Audi A4 1995 ➢

6-speed manual gearbox 01E Four-wheel drive									
Gearbox ID	DQT	DSY	EDU	EHW	FDP	FRQ	FTF	FTG	FTK
	FTU	FZV	FZW	FZY					
Geartype	01EA								

Edition 04.2002

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 A4 1995 ➤

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 Gearbox identification 1
1.1 Gearbox identification 1
1.2 Code letters, assignment of mechanical units, transmission ratios, capacities 2
2 Identification of rear final drive 6
2.1 Identification of rear final drive 6
2.2 Code letters, assignment of mechanical units, transmission ratios, capacities 6
3 Transmission layout 8
3.1 Transmission layout 8
4 Calculating transmission ratio "i" 10
4.1 Calculating transmission ratio "i" 10
5 Repair instructions 10
5.1 Repair instructions 10
30 - Clutch 14
1 Servicing clutch mechanism 14
1.1 Servicing clutch mechanism 14
1.2 Exploded view of pedal cluster (LHD vehicles) 15
1.3 Exploded view of pedal cluster (RHD vehicles) 20
1.4 Exploded view of hydraulic system 24
1.5 Removing and installing master cylinder 28
1.6 Bleeding clutch system 35
2 Servicing clutch release mechanism 37
2.1 Servicing clutch release mechanism 37
2.2 Removing and installing clutch slave cylinder 42
3 Servicing clutch 47
3.1 Servicing clutch 47
3.2 Clutch for vehicles with 4 and 6-cyl. TDI engine 48
3.3 Clutch with SAC pressure plate for vehicles with 6-cyl. 2.7l bi-turbo engine (S4 and RS4) 53
3.4 Removing and installing clutch with SAC pressure plate 56
3.5 Resetting adjuster ring of SAC pressure plate 57
34 - Controls, Housing 60
1 Servicing shift mechanism 60
1.1 Servicing shift mechanism 60
1.2 Servicing gear stick and push rod - rear 60
1.3 Servicing selector rod, connecting rod and push rod - front 64
1.4 Removing and installing shift mechanism 67
1.5 Adjusting shift mechanism 71
1.6 Checking gear stick setting 74
2 Servicing shift mechanism for vehicles as of 05.99 to 11.00, ident. no. 8D-X-260 001 to 8D-1-100 000 75
2.1 Servicing shift mechanism for vehicles as of 05.99 to 11.00, ident. no. 8D-X-260 001 to 8D-1-100 000 75
2.2 Installation position of shift mechanism 75
2.3 Servicing gear stick and push rod - rear 77
2.4 Removing and installing gear stick with push rod - rear 81
2.5 Servicing selector rod, connecting rod and push rod - front 83
2.6 Removing and installing shift mechanism 88
2.7 Adjusting shift mechanism 94
2.8 Checking gear stick setting 97
3 Servicing shift mechanism for vehicles as of 11.00, ident. no. 8D-1-100 001 ä 97

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.

3.1 Servicing shift mechanism for vehicles as of 11.00, ident. no. 8D-1-100 001 ä 97
3.2 Installation position of shift mechanism 98
3.3 Servicing gear stick and push rod - rear 99
3.4 Servicing selector rod, connecting rod and push rod - front 102
3.5 Adjusting shift mechanism 104
3.6 Checking gearshift setting 107

4 Removing and installing gearbox 108
4.1 Removing and installing gearbox 108
4.2 Removal on vehicles with 4-cyl. TDI engine 108
4.3 Removal on vehicles with V6 TDI engine 118
4.4 Installing gearbox on vehicles with 4 and 6-cyl. TDI engine 128

5 Removal on vehicles with V6 bi-turbo engine (S4, RS4) 135
5.1 Removal on vehicles with V6 bi-turbo engine (S4, RS4) 135
5.2 Fitting gearbox on vehicles with V6 bi-turbo engine (S4, RS4) 147

6 Checking gear oil level in manual gearbox 156
6.1 Checking gear oil level in manual gearbox 156

7 Removing and installing oil pipes 157
7.1 Removing and installing oil pipes 157

8 Removing and installing oil pump 159
8.1 Removing and installing oil pump 159

9 Servicing oil pump 162
9.1 Servicing oil pump 162

10 Dismantling and assembling gearbox 164
10.1 Dismantling and assembling gearbox 164
10.2 Removing and installing bearing housing, Torsen differential and end cover 165
10.3 Removing and installing manual gearbox and selector shaft 168
10.4 Removing and installing 5th and 6th gear 170
10.5 Removing and installing input shaft, drive pinion, hollow shaft and gearbox shift mechanism 174

11 Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft 177
11.1 Removing and installing bearing housing, Torsen differential, end cover, internal selector mechanism, input shaft, drive pinion and hollow shaft 177
11.2 Assembly sequence 177

12 Dismantling and assembling bearing housing 202
12.1 Dismantling and assembling bearing housing 202

13 Servicing bearing system for Torsen differential 209
13.1 Servicing bearing system for Torsen differential 209

14 Servicing end cover 215
14.1 Servicing end cover 215

15 Servicing bearing plate 221
15.1 Servicing bearing plate 221
15.2 Re-determining shim "S4" 228

16 Servicing gearbox housing 233
16.1 Servicing gearbox housing 233
16.2 Dismantling and assembling selector shaft as complete unit 250

35 - Gears, Shafts 253

1 Dismantling and assembling input shaft 253
1.1 Dismantling and assembling input shaft 253

2 Dismantling and assembling drive pinion and hollow shaft 265
2.1 Dismantling and assembling drive pinion and hollow shaft 265
2.2 Optimised synchronisation for 1st and 2nd gear on gearboxes with gearbox code letters FZV, FZW and FZY (repair option for all 01E gearboxes) 281

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 284
1 Replacing oil seal for flange shaft 284
1.1 Replacing oil seal for flange shaft 284
2 Removing and installing speedometer sender -G22 and drive wheel for speedometer sender 286
2.1 Removing and installing speedometer sender -G22 and drive wheel for speedometer sender 286
3 Replacing oil seal and grooved ball bearing for propshaft flange at gearbox 288
3.1 Replacing oil seal and grooved ball bearing for propshaft flange at gearbox 288
4 Removing and installing differential 294
4.1 Removing and installing differential 294
5 Dismantling and assembling differential (gearbox with no oil pump) 296
5.1 Dismantling and assembling differential (gearbox with no oil pump) 296
6 Dismantling and assembling differential (gearbox with oil pump) 309
6.1 Dismantling and assembling differential (gearbox with oil pump) 309
7 Adjusting drive pinion and crown wheel 323
7.1 Adjusting drive pinion and crown wheel 323
7.2 Adjustment and labelling of pinion sets 324
7.3 Position of shims 326
7.4 Adjustment table 326
7.5 Pinion set readjustment sequence 327
8 Adjusting drive pinion 328
8.1 Adjusting drive pinion 328
9 Adjusting crown wheel 337
9.1 Adjusting crown wheel 337
10 Servicing propshaft 344
10.1 Servicing propshaft 344
10.2 Removing and installing propshaft 348
10.3 Measuring and marking radial run-out at flange/propshaft 350
10.4 Adjusting propshaft 351
11 Checking gear oil level in rear final drive 354
11.1 Checking gear oil level in rear final drive 354
12 Removing and installing thrust tube 355
12.1 Removing and installing thrust tube 355
12.2 Exploded view 355
12.3 Removing 356
12.4 Installing 358
13 Dismantling and assembling thrust tube (exploded view) 359
13.1 Dismantling and assembling thrust tube (exploded view) 359
13.2 Dismantling and assembling thrust tube 362
14 Replacing oil seals for flange shafts 366
14.1 Replacing oil seals for flange shafts 366
15 Removing and installing rear final drive 368
15.1 Removing and installing rear final drive 368
15.2 Attaching rear final drive to repair stand 372
16 Dismantling and assembling rear final drive 373
16.1 Dismantling and assembling rear final drive 373
16.2 Exploded view of gearbox 373
17 Removing and installing differential 376
17.1 Removing and installing differential 376
18 Dismantling and assembling differential 382
18.1 Dismantling and assembling differential 382

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Removing, installing, dismantling and assembling drive pinion 394
19.1 Removing, installing, dismantling and assembling drive pinion 394
20 Adjusting drive pinion and crown wheel 401
20.1 Adjusting drive pinion and crown wheel 401
20.2 Adjustment and labelling of pinion sets 402
20.3 Pinion set readjustment sequence 403
20.4 Adjustment table 404
20.5 Position of shims 405
20.6 Adjusting drive pinion 406
20.7 Adjusting crown wheel 412

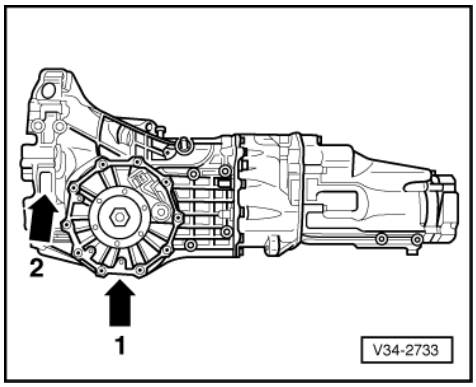
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

00 - Technical data

1 - Gearbox identification

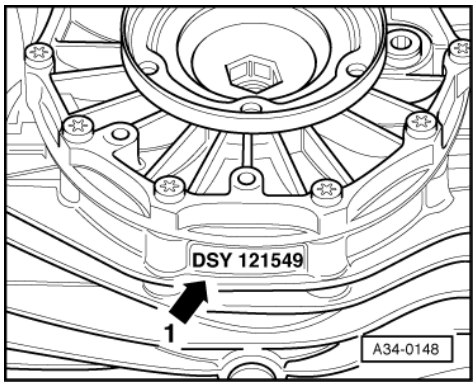
1.1 - Gearbox identification

The 6-speed manual gearbox 01E 4WD was introduced as of 09.97 for the models Audi S4 and RS4 (2.7l bi-turbo engine), Audi A4 1.9 l - 85 kW - TDI and Audi A4 V6-TDI. Assignment => Page 2 .



-> Location on gearbox

- Code letters and serial no. -arrow 1-
- Manual gearbox 01E -arrow 2-



-> Gearbox code letters and consecutive serial number -arrow 1-

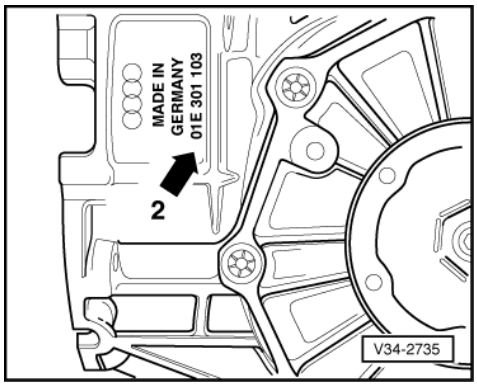
Example:	DSY	121549
	I	I
	Code letters	Consecutive gearbox serial number

Additional data depend on manufacture.

Note:

The gearbox code letters can also be found on the vehicle data stickers.

Electronically saved. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 01E -arrow 2-

1.2 - Code letters, assignment of mechanical units, transmission ratios, capacities

Manual gearbox		6-speed 01E Four-wheel drive		
Code letters		DQT	DSY	EDU
Manufactured	from	07.97	05.97	07.99
	to	12.98	12.98	10.00
Assignment	Model	Audi A4 1995 >	Audi A4 1995 >	Audi A4 1995 >
	Engine	2.5 l - 110 kW - TDI	2.7l - 195 kW - S4	2.7 l - 184 kW - S4
Transmission 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	32 : 26 = 1.231	32 : 26 = 1.231
	4th gear	27 : 31 = 0.871	29 : 30 = 0.967	29 : 30 = 0.967
	5th gear	26 : 39 = 0.667	29 : 36 = 0.806	29 : 36 = 0.806
	6th gear	23 : 41 = 0.561	26 : 38 = 0.684	26 : 38 = 0.684
	Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

Protected by Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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	DQT	DSY	EDU
Speedometer	Electronic		
Capacity	2.5 litres 1)	3.4 litres 1) 2)	2.5 litres 1)
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic)		
Clutch mechanism	Hydraulic		
Clutch plate ø	240 mm 3)		
Drive shaft flange ø	130 mm 4)	108 mm	108 mm
itot in top gear	2.306	2.813	2.813

Rear final drive assignment Code letters	DAK	DQA	DQA

1) Reduced oil quantity

2) Oil quantity includes 0.3 l for gear oil cooler and oil pipe. Oil cooler and oil pipe must be completely drained on replacing gearbox.

