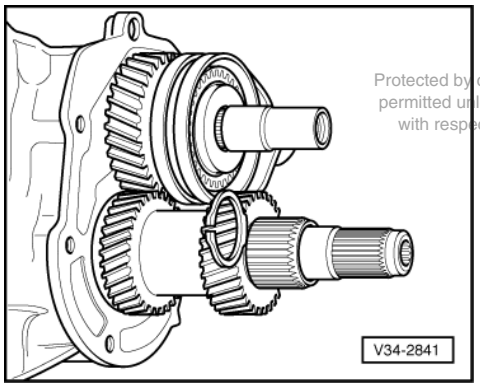
All gearboxes:



- -> Fit selected size of shim -arrow- onto hollow shaft.



- -> Heat 5th gear to approx. 120 oC fit and drive onto stop free of play.
  - Installation position: Shoulder towards spacer sleeve



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.

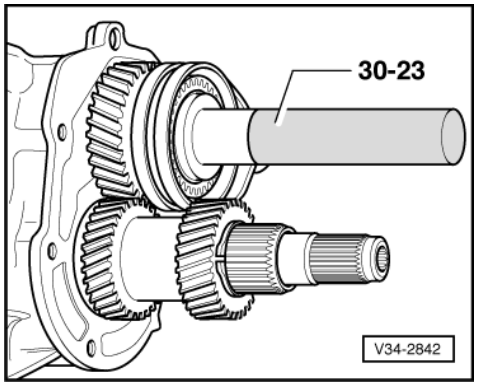
- -> Re-determine circlip for 5th gear wheel:
  - Determine the thickest circlip that can still just be fitted.
  - Determine circlip from table. Part numbers

=> Parts Catalogue

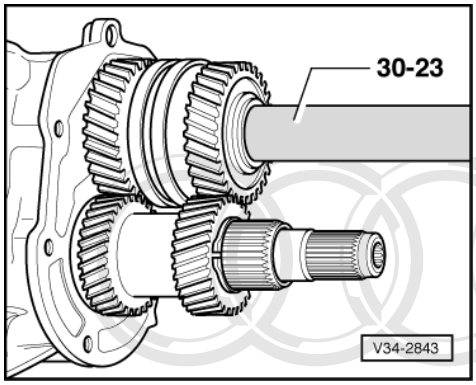
Available circlips:

Circlip thickness (mm)		
2.32	2.40	2.48
2.34	2.42	2.50
2.36	2.44	
2.38	2.46	

- Fit circlip.

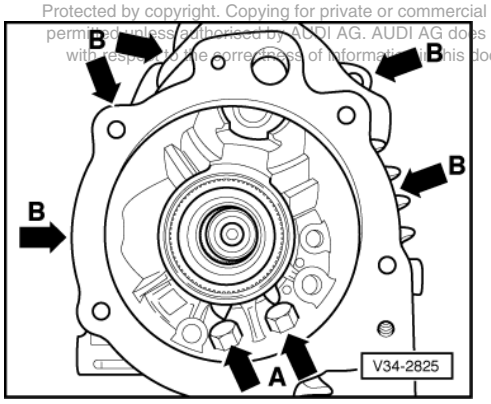


- -> Drive on inner race for 5th speed sliding gear free of axial play.
- Oil needle roller bearing with gear oil and fit.
- Place synchro-ring for 5th gear in locking collar.
- Slide on 5th speed sliding gear with spring.



- -> Heat 1st inner race for ball bearing for input shaft to approx. 100 oC, fit onto input shaft and drive onto stop free of play.
- Check 5th speed sliding gear for axial play.
  - Specified axial clearance: 0.15 ... 0.35 mm
- Insert dowel sleeves into bearing plate.
- Fit new gasket for end 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.

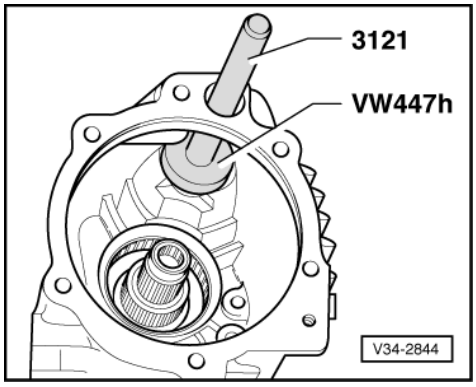


- -> Fit end cover and insert securing bolts -arrows B-.

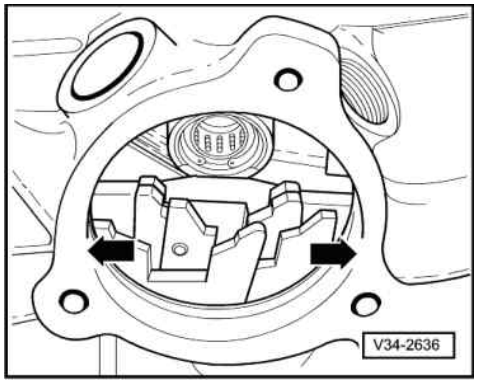
Note:

Do not tighten bolts at this stage.

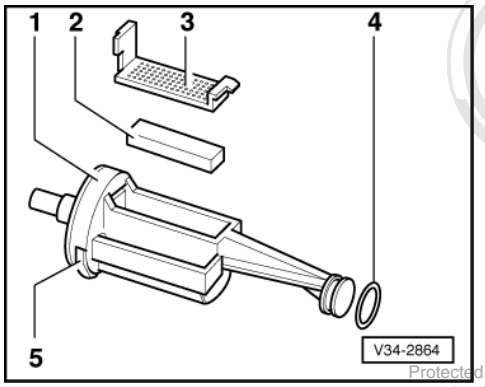
- Clean 2 magnets -arrows A- and insert.
- Insert supporting plate and tighten by hand.
  - Installation position: Lugs face magnets
- Tighten bolts for end cover in diagonal sequence.



- -> Insert 2nd inner race onto input shaft with track for ball facing ball bearing of input shaft and knock over hole in end cover.
- Remove support bridge 30-211 A.



- -> Lock input shaft by engaging 2 gears (e.g. reverse and 2nd gear) do this by moving 2 selector plates -arrows-.
- Tighten multi-point socket head bolt to 150 Nm.

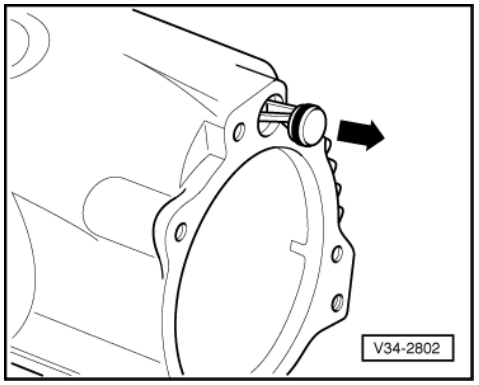


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

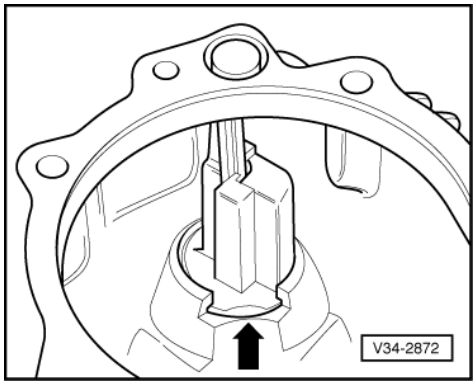
- -> Use screwdriver to unclip cover for oil collector -3- from oil collector -1- at long end and take off magnet -2-.

4 - O-ring
5 - Positioning segment

- Clean oil collector.
- Assemble oil collector.

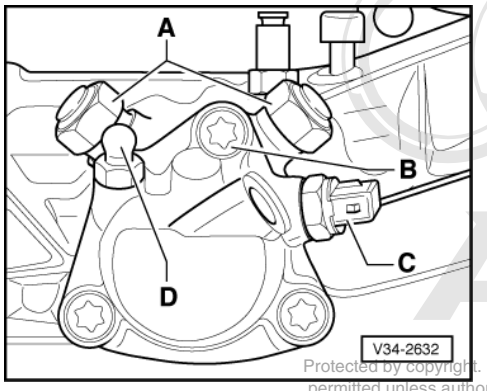


- -> Guide oil collector with supporting arm ahead, from interior of end cover through hole of end cover sufficiently far -arrow-, so that O-ring can be fitted onto oil collector from outside.
- Lightly oil new O-ring and insert.



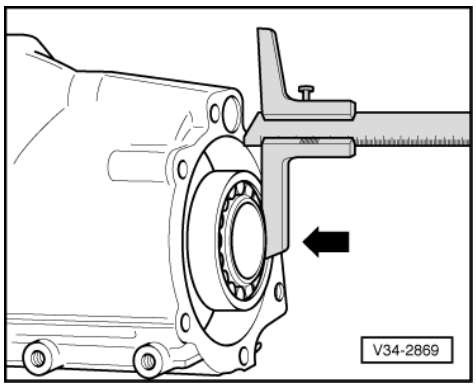
- Insert oil pipe of oil collector in input shaft.
- -> Rotate oil collector until positioning segment is positioned in milled recess of end cover -arrow-.
- Press in oil collector onto stop.
- Fit assembly sleeve Part no. 01E 311 120 onto selector shaft.
- Check neutral position of followers.
  - Gear gates must align

- Install complete selector 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.

- -> Screw locking bolts -A- for selector shaft into gearbox housing.
  - Tightening torque:
    For aluminium locking bolts 50 Nm
    For steel locking bolts 70 Nm
- Lightly oil new O-ring for cover for selector shaft and fit.
- Fit cover for selector shaft.
- Coat bolts -B- (Qty. 3) with sealing paste AMV 188 200 03 before installing and tighten.

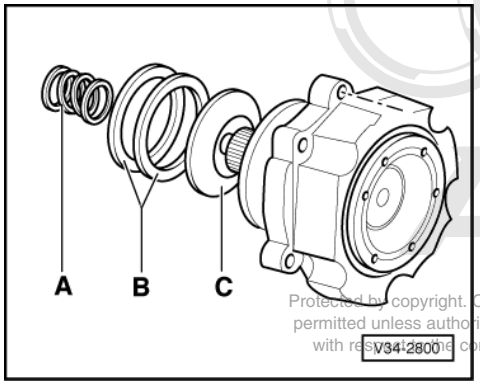


- Push Torsen differential onto splines of hollow shaft.
- -> Press Torsen differential in direction of arrow; measure distance between top edge of bolted end cover and front edge of outer race of ball bearing for Torsen differential.
- Determine shim(s) from table overleaf. Part numbers

=> Parts Catalogue

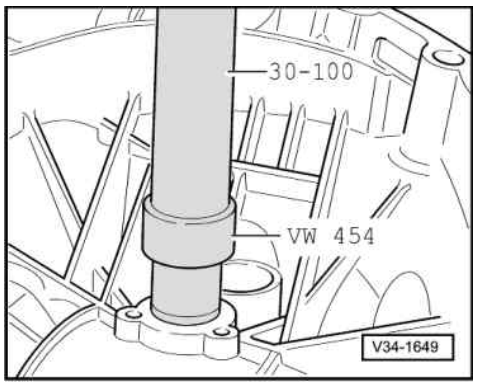
The following shims are available:

Measured range mm	Qty.	Shim thickness (mm)
7.05 ... 7.30	1 1 1	1.65 1.45 1.20
7.30 ... 7.55	1 1 1	1.65 1.45 0.95
7.55 ... 7.80	1 1 1	1.65 1.45 0.70
7.80 ... 8.05	1 1 1	1.65 1.45 1.05
8.05 ... 8.25	2	1.05
8.25 ... 8.50	1 1	1.65 1.45
8.50 ... 8.75	1 1	1.65 1.20
8.75 ... 9.00	1 1	1.65 0.95
9.00 ... 9.25	1 1	1.65 0.70
9.25 ... 9.50	1 1	1.65 0.45

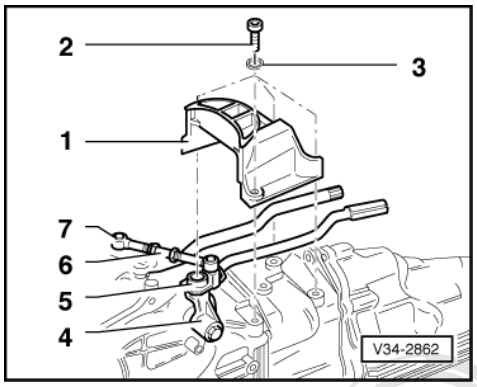


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Insert dished washer -C- into bearing housing.
  - Installation position: Large diameter (concave side) facing shims
- Fit shims determined from table -B-.
- Fit spring -A- onto end of flange shaft.
- Lightly oil new O-ring for bearing housing and insert.
- Oil small needle roller bearing in drive pinion.
- Insert complete bearing housing and pre-tighten evenly.
- Tighten bolts in diagonal sequence.



- Pack space between sealing and dust lip of new seal for input shaft with multi-purpose grease.
- Pull a thin protective hose tightly onto splines of input shaft.
- -> Tap in input shaft oil seal.
  - Insertion depth: 3.5 mm
- Remove protective hose.



- Install release bearing, clutch release lever and guide sleeve => Page 35 .
- -> Install front selector rod -5- together with selector lever -4- and cap nut => Page 48 .
- Check that gearbox can be shifted through all gears.
- Install push rod -6- => Page 55 .
- Check connecting rod -7- adjustment => Page 58 .
- Fit connecting rod.
- Fit cable arrester -1- for procon-ten and tighten 4 bolts -2- with washers -3- to 40 Nm.

Note:

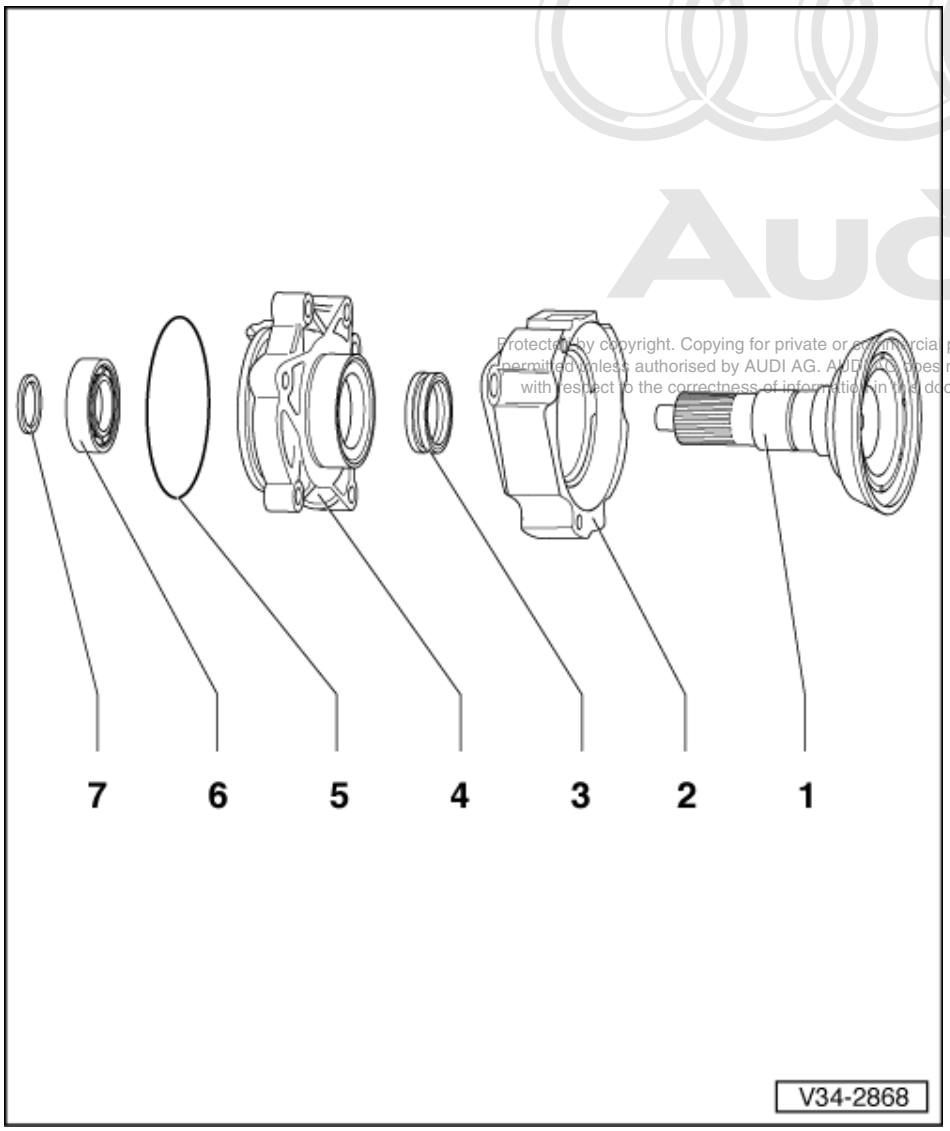
When installing an exchange gearbox with new gearbox housing version in a vehicle equipped with procon-ten, use a longer bolt and spacer bush to secure cable arrester =>Page 64 .

- Checking oil level in manual gearbox => Page 81 .

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.

9 - Dismantling and assembling bearing housing

9.1 - Dismantling and assembling bearing housing



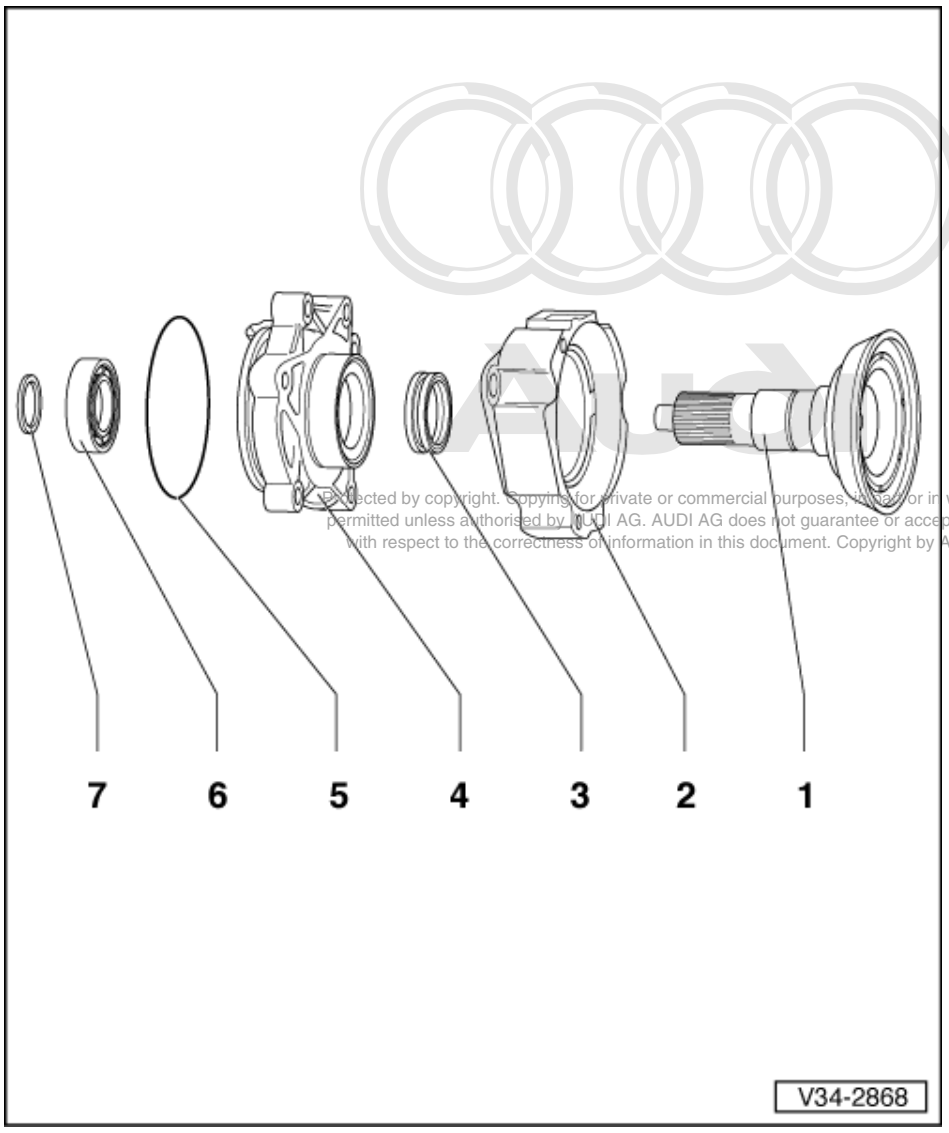
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 **Flange shaft**
- Pressing out =>Fig. 1
- Pressing in =>Fig. 2

2 **Vibration damper**
- Pressing off => Fig. 3
- Pressing on => Fig. 4

3 **Oil seal**
- Pulling out =>Fig. 5
- Preparing for installation => Fig. 6
- Driving in => Fig. 7

4 **Bearing housing**



The data is 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.

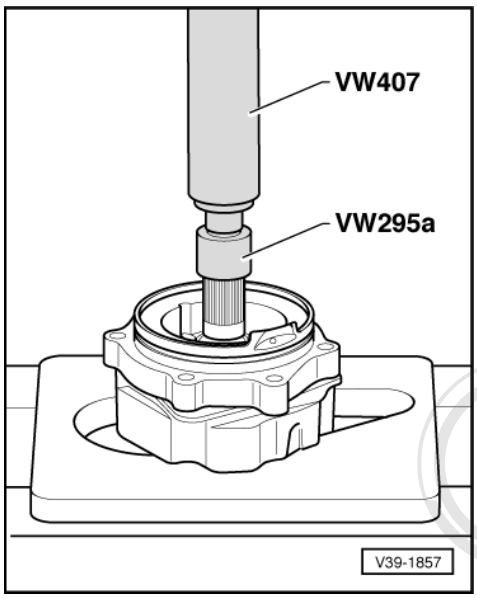
5 O-ring

- Always replace
- Oil lightly before installing.

6 Ball bearing for flange shaft

- Pressing out =>Fig. 8
- Pressing in =>Fig.9

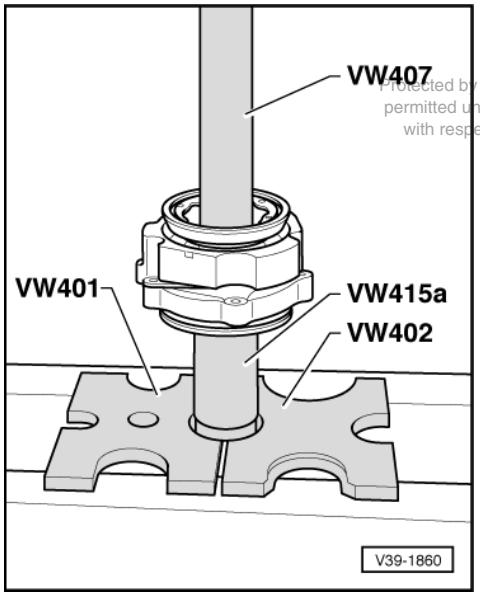
7 Circlip



-> Fig.1 Pressing out flange shaft

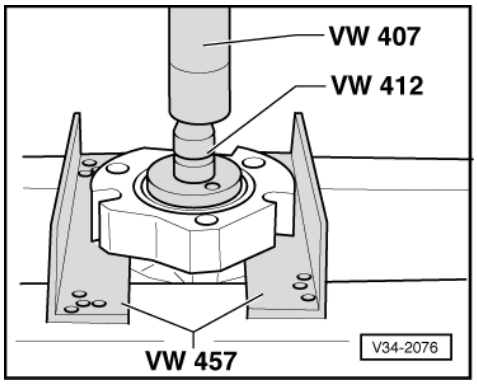
- Take off circlip before pressing out flange shaft.

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.

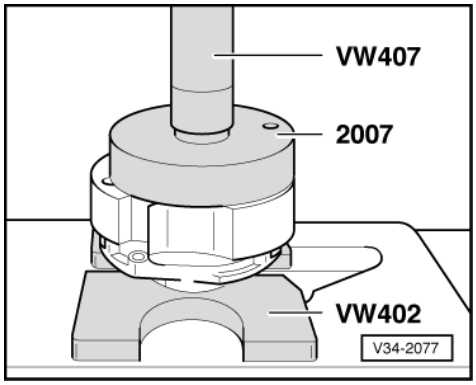


-> Fig.2 Pressing in flange shaft

- Press on vibration damper before pressing in flange shaft => Fig. 4 .
- Fit circlip.



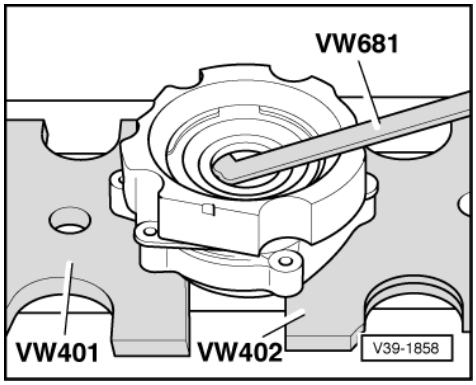
-> Fig.3 Pressing off vibration damper



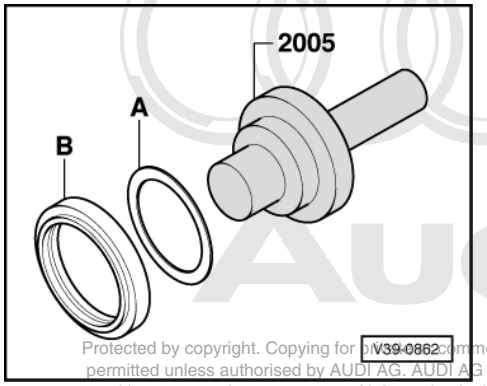
-> Fig.4 Pressing on vibration damper

Note:

Observe position of holes.



-> Fig.5 Removing oil seal



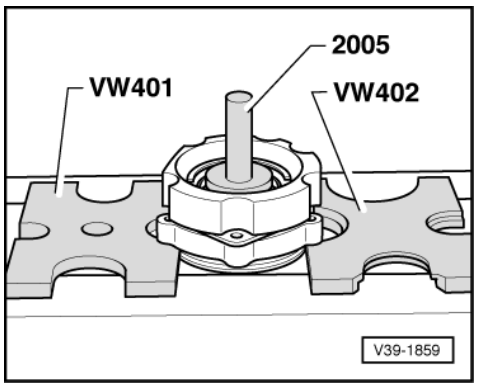
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.6 Preparing oil seal for installing

A - Washer Part No. 016 311 391 B (1.7 mm thick)
B - Oil seal

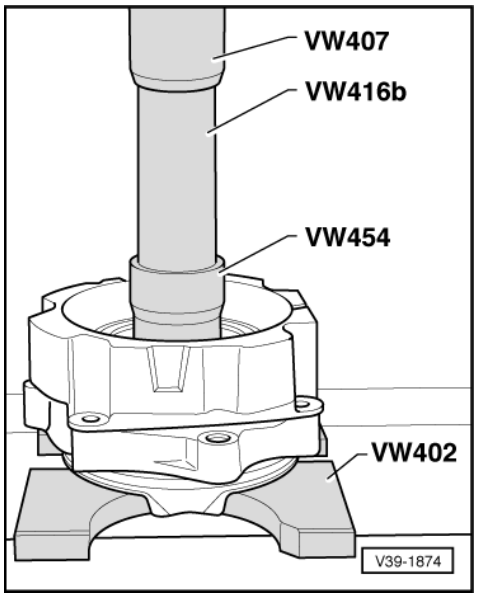
- Pack space between sealing and dust lips with grease.
- Fit washer and oil seal one after the other onto tool.

- Installation position: Open side of oil seal towards bearing housing

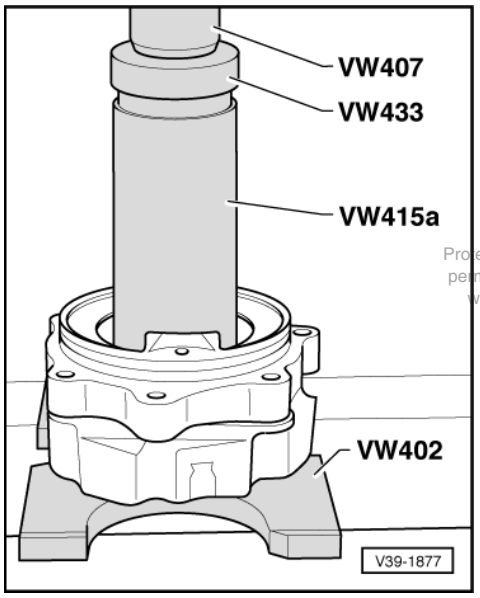


-> Fig.7 Inserting oil seal

- Take off washer.



-> Fig.8 Pressing out ball bearing for flange shaft



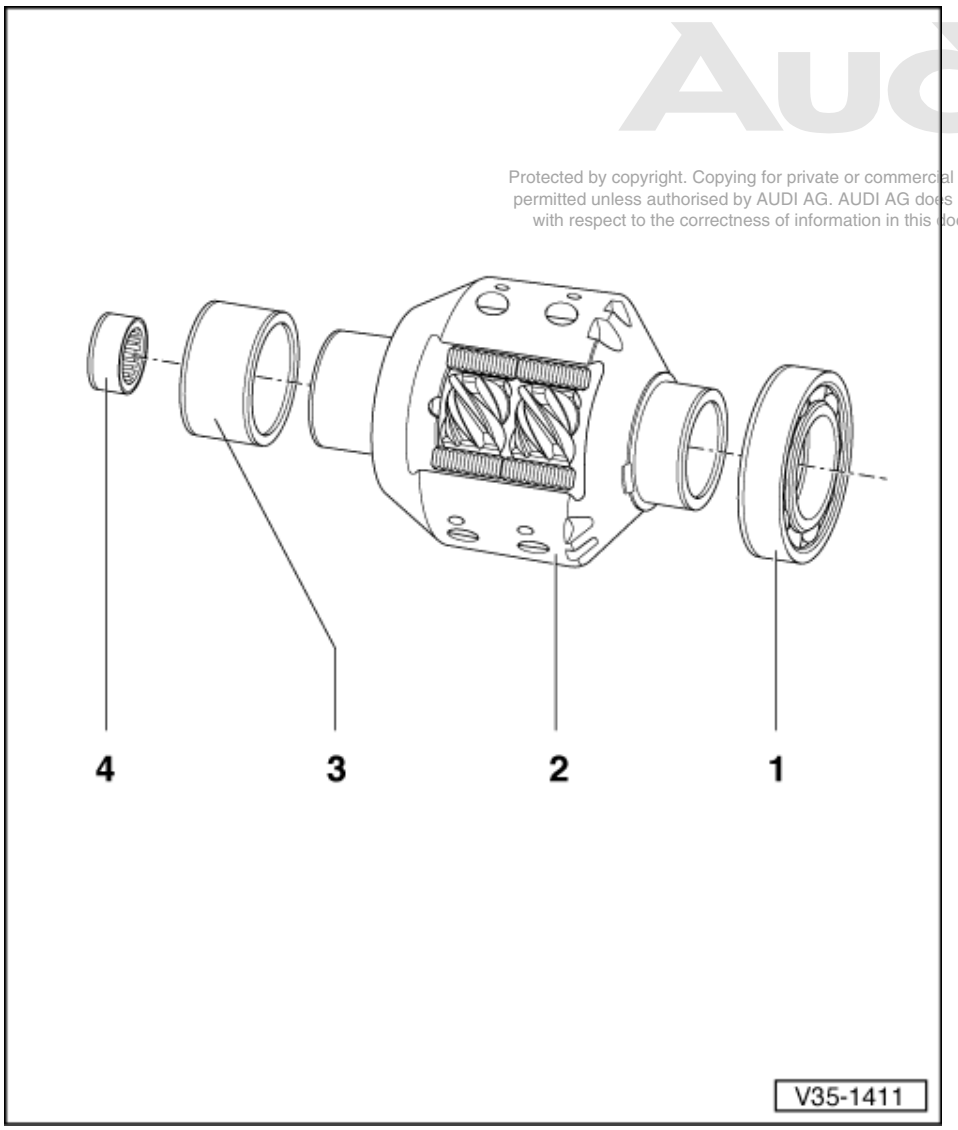
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.9 Pressing in ball bearing for flange shaft

10 - Servicing mounting for Torsen differential

10.1 - Servicing mounting for Torsen differential

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.

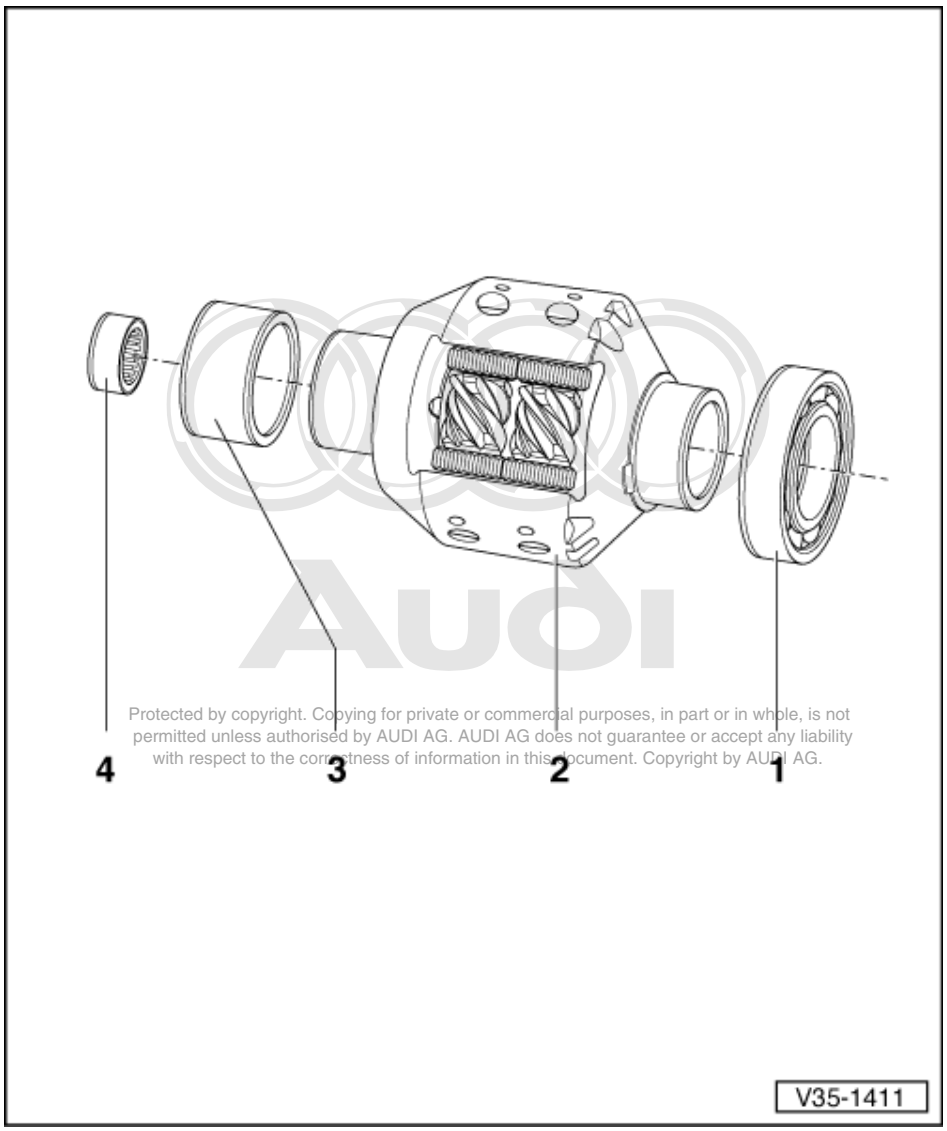


1 Ball bearing for Torsen differential
- Pressing off => Fig. 1
- Pressing on => Fig. 2

2 Torsen differential
- Servicing only at manufacturer

3 Inner race for needle roller bearing for Torsen differential
- Pulling off => Fig. 3
- Pressing on => Fig. 4

4 Needle roller bearing for drive pinion/Torsen differential
- Pulling out =>Fig. 5
- Pressing in =>Fig.6

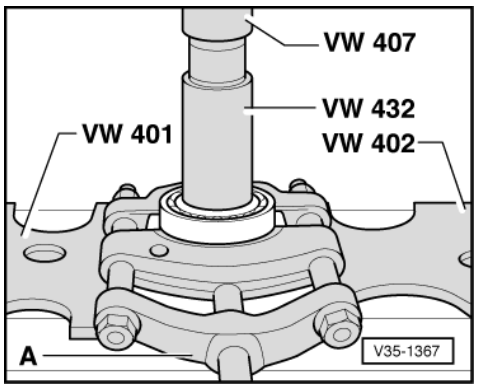


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

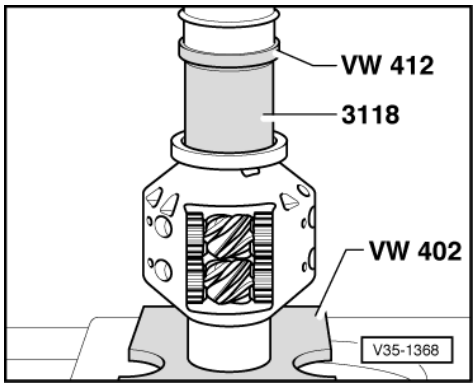
The shims for Torsen differential have to be re-determined after replacing following components =>Page 120 :

- End cover
- Inner race for needle roller bearing
- Torsen differential
- Torsen differential ball bearing



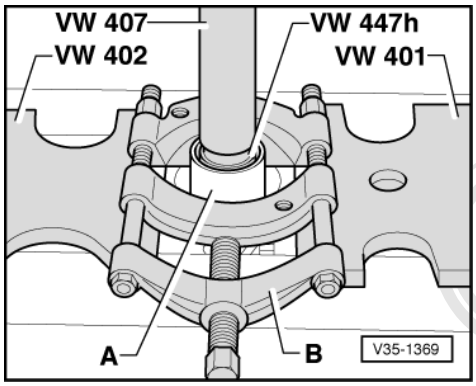
-> Fig.1 Pressing off Torsen differential ball bearing

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



-> Fig.2 Pressing on Torsen differential ball bearing

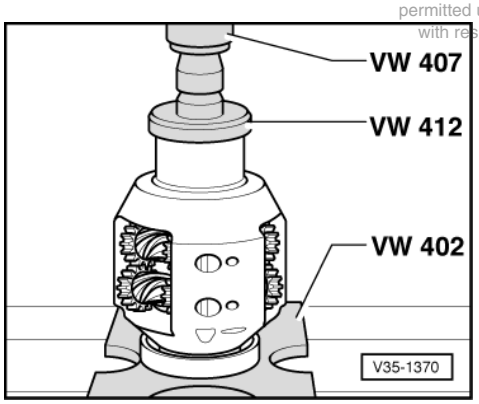
- Thrust pad 3118 with shoulder facing press tool VW 412.



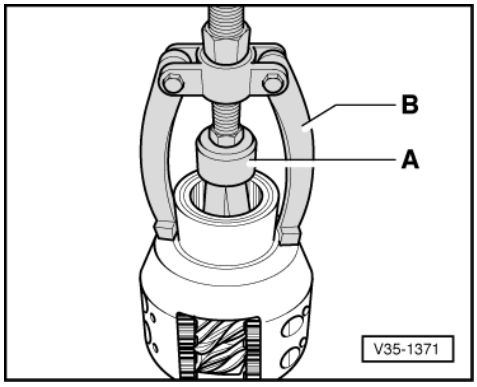
-> Fig.3 Pulling off inner race for needle roller bearing for Torsen differential

A - Inner race
B - Separating device 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.

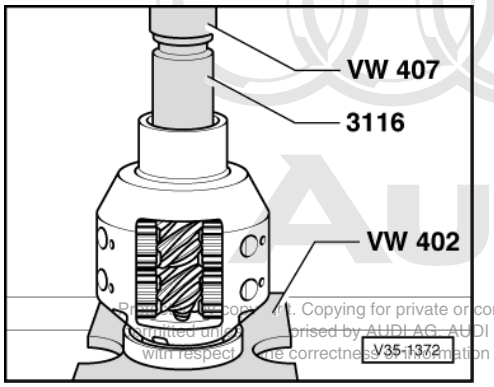


-> Fig.4 Pressing on inner race for needle roller bearing for Torsen differential



-> Fig.5 Removing needle roller bearing for drive pinion/Torsen differential

A - Internal puller 30 ... 37 mm, e.g. Kukko 21/5
B - Support, e.g. Kukko 22/1

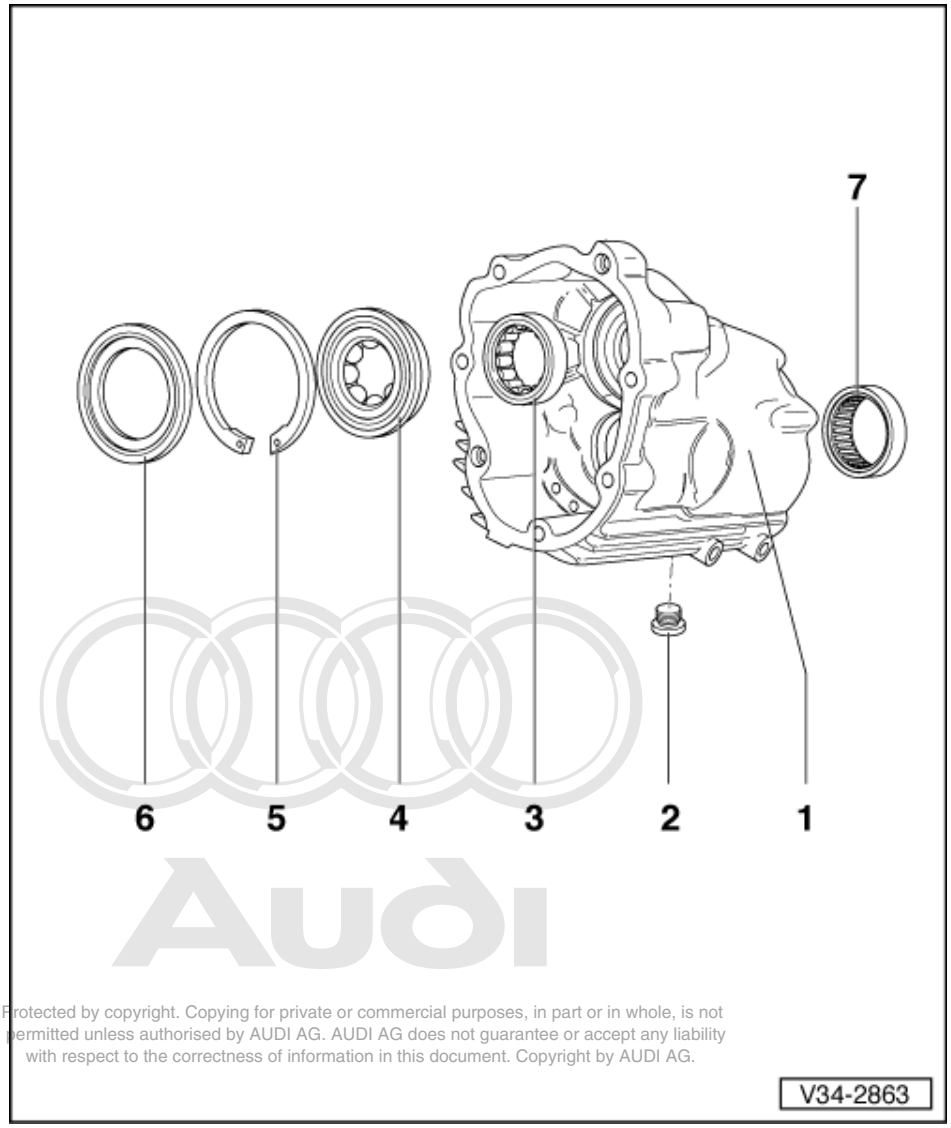


Printed in Germany. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.6 Inserting needle roller bearing for drive pinion/Torsen differential

11 - Servicing end cover

11.1 - Servicing end cover



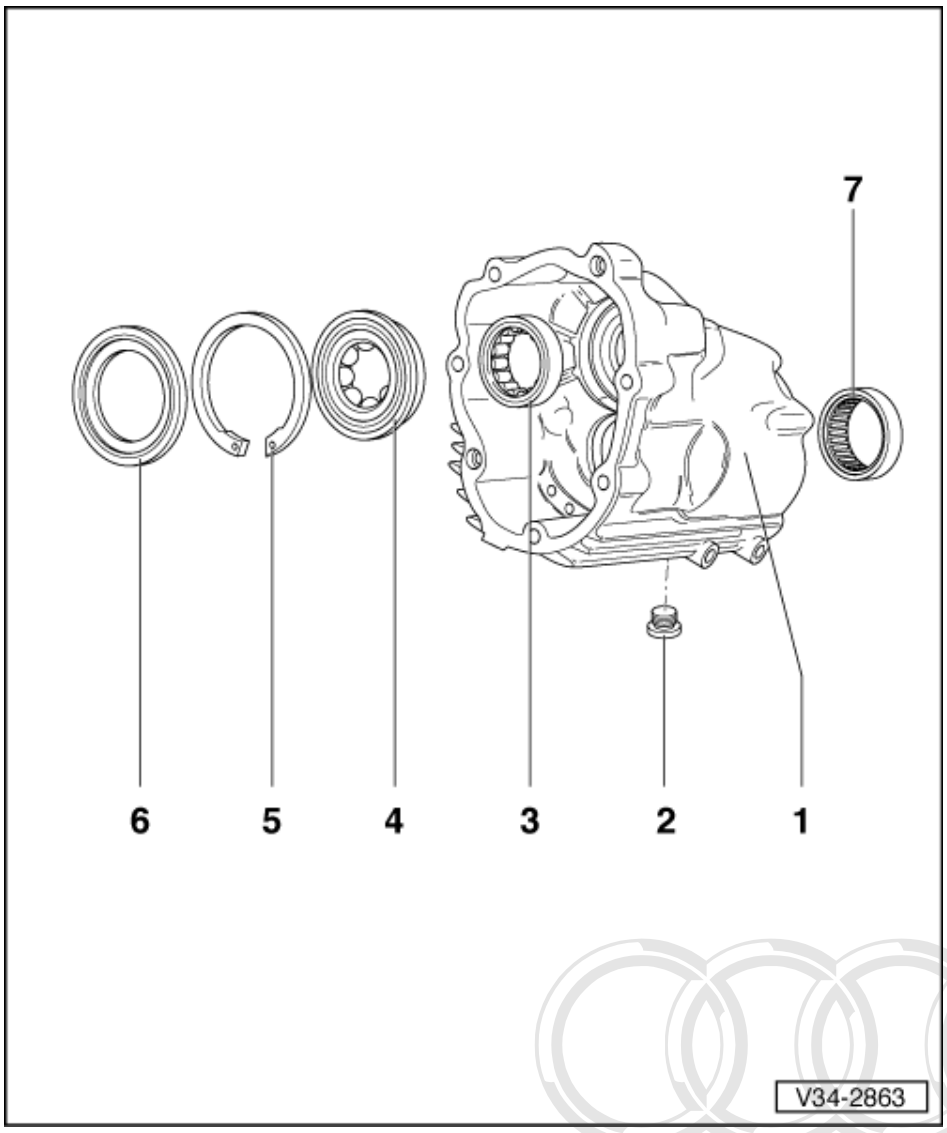
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 End cover
- ◆ If replaced:
- - Re-determine thickness of circlip -Item 5 -
- - Re-determine shims for Torsen differential => Page 120 .

2 Oil drain plug - 40 Nm

3 Cylinder roller bearing for input shaft
- ◆ Pulling out =>Fig. 1
- ◆ Pressing in flush =>Fig. 2

4 Ball bearing for input shaft
- ◆ Removing => Fig. 3
- ◆ Installing => Fig. 4
- ◆ If replaced, re-determine thickness of circlip -Item 5 -



5 Circlip

- Re-determining thickness => Page 134
- Installing => Fig. 4

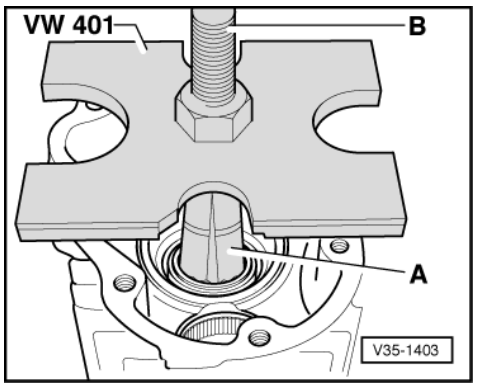
6 Baffle plate

- Always replace
- Removing => Fig. 3
- Installing and peening in position when replacing ball bearing for input shaft => Fig. 5
- Installing and peening in position when replacing end cover => Fig. 6

7 Needle roller bearing for Torsen differential

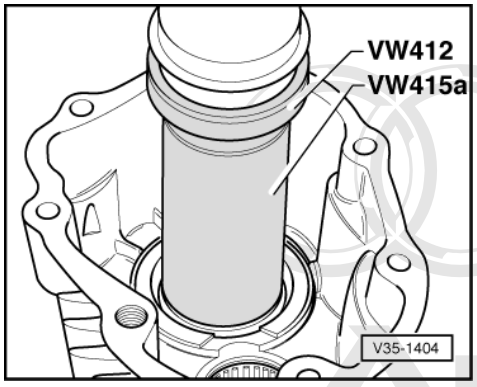
- Removing => Fig. 7
- Pressing in =>Fig. 8

The reproduction, distribution and utilization of this document for 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.



-> Fig.1 Removing cylinder roller bearing for input shaft from end cover

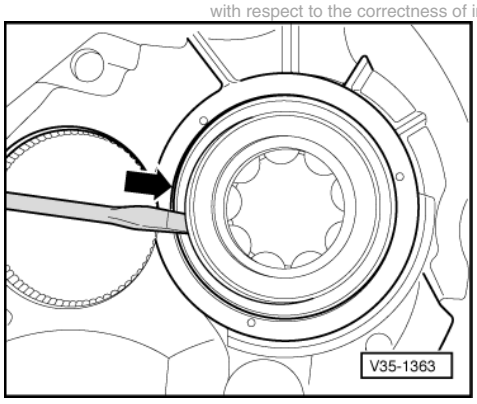
A - Internal puller 37 ... 46 mm, e.g. Kukko 21/6
B - Spindle from counter support, e.g. Kukko 22/2



-> Fig.2 Inserting cylinder roller bearing for input shaft flush in end cover

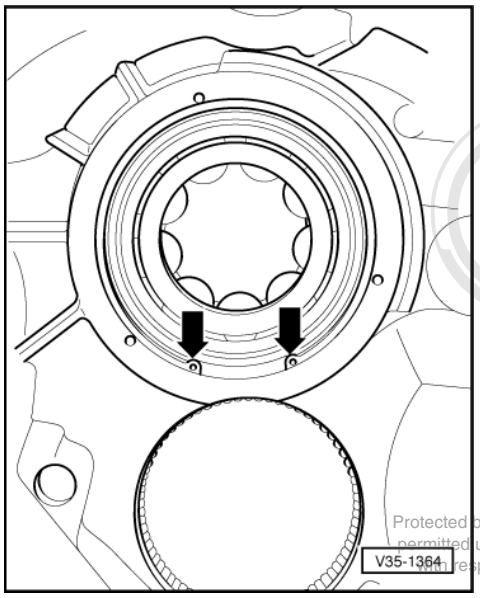
- Pipe section VW 415 A with shoulder for press tool VW 412

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.



-> Fig.3 Removing ball bearing for input shaft out of end cover

- Position screwdriver as illustrated, drive into baffle plate -arrow- and lever out.
- Remove circlip.
- Take out bearing, remove peening indentations if necessary.



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.

-> Fig.4 Installing ball bearing for input shaft in end cover

Installation position of circlip:

- End of circlip -arrows- towards needle roller bearing

Note:

The thickness of the circlip must be re-determined if the bearing or the end cover are replaced.

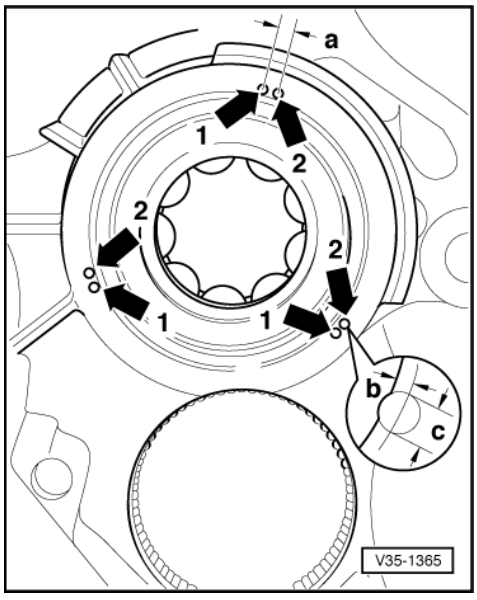
- Determining thickness of circlip for ball bearing for input shaft:
  - Press ball bearing outer race onto stop.
  - Determine the thickest circlip that can still just be fitted.
  - Axial clearance: max. 0.08 mm
  - Determine circlip from table. Part numbers

=> Parts Catalogue

Available circlips:

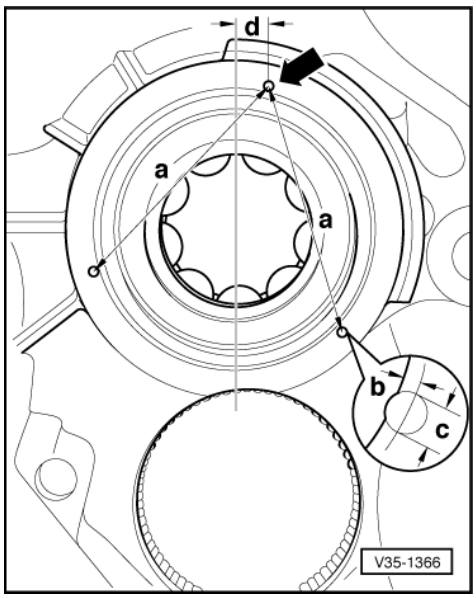
Circlip thickness (mm)	
2.55	2.65
2.60	2.70

- Fit circlip.



-> Fig.5 Peening baffle plate in position when replacing ball bearing for input shaft

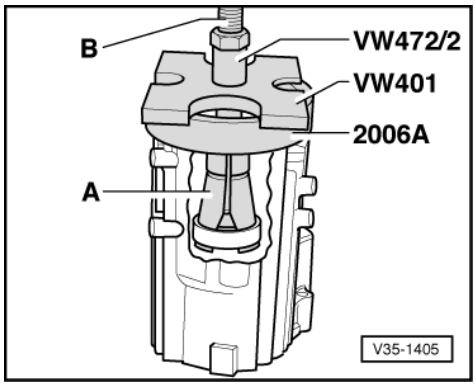
- Use a blunt punch with a ball shaped end (ball diameter 5 mm) to peen in position.
- Insert baffle plate.
- First peen at points marked with -arrows 1-.
- Then peen at points marked with -arrows 2- at distance -a- from first position.
  - Dimension a = 5 mm
- Observe position and diameter of peening positions:
  - Dimension b = 2 mm
  - Dimension c = 3 mm



-> Fig.6 Peening baffle plate in position when replacing end cover

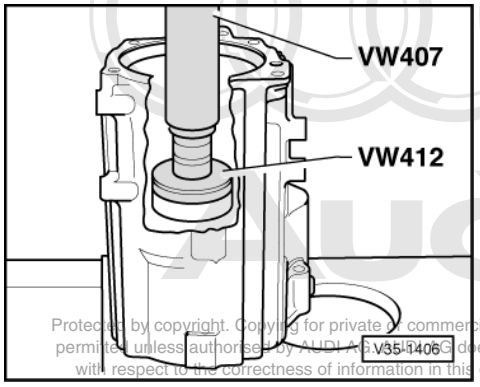
- Use a blunt punch with a ball shaped end (ball diameter 5 mm) to peen in position.
- Insert baffle plate.
- Peen in first peening point -arrow- at distance -d- from the centre line of the two shafts.
  - Dimension d = 10 mm
- Observe position and diameter of peening positions:
  - Dimension b = 2 mm
  - Dimension c = 3 mm
- Peen in second and third peening points in same manner at distance -a-.
  - Dimension a = 70 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.



-> Fig.7 Removing needle roller bearing for Torsen differential from end cover

A - Internal puller 46 ... 58 mm, e.g. Kukko 21/7
B - Spindle from counter support, e.g. Kukko 22/2



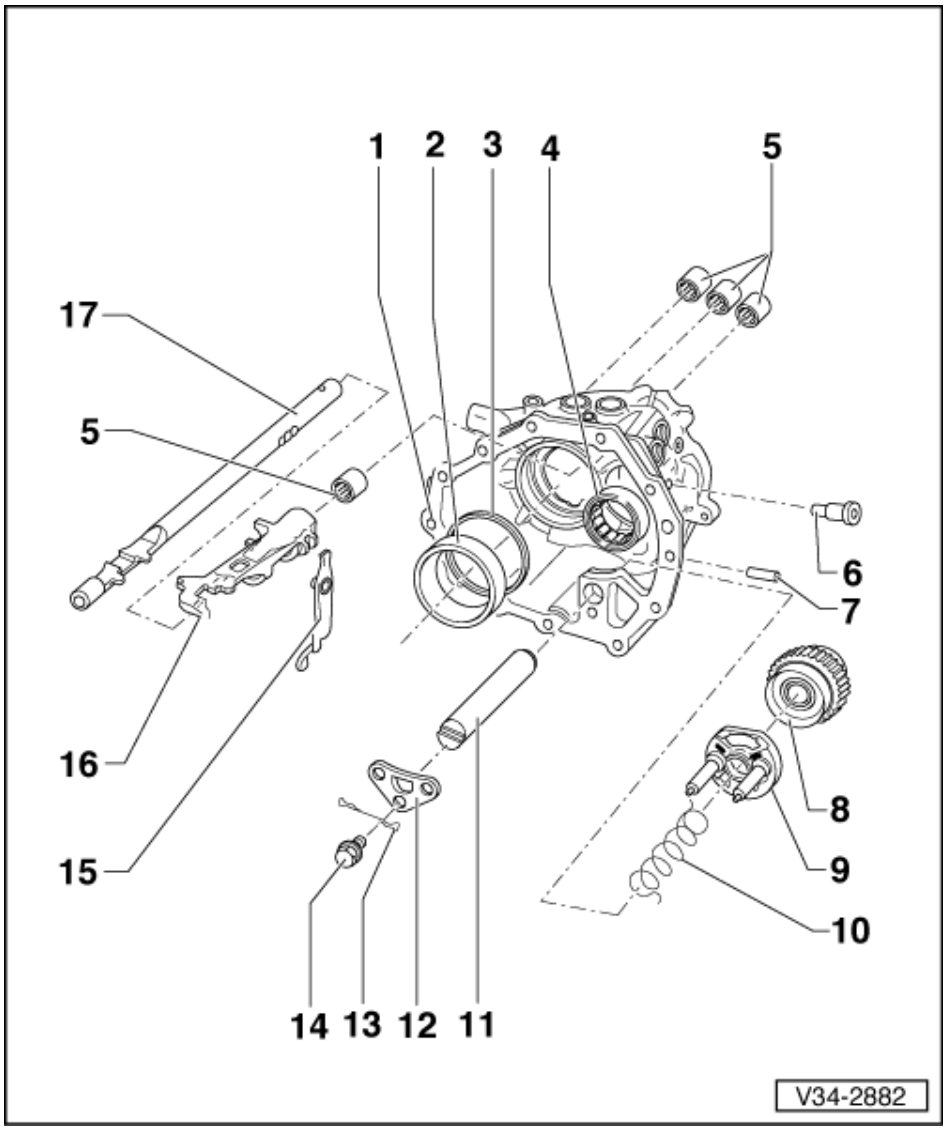
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.8 Insert needle roller bearing of Torsen differential flush in end cover

- Fit pressure plate VW 412 onto bearing with shoulder facing up.

12 - Servicing bearing plate

12.1 - Servicing bearing plate

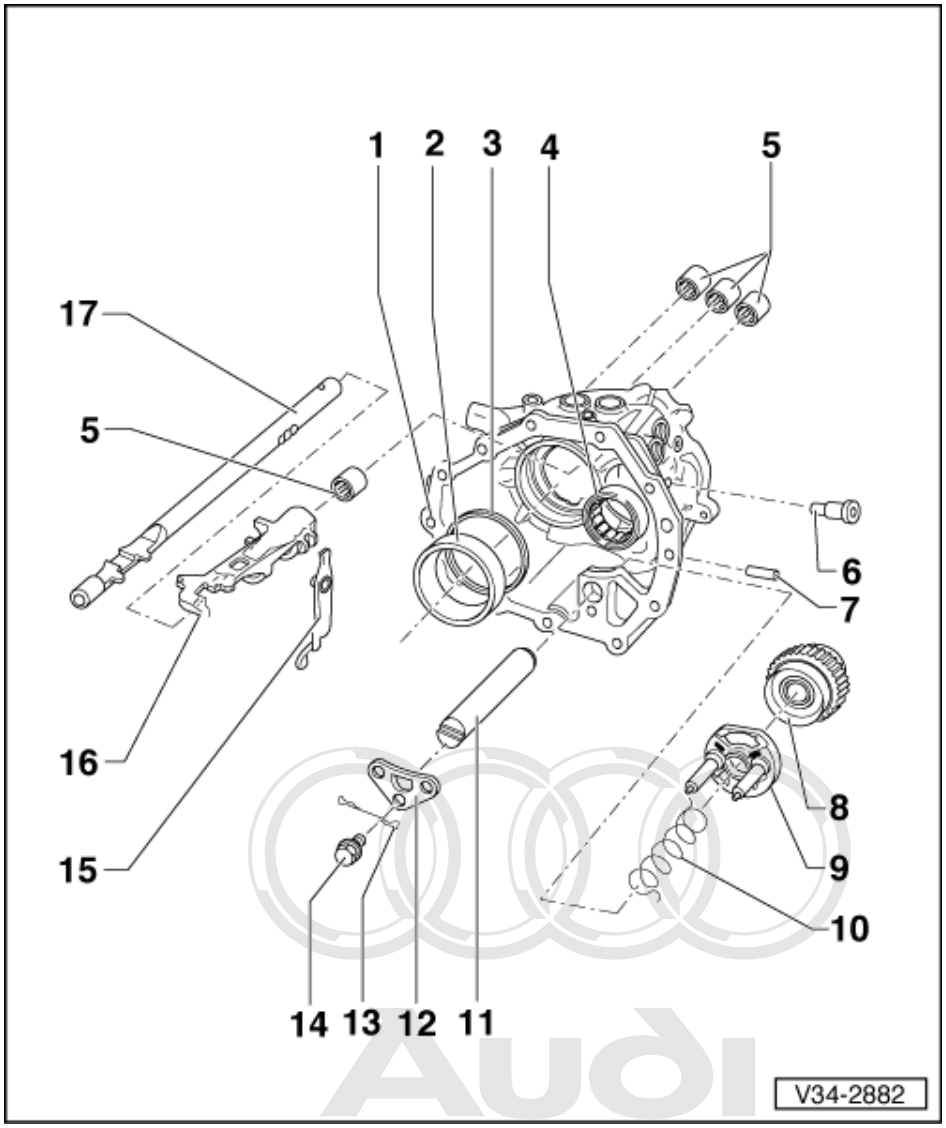


Notes:

- A wider gearwheel and a wider sliding gear for 1st gear have been used from gearbox serial number 77645. At the same time, the bearing plate -Item 1 - has been modified and a narrower inner race for cylinder roller bearings installed.
- Components of old and new construction status must not be installed mixed.

1 Bearing plate

- If replacing, re-determine shim "S4"
- With identification cut from gearbox serial number 77645 =>Fig. 1



2 Outer race for taper roller bearing for drive pinion

- Driving out => Page 191
- Pressing in =>Page 191
- If replacing, re-determine shim "S4"

3 Shim "S4"

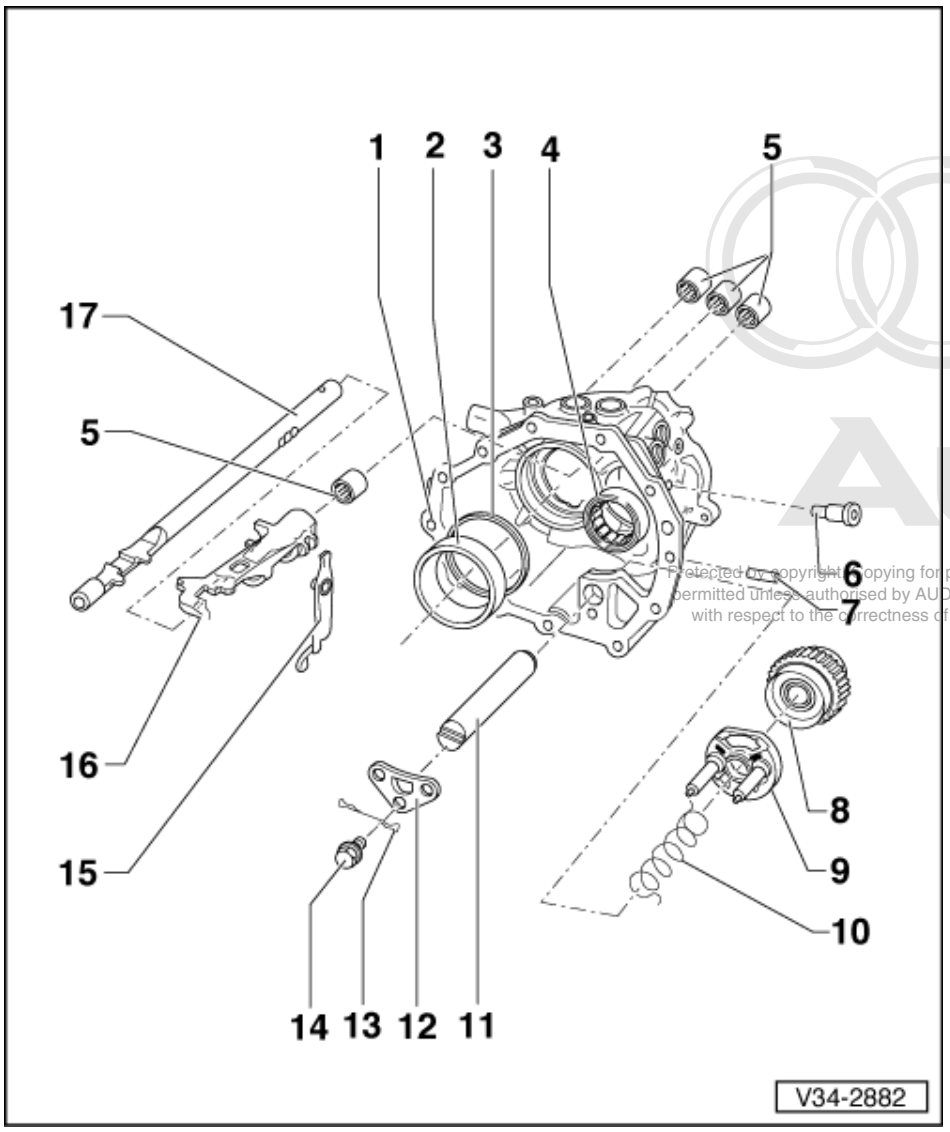
- Adjustment overview => Page 213
- Re-determining thickness => Page 144

4 Cylinder roller bearing for input shaft

- Pressing out =>Fig. 6
- Pressing in =>Fig. 7
- Modified insertion depth from gearbox serial number 77645

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.

- Measuring insertion depth => Fig. 8



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.

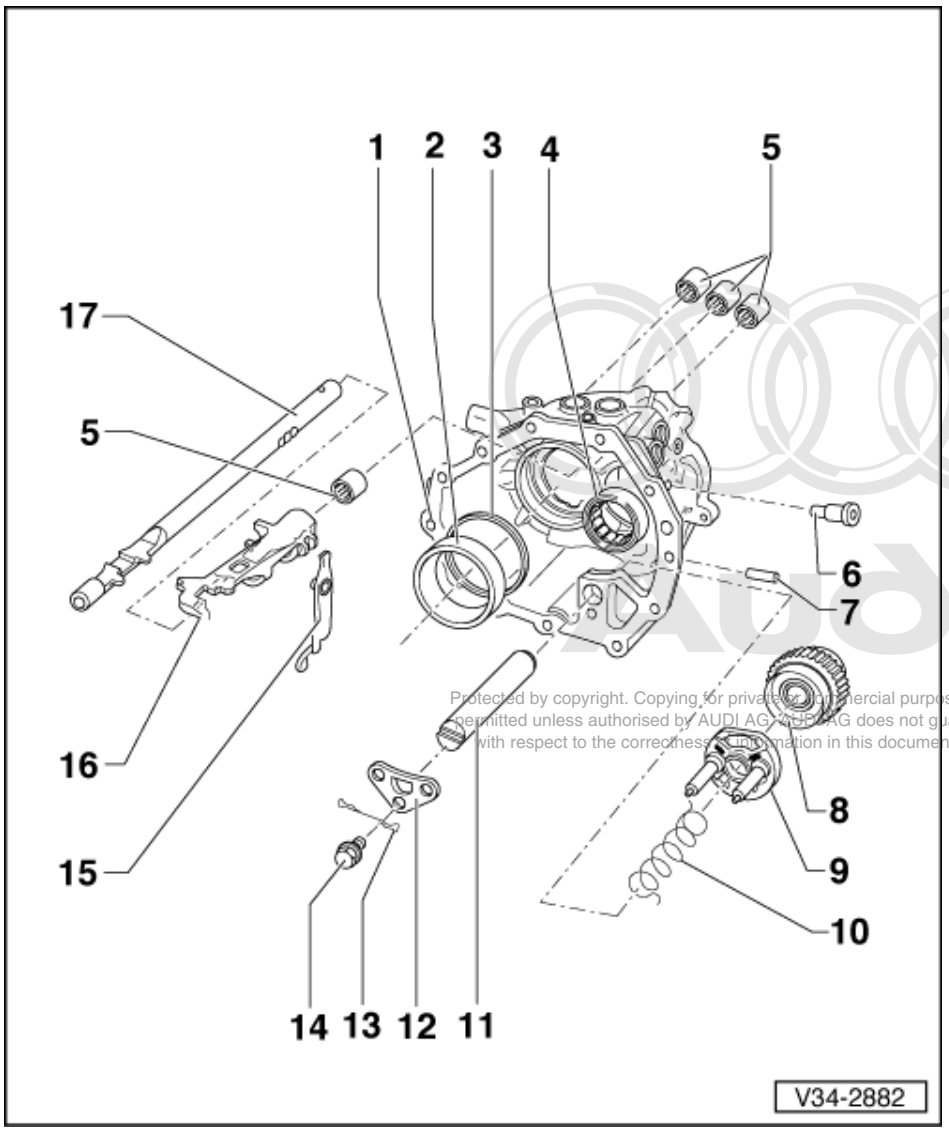
5 Ball sleeves
- For selector rods
- Removing and driving in => Fig. 2
- Always replace

6 Bolt - 35 Nm
- For relay lever

7 Dowel pin (7 x 28)
- Press in flush

8 Sliding gear for reverse gear

9 Synchro-ring for reverse gear
- With locking pins
- Checking for wear => Fig. 3
- Installation position: Position flat on synchro-ring circumference to face input shaft => Page 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.

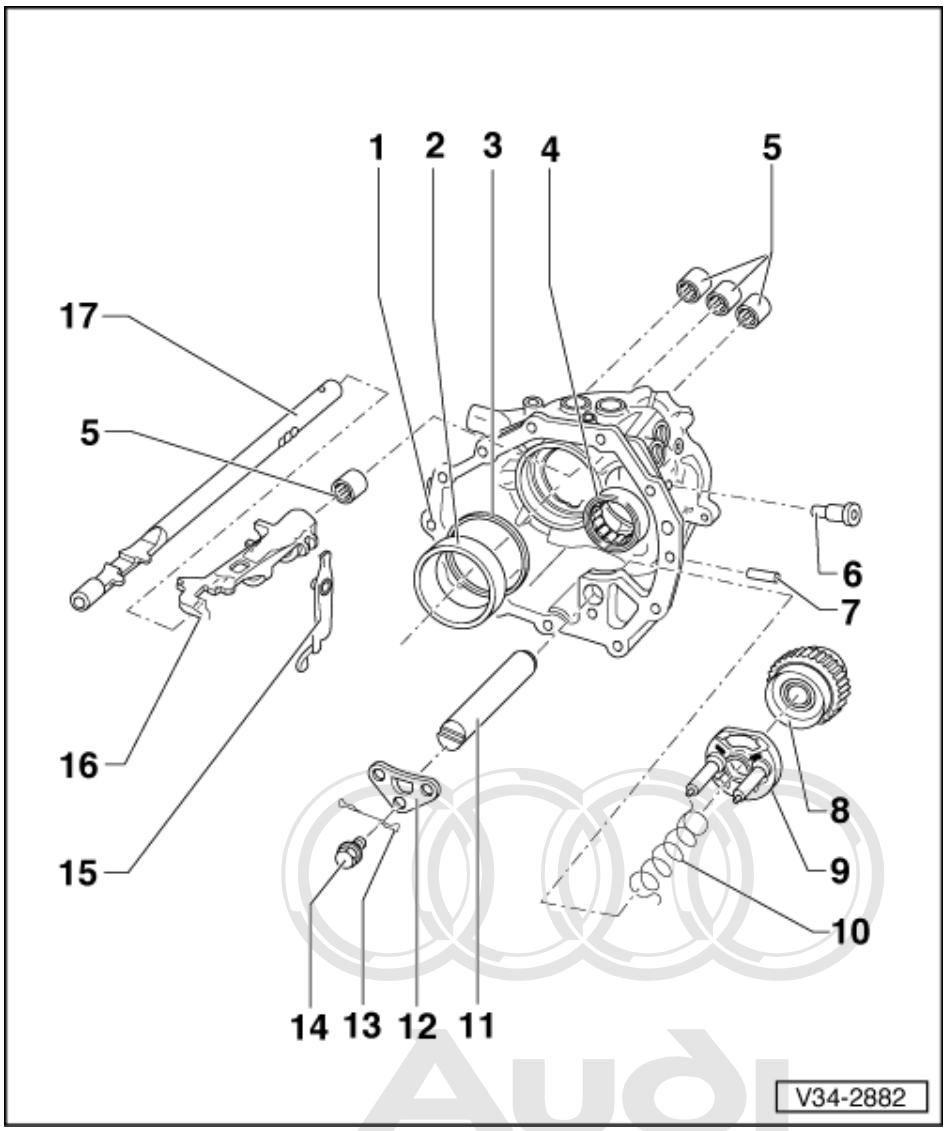
10 Spring

- Installation position: Hook single angled end into recess on synchro-ring. Turn double angled end anti-clockwise and insert into opening on bearing plate

11 Shaft for reverse sliding gear

12 Retaining plate

- Installation position: Chamfers of holes for locking pins of synchro-ring face bearing plate=> Page 110



13 Spring clasp

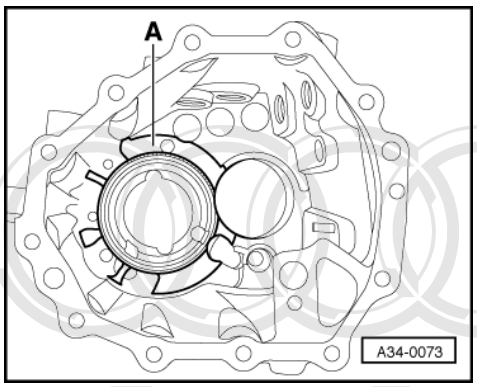
14 Bolt - 25 Nm
- Self-locking
- Always replace

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.

15 Relay lever for reverse gear

16 Follower for reverse gear
- Pulling out ball sleeve =>Fig. 4
- Driving in ball sleeve => Fig. 5

17 Selector rod for 5th and 6th gear
- Replace only together with follower => Page 92

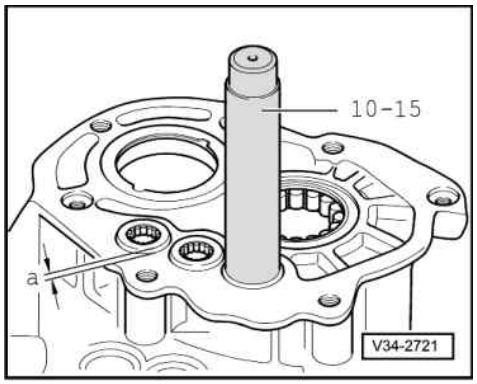


-> Fig.1 Bearing plate with identification cut

A - Identification cut (turned surface)

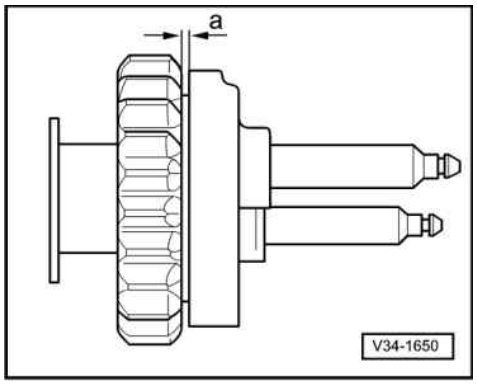
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- A wider gearwheel and a wider sliding gear for 1st gear have been used from gearbox serial number 77645. At the same time, the bearing plate has been provided with an identification cut and a narrower inner race for cylinder roller bearings installed.
- Components of old and new construction status must not be installed mixed.