3) With dual-mass flywheel

4) For triple roller joint/drive shaft with centring diameter 130 mm

Manual gearbox		**6-speed 01E Four-wheel drive**		
Code letters		**EHW**	**FDP**	**FRQ**
Manufactured	from	01.00	11.00	04.01
	to	04.01	04.01	09.01
Assignment	Model	**Audi A4 1995 >**	Audi A4 1995 >	Audi A4 1995 >
	Engine	1.9 l - 85 kW - TDI	2.7l - 280 kW - RS4	2.7l - 195 kW - S4
Transmission 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 : 25 = 1.320	32 : 26 = 1.231
	4th gear	28 : 30 = 0.933	30 : 29 = 1.034	29 : 30 = 0.967
	5th gear	27 : 38 = 0.711	29 : 36 = 0.806	29 : 36 = 0.806
	6th gear	24 : 40 = 0.600	26 : 38 = 0.684	26 : 38 = 0.684
	Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

Code letters	**EHW**	**FDP**	**FRQ**
Speedometer	Electronic		
Capacity	2.5 litres 1)	3.4 litres 1) 2)	3.4 litres 1) 2)
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic)		
Clutch mechanism	Hydraulic		
Clutch plate ø	240 mm 3)		
Drive shaft flange ø	130 mm 4)	108 mm	108 mm
itot in top gear	2.467	2.813	2.813
Rear final drive assignment Code letters	DAK	DQA	DQA

1) Reduced oil quantity

2) Oil quantity includes 0.3 l for gear oil cooler and oil pipe. Oil cooler and oil pipe must be completely drained on replacing gearbox.

3) With dual-mass flywheel

4) For triple roller joint/drive shaft with centring diameter 130 mm

Audi
Printing, copying and storage on data carriers of this document is not permitted unless authorised by AUDI 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		6-speed 01E Four-wheel drive		
Code letters		FTF	FTG	FTK
Manufactured	from	04.01	04.01	04.01
	to	09.01	09.01	09.01
Assignment	Model	Audi A4 1995 >	Audi A4 1995 >	Audi A4 1995 >
	Engine	2.5 l - 110 kW - TDI	2.7 l - 184 kW - S4	1.9 l - 85 kW - TDI
Transmission 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	32 : 26 = 1.231	32 : 26 = 1.231
	4th gear	27 : 31 = 0.871	29 : 30 = 0.967	28 : 30 = 0.933
	5th gear	26 : 39 = 0.667	29 : 36 = 0.806	27 : 37 = 0.730
	6th gear	23 : 41 = 0.561	26 : 38 = 0.684	24 : 40 = 0.600
	Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

Code letters	FTF	FTG	FTK
Speedometer	Electronic		
Capacity	2.5 litres 1)	2.5 litres 1)	2.5 litres 1)
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic)		
Clutch mechanism	Hydraulic		
Clutch plate ø	240 mm 3)		
Drive shaft flange ø	130 mm 4)	108 mm	130 mm 4)
itot in top gear	2.306	2.813	2.467
Rear final drive assignment Code letters	DAK	DQA	DAK

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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) Reduced oil quantity

3) With dual-mass flywheel

4) For triple roller joint/drive shaft with centring diameter 130 mm

Manual gearbox		6-speed 01E Four-wheel drive		
Code letters		FTU	FZV 5)	FZW 5)
Manufactured	from	04.01	01.02	01.02
	to	09.01		
Assignment	Model	Audi A4 1995 >	Audi A4 1995 >	Audi A4 1995 >
	Engine	2.7 l - 280 kW - RS4	2.7 l - 195 kW - S4	2.7 l - 280 kW - RS4
Transmission 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	33 : 25 = 1.320	32 : 26 = 1.231	33 : 25 = 1.320
	4th gear	30 : 29 = 1.034	29 : 30 = 0.967	30 : 29 = 1.034
	5th gear	29 : 36 = 0.806	29 : 36 = 0.806	29 : 36 = 0.806
	6th gear	26 : 38 = 0.684	26 : 38 = 0.684	26 : 38 = 0.684

Manual gearbox	6-speed 01E Four-wheel drive		
Reverse gear	38 : 11 = 3.455	38 : 11 = 3.455	38 : 11 = 3.455

5) Service gearbox for S4 and RS4; modified synchro-rings for 1st and 2nd gear (with carbon coating) and modified locking collar/synchro-hub for 1st/2nd gear

Code letters	FTU	FZV 5)	FZW 5)
Speedometer	Electronic		
Capacity	3.4 litres 1) 2)	3.4 litres 1) 2)	3.4 litres 1) 2)
Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic)		
Clutch mechanism	Hydraulic		
Clutch plate ø	240 mm 3)		
Drive shaft flange ø	108 mm	108 mm	108 mm
itot in top gear	2.813	2.813	2.813
Rear final drive assignment Code letters	DQA	DQA	DQA

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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) Reduced oil quantity

2) Oil quantity includes 0.3 l for gear oil cooler and oil pipe. Oil cooler and oil pipe must be completely drained on replacing gearbox.

3) With dual-mass flywheel

5) Service gearbox for S4 and RS4; modified synchro-rings for 1st and 2nd gear (with carbon coating) and modified locking collar/synchro-hub for 1st/2nd gear

Manual gearbox		6-speed 01E Four-wheel drive		
Code letters		FZY 5)		
Manufactured	from to	01.02		
Assignment	Model Engine	Audi A4 1995 > 2.7 l - 184 kW - S4		
Transmission ratio	Final drive	37 : 9 = 4.111		
Z2 :Z1=i	1st gear	28 : 8 = 3.500		
	2nd gear	34 : 18 = 1.889		
	3rd gear	32 : 26 = 1.231		
	4th gear	29 : 30 = 0.967		
	5th gear	29 : 36 = 0.806		
	6th gear	26 : 38 = 0.684		
	Reverse gear	38 : 11 = 3.455		

5) Service gearbox for S4 and RS4; modified synchro-rings for 1st and 2nd gear (with carbon coating) and modified locking collar/synchro-hub for 1st/2nd gear

Code letters	FZY 5)		
Speedometer	Electronic		
Capacity	2.5 litres 1)		

Specification	Gear oil G 052 911 A SAE 75 W 90 (synthetic)		
Clutch mechanism	Hydraulic		
Clutch plate ø	240 mm 3)		
Drive shaft flange ø	108 mm		
itot in top gear	2.813		
Rear final drive assignment Code letters	DQA		

1) Reduced oil quantity

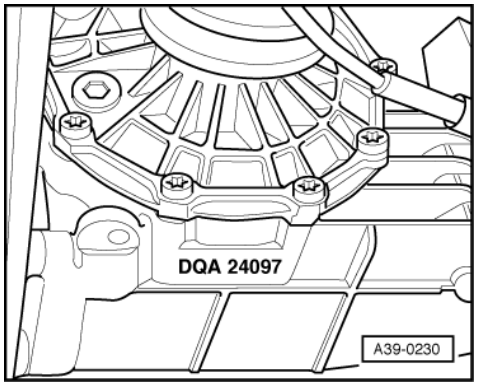
3) With dual-mass flywheel

5) Service gearbox for S4 and RS4; modified synchro-rings for 1st and 2nd gear (with carbon coating) and modified locking collar/synchro-hub for 1st/2nd gear

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

2 - Identification of rear final drive

2.1 - Identification of rear final drive



Final drive 01H is assigned to manual gearbox 01E four-wheel drive.

Assignment => Page 6

-> Code letters and date of manufacture of rear final drive:

Example:	**DQA**	**24**	**09**	**7**
	I	I	I	I
	Code letters	Day	Month	Year (1997) of manufacture

Note:

The rear final drive code letters can also be found on the vehicle data stickers.

2.2 - Code letters, assignment of mechanical units, transmission ratios, capacities

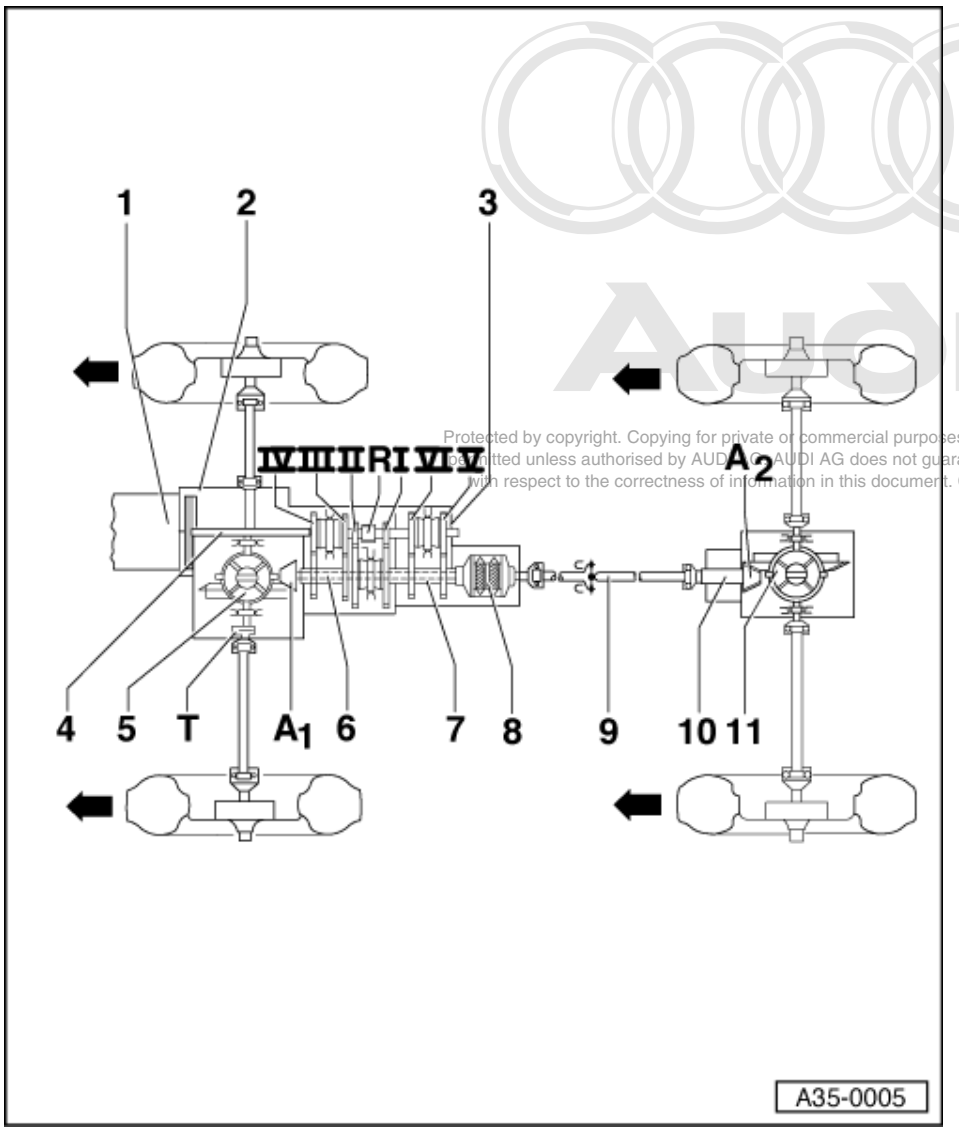
Rear final drive	**01H**	
Code letters	**DQA**	**DAK**

Rear final drive		01H	
Manufactured	from	05.97	07.97
	to	09.01	09.01
Assignment	Model	Audi A4 1995 >	Audi A4 1995 >
	Engine	2.7 l - 184 kW - bi-turbo 2.7 l - 195 kW - bi-turbo 2.7l - 280 kW - RS4	1.9 l - 85 kW - TDI V6 - 2.5 l - 110 kW - TDI
Transmission ratio	Final drive	37 : 9 = 4.111	37 : 9 = 4.111
Capacity		1.9 litres	
Specification		Gear oil GL 5 SAE 90 (MIL-L 2105 B)	
Drive shaft flange ø		108 mm	100 mm
Manual gearbox assignment Code letters		DSY, EDU, FDP, FRQ, FTG, FTU, FZV, FZW, FZY	DQT, EHW, FTF, FTK

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 - Transmission layout

3.1 - Transmission layout



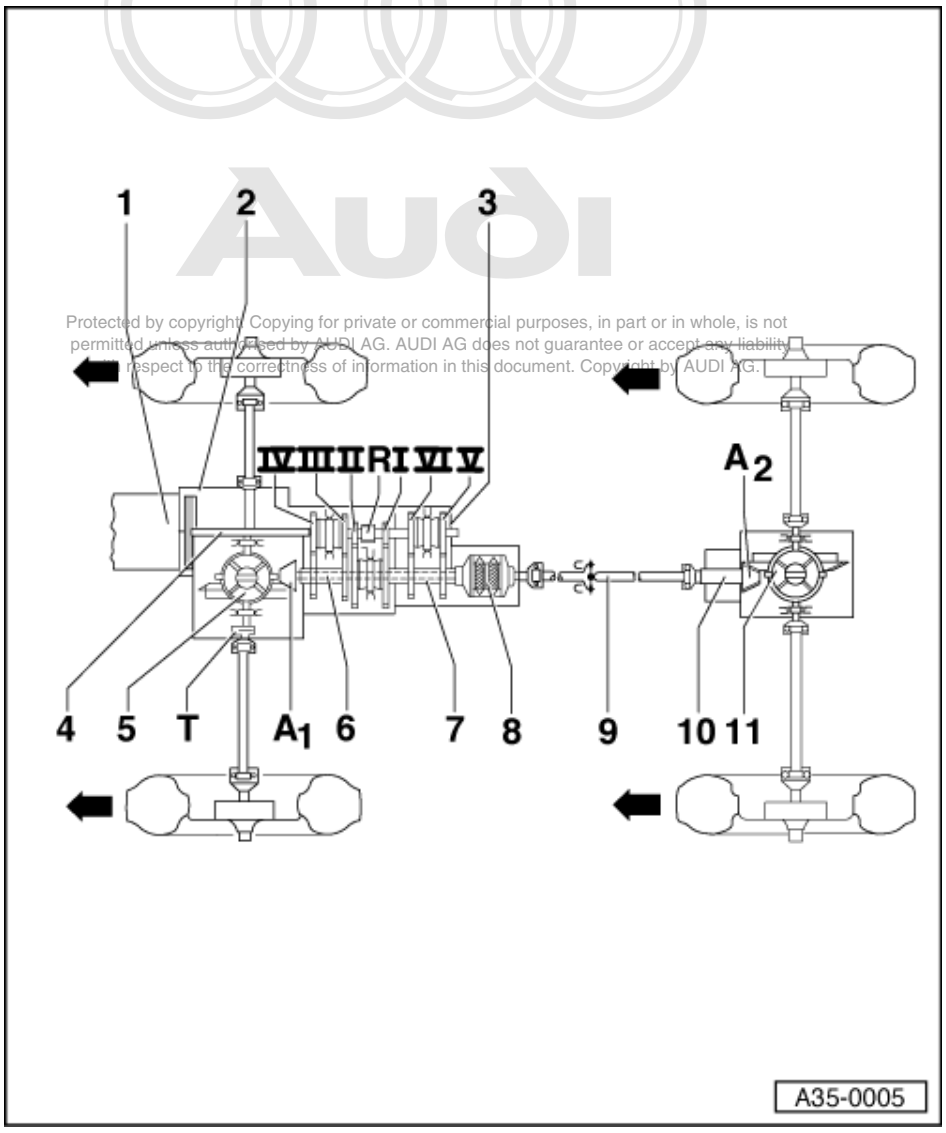
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 Engine
2 Clutch
3 Gear cluster
4 Input shaft (main shaft)
5 Front differential
6 Front drive pinion (output shaft)
7 Hollow shaft
8 Torsen differential
9 Propshaft
10 Rear drive pinion
11 Rear differential

Note:

Arrows point 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
III - 3rd gear
IV - 4th gear
V - 5th gear
VI - 6th gear
R - Reverse gear
A1 - Front final drive
A2 - Rear final drive
T - Electronic speedometer drive

Note:

Arrows point in direction of travel.

4 - Calculating transmission ratio "i"

4.1 - Calculating transmission ratio "i"

Transmission ratio

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

Transmission ratios			Formula
iG	=	Gear ratio	ZG2 :ZG1
iA	=	Axle ratio	ZA2 :ZA1
itot	=	Overall ratio	iG x iA

Example:

	6th gear	Final drive
Drive gear	ZG1 = 38	ZA1 = 9
Driven gear	ZG2 = 26	ZA2 = 37

Calculations:

iG = 26 : 38 = 0.684
iA = 37 : 9 = 4.111
itot = (26 : 38) x (37 : 9) = 0.684 x 4.111 = 2.813

5 - Repair instructions

5.1 - 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 naturally also apply when carrying out vehicle 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.

A number of generally valid instructions governing the various repair procedures - which used to be repeated several times throughout the Workshop Manual - are summarised here and apply to this Workshop Manual.

Special tools

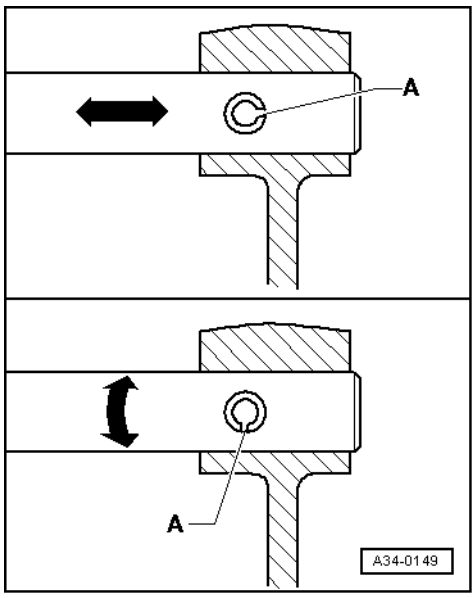
For a list of special tools used in this Workshop Manual, refer to

=> "Special Tools, Workshop Equipment" binder

Gearbox

- On replacing manual gearbox or rear final drive, check oil level and top up if necessary => Page 354 .
- Reconditioned gearboxes for S4 and RS4 (with gear oil cooling) contain an additional 0.3 litres of gear oil for gear oil cooling pipes. On gearbox replacement, gear oil pipes/gear oil cooler must therefore be completely drained.

- Capacities and specifications => Page 6 onwards.
- Carefully clean all joints and adjacent areas before disconnecting.
- Ensure correct fit of dowel sleeves when installing gearbox.



Locking elements

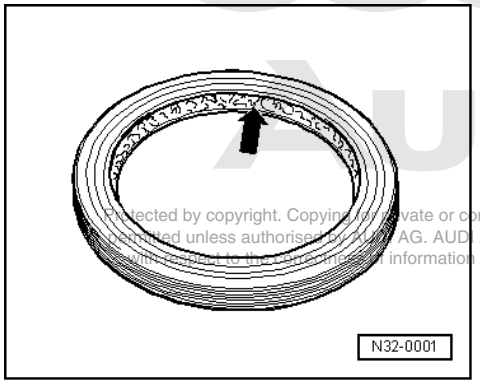
- Take care not to strain circlips.
- Always replace damaged or strained circlips.
- Circlips must be properly positioned in groove.
- -> Replace spring pins. Installation position: Slot -A- in line with direction of force -arrow-.

Sealant

- Thoroughly clean housing joint surfaces before applying sealing paste.
- Apply sealing paste AMV 188 000 02 or AMV 188 001 02 evenly and not too thickly.
- No sealing paste should be allowed to enter vent holes.

O-rings, oil seals, gaskets

- Always replace O-rings, oil seals and gaskets.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 removing gaskets, examine contact surface on housing/shaft for burr resulting from removal or for other signs of damage.
- Thoroughly clean housing joint surfaces prior to assembly.
- -> Before installing radial shaft oil seals, lubricate outer diameter slightly and half fill space between sealing lips -arrow- with sealing grease G 052 128 A1.
- Open sides of oil seals face fluid side.
- Press in new oil seal such that sealing lip is not at same location as sealing lip of old oil seal (make use of insertion depth tolerance).
- On insertion, lubricate O-rings slightly to stop them being crushed on assembly.
- After replacing gaskets and oil seals, check oil level =>Page 354 .

Bolts and nuts

- Slacken off bolts/nuts in reverse tightening sequence.
- Slacken off and tighten bolts and nuts for securing covers and housings in diagonal sequence.
- Take care not to tilt particularly sensitive components such as clutch pressure plates and slacken off/tighten gradually in diagonal sequence.
- Tightening torques specified apply to non-lubricated bolts and nuts.
- Always replace self-locking bolts and nuts.
- Clean threads of bolts fitted using locking fluid with a wire brush. Then insert bolts and apply AMV 185 101 A1.
- Tapped holes into which self-locking bolts or bolts fitted using locking fluid have been inserted must be cleaned (e.g. using a thread cutter). Otherwise there would be a danger of the bolts shearing off on renewed disassembly.

Bearings

- Install needle bearings with labelled side (thicker metal) facing fitting tool.
- Mark needle bearings of 1st to 6th speed sliding gears on removal to ensure the same installation position on fitting.
- Grease needle bearing for rear gearbox input shaft in flywheel.
- Apply gear oil to all bearings on installation in gearbox housing.
- Heat inner races of taper roller bearings to approx. 100 °C before installing. Press home as far as stop on assembly so that there is no axial clearance.
- Take care not to interchange outer and inner races of bearings of the same size.
- Taper roller bearings fitted on one shaft are to be replaced as a set using the same make of bearings.
- Taper roller bearings for output shaft and differential in manual gearbox are of low-friction design. Do not apply any extra oil to new taper roller bearings for friction torque measurement. The bearings are treated with a special oil at the factory for this purpose.

Shims

- Measure shims at several points with a micrometer. Different tolerances make it possible to obtain the exact shim thickness required.
- Check for burrs and damage.
- Only install shims which are in perfect condition.

Gear wheels, synchro-hubs, inner races for sliding gears

- Heat gear wheels and synchro-hubs to approx. 100°C before installing. Press home as far as stop on assembly so that there is no axial clearance.
- Heat inner races for sliding gears to approx. 100 °C before installing.
- Temperature can be checked using temperature tester V.A.G 1558.
- Pay attention to installation position.

Copyright by AUDI AG. Distribution to third parties 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.

Sliding gears

- After installing, check that 1st to 6th speed sliding gears have an axial clearance of 0.15 ... 0.35 mm and move freely.

Synchro-rings

- Do not interchange synchro-rings; always fit to same gear if rings are re-used.
- Check for wear and replace if necessary.
- Apply gear oil on insertion.
- Gearboxes with code letters FZV, FZW and FZY are fitted with optimised synchro-rings in conjunction with a modified locking collar for 1st and 2nd gear. These optimised synchro components are available for service work on all 01E gearboxes => Page 281 .

Clutch mechanism

- On removing gearbox, take out clutch slave cylinder without opening piping system.
- Do not press clutch pedal after removing slave cylinder as otherwise piston would be forced out of slave cylinder.

- Make sure clutch pressure plate is kept straight; slacken off and tighten bolts gradually in diagonal sequence.

- To reduce the odour nuisance of a scorched clutch, thoroughly clean bell housing, flywheel and parts of engine facing gearbox.
- Vehicles with 2.7l - 184 kW and 195 kW engine are fitted with an SAC pressure plate on which an adjuster ring has to be reset if only the clutch plate is replaced => Page 57 .
- Heed fitting instructions for SAC pressure plate => Page 56 .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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

Notes:

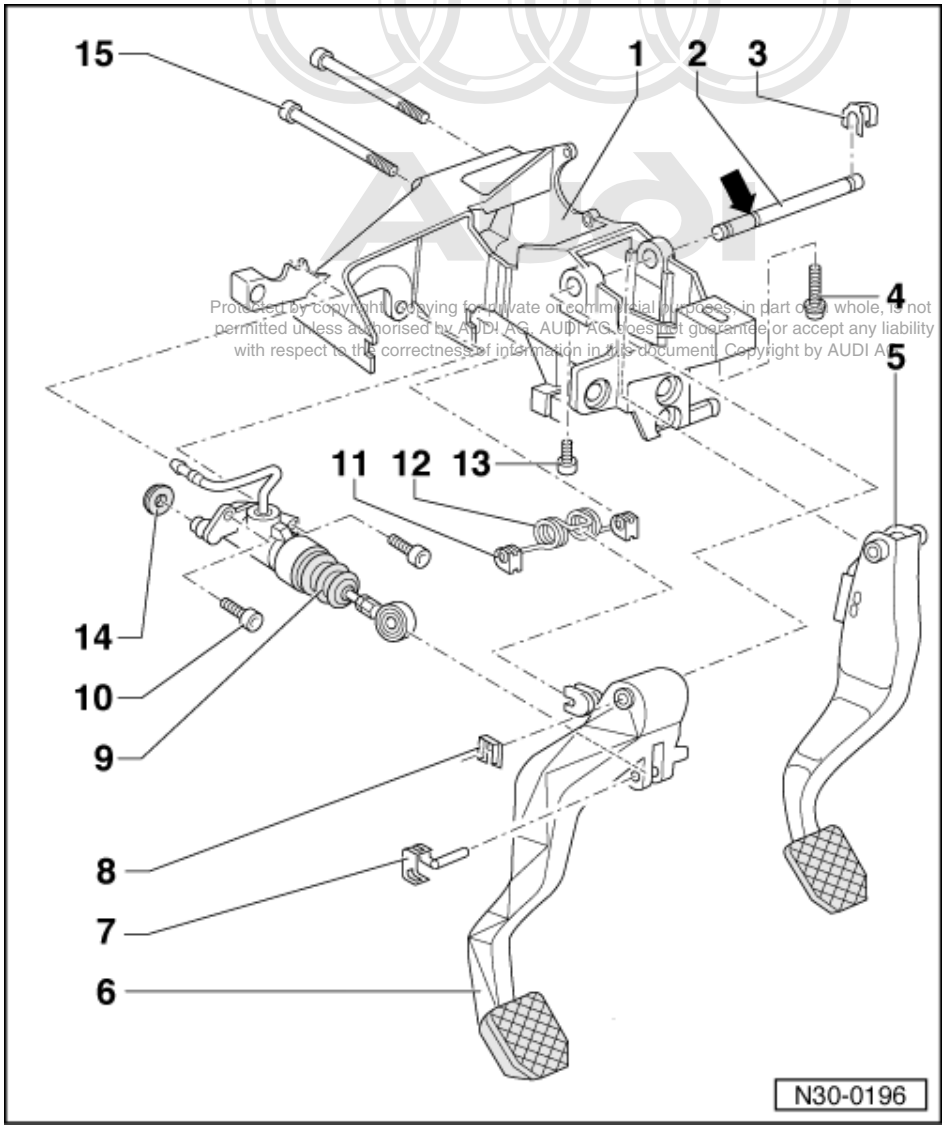
- Heed (if necessary obtain) radio code for vehicles with encoded radio.
- Disconnect battery earth strap with ignition switched off.
- Apply polycarbamide grease G 052 142 A 2 to all bearing and contact surfaces.
- Remove cover beneath dash panel before performing work on pedal cluster.