-> Fig.2 Driving out and driving in ball sleeves for selector rods

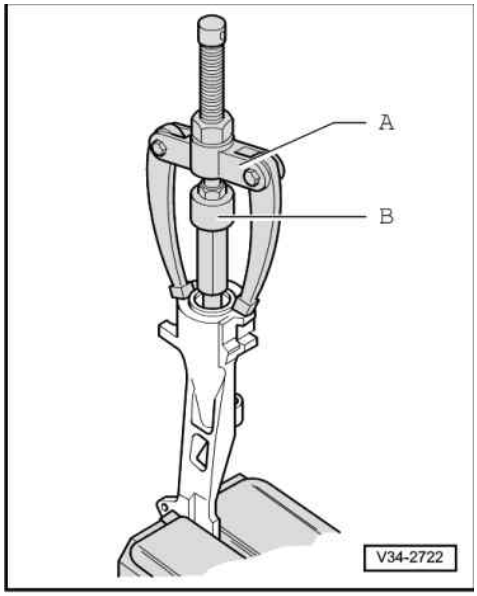
- Insertion depth a = 2.5 mm



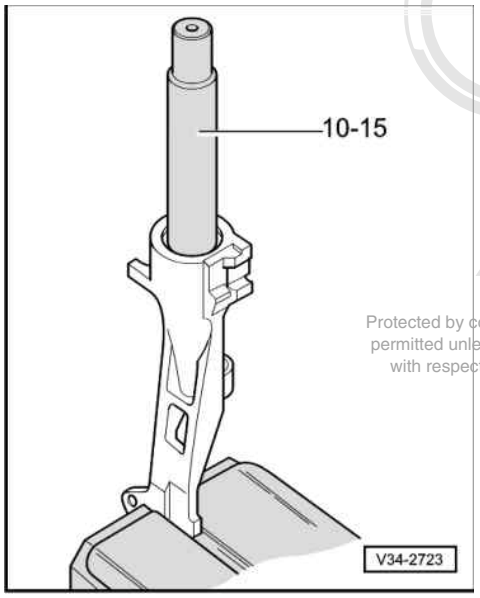
-> Fig.3 Checking synchro-ring for wear

- Press synchro-ring onto cone of gear.
- Measure gap "a" with a feeler gauge:
  - Dimension, new: 0.75 ... 2.3 mm

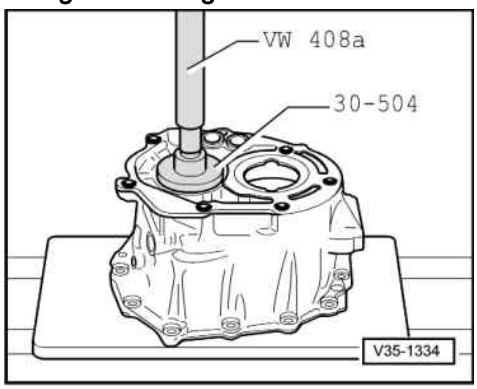
- Wear limit: 0.2 mm



-> Fig.4 Pulling ball sleeve out of follower for reverse gear
A - Counter support e.g. Kukko 22/1
B - Internal puller 18.5 ... 23.5 mm, e.g. Kukko 21/3

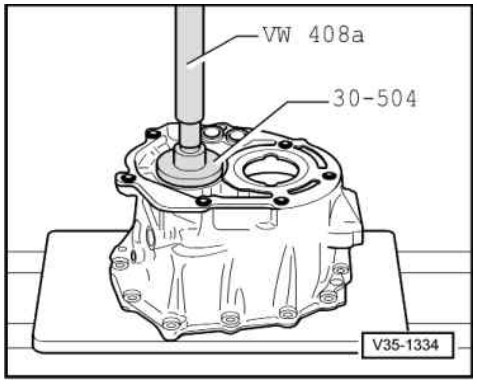


-> Fig.5 Driving ball sleeve flush into follower for reverse gear



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.

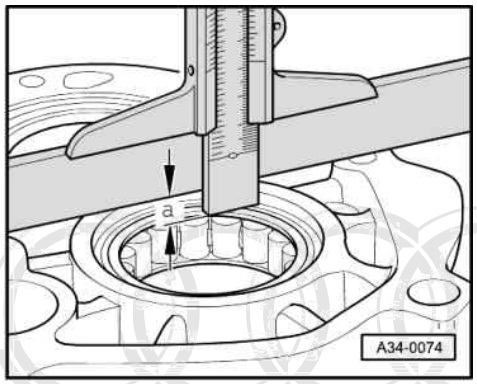
-> Fig.6 Pressing cylinder roller bearing for input shaft out of bearing plate



-> Fig.7 Pressing cylinder roller bearing for input shaft into bearing plate

Insertion depth depending on serial number of gearbox.

- Measuring insertion depth => Fig. 8



-> Fig.8 Measuring insertion depth of cylinder roller bearing for input shaft

Insertion depth -a- depends on serial number of gearbox:

- Up to gearbox number 77644:

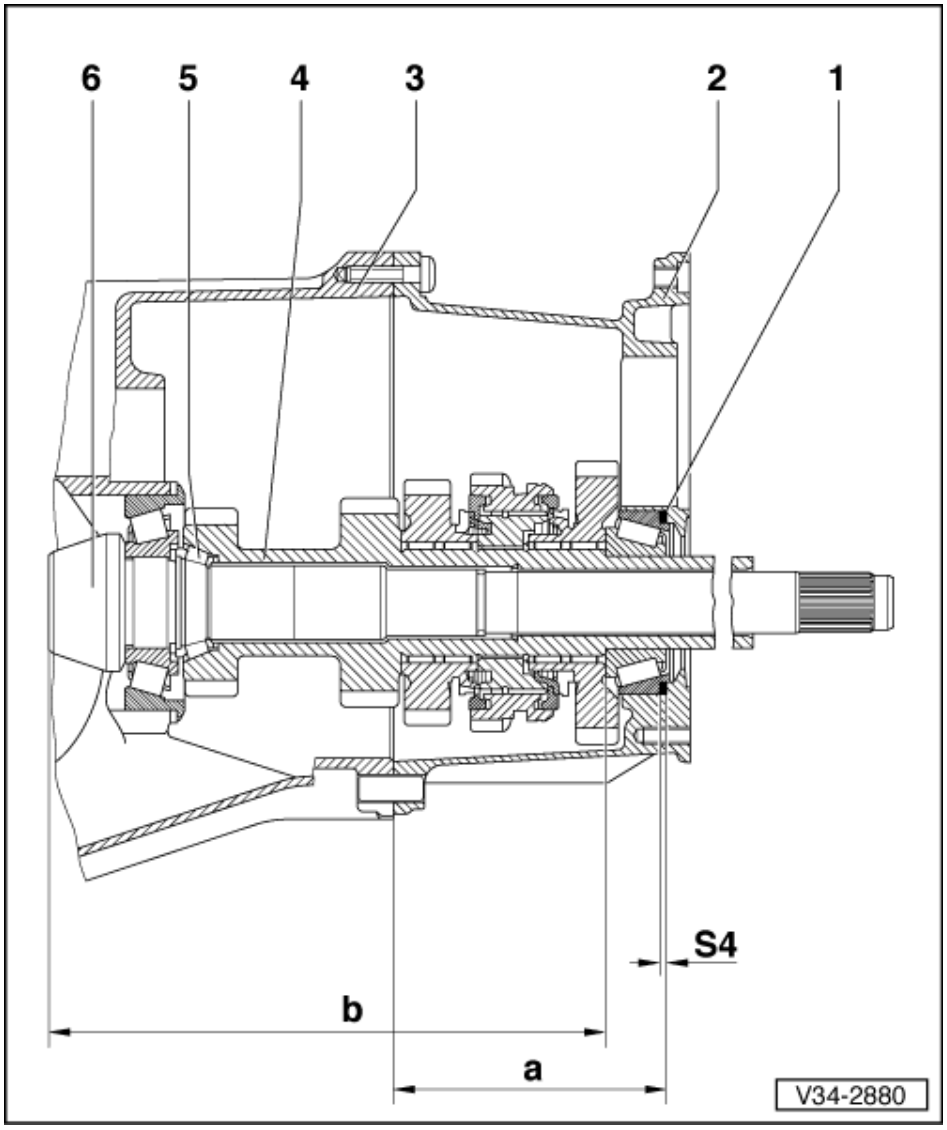
  Dimension a = 9 mm

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.

- From gearbox number 77645:

  Dimension a = 7 mm

12.2 - Re-determining shim "S4"



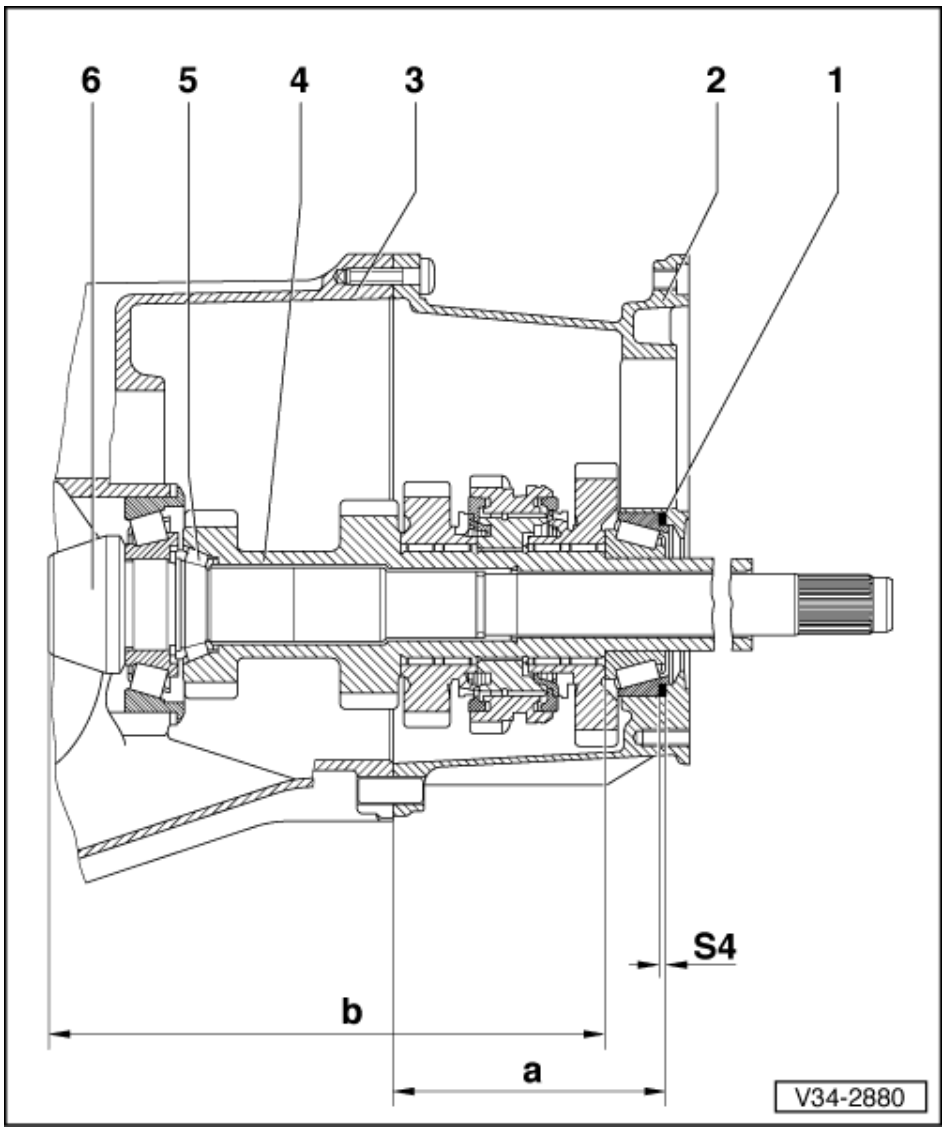
This procedure must be carried out when replacing the following components:

- Bearing plate => Page 146
- Hollow shaft => Page 146

The procedure restores the required preload of the taper roller bearings for the drive pinion and hollow shaft.

1 Shim "S4"
2 Bearing plate
3 Gearbox housing
4 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.



5 Taper roller bearing of drive pinion/hollow shaft
6 Drive pinion

a - Bearing plate housing depth
b - Dimensions from drive pinion head to shoulder of taper roller bearing on hollow shaft

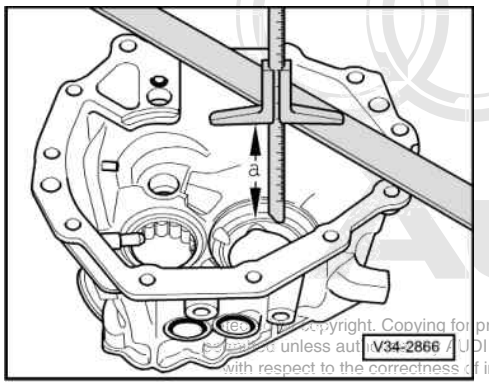
- Taper roller bearing of drive pinion/hollow shaft pre-stressed to 10 Nm.

S4 - Thickness of shim "S4"

Note:

When replacing the drive pinion (final drive set), observe adjustment overview =>Page 213 .

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.



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.

Determining thickness of shim when replacing bearing plate

- -> Measure difference of depth "a" on old and new bearing plates.

Example:

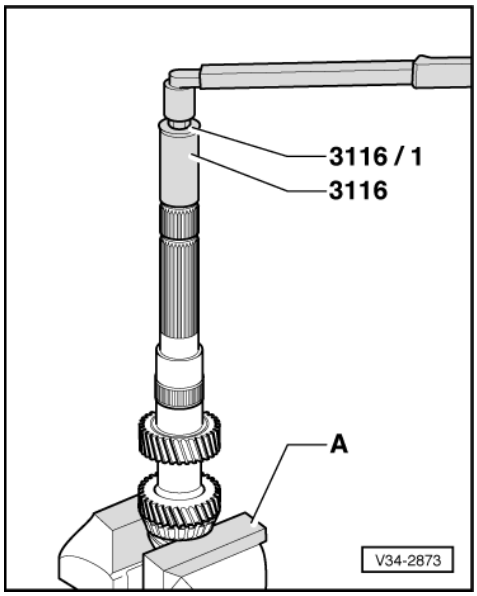
	Depth "a" of old bearing plate	124.40 mm
	Depth "a" of new bearing plate	124.65 mm
=	Difference	0.25 mm

- If new bearing plate is deeper, install a thicker "S4" shim.
- If old bearing plate is deeper, install a thinner "S4" shim.

Example:

	Previous shim "S4"	0.95 mm
+	Difference	0.25 mm
=	New "S4" shim	1.20 mm

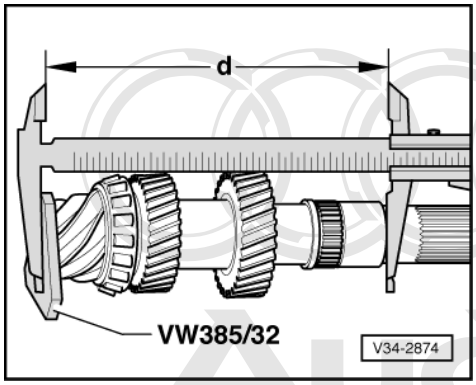
Available shims => Table on page 147 .



Determining thickness of shim when replacing hollow shaft

- Tighten tensioning sleeve to exactly 10 Nm.

A - Vice clamps



- -> Place end measuring plate VW 385/32 onto drive pinion head and measure dimension "d".
  - Top measuring point is shoulder for inner race of small taper roller bearing

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.

Example: 248.50 mm

- Install new hollow shaft and once again measure dimension "d".

  Example: 248.70 mm

- Determine the difference:

	Dimension "d" of old hollow shaft	248.50 mm
	Dimension "d" of new hollow shaft	248.70 mm
=	Difference	0.20 mm

- Install appropriately thinner shim "S4" if dimension "d" of new hollow shaft is larger.
- Install appropriately thicker shim "S4" if dimension "d" of new hollow shaft is less.
- Determine shim from table. Part numbers

=> Parts Catalogue

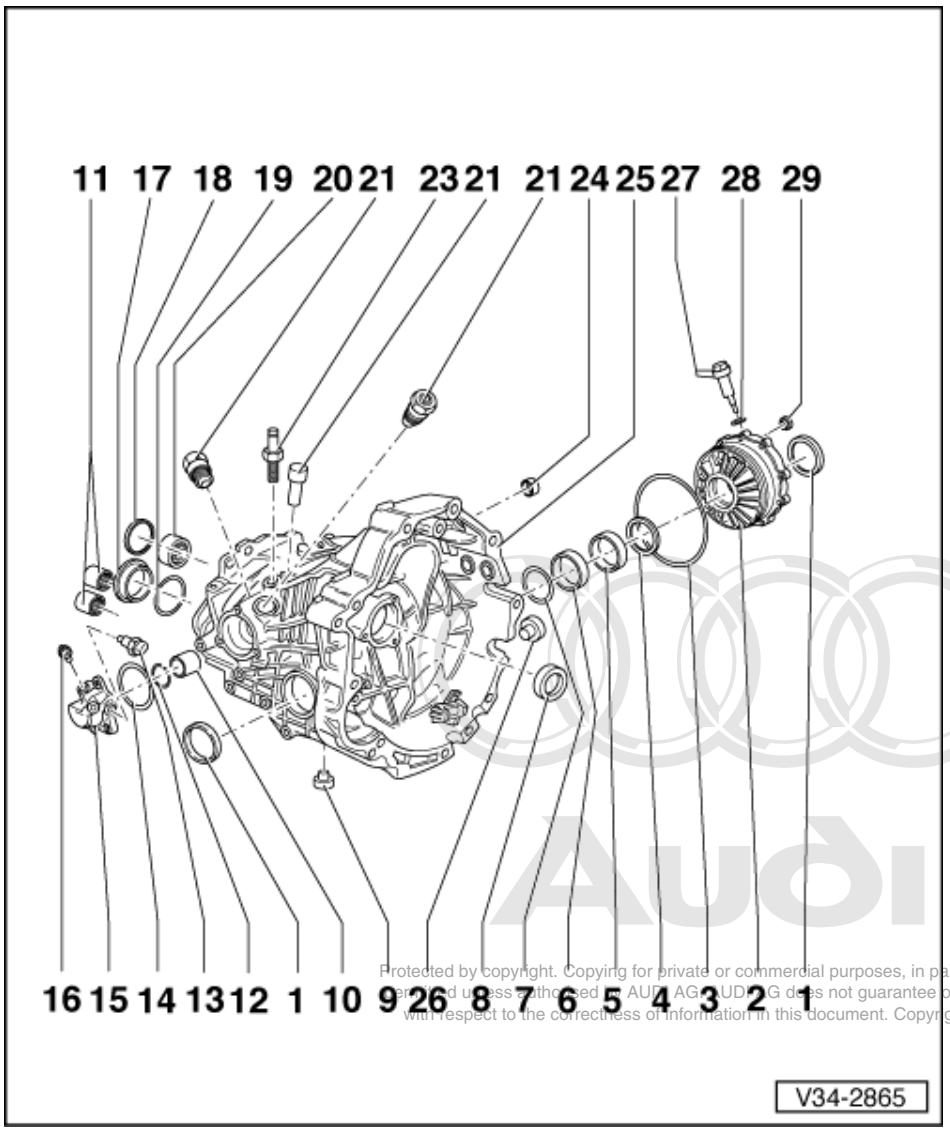
The following shims are available for "S4"

Shim thickness (mm) 1)		
0.45	0.65	0.85
0.50	0.70	0.90
0.55	0.75	
0.60	0.80	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

13 - Servicing gearbox housing

13.1 - Servicing gearbox housing



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.

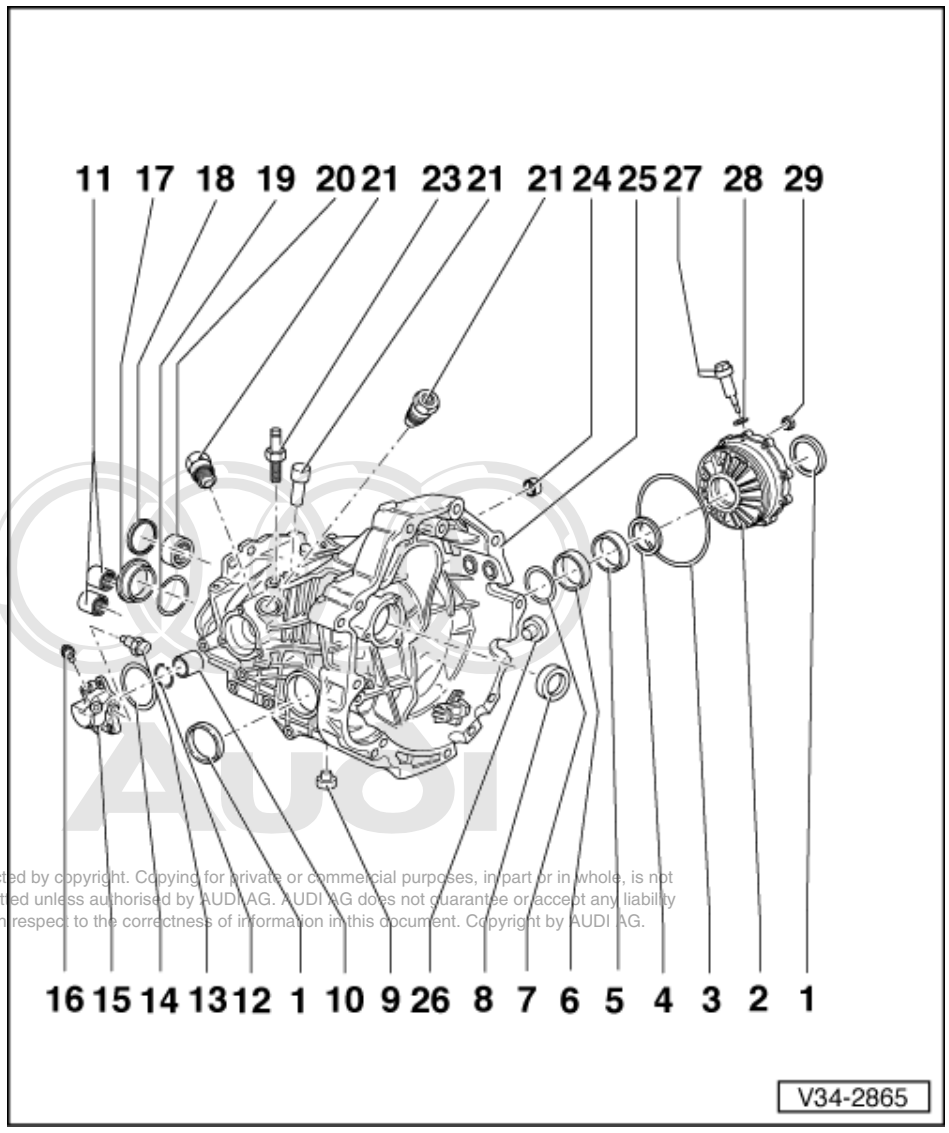
Notes:

- Observe the general repair instructions =>Page 11 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 213 .

1 Oil seal

- For flange shaft
- Pulling out =>Fig. 1
- Driving in => Fig. 2
- Pack space between sealing lips with multi-purpose grease
- Replacing with gearbox installed => Page 193

2 Cover for final drive 1)



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 O-ring

- For cover for final drive
- Always replace

4 Shim "S1"

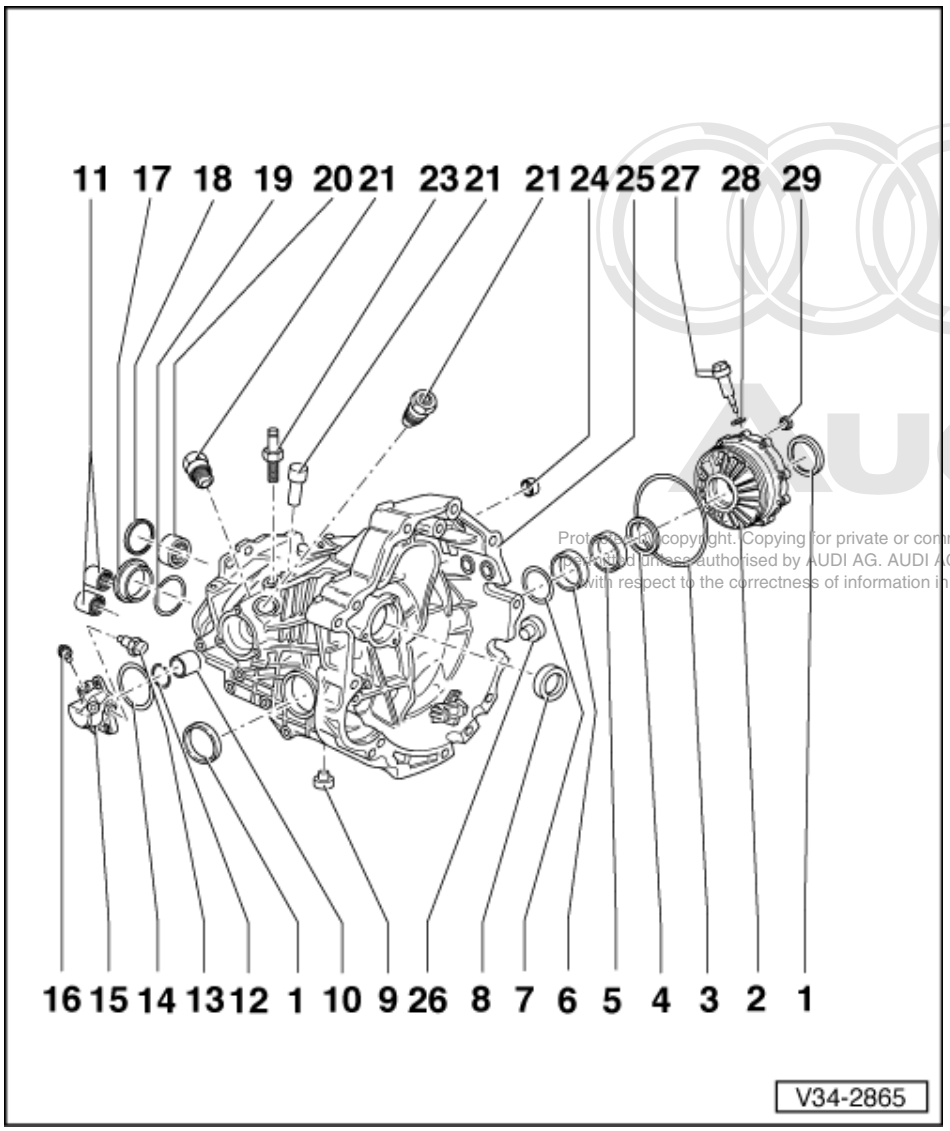
- Note thickness
- Adjustment overview => Page 213

5 Outer race for large taper roller bearing 1)

- For differential
- Driving out and driving in => Page 211

6 Outer race for small taper roller bearing 1)

- For differential
- Driving out and driving in => Page 211



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.

7 Shim "S2"

- Note thickness
- Adjustment overview => Page 213

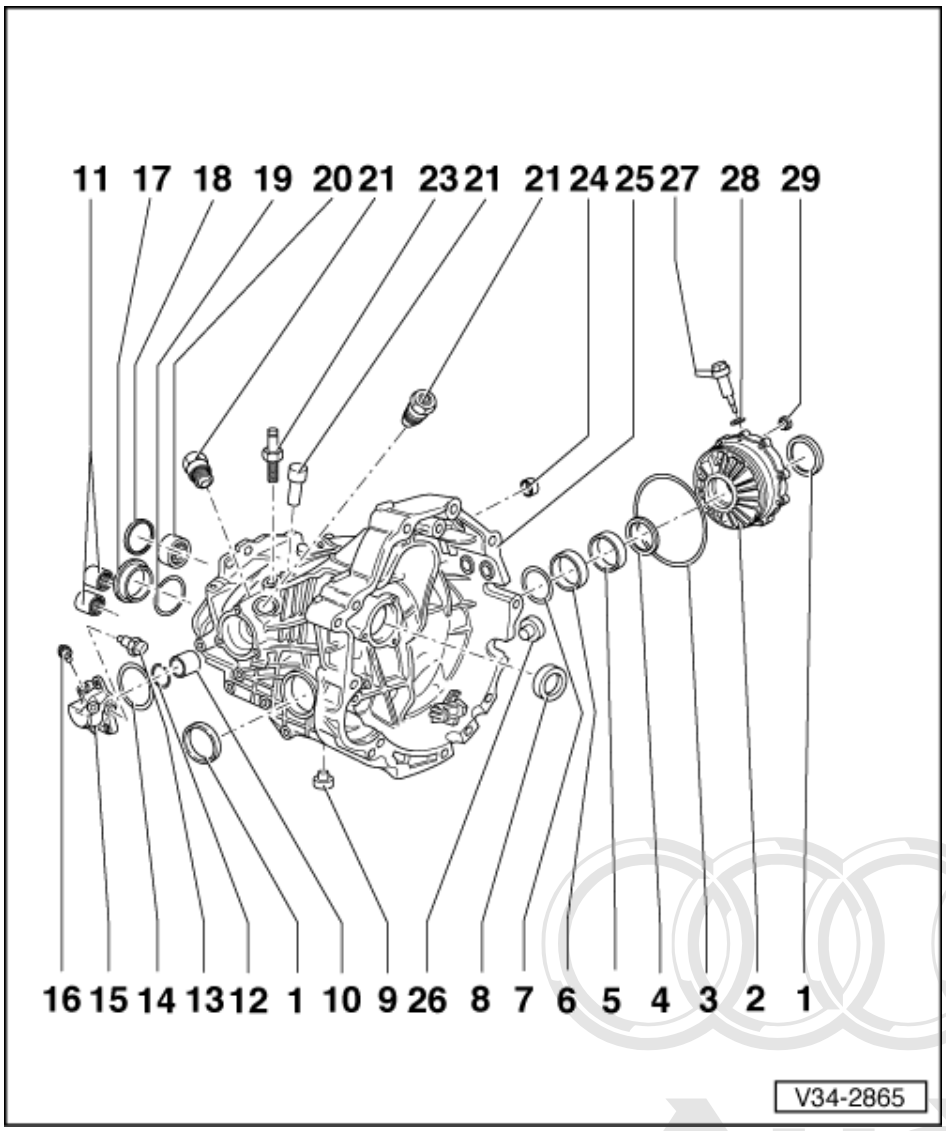
8 Oil seal

- For input shaft
- Levering out =>Fig. 3
- Driving in => Fig. 5
- Always replace when removing input shaft
- Replacing when gearbox is not dismantled => Fig. 4 and Fig. 5

9 Oil drain plug - 40 Nm

10 Ball sleeve

- For selector shaft
- Always replace
- Pulling out =>Fig. 6
- Driving in => Fig. 7



11 Ball sleeves

- For selector rods
- Always replace
- Pulling out as -Item 10 -
- Driving in as -Item 10 -

12 Circlip

- Installation position: Eyes facing up

13 Switch for reversing light - 20 Nm

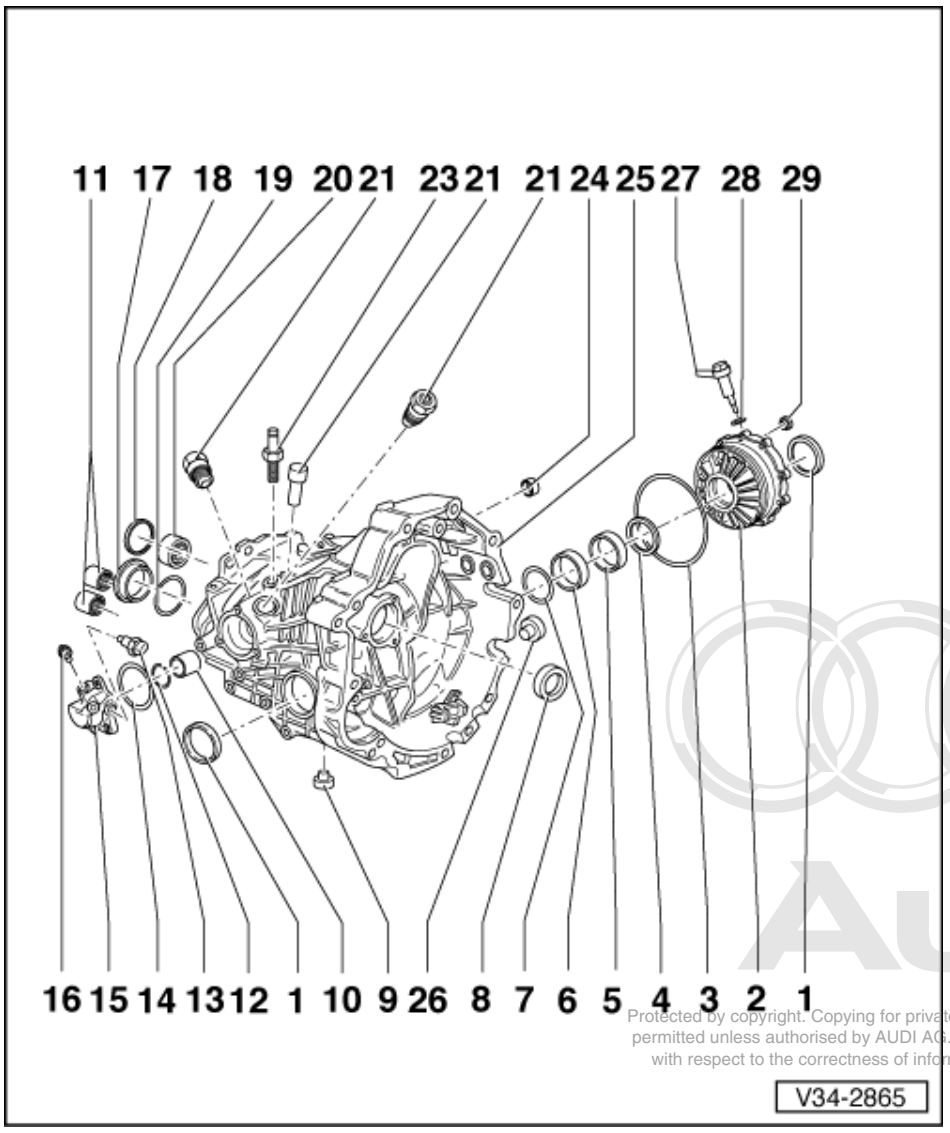
14 O-ring

- For cover for selector shaft
- Always replace

15 Cover for selector shaft

- Removing => Page 101
- Installing => Page 119

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.



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.

16 Ball stud - 20 Nm

- For connecting rod

17 Outer race for large taper roller bearing 1)

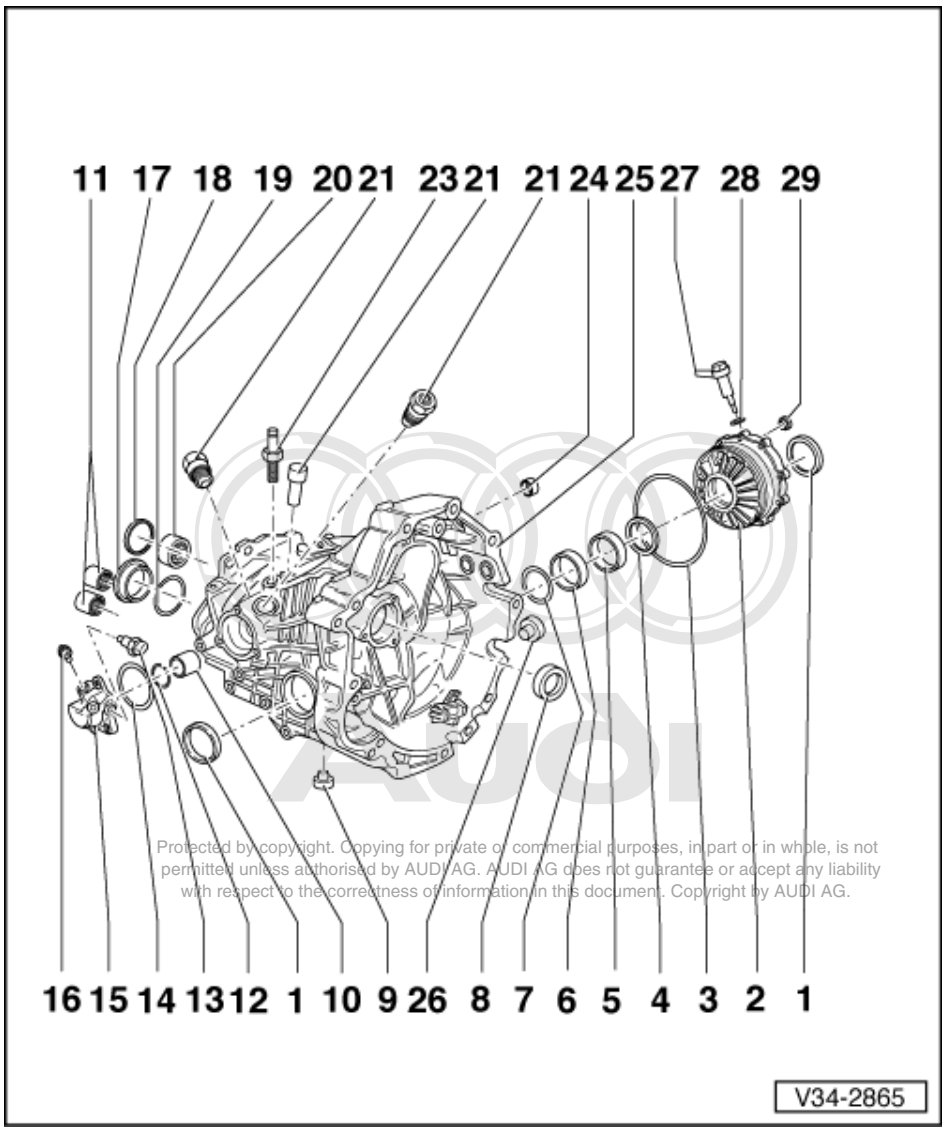
- For drive pinion
- Pulling out => Page 186
- Pressing in =>Page 187

18 Circlip

- Removing => Fig. 15

19 Shim "S3"

- Note thickness
- Adjustment overview => Page 213



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.

20 Needle roller bearing

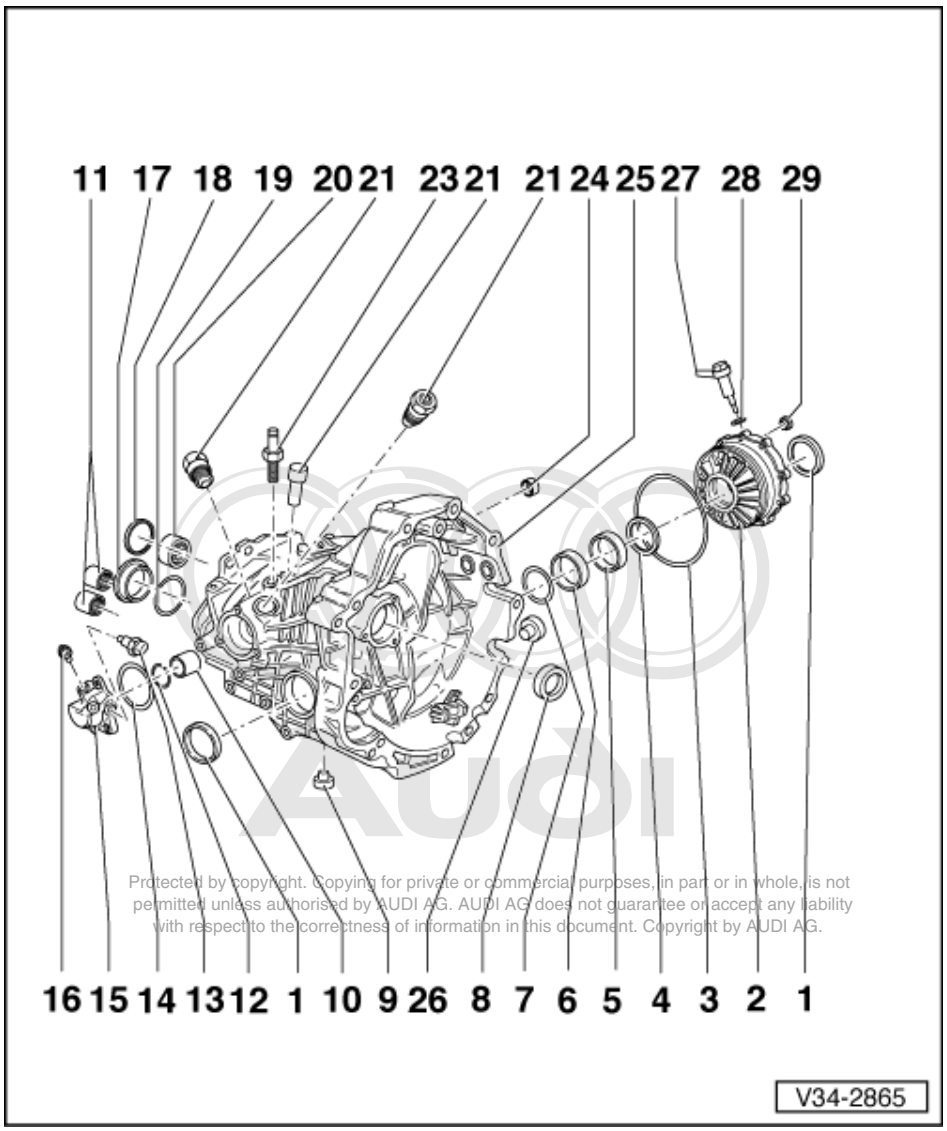
- For input shaft
- Pulling out =>Fig. 12
- Driving in => Fig. 13
- Measuring insertion depth=>Fig. 14

21 Locking bolt

- For selector shaft
- Removing => Page 101
- Installing => Page 119
- Tightening torque:
  For aluminium bolt: 50 Nm
  For steel bolt: 70 Nm

22 Trunnion bolt - 40 Nm

- For push rod



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.

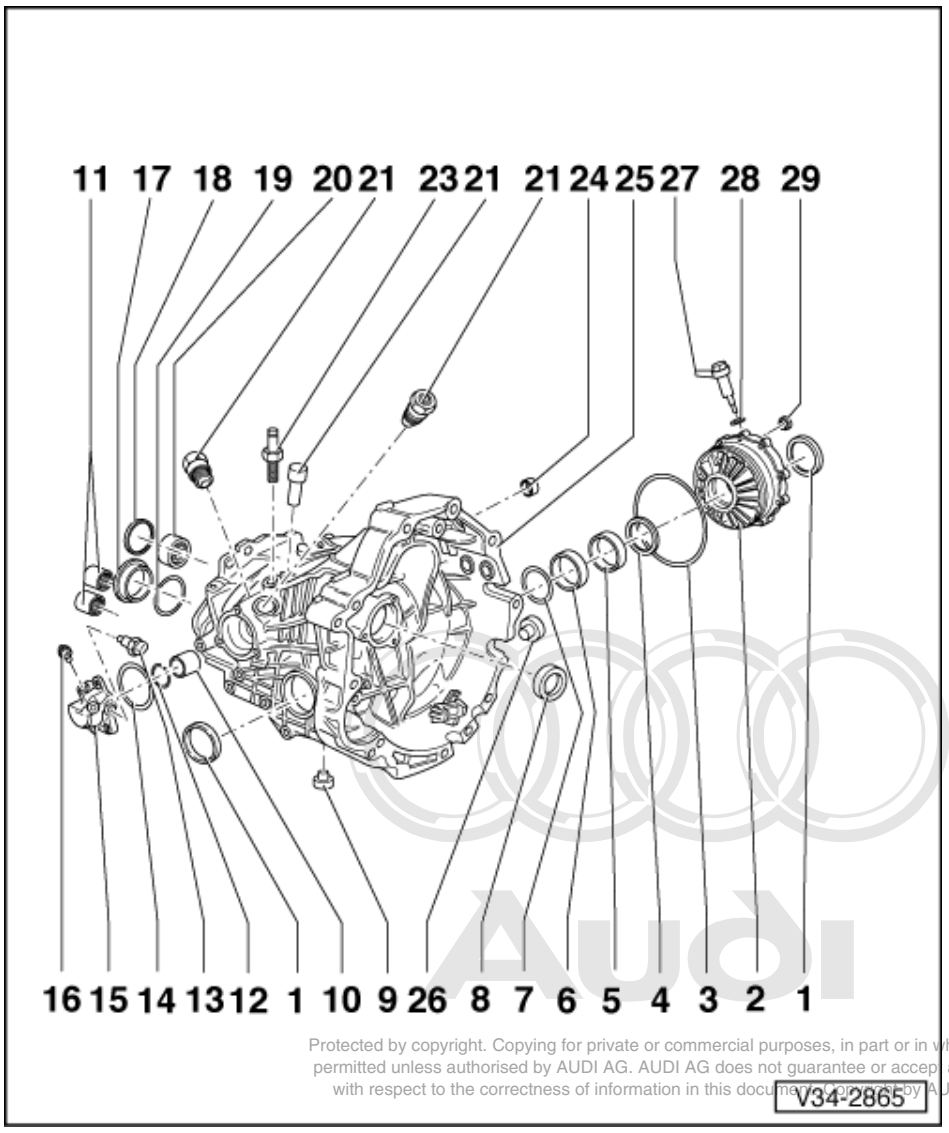
23 Breather

- Insertion depth of sleeve => Fig. 11
- Clip cap on

24 Selector shaft sealing ring

- Can be replaced when gearbox is removed but not dismantled
- Always replace
- Pulling out =>Fig. 8
- Driving in => Fig. 9
- Always use assembly sleeve for installing => Fig. 10

25 Gearbox housing 1)



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.

26 Magnet

- Clean
- Drive in (for example, with press tool VW 408 A) when replacing gearbox

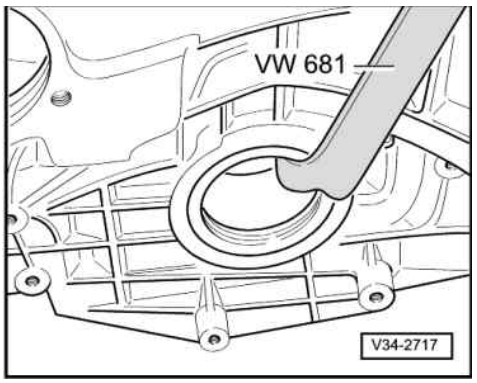
27 Speedometer sender -G22

- Replacing => Page 194

28 O-ring

- Always replace

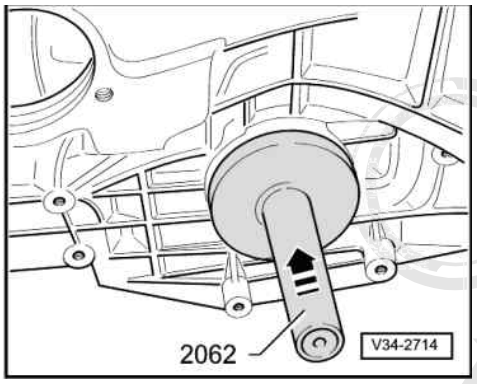
29 Oil filler plug - 40 Nm



-> Fig.1 Pulling out seal for flange shaft

Notes:

- Illustrated, removing oil seal on right-hand side.
- The procedure is identical for left and right-hand seals.



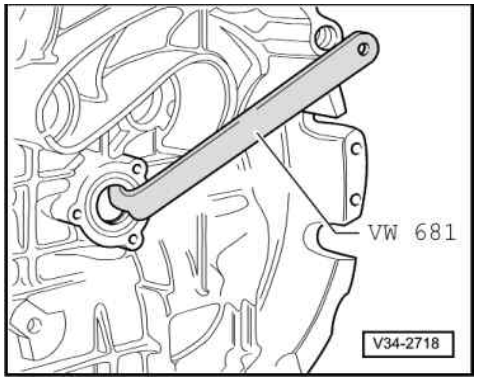
-> Fig.2 Driving in seal for flange shaft

- Insertion depth: 5.5 mm

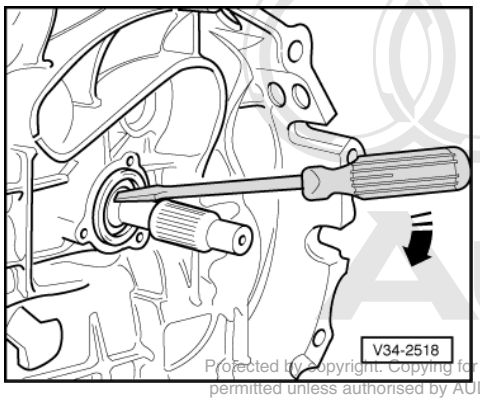
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- Illustrated, installing oil seal on right-hand side.
- The procedure is identical for left and right-hand seals.



-> Fig.3 Levering out input shaft oil seal



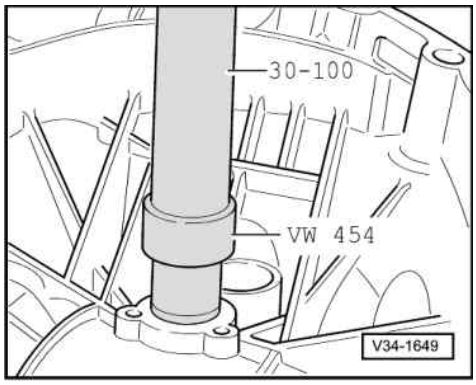
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.4 Removing input shaft oil seal when gearbox is not dismantled

- Lever out seal carefully with a screwdriver.

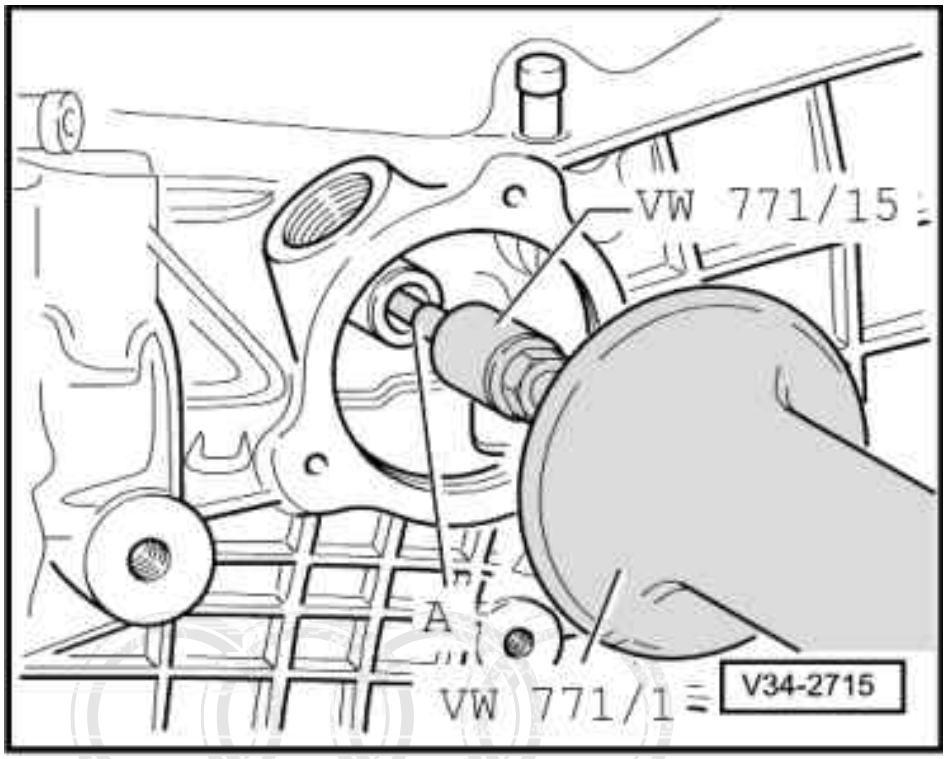
Note:

Do not damage bearing surface on input shaft for shaft seal.



-> Fig.5 Driving in input shaft oil seal

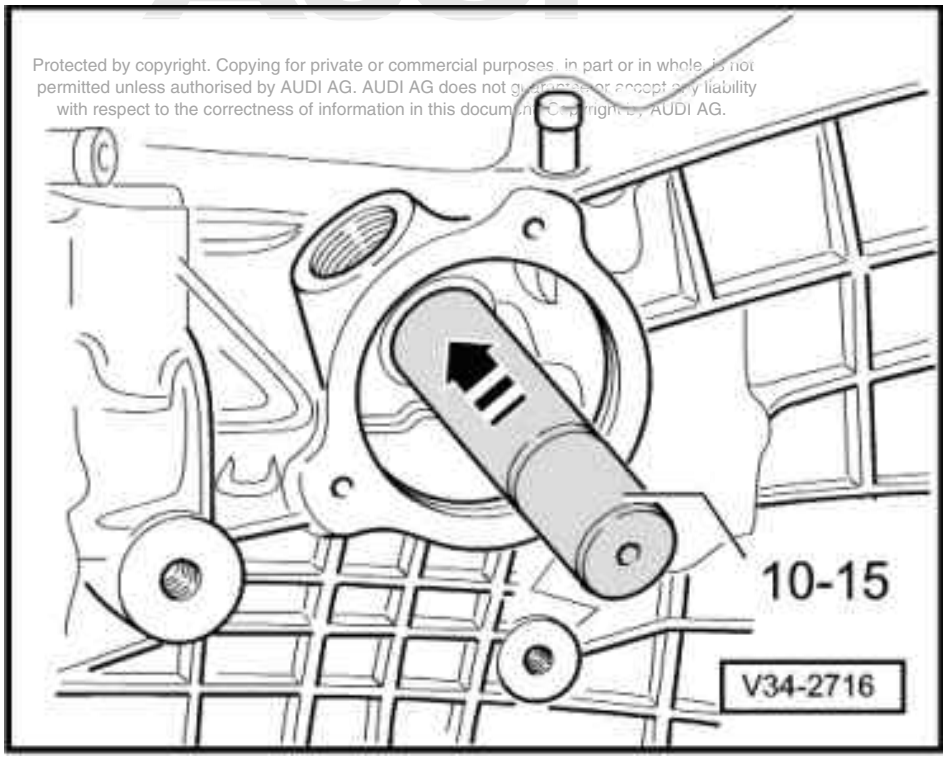
- Pack space between sealing and dust lip of new seal for input shaft with multi-purpose grease.
- Pull a thin protective hose tightly onto splines of input shaft.
- Tap in input shaft oil seal.
  - Insertion depth: 3.5 mm
- Remove protective hose.



-> Fig.6 Pulling out ball sleeve

- Remove circlip.

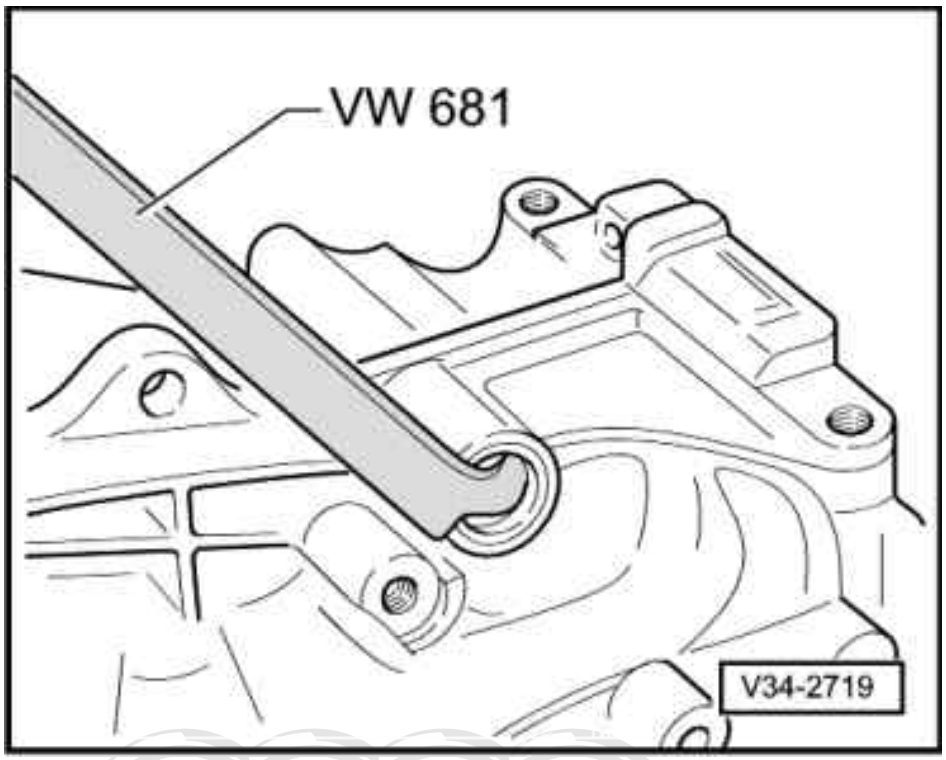
A - Internal puller 14.5 ... 18.5 mm, e.g. Kukko 21/2



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.

-> Fig.7 Driving in ball sleeve

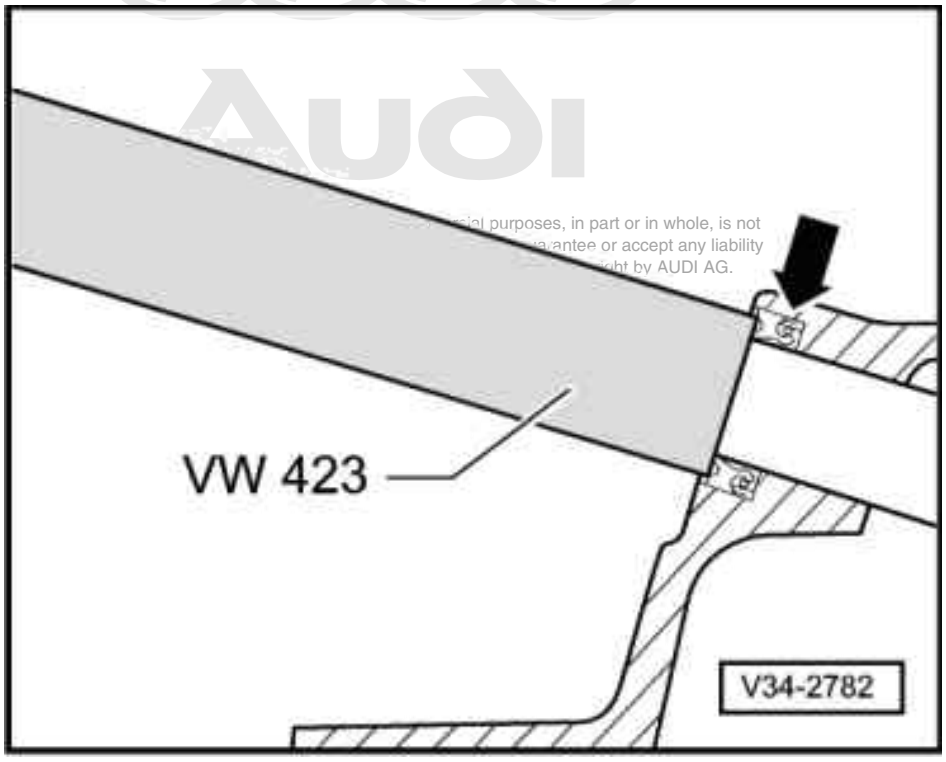
- Drive in onto stop.



-> Fig.8 Pulling out selector shaft sealing ring

Note:

With gearbox removed but not dismantled, carefully lever out seal without damaging the shaft with a screwdriver.



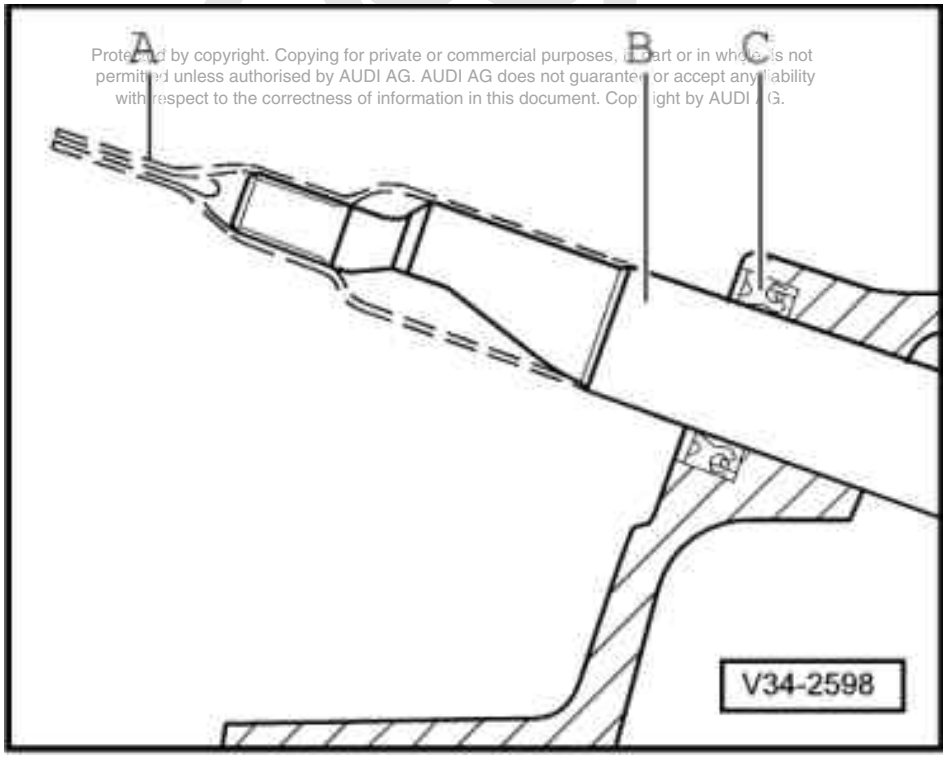
...ial purposes, in part or in whole, is not
...antee or accept any liability
...ight by AUDI AG.

-> Fig.9 Driving in selector shaft sealing ring

- Selector shaft installed or removed

- Pack space between sealing and dust lips with multi-purpose grease.
- Pull assembly sleeve onto selector shaft => Fig. 10
- Drive seal into housing onto stop.

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.

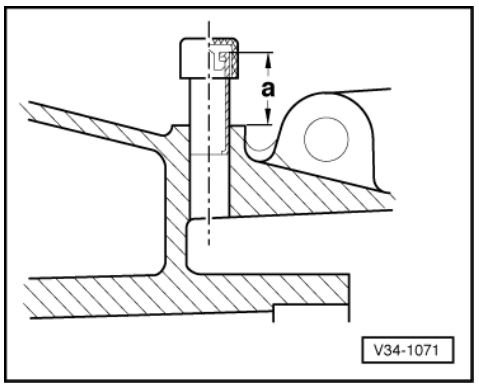


-> Fig.10 Installing seal and selector shaft with assembly sleeve

- To avoid damaging seal -C- always use assembly sleeve -A-, Part No. 01E 311 120, to install seal or selector shaft.

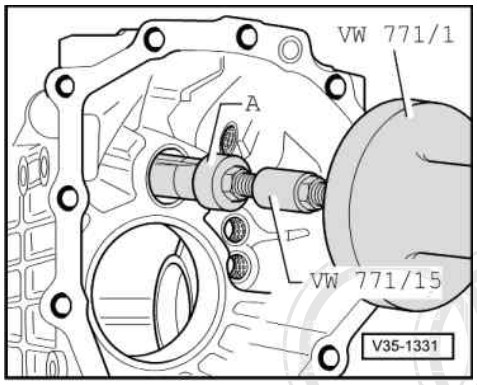
Note:

- Selector shaft -B- is angled to simplify detaching selector lever on gearbox.



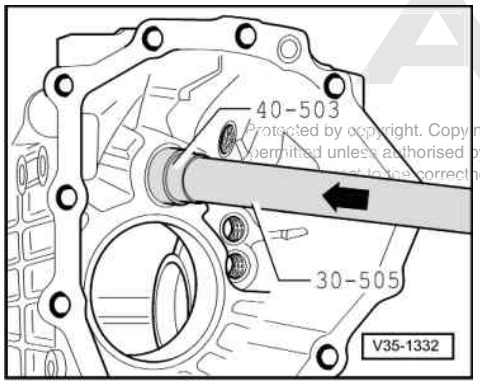
-> Fig.11 Insertion depth of breather sleeve

- Dimension a = 21 mm



-> Fig.12 Pulling needle roller bearing out of gearbox housing

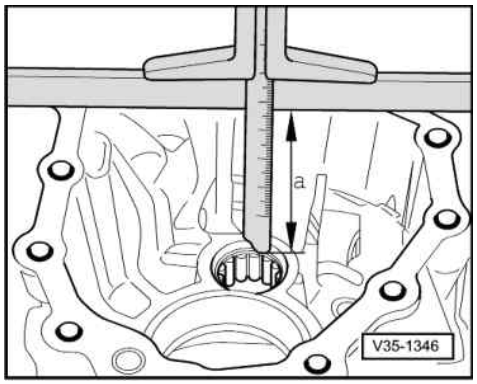
A - Internal puller 30 ... 37 mm, e.g. Kukko 21/5



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.

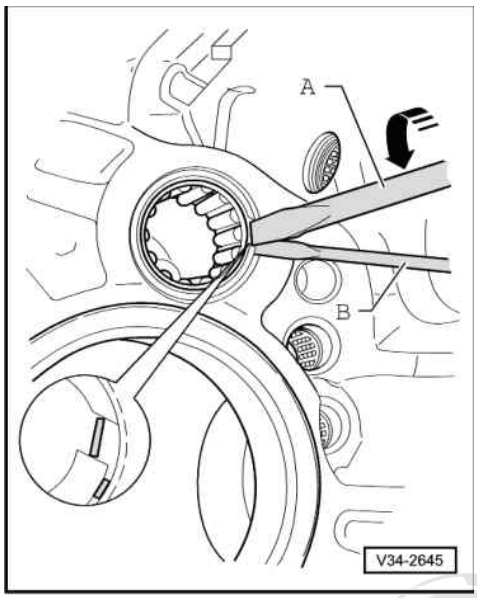
-> Fig.13 Driving needle roller bearing into gearbox housing

- Installation position: Inscription on bearing faces drift
- Insertion depth => Fig. 14



-> Fig.14 Insertion depth of needle roller bearing

- Dimension a = 105 mm

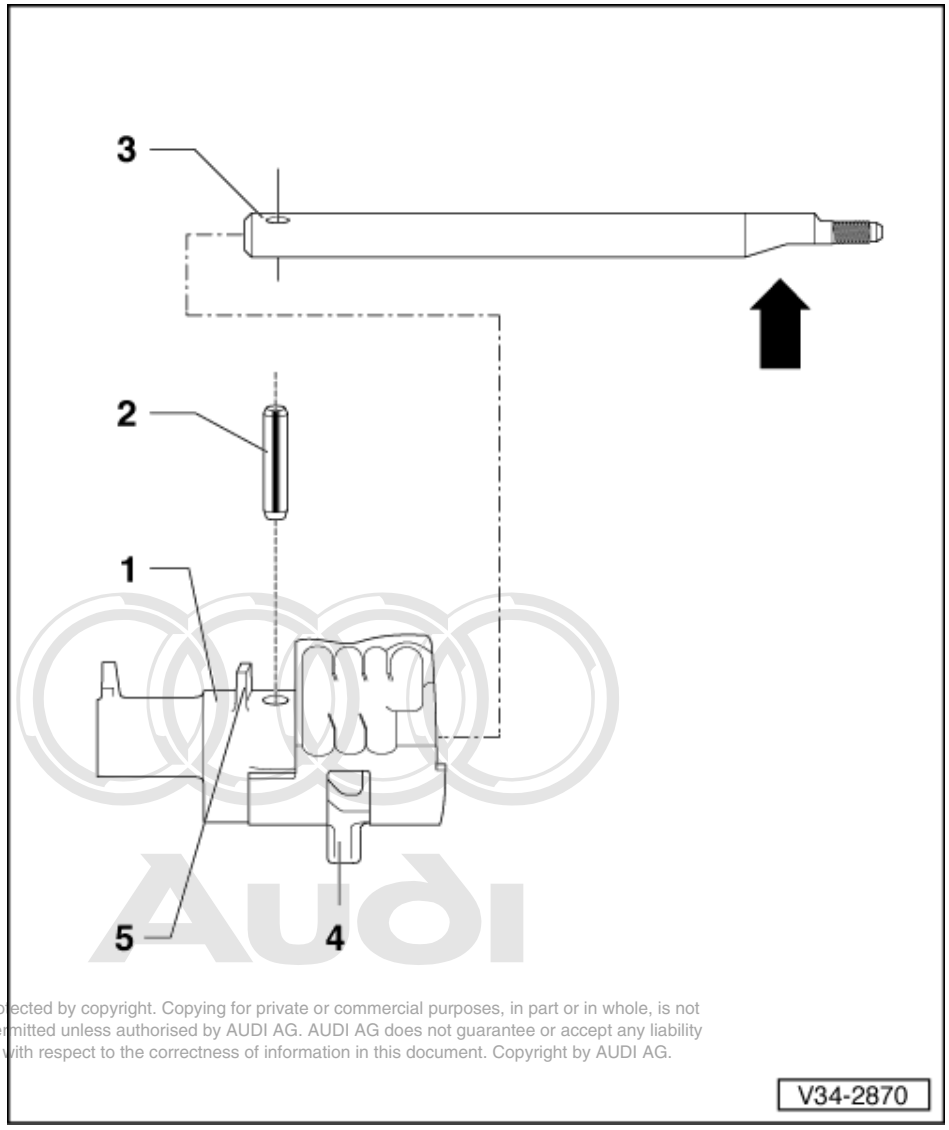


-> Fig.15 Removing circlip

- Lift circlip out of the groove by turning one end of circlip with a screwdriver -A-.
- Secure this end with a screwdriver -B-.
- Lever circlip out further by repositioning screwdriver -A-.

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.

13.2 - Dismantling and assembling complete selector shaft



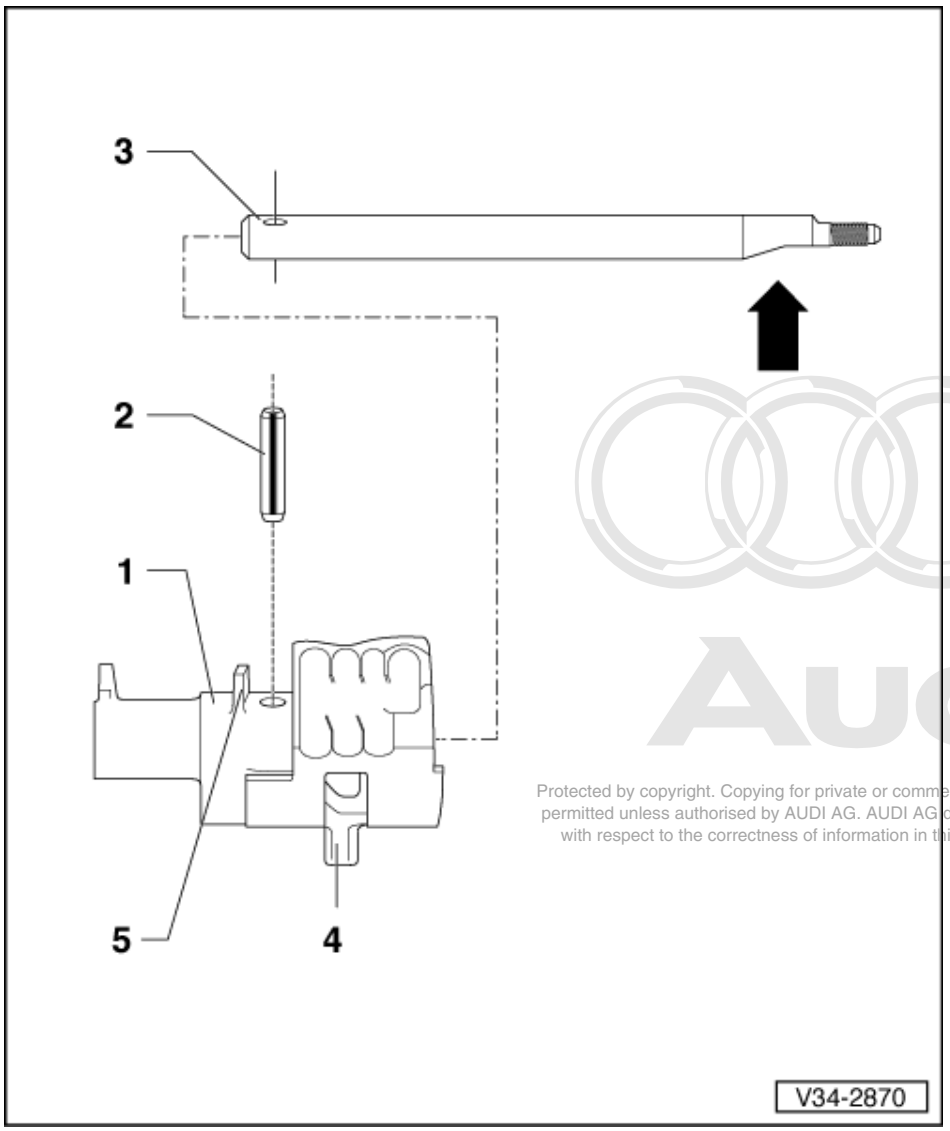
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 Selector cylinder

- 5 speed-gearbox => Fig. 1
- 6 speed-gearbox => Fig. 2

2 Spring sleeve

- 01.92 ä: Replaced by spring pin
- Removing and driving in flush => Fig. 3
- Installation position of spring sleeve: Slot longitudinal to line of force
- Installation position of spring pin: Not dependant on direction of force.



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.

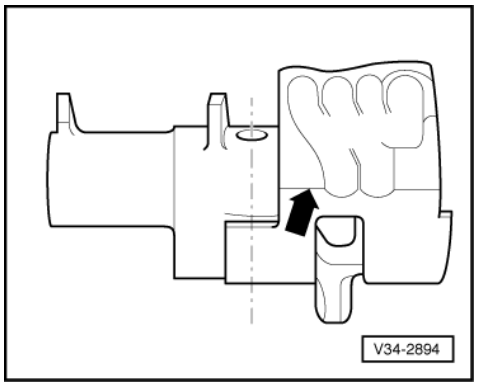
3 Selector shaft

- Driving out => Fig. 4
- Driving in => Fig. 5
- Installation position: Flat (arrow) and selector finger -Item 4 - face in same direction

4 Selector finger

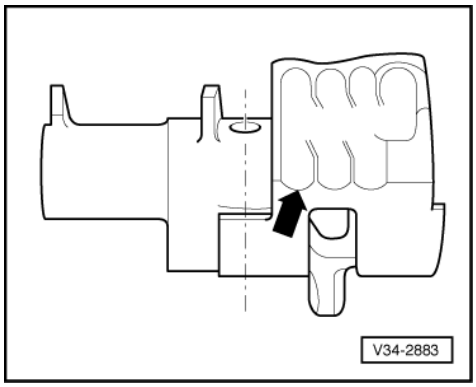
- Observe installation position to -Item 3 -

5 Cam for reversing light switch



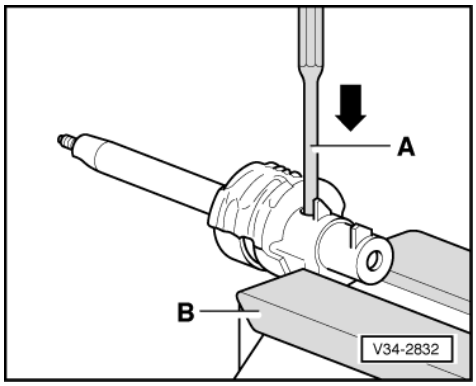
-> Fig.1 Selector cylinder for 5-speed gearbox

- Curved section of selector gate -arrow- runs diagonally between 4th gear (bottom) and 5th gear (top).



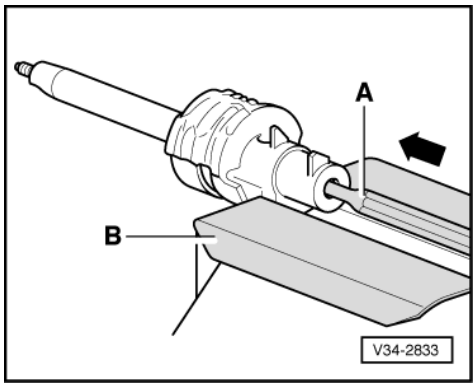
-> Fig.2 Selector cylinder for 6-speed gearbox

- Curved section of selector gate -arrow- runs vertically between 5th gear (top) and 6th gear (bottom).