=> General Body Repairs; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- Make sure brake fluid does not escape into footwell or plenum chamber or onto gearbox below. If it does, area affected must be thoroughly cleaned.
- When working in footwell, cover carpet with cloths to protect it against brake fluid spillage.

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

1.2 - Exploded view of pedal cluster (LHD 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.

1 Mounting bracket

- Prior to removal, detach steering column at steering box

=> Brake System; Repair Group 46; Removing and installing brake pedal mounting bracket Removing and installing brake pedal mounting bracket

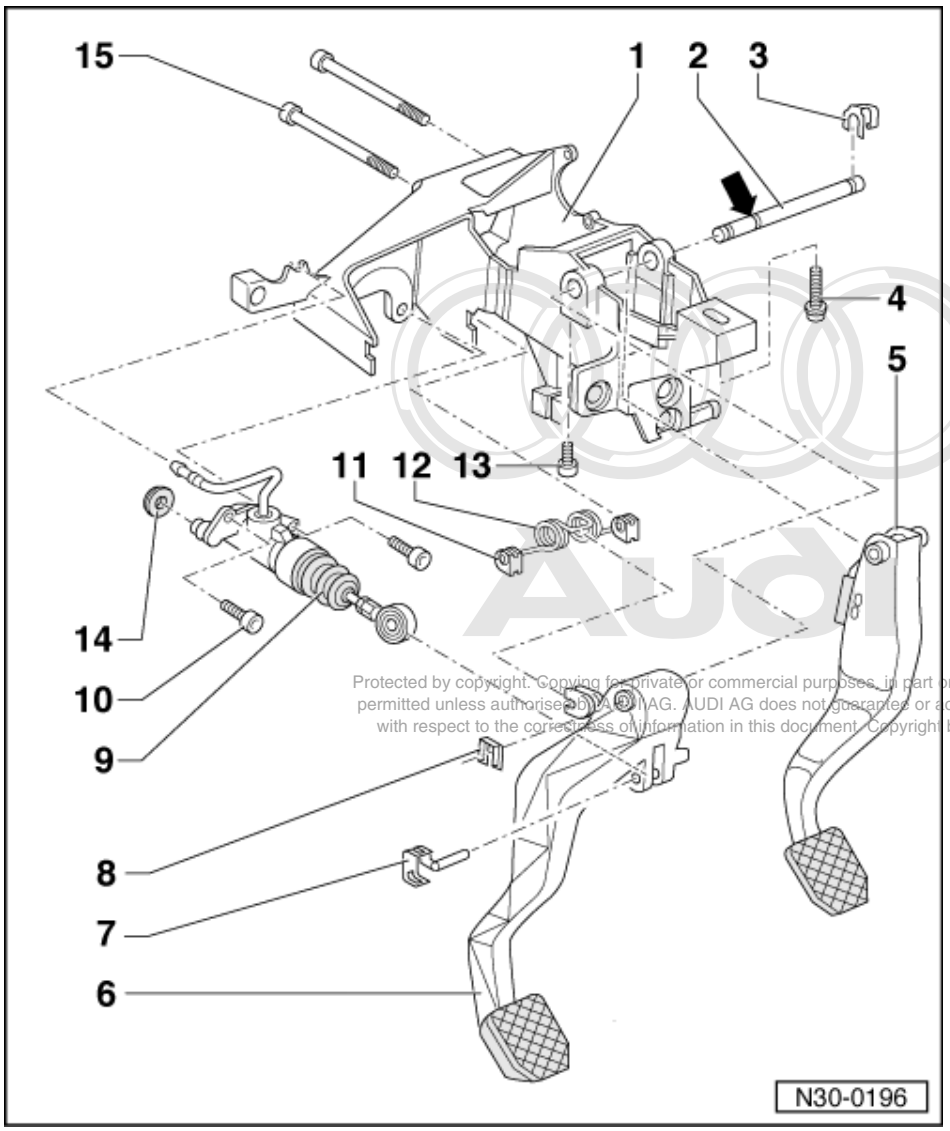
2 Pivot pin

- For clutch and brake pedal
- Installation position: Groove (arrow) facing clutch pedal

3 Locking element

4 Hexagon socket-head bolt - 25 Nm

5 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 correctness of information in this document. Copyright by AUDI AG.

6 Clutch pedal
- Removing and installing=>Page 18

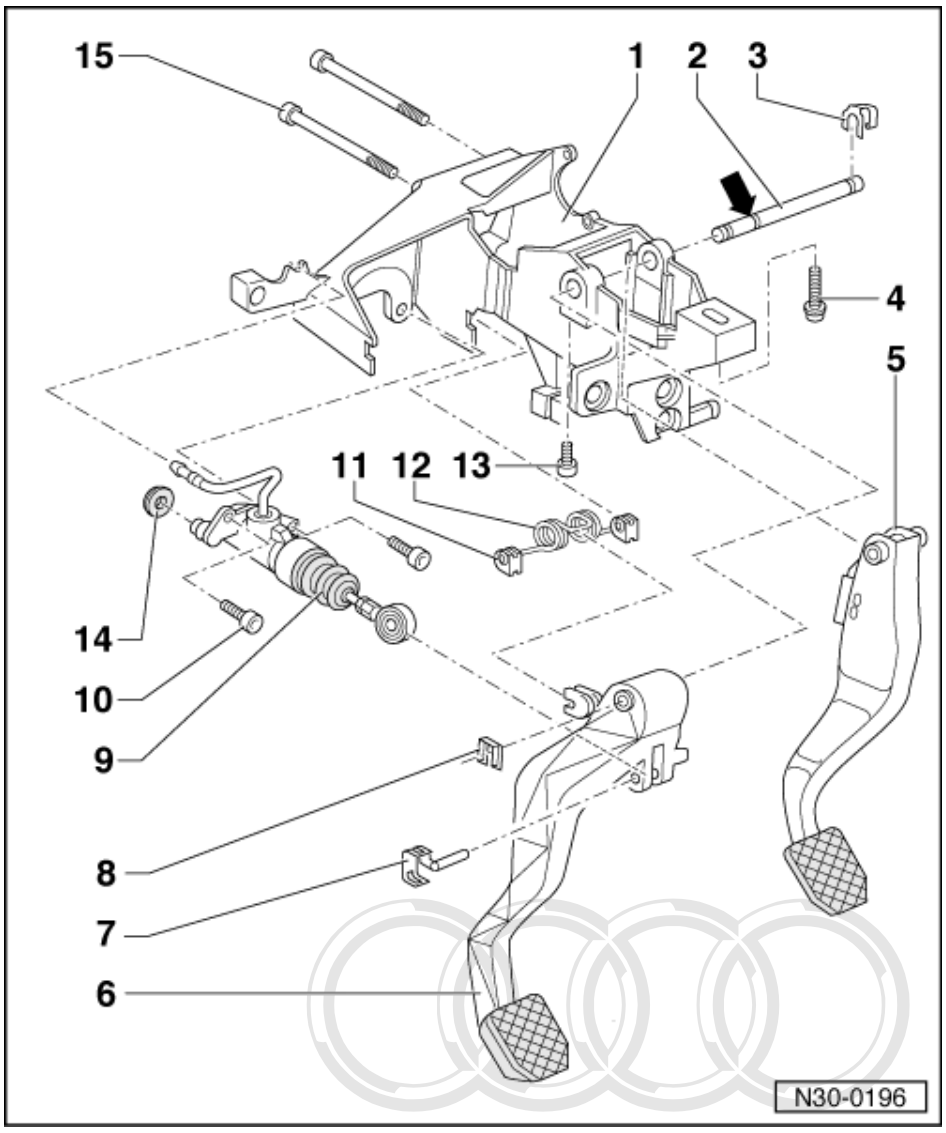
7 Pin
- Engage in clutch pedal

8 Locking element

9 Master cylinder
- Removing and installing=>Page 28

10 Hexagon socket-head bolt - 20Nm

11 Mount
- Insert with over-centre spring in mounting bracket



12 Over-centre spring

- Assignment

=> Parts List

- Removing and installing with clutch pedal =>Page 18

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Hexagon socket-head bolt - 5Nm

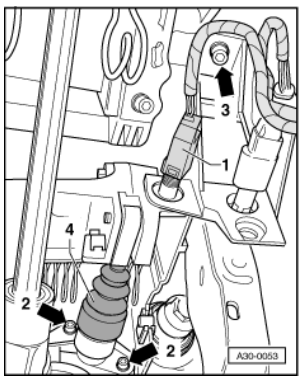
- For securing pivot pin for clutch pedal and brake pedal

14 Gasket

- Not to be removed

15 TORX bolt, 25 Nm

- Also used for attachment of brake master cylinder with brake servo



Removing and installing clutch pedal and over-centre spring

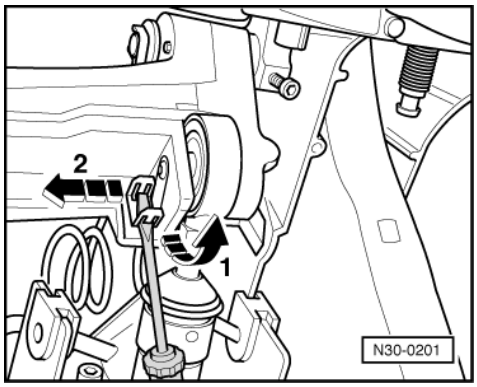
Removing

- Remove driver's storage compartment.

=> General Body Repairs; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

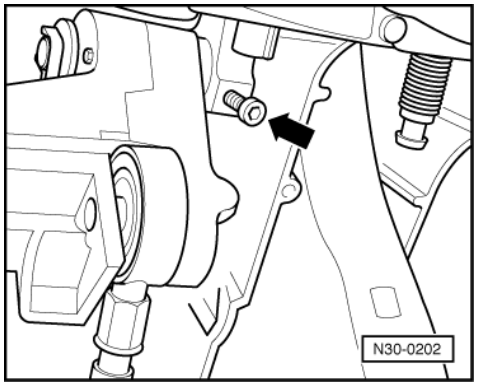
Note:

- -> When performing the operations described below, make sure clutch pedal does not press clutch pedal switch -1- out of clip, as otherwise switch thread would be damaged and switch would have to be replaced.
- Switch -1- is only to be fitted once so as to ensure a firm fit.

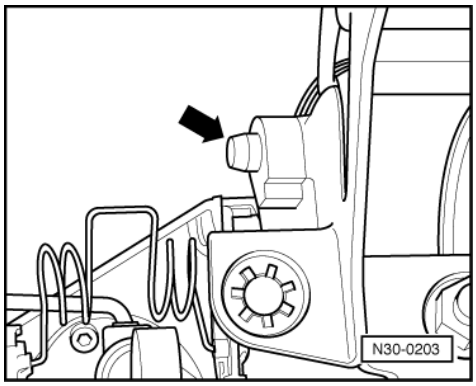


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Separate clutch pedal from master cylinder. To do so, use screwdriver to prise out pin locking element -arrow 1- and pull out pin
  -arrow 2-.
- Use screwdriver to press locking element for clutch pedal off pivot pin.



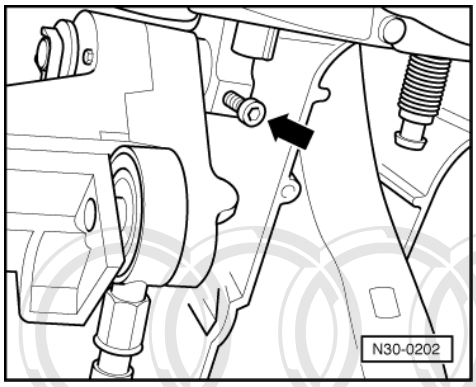
- -> Screw out bolt (arrow).
- Press pivot pin for clutch and brake pedal to right until clutch pedal can be detached.
- If necessary, use screwdriver to press locking element for brake pedal off pivot pin.
- Take out clutch pedal and over-centre spring.



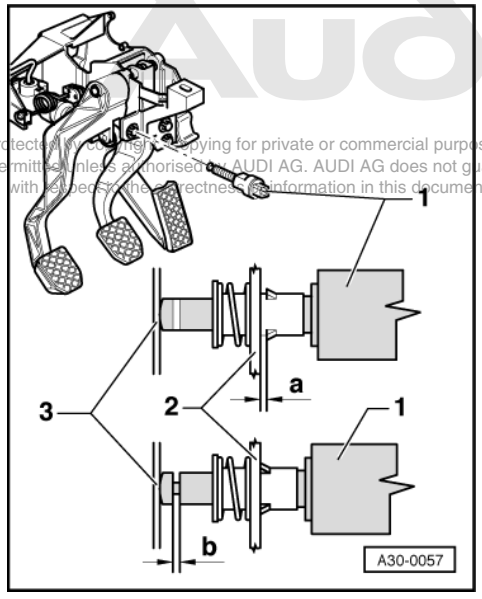
Installing

Install in reverse order, paying attention to the following:

- -> Align pivot pin for clutch pedal/brake pedal such that it faces out of mounting bracket on clutch pedal side (arrow).
- Start by engaging clutch pedal in over-centre spring, then attach to pivot pin.



- Connect master cylinder to clutch pedal. Engage pin locking element in clutch pedal.
- -> Do not tighten bolt (arrow) until the two lock washers have been attached to the clutch pedal/brake pedal pivot pin.

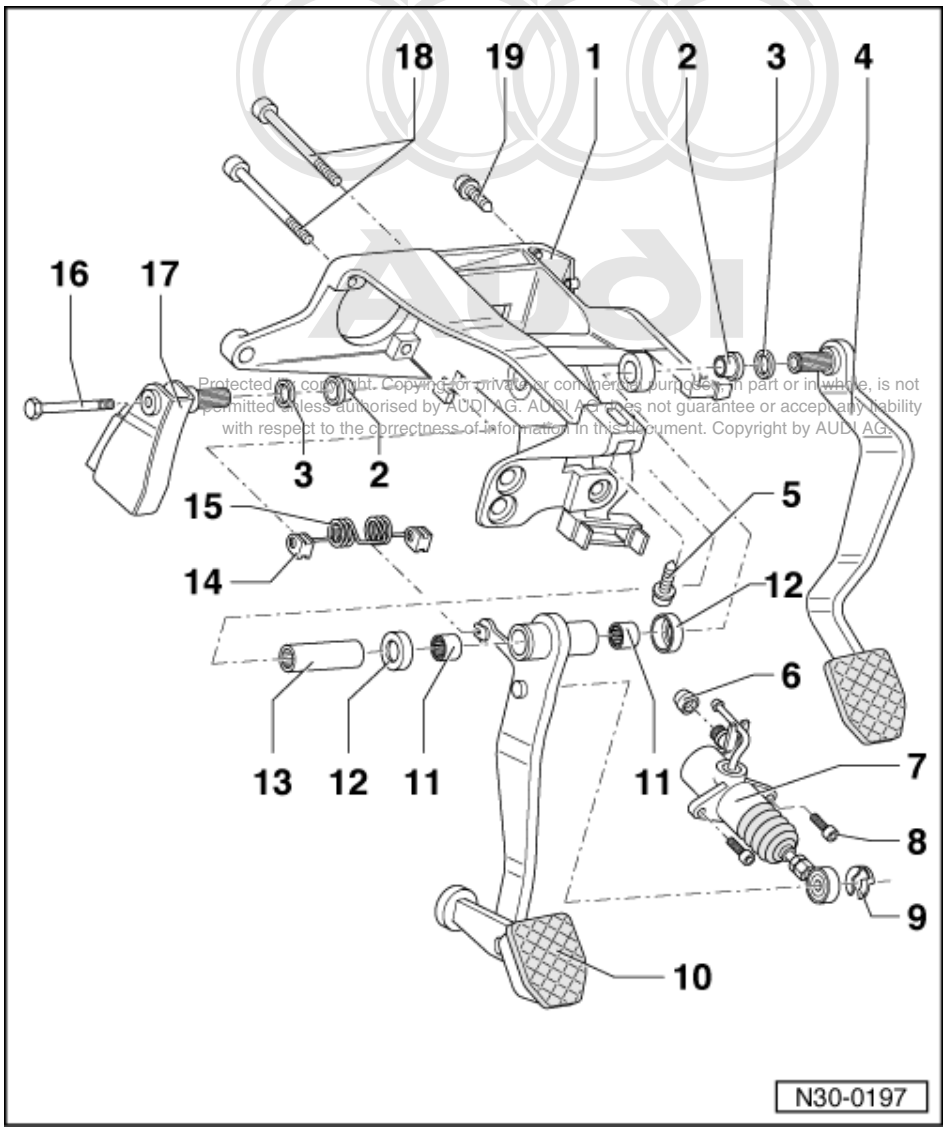


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Check setting of clutch pedal switch -1- over clutch pedal as follows:
  - Switch -1- must make full contact with clutch pedal -3- and be fully actuated.
  - Adjustment tolerance: Gap width -a- between clip and mounting bracket -2-/gap width -b- at switch -1- must not exceed 0.7 mm.
  - To adjust, hold clip and turn clutch pedal switch -1-.

Note:
Switch is only to be fitted once so as to ensure a firm fit.

1.3 - Exploded view of 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.

1 Mounting bracket

- Prior to removal, detach steering column at steering box

=> Brake System; Repair Group 46; Removing and installing brake pedal mounting bracket Removing and installing brake pedal mounting bracket

2 Mounting bush

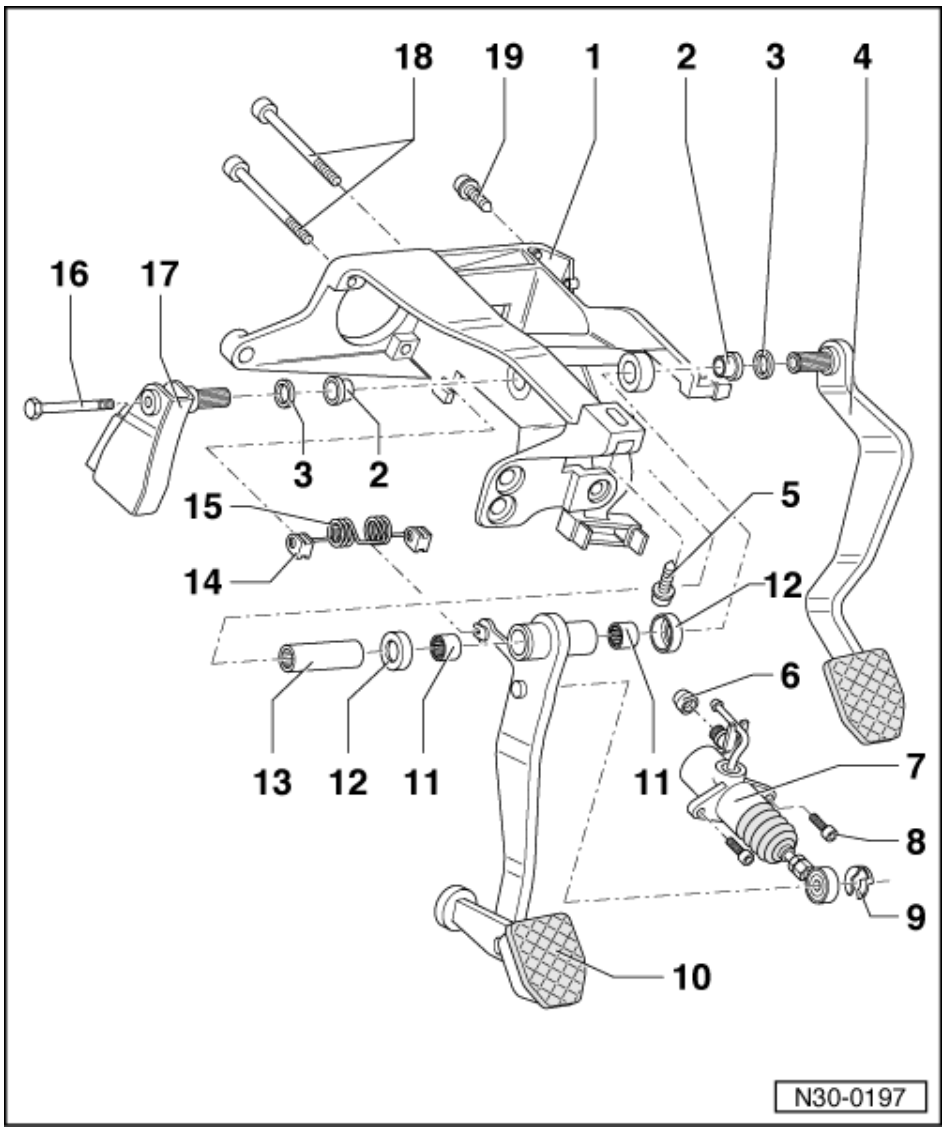
- Driving out => Fig. 1
- Driving in => Fig. 2

3 Washer

4 Brake pedal

- Pin only fits in one position in mounting bush (item 13)

5 Hexagon socket-head bolt - 25 Nm



6 Gasket
- Not to be removed

7 Master cylinder

8 Hexagon socket-head bolt - 20Nm

9 Locking element

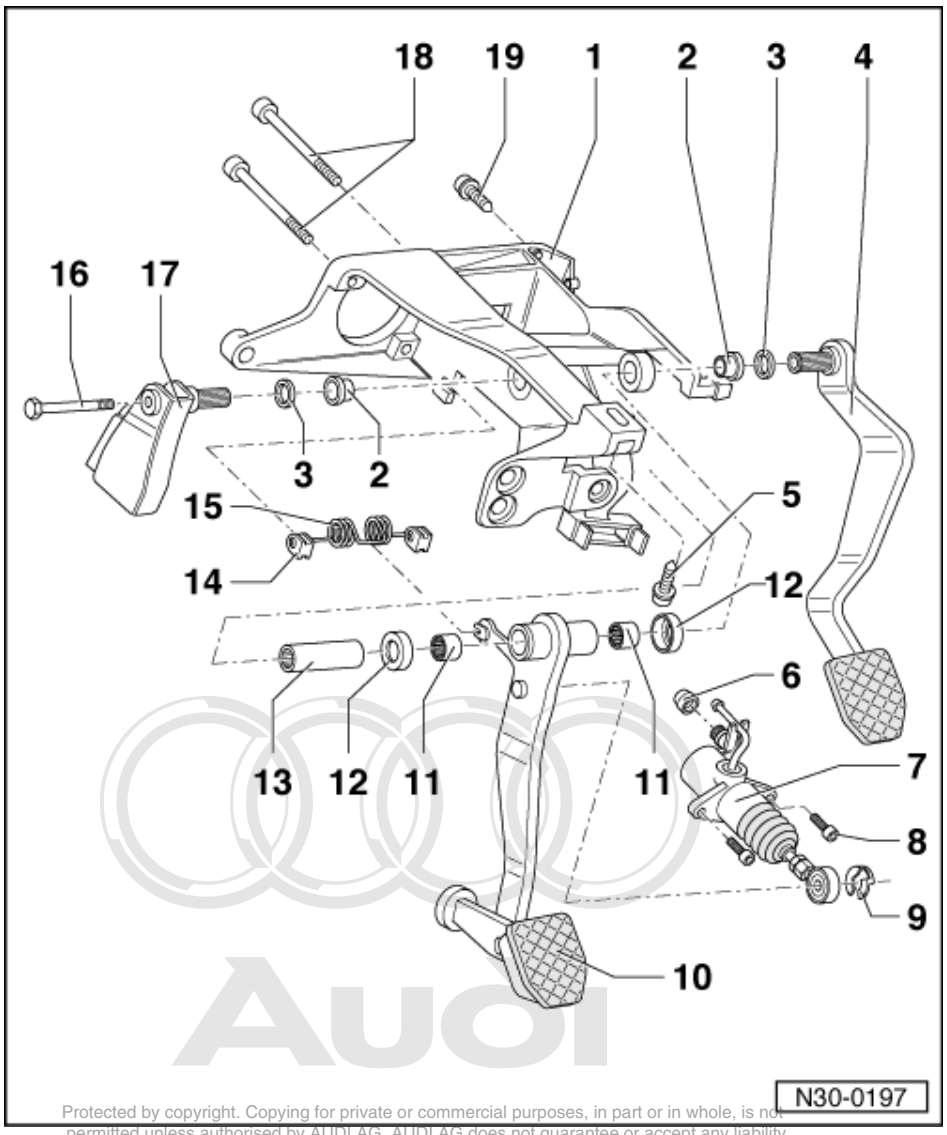
10 Clutch pedal

11 Needle bearing
- Extracting => Fig. 3

12 Cap

13 Mounting bush
- With internal splines to accommodate pins of brake pedal and lever (Item 17)

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

14 Mount

- Insert with over-centre spring in mounting bracket

15 Over-centre spring

- Assignment

=> Parts List

16 Bolt, 25 Nm

- Self-locking
- Replace

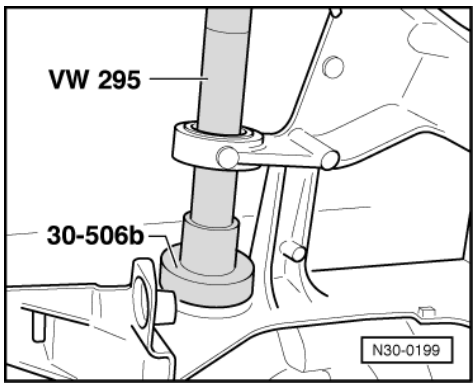
17 Lever

- Pin only fits in one position in mounting bush (item 13)

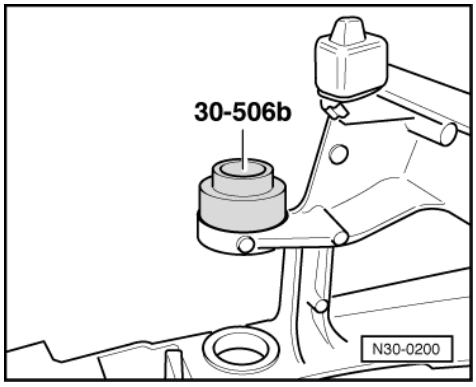
18 TORX bolt, 25 Nm

- Also used for attachment of brake master cylinder with brake servo

19 Bolt, 25 Nm

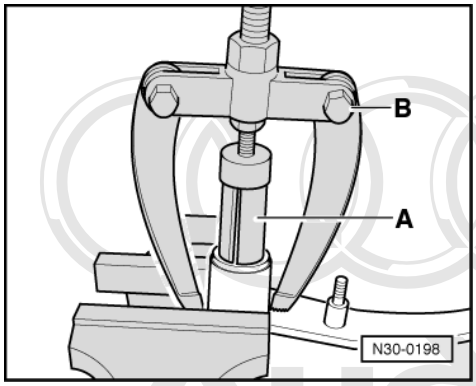


-> Fig.1 Driving bush out of mounting bracket



-> Fig.2 Driving bush into mounting bracket

- If bush is stiff, provide support for mounting bracket in area of hole.