-> Fig.3 Driving out and driving in spring sleeve or spring pin flush

A - Drift
B - Vice clamps

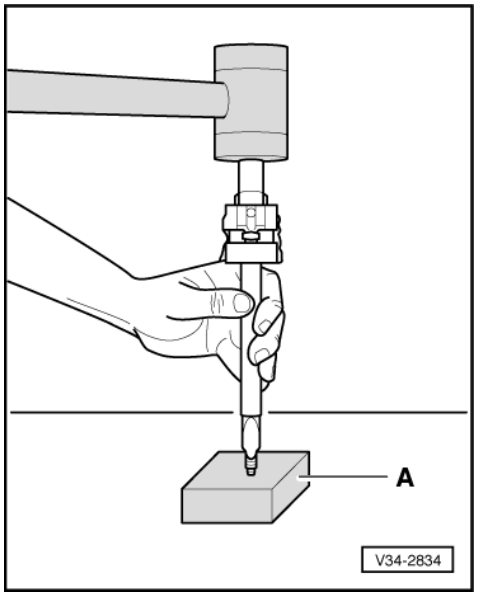


-> Fig.4 Driving out selector shaft

A - Drift

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.

B - Vice clamps



-> Fig.5 Driving in selector shaft

A - Wooden packing

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.

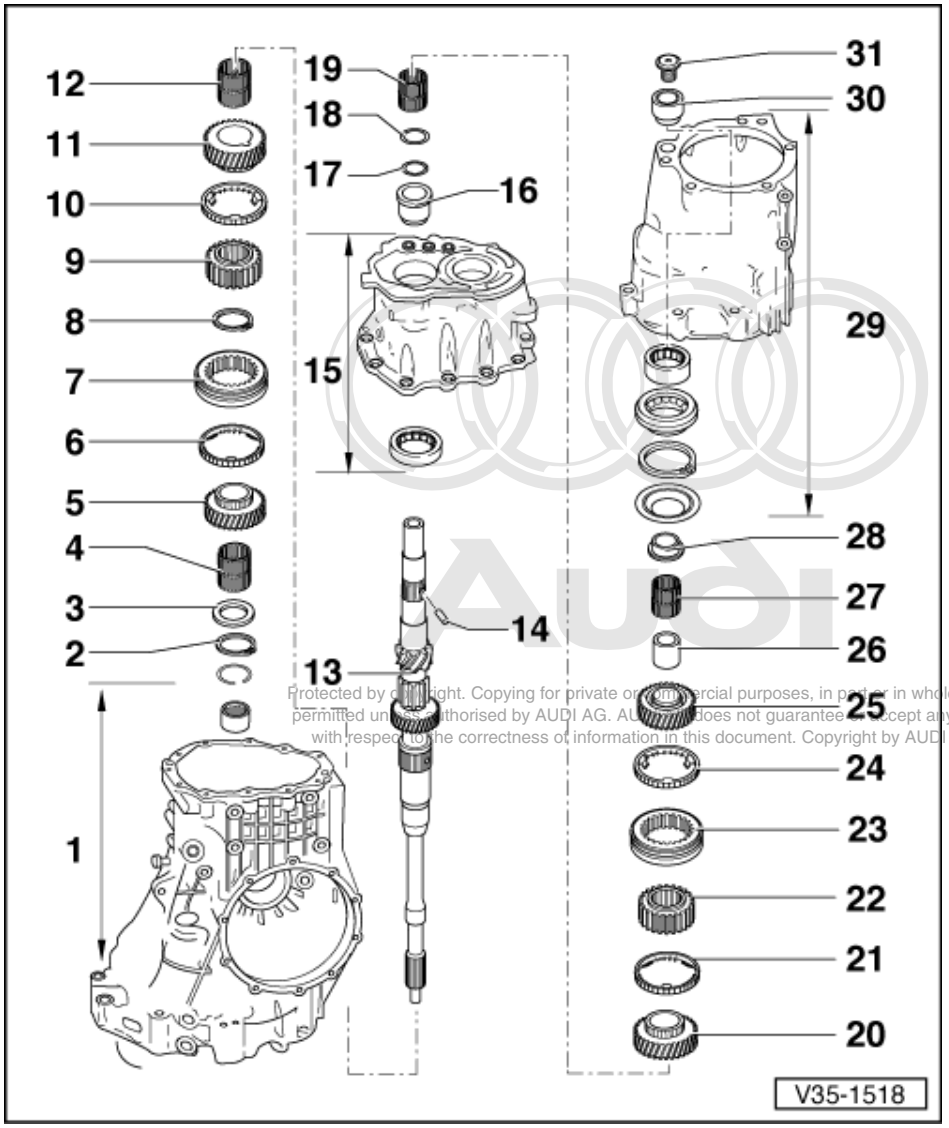
Notes:

- Bring holes into alignment.
- Flat on selector shaft and selector finger point in same direction.

35 - Gears, Shafts

1 - Dismantling and assembling input shaft

1.1 - Dismantling and assembling input shaft



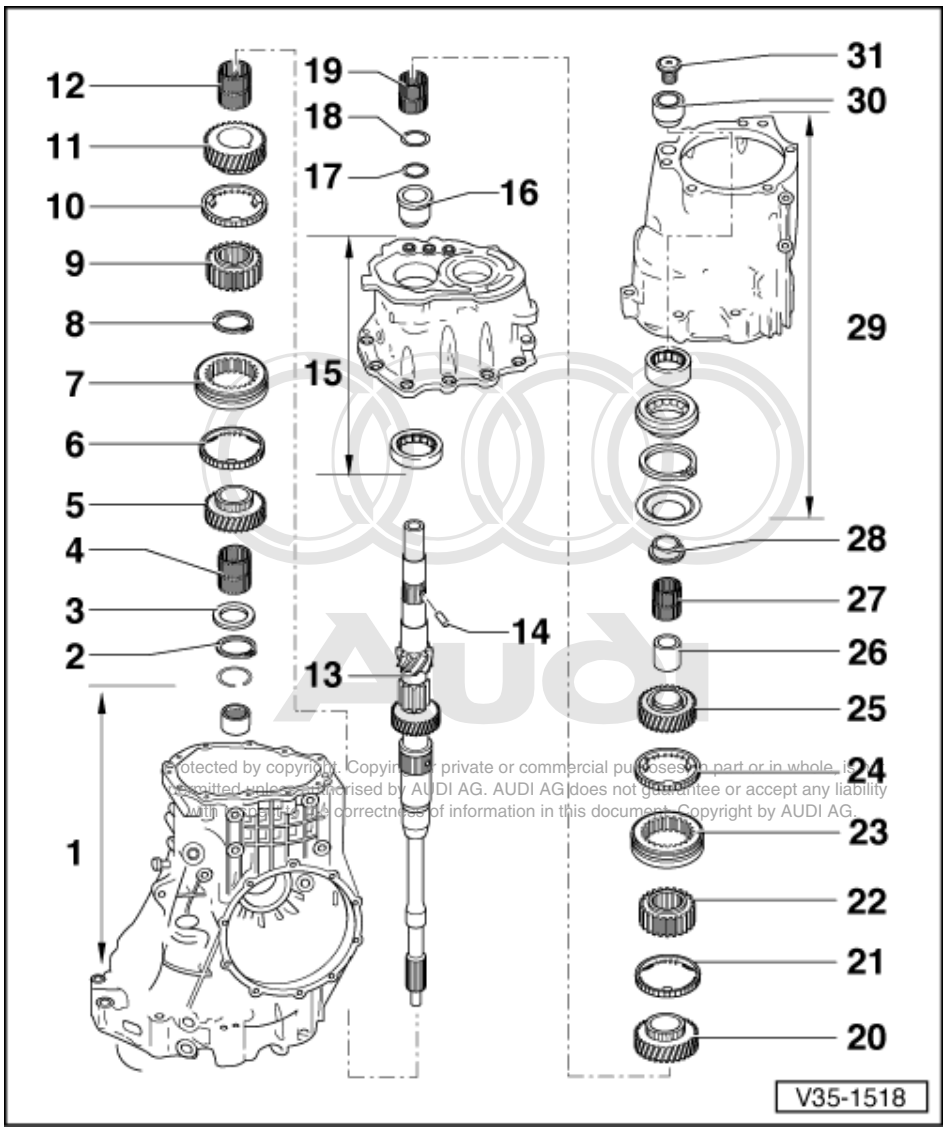
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

- When installing new gears, refer to => Technical data,Page 2 .
- A wider gearwheel (on input shaft -Item 13 -) and a wider sliding gear for 1st gear have been used from gearbox serial number 77645. At the same time, the bearing plate -Item 15 - has been modified and a narrower inner race for cylinder roller bearings -Item 16 - installed.
- Components of old and new construction status must not be installed mixed.

1 Gearbox housing

- Servicing => Page 148



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.

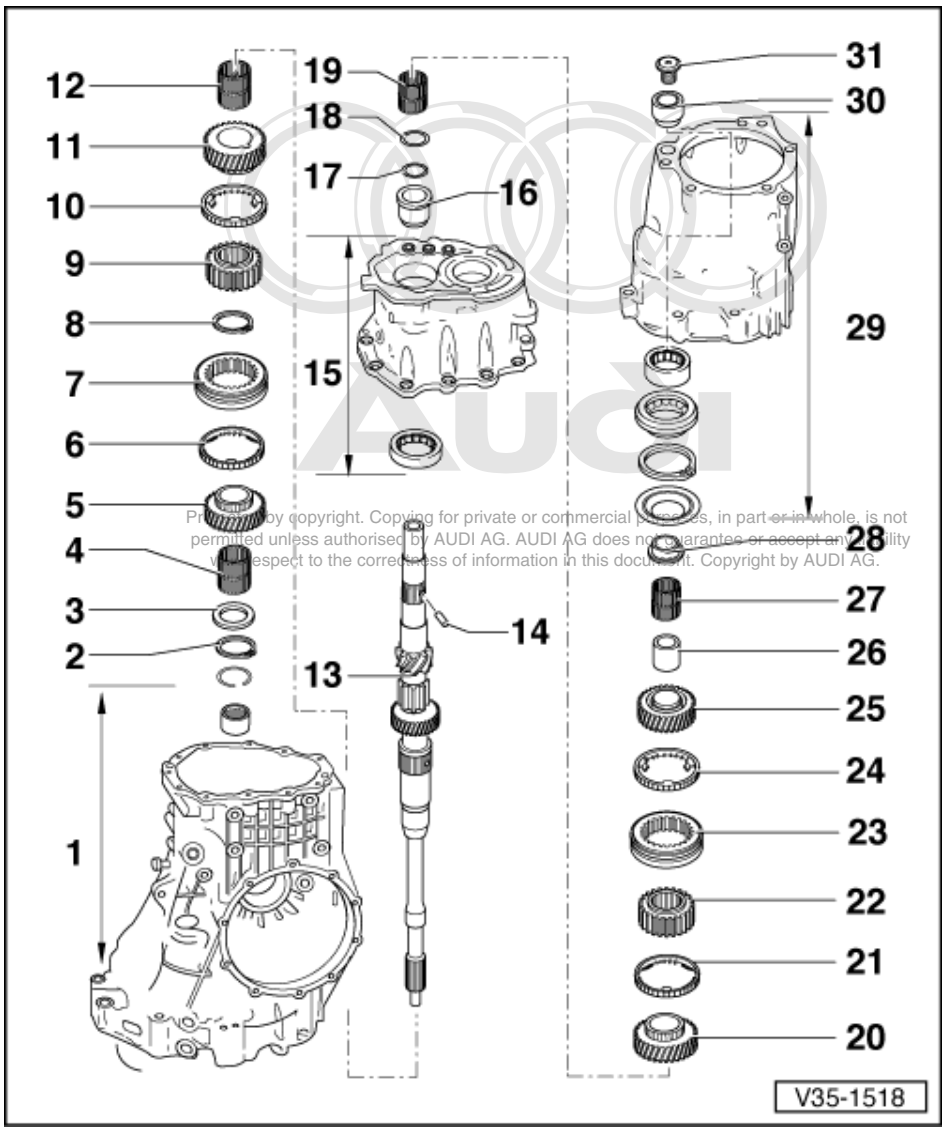
2 Circlip

3 Thrust washer

4 Needle roller bearing for 4th gear
- Mark before removing
- Do not interchange with needle roller bearing for 3rd gear
- Oil with gear oil before installing

5 4th speed sliding gear
- Before installing, insert spring => Fig. 1
- After installing, check axial clearance with a feeler gauge (0.15 ... 0.35 mm)

6 Synchro-ring for 4th gear
- Checking for wear => Fig. 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.

7 Locking collar

- Paired with synchro-hub
- Mark before removing => Page 104

8 Circlip

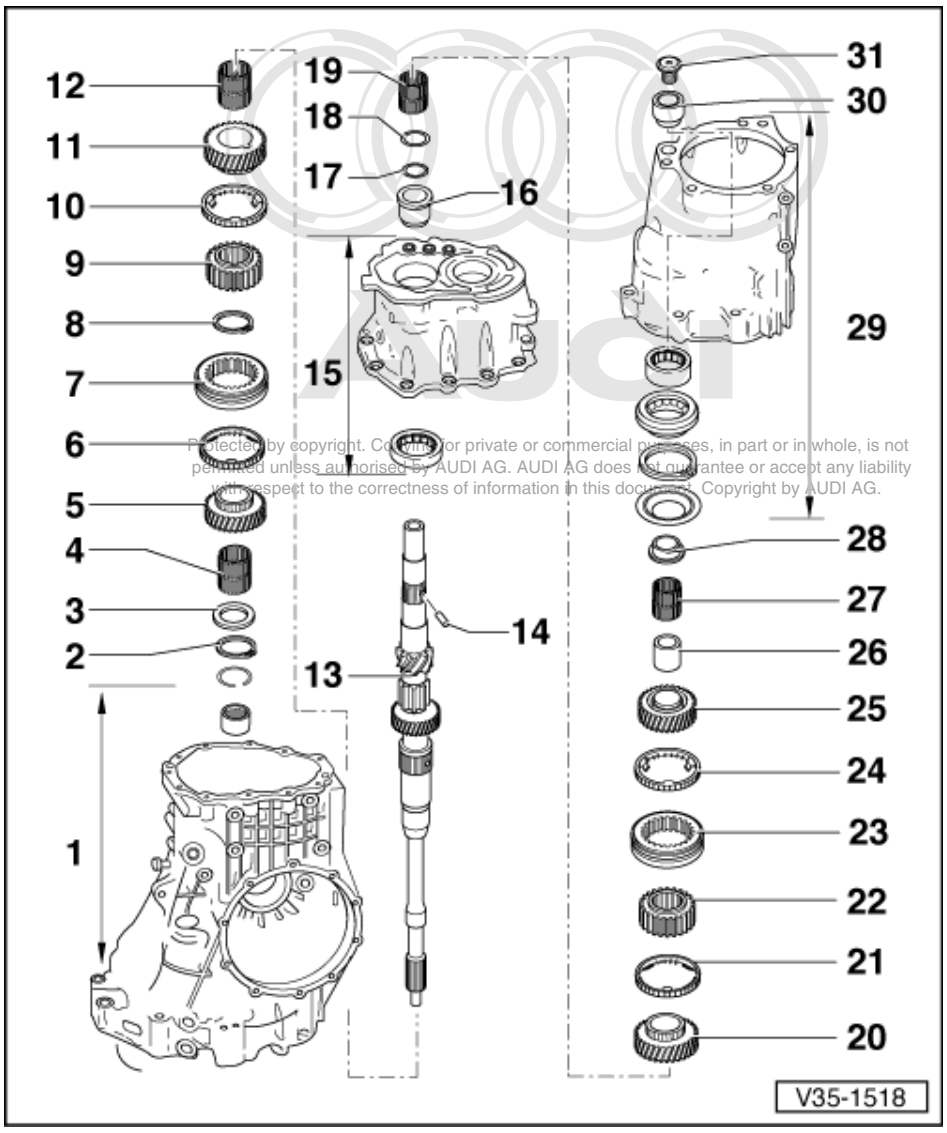
- If the synchro-hub is replaced re-determine thickness =>Fig. 3
- Installation position: Ends align with groove of synchro-hub

9 Synchro-hub for 3rd and 4th gear

- Pressing off => Fig. 4
- Installation position: => Fig. 5
- Pressing on => Fig. 6

10 Synchro-ring for 3rd gear

- Coated with molybdenum
- Checking for wear => Fig. 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.

11 3rd speed sliding gear

- Before installing, insert spring => Fig. 1
- After pressing on -Item 9 -, check axial clearance using a feeler gauge (0.15 ... 0.35 mm)

12 Needle roller bearing for 3rd gear

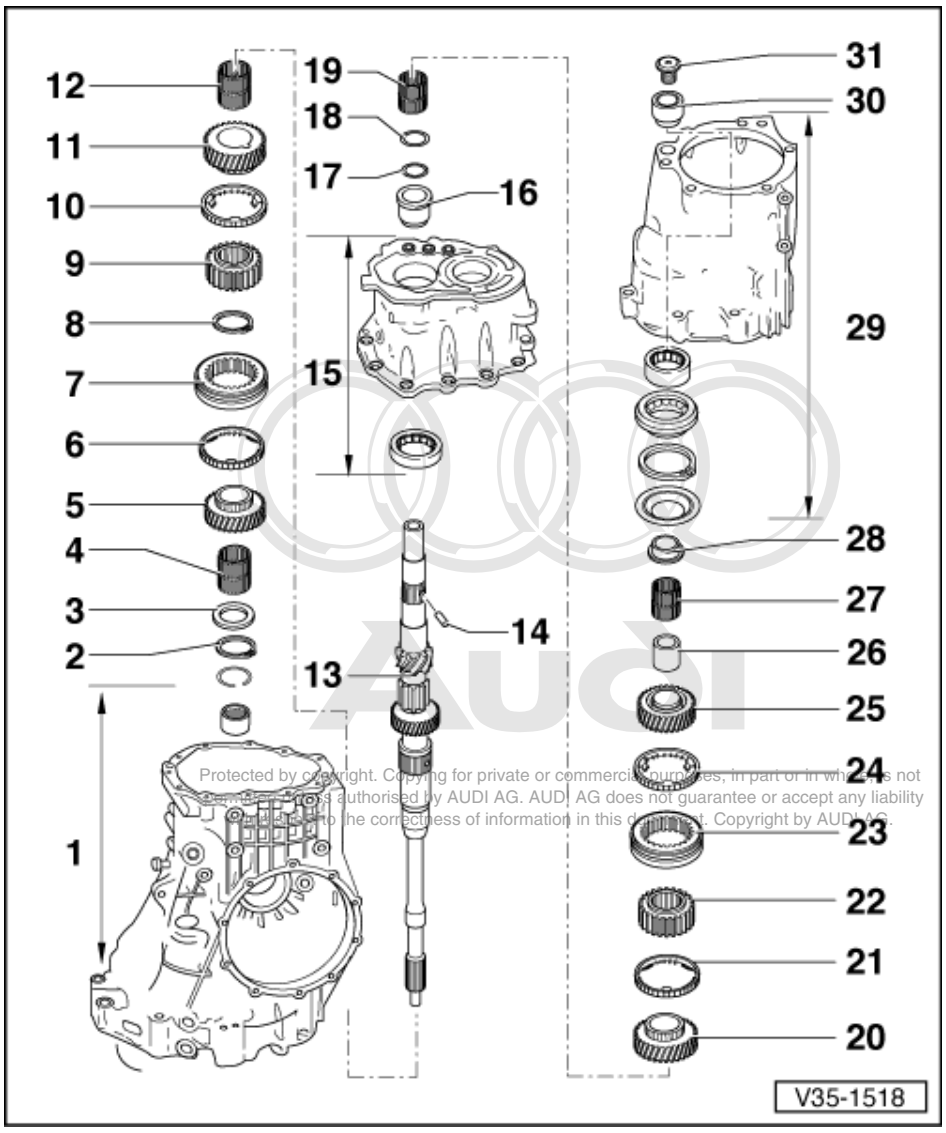
- Mark before removing
- Do not interchange with needle roller bearing for 4th gear
- Oil with gear oil before installing

13 Input shaft

- With wider gearwheel for 1st gear from gearbox serial number 77645. Assignment => Fig. 8

14 Spring sleeve

- Drive in when replacing input shaft => Fig. 7



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.

15 Bearing plate

- Servicing => Page 137
- With identification cut from gearbox serial number 77645 =>Fig. 141

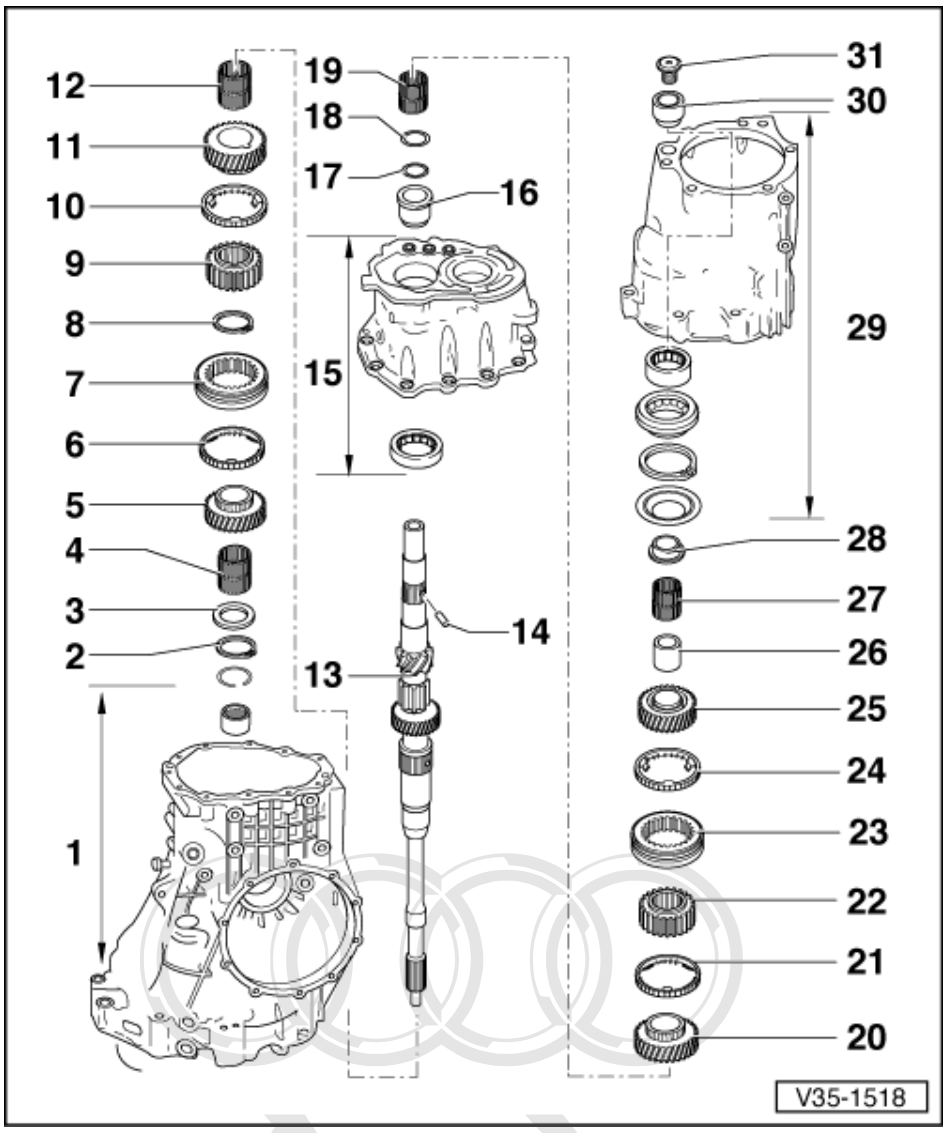
16 Inner race for cylinder roller bearing

- Modified insertion depth from gearbox serial number 77645 Assignment => Fig. 8
- Take off and fit by hand

17 Circlip

18 Thrust washer for needle roller bearing for 6th gear

- Not fitted in 5-speed gearboxes
- Installation position: Shoulder towards circlip, smooth face contact surface towards needle roller bearing => Page 112



19 Needle roller bearing for 6th gear

- Not fitted in 5-speed gearboxes
- Oil with gear oil before installing

20 6th speed sliding gear

- Not fitted in 5-speed gearboxes
- Before installing, insert spring => Fig. 1
- After installing, check axial play => Page 112

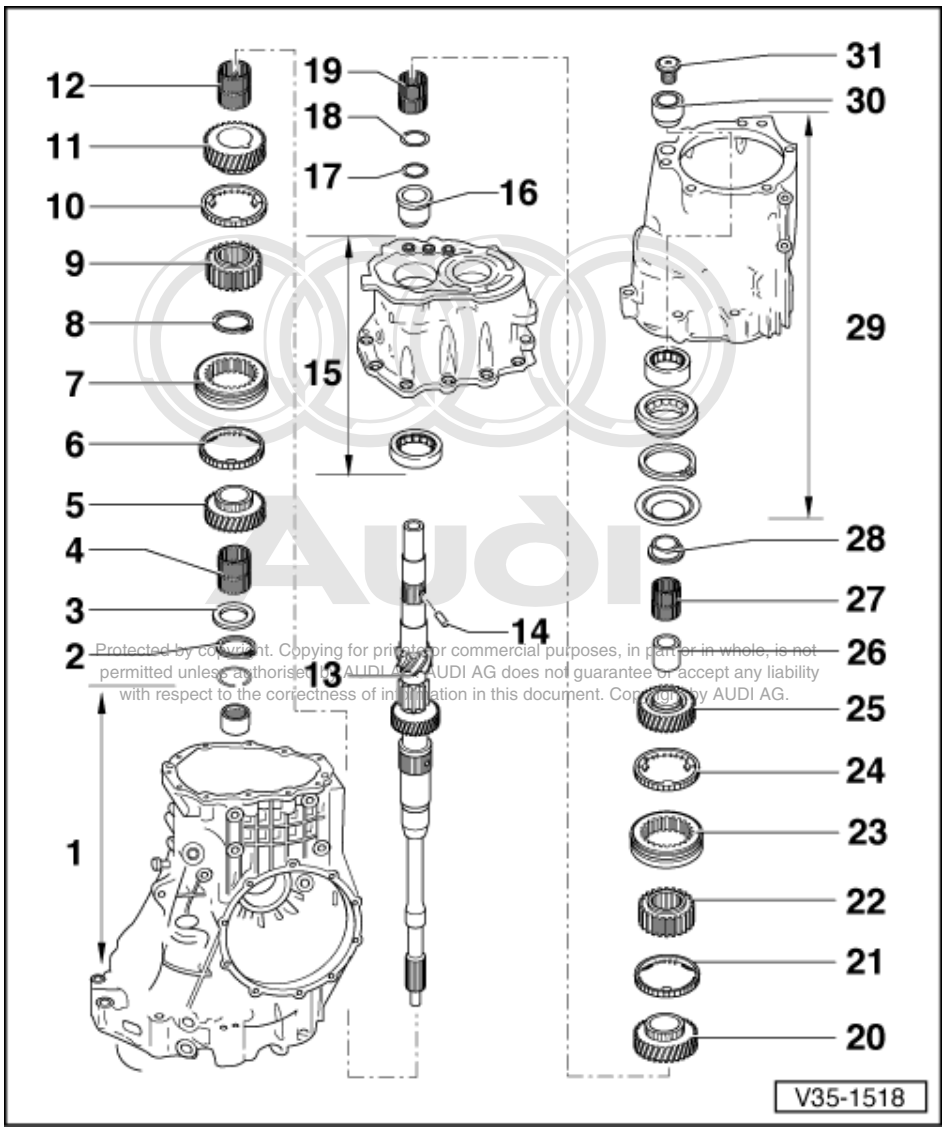
21 Synchro-ring for 6th gear

- Not fitted in 5-speed gearboxes
- Checking for wear => Fig. 2

22 Synchro-hub for 5th and 6th gear

- Pulling off => Page 105
- Driving on => Page 113
- Installation position: Projecting hub towards 5th speed sliding 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.



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.

23 Locking collar

- Paired with synchro-hub
- Mark before removing => Page 104

24 Synchro-ring for 5th gear

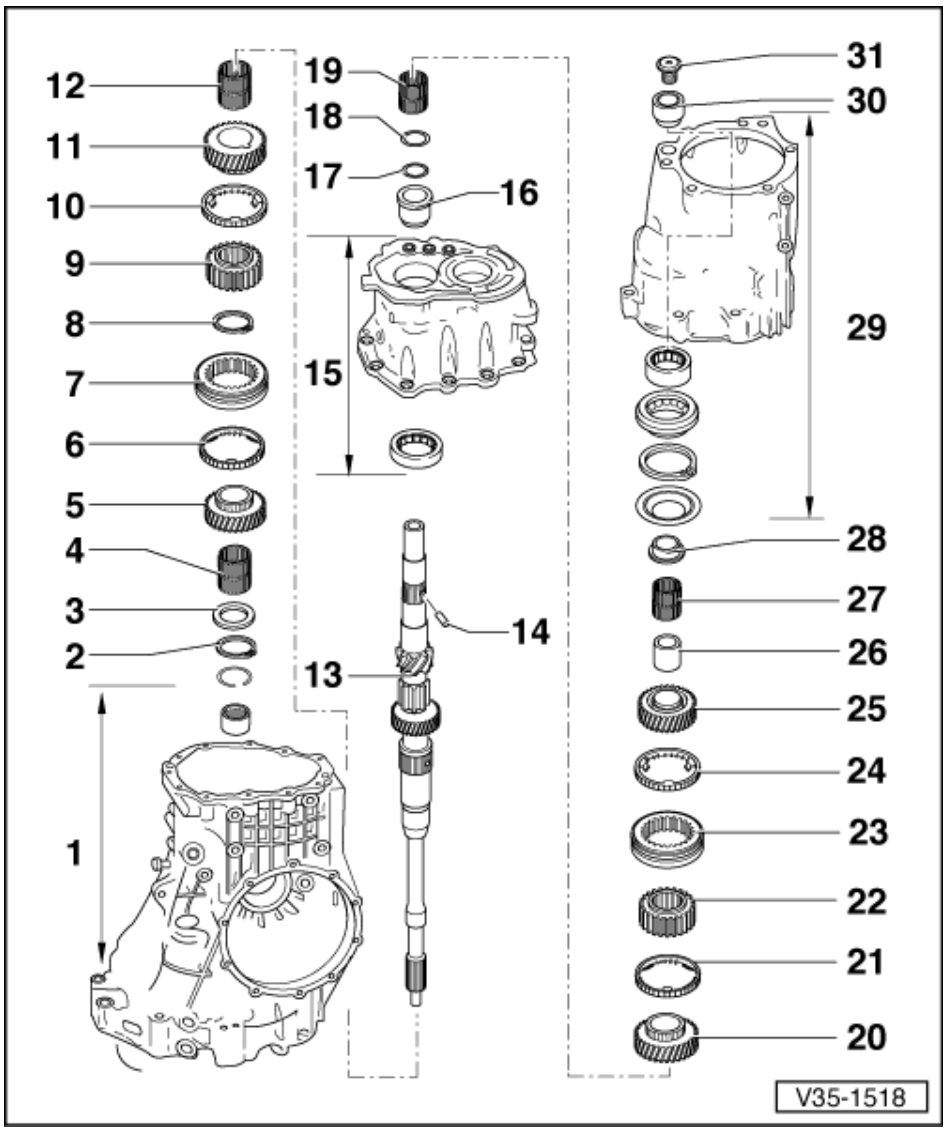
- Checking for wear => Fig. 2

25 5th speed sliding gear

- Before installing, insert spring => Fig. 1
- After installing, check axial play => Page 117

26 Inner race for 5th speed sliding gear

- Pulling off => Page 105
- Driving on => Page 117



27 Needle roller bearing for 5th gear

- Oil with gear oil before installing

28 1st inner race for ball bearing for input shaft

- Pulling off => Page 103
- Driving on => Page 117

29 End cover

- Servicing => Page 131

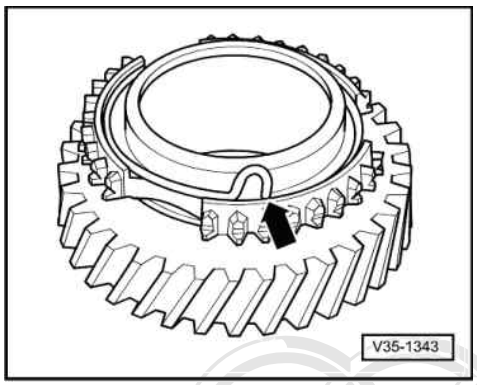
30 2nd inner race for ball bearing for input shaft

- Pulling off => Page 103
- Driving on => Page 118

31 Multi-point socket head bolt - 150 Nm

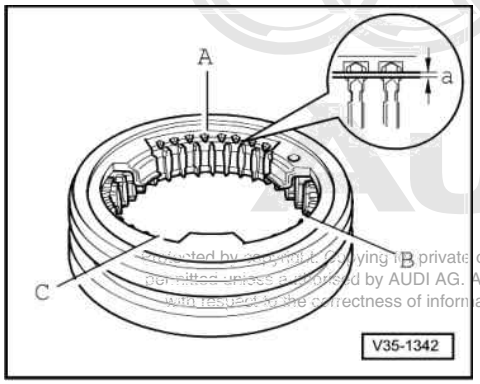
- Loosening and tightening => Page 102

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.



-> Fig.1 Inserting spring in sliding gear

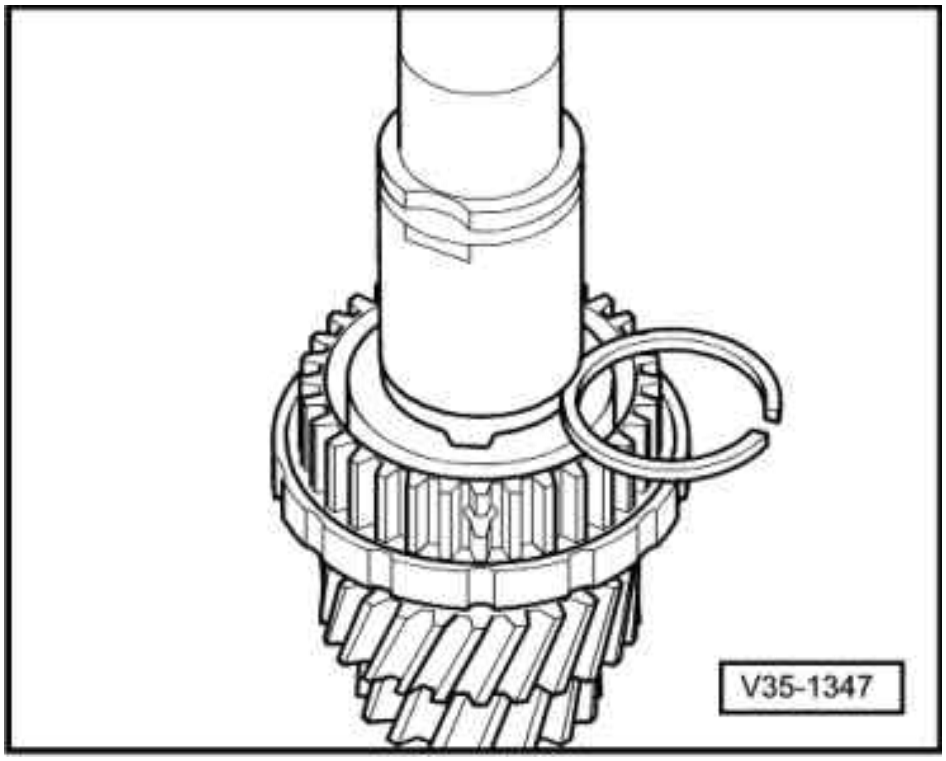
- Insert spring -arrow- in sliding gear, hook angled end into hole.



Copyright by AUDI AG. Passing on to 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.

-> Fig.2 Checking synchro-ring for wear

- Press synchro-ring into locking collar and measure gap "a" with a feeler gauge at positions -A-, -B- and -C-.
- Add the measured values and divide by 3.
  - The figure calculated must not be less than 0.5 mm



-> Fig.3 Re-determining thickness of circlip

- Press synchro-hub onto stop.

Note:

Note installation position when pressing on =>Fig. 4 .

- Determine the thickest circlip that can still just be fitted.

Note:

The opening of circlip must align with groove in synchro-hub.

- Determine circlip from table. Part numbers

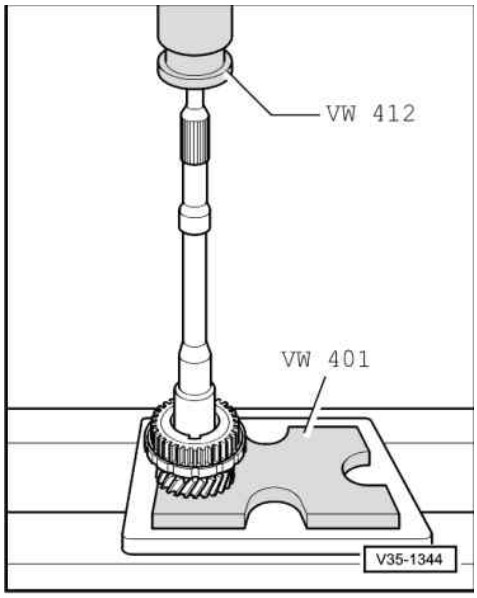
=> Parts Catalogue

Available circlips

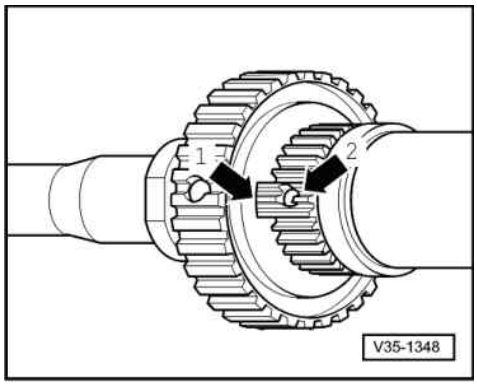
Circlip thickness (mm)		
1.90	1.96	2.02
1.93	1.99	2.05

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 circlip.

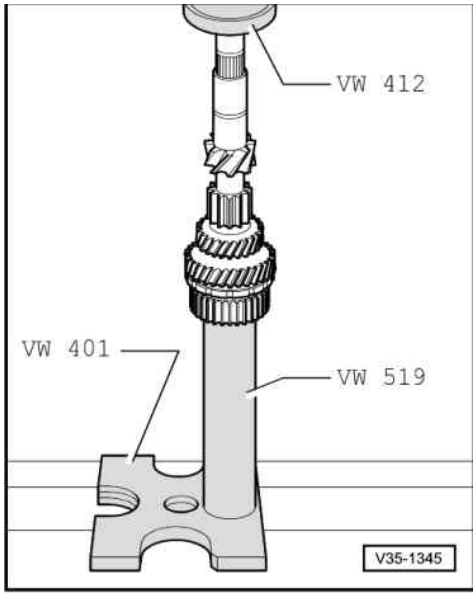


-> Fig.4 Pressing off synchro-hub for 3rd and 4th gear



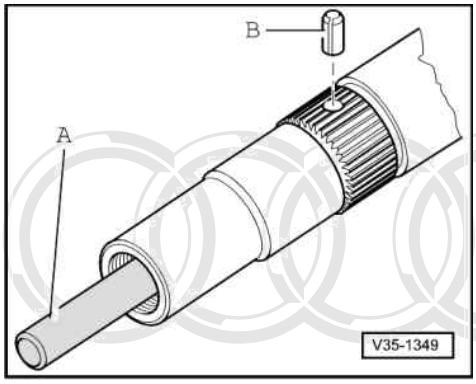
-> Fig.5 Installation position of synchro-hub

- Oil groove in synchro-hub -arrow 1- must align with oil drilling -arrow 2- in input shaft



-> Fig.6 Pressing on synchro-hub for 3rd and 4th gear

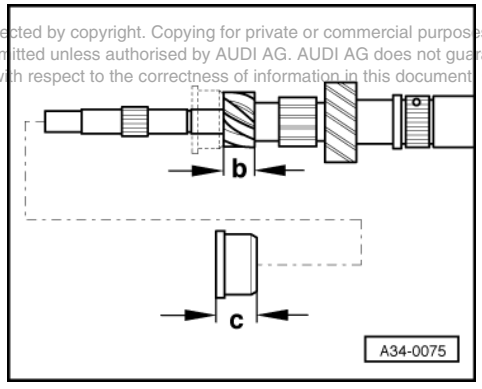
- Heat synchro-hub to approx. 100 oC, position and press home.
- Fit circlip.



-> Fig.7 Driving spring sleeve into input shaft

- Guide a 9 mm diameter drift -A- into oil drilling and drive spring sleeve -B- in until it touches drift.

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.



-> Fig.8 Matching gearwheel for 1st gear to inner race for cylinder roller bearing
A modified inner race for cylinder roller bearing has been fitted in combination with wider gearwheel for 1st gear from gearbox serial number 77645.

b - Wide gearwheel 1st gear
c - Wide inner race for cylinder roller bearing

Assignment:

- Up to gearbox number 77644:

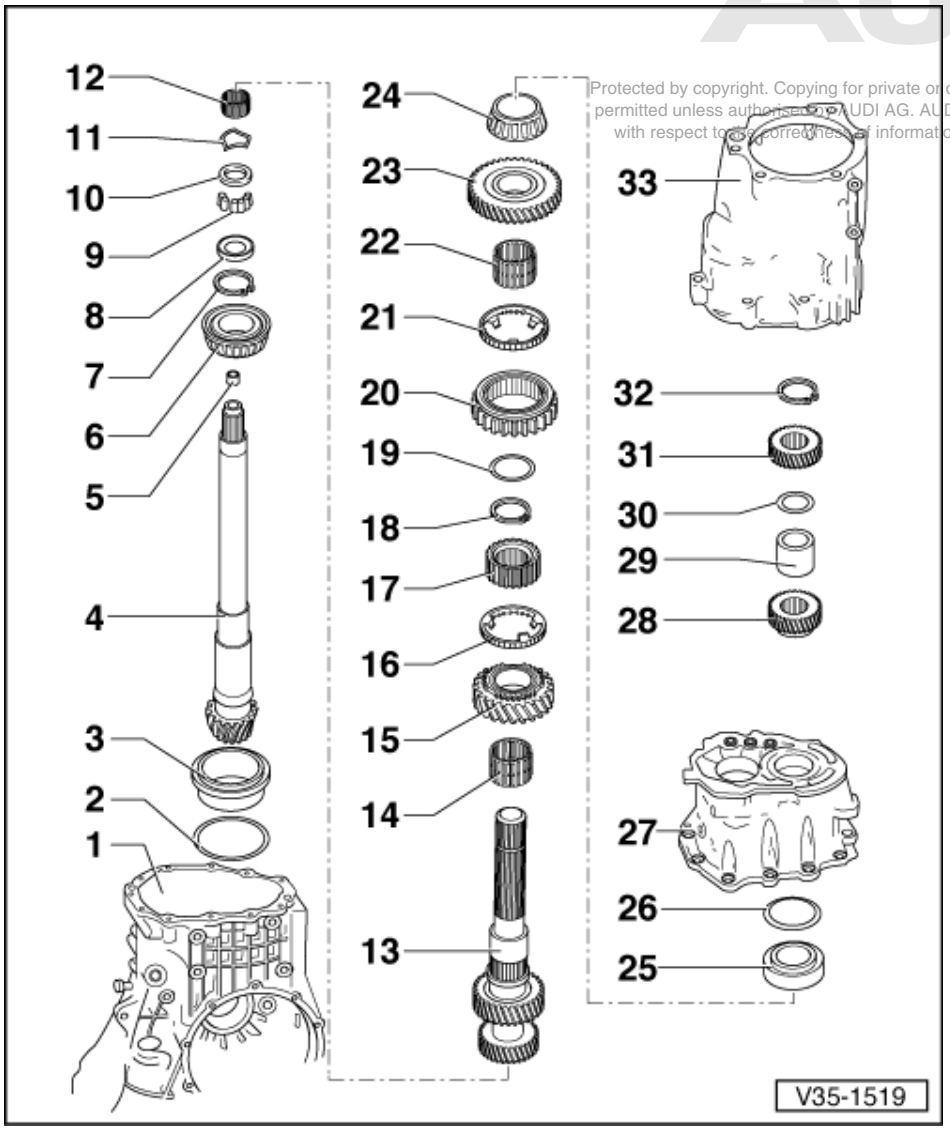
  Dimension b = 22 mm
  Dimension c = 28 mm

- From gearbox number 77645:

  Dimension b = 26 mm
  Dimension c = 24 mm

2 - Dismantling and assembling drive pinion and hollow shaft

2.1 - Dismantling and assembling drive pinion and hollow shaft



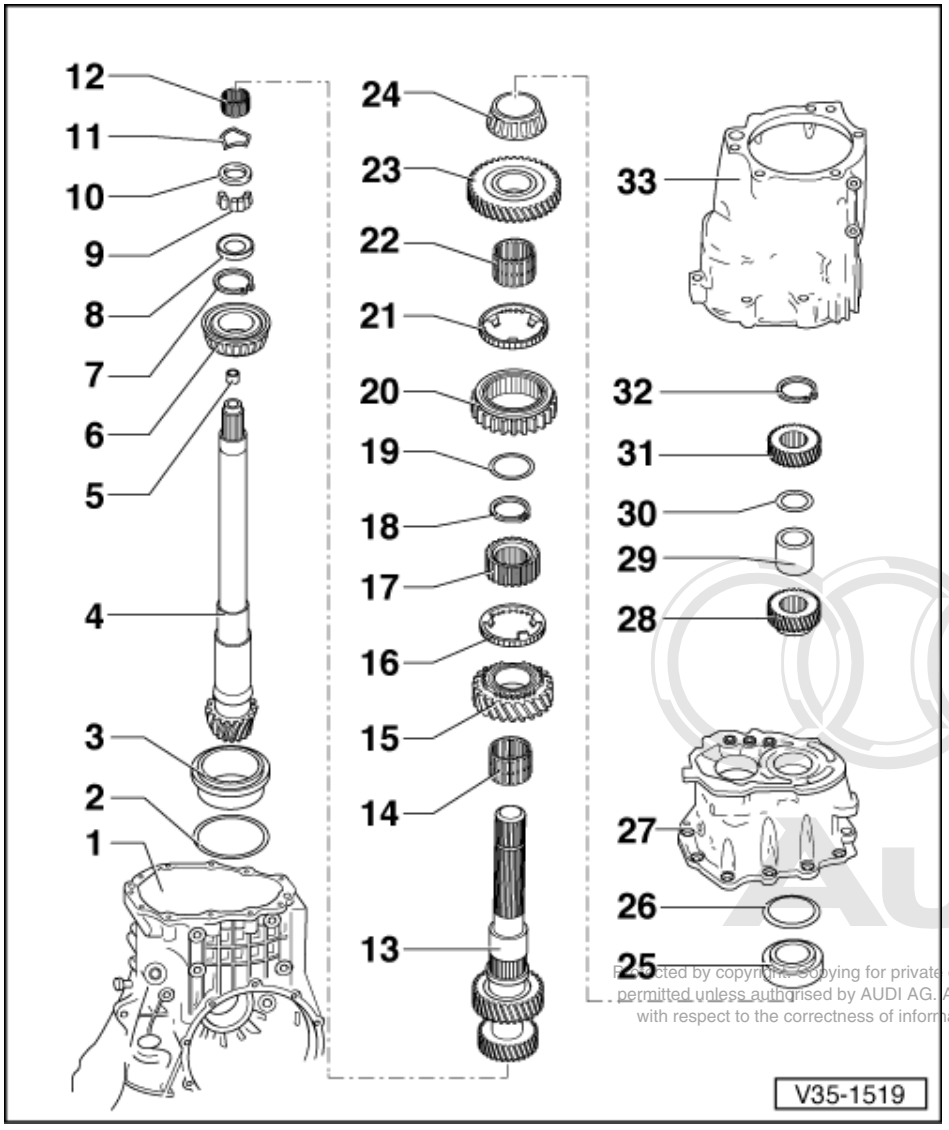
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- When installing new gears or final drive set, refer to => Technical data,Page 2 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 213 .

1 Gearbox housing
- Servicing => Page 148

2 Shim "S3"
- Adjustment overview => Page 213



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.

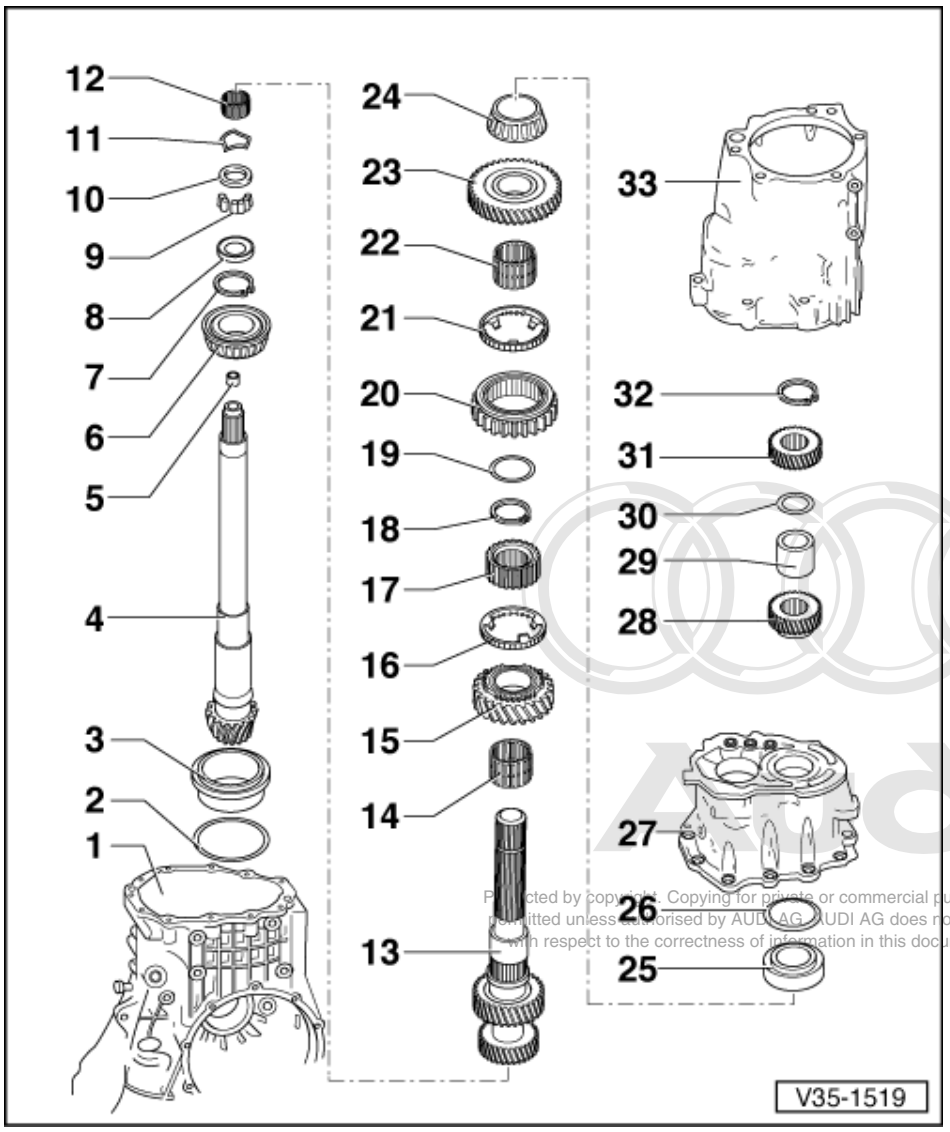
3 Outer race for large taper roller bearing 1)
- Pulling out =>Fig. 1
- Pressing in =>Fig. 2 and Fig. 3

4 Drive pinion 1)
- Paired with crown wheel (final drive set)

5 Needle roller bearing for flange shaft/drive pinion
- Pulling out =>Fig. 4
- Driving in => Fig. 5

6 Inner race for large taper roller bearing 1)
- Pressing off => Fig. 6
- Pressing on => Fig. 7

- Low friction bearing; do not oil when measuring frictional torque



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.

7 Circlip
- Re-determining thickness => Fig. 8

8 Flange ring
- Installation position => Page 107

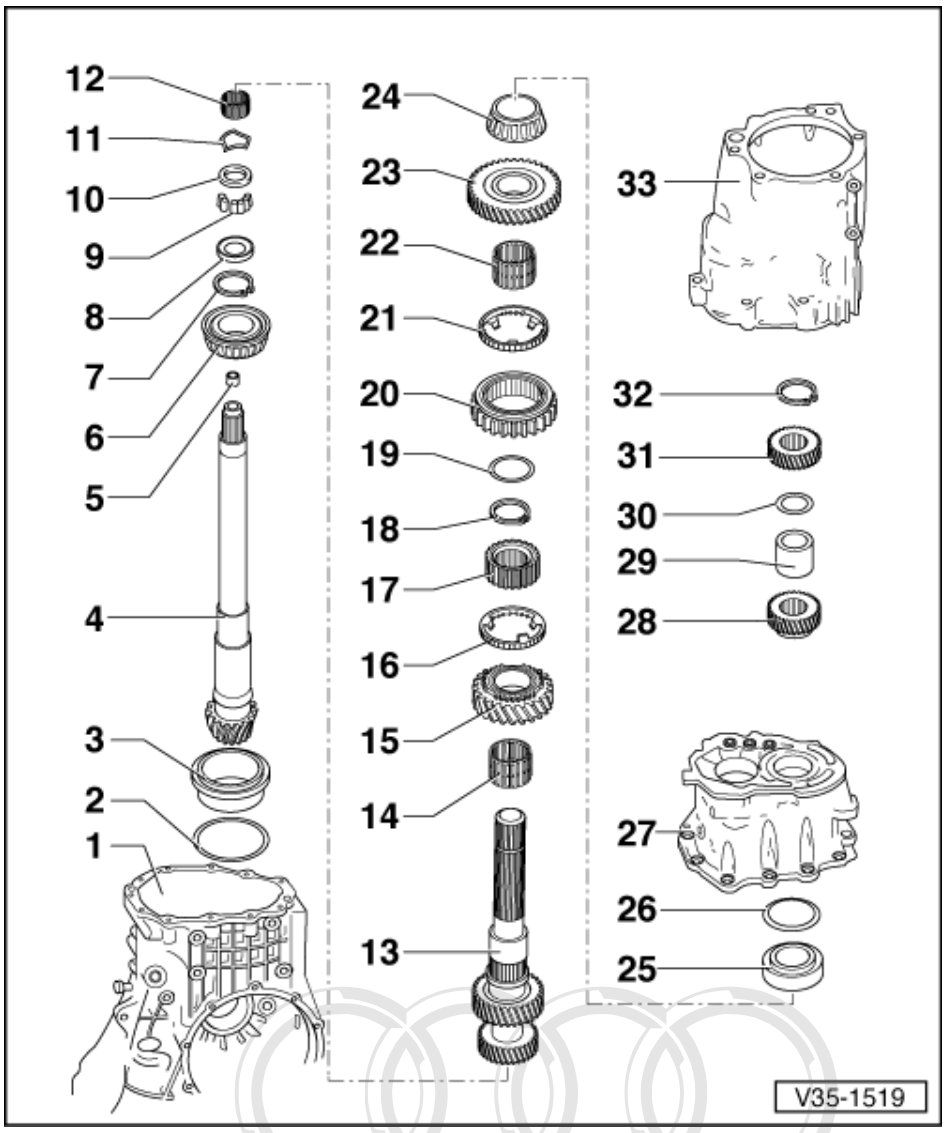
9 Taper rollers
- Qty. 23
- Installation position => Page 107

10 Supporting ring
- Installation position => Page 107

11 Corrugated spring

12 Needle roller bearing of drive pinion/hollow shaft
- Oil before installing

13 Hollow shaft with 3rd and 4th gears1)



14 Needle roller bearing for 2nd speed sliding gear

- Split
- Oil with gear oil before installing

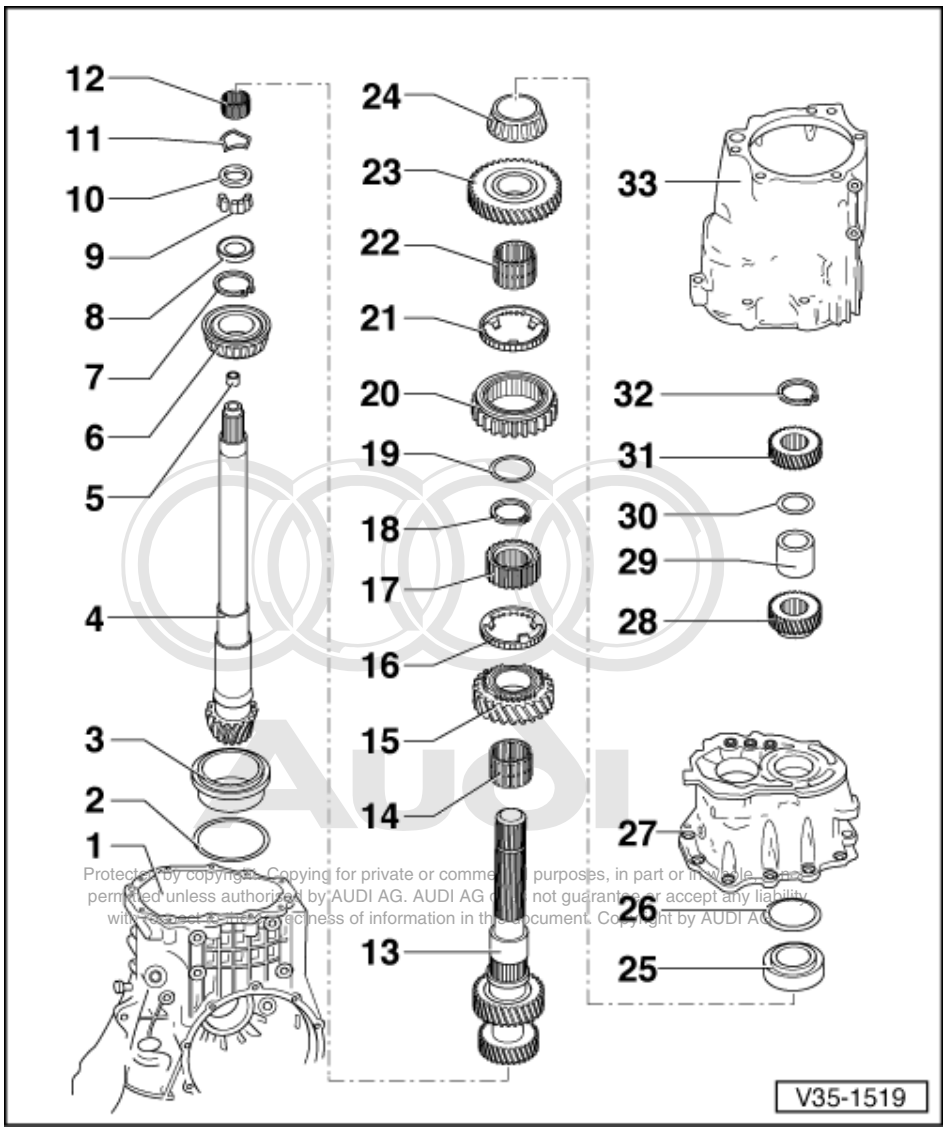
15 2nd gear sliding wheel

- Pressing off => Fig. 12
- Before installing, fit spring and slide needle roller bearing onto hollow shaft
- After installing, check axial clearance with a feeler gauge (0.15 ... 0.35 mm)

16 Synchro-ring for 2nd gear

- Coated with molybdenum
- Checking for wear => Fig. 175

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.



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.

17 Synchro-hub for 1st and 2nd gear

- Pressing off => Fig. 12
- Pressing on => Fig. 13
- Installation position: Flush hub towards 2nd speed sliding gear

18 Circlip

- Removing and installing => Fig. 11
- Re-determining thickness => Fig. 8

19 Washer

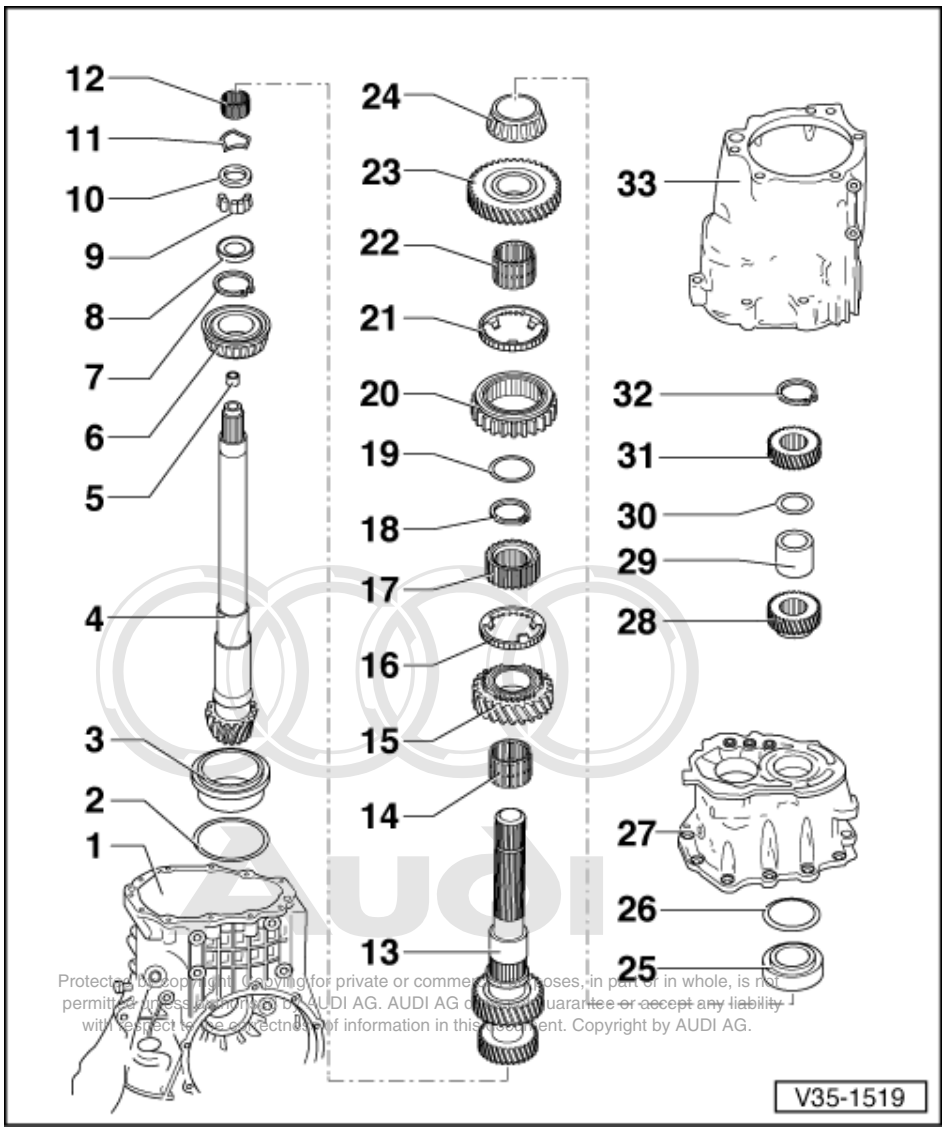
- Removing and installing => Fig. 11

20 Locking collar, 1st and 2nd gear

- Installation position: Splines for reverse gear facing synchro-ring for 2nd gear

21 Synchro-ring for 1st gear

- Checking for wear => Fig. 175



22 Needle roller bearing for 1st speed sliding gear

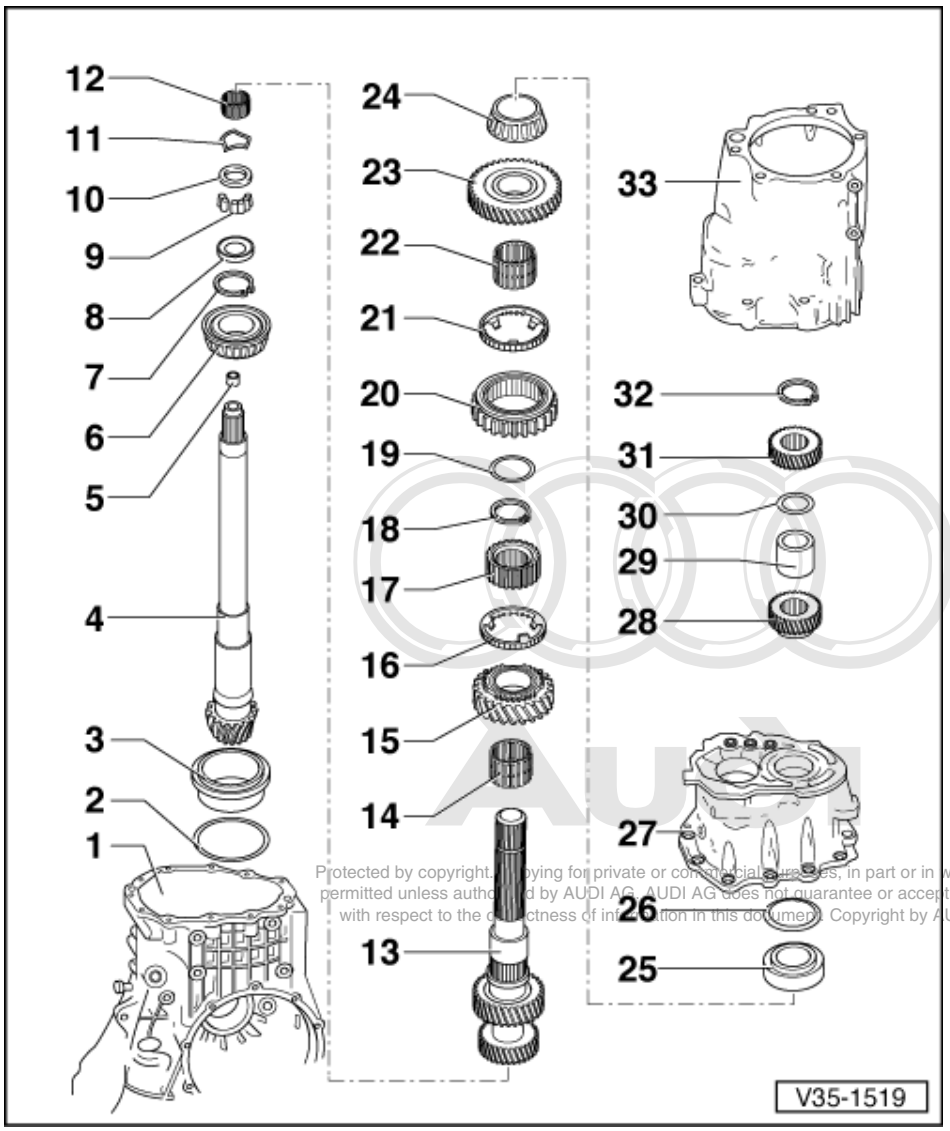
- Oil with gear oil before installing

23 1st speed sliding gear

- With wider sliding gear for 1st gear from gearbox serial number 77645 =>Fig. 17
- Before installing insert spring => Fig. 175
- After pressing on -Item 24 -, check axial clearance

24 Inner race for small taper roller bearing 1)

- Pressing off => Fig. 9
- Pressing on => Fig. 10
- Low friction bearing; do not oil when measuring frictional torque



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.

25 Outer race for small taper roller bearing 1)

- Driving out => Fig. 15
- Pressing in =>Fig. 16

26 Shim "S4"

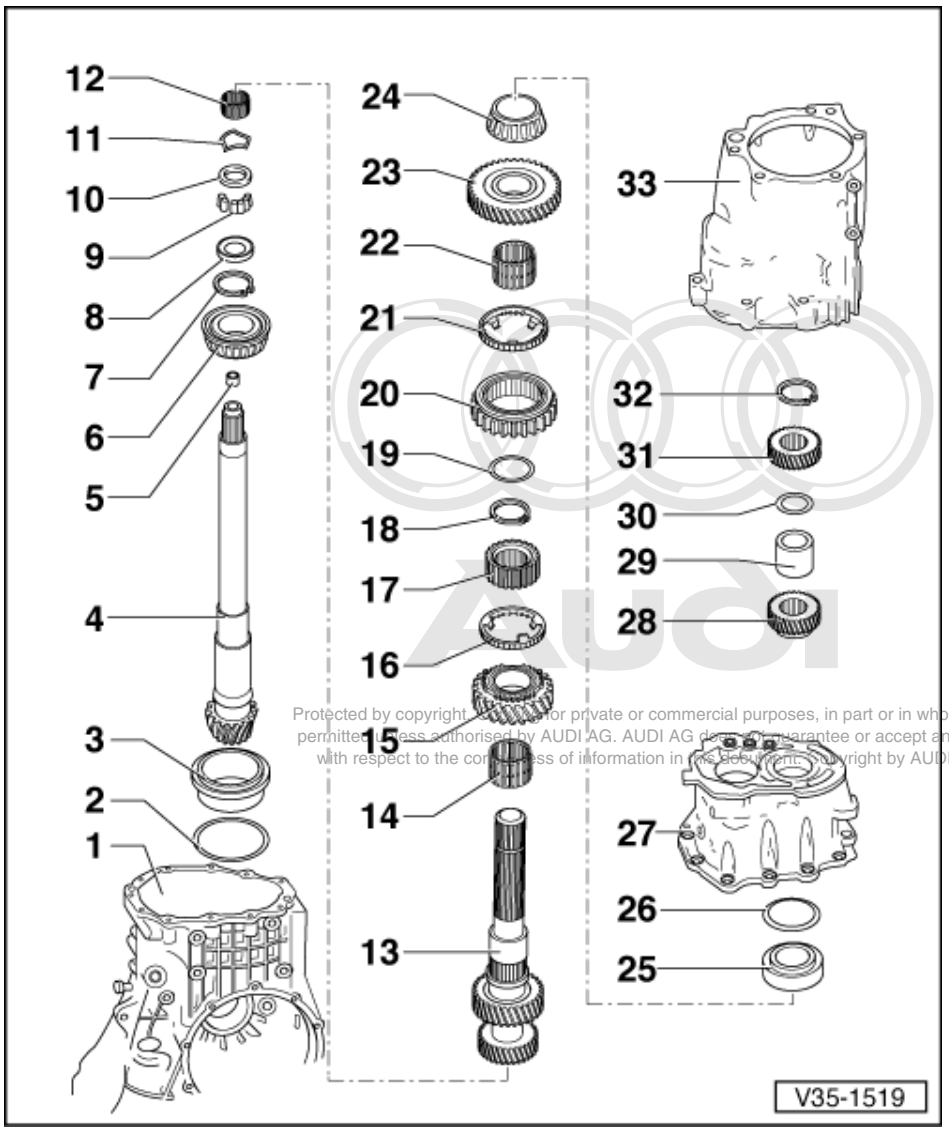
- Adjustment overview => Page 213

27 Bearing plate 1)

- Modified bearing plate with identification cut from gearbox serial number 77645 =>Fig. 141
- Servicing => Page 137

28 6th gear wheel

- Not fitted in 5-speed gearboxes
- Pressing off => Page 108
- Pressing on => Page 108
- Installation position: Shoulder towards inner race for small taper roller bearing



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.

29 Spacer sleeve

- Different versions for 5-speed and 6-speed gearboxes => Page 95

30 Shim

- Re-determining thickness => Page 114

31 5th gear wheel

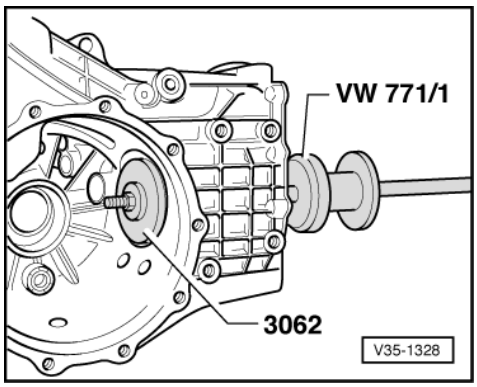
- Pulling off => Page 103
- Driving on => Page 116

32 Circlip for 5th gear wheel

- Re-determining thickness => Page 116

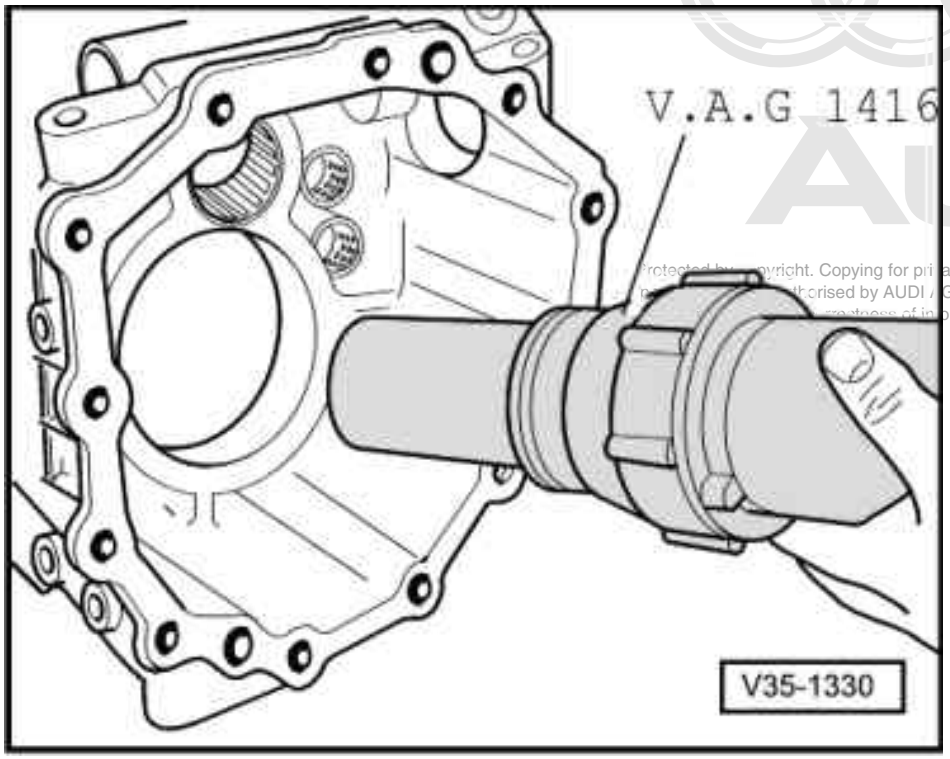
33 End cover

- Servicing => Page 131



-> Fig.1 Pulling out outer race for large taper roller bearing

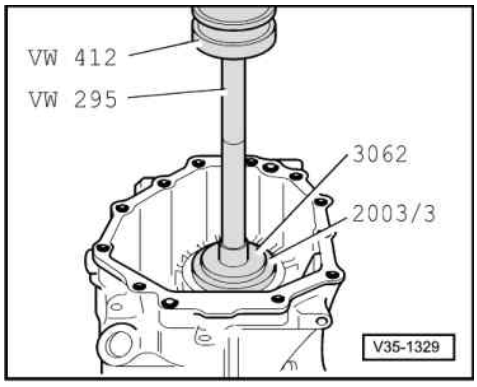
- Stepped side of thrust pad 3062 rests against the outer race



rotected by copyright. Copying for private or commercial purposes, in part or in whole, is not
thorised by AUDI AG. AUDI AG does not guarantee or accept any liability
rrectness of information in this document. Copyright by AUDI AG.

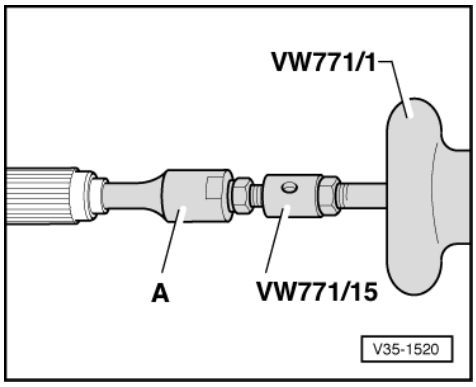
-> Fig.2 Heating gearbox housing in order to fit outer race for taper roller bearing

- Heat gearbox housing in area of bearing seat for approx. 15 minutes, to approx. 100 oC, with a hot air blower.



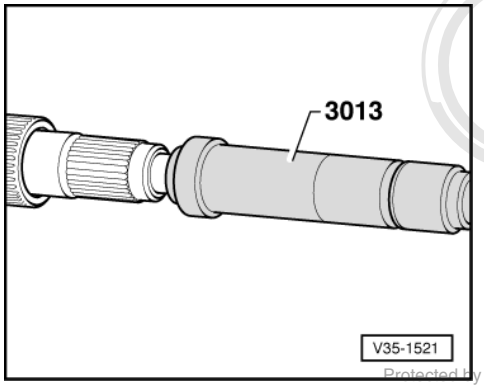
-> Fig.3 Inserting outer race for large taper roller bearing in gearbox housing and press home

- Insert outer race only after heating gearbox housing and push into position for 1 ... 2 minutes under a repair press until a heat exchange has taken place.



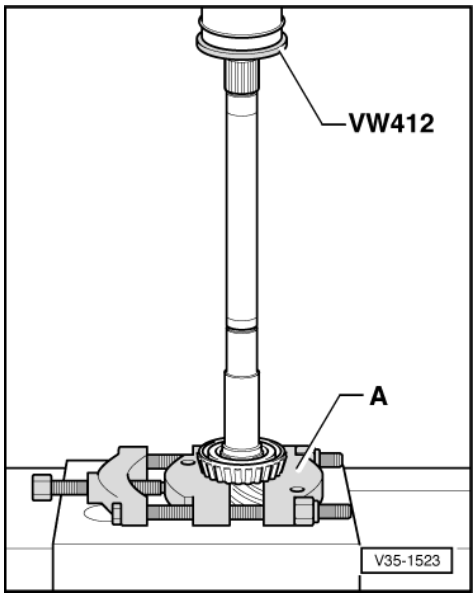
-> Fig.4 Removing needle roller bearing for flange shaft/drive pinion

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



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.

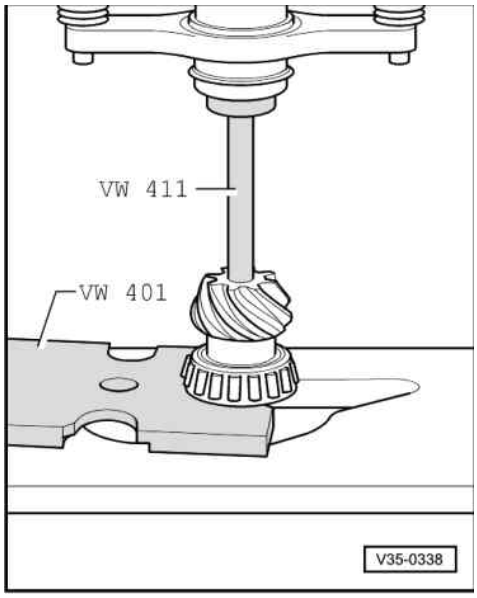
-> Fig.5 Inserting needle roller bearing for flange shaft/drive pinion flush



-> Fig.6 Pressing off inner race for large taper roller bearing

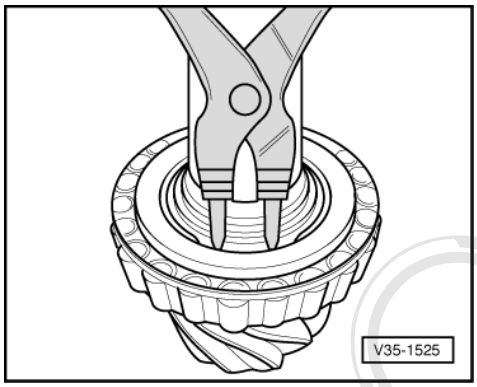
A - Separating device 22 ... 115 mm, e.g. Kukko 17/2

- Bearing is destroyed when pressing off



-> Fig.7 Pressing on inner race for large taper roller bearing

- Heat inner race to approx. 100 oC and fit.
- Press home ensuring there is no axial play.



-> Fig.8 Determining size of circlip for taper roller bearings for drive pinion

- Determine the thickest circlip that can still just be fitted.
- Determine circlip from table. Part numbers

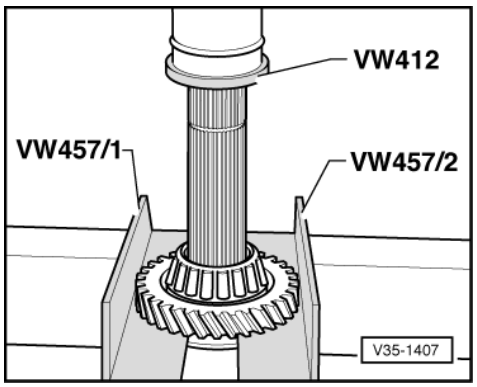
=> Parts Catalogue

Available circlips

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.

Circlip thickness (mm)		
2.34	2.40	2.46
2.36	2.42	2.48
2.38	2.44	

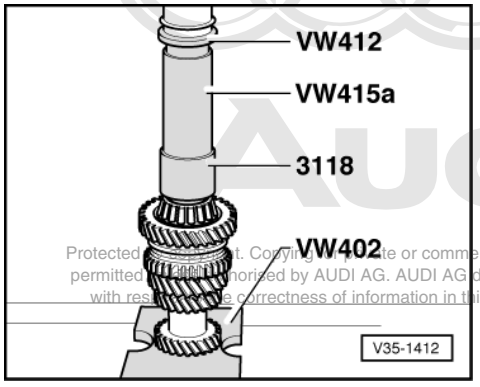
- Fit circlip.



-> Fig.9 Pressing off inner race of small taper roller bearing for drive pinion together with 1st speed sliding gear

Note:

Do not press off together with synchro-hub for 1st and 2nd gear and 2nd speed sliding wheel.



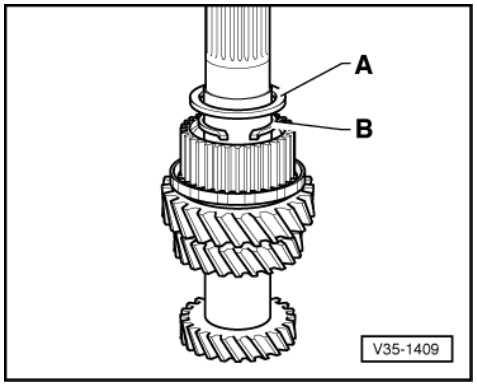
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.10 Pressing on inner race of small taper roller bearing for drive pinion together with 1st speed sliding gear

- Install circlip, washer for 1st speed sliding gear, synchro-ring for 1st gear and 1st speed sliding gear together with spring and needle roller bearing.
- Heat inner race to approx. 100 oC and fit.
- Press home ensuring there is no axial play.

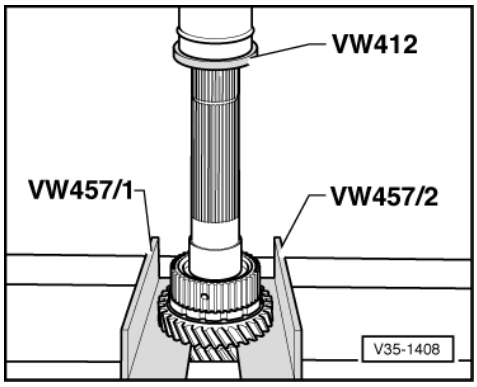
Notes:

- Press down only on bearing inner race with collar of thrust pad 3118.
- Position shoulder of pipe section VW 415 A facing up towards press tool VW 412
- After pressing on, check axial play of 1st speed sliding gear.



-> Fig.11 Removing and installing circlip of synchro-hub and washer of 1st speed sliding gear

- To remove circlip, take off washer -A- and then circlip -B-.
- To install circlip, fit on circlip -B- and then washer -A-.

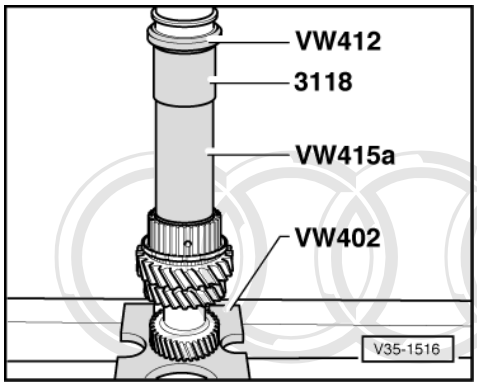


-> Fig.12 Pressing off 2nd speed sliding wheel with synchro-hub for 1st and 2nd gear

- Take off locking collar for 1st and 2nd gear and synchro-ring for 1st gear.
- Remove washer and circlip for synchro-hub.
- Press off 2nd speed sliding wheel with synchro-hub for 1st and 2nd gear

Note:

Do not press off together with 1st speed sliding gear and inner race of small taper roller bearing.



-> Fig.13 Fitting 2nd speed sliding gear, pressing on synchro-hub for 1st and 2nd gear

- Fit needle roller bearing (split), sliding gear (with spring) and synchro-ring for 2nd gear.
- Oil needle roller bearing.
- Heat synchro-hub to approx. 100 oC and fit.
- Press home ensuring there is no axial play.

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

Notes:

- Fit on pipe section VW 415 A with shoulder facing synchro-hub.
- Position thrust pad 3118 with shoulder facing press tool VW 412.

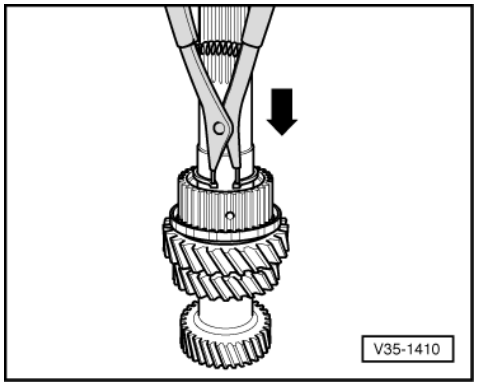


Fig.14 -> Determining size of circlip for synchro-hub for 1st and 2nd gear

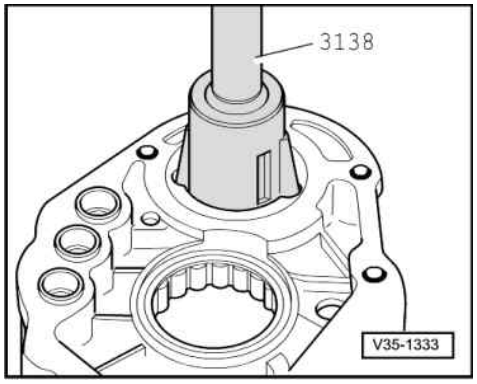
- Determine the thickest circlip that can still just be fitted.
- Determine circlip from table. Part numbers

=> Parts Catalogue

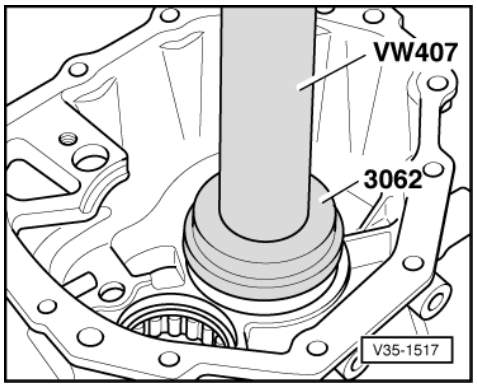
Available circlips

Circlip thickness (mm)		
1.90	1.96	2.02
1.93	1.99	

- Insert circlip in direction of arrow to synchro-hub.



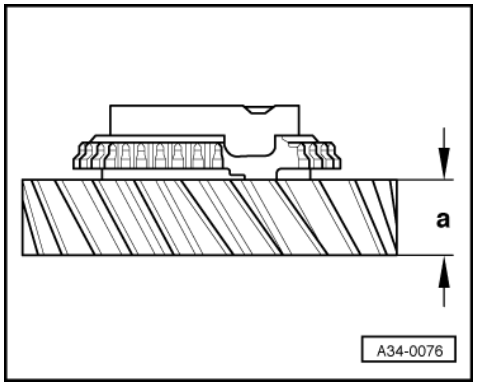
-> Fig.15 Driving out outer race for small taper roller bearing



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.

-> Fig.16 Pressing in outer race for small taper roller bearing

- Insert shim "S4" into bearing flange behind bearing seat.
- Position thrust pad 3062 with shoulder facing press tool VW 407.
- Pressing in outer race for small taper roller bearing onto stop



-> Fig.17 Width of 1st speed sliding gear

A wider gearwheel for 1st gear in conjunction with the wider 1st speed sliding gear is used from gearbox serial number 77645.

Assignment:

- Up to gearbox serial number 77644 narrow 1st speed sliding gear:

  Dimension a = 18 mm

- From gearbox serial number 7764 wide 1st speed sliding gear:

  Dimension a = 22 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, Differential rear

1 - Replacing flange shaft oil seal

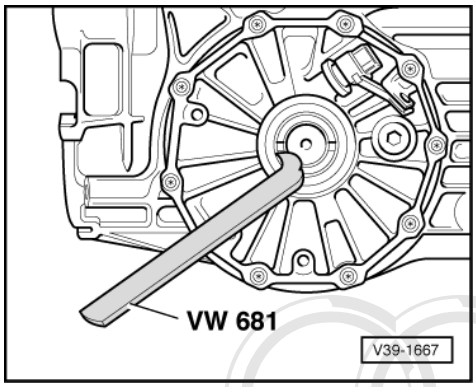
1.1 - Replacing flange shaft oil seal

- Gearbox installed

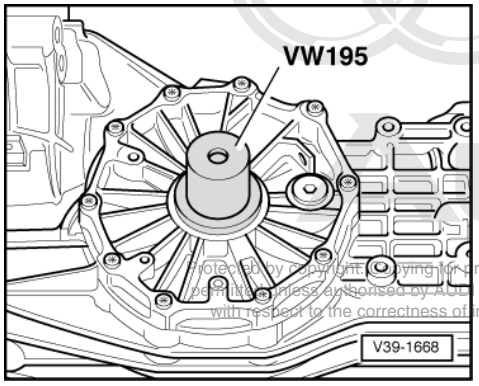
Note:

Illustrated, removing and installing oil seal on left-hand side.

- Remove heat shield.
- Disconnect drive shaft.
- Place oil collection pan underneath.
- Remove flange shaft, secure with a drift to prevent it turning.



- -> Pull seal out with lever VW 681.



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.

- Pack space between sealing and dust lips with multi-purpose grease.
- Lightly oil outer circumference of seal.
- -> Drive in flange shaft oil seal.
  - Insertion depth: 5 mm
- Install flange shaft and drive shaft.

Tightening torques

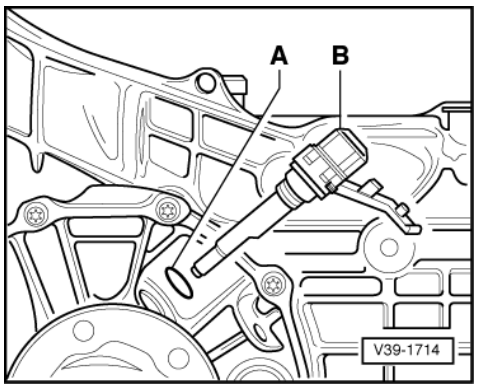
Components	Nm
Flange shaft to gearbox	10 + 90o
Drive shaft to flange shaft	80

2 - Removing and installing speedometer sender -G22 and drive wheel for speedometer sender

2.1 - Removing and installing speedometer sender -G22 and drive wheel for speedometer sender

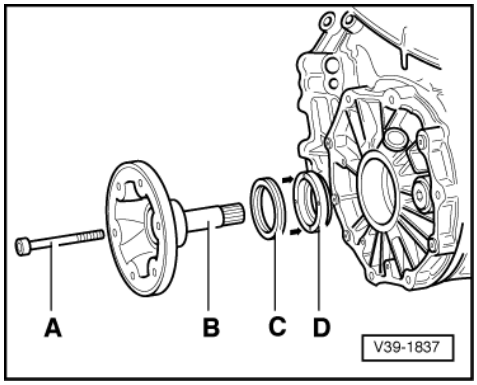
- Gearbox installed

Removing and installing speedometer sender -G22



- -> Pull connector off sender -B-.
- Push down clip holding sender, rotate, and pull out sender.
- Replace O-ring -A-.

Removing and installing drive wheel for speedometer sender -G22



Removing:

- Detach drive shaft from left flange shaft -B-.
- -> Unscrew bolt -A-. Secure flange shaft with drift to prevent it turning.
- Remove flange shaft and seal -C-.
- Remove drive wheel for speedometer sender -D- by alternately levering on the follower lugs -arrows- with a screwdriver.

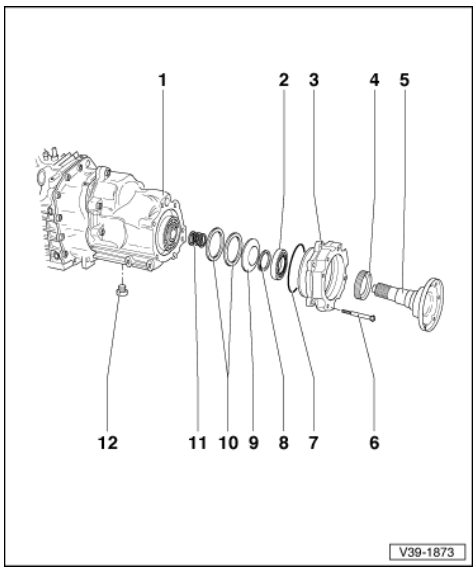
Installation:

- Install drive wheel for speedometer sender so that follower lugs -arrows- face towards seal.
- Follower lugs engage in differential housing grooves.
- Replace flange shaft oil seal and install flange shaft => Page 193 .
- Checking oil level in manual gearbox => Page 81 .

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 - Replacing oil seal and grooved ball bearing for flange of propshaft and gearbox

3.1 - Replacing oil seal and grooved ball bearing for flange of propshaft and gearbox



- Gearbox installed

Note:
Removing and installing propshaft =>Page 229 .

1 Gearbox

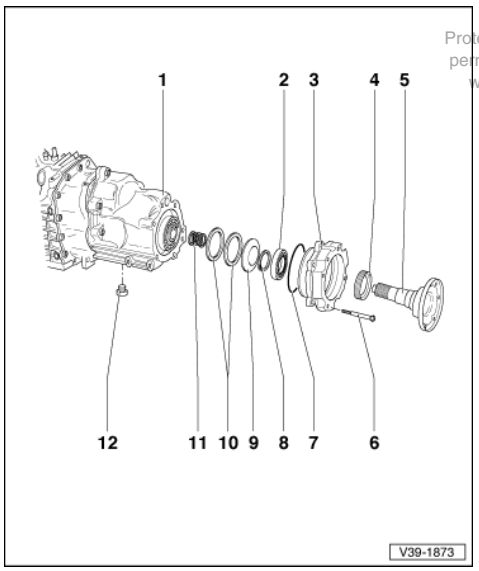
2 Grooved ball bearing

3 Bearing housing at vibration damper

4 Oil seal

- Pressing in =>Page 198

5 Flange shaft



6 Bolt - 25 Nm

- Qty. 6

7 O-ring

- Always replace

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.

8 Circlip
9 Dished washer
- Mark installation position when removing: Large diameter (concave side) facing shims -Item 10 -

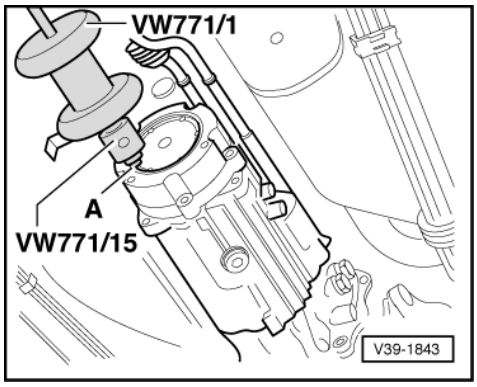
10 Washers
11 Spring
12 Oil drain plug - 40 Nm

Removing

- Place oil collection pan underneath.
- Unscrew rear oil drain plug (at end cover) and drain gear oil.
- Unscrew bolts attaching bearing housing.

Note:

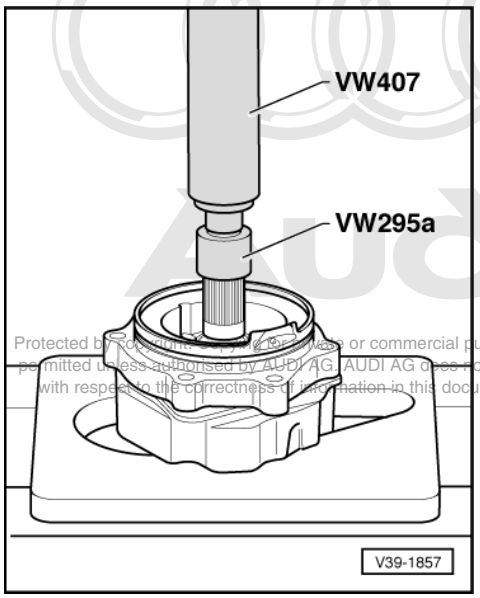
Bearing housing is pressed slightly off end cover by spiral spring when mounting bolts are slackened.



- -> Pull flange shaft together with bearing housing and vibration damper off end cover.

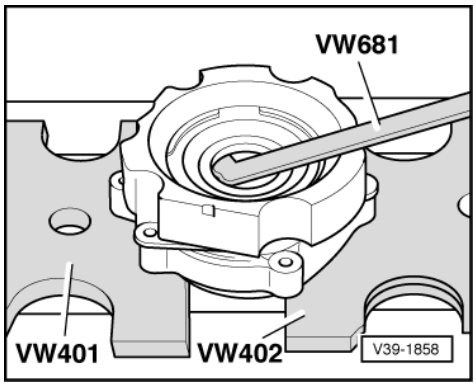
A - Stud M8/M10

- Take off bearing housing.

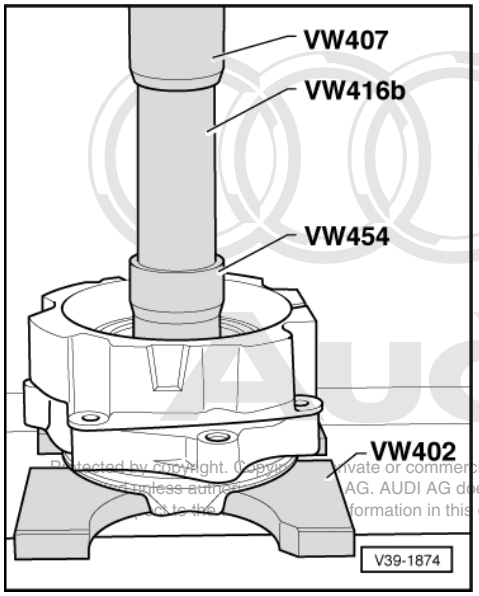


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove circlip from flange shaft.
- -> Press out flange shaft.

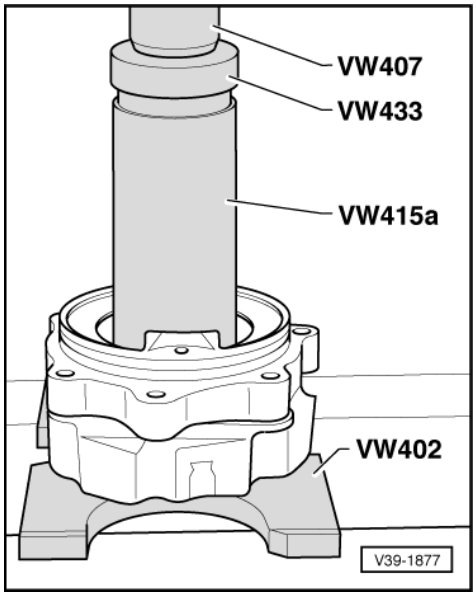


- -> Pull out flange shaft oil seal.
- Thoroughly clean seat for oil seal.



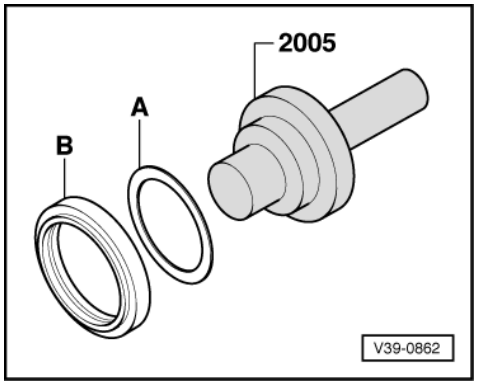
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Press out grooved ball bearing.

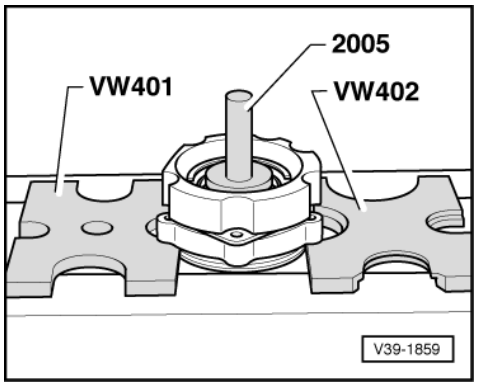


Installation

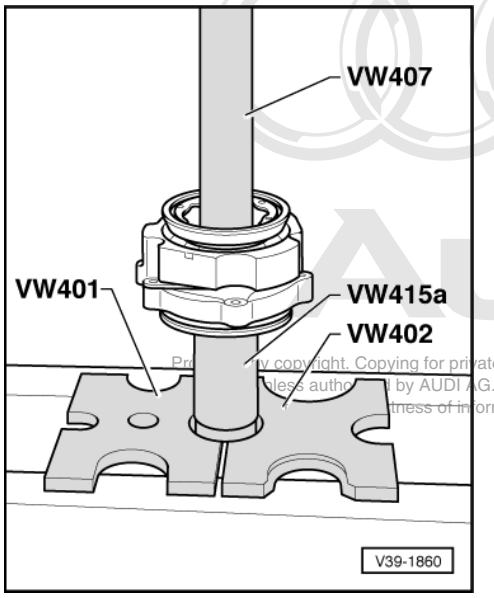
- -> Press grooved ball bearing into bearing housing.



- -> Lightly oil diameter of seal -B-.
- Pack space between sealing lips with grease
- Fit seal together with washer -A- Part No. 016 311 391 B (thickness 1.7 mm) onto drift 2005.
  - Installation position: Open side of oil seal faces towards gearbox



- -> Drive in flange shaft oil seal.
- Take off washer after inserting seal.



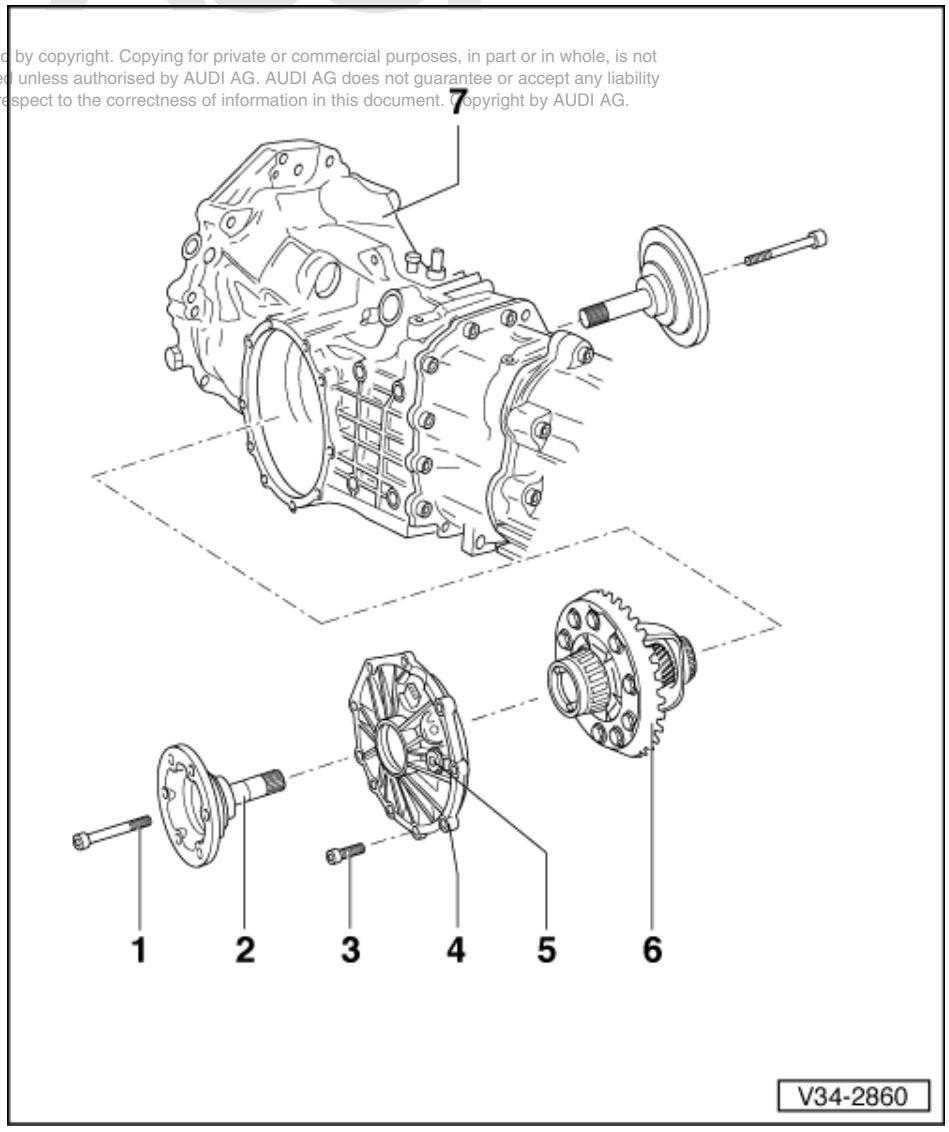
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Press in flange shaft.
- Fit circlip onto flange shaft.
- Lightly oil O-ring and insert into groove of bearing housing.
- Insert dished washer and shims into bearing housing.
  - Installation position => Page 196 .
- Fit spiral spring onto flange shaft.
- Tighten bolts attaching bearing housing in stages and diagonally.
- Checking oil level in manual gearbox => Page 81 .

4 - Removing and installing differential

4.1 - Removing and installing differential

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:
Removing and installing is possible with gearbox installed.

1 Bolt - 10 Nm + 1/4 turn (90o) further

2 Flange shaft

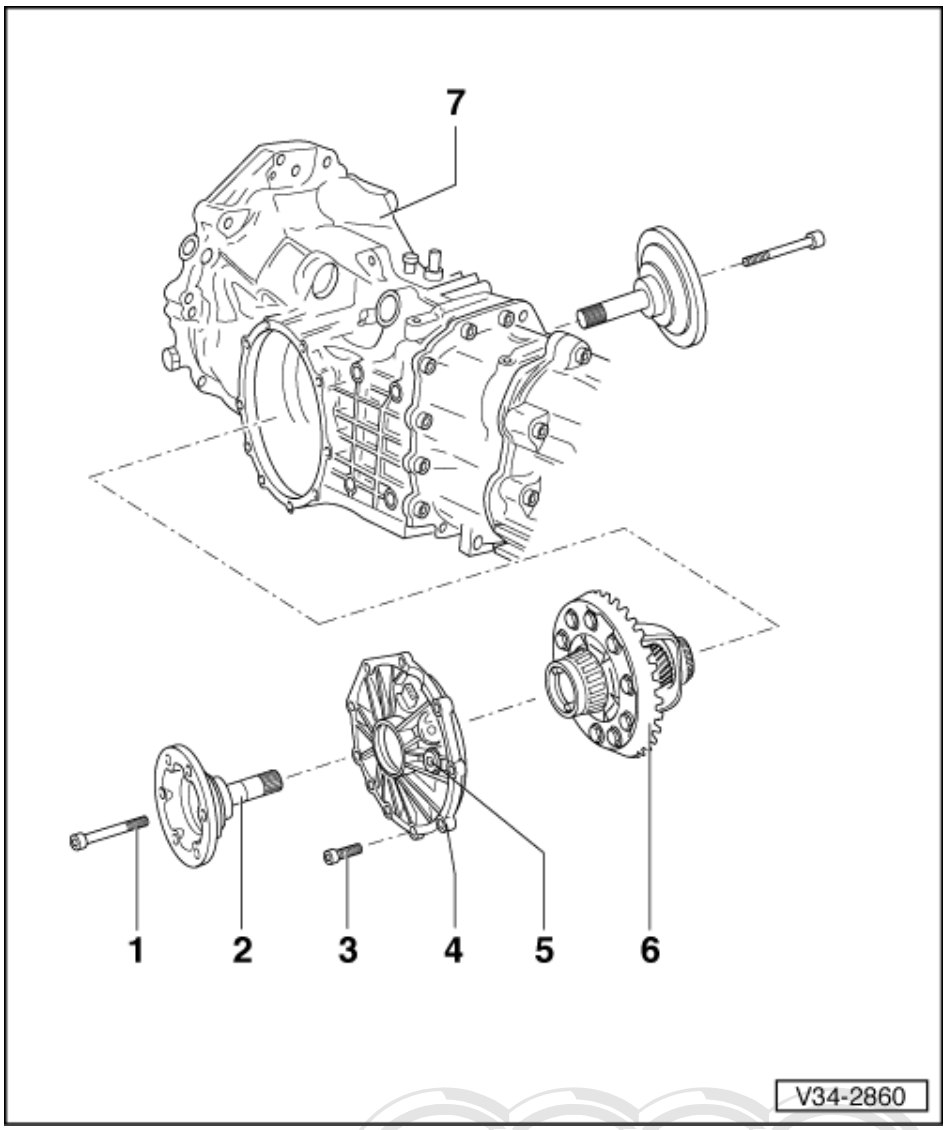
- When removing, secure with a drift to prevent it turning

3 Bolt - 25 Nm

- Qty. 10

4 Final drive cover

- Removing and installing drive wheel for speedometer sender -G22 => Page 194
- If replaced: Adjust crown wheel =>Page 221



5 Oil filler plug - 40 Nm

- Checking oil level in manual gearbox => Page 81 .

6 Differential

- Dismantling and assembling =>Page 201
- If replaced: Adjust crown wheel =>Page 221

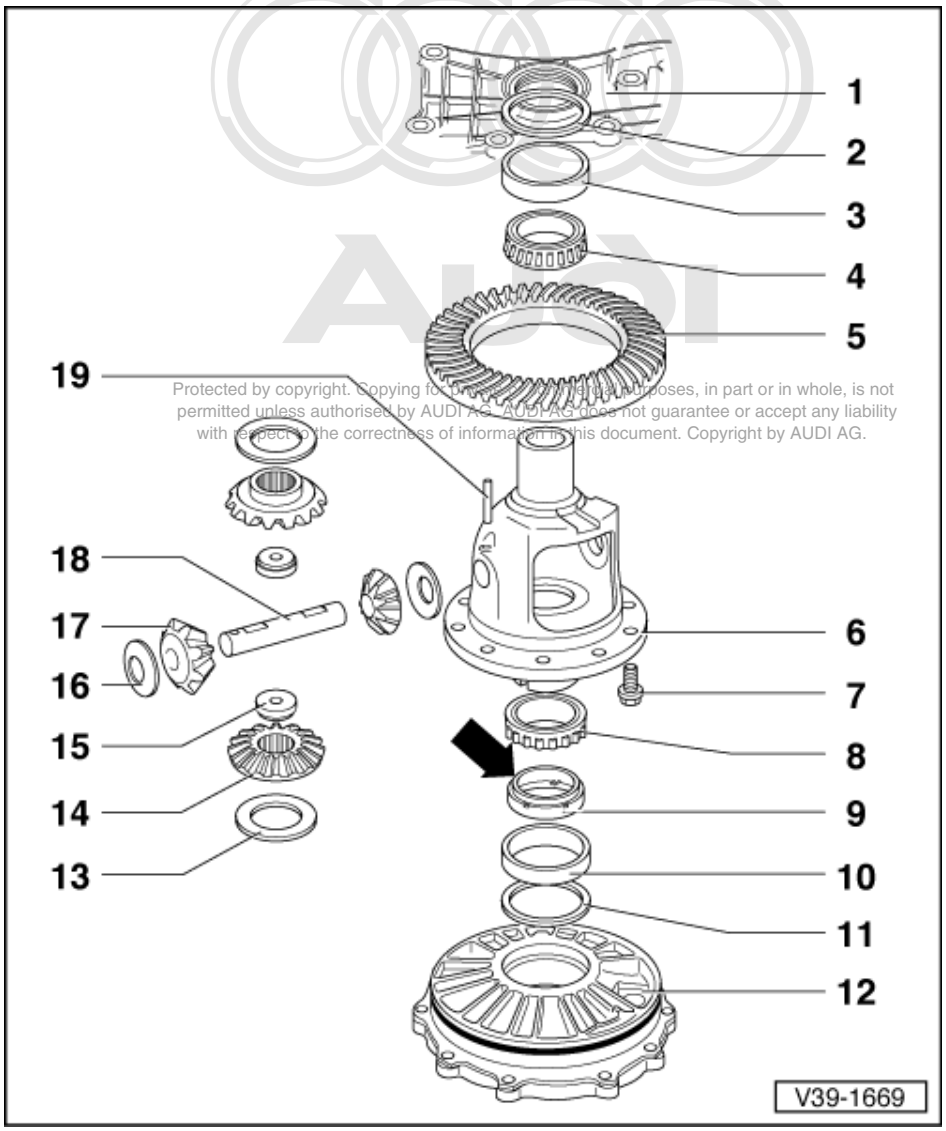
7 Gearbox housing

- Servicing => Page 148

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.

5 - Dismantling and assembling differential

5.1 - Dismantling and assembling differential



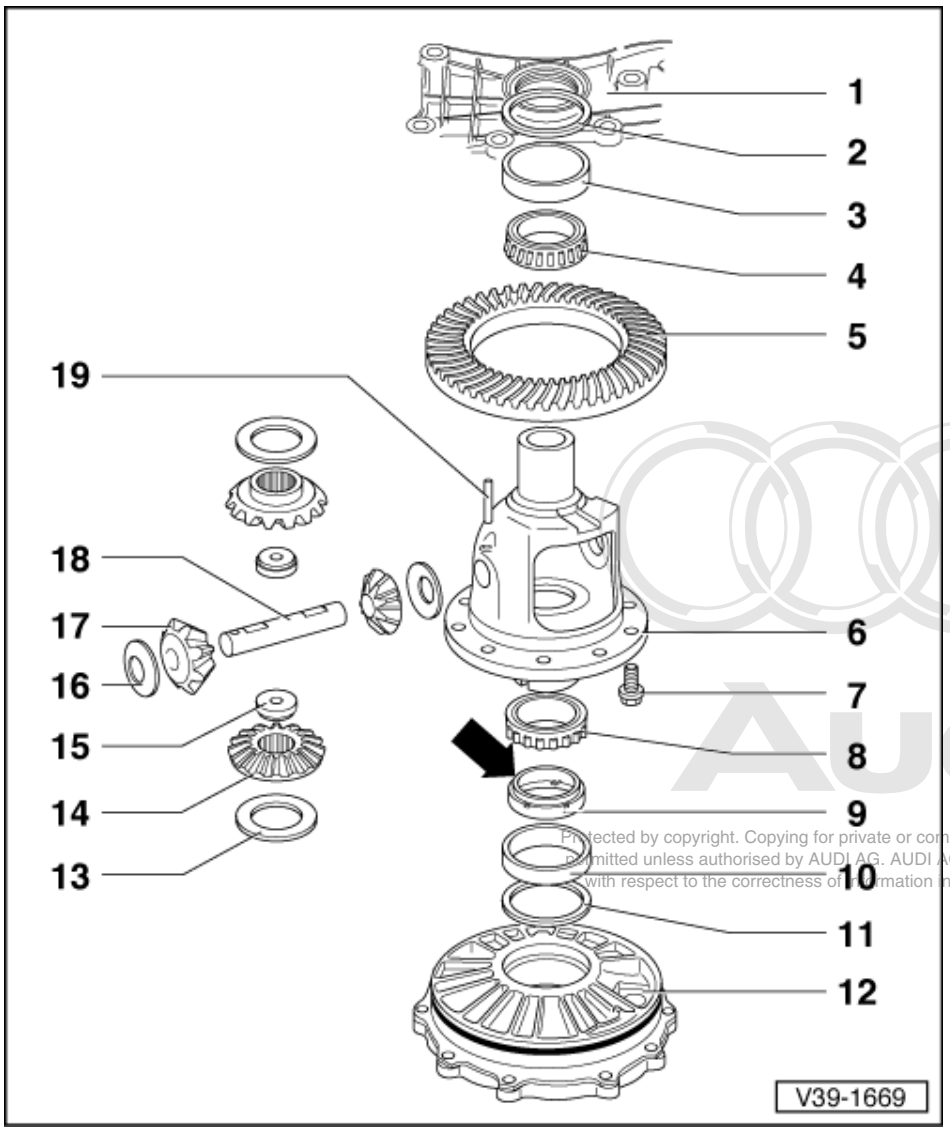
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- Removing and installing differential =>Page 199 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 213 .

1 Gearbox housing 1)

2 Shim "S2"
- Note thickness
- Adjustment overview => Page 213



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 Outer race for small taper roller bearing 1)

- Driving out => Fig. 9
- Driving in => Fig. 10

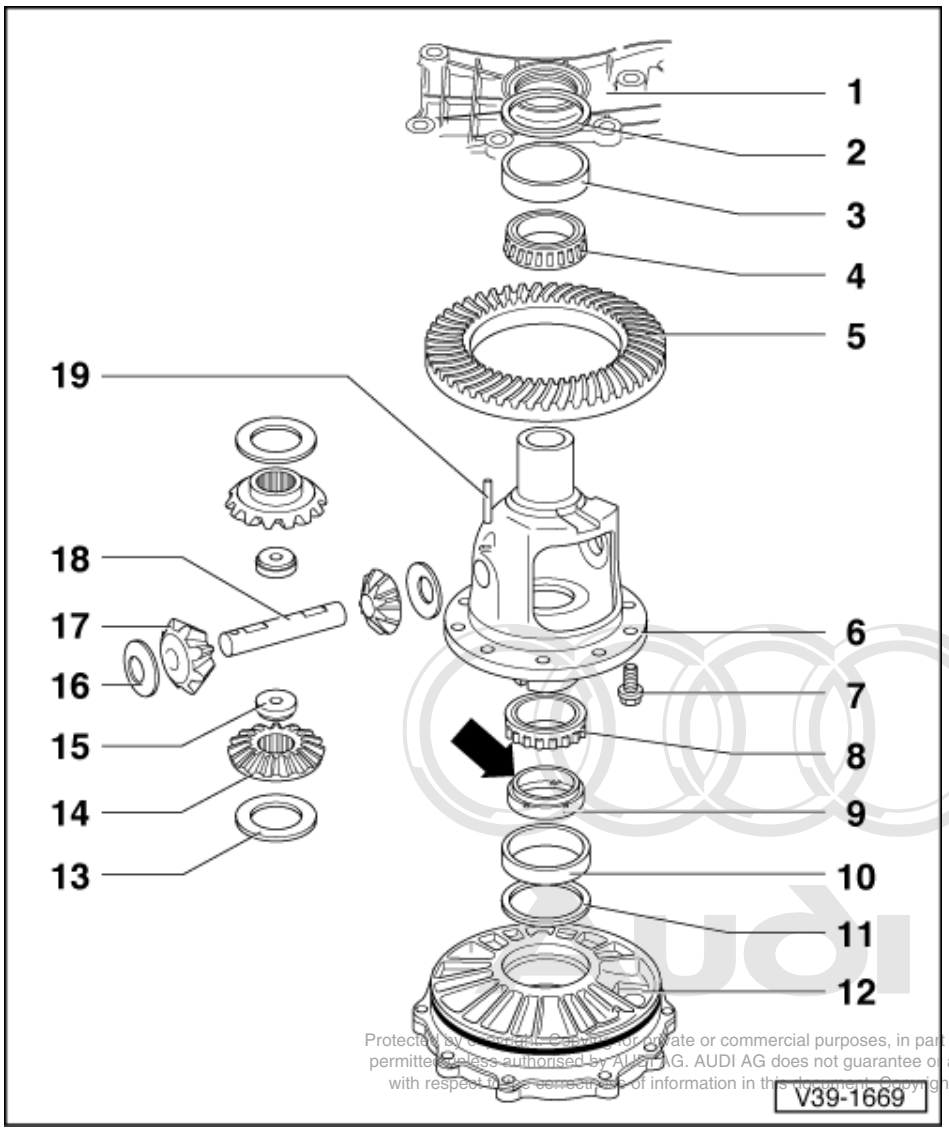
4 Inner race for small taper roller bearing 1)

- Pulling off => Fig. 1
- Pressing on => Fig. 3
- Low friction bearing; do not oil when measuring frictional torque

5 Crown wheel 1)

- Paired with drive pinion (final drive set)
- Removing => Fig. 5
- Installing => Fig. 6

6 Differential housing 1)



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.

7 Crown wheel bolt - 60 Nm + 1/8 turn (45o) further

- Always replace
- Use only genuine bolts

8 Inner race for large taper roller bearing 1)

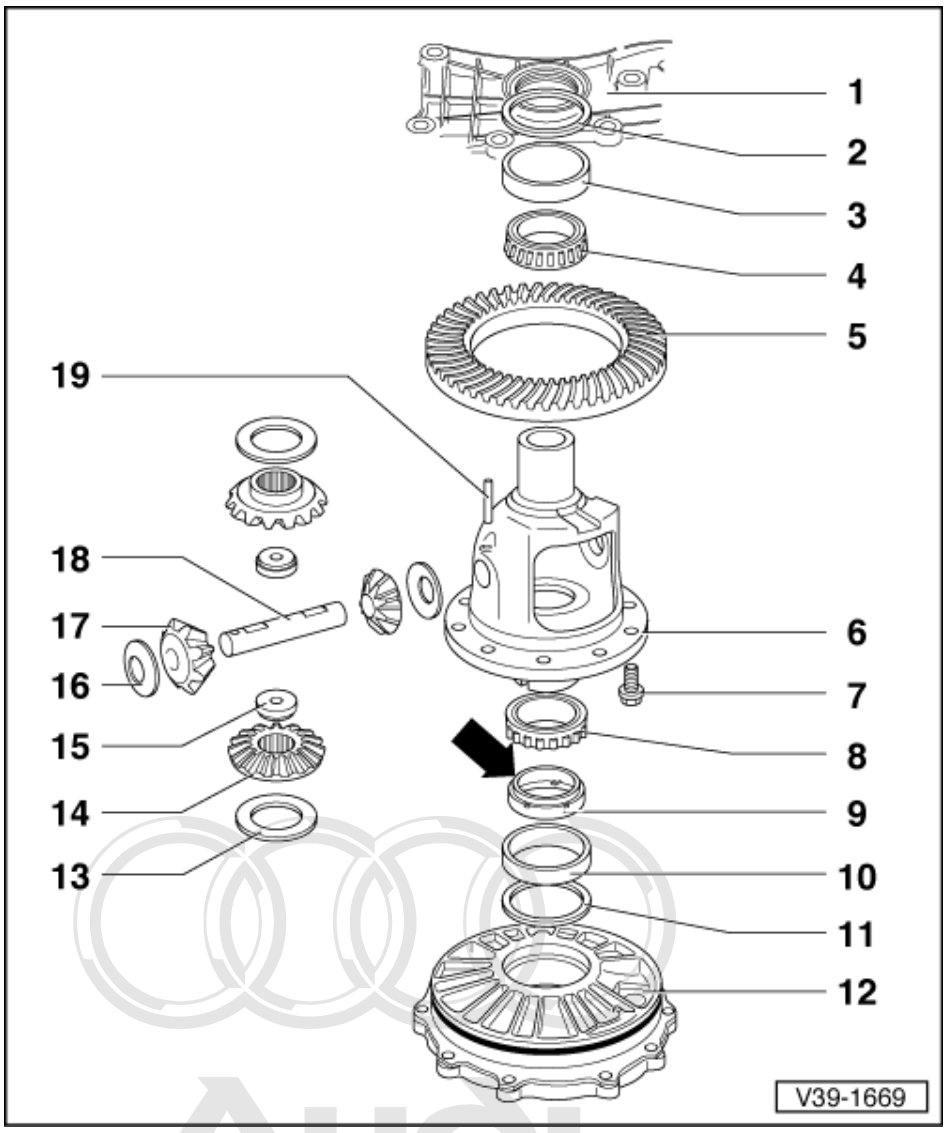
- Pulling off => Fig. 2
- Pressing on => Fig. 4
- Low friction bearing; do not oil when measuring frictional torque

9 Drive wheel

- For speedometer sender
- Removing and installing => Page 194
- Installation position: Shoulder -arrow- towards differential

10 Outer race for large taper roller bearing 1)

- Driving out => Fig. 11
- Driving in => Fig.12



11 Shim "S1"

- Note thickness
- Adjustment overview => Page 213

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.

12 Cover for final drive 1)

13 Shims

- Re-determining thickness => Fig. 8

14 Sun wheels

- Adjusting => Fig. 8

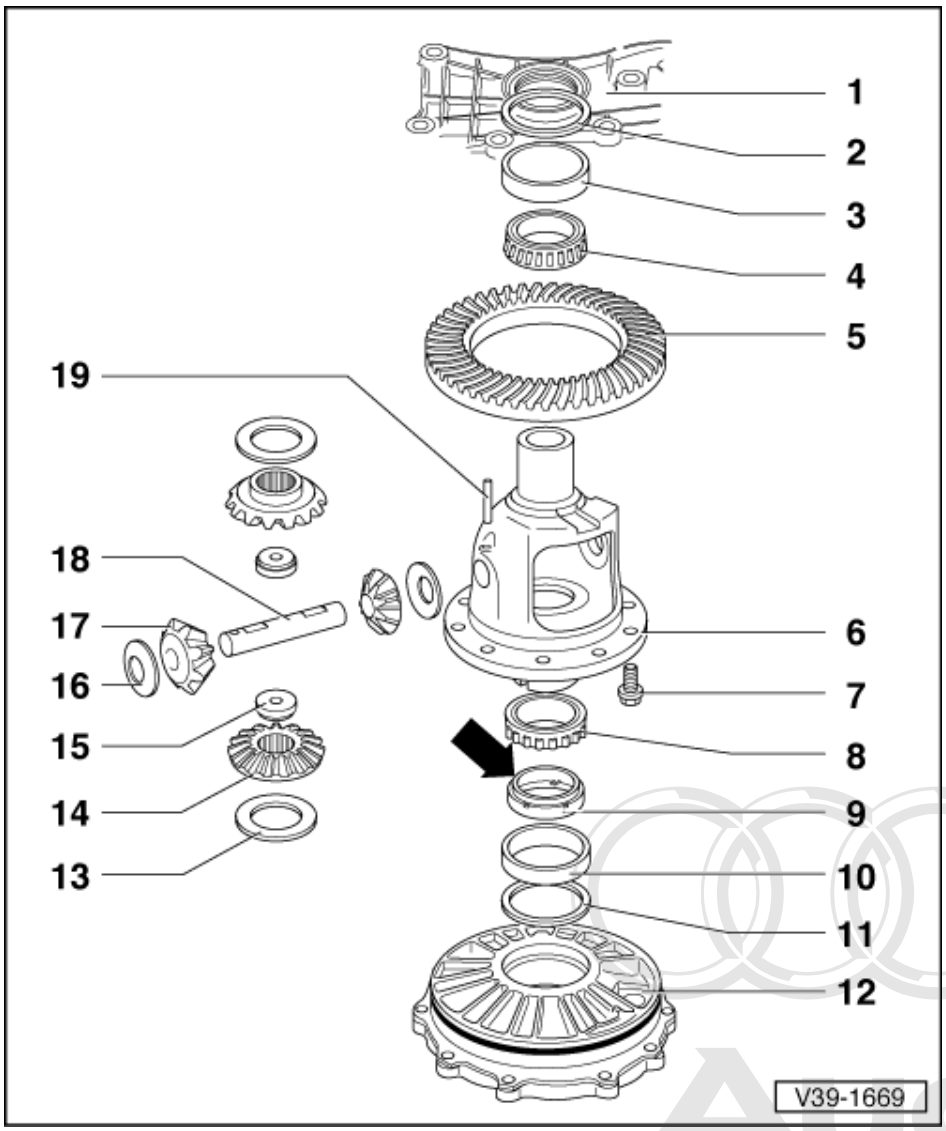
15 Threaded piece

16 Thrust washer

- Check for cracks and chipping

17 Planet wheels

- Installing => Fig. 7



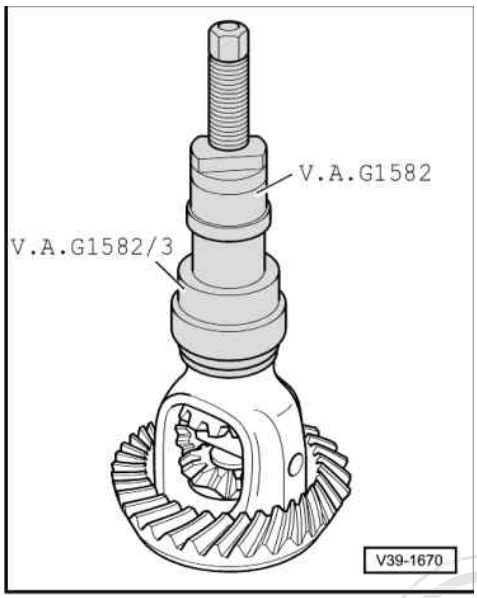
18 Shaft for bevel gears

- Drive out with drift after removing spring pin
- Before driving in, align thrust washers

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.

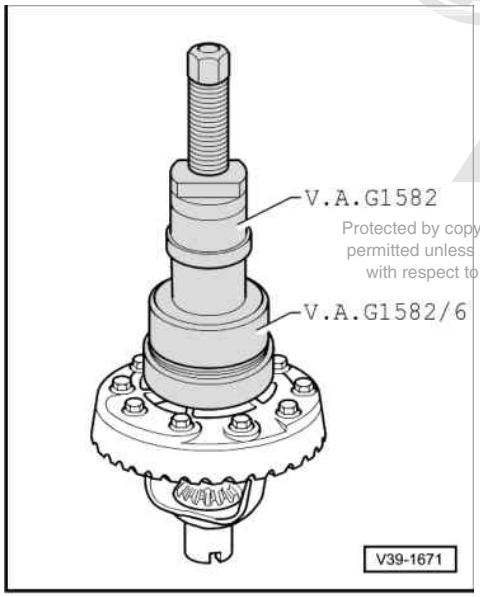
19 Spring sleeve

- Drive in flush



-> Fig.1 Pulling inner race for small taper roller bearing out of housing

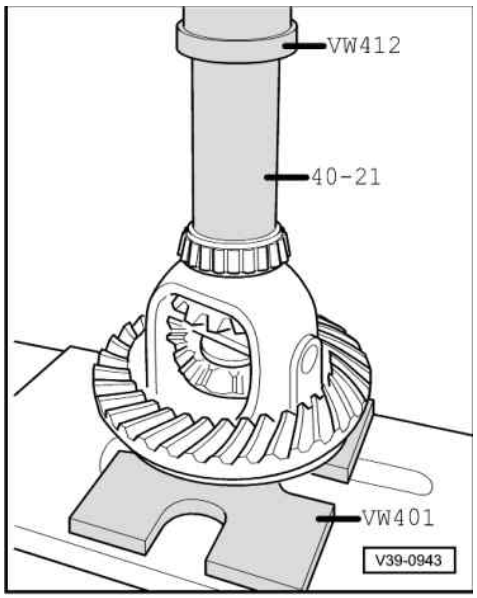
- Fit thrust plate 40-105 before fitting puller.



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.

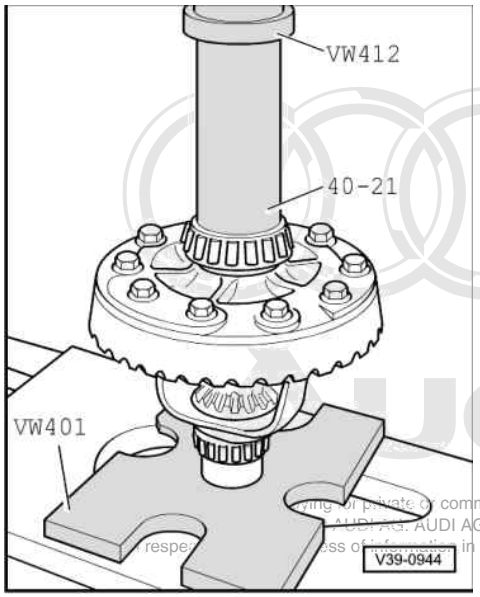
-> Fig.2 Pulling inner race for large taper roller bearing out of housing

- Fit thrust plate 40-105 before fitting puller.



-> Fig.3 Pressing on inner race for small taper roller bearing

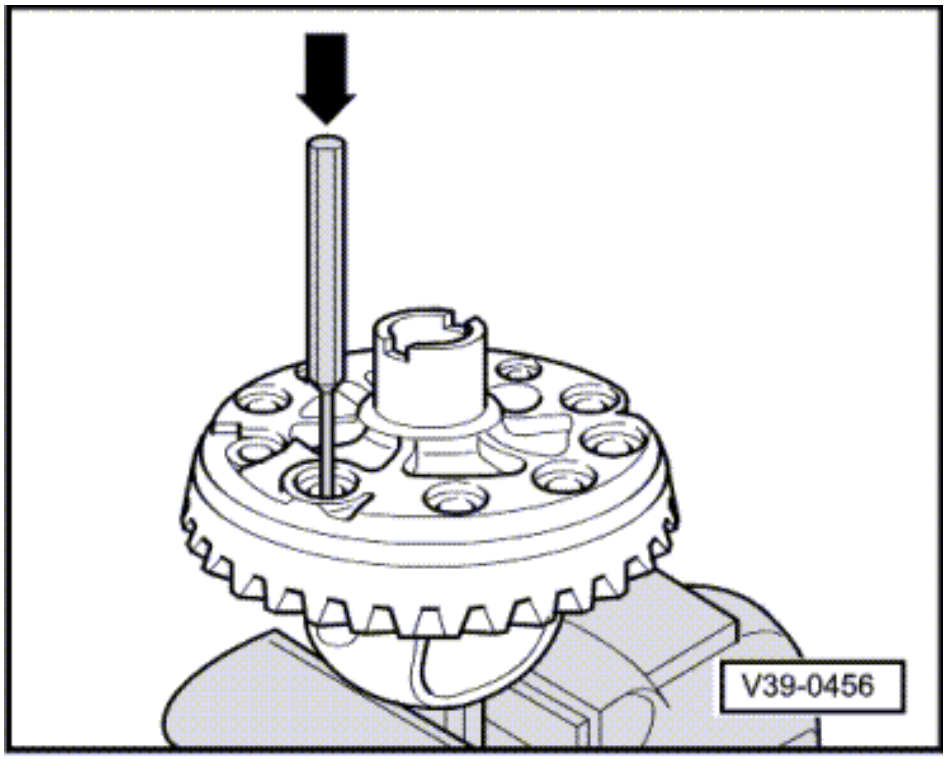
- Heat inner race for small taper roller bearing to approx. 100oC.
- Fit inner race and press home.



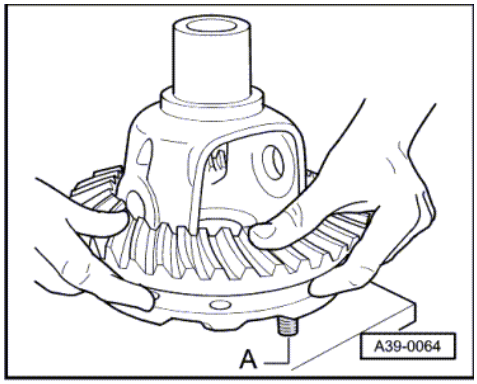
ing for private or commercial purposes, in part or in whole, is not
AUDI AG. AUDI AG does not guarantee or accept any liability
respect
ss of information in this document. Copyright by AUDI AG.

-> Fig.4 Pressing on inner race for large taper roller bearing

- Heat inner race for large taper roller bearing to approx. 100 oC.
- Fit inner race and press home.



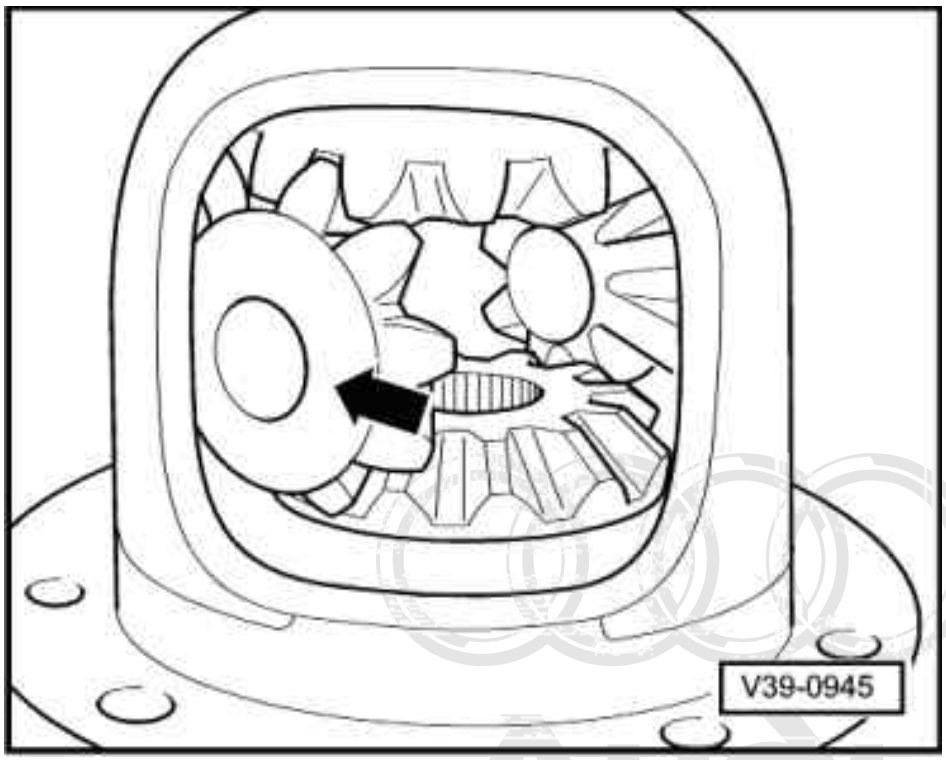
-> Fig.5 Driving crown wheel off housing



-> Fig.6 Installing crown wheel

- Use 2 centring pins -A- (local manufacture) as a guide.
- Heat crown wheel to approx. 100 oC and install.

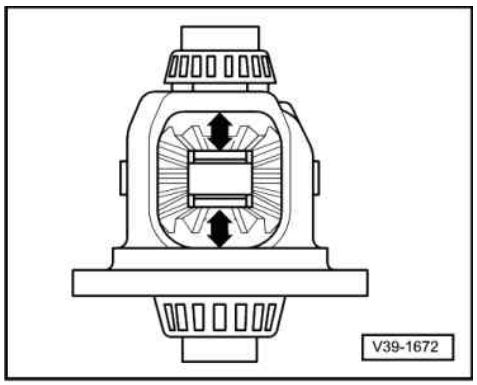
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.7 Installing bevel gears

- Carefully lever out drive wheel for speedometer sender with a screwdriver.
- Insert thrust washers for planet wheels with a small amount of grease.
- Insert sun wheels with correct shims => Fig. 8
- Insert planet wheels spaced 180° apart, and then rotate into place -arrow-.
- Insert threaded pieces.
  - Installation position: Step towards sun wheel
- Align thrust washers with hole.
- Drive in shaft and secure.

Translated by Volkswagen Group Services. Reproduction of this text, in part or in whole, is not permitted without prior written authorization. We do not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

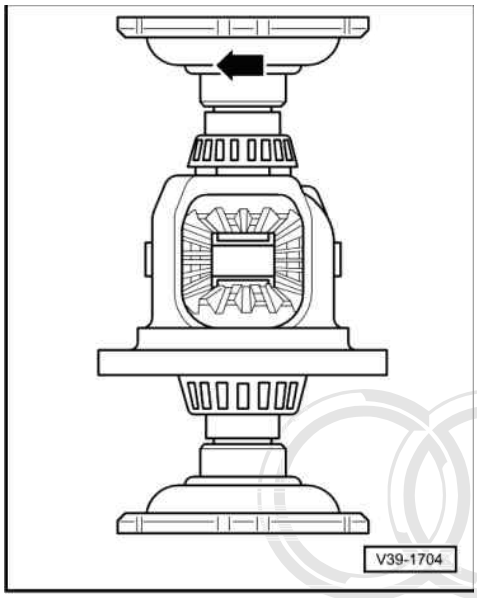


-> Fig.8 Adjusting bevel gears

- Insert sun wheels with thinnest shims (0.5 mm).
- Insert planet wheels with thrust washers and press in shaft.

Note:

Do not now interchange bevel gears and thrust washers.



- Press planet wheels outwards and check play of sun wheels by hand -arrows-.
- Adjust play by inserting an appropriate shim => Page 210 .
  - Specification: max. 0.10 mm

Note:

-> The adjustment is also correct if no further play is perceptible, although it is still possible to rotate the bevel gears -arrow-.

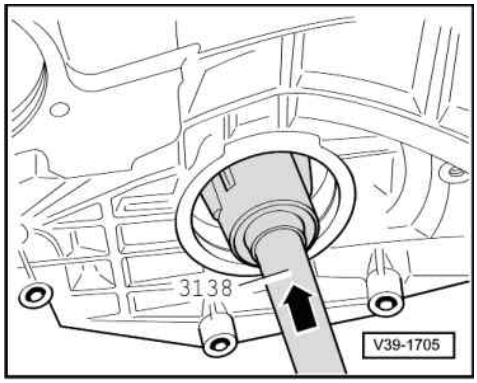
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available

Shim thickness (mm)		
0.50	0.70	0.90
0.60	0.80	1.00



-> Fig.9 Driving out outer race for small taper roller bearing out of gearbox housing

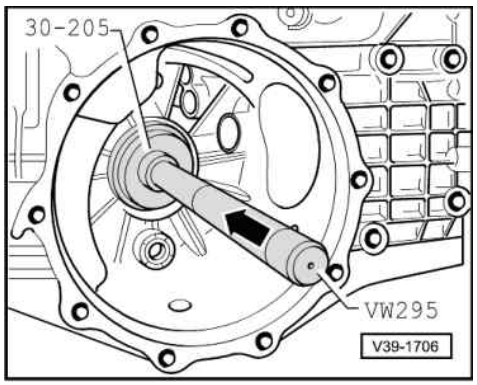
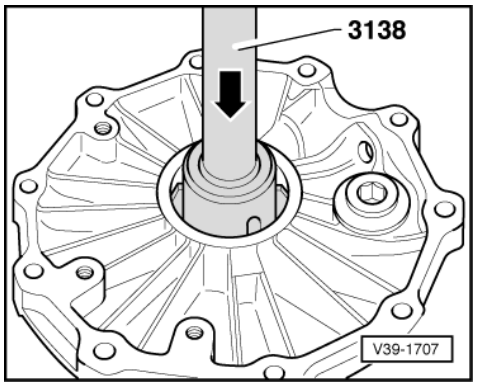


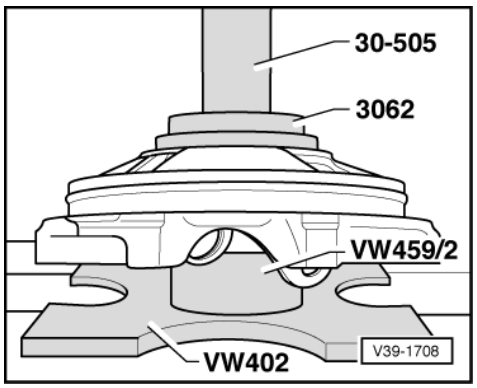
Fig.10 -> Driving outer race for small taper roller bearing into gearbox housing



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.

-> Fig.11 Driving out outer race for large taper roller bearing out of cover

- Use suitable base, e.g. VW 470 with recess towards cover.



-> Fig.12 Driving outer race for large taper roller bearing into cover

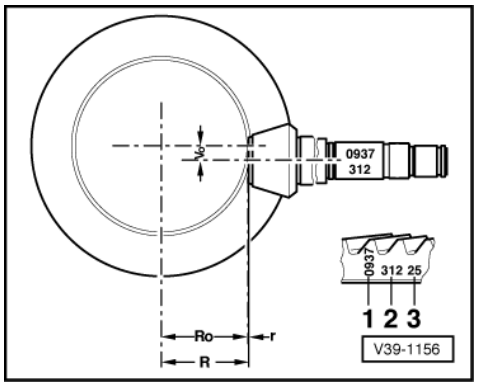
6 - Adjusting pinion shaft and crown wheel

6.1 - Adjusting pinion shaft and crown wheel

General notes:

- Careful adjustment of the drive pinion and crown wheel is important for the service life and smooth running of the final drive. For this reason, the drive pinion 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 drive pinion 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 deviation "r", which is related to the master gauge "Ro" is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the crown wheel. The final drive set (drive pinion and crown wheel) must only be replaced together as a matched pair.
- Observe the general repair instructions for taper roller bearings and shims.
- The friction torque measurement is only used as a final check to make sure that the adjustment is correct.

6.2 - Adjusting final drive sets; identification



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

1 =	"0937" indicates Oerlikon final drive set with a ratio of 37 : 9
2 =	Pairing number (312) of final drive set
3 =	Dimension "r" related to the master gauge of the special test machine used during production. Dimension "r" is always stated in 1/100 mm
	Example: "25" indicates r = 0.25 mm
Ro =	Length of master gauge used on special test machine
	"Ro" = 59.65 mm
R =	Actual distance between crown wheel axis and face of drive pinion at the point of quietest running for this final drive set
	R = Ro + r
Vo =	Hypoid offset

6.3 - Sequence for re-adjusting final drive set

When crown wheel and pinion shaft have to be adjusted, in the interests of a rational sequence, keep to the following order:

1.) Determine total shim thickness "Stotal" for "S1" + "S2" (sets preload for taper roller bearings for differential) => Page 221 onwards.
2.) Determine total shim thickness "Stotal" for "S3" + "S4" (sets preload for taper roller bearings for drive pinion) => Page 215 onwards.
3.) Distribute total shim thickness "Stotal" for "S3" + "S4" so that the distance from centre of crown wheel to face of drive pinion is the same as distance "R" which was determined during production => Page 219 onwards.
4.) Distribute total shim thickness "Stotal" for "S1" + "S2" so that the specified backlash exists between crown wheel and drive pinion => Page 226 onwards.

Note:

Overview of components and shims =>Page 214 .

6.4 - Adjustment overview

Note:

If repairs have been carried out on the gearbox it is only necessary to adjust the pinion shaft, crown wheel or final drive set if components have been replaced which have a direct effect on the adjustments of the final drive. Refer to following table to avoid unnecessary adjustments:

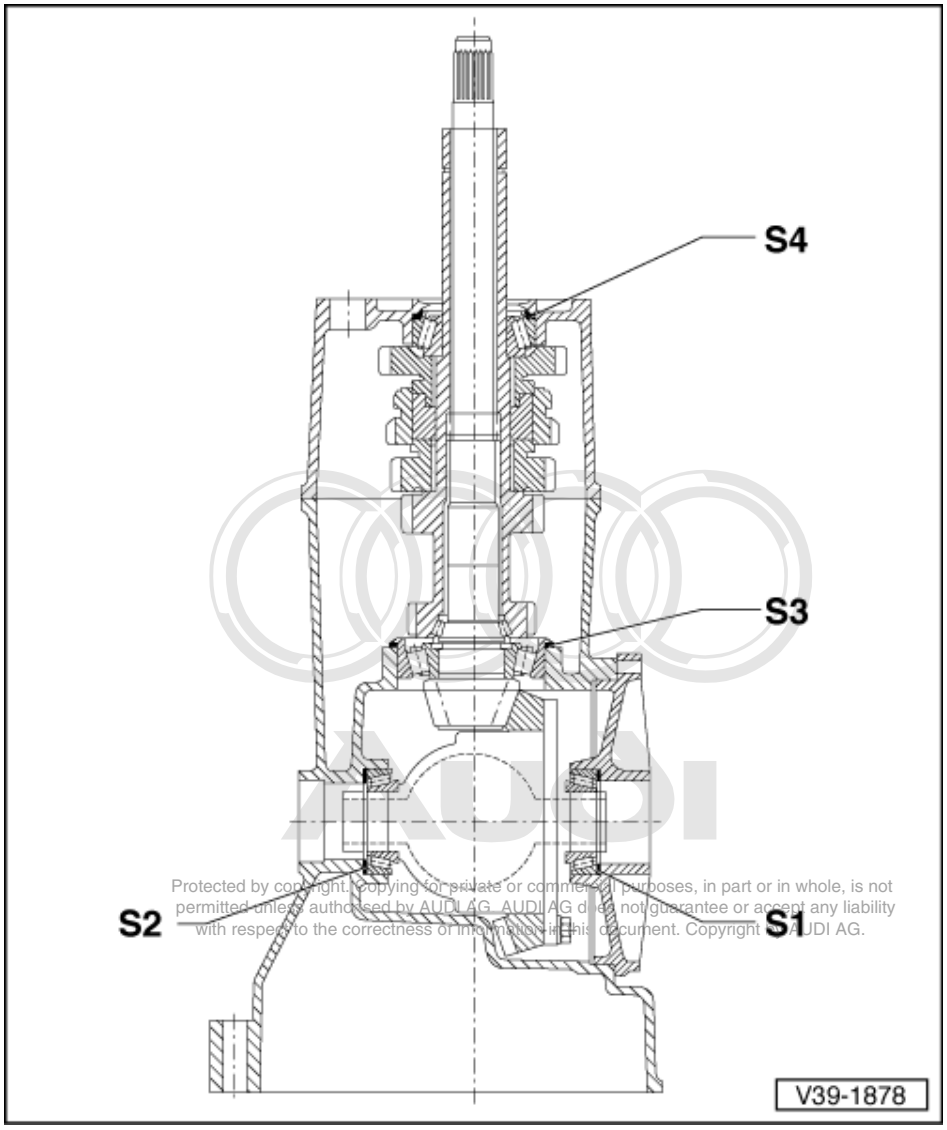
Parts replaced: ▼	To be adjusted:			
	Crown wheel "S1"+"S2" 1) => Page 221	Drive pinion "S3"+"S4" 1) using deviation "r" => Page 214	Drive pinion "S4" 1) => Page 144	Backlash Check => Page 225
Gearbox housing	X	X		X
Bearing plate			X	X
Differential housing	X			X
Taper roller bearings for drive pinion		X		X
Taper roller bearing for differential	X			X
Final drive set 2)	X	X		X
Hollow shaft			X	X
Cover for differential	X			X

1) Shims; installation position => Page 214 .

2) Drive pinion and crown wheel; only replace 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.

6.5 - Position of shims



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:

Adjustment overview when replacing individual components of gearbox =>Page 213 .

- S1 - Adjustment shim for crown wheel in cover for differential
- S2 - Adjustment shim for crown wheel in gearbox housing
- S3 - Adjustment shim for drive pinion in gearbox housing
- S4 - Adjustment shim for drive pinion in bearing plate

7 - Adjusting drive pinion

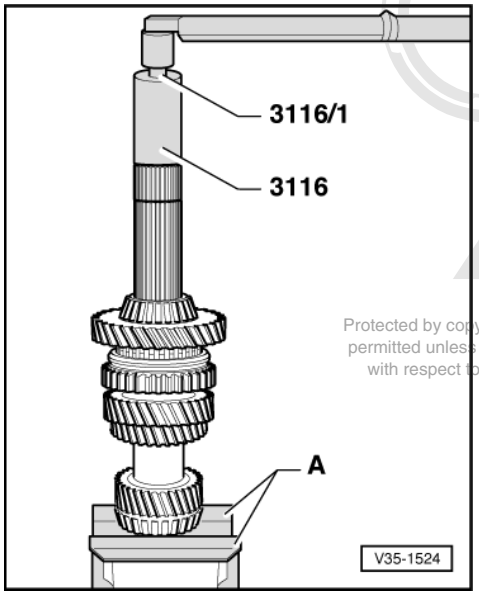
7.1 - Adjusting drive pinion

(Adjusting drive pinion and hollow wheel)

Repairs after which the drive pinion must be adjusted => table on Page 213 .

Determining total shim thickness "Stotal" for shims "S3" + "S4"

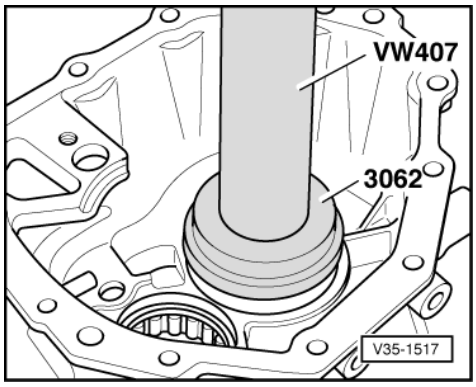
(Adjusting preload of taper roller bearings for drive pinion with hollow shaft)



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.

- Differential removed.

- -> Clamp drive pinion in vice using vice clamps -A-.
- Insert taper rollers with grease, assemble drive pinion and hollow shaft.
- Rotate hollow shaft against drive pinion 5 turns in both directions to settle taper roller bearing.
- Preload drive pinion/hollow shaft to 10 Nm, hold hollow shaft tight for this step.
- Fit taper roller bearing outer race for drive pinion in gearbox housing without shims => Fig. 187 .