-> Fig.3 Extracting needle bearing

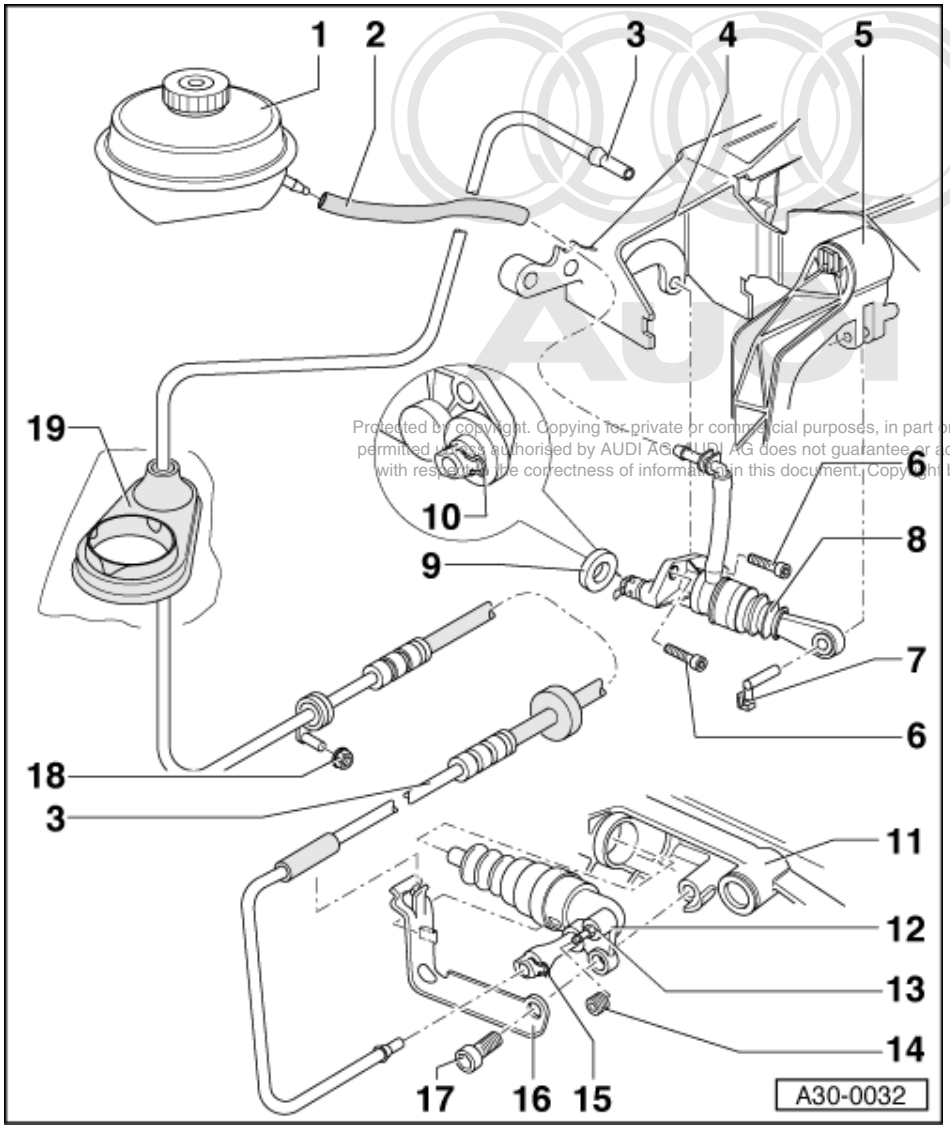
A - Internal puller 30 - 37 mm, e.g. Kukko 21/5
B - Counter-support, e.g. Kukko 22/2

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.

Pressing in

- Press in new needle bearings in vice. Use aluminium soft jaws for vice.

1.4 - Exploded view of hydraulic 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.

1 **Brake fluid reservoir**

2 **Supply hose**

3 **Hose/pipe assembly**

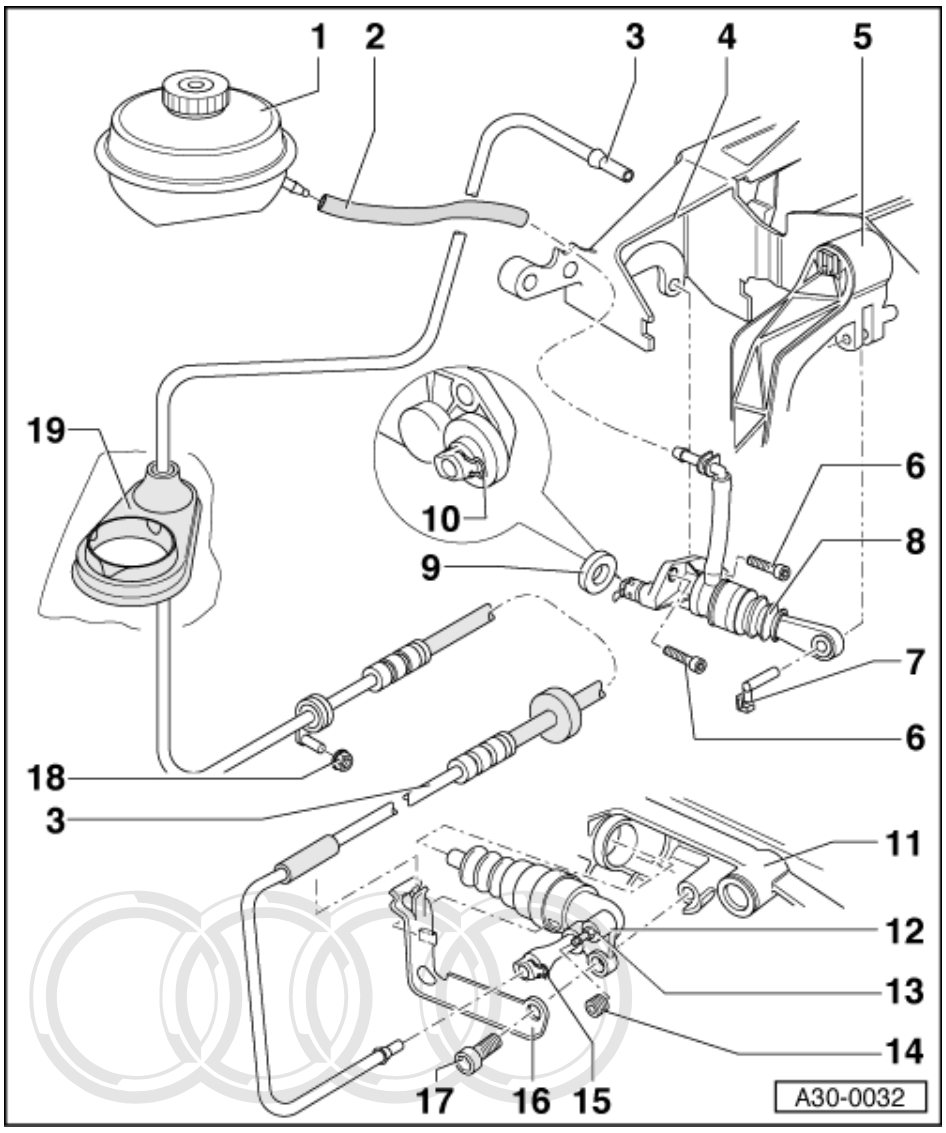
- With screw or plug connections at master/slave cylinder depending on design
- Separating from master cylinder and installing => Page 30
- Separating from slave cylinder
  => Fig. 1
- Assignment for LHD/ RHD vehicles

=> Parts List

4 **Mounting bracket**

5 **Clutch pedal**

- Removing and installing=>Page 18



6 Hexagon socket-head bolt - 20 Nm

7 Pin

8 Master cylinder

- With screw or plug connection for hose/pipe assembly depending on design
- Removing and installing=>Page 28

9 Gasket

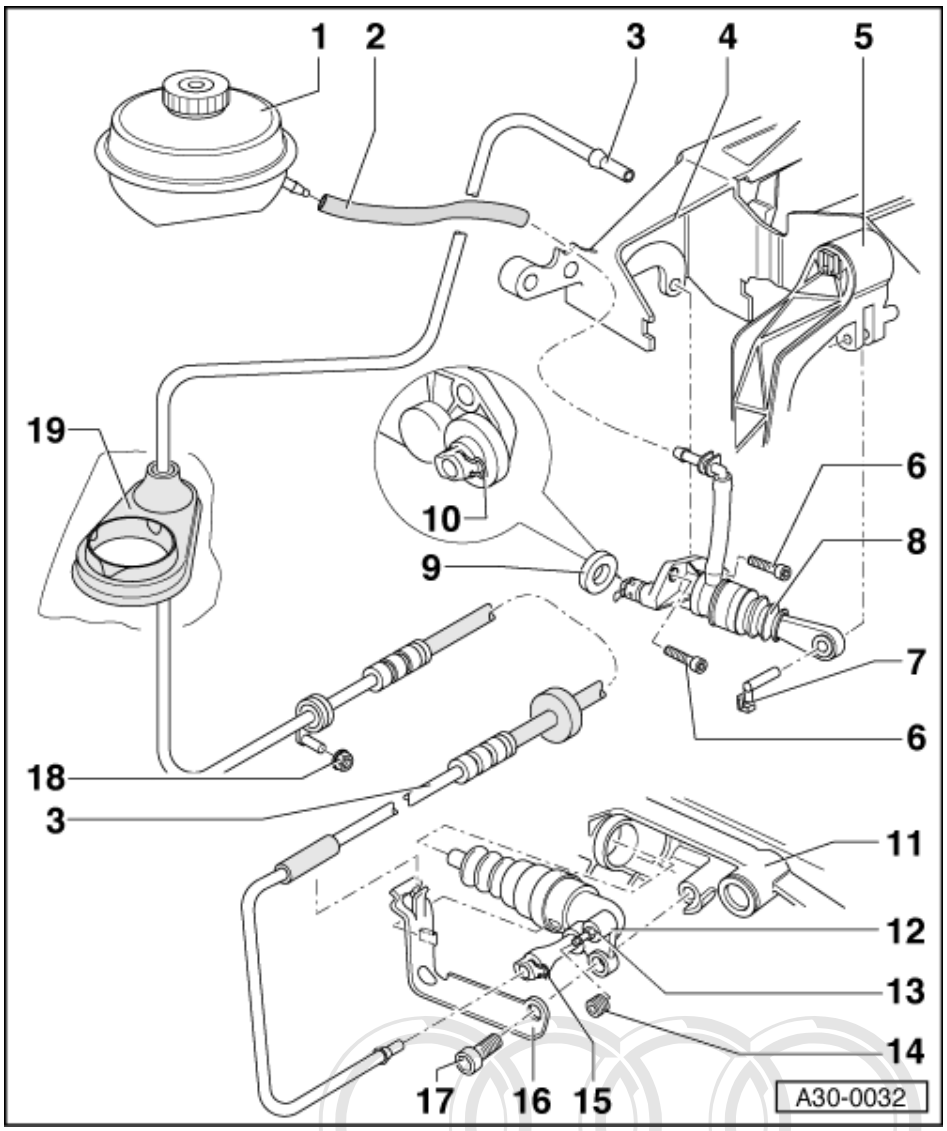
- Not to be removed

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Clip

- Pipe removal involves pulling out clip => Page 30
- Only provided for version with plug connection