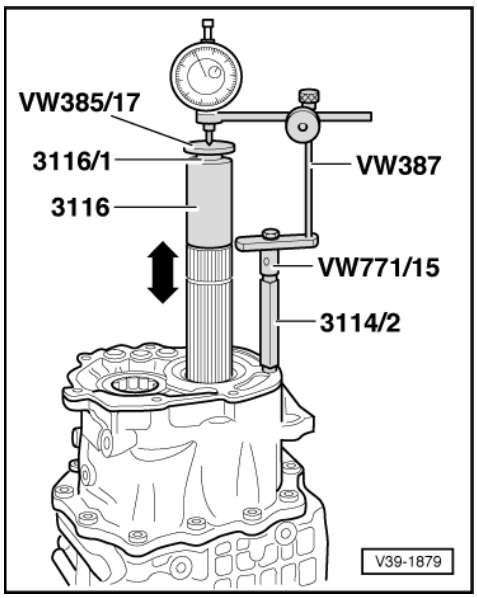


- -> Fit taper roller bearing outer race for drive pinion with shim "S4*" (1.0 mm thick) into bearing plate.

Note:

For measurement purposes a shim "S4" with a thickness of 1.0 mm is initially inserted It is referred to as "S4" in the following. After determining measurement "e", "S4*" will be replaced by the correct shim "S4".*

- Insert completely assembled drive pinion in gearbox housing.



- Fit bearing plate with dowel sleeves and tighten to 25 Nm.
- Rotate drive pinion and hollow shaft 5 turns in both directions to settle taper roller bearing.
- -> Assemble measuring equipment, use a 30 mm dial gauge extension.
- Set dial gauge (3 mm measuring range) to "0" with 1 mm preload.

Note:

The tip of the dial gauge must be positioned on centre of drive pinion.

- Lift drive pinion, without turning, and read off play on dial gauge.
  - Measurement in example: 0.90 mm

Note:

If the measurement has to be repeated, drive pinion must first be rotated another 5 turns in each direction to settle the taper roller bearing. Reset dial gauge to "0" with 1 mm preload.

Formula:
"Stotal" = "S4*" + measurement + bearing preload

Example:		
	Inserted shim "S4*"	1.00 mm
+	Measurement (example)	0.90 mm
+	Bearing preload (constant)	0.15 mm
=	Total shim thickness "Stotal" for "S3" + "S4"	2.05 mm

Determining thickness of shim "S3*"

Formula:
"S3*" = "Stotal" - "S4*"

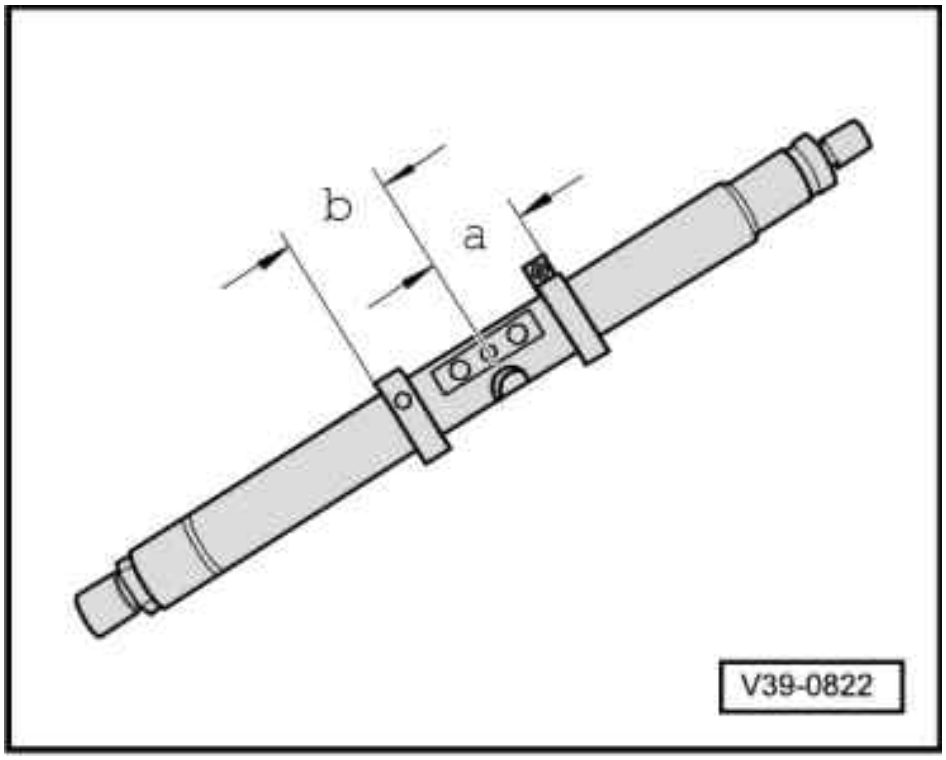
Example:		
	Total shim thickness "Stotal" for "S3" + "S4"	2.05 mm
-	Inserted shim "S4*"	1.00 mm
=	Thickness of shim "S3*"	1.05 mm

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.

- Remove taper roller bearing outer race, fit shim "S3*" in gearbox housing and install outer race again => Fig. 187 .
- Insert completely assembled drive pinion in gearbox housing again.

- Fit bearing plate with dowel sleeves and tighten to 25 Nm.
- Rotate drive pinion and hollow shaft 5 turns in both directions to settle taper roller bearing.

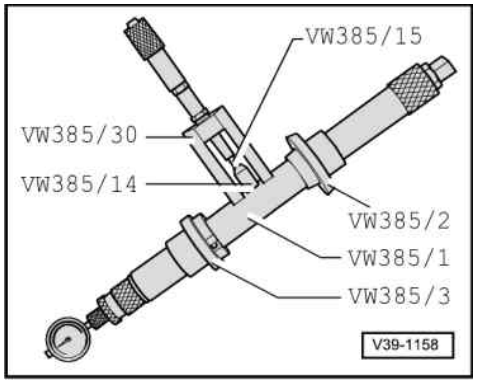
Determining measurement "e"



Note:

Measurement "e" is required to determine the final shim thickness of "S3" and "S4".

- -> Set adjustment rings of universal mandrel VW 385/1 to the following measurements:
  - Dimension a = 65 mm
  - Dimension b = 55 mm

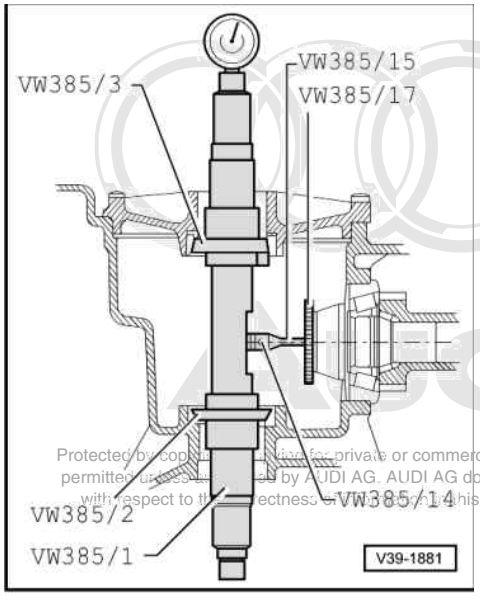


- -> Assemble universal mandrel VW 385/1 as shown in the illustration:
  - Dial gauge extension VW 385/15, 9.3 mm long
  - Master gauge VW 385/30
- Set master gauge VW 385/30 to Ro = 59. 65 mm and fit onto mandrel.
- Set dial gauge (3 mm measuring range) to "0" with 2 mm preload.

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:

Gauge VW 385/27 can also be used in place of master gauge VW 385/30 (Ro = 59.65 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.

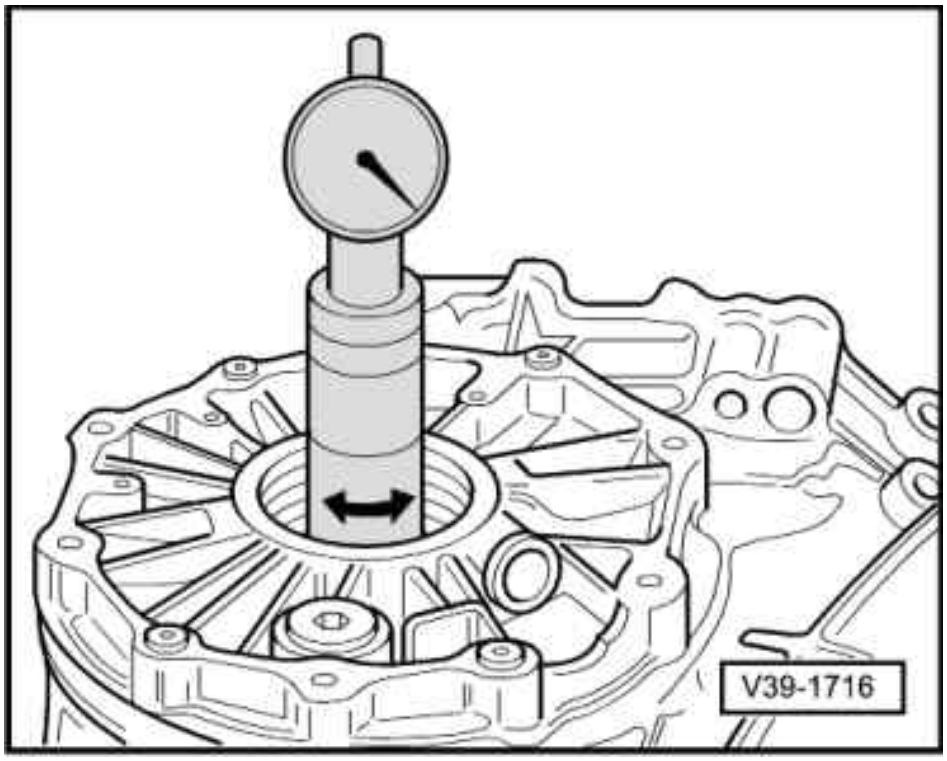
-> Arrangement of measuring equipment when determining dimension "e"

- Place end measuring plate VW 385/17 onto drive pinion head.

Note:

Ensure plate contact surface fits exactly and is free of oil.

- Take master gauge off mandrel.
- Insert mandrel into gearbox housing.
  - The centring disc 385/3 faces towards cover for final drive
- Fit final drive cover and tighten 4 bolts to 25 Nm.
- Using the adjustable ring, move 2nd centring disc VW 385/2 out as far as possible so that the mandrel can still just be turned by hand.



- -> Turn mandrel until the dial gauge point touches the end measuring plate on drive pinion head, then measure maximum deflection (return point).
  - Measurement in following example: "e" = 0.16 mm (in red scale on dial)

Determining thickness of shim "S3"

Formula:
"S3" = "S3*" + "r" + "e"
("e" in black scale)
or
"S3" = "S3*" + "r" - "e"
("e" in red scale)

Notes:

- The deviation "r", which is related to the master gauge "Ro" is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the crown wheel.
- If dial gauge reading is in red scale, subtract dimension "e".
- If dial gauge reading is in black scale, add dimension "e".

Example:		
	Inserted shim "S3*"	1.05 mm
+	Deviation "r"	0.38 mm
-	Determined value "e" (red scale)	0.16 mm
=	Thickness of shim "S3"	1.27 mm

- Determine shim from table. Part numbers

=> 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.

The following shims are available for "S3"

Shim thickness (mm) 1)		
0.45	0.60	0.75
0.50	0.65	
0.55	0.70	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Determining thickness of shim "S4"

Formula:
"S4" = "Stotal" - "S3"

Example:		
	Total shim thickness "Stotal" for "S3" + "S4"	2.05 mm
-	Thickness of shim "S3"	1.27 mm
=	Thickness of shim "S4"	0.78 mm

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S4"

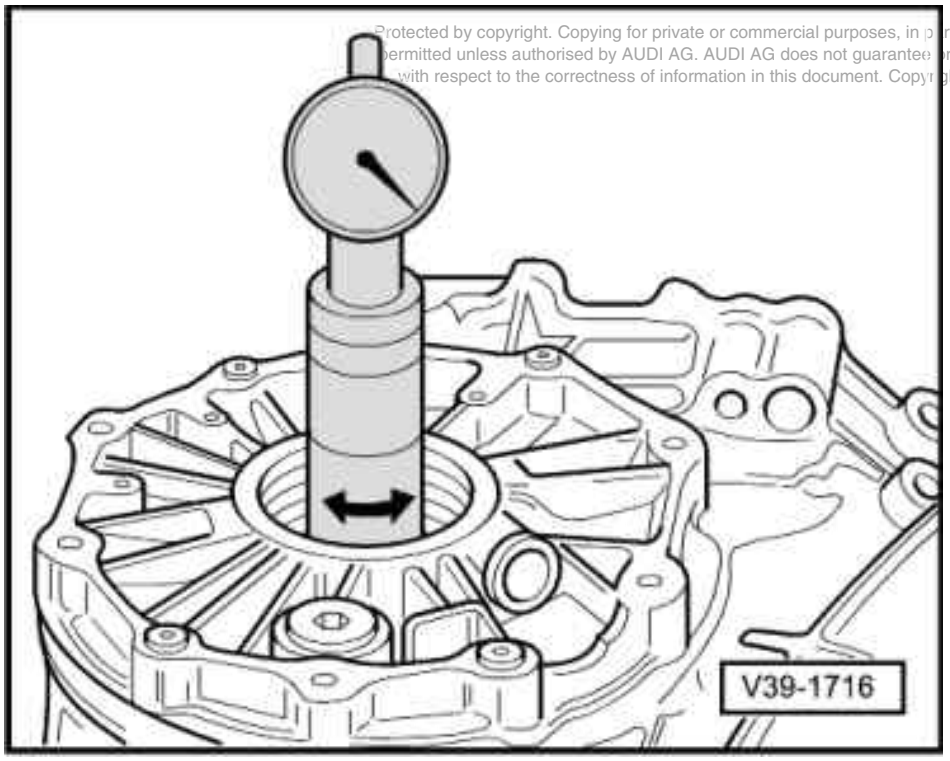
Shim thickness (mm) 1)		
0.45	0.65	0.85
0.50	0.70	0.90
0.55	0.75	
0.60	0.80	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Performing check measurement

Checking dimension "r"

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 pinion shaft with determined shims "S3" and "S4" and turn 5 turns in both directions.
- -> Insert universal mandrel => "Determining measurement `e'" on Page 217 , and perform check measurement.
- Read off dial gauge anti-clockwise (red scale).
  - If the shims have been correctly selected, the deviation "r" (marked on outer circumference of crown wheel) must be shown within a tolerance of ± 0.04 mm.

Note:

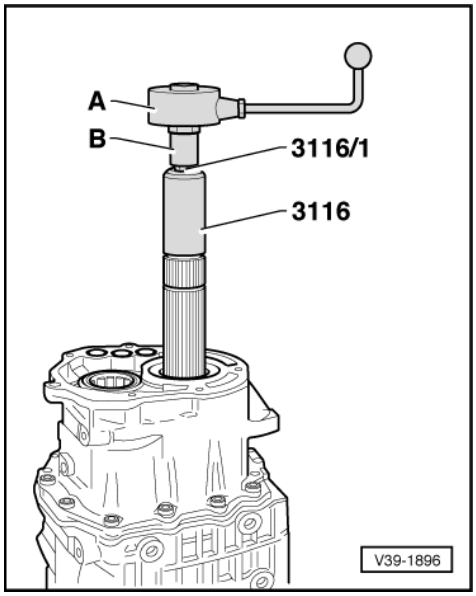
Then, (after removing universal mandrel) check again that dial gauge, with master gauge VW 385/30 in place, indicates "0" with 2 mm preload. Otherwise correct adjustments.

Measuring friction torque (check)

Notes:

- Taper roller bearings for drive pinion/hollow shaft are low-friction bearings. Therefore the frictional torque only has a limited use as a check. Correct adjustment is only possible by determining the total shim thickness "Stotal".

- Do not additionally oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with a special oil by the manufacturer.



- -> Fit torque gauge 0 ... 600 Ncm -A- onto drive pinion.

  B - Socket

- Fit spring sleeve 3116.

Frictional torque specifications:

New bearings	Used bearings
80 ... 150 Ncm	30 ... 60 Ncm

8 - Adjusting crown wheel

8.1 - Adjusting crown wheel

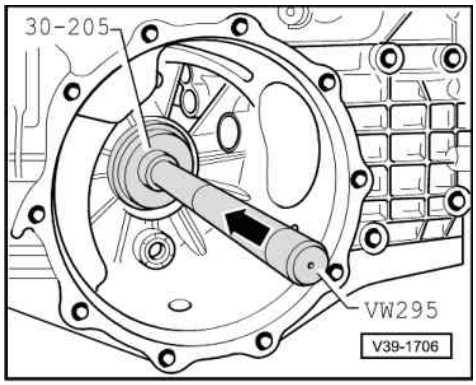
(Adjusting differential)

Repairs after which the crown wheel must be adjusted => Page 213.

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.

Determining total shim thickness "Stotal" for shims "S1" + "S2"

(Adjusting preload of taper roller bearing for differential)

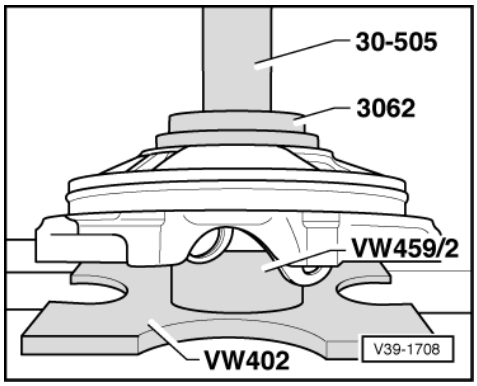


- Drive pinion removed

- Remove seal and outer races of both taper roller bearings for the differential.
- Remove shims => Page 201 .
- -> Drive outer race for taper roller bearing with shim "S2" into gearbox housing. For measurement purposes use a 1.20 mm thick "S2*" shim (2 shims of 0.60 mm).

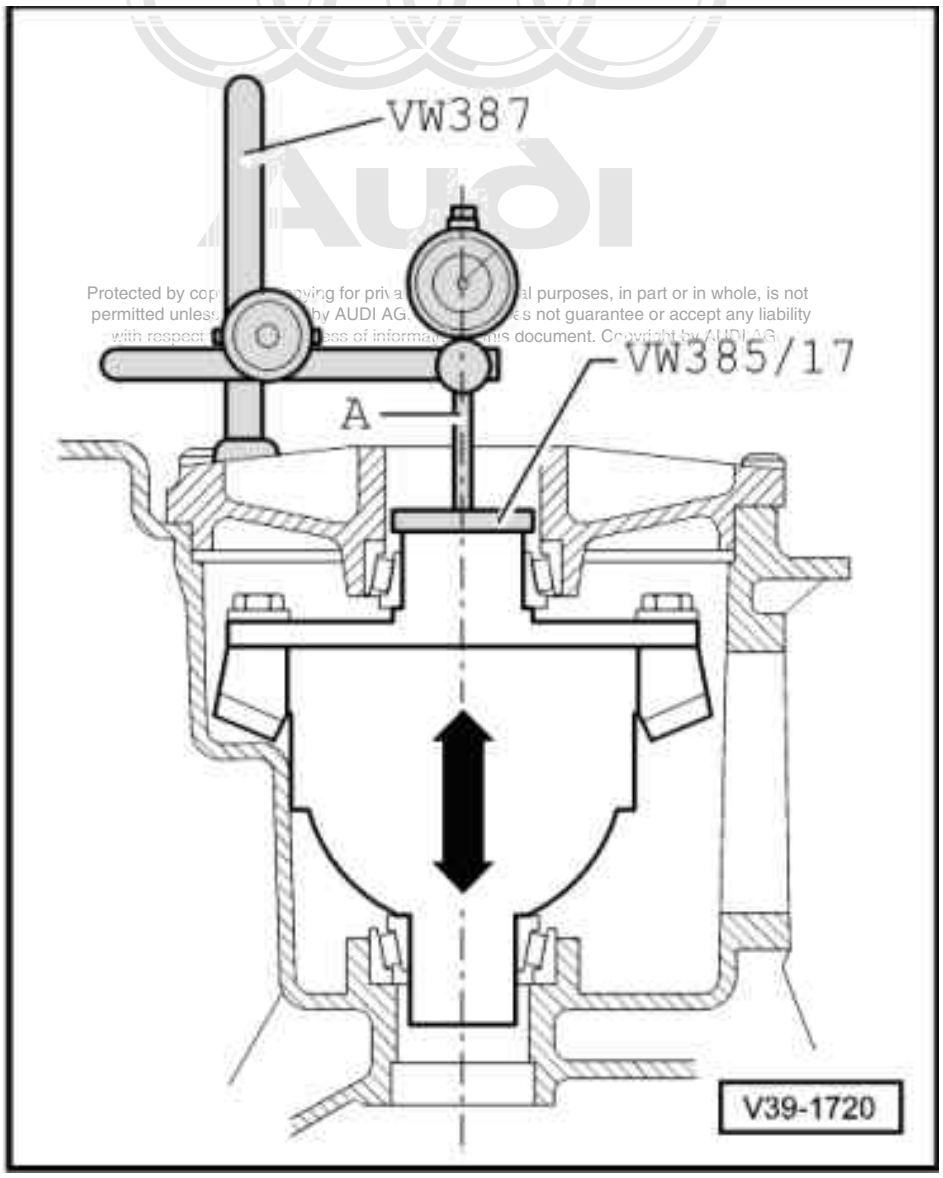
Note:

For measurement purposes a shim "S2" with a thickness of 1.20 mm is initially inserted. It is referred to as "S2" in the following. After determining the backlash "S2*" will be replaced by the correct "S2".*



- -> Press outer race for taper roller bearing without shim "S1" into cover for differential.
- Insert differential without drive wheel for speedometer sender -G22 into gearbox housing. The crown wheel is positioned on the left-hand side in front of the final drive cover.
- Install cover for differential with 4 bolts (25 Nm).
- Position gearbox so that cover for differential faces up.

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.



Protected by copyright. Copying for private and 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 differential 5 turns in both directions to settle the taper roller bearing.
- -> Assemble measuring equipment, use a 30 mm dial gauge extension.
- Set dial gauge (3 mm measuring range) -A- to "0" with 1 mm preload.

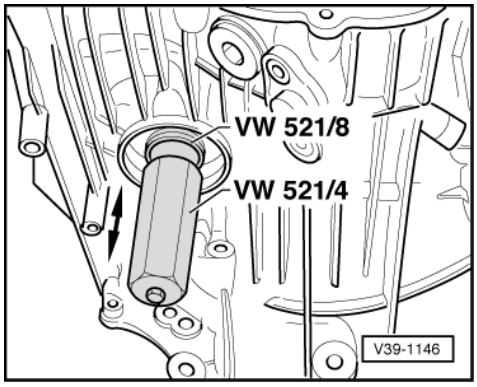
Note:

The tip of the dial gauge must be positioned on centre of differential.

- Lift differential without turning; read off play on dial gauge and note.

• Measurement in following example: 0.62 mm

Notes:



- -> Secure special tools VW 521/4 and VW 521/8 on right of differential (gearbox side) to lift differential.
- If the measurement has to be repeated, drive pinion must first be rotated another 5 turns in each direction to settle the taper roller bearing.

Formula:
"Stotal" = "S2*" + measurement + bearing preload

Example:		
	Inserted shim(s) "S2*"	1.20 mm
+	Measurement	0.62 mm
+	Bearing preload (constant)	0.25 mm
=	Total shim thickness "Stotal" for "S1" + "S2"	2.07 mm

Determining thickness of shim "S1*"

Notes:

- The preliminary adjustment shim "S1*" will be replaced with the final shim "S1" after determining the backlash.
- The total shim thickness "Stotal" remains the same.

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.

Formula:
"S1*" = "Stotal" - "S2*"

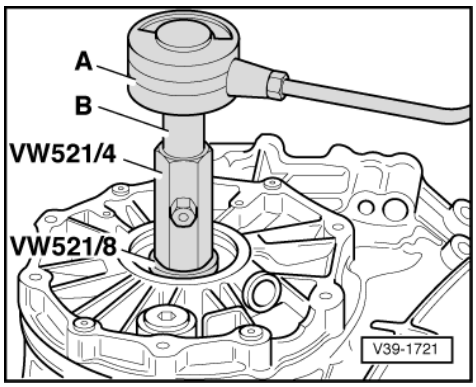
Example:		
	Total shim thickness "Stotal" for "S1" + "S2"	2.07 mm
-	Inserted shim(s) "S2*"	1.20 mm
=	Thickness of shim "S1*"	0.87 mm

Measuring friction torque (check)

Notes:

- Differential taper roller bearings are low friction bearings. Therefore the frictional torque only has a limited use as a check. Correct adjustment is only possible by determining the total shim thickness "Stotal".
- Do not additionally oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with a special oil by the manufacturer.

- Drive pinion removed



- -> Fit torque gauge 0 ... 600 Ncm -A- onto differential.

  B - Socket

- Read off friction torque.

Frictional torque specifications:

New bearings	Used bearings
200 ... 350 Ncm	30 ... 50 Ncm

Note:

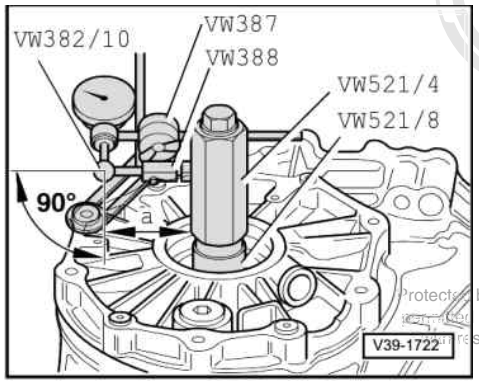
If the final drive set is being re-adjusted, the adjustment of the pinion shaft should be performed now, and the adjustment should be checked => Page 214 .

Measuring backlash

(Position of crown wheel in gearbox housing)

- Drive pinion and shims "S3" and "S4" installed

- Install differential.



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 differential 5 turns in both directions so that the taper roller bearings settle.
- -> Secure dial gauge retainer VW 387 to the housing.
- Insert adjustment device VW 521/4 and VW 521/8 for crown wheel.
- Fit dial gauge with dial gauge extension VW 382/10 (6 mm flat).
- Set measuring lever VW 388 to dimension "a" = 79 mm.
- Measure play between teeth flanks (backlash) as follows:
  - Turn crown wheel until it makes contact with a tooth flank (end of backlash travel).
  - Set dial gauge to "0" with 1 mm preload.
  - Turn crown wheel back until lying against an opposite tooth flank (backlash).

  - Read off backlash and note value.

- Turn crown wheel through 90o and repeat measurements a further 3 times.

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 set itself is defective. Check installation, replace final drive set if necessary.

Determining average backlash

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

Example:		
	1st Measurement	0.49 mm
+	2nd Measurement	0.48 mm
+	3rd Measurement	0.50 mm
+	4th Measurement	0.49 mm
=	Sum of measured values	1.96 mm

• Result: The average backlash is 1.96 mm divided by 4 = 0.49 mm

Determining thickness of shim "S2"

Formula:
"S2" = "S2*" - backlash + lift

Example:		
	Inserted shim "S2*"	1.20 mm
-	Average backlash	0.49 mm
+	Lift (constant)	0.15 mm
=	Thickness of shim "S2"	0.86 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.

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S2"

Shim thickness (mm) 1)		
0.45	0.65	0.85
0.50	0.70	0.90
0.55	0.75	
0.60	0.80	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Determining thickness of shim "S1"

Formula:
"S1" = "Stotal" - "S2"

Example:		
	Total shim thickness "Stotal" for "S1" + "S2"	2.07 mm
-	Thickness of shim "S2"	0.86 mm

Example:	
= Thickness of shim "S1"	1.21 mm

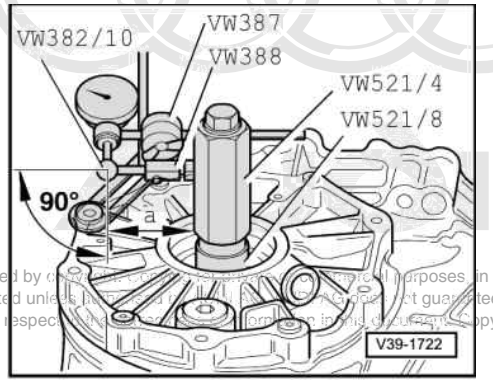
- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S1"

Shim thickness (mm) 1)		
0.45	0.65	0.85
0.50	0.70	0.90
0.55	0.75	
0.60	0.80	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.



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.

-> Performing check measurement

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

Notes:

- If the backlash is beyond the tolerance, the adjustments must be repeated. The total shim thickness "Stotal" must not be changed when the adjustment is repeated.
- The individual measurements must not differ by more than 0.06 mm from each other.

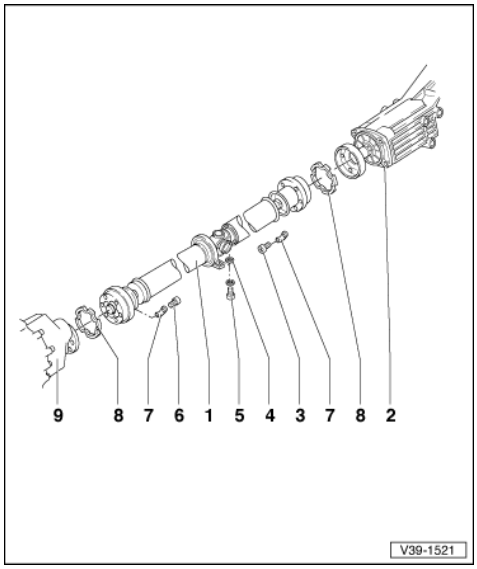
9 - Servicing propshaft

9.1 - Servicing propshaft

Notes:

- Do not bend the propshaft more than 25oat the central joint, otherwise the universal joint will be damaged.
- Only store and transport propshaft extended.
- Observe the general repair instructions =>Page 11 .
- No repair work can be carried out on the propshaft with the exception of removing, installing and adjusting.
- If the propshaft is only detached at the gearbox or from rear final drive then the propshaft is to be tied-up or supported at the constant velocity joint.
- Work on the propshaft should be carried out on a vehicle hoist.
- If complaints are received (noises, vibrations), it is essential to check whether correct adjustment of the propshaft rectifies the fault before replacing the propshaft.

- After removing the propshaft from the rear final drive, the additional balance disc (thick washer) that may be located between the lock plate and the bolt head must not be reinstalled. Always replace all flange bolts after dismantling.



1 Propshaft
- Adjusting => Page 233

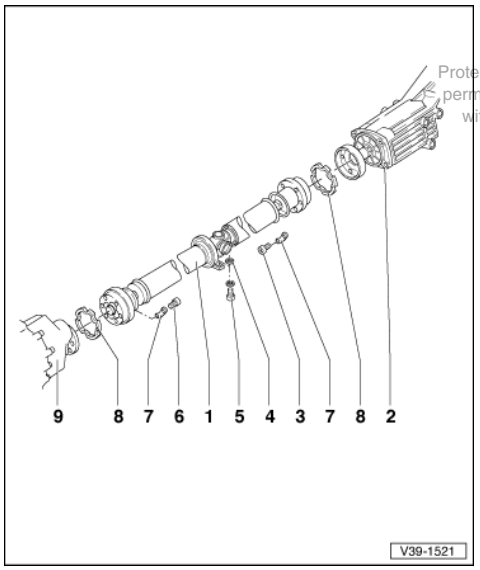
2 Rear final drive

3 Bolts - 55 Nm
- Qty. 6
- Self-locking
- Always replace

4 Shims
- Adjusting propshaft => Page 233

5 Hexagon bolt -23 Nm
- Qty. 2

6 Bolts - 55 Nm
- Qty. 6
- Self-locking
- Always replace



7 Base plate
- Qty. 3

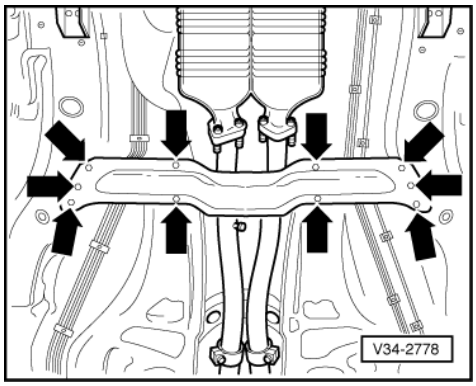
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- After balancing propshaft, base plates of a different thickness may have to be installed. Mark installation position before removing and observe marking when installing

8 Gasket
- Always replace
- Pull off protective foil and stick self-adhesive side onto flange shaft

9 Manual gearbox

9.2 - Removing and installing propshaft



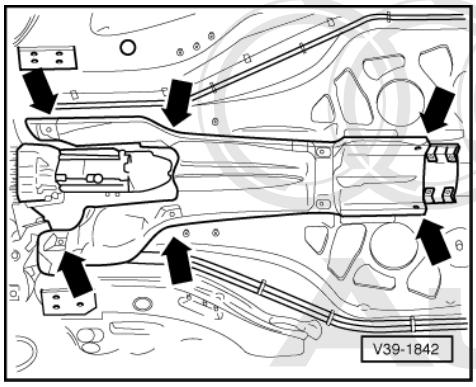
Removing

- Observe notes=> Page 227 .
- -> Remove front cross member below exhaust system -arrows-
- Remove exhaust system as from front exhaust pipe

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

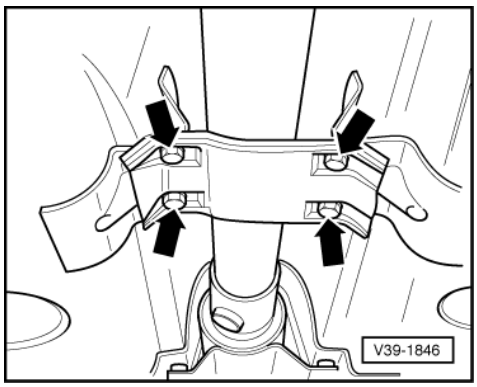
=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system

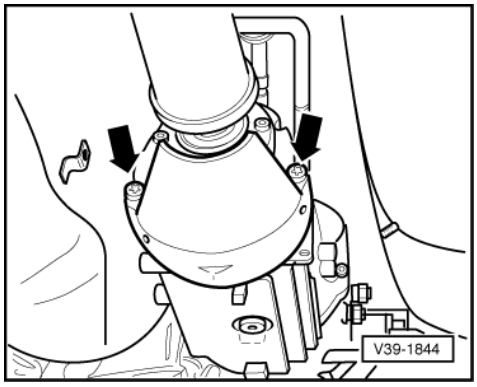


- -> Unbolt heat shield below propshaft -arrows-.

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.

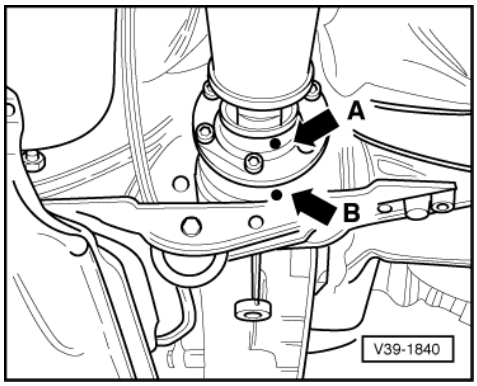


- -> Remove cross member with heat shield below propshaft -arrows-



- -> Remove heat shield for propshaft -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.

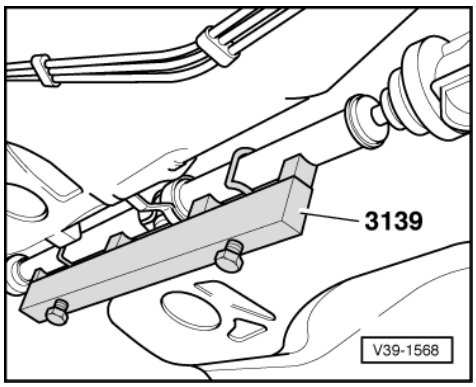


- -> Mark position of propshaft flanges -arrow A- to rear final drive -arrow B- with paint, if not already marked.
- Slacken bolts attaching two propshaft flanges and mark base plates.

Note:

After balancing propshaft, base plates of a different thickness may have to be installed. Mark installation position before removing and observe marking when installing.

- Loosen securing bolts of centre propshaft mounting slightly.



- -> Attach assembly device 3139 and tighten plastic nuts.

Note:

Never fit assembly appliance onto balance plates.

- Remove securing bolts of flange to gearbox and to rear final drive as well as securing bolts of centre propshaft mounting.
- Slide propshaft together towards rear final drive. The constant velocity joints move along their axes.

- Guide propshaft out at rear final drive with assembly device.

Note:

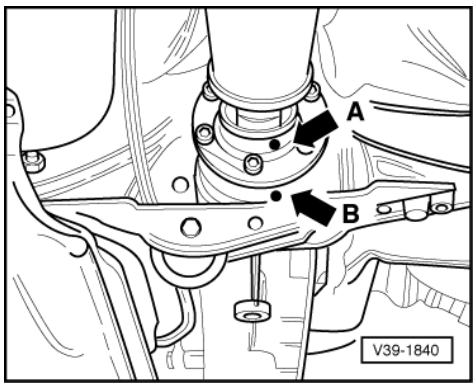
Only transport and store propshaft when extended.

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.

Installation

Installation is carried out in the reverse order. Ensure all blanking plugs are removed. Additionally, the following operations are to be performed.

Notes:

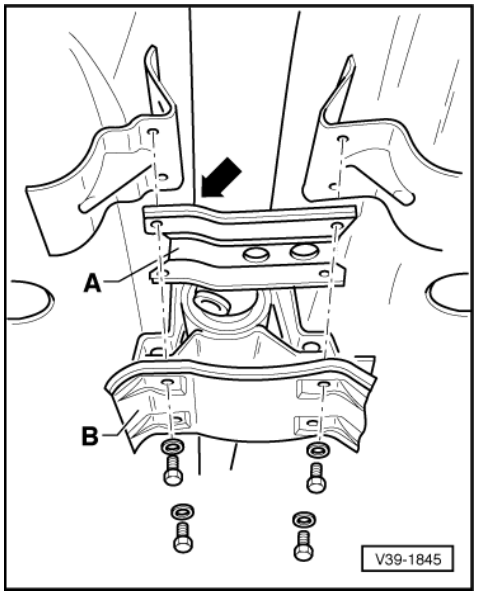


- -> To prevent imbalance, install flanges of prop shaft -arrow A- and rear final drive -arrow B- in such a way that the coloured markings are in a line.
- Replace seal between the propshaft and the output/ input flange (remove the protective film and stick to the flange shafts).
- It is essential that locking fluid remaining in the threads in the flange shafts on the gearbox and rear final drive is cleaned out after removing propshaft. Otherwise there is a danger that new bolts will seize when they are screwed in and then shear if they have to removed later.
- Threaded holes can be cleaned with a thread tap.

- After removing the propshaft from rear final drive, the additional balance disc (thick washer) that may be located between lock plate and bolt head must not be reinstalled.
- Replace prop shaft bolts (self-locking).

◆ Observe marking of base plates when installing.

- Adjust propshaft after installing => Page 233 .



- -> Observe installation position of cross member -A- and heat shield -B- below propshaft.
  - Side with shoulder -arrow- points in direction of travel to left.
- Install exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

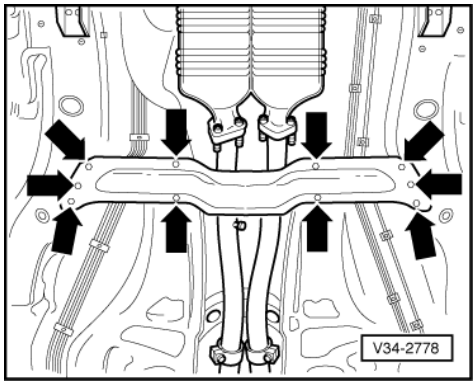
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

Tightening torques

Component	Nm
Propshaft to gearbox (drive flange) M8	55
Prop shaft to final drive (input flange) M8	55
Propshaft centre mounting to body	23
Heat shield for propshaft to gearbox	25
Cross member with heat shield to body	25
Front cross member below exhaust system to body	25
Catalytic converter to front exhaust pipe	25
Catalytic converter to bracket	25

9.3 - Adjusting propshaft



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

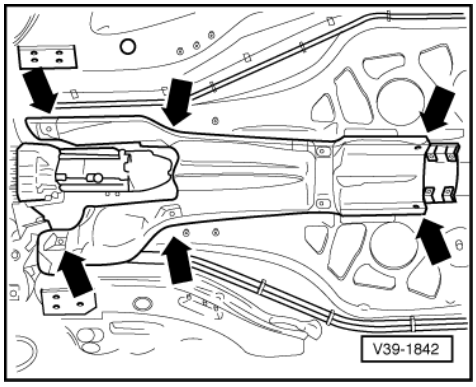
Adjusting operation should be carried out with scrupulous care as a poorly adjusted propshaft is frequently a cause of vibrations and rumbling noises.

- -> Remove front cross member below exhaust system -arrows-
- Remove exhaust system as from front exhaust pipe

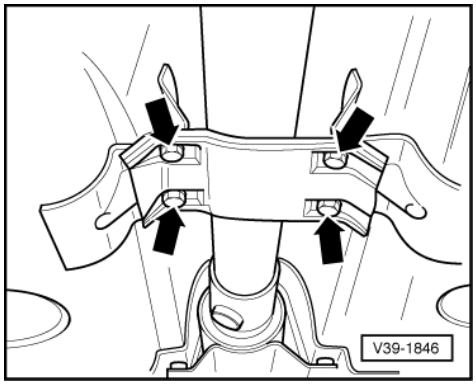
=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

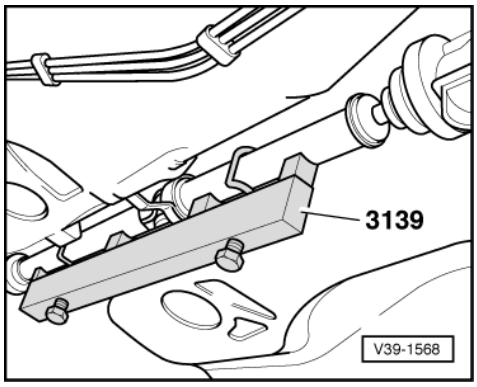
=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system



- -> Unbolt heat shield below propshaft -arrows-.



- -> Remove cross member with heat shield below propshaft -arrows-
- Loosen securing bolts of centre propshaft mounting slightly.

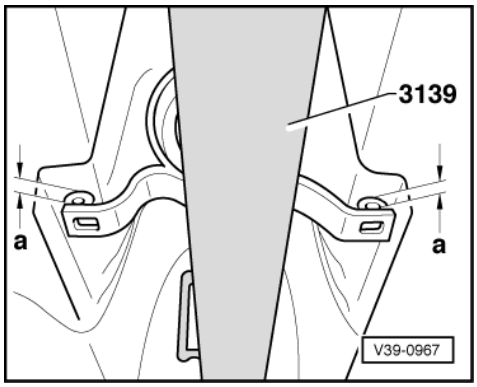


- -> Attach assembly device 3139 and tighten plastic nuts.

Note:

Never fit assembly appliance onto balance plates.

- Remove securing bolts and shims from centre mounting.



- Align centre propshaft mounting so that the dimension -a- on left-hand side is the same as dimension -a- on right-hand side.
- -> Measure dimension -a-.
- Determine shim from table. Part numbers

=> 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.

The following shims are available

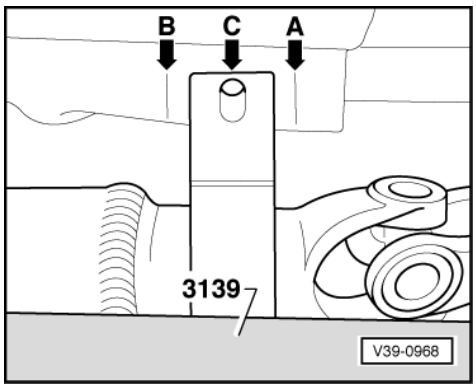
Dimension -a- (mm)	Shim thickness (mm)
0 ... 3.0	-
3.1 ... 5.0	2
5.1 ... 7.0	4
7.1 ... 9.0	6
9.1 ... 11.0	8
11.1 ... 13.0	10

- Install correct shims on left and right.

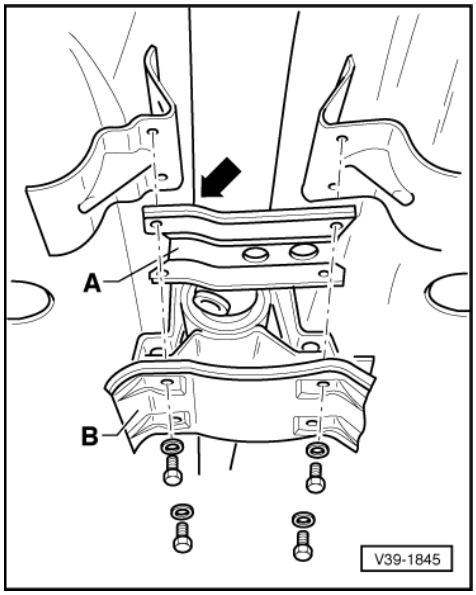
Tightening torques

Component	Nm
Propshaft centre mounting to body	23

Aligning propshaft longitudinally



- -> Slide propshaft with assembly device to rear onto stop.
- Mark position of centre mounting on body -arrow A-.
- Slide propshaft with assembly device forwards onto stop.
- Mark position of centre mounting on body -arrow B-.
- Align propshaft -arrow C-.
  - The centre mounting must be positioned centrally between the markings -A- and -B-
- Install securing bolts of propshaft centre mounting and previously determined shims and tighten.
- Remove assembly device.



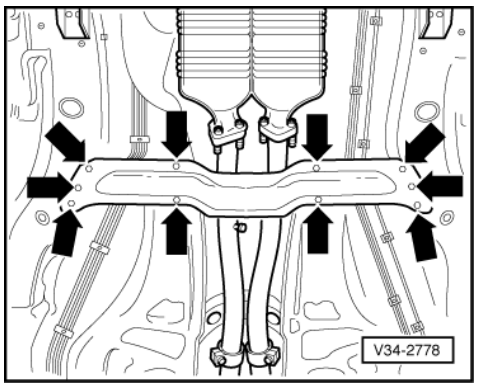
- -> Install cross member -A- with heat shield -B- below propshaft.
  - Side with shoulder -arrow- points in direction of travel to left.
- Install heat shield above propshaft => Page 233 .
- Install exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

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 front cross member below exhaust system.

Tightening torques

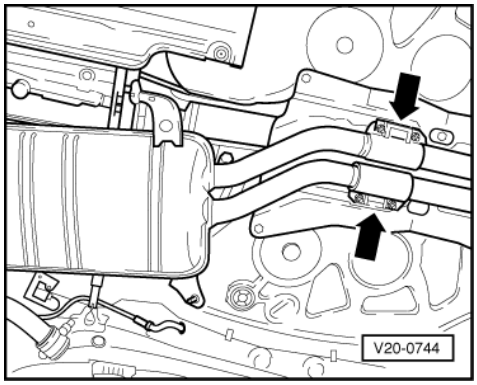
Component	Nm
Propshaft centre mounting to body	23
Cross member with heat shield to body	25
Front cross member below exhaust system to body	25

9.4 - Balancing propshaft/flange at rear final drive

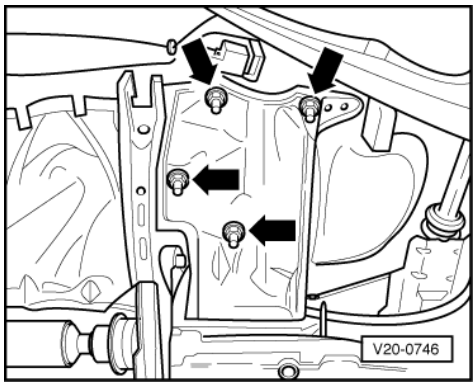
Notes:

- Balancing can be used in order to eliminate any rumbling or droning noises and should be carried out with scrupulous care.
- Inspect propshaft as well as flange for signs of any damage.
- Observe notes=> Page 227 .
- Propshaft has to be properly set at centre bearing and be centred in longitudinal direction => Page 233 .
- If, after carrying out adjusting of propshaft, rumbling and droning noises still occur in speed range between 160 and 200 km/h, balance connection of propshaft/flange at rear final drive as described in sections which follow.
- After carrying out measurement, replace base plates according to table => Page 238 .

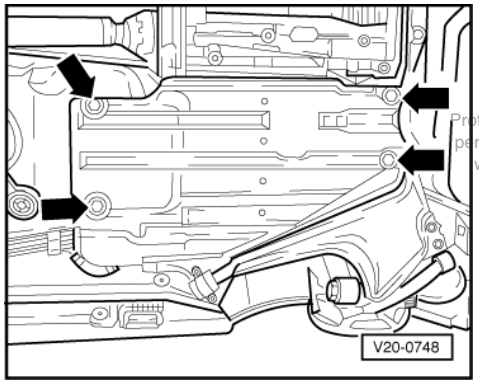
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



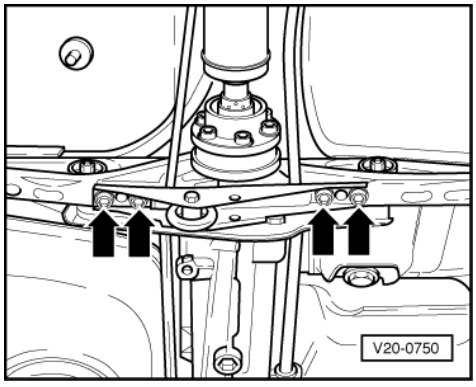
- -> Disconnect exhaust system at double pipe clamp -arrows-.
- Detach main and rear silencers from retaining loops.



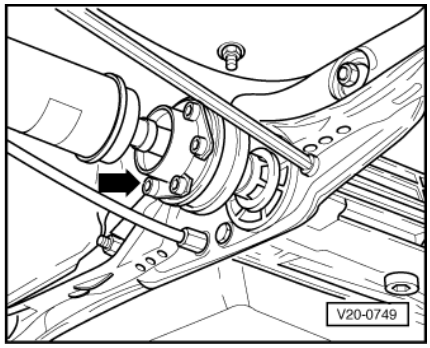
- -> Unbolt heat shield behind cross member -arrows-.



- -> Unbolt cover for fuel tank -arrows-.



- -> Unbolt end plate -arrows-.



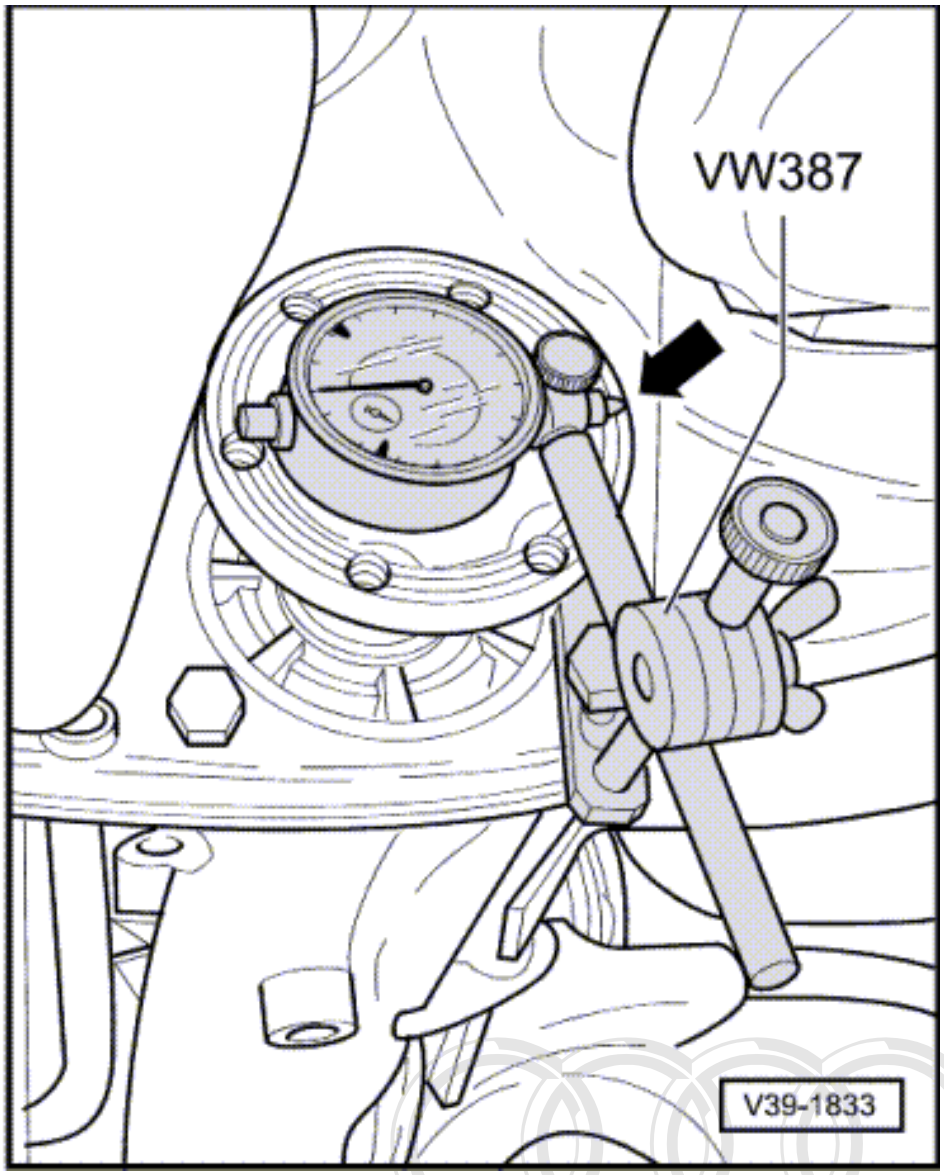
- -> Remove securing bolts of propshaft at rear final drive.

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.

- Tie up propshaft tight.

Notes:

- Lower propshaft only sufficiently as is necessary for measuring radial run-out at output flange.
- Do not bend the propshaft more than 25oat the central joint, otherwise the universal joint will be damaged.



- -> Secure universal dial gauge retainer VW 387 with dial gauge to cross member/final drive bolted joint.
- Position the dial gauge to the ground diameter in propshaft flange -arrow- and set to "0" with a preload of 1 mm.
- Rotate the differential by turning the two rear wheels (left and right-hand flange shafts) simultaneously in one direction until the propshaft flange has undergone one complete revolution.
- Mark the position of greatest radial run-out on flange exterior (equates to greatest distance from rotational axis).
- Remove old marking on flange shaft.

Balancing weights (base plates) available

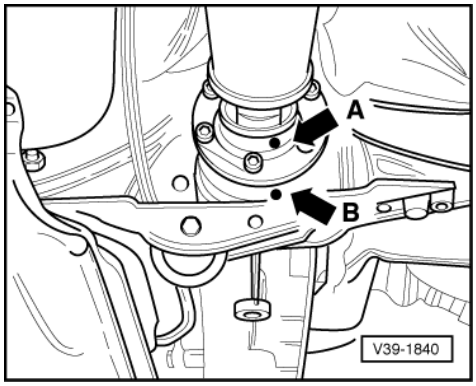
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Determine base plates from table. Part numbers

=> Parts Catalogue

Radial run-out (mm)	Propshaft without coloured marking or with green coloured marking		Propshaft with yellow coloured marking	
mm	Weight class	Weight (g)	Weight class	Weight (g)
0.00 ... 0.01	4	9.2	2	7.6
0.02 ... 0.03	5	10.0	3	8.4
0.04 ... 0.05	6	10.8	4	9.2
0.06 ... 0.07	7	11.6	5	10.0
0.08 ... 0.09	8	12.4	6	10.8
0.10 ... 0.11	9	13.2	7	11.6
0.12 ... 0.13	10	14.0	8	12.4
0.14 ... 0.15	11	14.8	9	13.2

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.



Note:

The propshaft balancing set consists of 3 base plates with different coloured marking (1 yellow and 2 white base plates).

- Install propshaft balancing set:
  - -> Connect propshaft to rear final drive.
  - Marking of propshaft -arrow A- should be aligned with marking of radial run-out measured at flange of final drive -arrow B-
  - Install calculated size of base plate (with yellow coloured marking) opposite maximum radial run-out.
  - Distribute remaining 2 base plates with white coloured marking (weight class 5) over remaining bolts
- The remaining installation steps are carried out in reverse sequence:

- Install exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

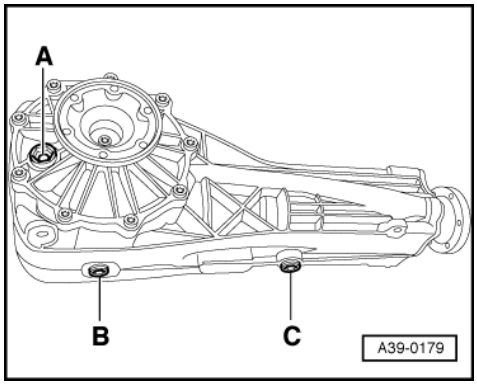
Tightening torques

Component	Nm
Prop shaft to final drive (input flange) M8	55
Propshaft centre mounting to body	23
End plate to cross member	55

Cross member 11 to rear final drive	45
Cover for fuel tank	20

10 - Checking oil level in rear final drive

10.1 - Checking oil level in rear final drive



- -> Unscrew plug for inspecting gear oil -arrow A-.

The oil level is correct when gearbox is full to lower edge of filler hole.

Gear oil specification => Page 5

- Insert drain plug again -arrow A-.

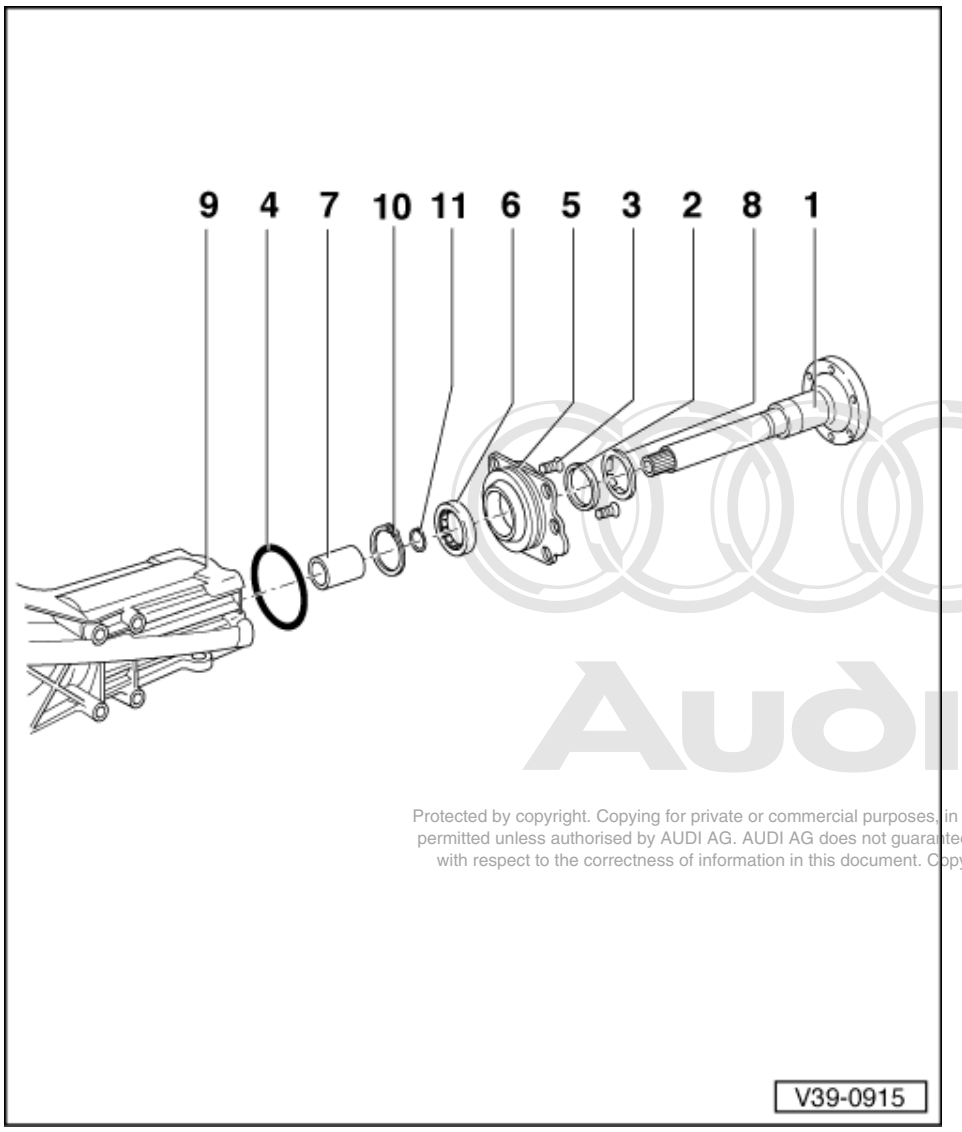
Tightening torque

Component	Nm
Oil filler plug	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.

11 - Replacing seal and grooved ball bearing for propshaft flange

11.1 - Replacing seal and grooved ball bearing for propshaft flange



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.

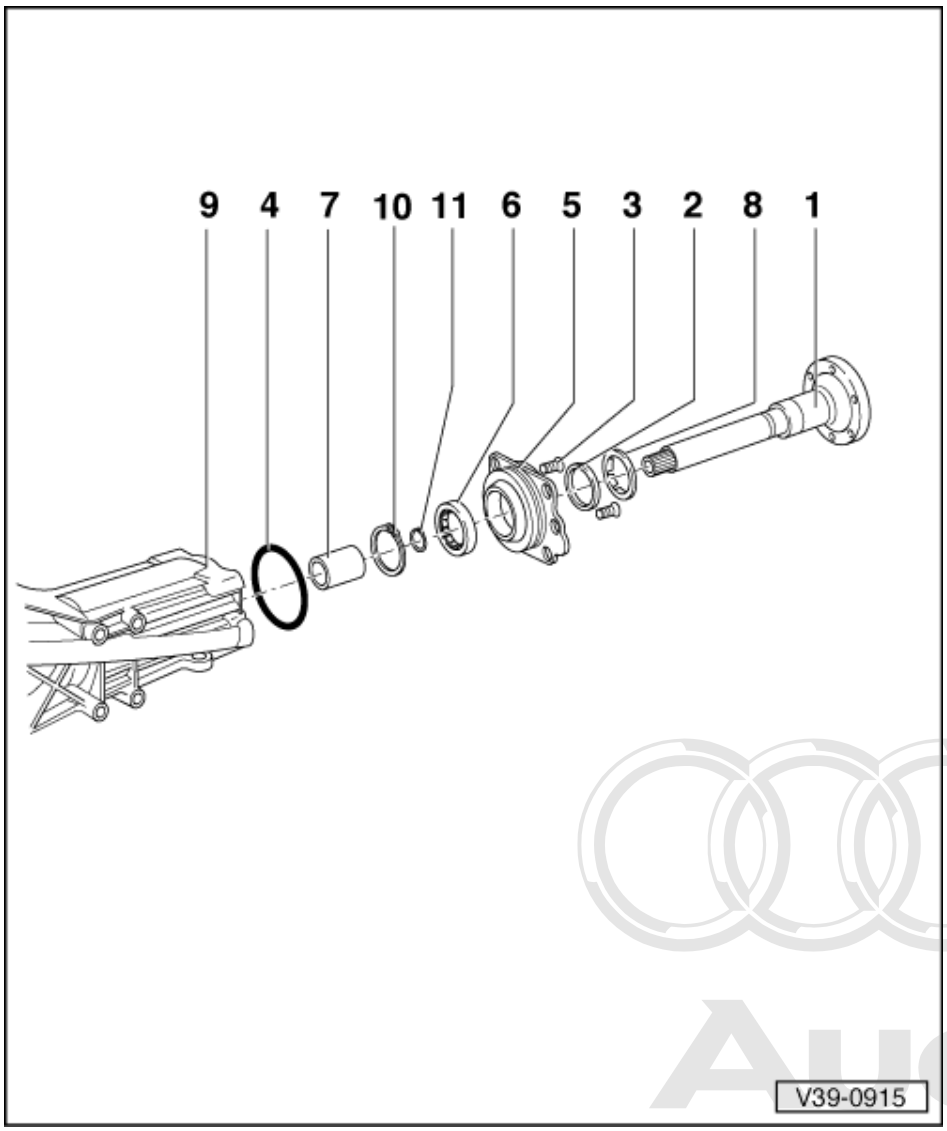
Note:

The seal and grooved ball bearing can be replaced with the rear final drive remaining installed. But the final drive must be lowered.

1 Flange shaft

- Observe position relative to propshaft, mark if necessary
- Always replace gasket between flange shaft and prop shaft ;remove protective sheet and bond gasket to flange shaft.

2 Gasket

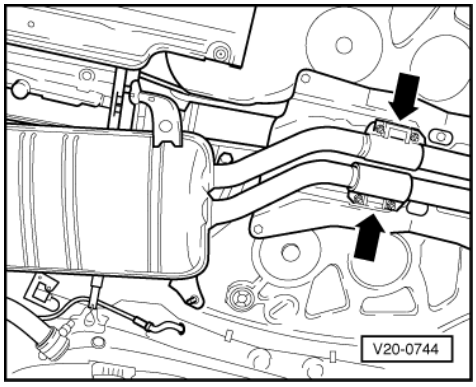


3 Countersunk bolt - 25 Nm
4 O-ring
- Always replace

5 Cap
6 Grooved ball bearing
7 Sleeve
8 Plastic washer
9 Housing of rear final drive
10 Large circlip
11 Small circlip

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

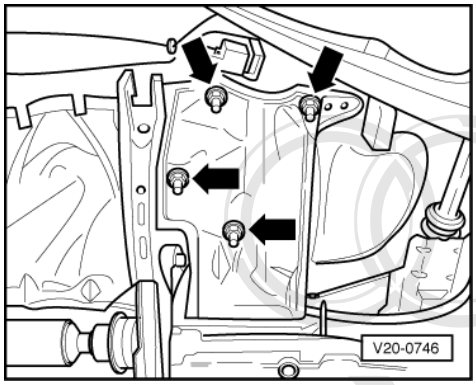


- -> Slacken double pipe clamps -arrows- and remove rear exhaust system

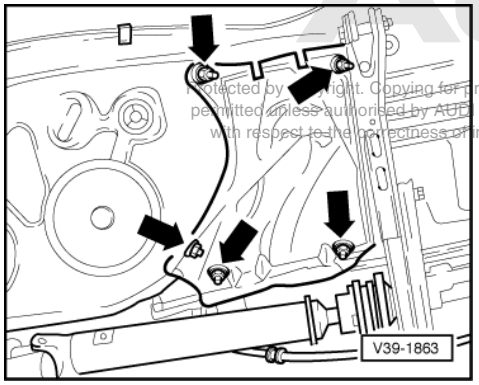
=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system

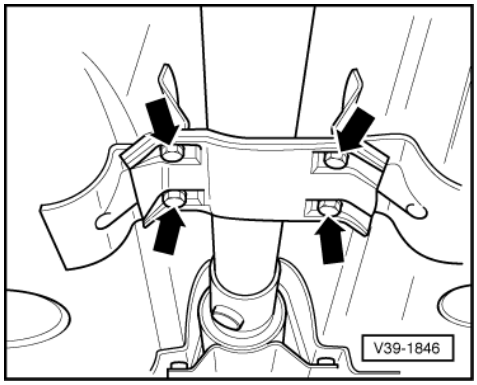


- -> Unbolt heat shield behind cross member l -arrows-.

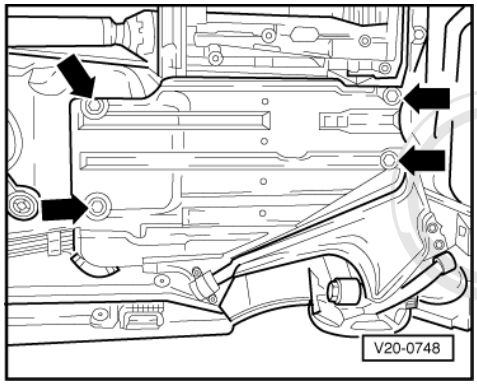


- -> Unbolt heat shield in front of cross member l -arrows-.

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.

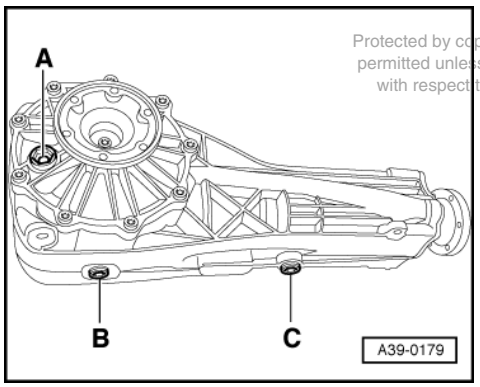


- -> Remove cross member with heat shield below propshaft -arrows-

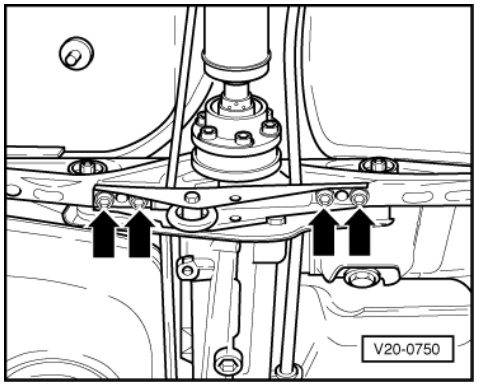


- -> Unbolt cover for fuel tank -arrows-.

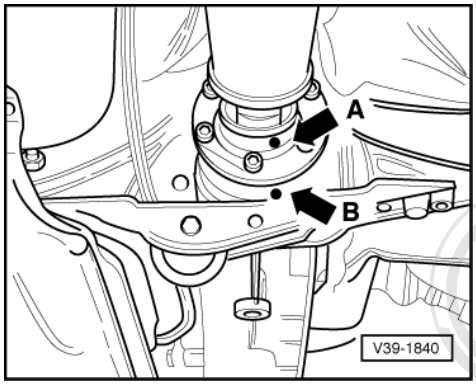
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



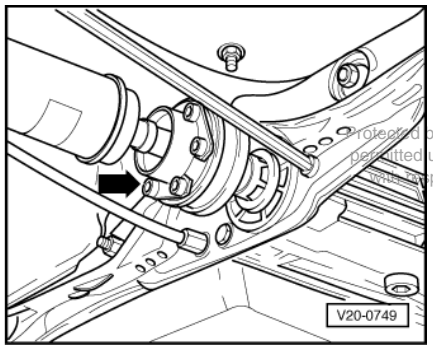
- Place oil drip tray underneath.
- -> Drain gear oil by unscrewing gear oil plugs -B- and -C-.



- -> Unbolt end plate -arrows-.



- -> If there is no mark, make a coloured mark on rear final drive -B- to indicate the position of prop shaft flange -A-.

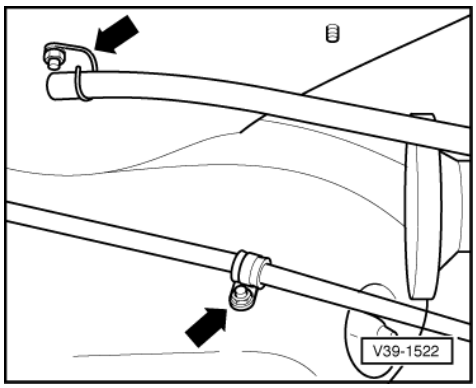


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Remove securing bolts of propshaft at rear final drive.
- Tie up propshaft.

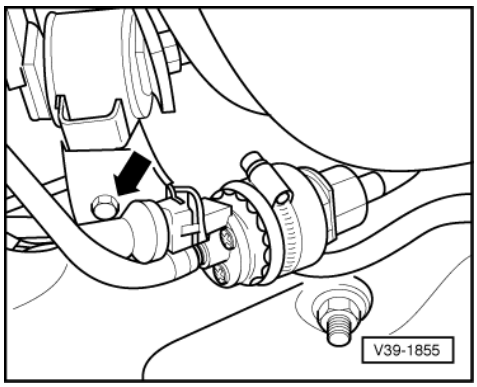
Note:

Do not bend the propshaft more than 25oat the central joint, otherwise the universal joint will be damaged.

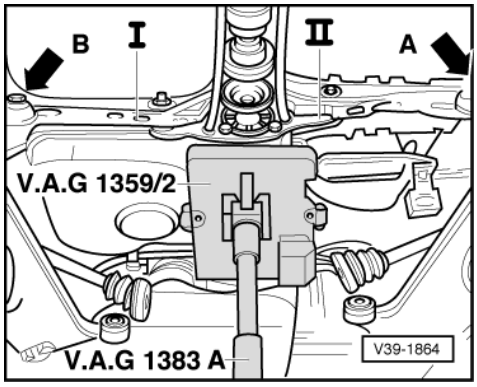


- -> Unscrew brackets for handbrake cables -arrows-.
- Slacken adjusting nut for handbrake cables and detach cables at compensating plate

=> Running gear Four-wheel drive; Repair group 46; Servicing handbrake Servicing handbrake



- -> Vehicles with auxiliary heater: Remove bracket for metering pump -arrows-.

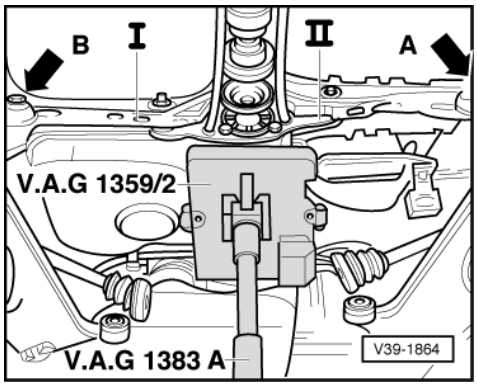


- -> Support final drive with gearbox jack V.A.G 1383 A and V.A.G 1359/2.
- Secure final drive with strap.
- Carefully pull handbrake cables back through eyes of cross member II.
- Slacken bolt -arrow A- for cross member I.

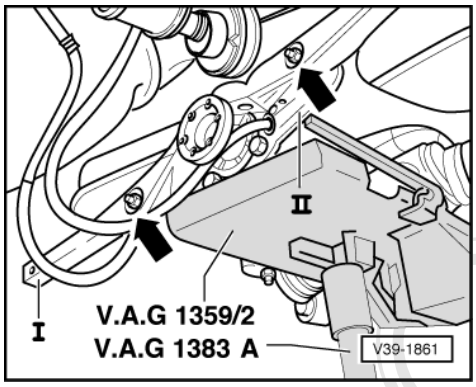
Note:

Bolts attaching rear final drive are not slackened.

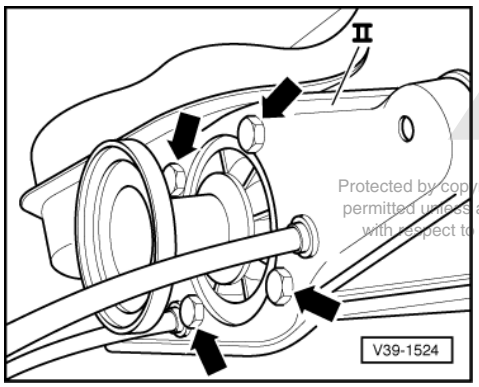
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Unscrew bolt -arrow B- for cross member I and carefully lower final drive with gearbox jack.
- Vehicles with mechanical differential lock ä 05.94: Unclip cable to differential lock control switch (above final drive) from its fixture.

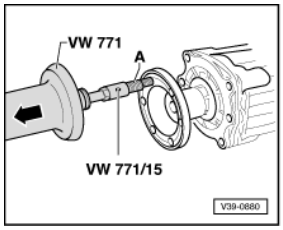


- -> Unbolt cross member 11 from cross member I -arrows-.
- Tie up cross member I.



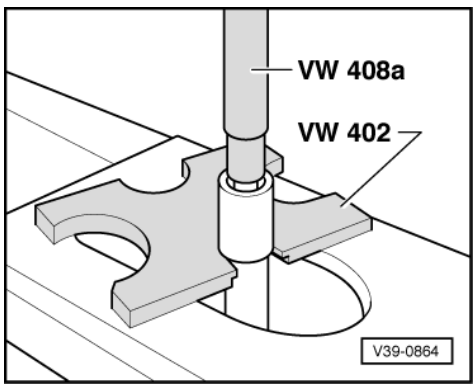
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Unbolt cross member 11 from final drive -arrows- and push away over flange shaft of final drive.

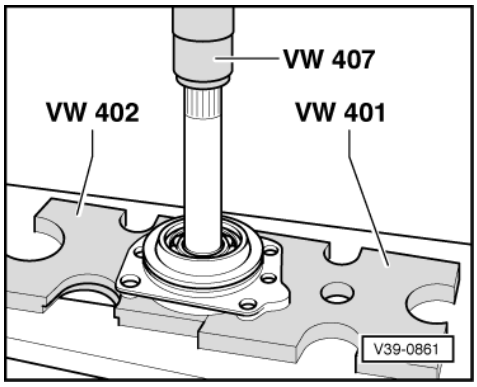


- -> Unbolt cover from final drive and pull out together with flange shaft.

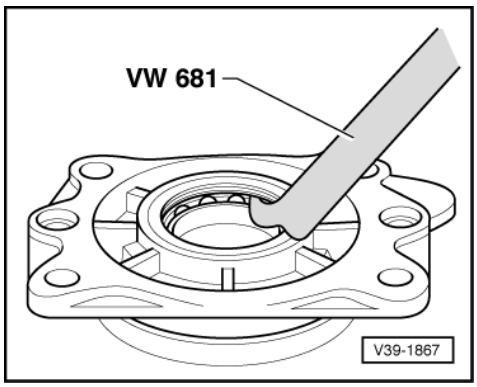
A - Stud M8/M10



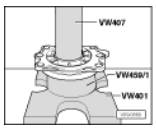
- -> Press off sleeve.



- Take off small circlip (positioned in front of grooved ball bearing).
- -> Press out flange shaft.

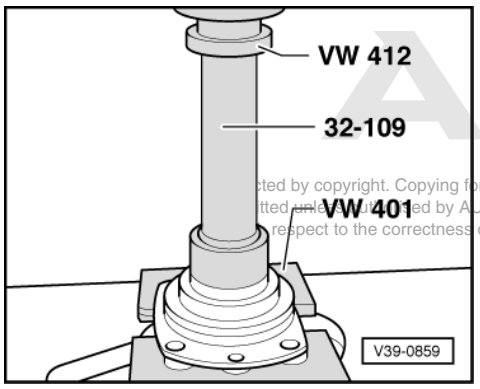


- -> Lever out seal.
- Clean seat for seal.



- Remove large circlip from cover.
- -> Press out grooved ball bearing.

Installation



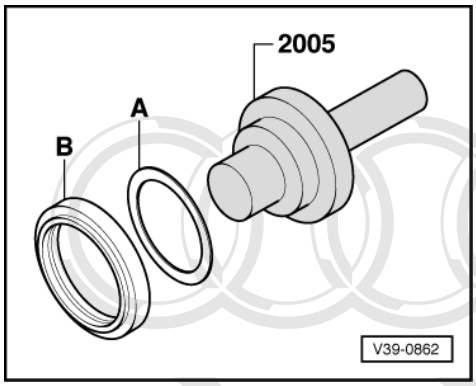
cted by copyright. Copying for private or commercial purposes, in part or in whole, is not
tted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability
respect to the correctness of information in this document. Copyright by AUDI AG.

Installation is carried out in the reverse order.

Note:

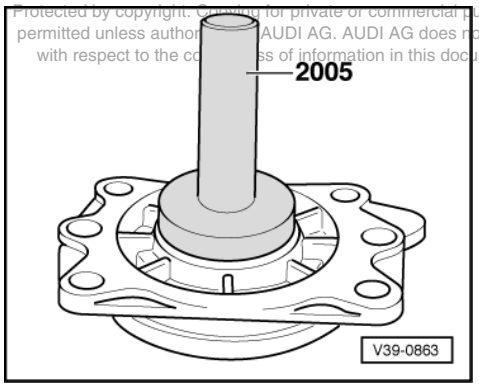
Replace self-locking bolts and nuts.

- -> Press in grooved ball bearing.
- Insert large circlip into cover.

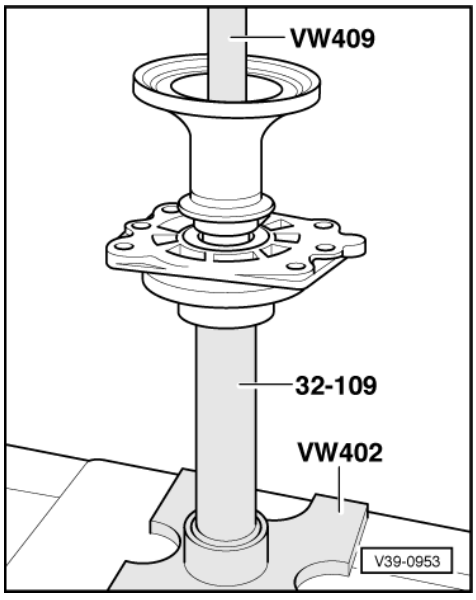


- -> Insert new seal -B- on to insertion drift 2005 using setting ring -A- Part No. 016 311 391 P (thickness 1.05 mm).
- Thoroughly clean seat for seal in cover.
- Coat outer circumference of seal with gear oil.

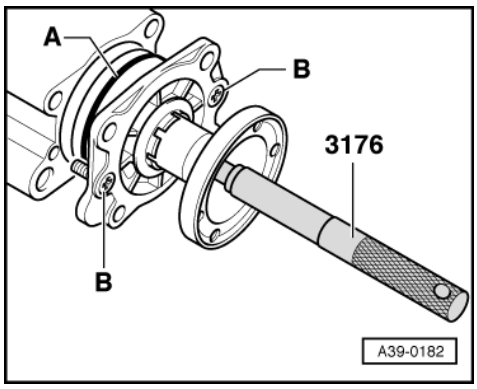
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



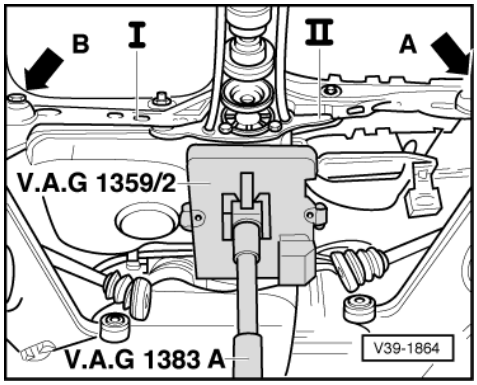
- -> Use drift 2005 and ring to insert seal for flange shaft as far as stop.
- Pack space between sealing and dust lips with multi-purpose grease.



- Fit plastic ring onto flange shaft => Page 242 , -Item 8 -
- -> Press in flange shaft.
- Fit small circlip.
- Fit sleeve and knock on with plastic-headed hammer.



- -> Always replace O-ring -A- and oil lightly before installing.
- Use 3176 to knock in flange shaft and cover.
- Tighten countersunk screws -B- to 25 Nm.



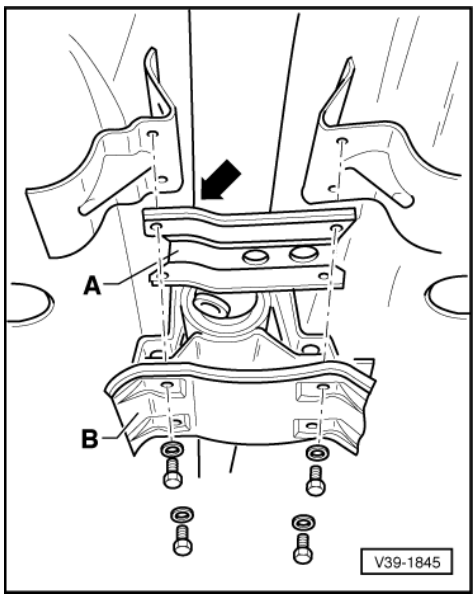
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Bolt cross member 11 to final drive.
- Bolt cross member I to cross member 11 and body.
- Vehicles with auxiliary heater: Attach bracket with metering pump.
- Attach bracket for handbrake cables.
- Attach handbrake cables in compensating plate and adjust handbrake.

=> Running gear Four-wheel drive; Repair group 46; Servicing handbrake Servicing handbrake

- Top-up gear oil in rear final drive and check oil level => Page 240 .

- The radial run-out at flange shaft must always be measured and marked =>Page 252 .
- Replace gasket on flange shaft and tighten propshaft securely. Observe fitting instructions => Page 231 .



- Bolt on end plate.
- Install cover for fuel tank.
- -> Install front cross member together with heat shield below propshaft.
  - Side with shoulder -arrow- points in direction of travel to left.
- Install heat shields in front of and behind cross member I.
- Install exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

Tightening torques

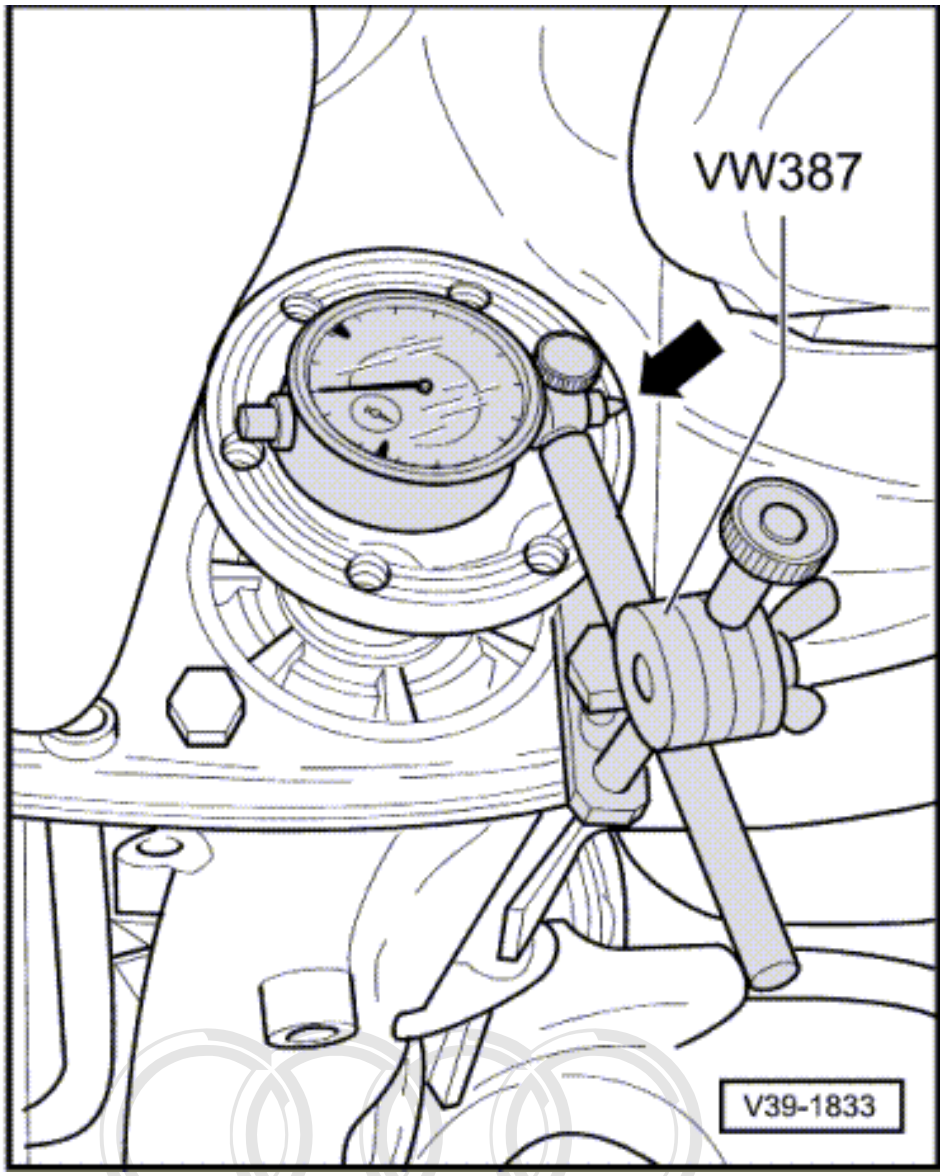
Component	Nm
Oil drain/filler plug	25
Cover to rear final drive	25
Cross member 11 to rear final drive	45
Cross member I to cross member 11	45
Cross member I to body	45
End plate to cross member I	55
Bracket for metering pump to body 1)	25
Propshaft to flange shaft M8	55
Cover for fuel tank to body	20
Cross member with heat shield to body	25
Double pipe clamp to exhaust system	40

1) Vehicles with auxiliary heater

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.

11.2 - Measuring and marking radial run-out at propshaft flange

Notes:

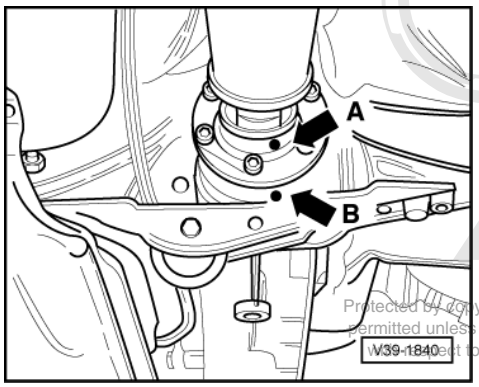


- It is always necessary to measure radial run-out at flange shaft if flange shaft has been removed.
- The radial run-out can be measured when rear final drive is installed but the propshaft must be disconnected at rear final drive. Observe notes=> Page 227 .

- -> Secure universal dial gauge retainer VW 387 with dial gauge to cross member/final drive bolted joint.
- Position the dial gauge to the ground diameter -arrow- in propshaft flange -arrow- and set to "0" with a preload of 1 mm.
- Rotate the differential by turning the two rear wheels (left and right-hand flange shafts) simultaneously in one direction until the propshaft flange has undergone one complete revolution.
- Mark the position of greatest radial run-out on flange exterior (equates to greatest distance from rotational axis).

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.

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.

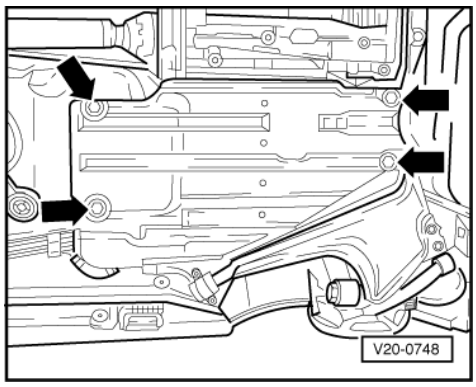


- Remove old marking on flange shaft.
- -> Bolt on propshaft.
  - Marking on propshaft joint -A- should be aligned with new marking on flange shaft -B-

12 - Removing and installing flange shaft oil seals

12.1 - Removing and installing flange shaft oil seals

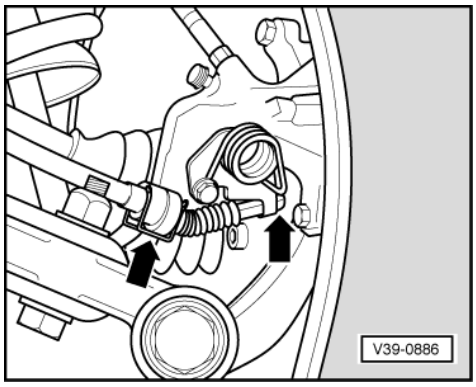
12.2 - Renewing flange shaft oil seal (right)



- Rear final drive installed

Removing

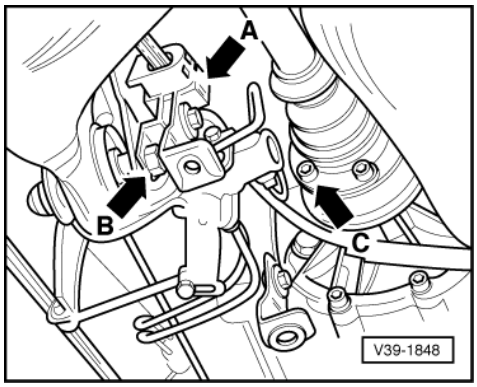
- -> Unbolt cover for fuel tank -arrows-.



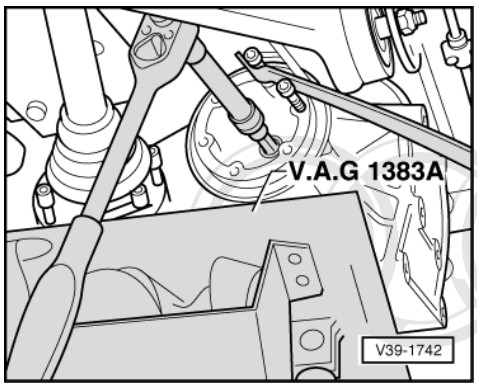
- -> Detach handbrake cable at right brake calliper -arrows-.

Note:

When detaching handbrake cable, it is important to ensure that plastic sheathing of handbrake cable is not damaged.

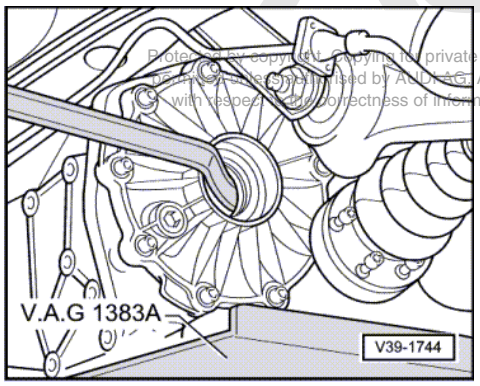


- -> Press handbrake cable out of fixture -arrow A-.
- Unbolt trapezium link from cross member -arrow B- and carefully lower with gearbox jack V.A.G 1383 A.
- Unbolt drive shaft from flange shaft -arrow C- and place down.



- -> Remove flange shaft. To loosen the securing bolt, screw two bolts into the flange shaft and counter-hold with a lever.
- Place oil drip tray underneath and pull 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.



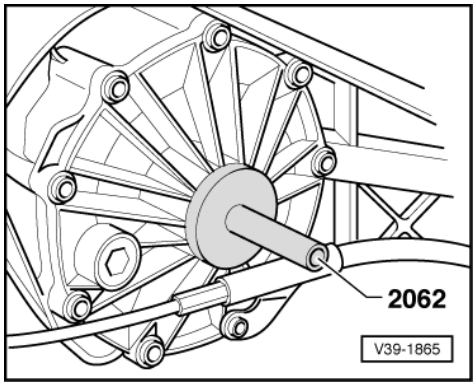
- -> Lever out flange shaft oil seals using a suitable lever.
- Clean seat for oil seal.

Installation

Installation is carried out in the reverse order. Observe following points.

- Coat outer circumference of seal with gear oil.

- Pack space between sealing and dust lips with multi-purpose grease.



- -> Install oil seal onto stop with drift 2062, do not cant seal.
- Insert flange shaft.
- Screw in taper head bolt for attaching flange shaft.
- Always replace gasket between drive shaft and flange shaft ;remove protective sheet of gasket and bond gasket to flange shaft.
- Bolt on drive shaft

=> Running gear, Four.-wheel drive; Repair group 42; Removing and installing drive shaft, suspension strut, steering arm, wheel bearing housing, coupling rod and anti-roll bar; Removing and installing drive shaft Removing and installing drive shaft, suspension strut, steering arm, wheel bearing housing, coupling rod and anti-roll bar Removing and installing drive shaft

- Bolt trapezium link onto cross member

=> Running gear, Four-wheel drive; Repair group 42; Servicing trapezium link; Removing and installing trapezium link Servicing trapezium link Removing and installing trapezium link

- Attach handbrake cable to brake calliper and press into fixture.
- Install cover for fuel system.
- Top-up gear oil in rear final drive and check oil level => Page 240.

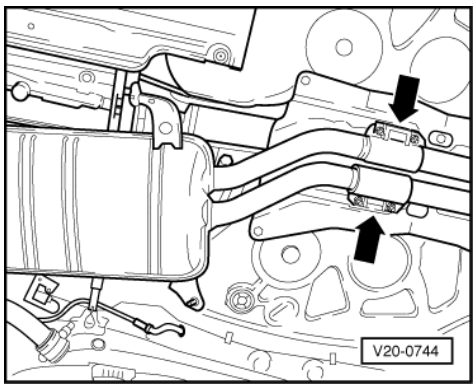
Audi Technical Publications. Reproduction, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Tightening torques

Component	Nm
Flange shaft to final drive M8	10 + 90o
Drive shaft to flange shaft M10	80
Trapezium link to control arm	85 1)
Cover plate for fuel tank to body	20

1) Replace self-locking nuts.

12.3 - Renewing flange shaft oil seal (left)



- Rear final drive installed

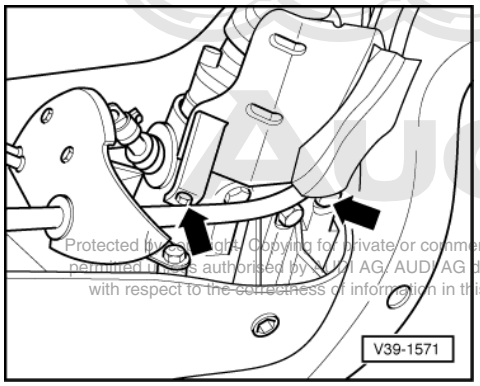
- -> Slacken double pipe clamps -arrows- and disconnect exhaust system

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

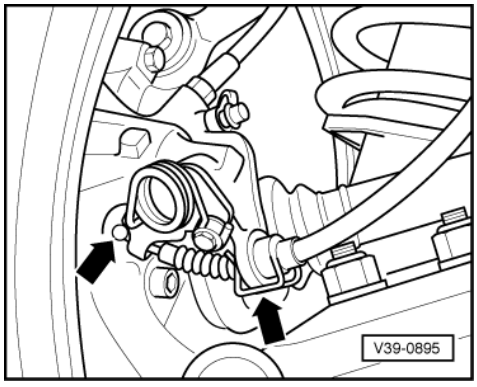
=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system

- Detach main and rear silencers from retaining loops.



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.

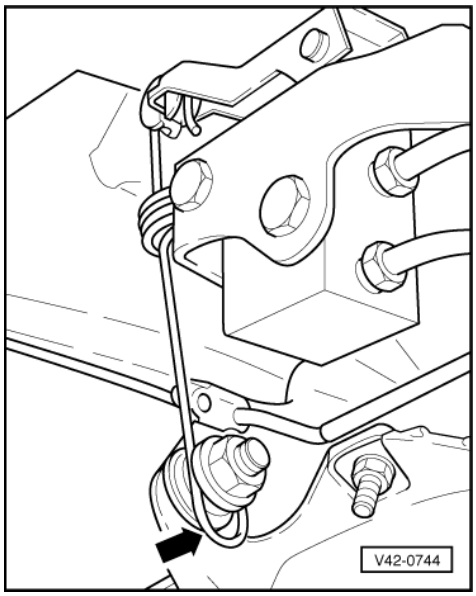
- -> Remove cover plate for drive shaft -arrows-.



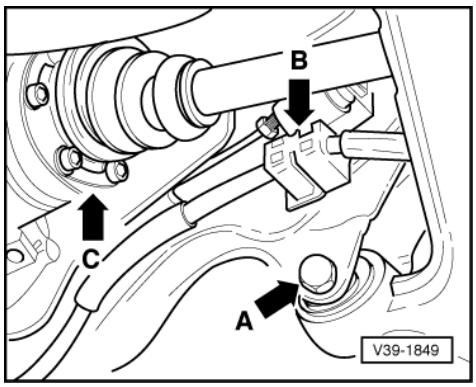
- -> Detach handbrake cable at left brake calliper -arrows-.

Note:

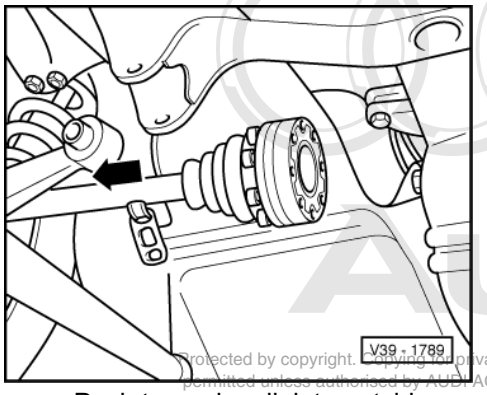
When detaching handbrake cable, it is important to ensure that plastic sheathing of handbrake cable is not damaged.



- -> Vehicles without self-levelling suspension: Detach spring for brake pressure regulator -arrow-.

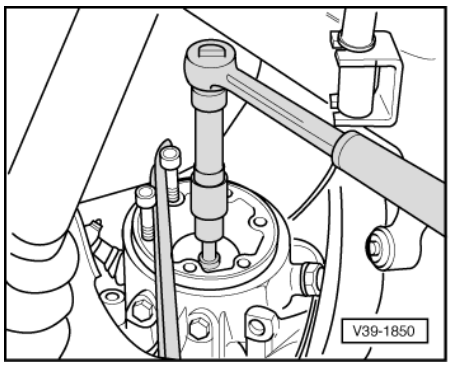


- -> Unbolt trapezium link from cross member -arrow A- and carefully lower with gearbox jack V.A.G 1383 A.
- Press handbrake cable out of fixture -arrow B-.
- Unbolt drive shaft from flange shaft -arrow C-.



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.

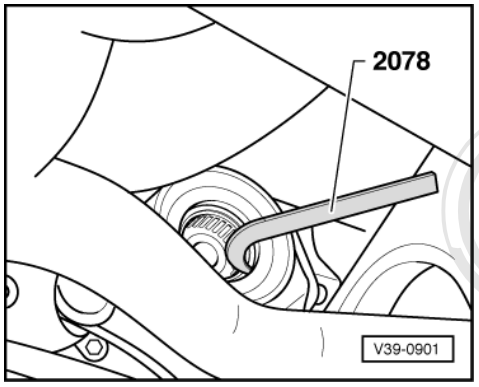
- -> Push trapezium link to outside -arrow- and place down drive shaft.



- Place oil drip tray underneath.
- -> Remove flange shaft. To loosen the securing bolt, screw two bolts into the flange shaft and counter-hold with a lever.
- Pull out flange shaft using the bolts already screwed in.

Note:

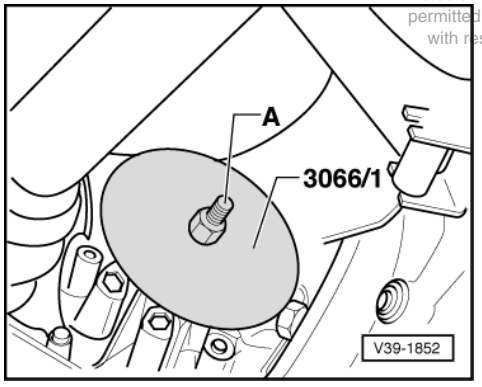
On vehicles ‣ 05.94 with mechanical differential lock, a shim is located between flange shaft and differential and this has to be re-installed.



- -> Lever out flange shaft oil seals using a suitable lever.
- Clean seat for oil seal.

Installation

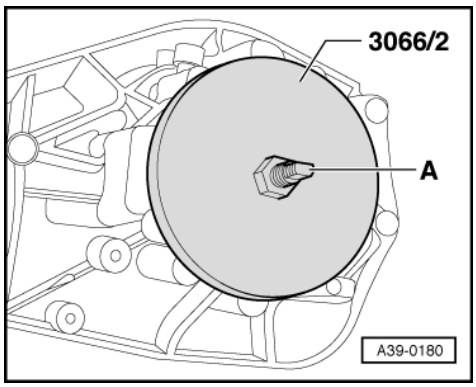
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Installation is carried out in the reverse order. Observe following points.

- Coat outer circumference of seal with gear oil.
- Pack space between sealing and dust lips with multi-purpose grease.
- -> Screw threaded rod -A- from assembly device 3066 into differential.

Vehicles with differential lock:



- Fit seal onto thrust plate 3066/1 and spindle in as far as stop using hexagon nut from 3066.

Vehicles without differential lock:

- -> Spindle in seal as far as stop using thrust plate 3066/2.

- Insert flange shaft.

Note:

On vehicles ‣ 05.94 with mechanical differential lock, a shim is located between flange shaft and differential and this has to be re-installed..

- Screw in taper head bolt for attaching flange shaft.
- Always replace gasket between drive shaft and flange shaft; remove protective sheet of gasket and bond gasket to flange shaft.
- Bolt on drive shaft

=> Running gear, Four-wheel drive; Repair group 42; Removing and installing drive shaft, suspension strut, steering arm, wheel bearing housing, coupling rod and anti-roll bar; Removing and installing drive shaft Removing and installing drive shaft, suspension strut, steering arm, wheel bearing housing, coupling rod and anti-roll bar Removing and installing drive shaft

- Bolt trapezium link onto cross member

=> Running gear, Four-wheel drive; Repair group 42; Servicing trapezium link; Removing and installing trapezium link Servicing trapezium link Removing and installing trapezium link

- Vehicles without self-levelling suspension: Attach spring to brake pressure regulator.
- Adjust brake pressure regulator and check.

=> Running gear, Four-wheel drive; Repair group 47; Checking and adjusting brake pressure regulator Checking and adjusting brake pressure regulator

- Attach handbrake cable to brake calliper and press into fixture.
- Install cover plate for drive shaft.
- Top-up gear oil in rear final drive and check oil level => Page 240 .
- Install exhaust system free of stress

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 accuracy of the information in this document. Copyright by AUDI AG.

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

Tightening torques

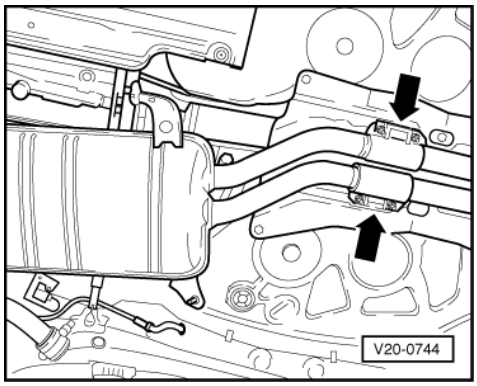
Component	Nm
Flange shaft to final drive M8	10 + 90o
Drive shaft to flange shaft M10	80
Trapezium link to cross member M12	85 1)
Cover plate to drive shaft	25
Double pipe clamp to exhaust system	40

1) Replace self-locking nuts.

13 - Removing and installing rear final drive

13.1 - Removing and installing rear final drive

Removing

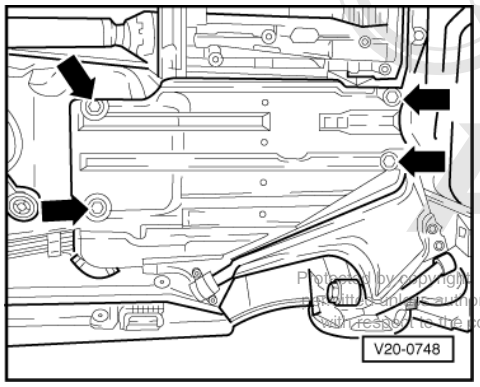


- -> Slacken double pipe clamps -arrows- and remove rear exhaust system

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

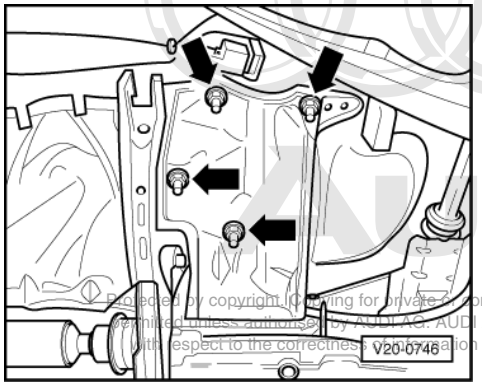
=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system



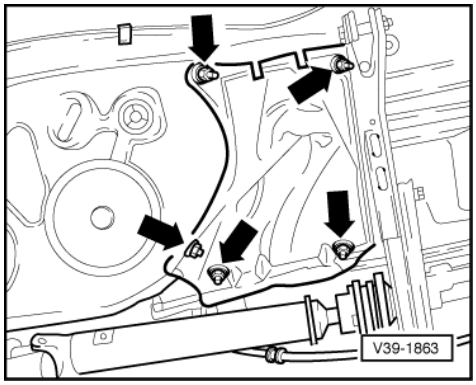
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Unbolt cover for fuel tank -arrows-.

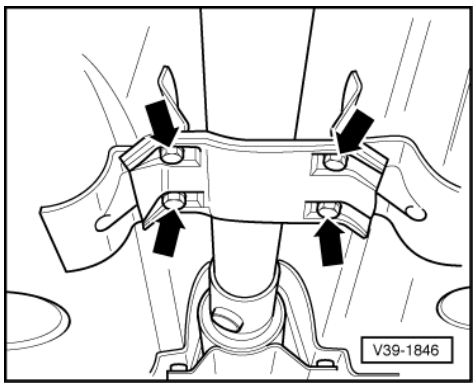


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

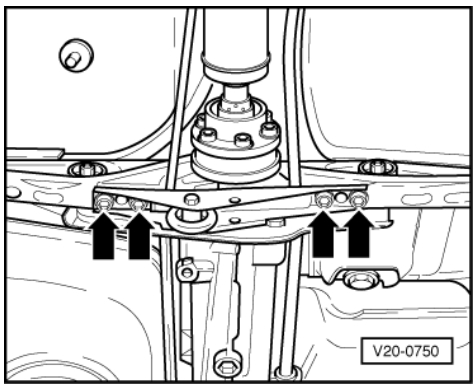
- -> Unbolt heat shield behind cross member I -arrows-.



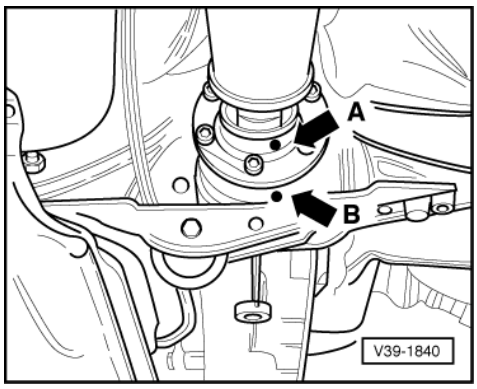
- -> Unbolt heat shield in front of cross member I -arrows-.



- -> Remove cross member with heat shield below propshaft -arrows-



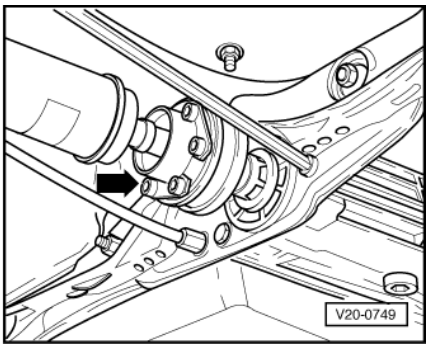
- -> Unbolt end plate -arrows-.



- -> Mark position of propshaft flanges -arrow A- to rear final drive -arrow B- with paint, if not already marked.

Note:

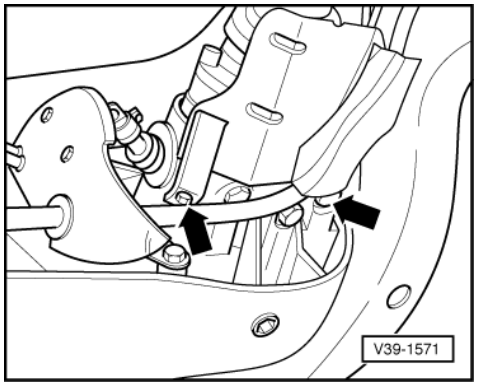
After balancing propshaft, base plates of a different thickness may have to be installed. Mark installation position before removing and observe marking when installing.



- -> Remove securing bolts of propshaft at rear final drive.
- Tie up propshaft.

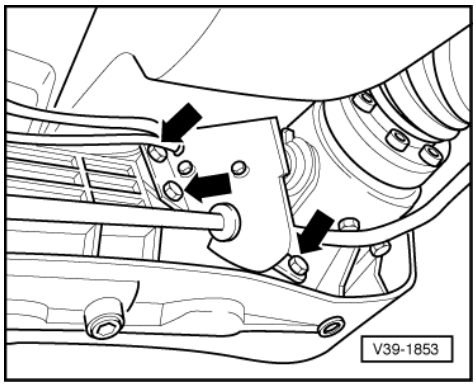
Note:

Do not bend the propshaft more than 25oat the central joint, otherwise the universal joint will be damaged.

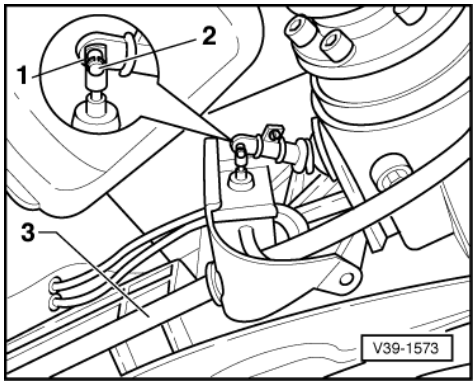


- -> Remove cover plate for left drive shaft -arrows-.

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.

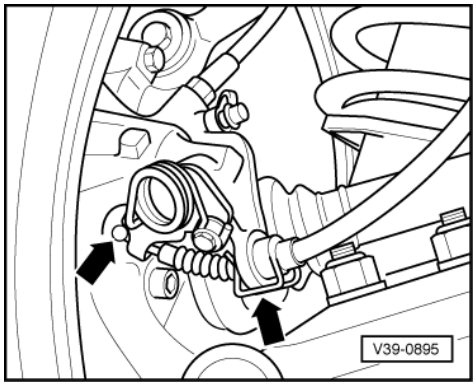


- -> Vehicles with mechanical differential lock ä 05.94: Unbolt bracket for vacuum element and rear final drive -arrows-.



- -> Release securing clip -1-.
- Push pin connecting vacuum element/shift fork -2- up.
- Pull handbrake cable -3- together with rubber grommet out of mounting plate.
- Vehicles with mechanical differential lock ä 05.94: Pull off cable for differential lock control switch.

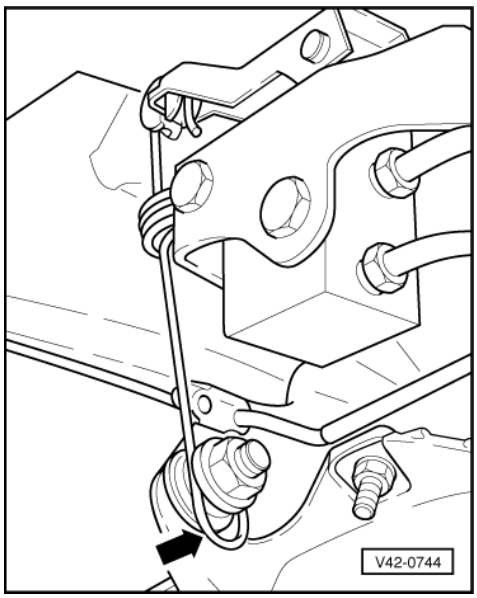
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



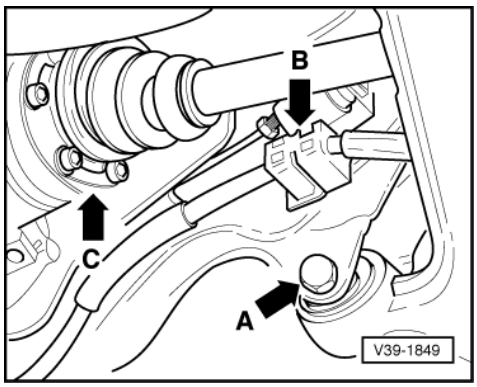
- -> Detach handbrake cable at left brake calliper -arrows-.

Note:

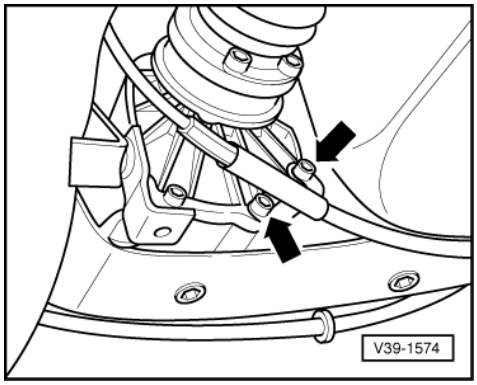
When detaching handbrake cable, it is important to ensure that plastic sheathing of handbrake cable is not damaged.



- -> Vehicles without self-levelling suspension: Detach spring for brake pressure regulator -arrow-.

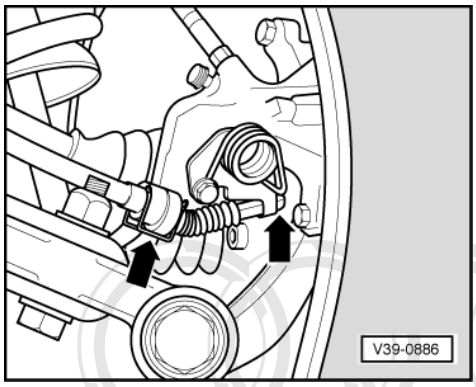


- -> Press left handbrake cable out of fixture -arrow B-.
- Unbolt left drive shaft -arrow C- from flange shaft and tie up.



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.

- -> Unbolt right-hand bracket of handbrake cable -arrows- from rear final drive.

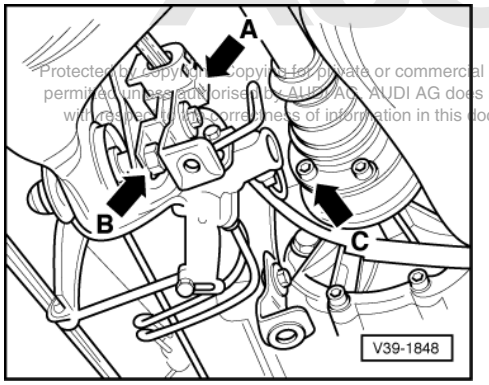


- -> Detach handbrake cable at right brake calliper -arrows-.

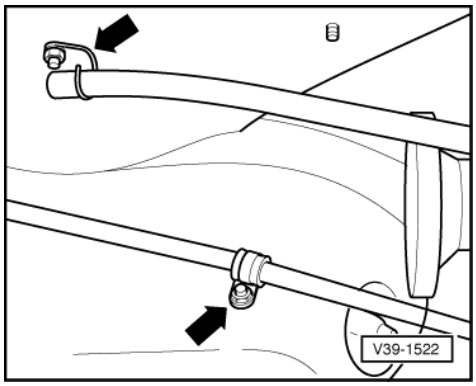
Note:

When detaching handbrake cable, it is important to ensure that plastic sheathing of handbrake cable is not damaged.

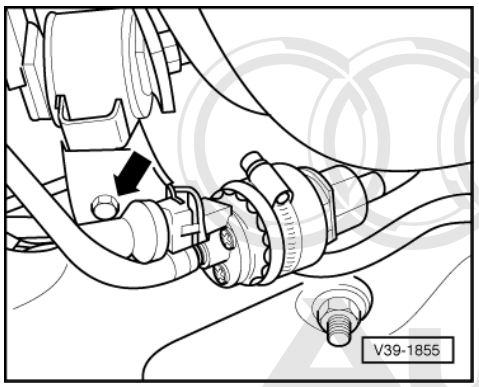
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Press handbrake cable out of right-hand fixture -arrow A-.
- Unbolt right drive shaft -arrow C- from flange shaft and place down.

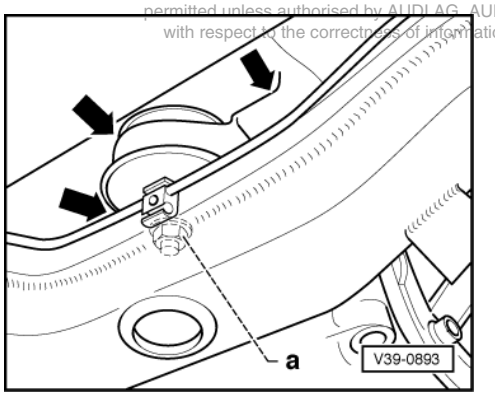


- -> Unscrew brackets for handbrake cables -arrows-.

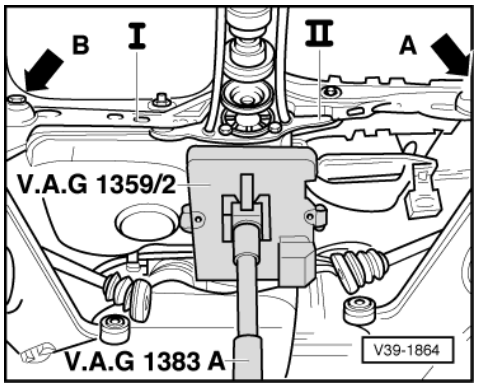


- -> Vehicles with auxiliary heater: Remove bracket for metering pump -arrows-.

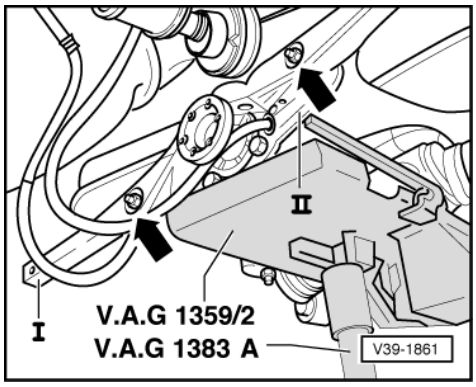
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



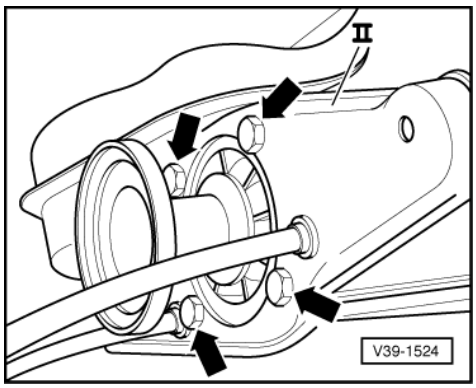
- Support final drive with gearbox jack V.A.G 1383 A and V.A.G 1359/2.
- Secure final drive with strap.
- -> Slacken nut for gearbox mount -a- at rear cross member and remove 3 bolts -arrows-.



- Carefully pull handbrake cables back through eyes of cross member II.
- -> Unscrew bolts -arrows A and B- for cross member I.
- Lower final drive a little with gearbox jack.
- Vehicles with mechanical differential lock ä 05.94: Unclip cable to differential lock control switch (above final drive) from its fixture.



- -> Unbolt cross member I from cross member 11 -arrows-.
- Tie up cross member I.

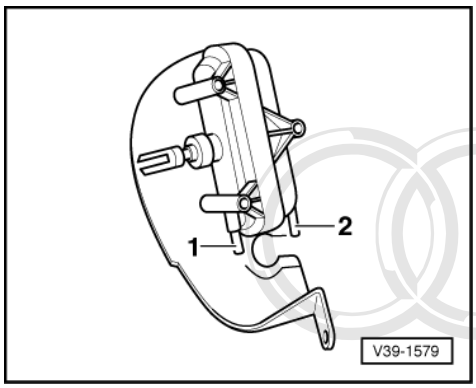


- -> Unbolt cross member 11 from final drive -arrows- and push away over flange shaft of final drive.
- Pull final drive forward and lower slowly complete with rear gearbox mount.

Note:

When lowering, also pull final drive away from fuel tank to the left.

Installation



Installation is carried out in the reverse order. Observe following points.

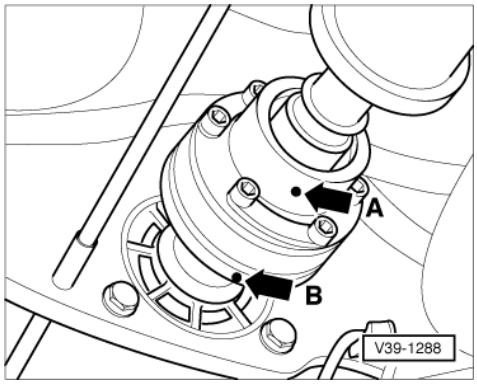
- -> Coloured marking of vacuum hoses:
  - Yellow hose to connection -1-
  - Blue hose to connection -2-

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.

Notes:

- Always replace self-locking nuts.

- It is essential that the residues of locking fluid are cleaned out from the threaded holes in flange shaft on the rear final drive after removing the propshaft. Otherwise there is a danger that new bolts will seize and then shear when removing them again.



- Threaded holes can be cleaned with a thread tap.
- Renew gaskets on flange shafts (pull off protective foil and stick onto flange shaft.
- -> To prevent imbalance, the flanges must be installed so that the paint markings align -arrows A and B-. Install propshaft => Page 227 .
- After removing the propshaft from rear final drive, the additional balance disc (thick washer) that may be located between lock plate and bolt head must not be reinstalled.
- Replace prop shaft bolts (self-locking).
- Observe marking of base plates when installing.

- Top-up gear oil in rear final drive and check oil level => Page 240 .

- Install exhaust system free of stress

=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system; Aligning exhaust system free of stress Removing and installing parts of exhaust system Aligning exhaust system free of stress

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system; Aligning exhaust system free of stress Removing and installing exhaust system Aligning exhaust system free of stress

Tightening torques

Component	Nm
Cross member 11 to rear final drive	45
Cross member I to cross member 11	45
Cross member I to body	45
Gearbox support/gearbox mount to rear final drive	45
Gearbox mount to rear cross member	45
End plate to cross member I	55
Trapezium link to cross member M12	85 1)
Flange shaft to final drive M8	10 + 90o

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.

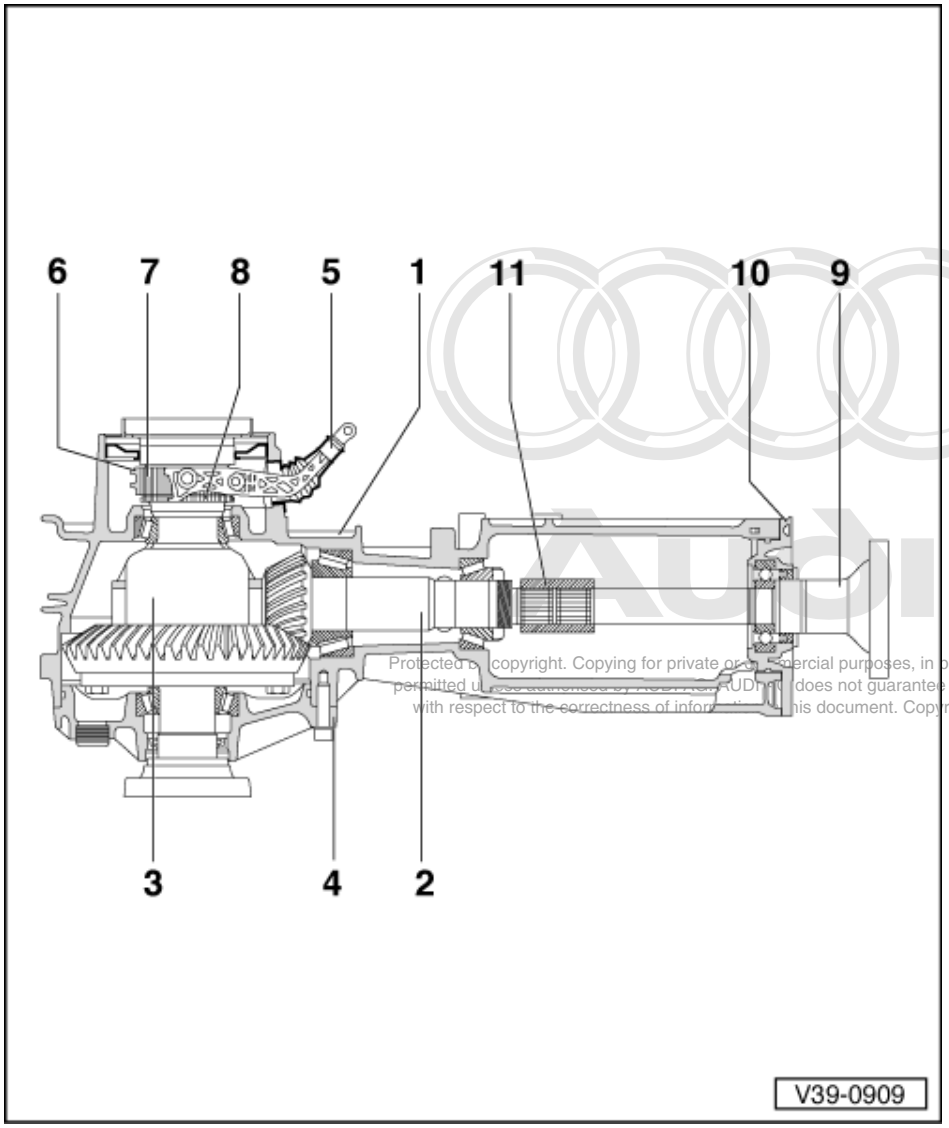
1) Replace self-locking nuts.

Component	Nm
Drive shaft to flange shaft M10	80
Cross member with heat shield to body	25
Cover plate for drive shaft to rear final drive	25
Mounting plate for vacuum unit to rear final drive	25

Component	Nm
Bracket for handbrake cable	25
Bracket for metering pump to body	25
Prop shaft to rear final drive	55
Cross member with heat shield to body	25
Cover for fuel tank to body	20
Double pipe clamp to exhaust system	40
Oil drain/filler plug	25

14 - Dismantling and assembling rear final drive

14.1 - Dismantling and assembling rear final drive



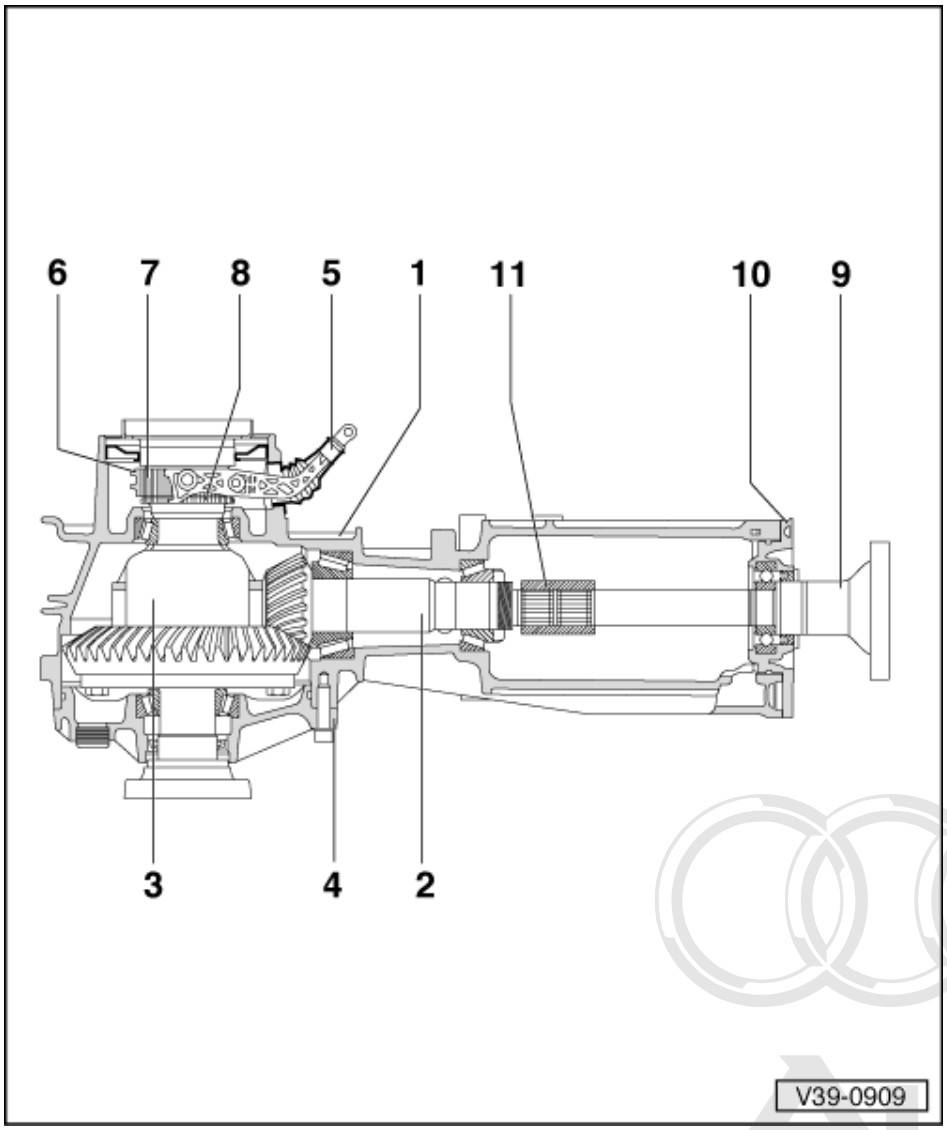
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

14.2 - Assembly overview

Note:

On vehicles 06.94 ‣ the mechanical differential lock in rear final drive was discontinued. Discontinued components:

- Selector fork -Item 5 -
- Locking collar -Item 6 -
- Synchro-hub -Item 7 -
- Coupling body for differential lock -Item 8 -



1 Final drive housing

2 Drive pinion

- Paired with crown wheel
- Removing and installing => Page 294

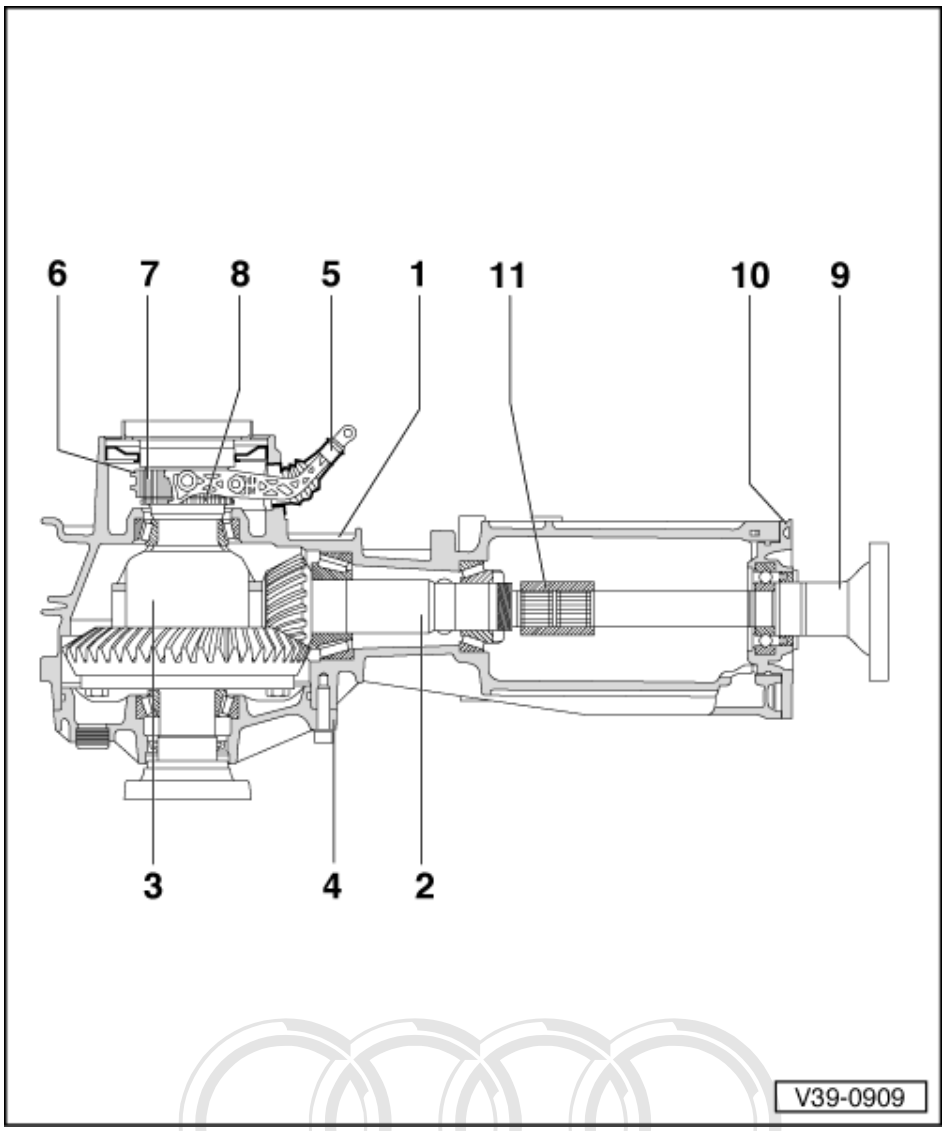
3 Differential with crown wheel

- Must be removed before dismantling drive pinion
- Crown wheel is paired with drive pinion
- Removing and installing => Page 272

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.

- Dismantling and assembling =>Page 283

4 Final drive cover

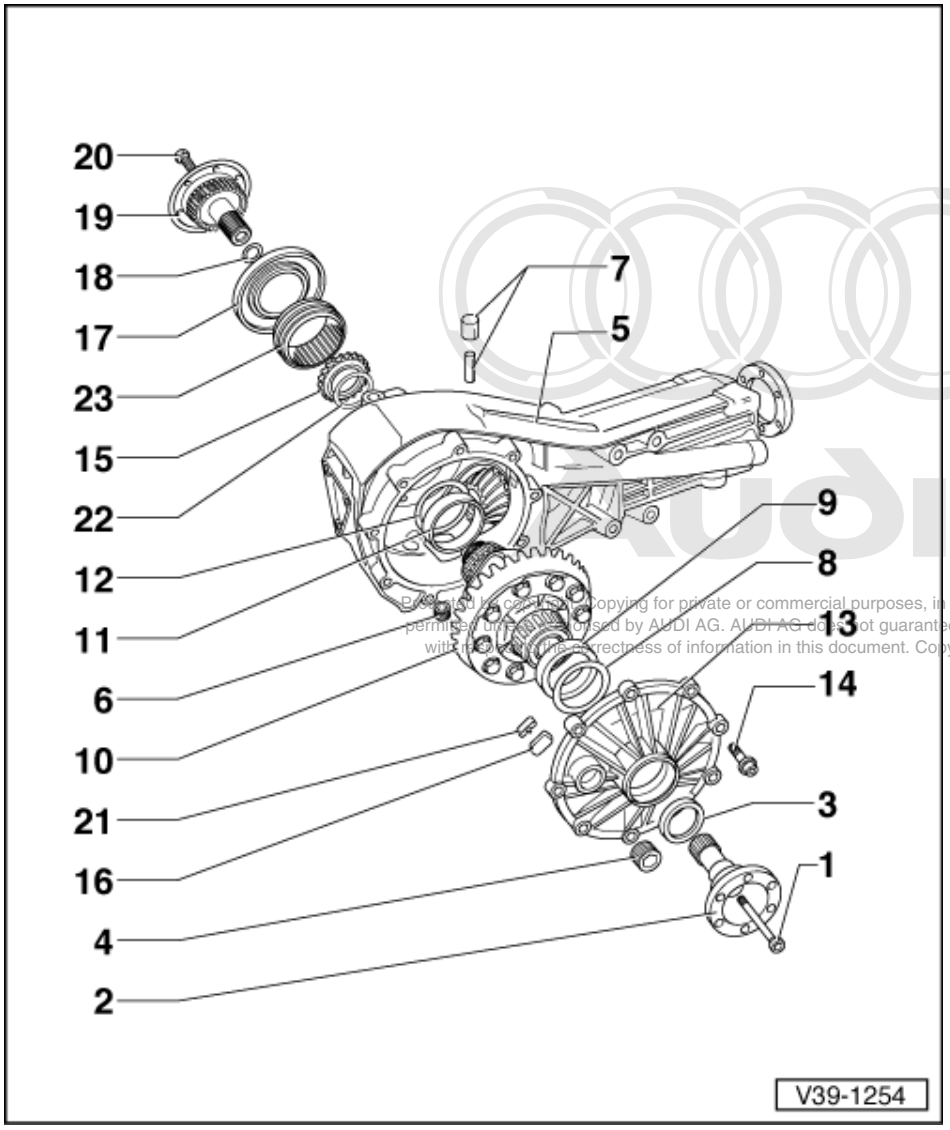


5 Selector fork
6 Locking collar
7 Synchro-hub
8 Coupling body for differential lock
9 Flange for propshaft
- Removing and installing => Page 296 , -Item 10 -

10 Final drive cover
11 Sleeve

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.

14.3 - Removing and installing differential together with differential lock



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.

Notes:

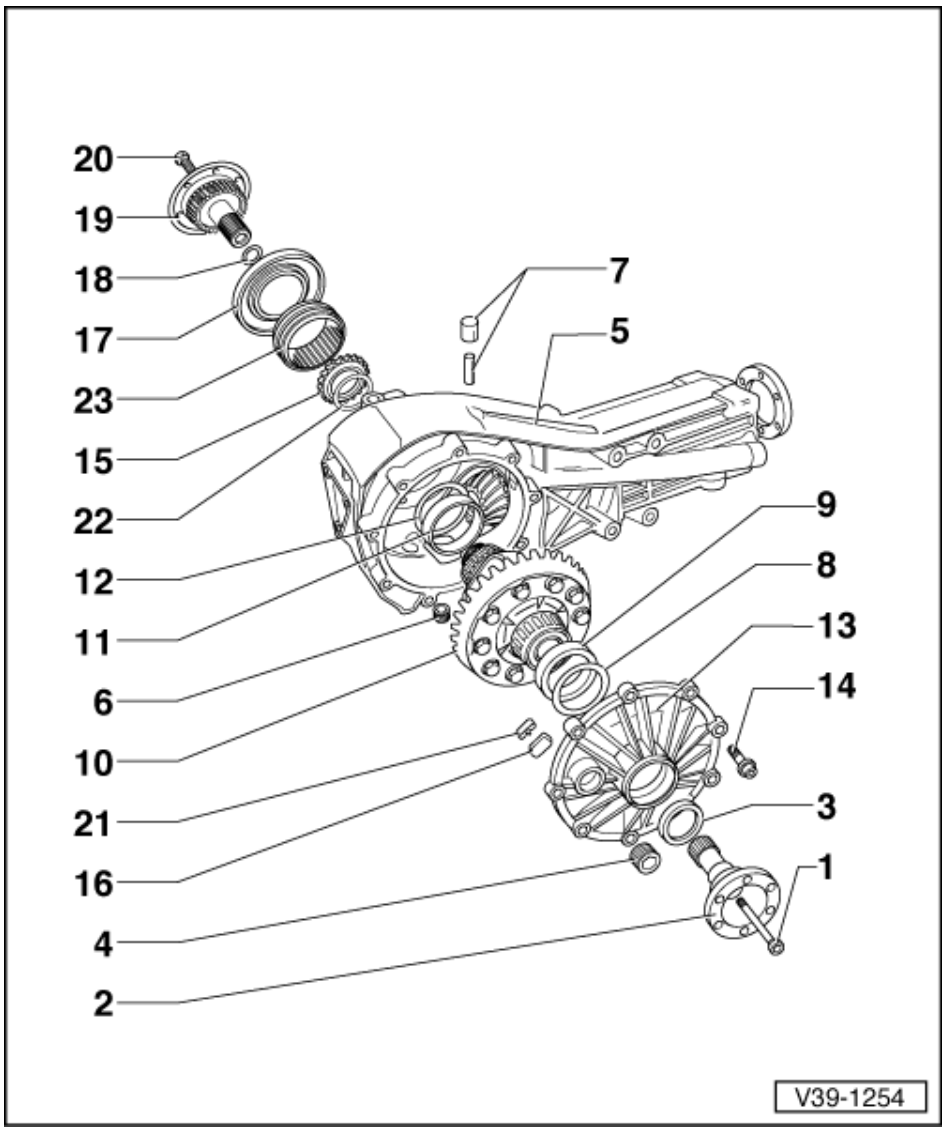
- Secure final drive on a repair stand => Page 281 .
- Observe the general repair instructions =>Page 11 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 318 .

1 Taper head bolt M8 - 10 Nm + 1/4 turn (90o) further

2 Flange shaft, right

3 Seal, right

- Levering out=>Page 254
- Use 2062 to insert as far as stop=>Page 255



4 Oil filler plug - 25 Nm

5 Final drive housing 1)

- With drive pinion
- Removing and installing drive pinion => Page 294

6 Oil drain plug - 25 Nm

7 Breather

- Dimension=>Fig. 1

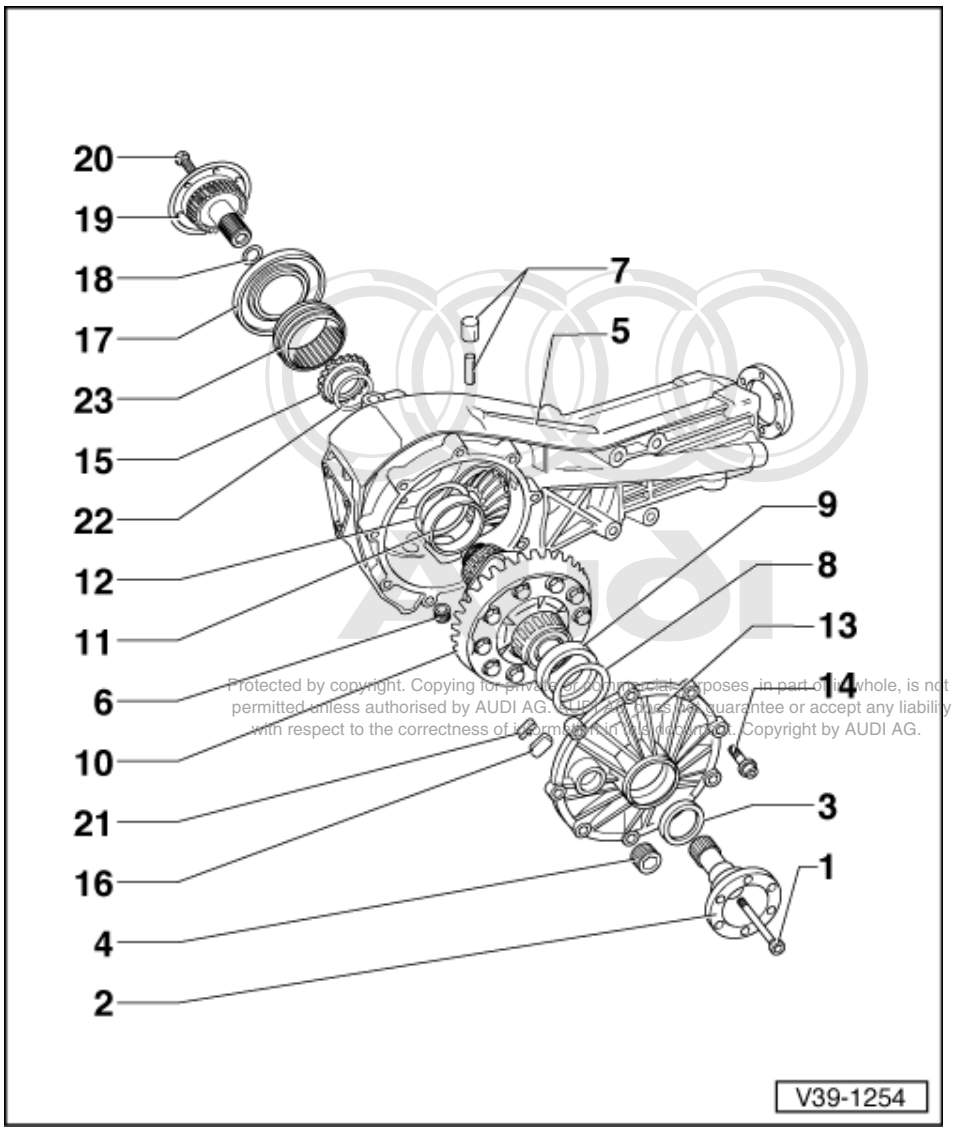
8 Shim "S1"

- Note thickness
- Adjustment overview => Page 318

9 Outer race for small taper roller bearing 1)

- Removing and driving in => Fig. 293

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.



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.

10 Differential with crown wheel 1)

- Removing => Page 281
- Dismantling and assembling =>Page 283

11 Outer race for large taper roller bearing 1)

- Removing and driving in => Fig. 293

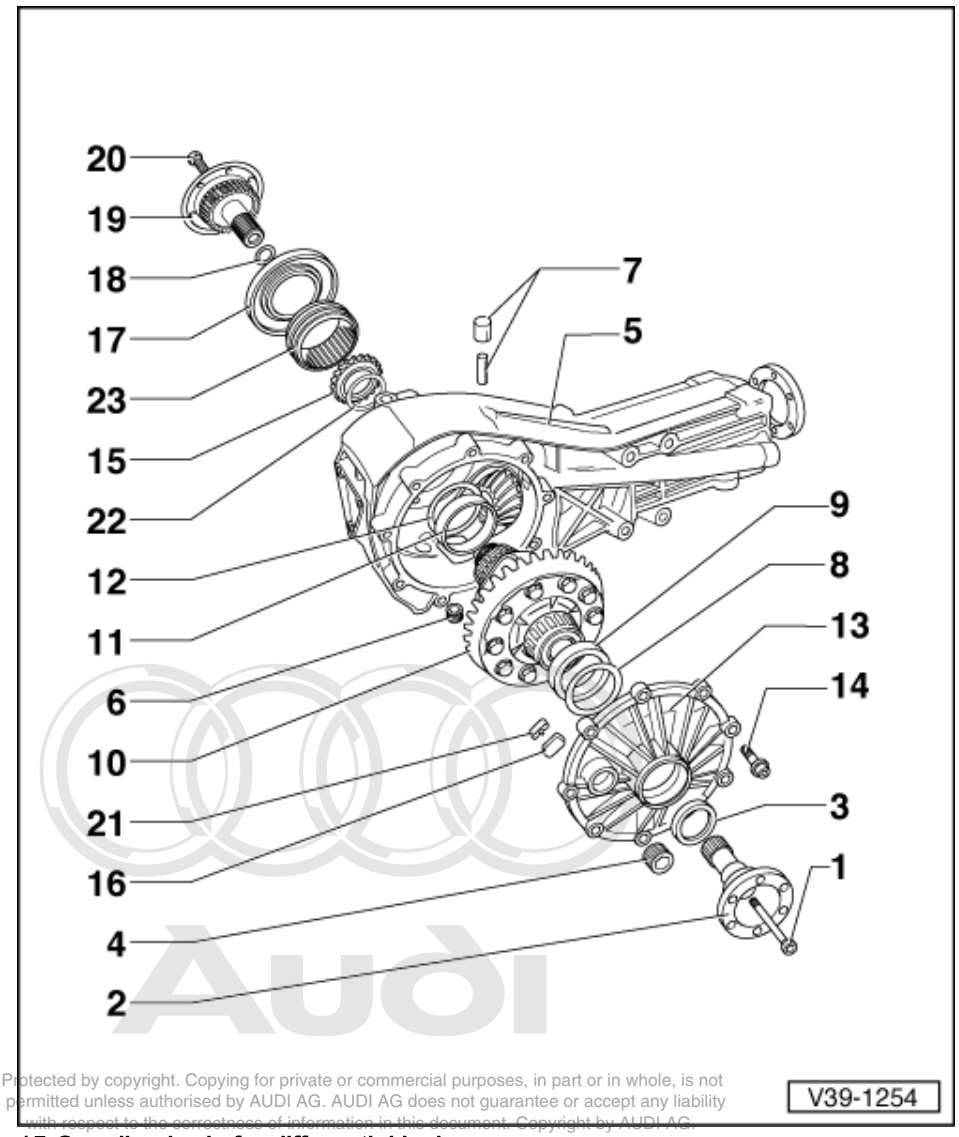
12 Shim "S2"

- Note thickness
- Adjustment overview => Page 318

13 Cover for final drive 1)

- Seal with sealing paste AMV 188 200 03
- Installation position: Magnet faces down

14 M8 bolts - 25 Nm



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.

15 Coupling body for differential lock

- Installation position => Fig. 315

16 Magnet

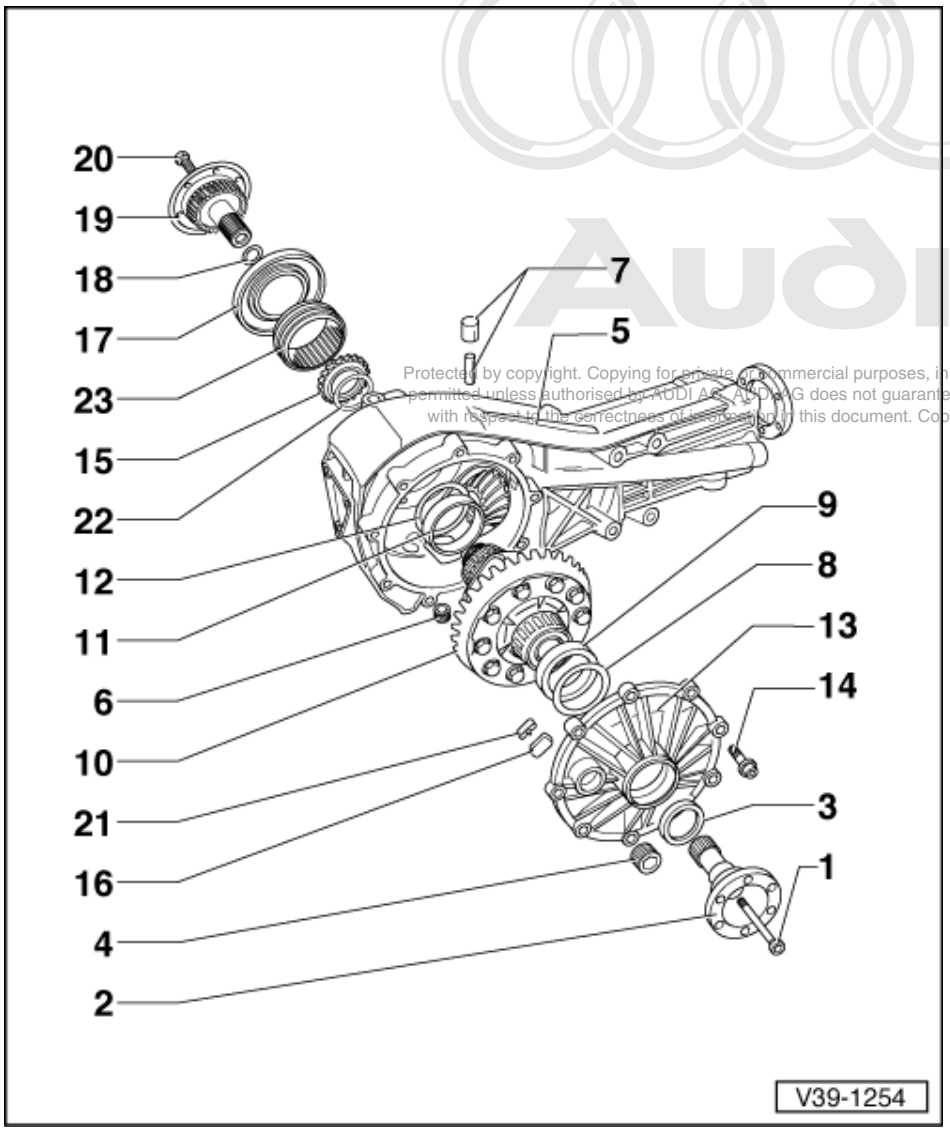
- Installation position => Fig. 2

17 Seal, left

- Levering out=>Page 258
- Use 3066/1 to insert as far as stop => Page 258

18 Shim for flange shaft

- When removing, ensure that shim is not lost
- Determining thickness => Page 315
- Adjustment overview => Page 318



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.