11 Gearbox



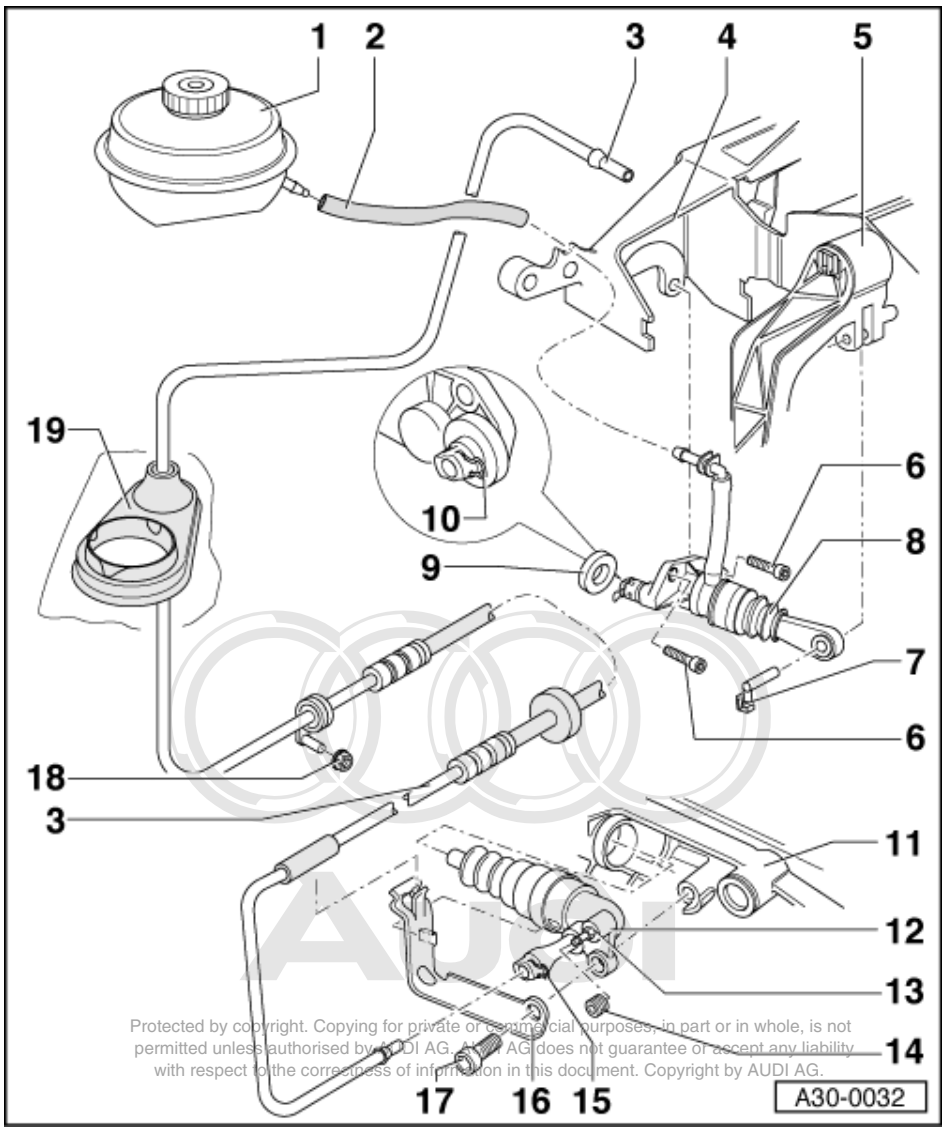
12 Clutch slave cylinder

- With screw or plug connection for hose/pipe assembly depending on design
- Do not press clutch pedal again following removal
- Removing and installing=>Page 42
- Separating from hose/pipe assembly => Fig. 1
- Following work on hydraulic clutch mechanism, bleed slave cylinder => Page 35
- Brake fluid must not be allowed to come into contact with gearbox

13 Bleed valve

- Heed sequence of operations for bleeding => Page 35
- Tighten to 4.5 Nm
- A broken-off bleed valve can be screwed out using a 3mm Allen key

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

14 Dust cap

15 Clip

- Pipe removal involves pulling out clip => Fig. 1
- Only provided for version with plug connection

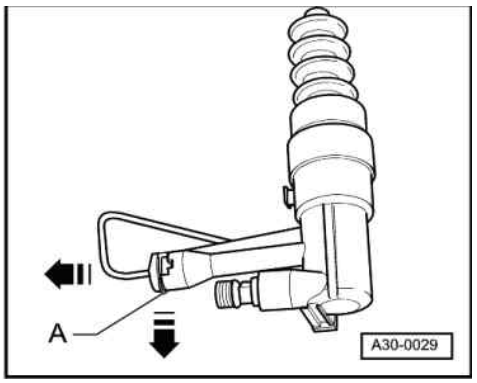
16 Bracket

- Attached to gearbox

17 Hexagon socket-head bolt
- 23 Nm

18 Nut, 2 Nm

19 Gasket



-> Fig.1 Separating clutch slave cylinder and pipe

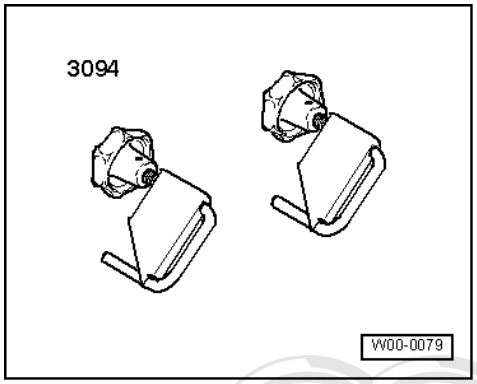
Removing

- To remove pipe, prise out clip -A- as far as detent using a screwdriver. Pipe can then be pulled out.

Installing

- Press home clip -A-.
- Insert pipe in slave cylinder until it is heard to engage.

1.5 - Removing and installing master cylinder

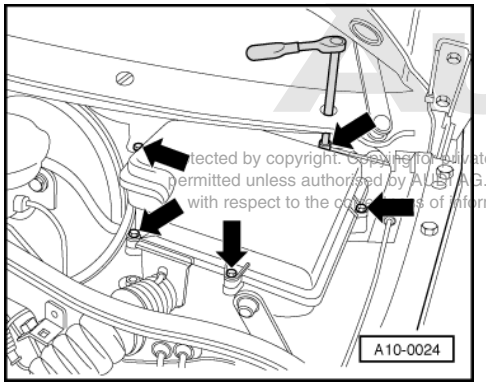


Special tools, testers and other items required

- Hose clamp 3094

Removing

- If fitted, detach cover over plenum chamber.

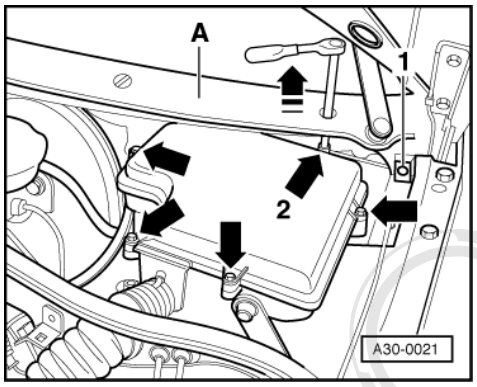


tected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Disconnect battery earth strap with ignition switched off.
- Remove electronics box from plenum chamber as follows:

Old version with assembly hole in cowl panel grille:

- -> Screw out bolts -arrows- and pull off cap.



New version with no assembly hole in cowl panel grille:

- -> Pull off clip -1- and lift cowl panel grille -A- slightly. Then screw out bolt -arrow 2-.
- Screw out remaining bolts -arrows- and pull off cap.

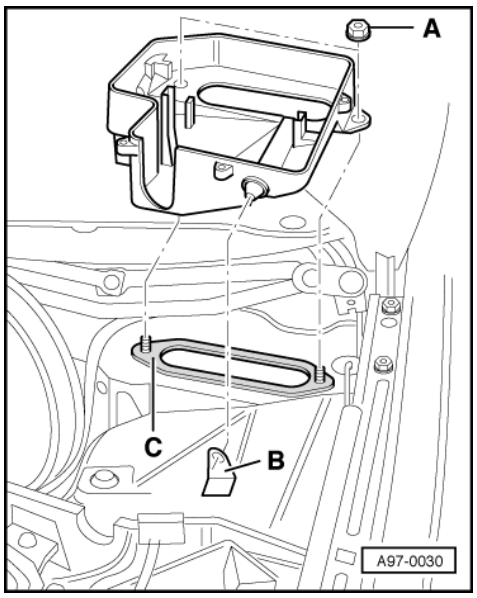
All models:

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.

- Remove engine control unit and, if applicable, auxiliary relay carrier and auxiliary fuse box.

=> Electrical System; Repair Group 97; Removing and installing auxiliary relay carrier with auxiliary fuse box
Removing and installing auxiliary relay carrier with auxiliary fuse box

- Unplug connector at connector point.
- Pull engine wiring harness together with rubber grommet out of recess in electronics box.

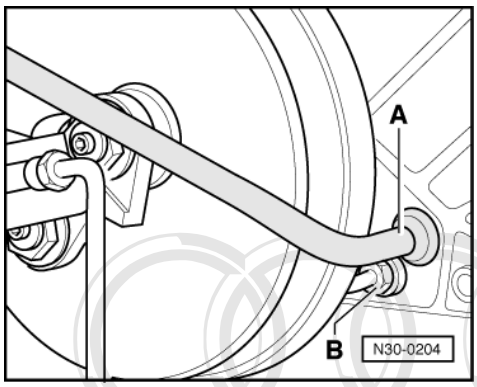


- -> Unscrew both nuts -A-.
- Lift rear of electronics box off studs and then pull out of attachment point -B-.

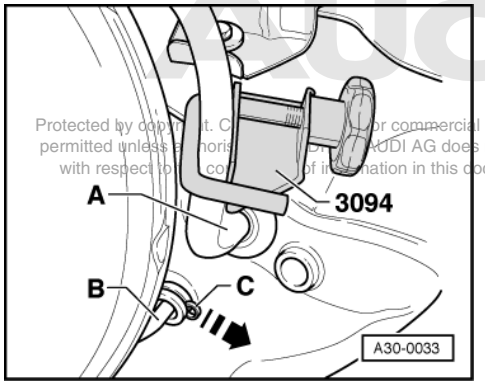
Notes:

- Make sure brake fluid does not ingress into plenum chamber or onto gearbox below when performing the following operations. If it does, area affected must be thoroughly cleaned.
- When working in footwell, cover carpet with cloths to protect it against brake fluid spillage.

Old version with aluminium master cylinder:



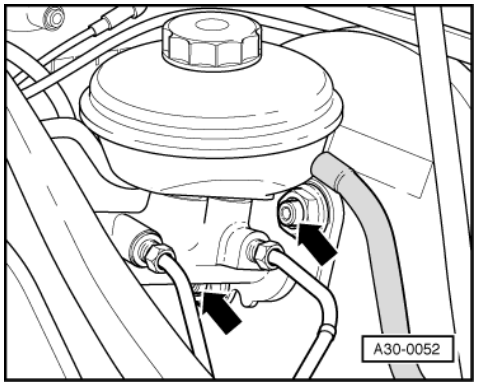
- -> Use special tool 3094 to pinch off supply hose -A- to brake fluid reservoir, disconnect at master cylinder and seal off.
- Remove rubber grommet over connecting pipe for supply hose from bulkhead.
- Unscrew pipe -B- from master cylinder and seal off.



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

New version with plastic master cylinder:

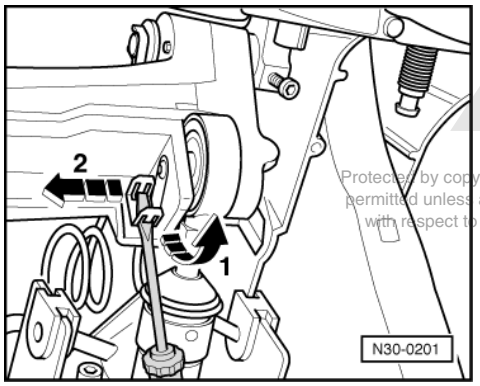
- -> Use special tool 3094 to pinch off supply hose -A- to brake fluid reservoir, disconnect at master cylinder and seal off.
- Remove rubber grommet over connecting pipe for supply hose from bulkhead.
- Use screwdriver to prise out clip -C- and then pull pipe -B- out slightly.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 models:

- -> Screw out the two Torx socket-head bolts -arrows-.

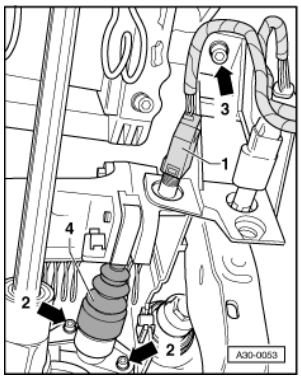


- Remove driver's storage compartment.