19 Flange shaft, left

- Removing => Page 282
- Adjusting => Page 315

20 Taper head bolt M8 - 10 Nm + 1/4 turn (90o) further

21 Clip for magnet

- Installation position => Fig. 2
- Always replace

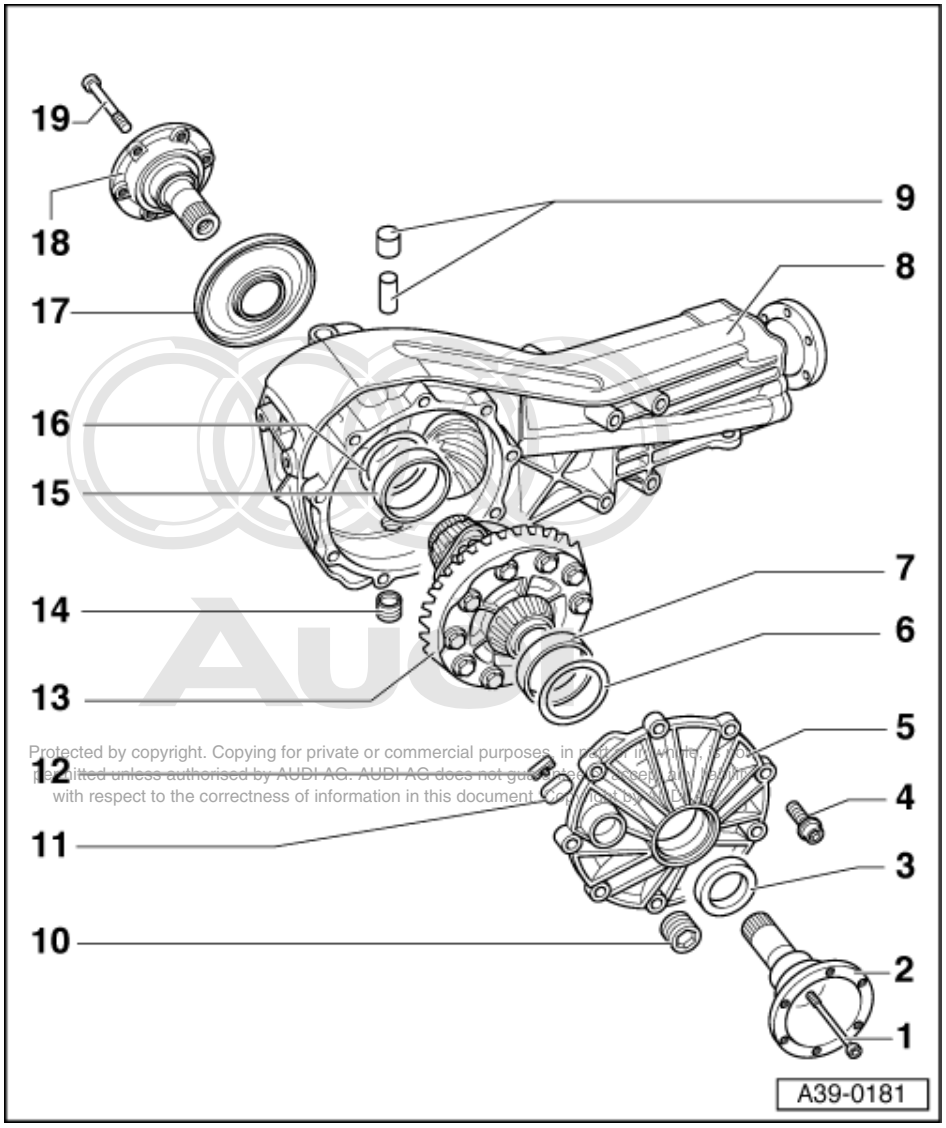
22 Shim for coupling body

- Determining thickness => Fig. 315

23 Locking collar

- Installation position: Step towards coupling body
- Remove and install together with selector fork

14.4 - Removing and installing differential without differential lock

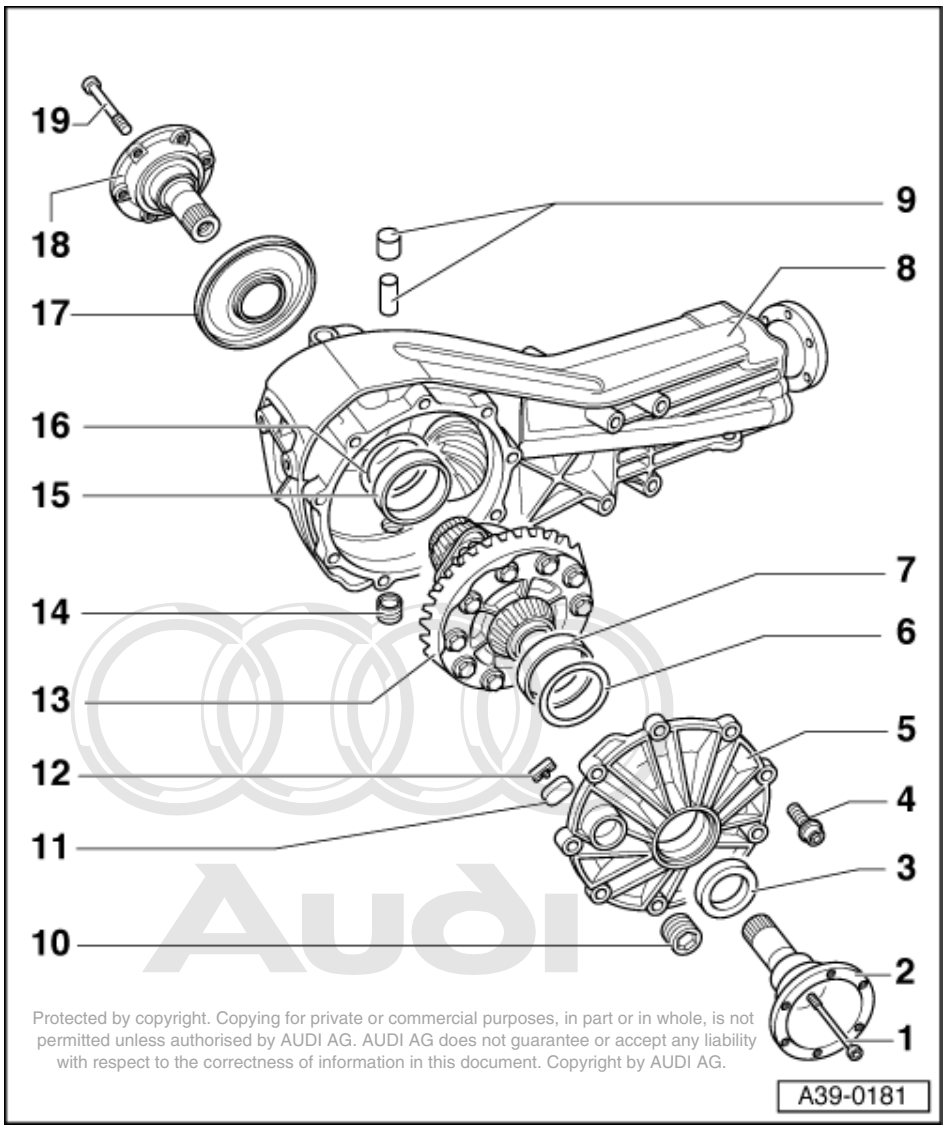


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- Secure final drive on a repair stand => Page 281 .
- Observe the general repair instructions =>Page 11 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 318 .

1 Taper head bolt M8 - 10 Nm + 1/4 turn (90o) further
2 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.

3 Seal, right

- Levering out=>Page 254
- Use 2062 to insert as far as stop=>Page 255

4 M8 bolt - 25 Nm

5 Cover for final drive 1)

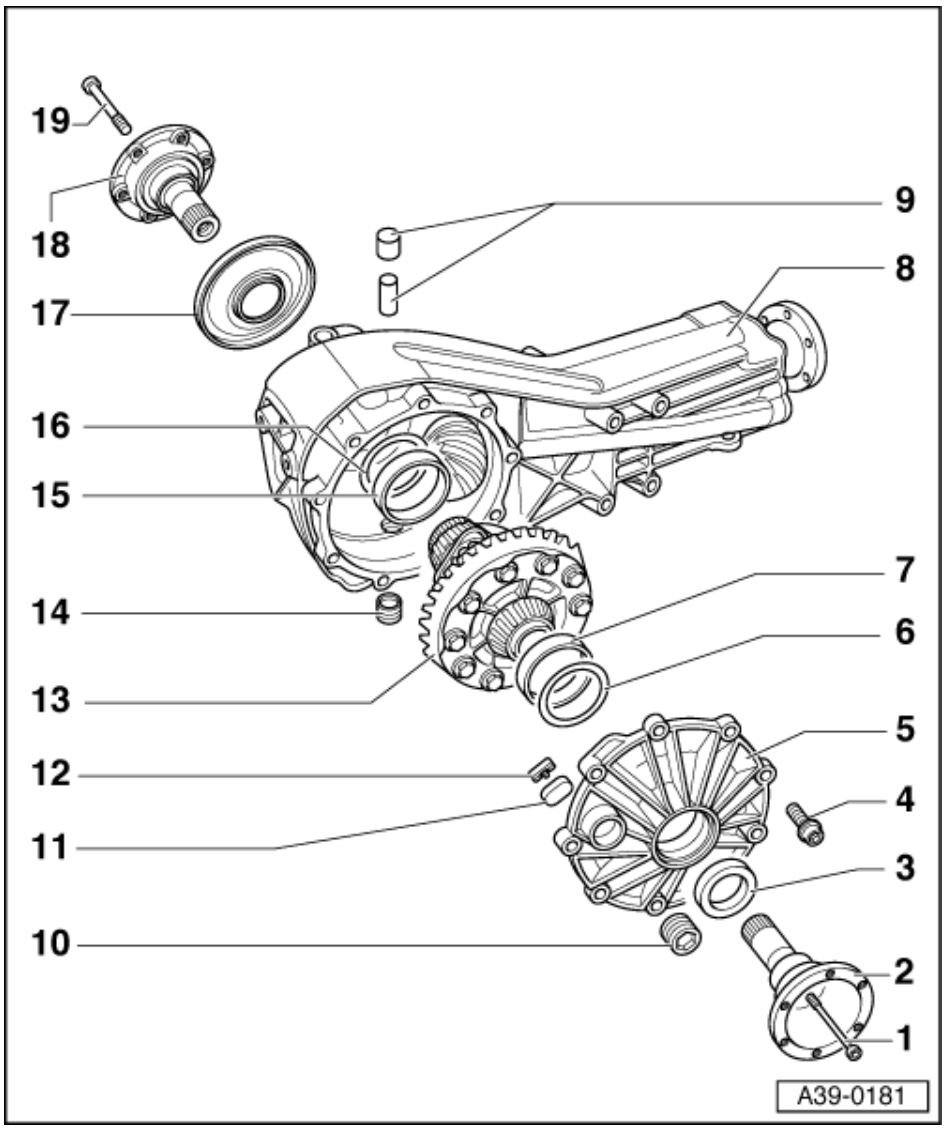
- Seal with sealing paste AMV 188 200 03
- Installation position: Magnet faces down

6 Shim "S1"

- Note thickness
- Adjustment overview => Page 318

7 Outer race for small taper roller bearing 1)

- Removing and driving in => Fig. 293



8 Final drive housing 1)
- With drive pinion
- Removing and installing drive pinion => Page 294

9 Breather
- Dimension=>Fig. 1

10 Oil filler plug - 25 Nm

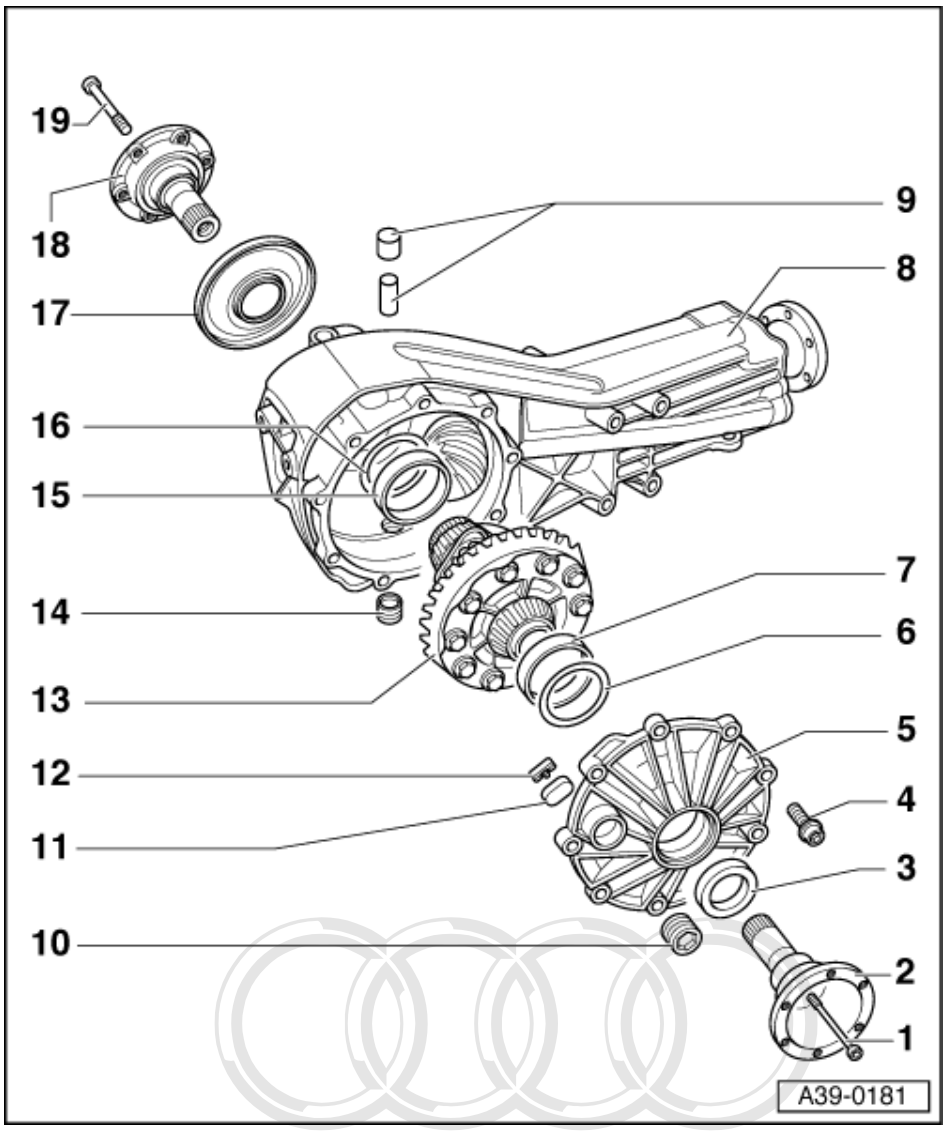
11 Magnet
- Installation position => Fig. 2

12 Clip for magnet
- Installation position => Fig. 2
- Always replace

13 Differential with crown wheel 1)
- Removing => Page 281

14 Oil drain plug - 25 Nm

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.



15 Outer race for large taper roller bearing 1)

- Removing and driving in => Fig. 293

16 Shim "S2"

- Note thickness
- Adjustment overview => Page 318

17 Seal, left

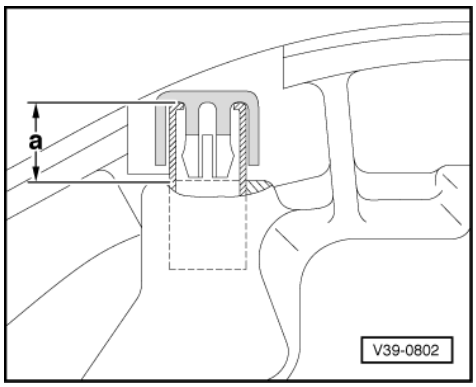
- Removing => Page 258
- Use 3066/2 to insert as far as stop => Page 258

18 Flange shaft

- No adjustment required
- Removing => Page 282

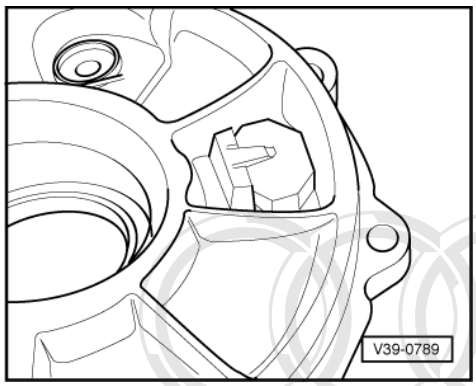
19 Taper head bolt M8 - 10 Nm + 1/4 turn (90o) further

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.



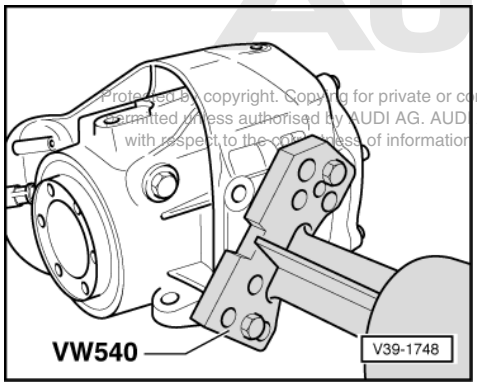
-> Fig.1 Insertion depth of breather sleeve

- Dimension a = 13 mm



-> Fig.2 Installation position of magnet

- Always replace clip when performing repairs.

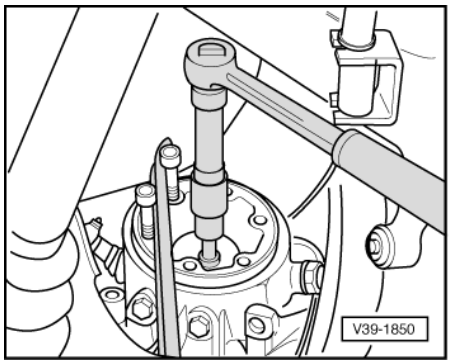


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing

- Rear final drive removed

- -> Secure complete rear final drive on a repair stand with bracket VW 540.
- Place oil drip tray underneath.
- Drain gear oil.



- -> Remove left and right-hand flange shafts.
- To loosen the securing bolt, screw two bolts into the flange shaft and counter-hold with a lever.
- Mark flange shafts (left and right) and pull out.
- Remove coupling body for differential lock, if fitted => Page 309 . Selector fork and locking collar remain installed
- Unscrew securing bolts from cover for final drive.
- Take cover for final drive off axle housing and remove differential.

Installation

Installation is carried out in the reverse order.

- Insert differential.
- Clean sealing surface and coat with sealing paste AMV 188 200 03.
- Fit cover for final drive onto axle housing and tighten in diagonal sequence.
- Install coupling body for differential lock, if fitted, with relevant shim => Page 309 .
- Pack space between sealing and dust lips with multi-purpose grease.
- Install flange shafts and tighten.

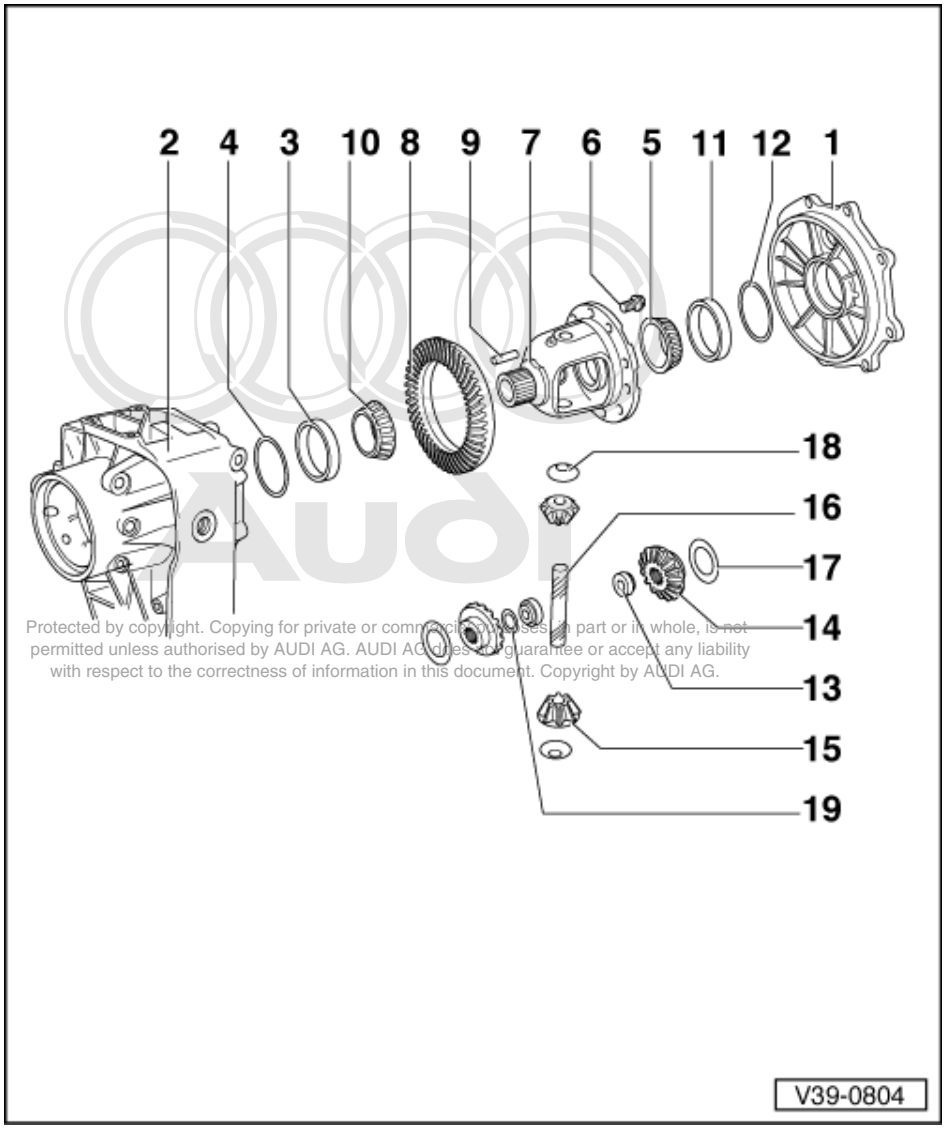
Note:

On vehicles with differential lock a shim is installed between differential and right flange shaft.

- Top-up gear oil in rear final drive and check oil level => Page 240 .

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.

14.5 - Dismantling and assembling differential

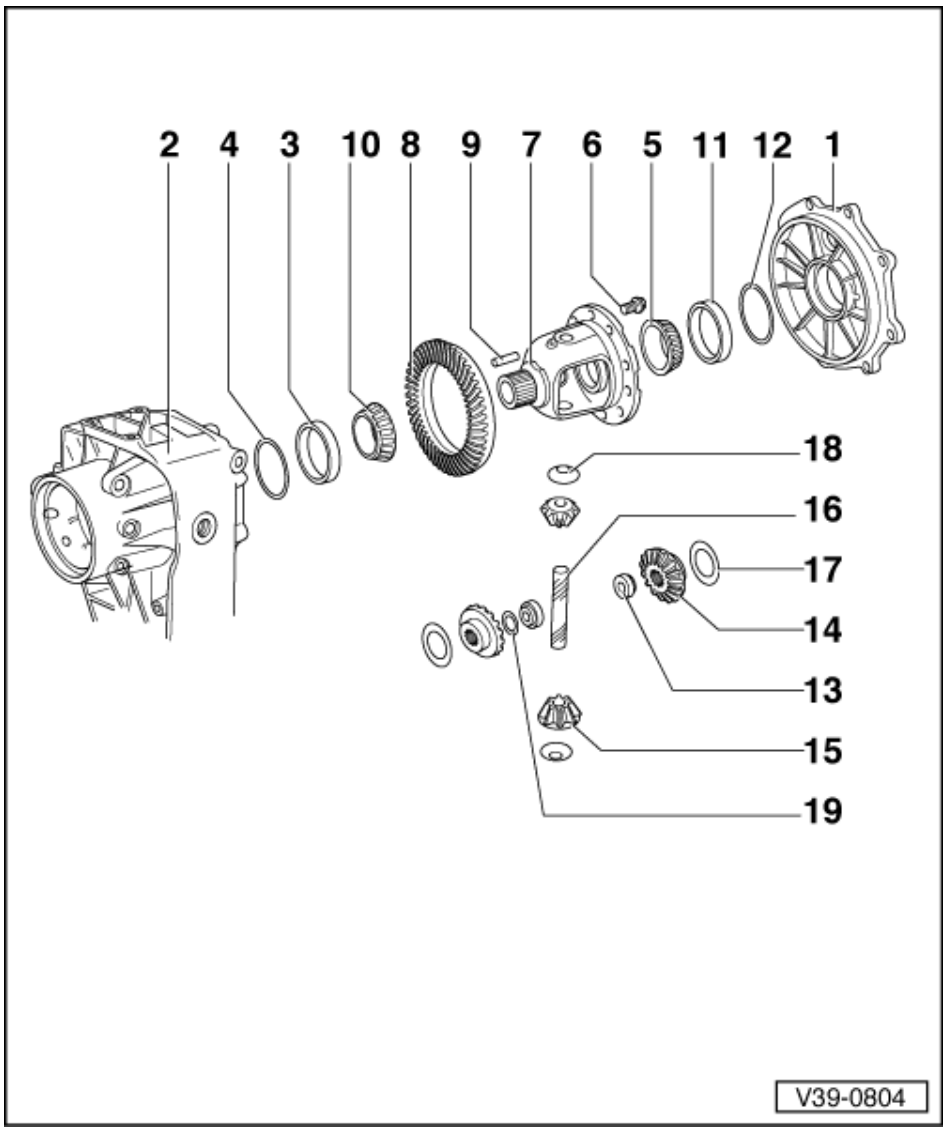


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- Observe the general repair instructions =>Page 11 .
- Replace both taper roller bearings of the differential together. Use same make if possible.
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 318 .

1 Cover for final drive 1)
2 Final drive housing 1)



3 Outer race for large taper roller bearing 1)

- Driving out => Fig. 9
- Driving in => Fig. 10

4 Shim "S2"

- Note thickness
- Adjustment overview => Page 318

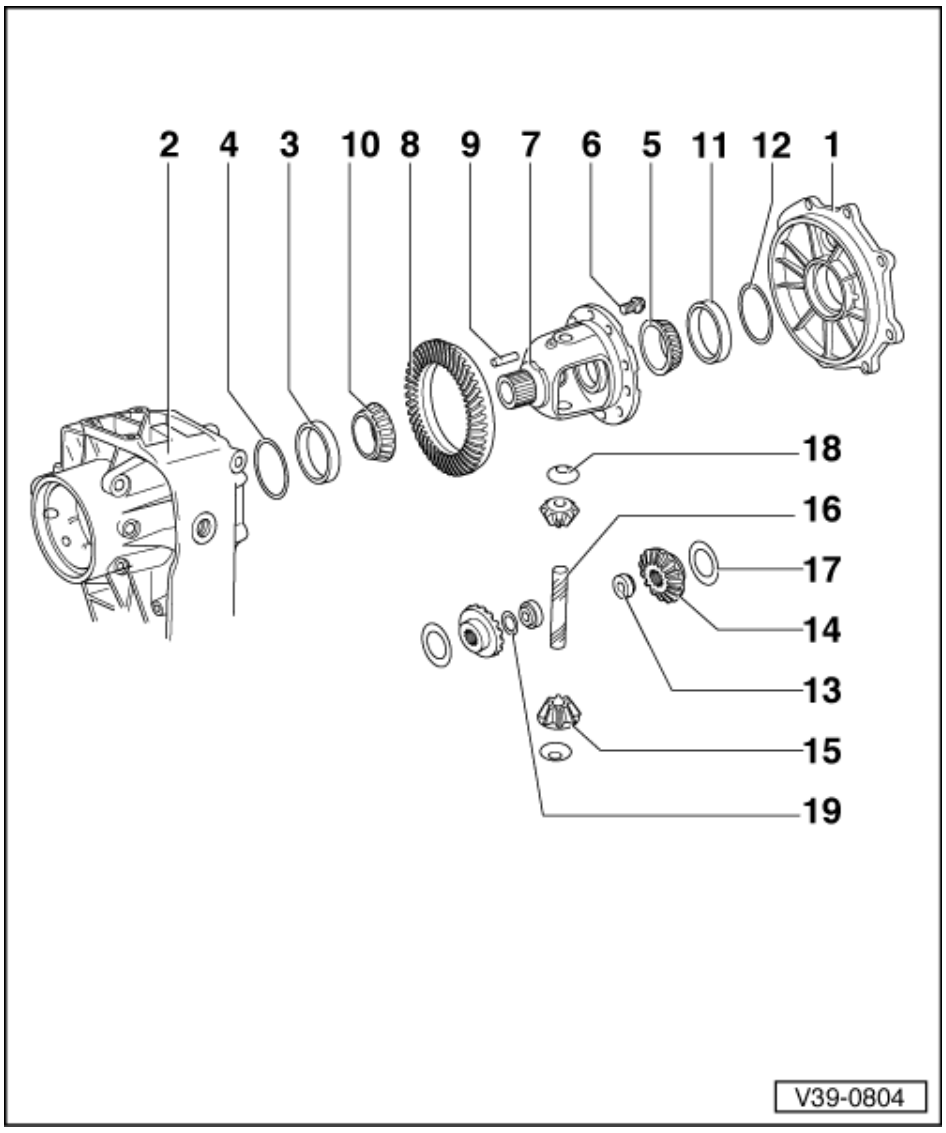
5 Inner race for small taper roller bearing 1)

- Pulling off => Fig. 2
- Pressing on => Fig. 4

6 Crown wheel bolt

- Always replace
- Use only genuine bolts
- Counter hold, then tighten using diagonal sequence to 60 Nm and then turn 45o further

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.



7 Differential housing 1)

8 Crown wheel 1)

- Paired with pinion shaft (final drive set)
- Drive off differential housing with a drift => Fig. 5
- Installing => Fig. 6
- Heat crown wheel to 100 oC when installing

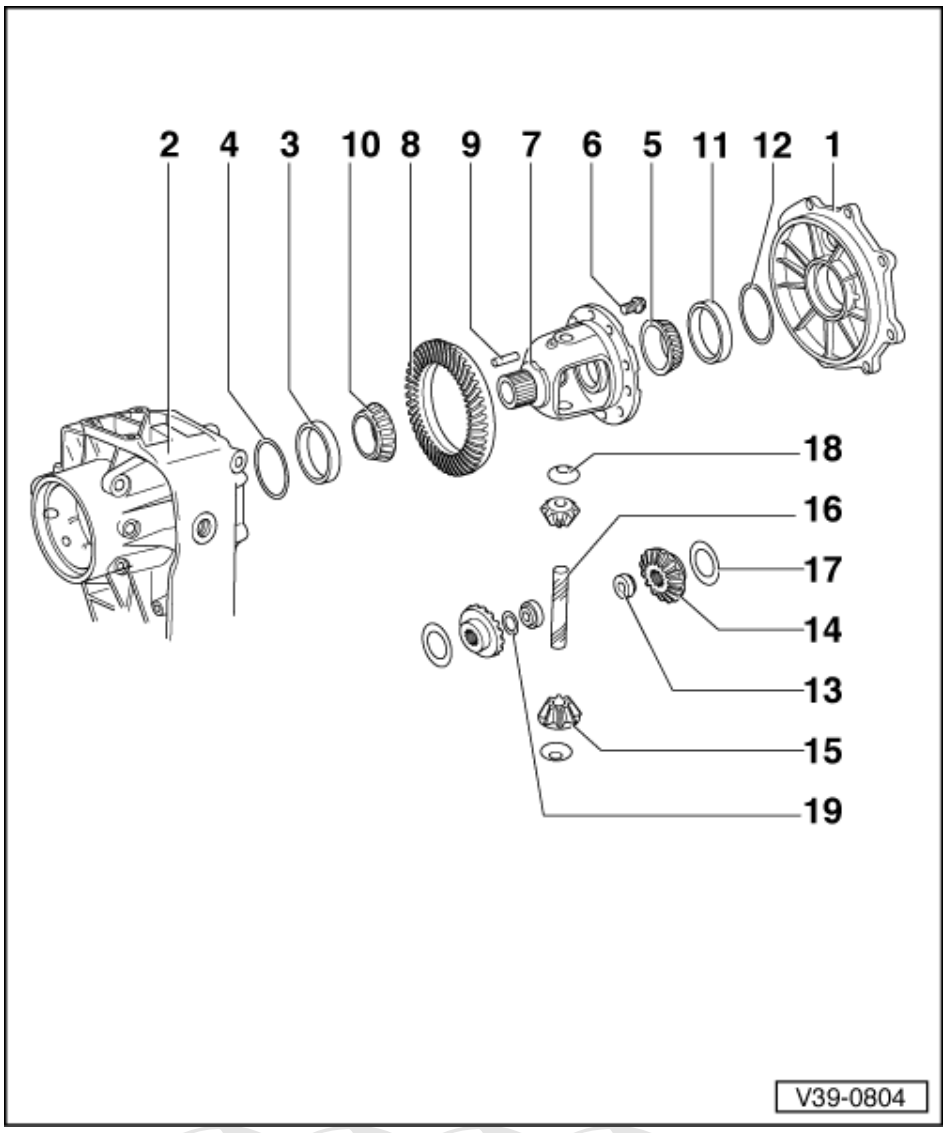
9 Spring sleeve

- Drive in flush

10 Inner race for large taper roller bearing 1)

- Pulling off => Fig. 1
- Pressing on => Fig. 3

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.



11 Outer race for small taper roller bearing 1)

- Driving out => Fig. 11
- Pressing in =>Fig. 12

12 Shim "S1"

- Note thickness
- Adjustment overview => Page 318

13 Threaded piece

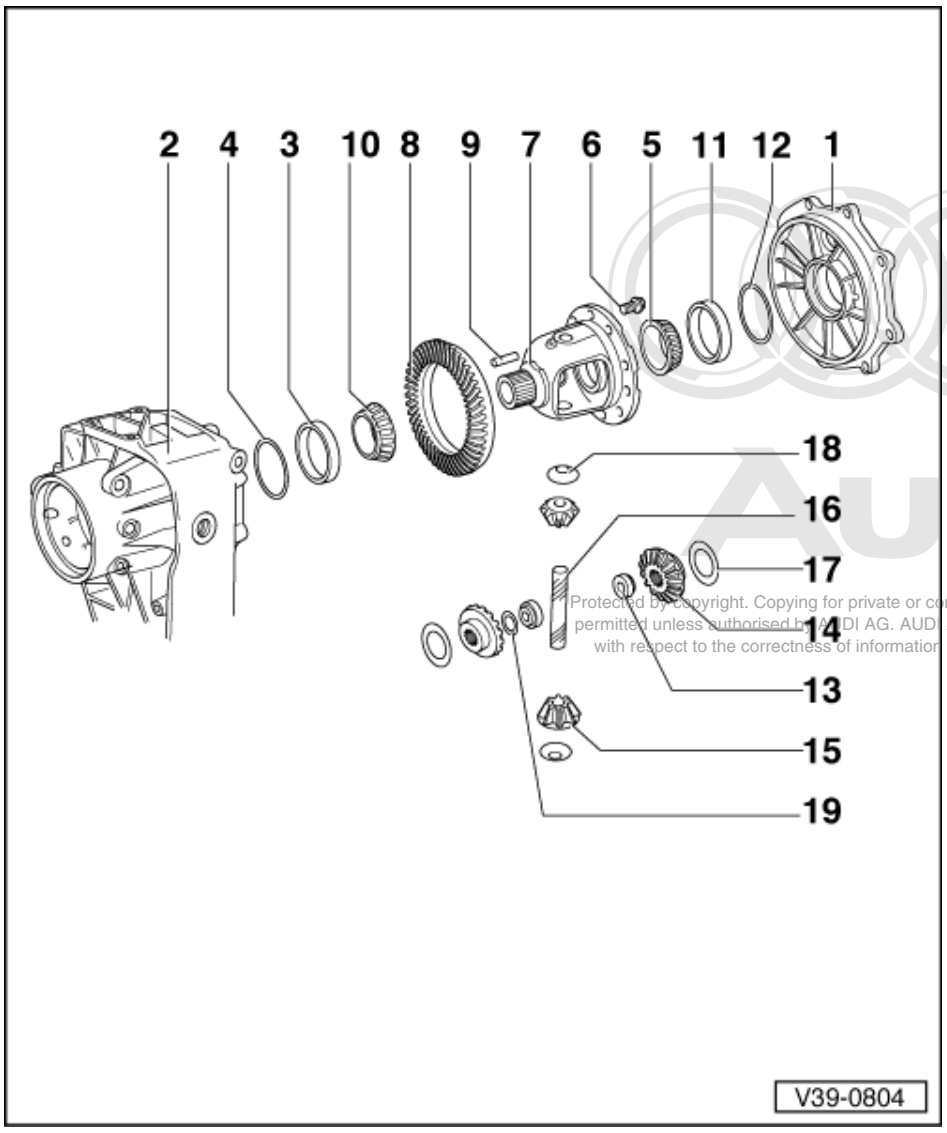
14 Sun wheels

- Installing => Fig. 7
- Adjusting => Fig. 8

15 Planet wheels

- Installing => Fig. 7

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.



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.

16 Shaft for bevel gears

- Drive out with drift
- Drive in carefully so that the thrust washers are not damaged
- Secure with spring sleeve

17 Shim

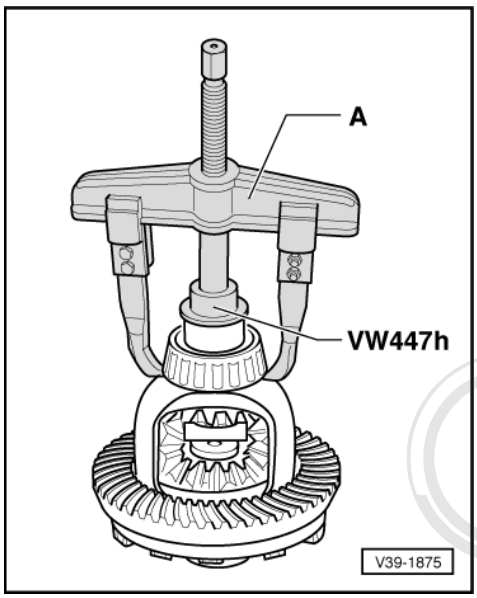
- Re-determining thickness => Fig. 8

18 Thrust washer

- Check for cracks and chipping

19 Shim for flange shaft

- When removing, ensure that shim is not lost
- Determining thickness => Page 315
- Adjustment overview => Page 318

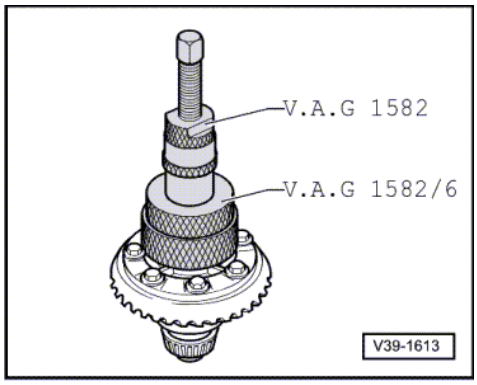


-> Fig.1 Pulling off inner race for large taper roller bearing

- Fit thrust plate VW 447 h onto differential housing before fitting puller.

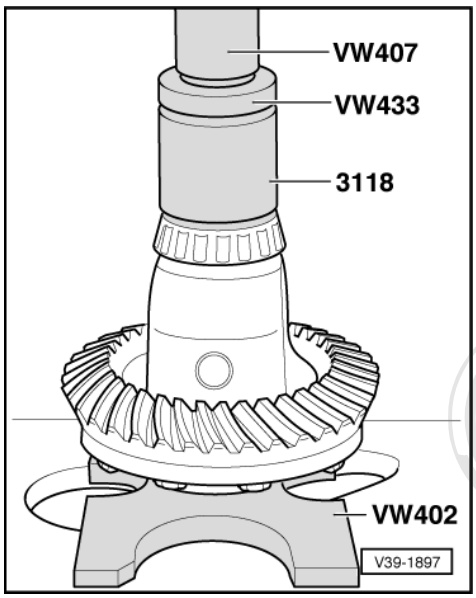
A - Two arm puller, e.g. Kukko 20/10

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.



-> Fig.2 Pulling off inner race for small taper roller bearing

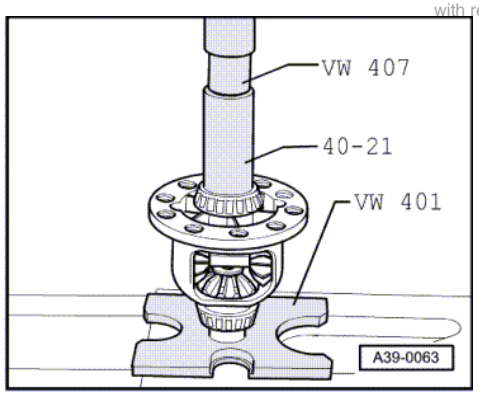
- Fit thrust plate 40-105 onto differential housing before fitting puller.



-> Fig.3 Pressing on inner race for large taper roller bearing

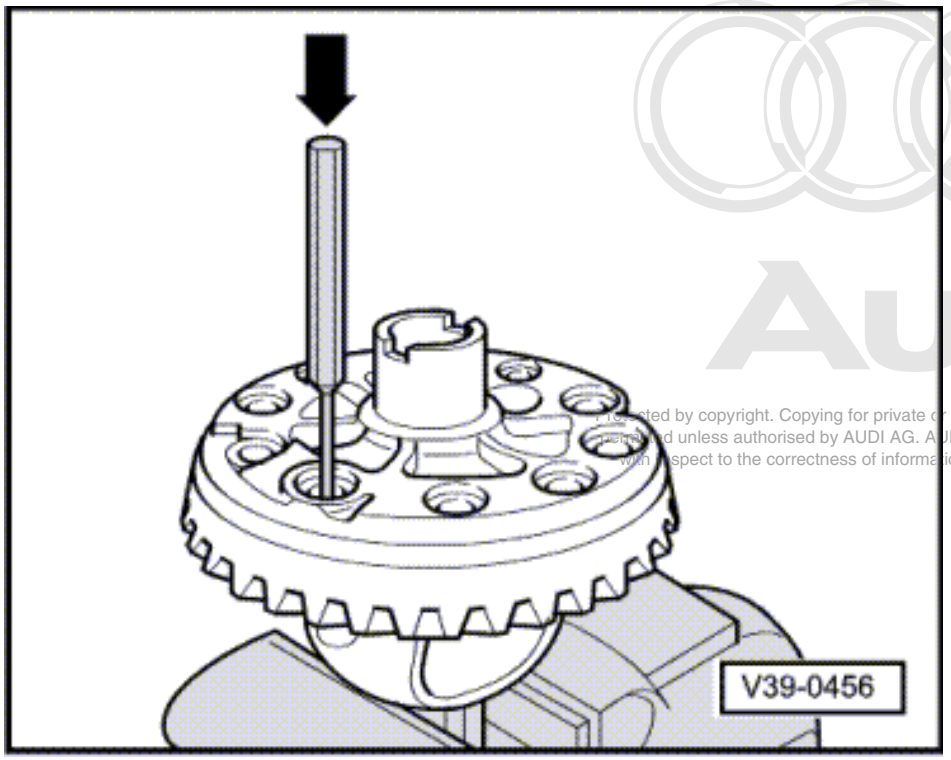
- Heat the bearing to approx. 100 oC, position and push to final position.

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.



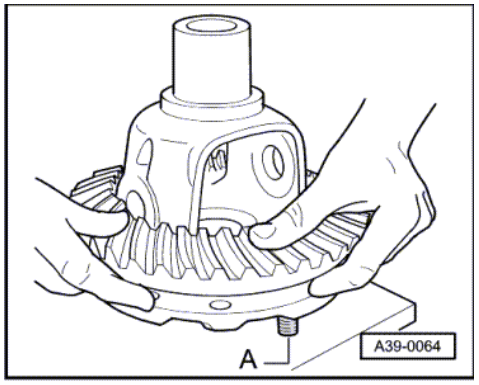
-> Fig.4 Pressing on inner race for small taper roller bearing

- Heat the bearing to approx. 100 oC, position and push to final position.



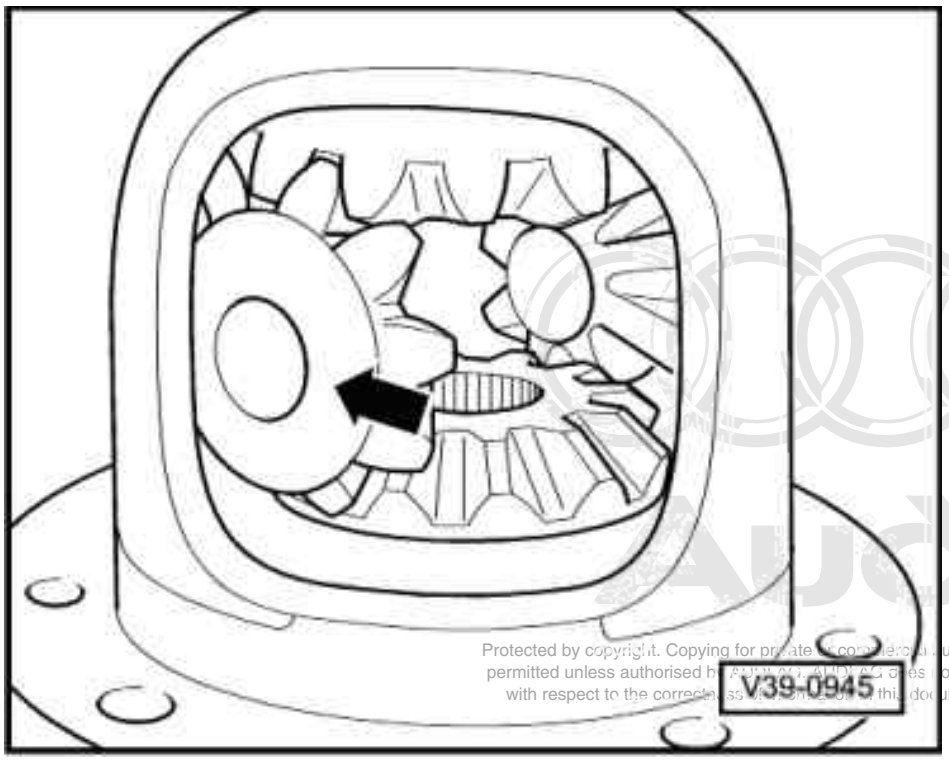
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.5 Driving crown wheel off housing



-> Fig.6 Installing crown wheel

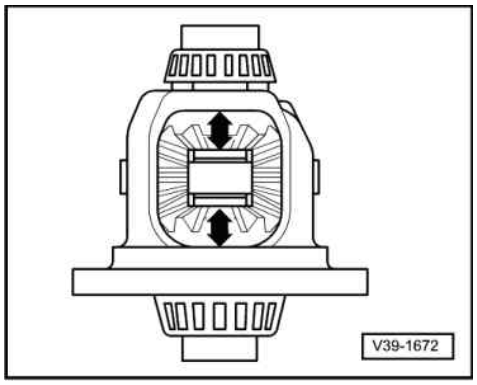
- Use 2 centring pins -A- (local manufacture) as a guide.
- Heat the crown wheel to approx. 100 oC and position.



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.

-> Fig.7 Installing bevel gears

- Insert sun wheels with correct shims => Fig. 8
- Insert planet wheels spaced 180o apart (stick thrust washers on with a small amount of grease) and rotate into position -arrow-.
- Position thrust washers so that they align with holes in differential.
- Insert threaded pieces.
- Drive in shaft and secure with spring sleeve.



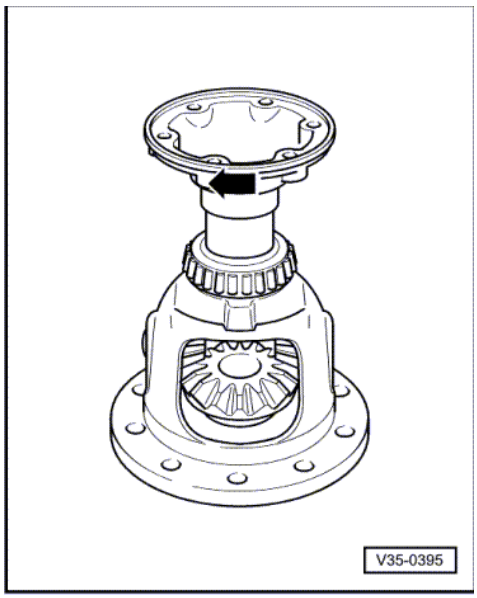
-> Fig.8 Adjusting bevel gears

- Insert sun wheels with thinnest shims (0.5 mm).
- Insert planet wheels with thrust washers and press in shaft.

Note:

Do not now interchange bevel gears and thrust washers.

- Press planet wheels outwards and check play of sun wheels by hand -arrows-.



- Adjust play by inserting an appropriate shim.
  - Specification: max. 0.10 mm

Note:

-> The adjustment is also correct if no further play is perceptible, although it is still possible to rotate the bevel gears -arrow-.

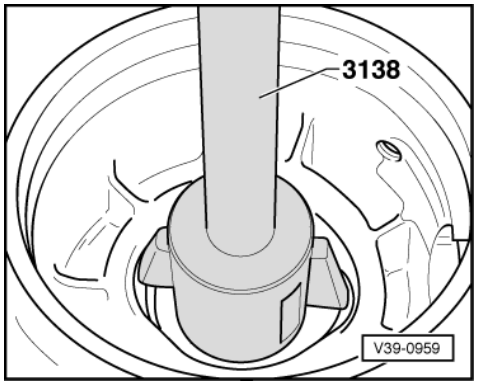
The following shims are available

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available

Shim thickness (mm)		
0.50	0.70	0.90
0.60	0.80	1.00

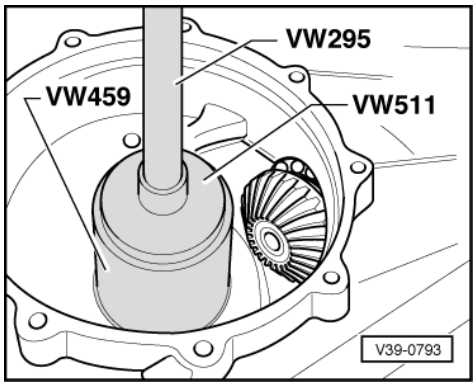


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.9 Driving out outer race for large taper roller bearing out of final drive housing

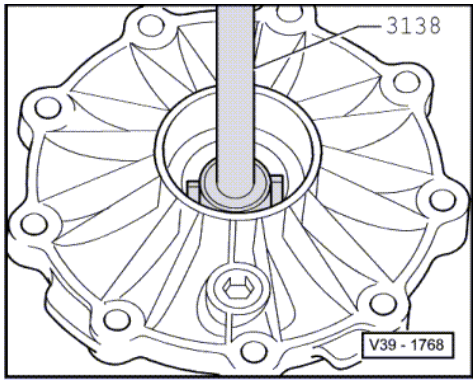
Note:

When removing, there is a possibility that the shim(s) will be damaged.



-> Fig.10 Driving outer race for large taper roller bearing into final drive housing

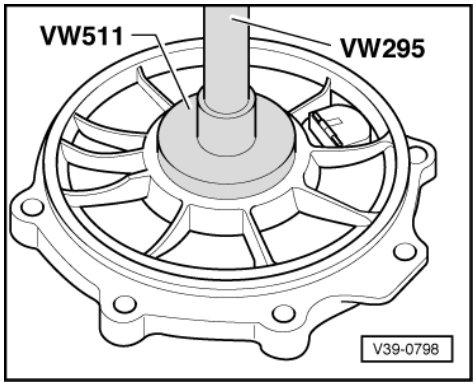
- Position outer race using VW 295 and light even blows with a hammer.
- Then drive in onto stop as shown in illustration.



-> Fig.11 Driving out outer race for small taper roller bearing out of cover

Note:

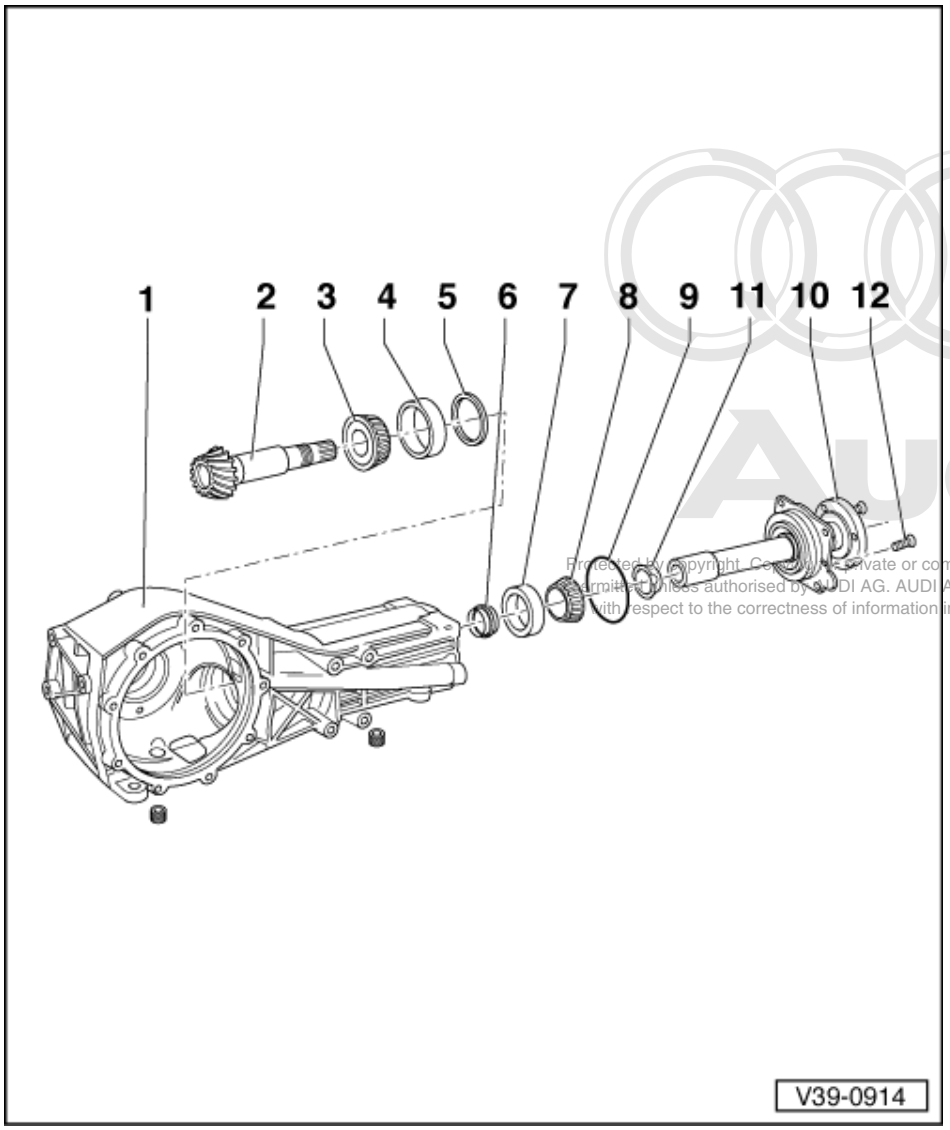
When removing, there is a possibility that the shim(s) will be damaged.



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.

-> Fig.12 Pressing outer race for small taper roller bearing into cover

14.6 - Removing and installing drive pinion

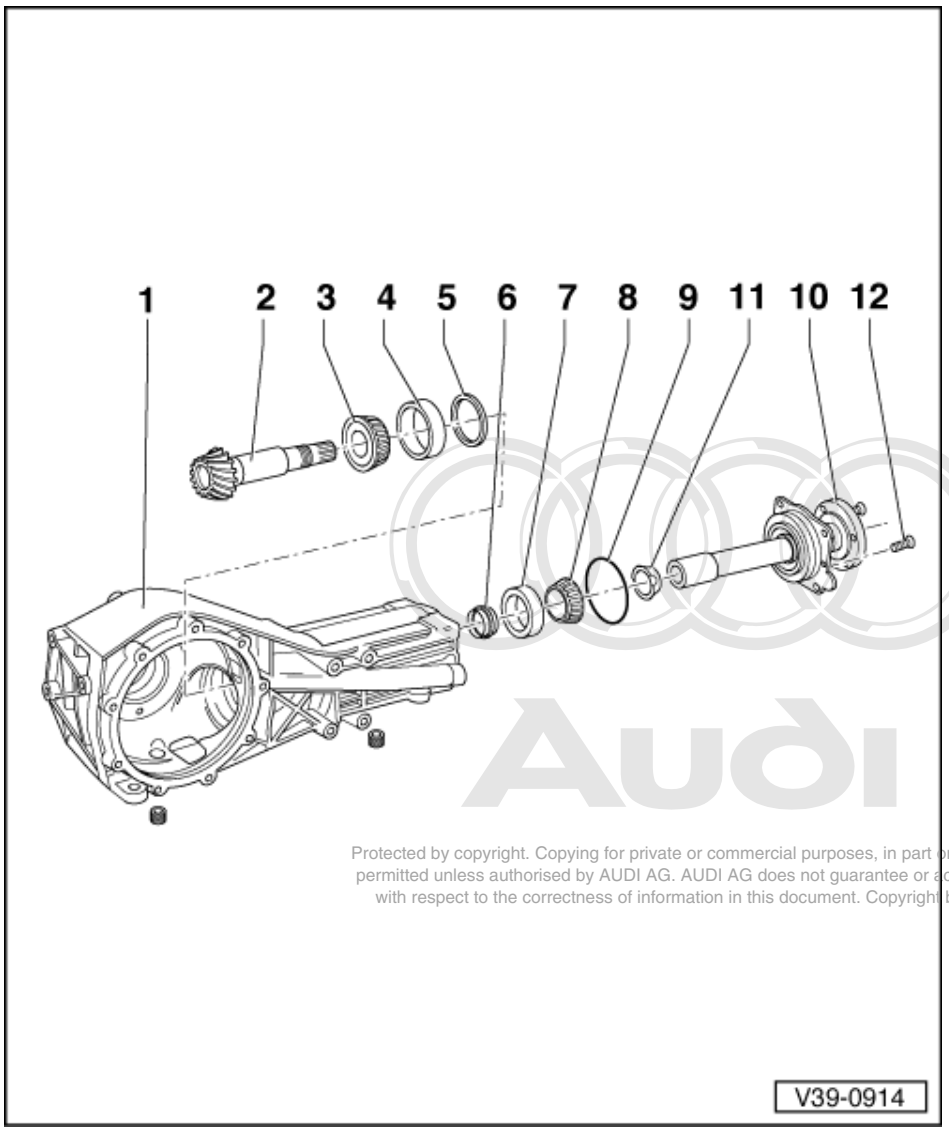


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

- Observe the general repair instructions =>Page 11 .
- Secure final drive on a repair stand => Fig 1 .
- Replace both taper roller bearings together. Use same make if possible.
- Removing differential => Page 272 .
- Adjustments are required when replacing components marked 1) => Adjustment overview, Page 318 .

1 Final drive housing 1)
2 Drive pinion 1)
- Paired with crown wheel
- Replace only in conjunction with crown wheel



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 Inner race for large taper roller bearing 1)

- Pulling off => Fig. 8
- Pressing on => Fig. 9

4 Outer race for large taper roller bearing 1)

- Driving out => Fig. 7
- Pressing in => Fig. 10

5 Shim "S3"

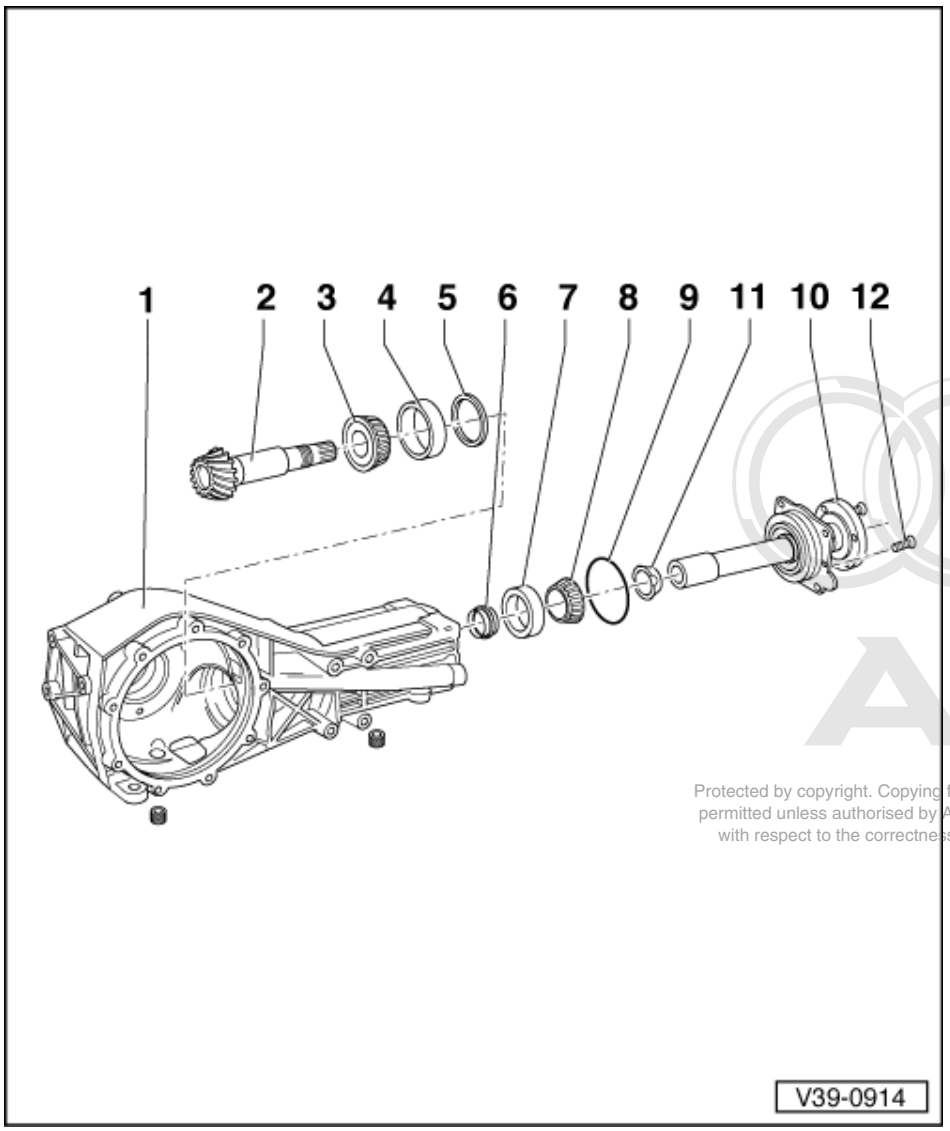
- Note thickness
- Adjustment overview => Page 318

6 Spacer sleeve 1)

- Always replace

7 Outer race for small taper roller bearing 1)

- Pulling out =>Fig. 6
- Pressing in =>Fig. 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.

8 Inner race for small taper roller bearing 1)

- Pressing out drive pinion => Fig. 5
- Installing => Fig. 12

9 O-ring

- Always replace

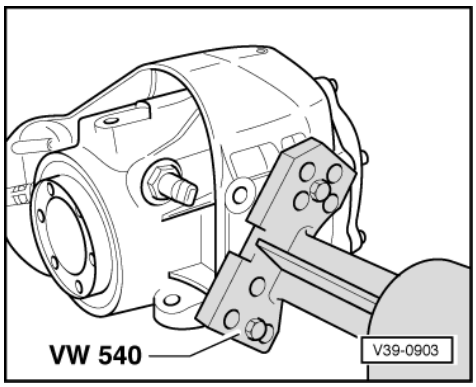
10 Flange for propshaft with cover for final drive

- Removing => Fig. 2
- Installing => Fig. 17
- Measuring radial run-out => Page 252

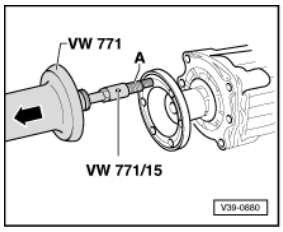
11 Drive pinion nut

- Slackening => Fig. 3 and Fig. 4
- Tightening => Fig. 14
- Measuring frictional torque => Fig. 15
- Locking => Fig. 16

12 Countersunk screw - 25Nm



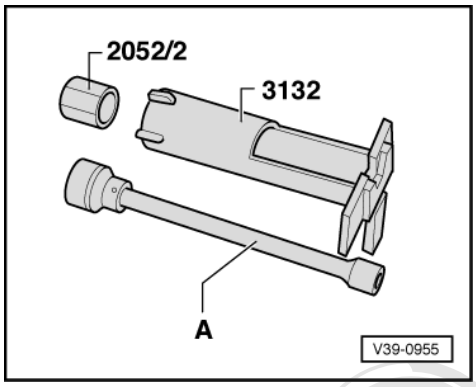
-> Fig.1 Securing final drive in repair stand



-> Fig.2 Pulling out cover for final drive together with flange of propshaft

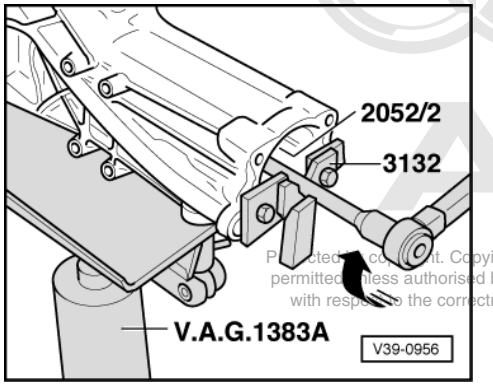
A - Bolt M8/M10

- Remove 2 countersunk screws in cover.



-> Fig.3 Tool for slackening and tightening drive pinion nut

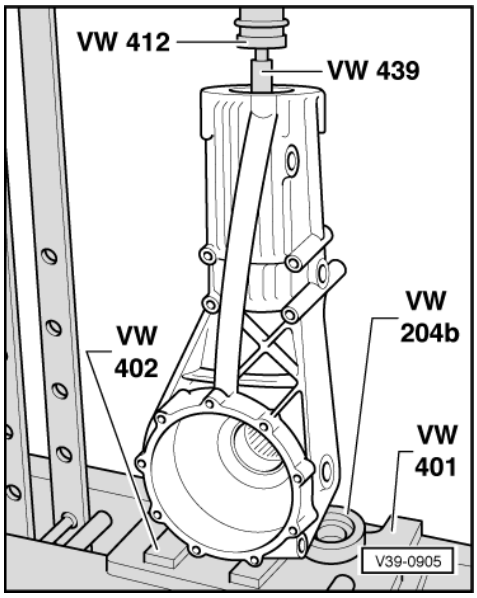
A - Extension and 32 mm socket insert



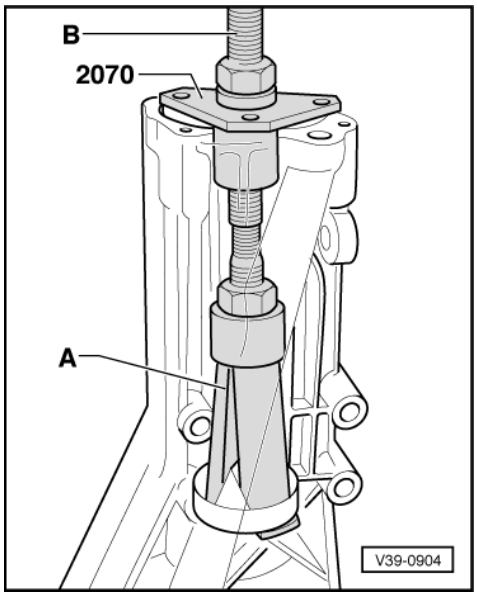
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.4 Slackening drive pinion nut

The final drive must be supported (e.g. with V.A.G 1383 A) when loosening the drive pinion nut otherwise the threaded holes in the housing will be damaged.



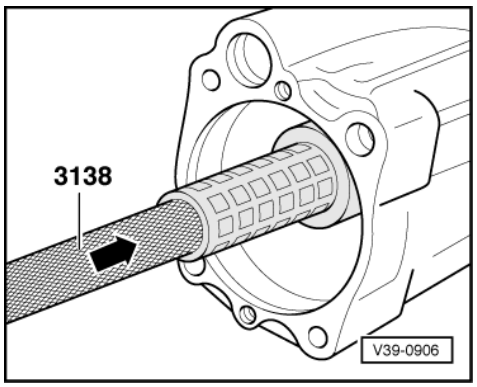
-> Fig.5 Pressing drive pinion out of inner race for small taper roller bearing



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.

-> Fig.6 Pulling out outer race for small taper roller bearing

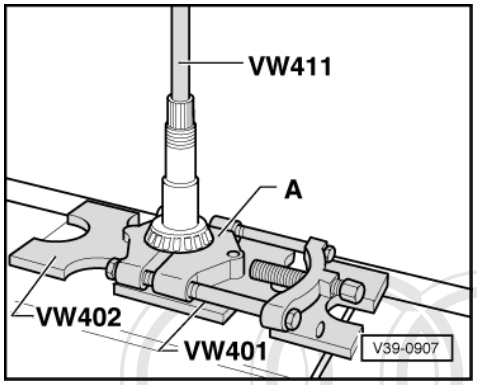
A - Internal puller, e.g. Kukko 21/7, 46 ... 56 mm
B - Spindle from counter support, e.g. Kukko 22/1



-> Fig.7 Driving out outer race for large taper roller bearing

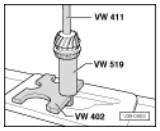
Note:

When removing, there is a possibility that the shim(s) will be damaged.



-> Fig.8 Pressing inner race for large taper roller bearing off drive pinion

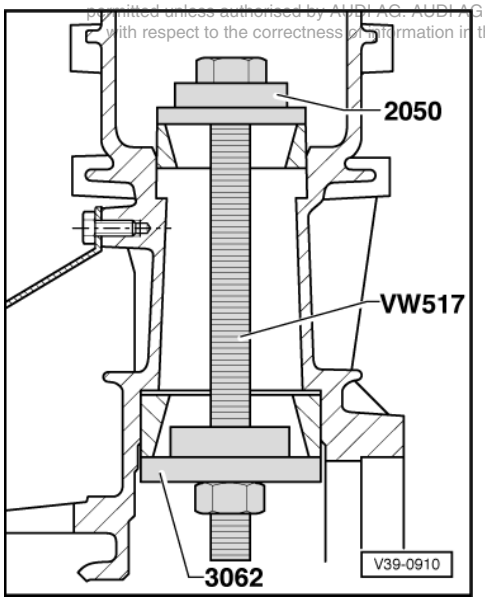
A - Separating device, e.g. Kukko 17/2, 22 ... 115 mm



-> Fig.9 Pressing inner race for large taper roller bearing onto drive pinion

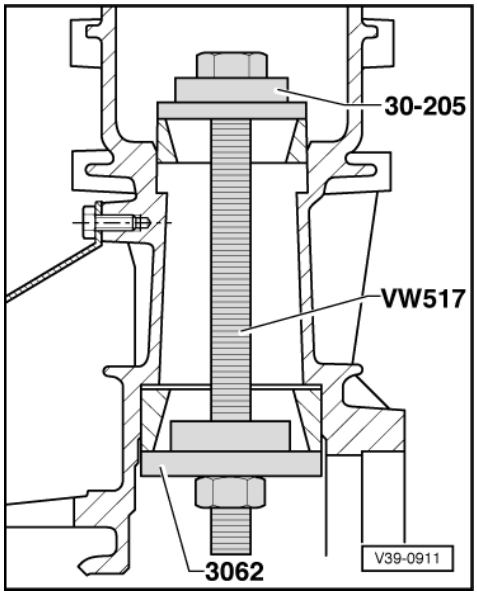
- Heat the bearing to approx. 100 oC, position and push to final position.

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.



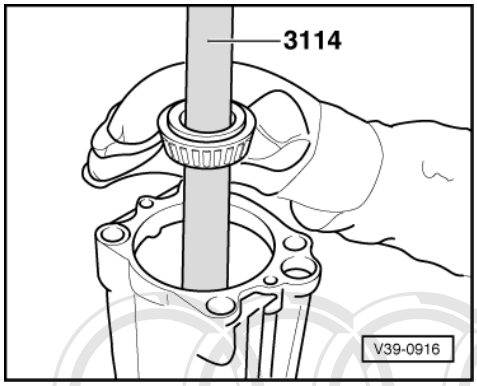
-> Fig.10 Inserting outer race for large taper roller bearing

- Insert predetermined shim "S3" for drive pinion => Page 318 .



-> Fig.11 Pressing in outer race for small taper roller bearing

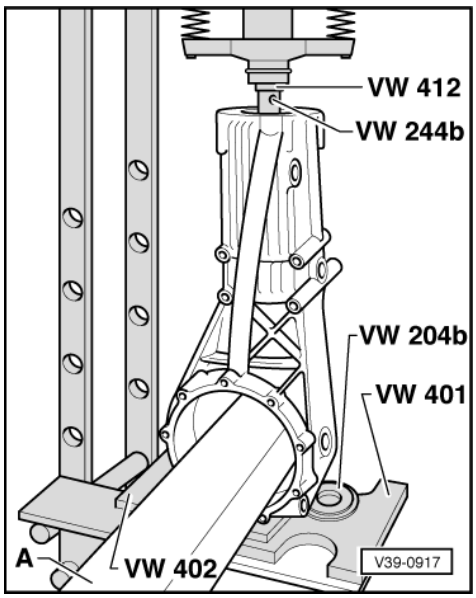
- Fit on bearing outer race evenly before pressing in.



-> Fig.12 Pressing inner race for small taper roller bearing onto drive pinion

- Insert drive pinion with new spacer sleeve.
- Heat inner race for small taper roller bearing to approx. 100 oC.
- Push up drive pinion, place rod 3114 centred on drive pinion and insert inner race of taper roller bearing.

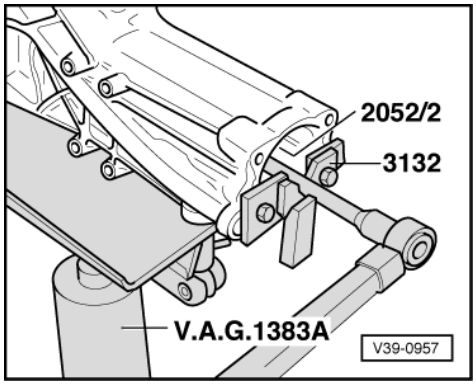
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.13 Pressing taper roller bearing fully home

A - Square timber for supporting drive pinion

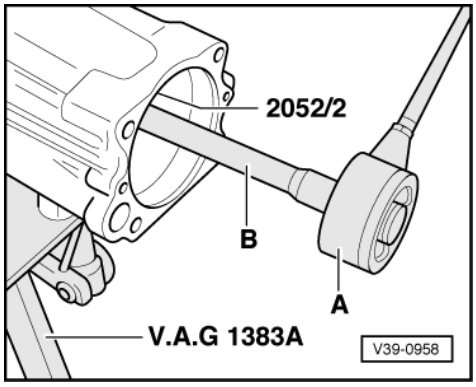
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.14 Tightening drive pinion nut and setting frictional torque

Notes:

- Only increase tightening torque slowly and read-off frictional torque frequently. If the specified frictional torque is exceeded, the spacer sleeve must be replaced and the adjustment repeated. It is not possible to re-use a spacer sleeve that has been excessively compressed.
- The final drive must be supported (e.g. with V.A.G 1383 A) when tightening the drive pinion nut, otherwise the threaded holes in the housing will be damaged.

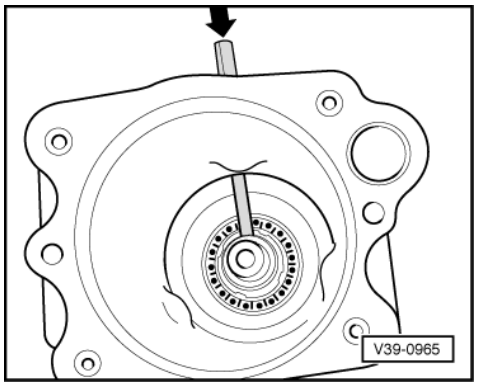


-> Fig.15 Measuring friction torque

A - Torque gauge, commercially available, 0 ... 600 Ncm
B - Extension with 32 mm socket insert

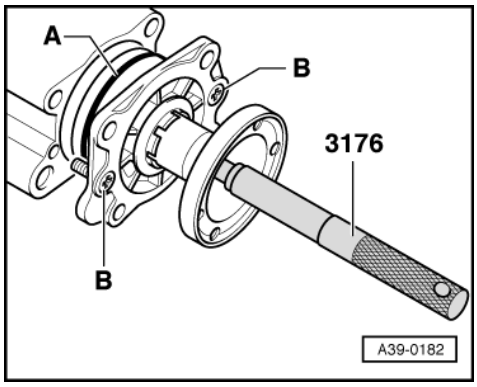
- The following frictional torques should be set:

New bearings	Used bearings
250 ... 300 Ncm	30 ... 60 Ncm



-> Fig.16 Securing drive pinion nut

- Use a drift to peen drive pinion nut through oil drain hole.



-> Fig.17 Installing flange for propshaft with cover for final drive

- Replace O-ring -A- in cover and oil lightly.
- Use drift 3176 to knock in flange shaft/cover.
- Tighten countersunk screws -B- to 25 Nm.

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:

The radial run-out at flange for propshaft must always be measured and marked =>Page 252 .

15 - Servicing mechanism of differential lock - Vehicles > 05.94

15.1 - Servicing mechanism of differential lock - Vehicles > 05.94

Note:

- On vehicles 06.94 ‣ the mechanical differential lock in rear final drive was discontinued.

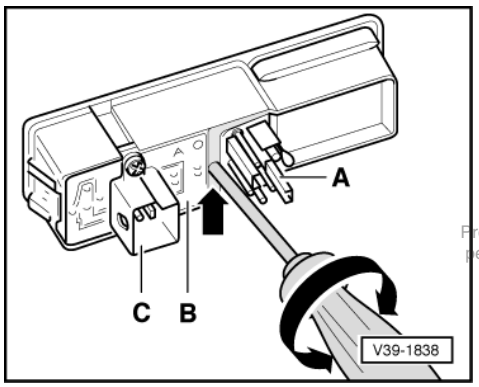
15.2 - Removing and installing differential lock control switch

Notes:

- Switch for differential lock is installed with a trim surround in cover of centre console.
- Operational check of differential lock switch

=> Binder "Current flow diagrams, Electrical fault finding and fitting locations" ; December 1990 ä 1992; Fault finding program No. 2

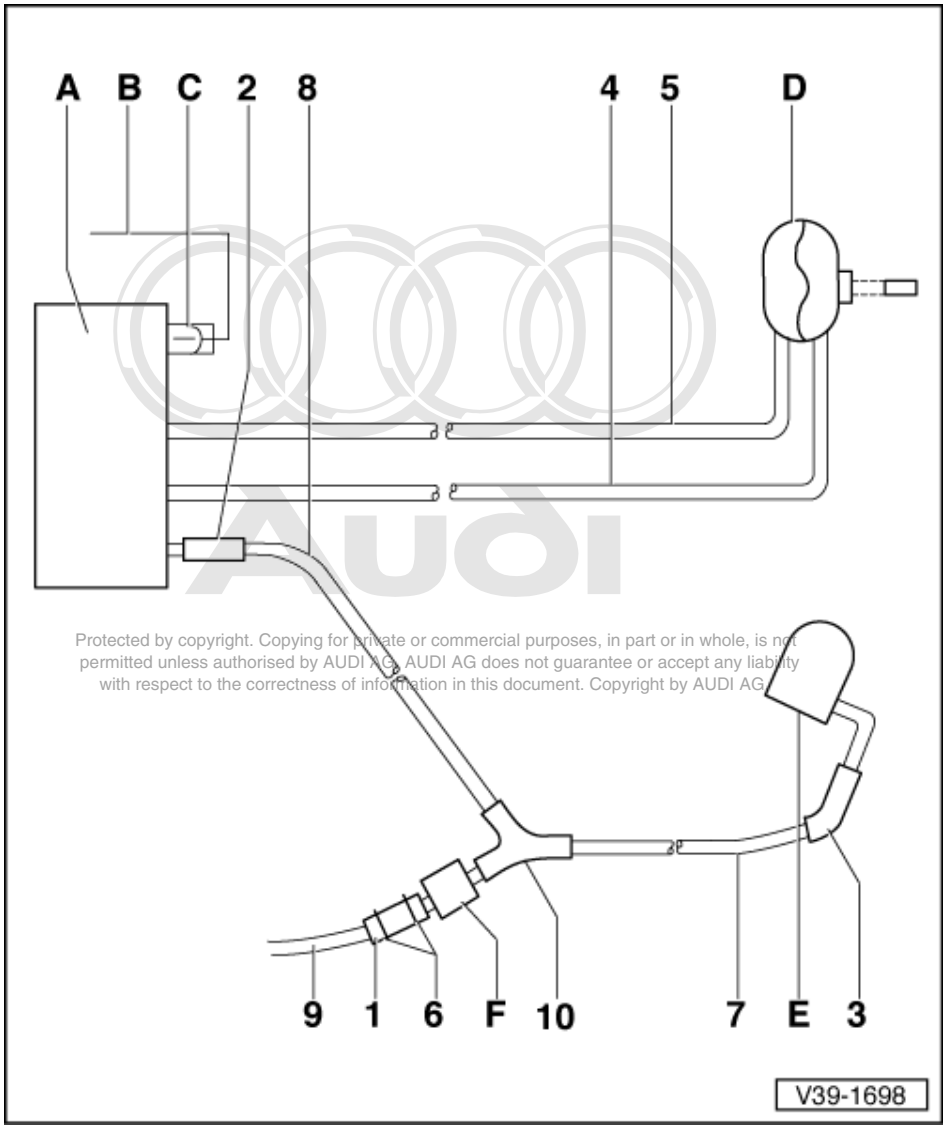
- Carefully lever switch and trim surround off cover.
- Detach cable connection.



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 small screwdriver between switch -A- and conductor plate -B- -arrow-.
- Press switch out of front catch by turning screwdriver.
- Take switch out of trim surround.
- Printed conductor plate -B- should be removed from trim panel together with plug housing -C-.

15.3 - Routing diagram for piping and hoses



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.

A - Control unit for differential lock -J187

- Under rear seat bench

B - Electric cable

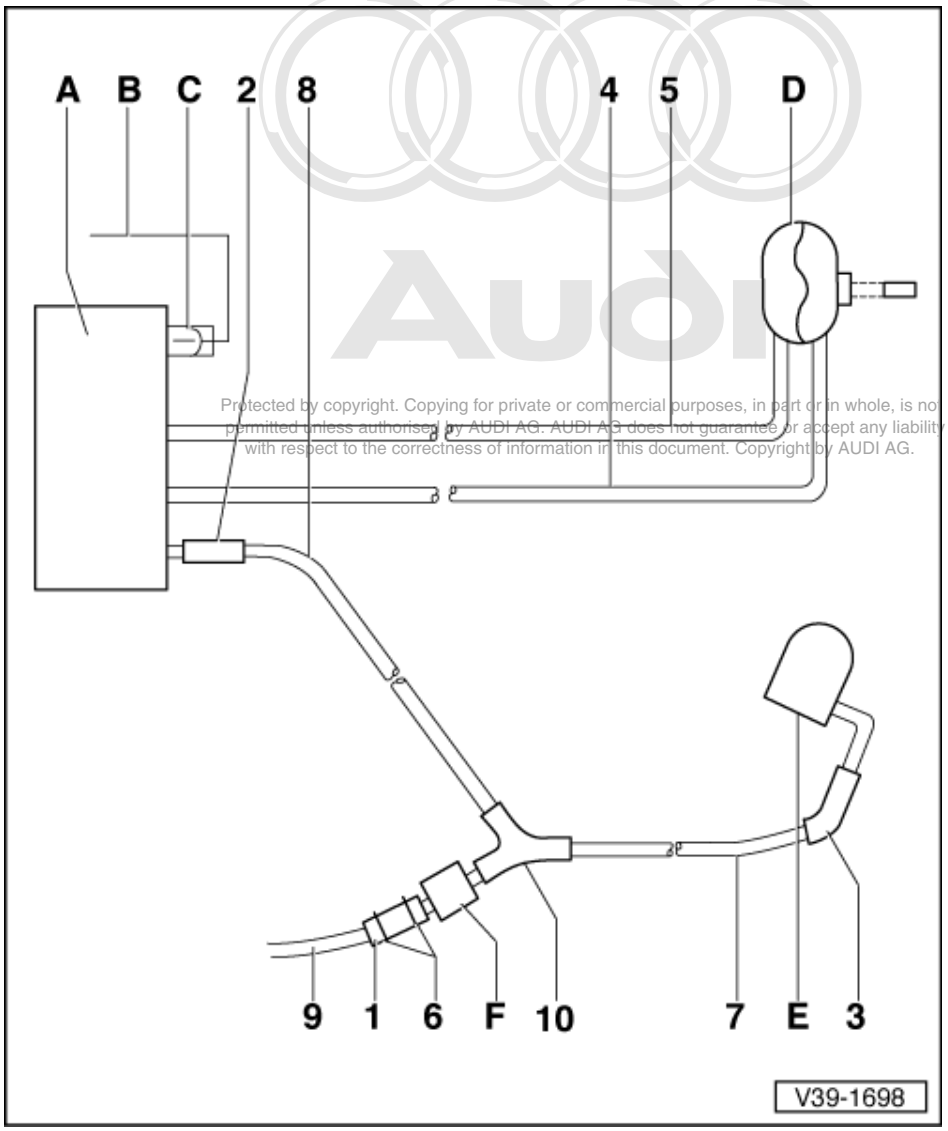
- To switch for differential lock control and to speedometer

C - Connector

- At control unit -J187

D - Vacuum element

- At rear final drive



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.

E - Vacuum reservoir

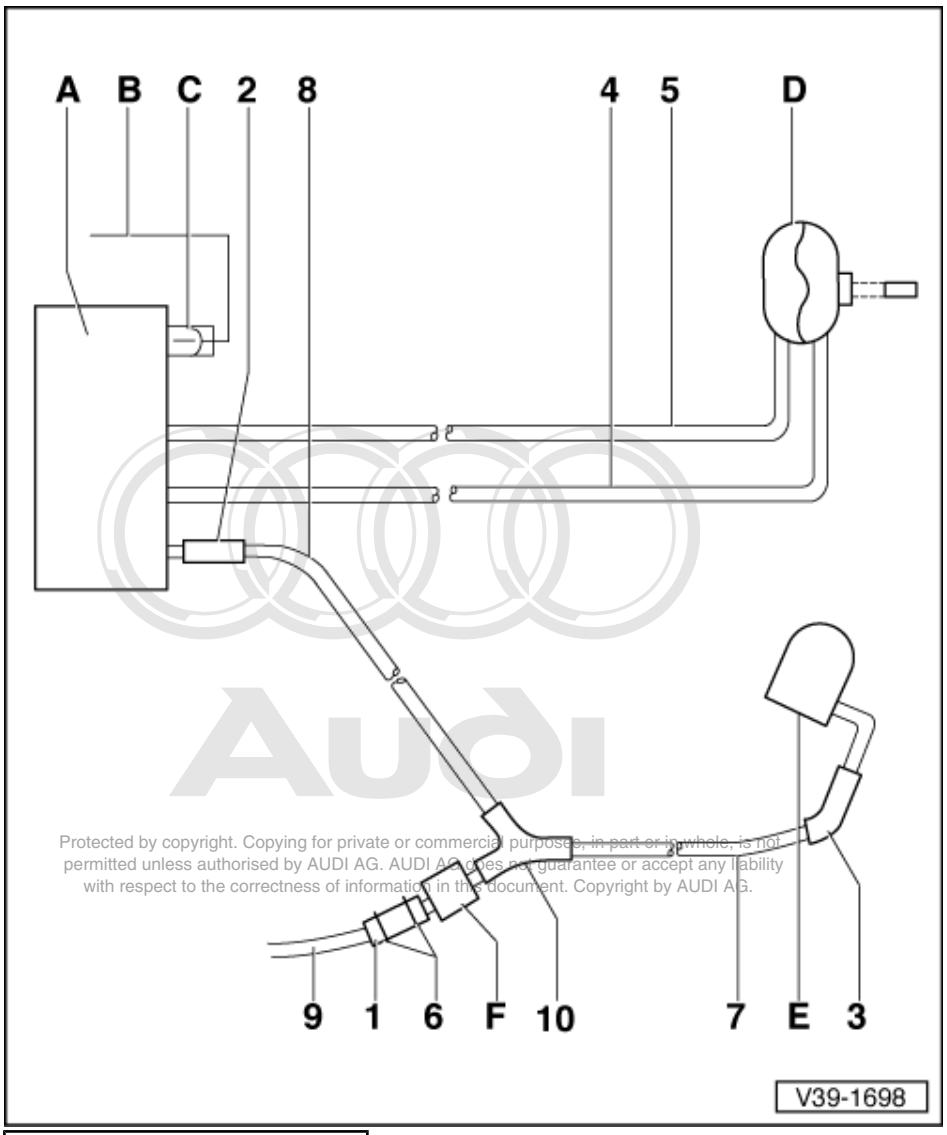
- Location on Saloon: In top left of boot, below hinge for boot lid. To remove, take off boot trim panel
- Location on Avant: In area of rear left wheel house, accessible through cover

F - Non-return valve

- Under rear seat bench

Note:

Hoses and pipes are supplied as single-coloured replacement parts. When installing a hose or pipe, cut to length and mark with a strip of adhesive tape of appropriate colour or inscribe appropriate colour.



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.

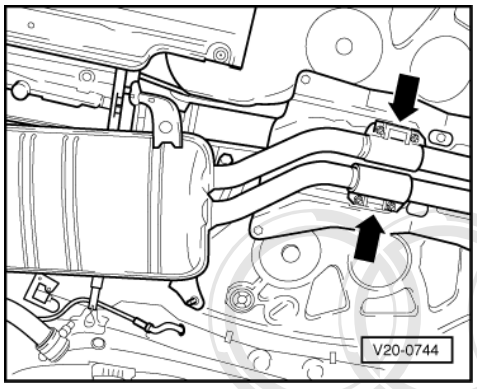
Hoses			
No.	Length (mm)	Colour	Qty.
1	45	Black	1
2	45	Black	1
3	510/350 1)	Grey	1
4	850	Yellow	1
5	820	Blue	1
6	Hose clip		2

Pipes 4 x 1			
No.	Length	Colour	Qty.
7	1200 mm	Red	1
8	720 mm	Purple	1
9 2)	2830 mm	Black	1
10	Connector (under rear seat bench)		1

1) Avant only

2) Pipe runs to engine or brake servo unit, respectively

15.4 - Removing and installing vacuum element



- Final drive installed

Removing

- -> Slacken double pipe clamps -arrows- and disconnect exhaust system

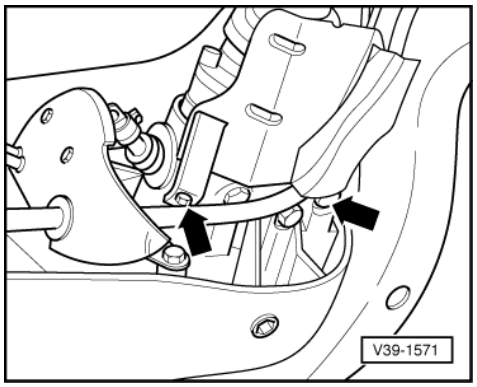
=> 5-cyl. fuel injection engine (4-valve turbo), Mechanics; Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

=> 5-cyl. diesel engine, Mechanics (2.5 l engine); Repair group 26; Removing and installing parts of exhaust system Removing and installing parts of exhaust system

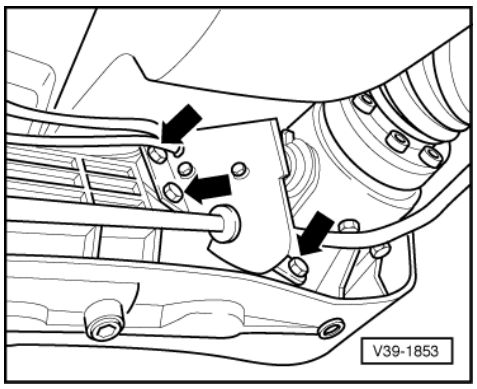
Audi
Audi AG does not guarantee or accept any liability
with respect to the correctness of information in this document. Copyright by AUDI AG.

=> 8-cyl. fuel injection engine, Mechanics; Repair group 26; Removing and installing exhaust system Removing and installing exhaust system

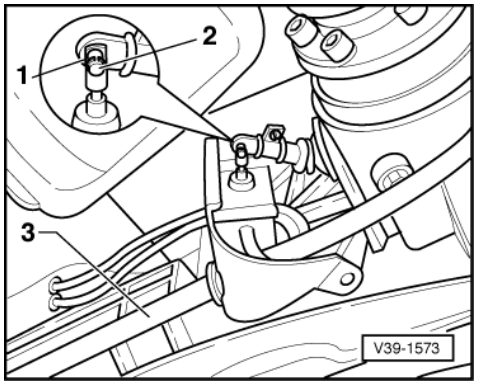
- Detach main and rear silencers from retaining loops.



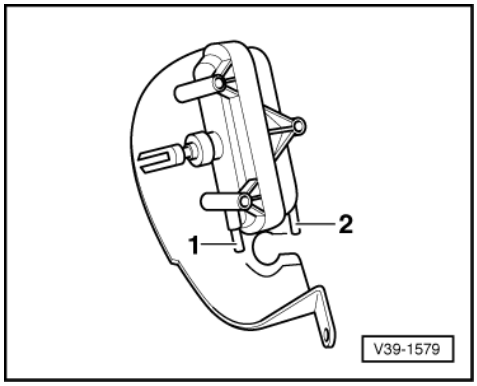
- -> Remove cover plate for left drive shaft -arrows-.



- -> Unbolt bracket with vacuum element from rear final drive -arrows-.



- -> Release securing clip -1-.
- Press bolt for vacuum element/shift fork -2- up.
- Pull handbrake cable -3- together with rubber grommet out of bracket.
- Disconnect vacuum hoses from vacuum element - pay attention to coloured markings.
- Unbolt vacuum element from bracket.



Installing

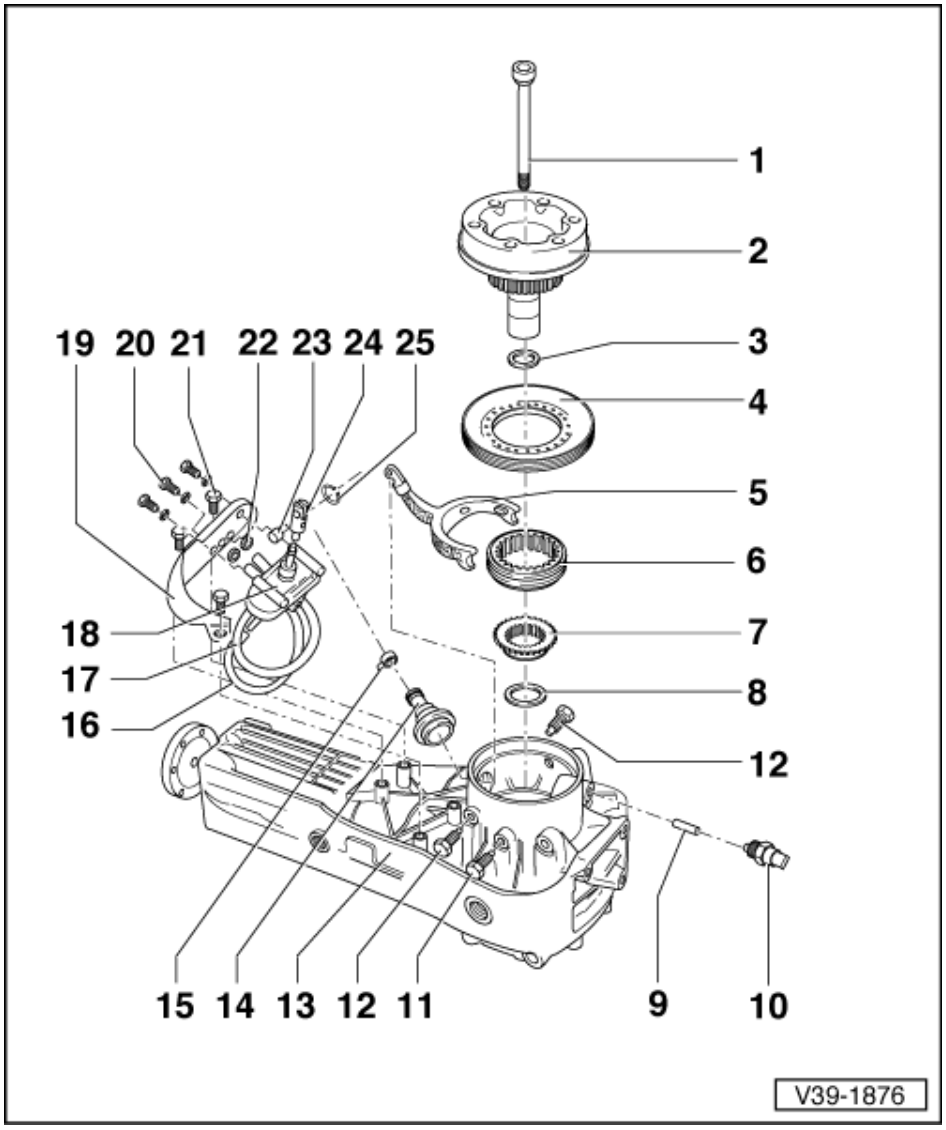
- -> Pay attention to coloured marking of vacuum hoses:
  - Yellow hose to connection -1-
  - Blue hose to connection -2-
- Adjust clevis at vacuum element => Page 314.

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.

Tightening torques

Component	Nm
Vacuum element to bracket	3.5
Bracket to rear final drive	25
Cover plate to rear final drive	25
Double pipe clamp to exhaust system	40

15.5 - Dismantling and assembling differential lock

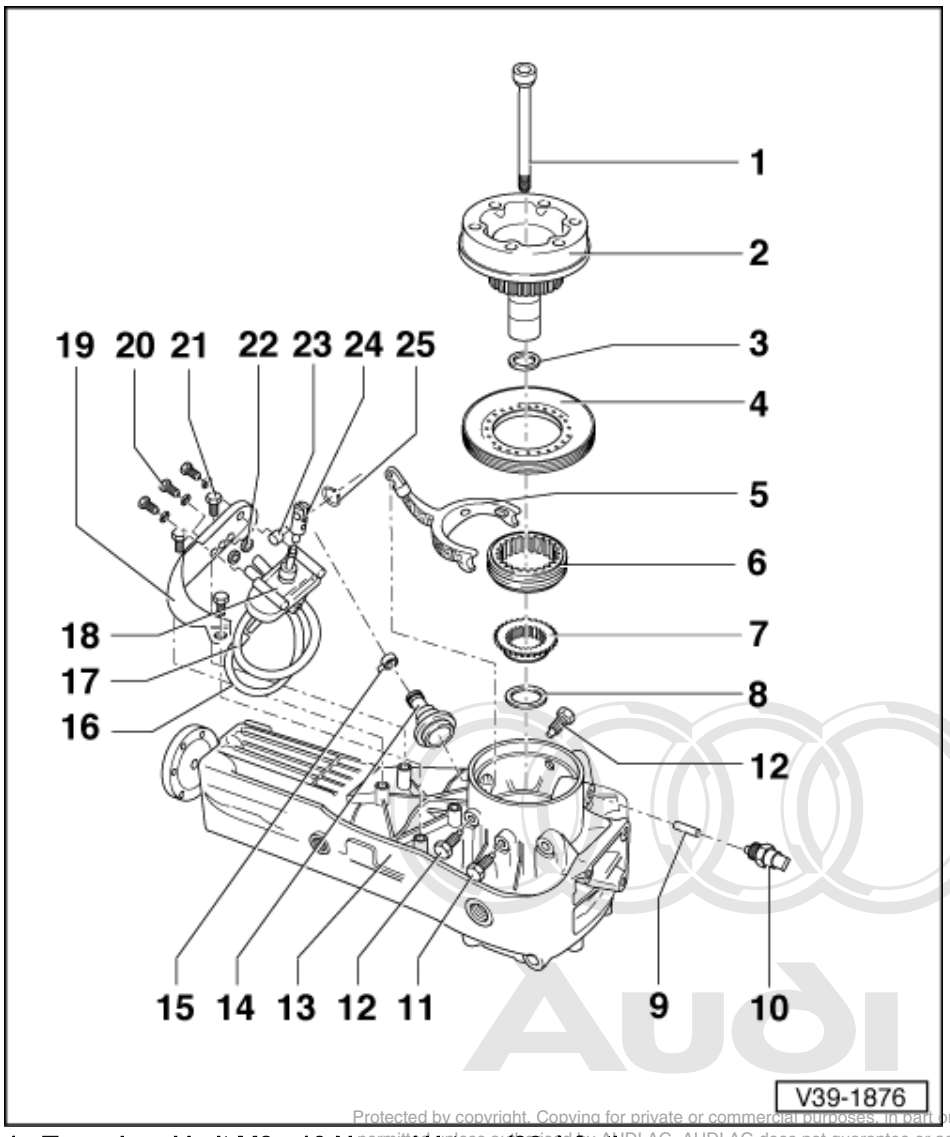


Notes:

- Can be disassembled with final drive installed.
- Differential lock of rear final drive can be locked by means of control unit up to 25 km/h. Differential lock is switched off automatically once speed rises above 25 km/h.
- Fault finding at differential lock

=> Binder "Current flow diagrams, Electrical fault finding and fitting locations" ; December 1990 ä 1992; Fault finding program No. 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.

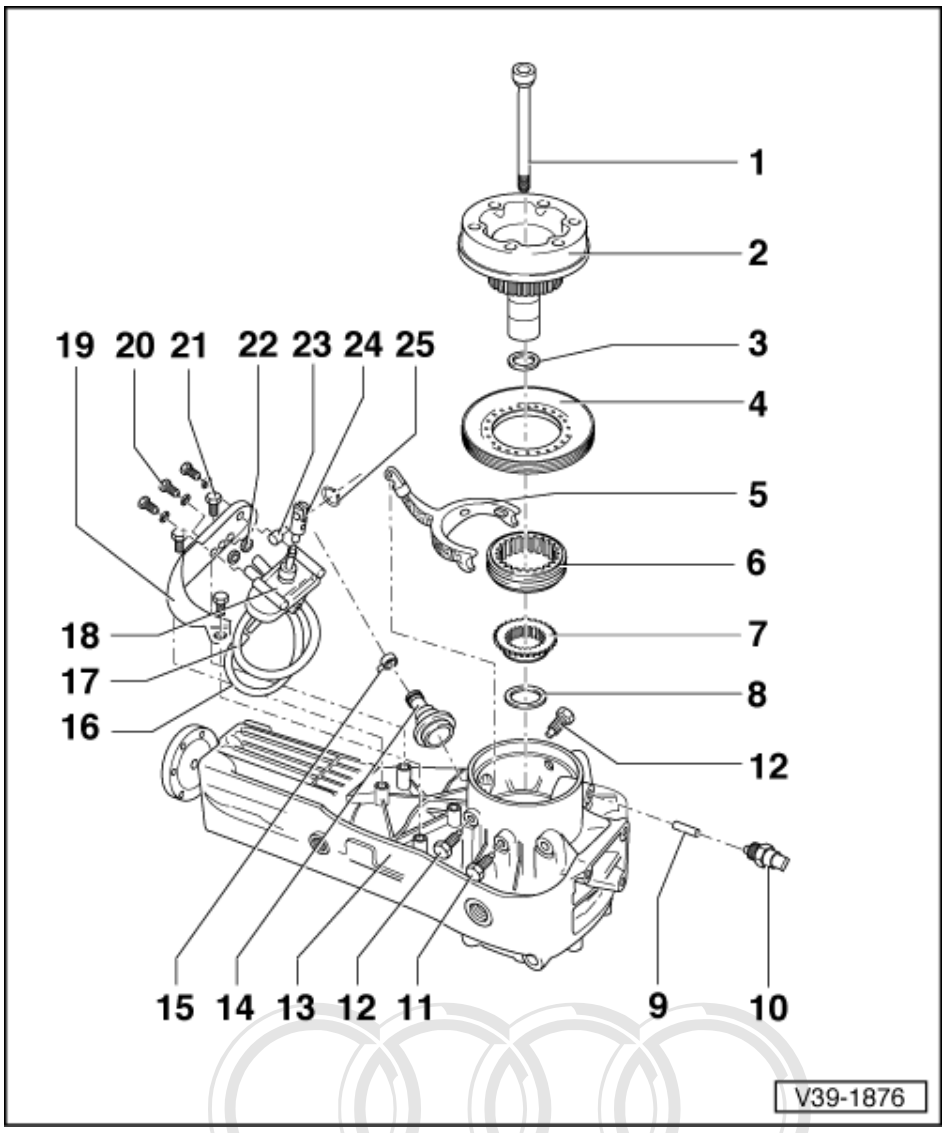


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 Taper head bolt M8 - 10 Nm + 1/4 turn (90o) further
2 Flange shaft
3 Shim for flange shaft
- When removing, ensure that shim is not lost
- Determining thickness => Page 315

4 Oil seal
- Always replace
- Removing and installing => Page 255

5 Selector fork
- Remove and install together with locking collar



6 Locking collar

- Installation position: Step towards coupling body
- Remove and install together with selector fork

7 Coupling body for differential lock

- Installation position => Fig. 1

8 Shim for coupling body

- Determining thickness => Fig. 2

9 Extension pin

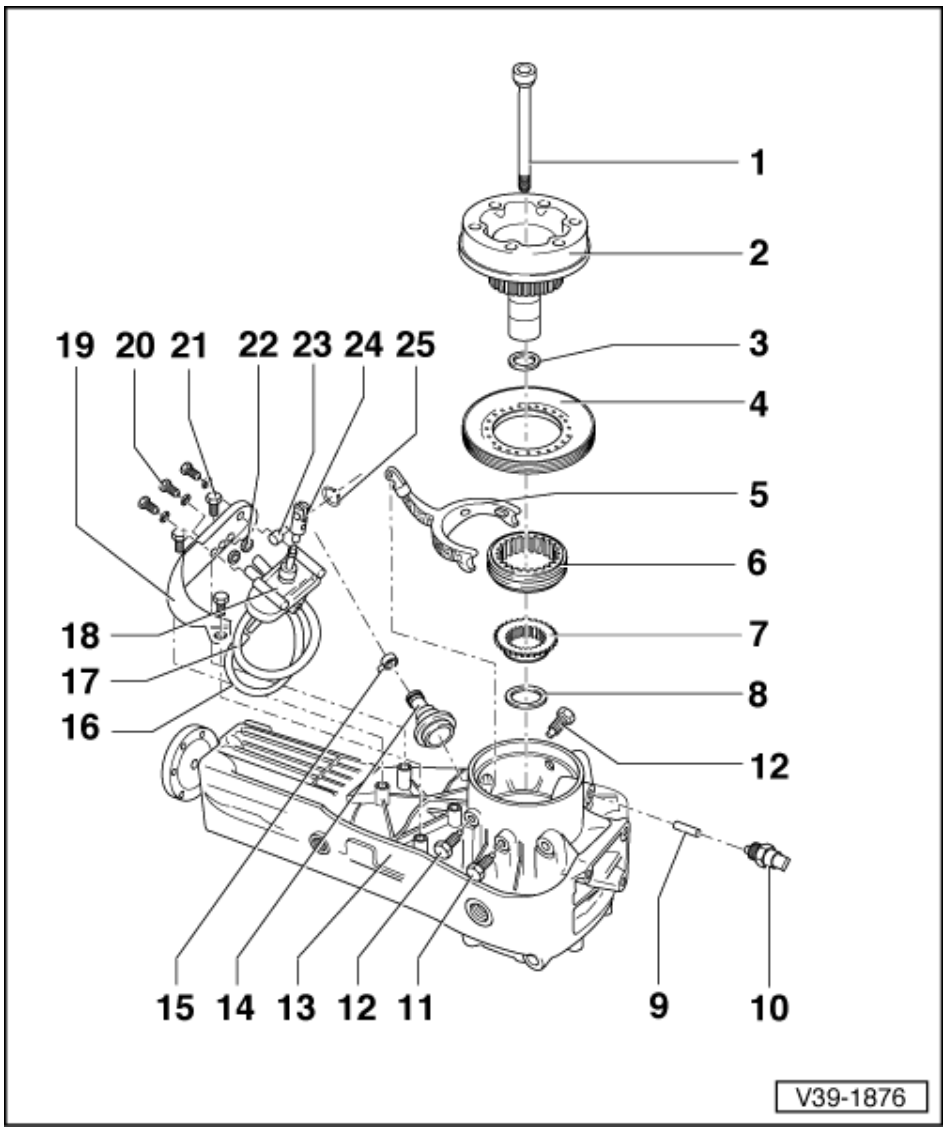
- For gearbox switch

10 Gearbox switch - 42 Nm

11 Trunnion bolt - 35 Nm

- Stop for selector fork

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.



12 Trunnion bolt - 35 Nm

- Guide for selector fork

13 Rear final drive

14 Bellows

- For removing and installing, remove bracket together with vacuum element => Page 308

15 Clip

- For attaching bellows to selector fork

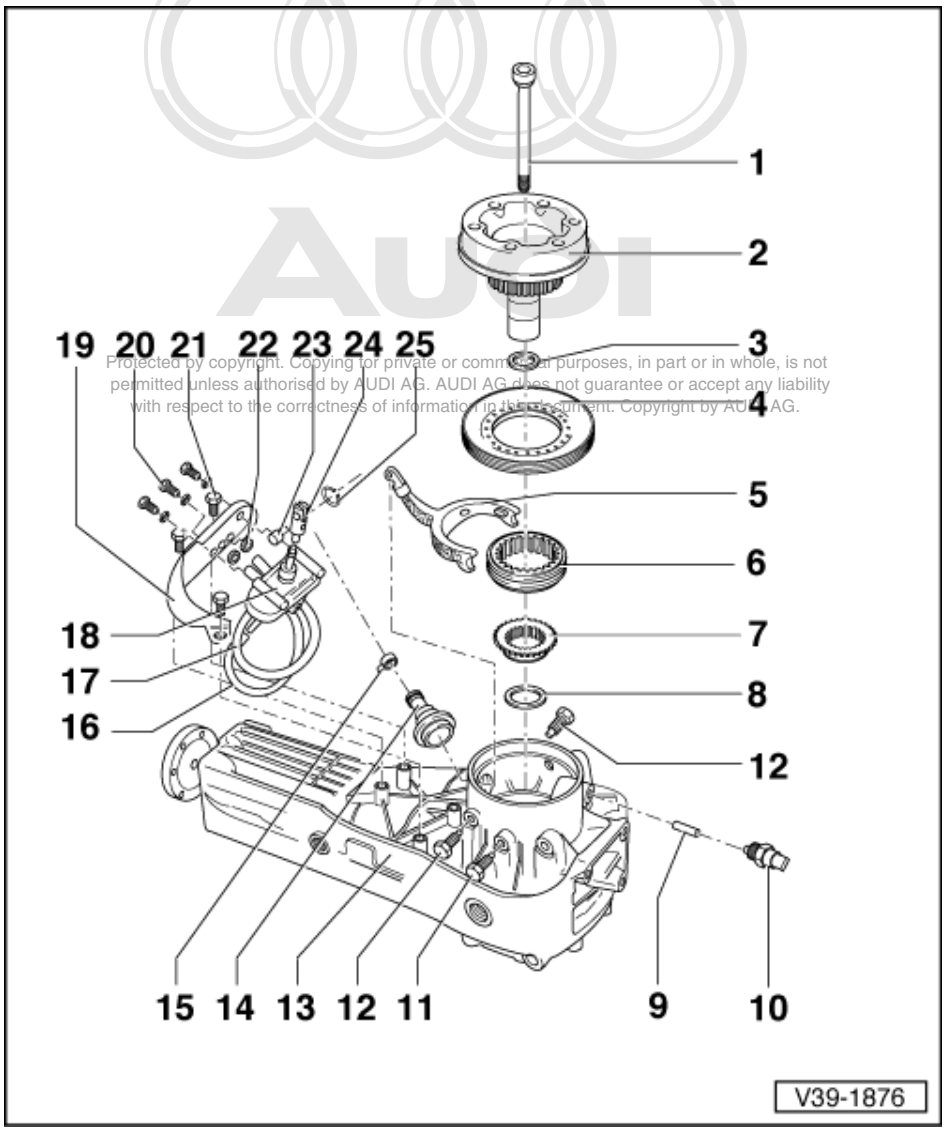
16 Blue vacuum hose

- Fit onto inner connection of vacuum element

17 Yellow vacuum hose

- Fit onto outer connection of vacuum element

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.



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.

18 Vacuum element

- Removing and installing => Page 307

19 Bracket

- For vacuum element

20 Screw M5 - 3.5 Nm

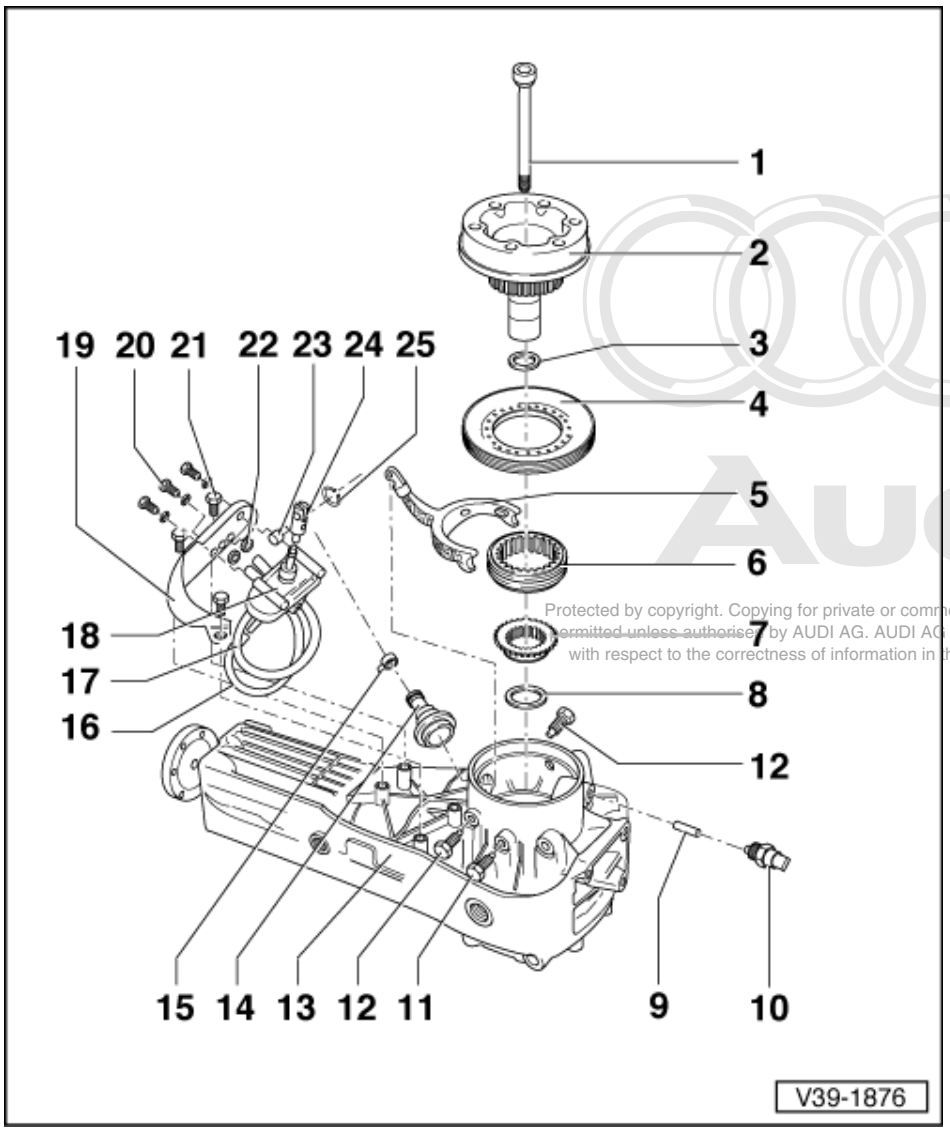
- Qty. 3
- With corrugated washer
- For attaching vacuum element to bracket

21 Screw M8 - 25 Nm

- Qty. 3
- For attaching bracket to final drive

22 Grommet

- Qty. 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.

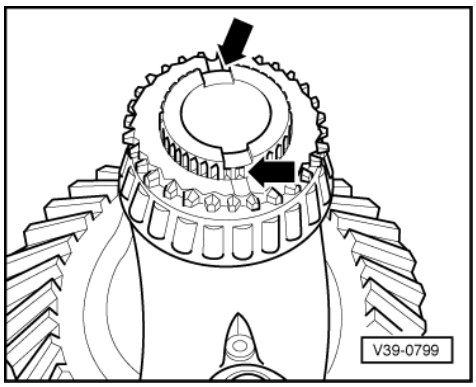
23 Pin

24 Clevis

- Adjusting:
- Final drive has to be completely assembled.
- Remove pin at clevis.
- Centre operating travel of vacuum element by turning clevis so that the two end positions of selector fork are completely reached (stop produced by stud bolt -Item 11 -).

25 Locking clip

- Fit onto pin

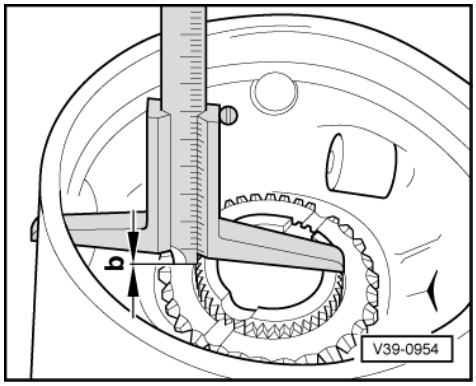


-> Fig.1 Installation position of coupling body

Note:

Shown in illustration with differential removed.

The oiling slots -arrows- at differential and coupling body should be aligned.



-> Fig.2 Determining thickness of shim for coupling body

- Measure dimension -b-.
- Determine shim from table. Part numbers

=> Parts Catalogue

Dimension -b-	Thickness (mm)
0.00 ... 4.10	No shim
4.11 ... 4.40	0.3
4.41 ... 4.70	0.6
4.71 ... 4.90	0.9

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.

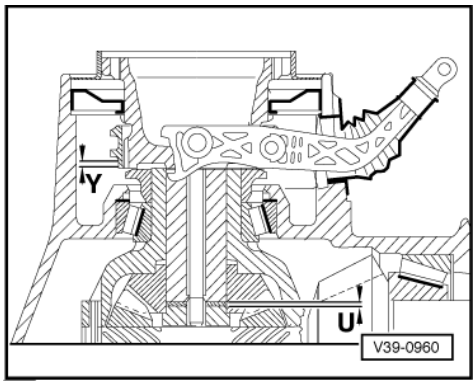
15.6 - Adjusting flange shaft, left

Notes:

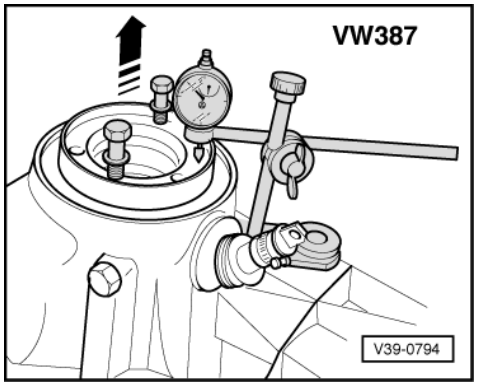
- This operation should only be carried out if left flange shaft, differential housing or bevel gears have been replaced.

- The purpose of this adjustment is to achieve a clearance -Y- of 0.2 ... 0.5 mm between flange shaft and differential housing. This is the only way to ensure smooth operation of parts as well as precise gearshifts.

Determining size of shim "u"



- -> Determine gap -y- between flange shaft and differential housing as follows.



- -> Attach dial gauge with universal dial gauge holder VW 387 to rear final drive.
- Press flange shaft in towards differential. Apply dial gauge to flange shaft and set to "0" with a preload of 1 mm.
- Pull out flange shaft in direction of arrow as far as stop and measure clearance.
  - Specification: 0.2 ... 0.5 mm
- If clearance is insufficient, install appropriately thicker shims, if clearance is too large, install appropriately thinner shims.
- Select required shims from table. Part numbers

=> Parts Catalogue

The following shims are available

Shim thickness (mm)		
0.3	0.6	0.9

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.

16 - Adjusting drive pinion and crown wheel

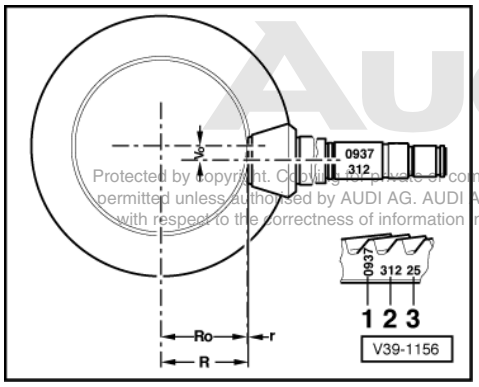
16.1 - Adjusting drive pinion and crown wheel

General notes:

- Careful adjustment of the drive pinion and crown wheel is important for the service life and smooth running of the final drive. For this reason, the drive pinion 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 drive pinion 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 deviation "r", which is related to the master gauge "Ro" is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the crown wheel. The final drive set (drive pinion and crown wheel) must only be replaced together as a matched pair.
- Observe the general repair instructions for taper roller bearings and shims.

16.2 - Adjusting final drive sets; identification



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.

Service final drive sets

1 =	"0937" indicates Oerlikon final drive set with a ratio of 37 : 9
2 =	Pairing number (312) of final drive set
3 =	Dimension "r" related to the master gauge of the special test machine used during production. Dimension "r" is always stated in 1/100 mm Example: "25" indicates r = 0.25 mm
Ro =	Length of master gauge used on special test machine "Ro" = 53.15 mm
R =	Actual distance between crown wheel axis and face of drive pinion at the point of quietest running for this final drive set R = Ro + r
Vo =	Hypoid offset

16.3 - Sequence for re-adjusting final drive set

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

1.) Determine total shim thickness "Stotal" for "S1" + "S2" for the specified preload for taper roller bearings for differential.

2.) Determine total shim thickness "S3" to reproduce the installation position for the drive pinion determined on the test machine in production.

3.) Distribute total shim thickness "Stotal" for "S1" + "S2" so that the specified backlash exists between crown wheel and drive pinion.

Note:

Overview of components and shims =>Page 319 .

16.4 - Adjustment overview

Note:

If repairs have been carried out on the final drive it is only necessary to adjust the drive pinion or final drive set if components have been renewed which have a direct effect on the adjustments of the final drive. Refer to following table to avoid unnecessary adjustments:

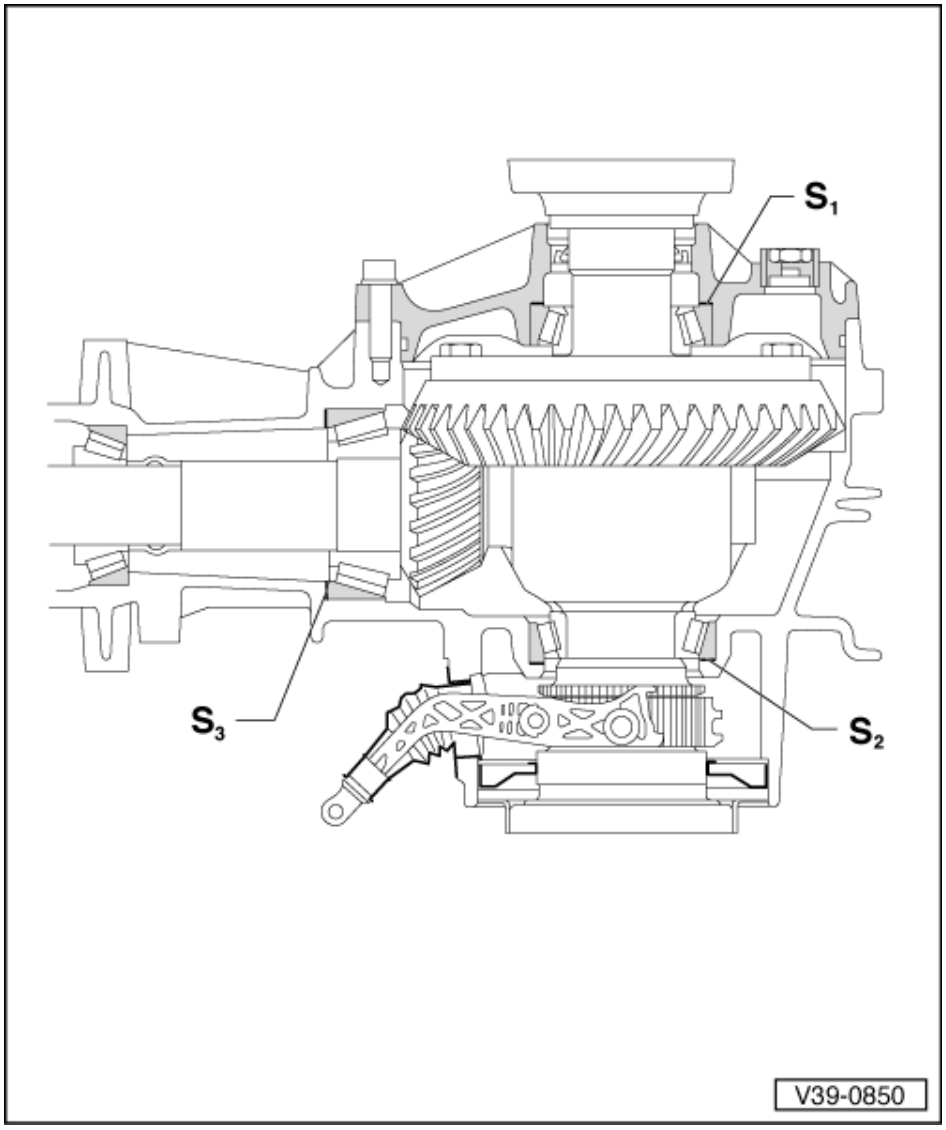
	To be adjusted:			
Parts replaced: ▼	Crown wheel "S1"+"S2" 1) => Page 326	Drive pinion "S3" 1) using deviation "r" => Page 319	Backlash 0.12 ... 0.22 mm => Page 329	Flange shaft, left only for final drive with differential lock => Page 315
Final drive housing	X	X	X	
Differential housing	X		X	X
Taper roller bearings for drive pinion		X	X	
Taper roller bearing for differential	X		X	
Final drive set 2)	X	X	X	
Final drive cover	X		X	
Flange shaft				X
Bevel gears				X

1) Shims; installation position => Page 319 .

2) Drive pinion and crown wheel; only replace 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.

16.5 - Position of shims



Note:

Adjustment overview when replacing individual components of gearbox =>Page 318 .

S1 - Adjustment shim for crown wheel in cover for final drive
S2 - Adjustment shim for crown wheel in final drive housing
S3 - Adjustment shim for drive pinion in final drive housing

17 - Adjusting drive pinion

17.1 - Adjusting drive pinion

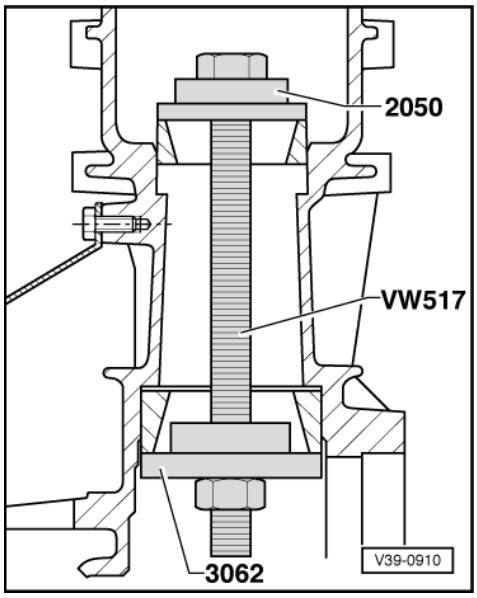
Notes:

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.

- Before adjusting pinion, adjust the crown wheel (determine total shim thickness "Stotal" for shims "S1" + "S") => Page 326 .

- Re-adjustment of the drive pinion is only necessary if the final drive set, taper roller bearing for drive pinion or housing for final drive is replaced. Adjustment overview => Page 318

Determining total shim thickness "Stotal" for shims "S3" + "S4"

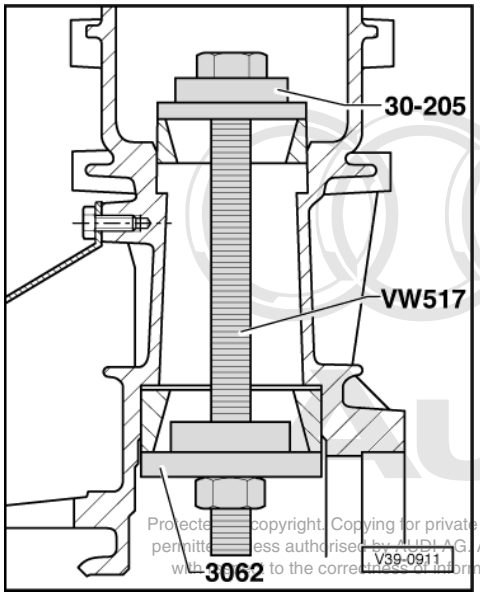


(Adjusting preload of taper roller bearing for drive pinion)

- Secure final drive on a repair stand.
- -> Pull outer race for large taper roller bearing into housing without shim.

Note:

Oil bearing outer race and housing bore thoroughly.

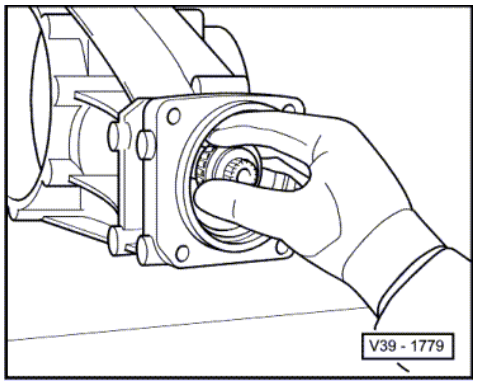


Protected copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Pull outer race for small taper roller bearing into housing.

Note:

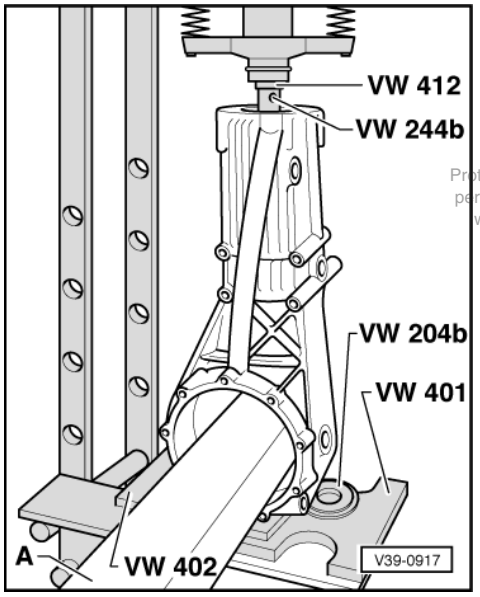
Oil bearing outer race and housing bore thoroughly.



- -> Insert drive pinion without spacer sleeve.
- Heat inner race for taper roller bearing to approx. 100 oC and fit onto drive pinion.

Note:

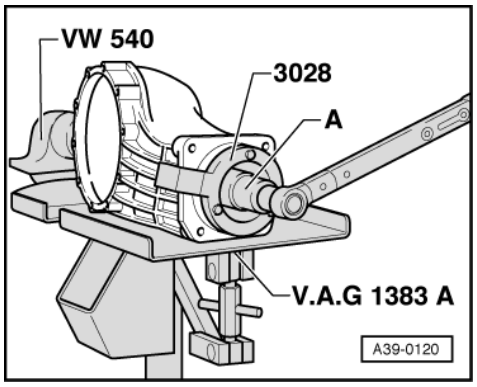
Only install spacer sleeve for final frictional torque measurement (after determining shim "S3").



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 taper roller bearing fully home.

A - Square timber for supporting drive pinion



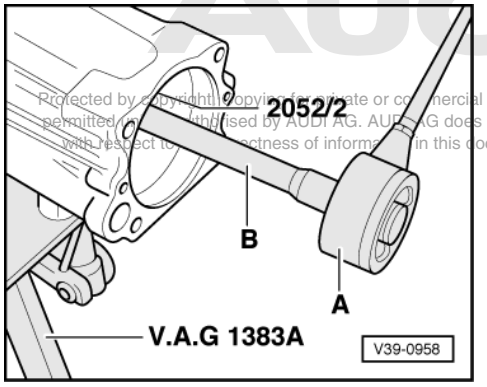
- -> Tighten drive pinion nut until the following frictional torque is obtained:

New bearings	Used bearings
250 ... 300 Ncm	30 ... 60 Ncm

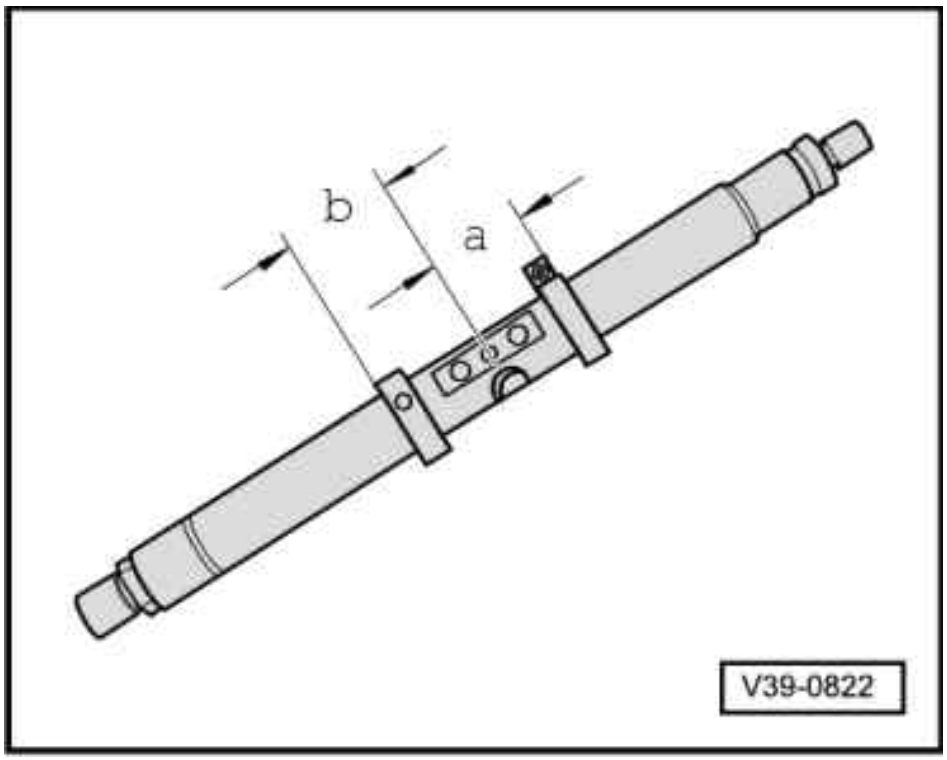
Note:

The final drive must be supported (e.g. with V.A.G 1383 A) when tightening the drive pinion nut otherwise the threaded holes in the housing will be damaged.

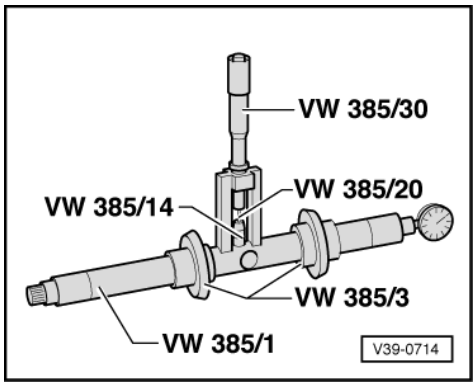
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



A - -> Torque gauge, commercially available, 0 ... 600 Ncm
B - Extension with 32 mm socket insert



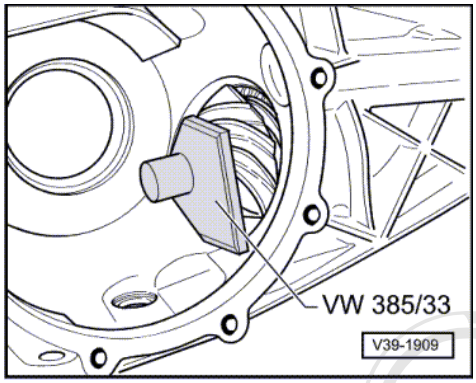
- -> Set adjustment ring of universal mandrel VW 385/1.
  - Dimension "a" = 75 mm
- Set sliding adjustment ring.
  - Dimension "b" = 35 mm



- -> Assemble universal mandrel as illustrated.
  - Dial gauge extension VW 385/20 = 3 mm long
- Set universal master gauge VW 385/30.
  - Ro = 53.15 mm
- Set dial gauge (3 mm measuring range) to "0" with 2 mm preload.

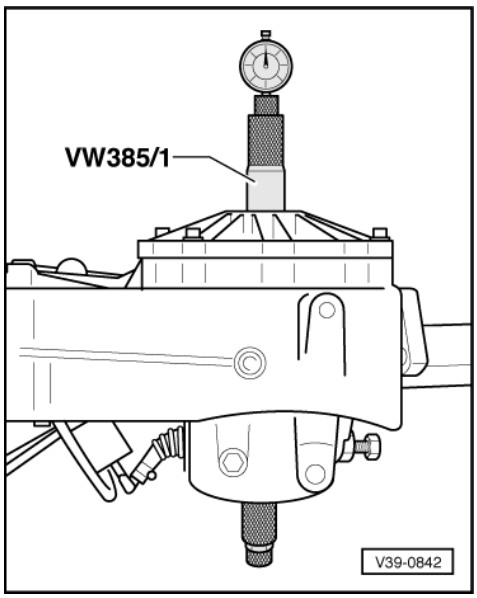
Note:

Before performing following measurements turn drive pinion at least five turns in both directions, so that the taper roller bearings settle. Otherwise a false reading will be obtained.



- -> Place end measuring plate VW 385/33 onto drive pinion head.
- Remove master gauge VW 385/30 and insert mandrel into housing.
  - The centring disc for VW 385/3 faces towards cover for final drive
- Fit cover for final drive and tighten 4 bolts.
- Using the adjustable ring, move 2nd centring disc out as far as possible so that the mandrel 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.



Determining dimension "e"

- -> Turn mandrel until the dial gauge point touches the end measuring plate on drive pinion head, then measure maximum deflection (return point). The measured value is dimension "e" (in red scale).
  - Measurement in following example: "e" = 1.60 mm

Note:

Dimension "e" is required to determine thickness of shim "S3".

- Then, (after removing universal mandrel) check again that the dial gauge, with master gauge VW 385/30 fitted, indicates "0" with 2 mm preload, otherwise repeat the measurement.

Determining shim thickness "S3"

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.

Formula:
"S3" = "e" - "r"
e = Determined value => Page 324
r = deviation (marked on crown wheel in 1/100 mm)

Example:		
	Determined value "e"	1.60 mm
-	Deviation "r"	0.42 mm
=	Thickness of shim "S3"	1.18 mm

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S3"

Shim thickness (mm) 1)		
0.95	1.15	1.35
1.00	1.20	1.45
1.05	1.25	1.50

Shim thickness (mm) 1)		
1.10	1.30	1.55

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

- Remove universal mandrel.

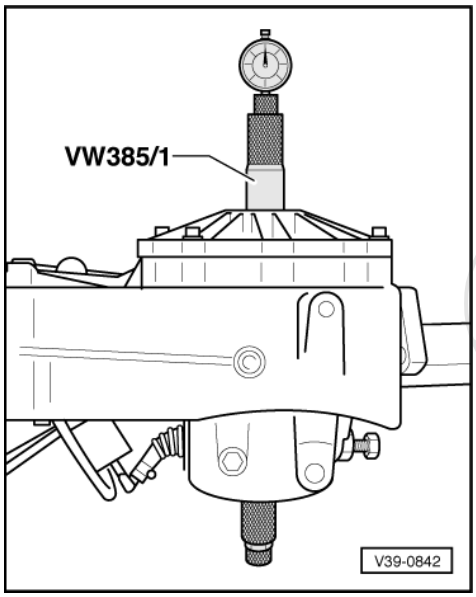
- Remove drive pinion and outer race for large taper roller bearing and reinstall with determined shim(s) and spacer sleeve => Page 294 .
- Insert inner race for small taper roller bearing and tighten drive pinion nut until specified frictional torque is achieved => Page 294 .

Note:

Tighten the drive pinion nut slowly and read-off frictional torque frequently. If the specified frictional torque is exceeded, the spacer sleeve must be replaced. It is not possible to re-use a spacer sleeve that has been excessively compressed.

- Set to following frictional torques:

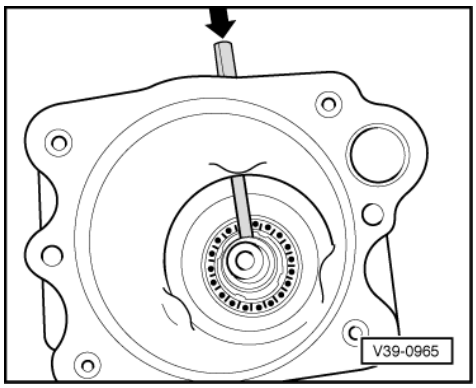
New bearings	Used bearings
250 ... 300 Ncm	30 ... 60 Ncm



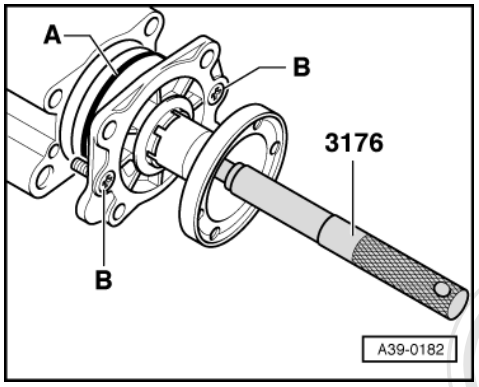
Performing check measurement
Checking dimension "r"

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 drive pinion at least 5 turns in both directions.
- -> Insert universal mandrel and perform check measurement.
  - If the shims have been correctly selected, the dial gauge, reading anti-clockwise (in red scale), will show the deviation "r" within a tolerance of ± 0.04 mm



- -> Use a drift to peen drive pinion nut through oil drain hole.



- -> Replace O-ring -A- in cover.
- Install flange for propshaft with cover for final drive
- Use drift 3176 to knock in flange shaft.
- Tighten 2 countersunk screws -B- for cover to 25 Nm.
- The radial run-out at flange for propshaft must always be measured and marked =>Page 252 .

18 - Adjusting crown wheel

18.1 - Adjusting crown wheel

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.

(Adjusting differential)

Repairs after which the crown wheel must be adjusted => Page 318 .

Determining total shim thickness "Stotal" for shims "S1" + "S2"

(Adjusting preload of taper roller bearing for differential)

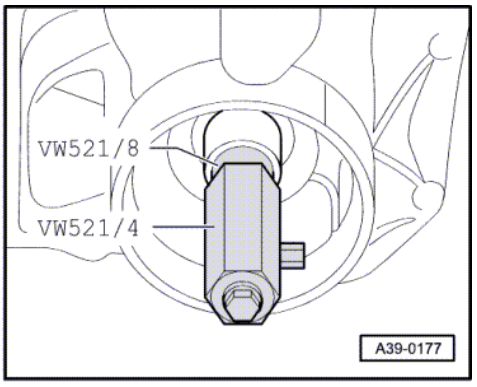
- Drive pinion removed or crown wheel dismantled from differential housing

- Remove seal and left and right differential outer races for taper roller bearings and take out shims => Page 293 .
- Drive left outer race for taper roller bearing for differential (housing side) with shim "S2" into final drive housing => Page 292 . For measurement purposes use a 1.00 mm thick "S2*" shim (2 shims, 1 of 0.80 mm and 1 of 0.20 mm).

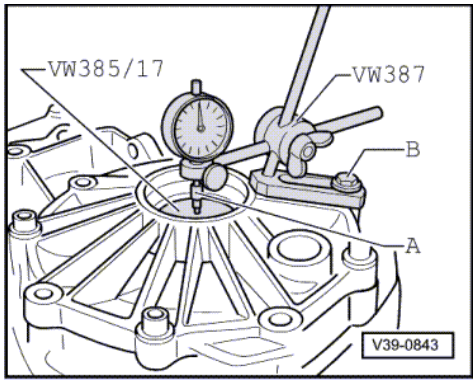
Note:

For measurement purposes a shim "S2" with a thickness of 1.00 mm is initially inserted. It is referred to as "S2" in the following. After determining the backlash "S2*" will be replaced by the correct "S2".*

- Drive outer race for right-hand taper roller bearing for differential (cover side) without shim in onto stop => Page 293 .



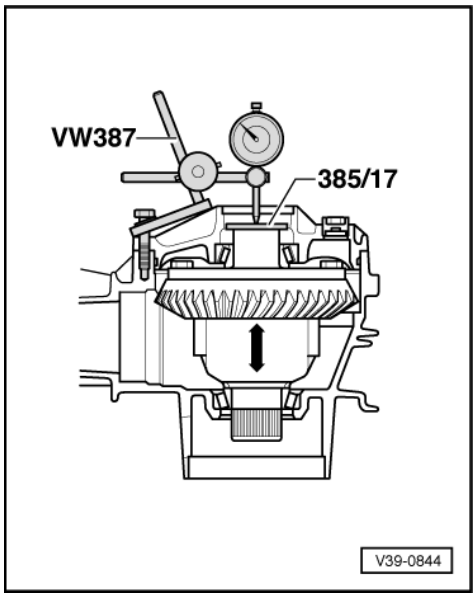
- Insert differential into housing. The crown wheel is positioned on the right side (cover side).
- Fit cover and tighten bolts to 25 Nm.
- -> Install special tools VW 521/4 and 521/8 onto housing side in differential housing.
- Turn cover side of differential housing upwards.
- Turn differential 5 turns in both directions to settle the taper roller bearing.



- Place measuring plate VW 385/17 onto differential.
- -> Fit measuring tools.

A - Dial-gauge extension approx. 30 mm long
B - Hexagon bolt M8 x 45

- Set dial gauge extension onto centre of plate.
- Set dial gauge (3 mm measuring range) to "0" with 1 mm preload.



- -> Lift differential without turning; read off play on dial gauge and note.
  - Measurement in following example: 0.50 mm

Note:

If the measurement has to be repeated, the differential must again be turned 5 turns in each direction to settle the taper roller bearing.

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.

Formula:
"Stotal" = "S2*" + measurement + bearing preload

Example:	
Inserted shim(s) "S2*"	1.00 mm

Example:	
+ Measurement	0.50 mm
+ Bearing preload (constant)	0.30 mm
= Total shim thickness "Stotal" for shims "S1" + "S2"	1.80 mm

Determining thickness of shim "S1*"

Notes:

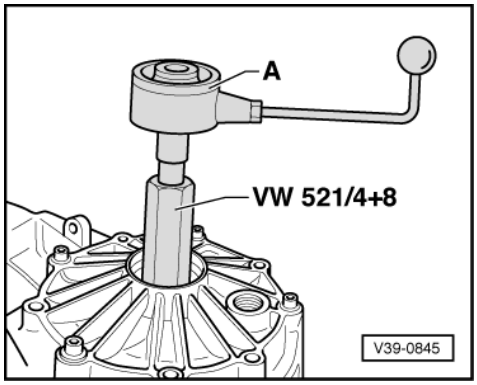
- The preliminary adjustment shim "S1*" will be replaced with the final shim "S1" after determining the backlash.
- The total shim thickness "Stotal" remains the same.

Formula:
"S1*" = "Stotal" - "S2*"

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.

Example:	
Total shim thickness "Stotal" for shims "S1" + "S2"	1.80 mm
- Inserted shim(s) "S2*"	1.00 mm
= Thickness of shim "S1*"	0.80 mm

- Determine shim(s) from table => Page 330 .



Measuring friction torque (check)

- Drive pinion removed
- Differential fitted with shims "S1*" and "S2*"

- -> Fit torque gauge 0 ... 600 Ncm -A- onto differential.
- Read off friction torque.

Frictional torque specifications:

New bearings	Used bearings
250 ... 300 Ncm	30 ... 60 Ncm

Note:

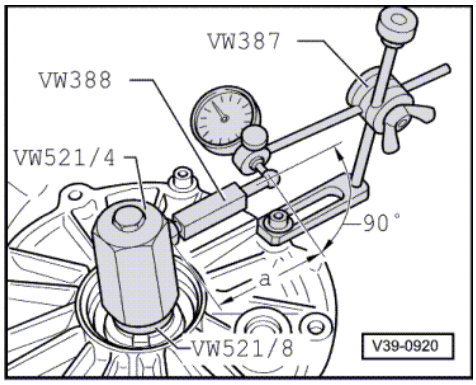
If the final drive set is being re-adjusted, the adjustment of the drive pinion should be performed now, and the adjustment should be checked =>Page 319 .

Adjusting backlash

(Position of crown wheel in gearbox housing)

- Drive pinion with shim "S3" installed
- Differential with shims "S1*" + "S2*" installed

- Insert differential in final drive housing, install cover and tighten all bolts to 25 Nm.



- Turn differential 5 turns in both directions so that the taper roller bearings settle.
- -> Fit measuring tools.
- Use dial gauge extension VW 382/10 (6 mm flat).
- Set measuring lever VW 388 to dimension "a" = 60 mm.
- Measure play between teeth flanks (backlash) as follows:
  - Turn crown wheel until it makes contact with a tooth flank (end of backlash travel).
  - Set dial gauge to "0" with 1 mm preload.

  - Turn crown wheel back until lying against an opposite tooth flank (backlash).
  - Read off backlash and note value.
  - Turn crown wheel through 90o and repeat measurements a further 3 times.

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 crown wheel and pinion themselves are defective. Check installation, replace final drive set if necessary.

Determining average backlash

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

- Result: The average backlash is 1.16 mm divided by 4 = 0.29 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.

Determining thickness of shim "S2"

Formula:		
"S2"	=	"S2*" - backlash + lift

Example:		
	Inserted shim "S2*"	1.00 mm
-	Average backlash	0.29 mm
+	Lift (constant)	0.15 mm

Example:	
= Thickness of shim "S2"	0.86 mm

- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S2"

Shim thickness (mm) 1)		
0.15	0.60	1.50
0.20	0.65	1.65
0.25	0.80	
0.55	1.35	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Determining thickness of shim "S1"

Formula:
"S1" = "Stotal" - "S2"

Example:	
Total shim thickness "Stotal" for "S1" + "S2"	1.80 mm
- Thickness of shim "S2"	0.86 mm
= Thickness of shim "S1"	0.94 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.

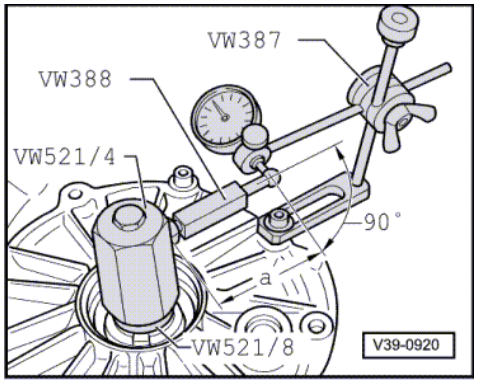
- Determine shim from table. Part numbers

=> Parts Catalogue

The following shims are available for "S1"

Shim thickness (mm) 1)		
0.15	0.50	1.50
0.20	0.80	
0.25	1.00	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.



-> Performing check measurement

- Drive pinion with shim "S3" installed
- Differential with shims "S1" + "S2" installed

- Turn differential 5 turns in both directions so that the taper roller bearings settle.
- Measure backlash four times on circumference.
  - Specification: 0.12 ... 0.22 mm

Notes:

- If the backlash is beyond the tolerance, the adjustments must be repeated. The total shim thickness "Stotal" must not be changed when the adjustment is repeated.
- The individual measurements must not differ by more than 0.06 mm from each other.

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.