=> General Body Repairs; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

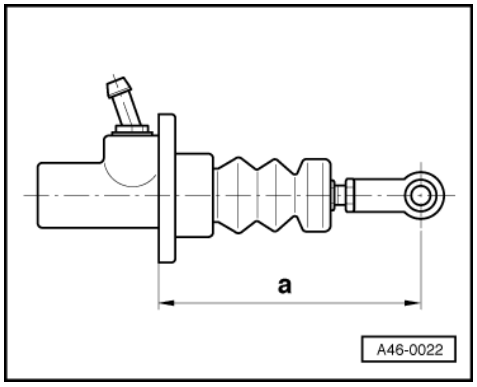
- -> Separate clutch pedal from master cylinder. To do so, use screwdriver to prise out pin locking element -arrow 1-, pull out pin -arrow 2- and press out clutch pedal.

Note:



- -> When performing the operations described below, make sure clutch pedal does not press clutch pedal switch -1- out of clip, as otherwise switch thread would be damaged and switch would have to be replaced.
- Switch is only to be fitted once so as to ensure a firm fit.

- Screw out bolts for master cylinder -arrow 2- and mounting bracket -arrow 3-.
- Pull entire pedal cluster slightly towards passenger compartment and take out clutch master cylinder -4-.



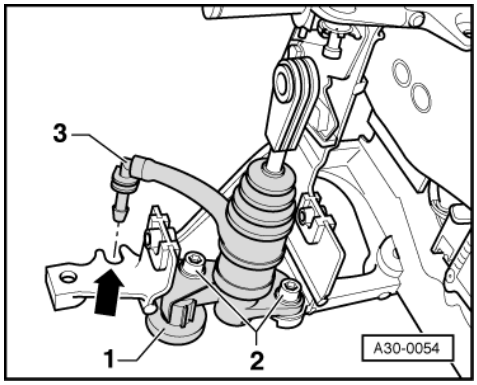
Installing

Install in reverse order, paying attention to the following:

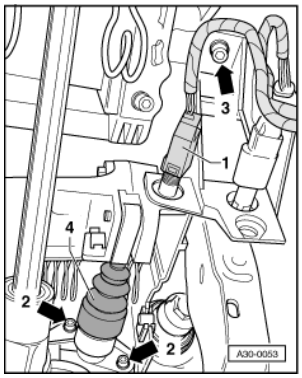
Aluminium master cylinder with adjustable push rod joint only:

- -> On replacing master cylinder, check dimension -a- at push rod joint when extended and adjust if necessary.
  - LHD vehicles: Dimension a = 165 ± 0.5 mm
  - RHD vehicles: Dimension a = 139 ± 0.5 mm

All models:

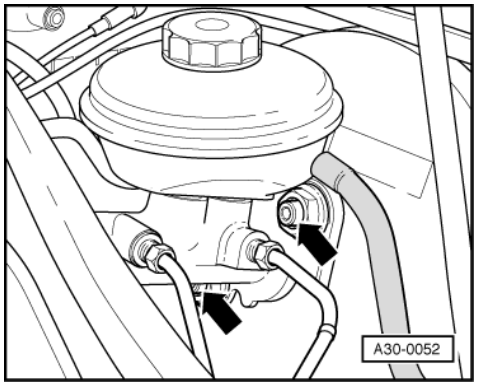


- -> Insert master cylinder such that gasket -1- makes contact with washer behind mounting bracket and tighten bolts -2- to 20 Nm.
- Press connecting pipe -3- with guide -arrow A- into recess -arrow B- at mounting bracket.



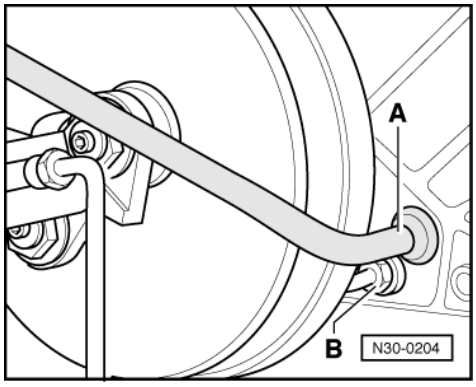
A second mechanic is required for the next operation.

- -> Move entire pedal cluster forwards towards bulkhead, insert bolt -arrow 3- and hand-tighten. In doing so, have second mechanic guide pipe into master cylinder from plenum chamber.



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

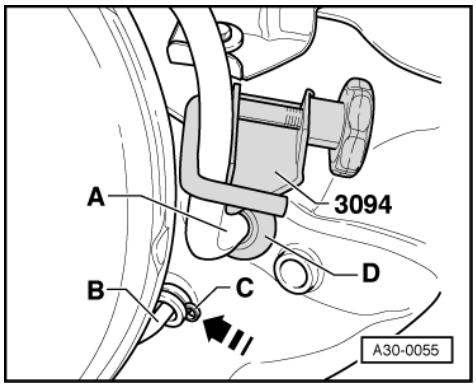
- -> Tighten bolts for brake servo -arrows- to 25 Nm.



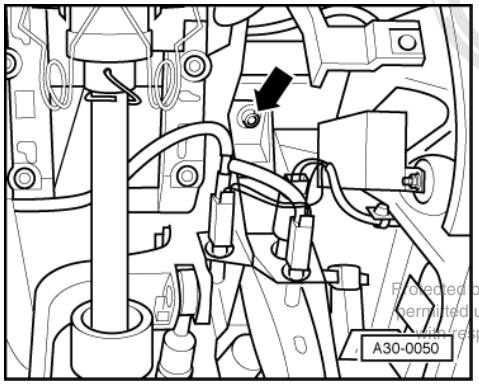
Old version with aluminium master cylinder:

- -> Screw (15 Nm) pipe connecting nut -B- to master cylinder.
- Insert rubber grommet over connecting pipe for supply hose -A- in bulkhead.
- Slip on supply hose -A- to brake fluid reservoir as far as it will go.
- Remove special tool 3094.

New version with plastic master cylinder:



- -> Press home clip -C-.
- Insert pipe -B- in master cylinder until it is heard to engage.
- Insert rubber grommet -D- over connecting pipe for supply hose -A- in bulkhead.
- Slip on supply hose -A- to brake fluid reservoir as far as it will go.
- Remove special tool 3094.

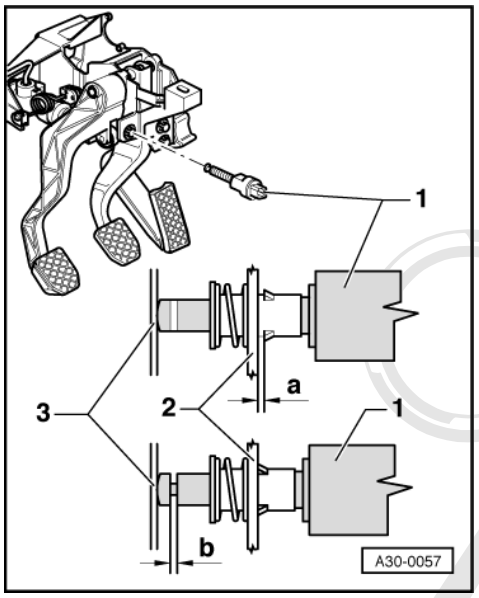


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

All models:

- -> Tighten hexagon socket-head bolt -arrow- for securing pedal cluster to dash panel mount to 25 Nm.
- Connect master cylinder to clutch pedal. Engage pin locking element in clutch pedal.

- After installing master cylinder, bleed clutch system => Page 35 .

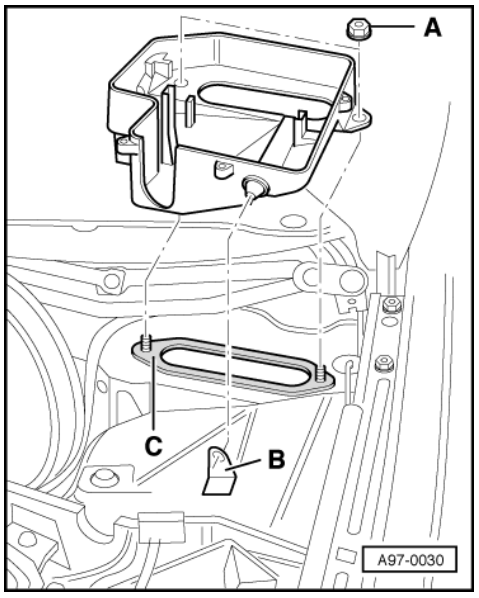


- -> Check setting of clutch pedal switch -1- over clutch pedal as follows:
  - Switch -1- must make full contact with clutch pedal -3- and be fully actuated.
  - Adjustment tolerance: Gap width -a- between clip and mounting bracket -2-/gap width -b- at switch -1- must not exceed 0.7 mm.
  - To adjust, hold clip and turn clutch pedal switch -1-.

Information contained in this document is not binding. Copyright by AUDI AG. Any liability, in particular with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

Switch is only to be fitted once so as to ensure a firm fit.



- Install driver's storage compartment.

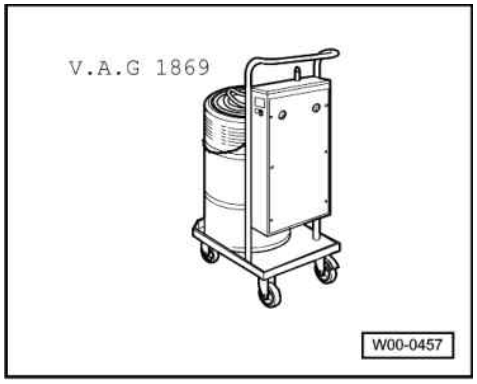
=> General Body Repairs; Repair Group 68; Storage compartments/covers and trim panels; Removing driver's storage compartment Storage compartments/covers and trim panels Removing driver's storage compartment

- -> Always replace gasket -C-.
- Make sure gasket does not conceal opening in body and raised metal edge.
- Insert electronics box at attachment point -B- and tighten nuts -A- to 4 Nm.
- Press on cap hand-tight and tighten bolts diagonally to 4 Nm (refer also to marking on cap).
- Lay engine wiring harness and plug in connector in connector point.

- Install engine control unit and, if applicable, auxiliary relay carrier and auxiliary fuse box.

=> Electrical System; Repair Group 97; Removing and installing auxiliary relay carrier with auxiliary fuse box
Removing and installing auxiliary relay carrier with auxiliary fuse box

1.6 - Bleeding clutch system



Special tools, testers and other items required

- Brake filling and bleeding appliance V.A.G 1238 B

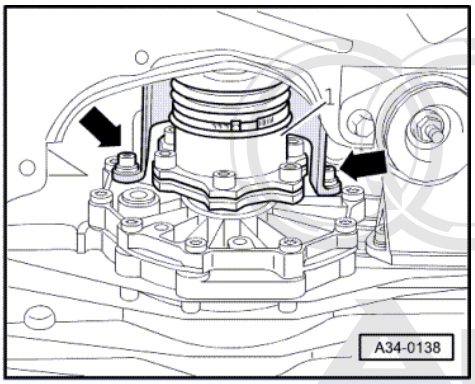
Or

- Brake filling and bleeding appliance V.A.G 1869

Notes:

- Bleed system after working on hydraulic clutch mechanism.
- Before bleeding, top up reservoir with brake fluid as far as "max" mark.
- Open bleed valve before switching on bleeding appliance.
- Make sure no brake fluid escapes onto gearbox when performing the following work.

- Pull back clutch pedal into rest position.
- Engage 3rd gear.

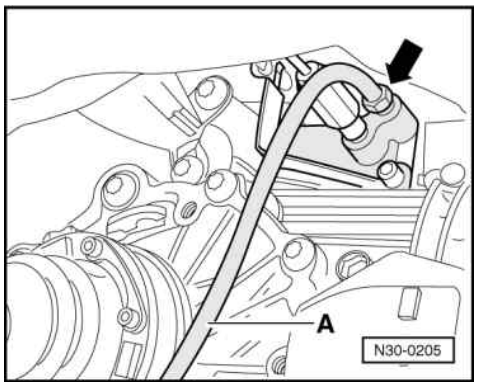


- Connect up brake filling and bleeding appliance V.A.G 1238 B of V.A.G 1869, but do not as yet switch on.
- If fitted, remove noise insulation beneath gearbox.

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.

Vehicles with 6-cylinder engine:

- -> Remove heat shield for inner left joint from gearbox -arrows-.
- Detach drive shaft -1- on left of gearbox and lay aside.
- Unplug connector at speedometer sender.



All models:

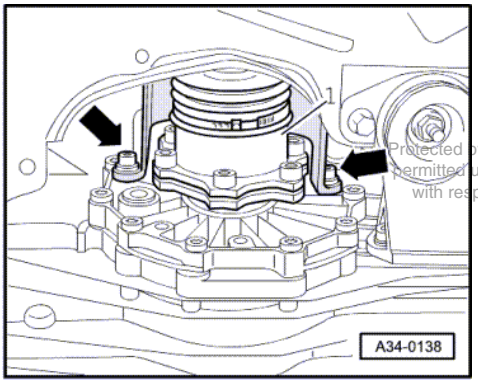
- -> Connect bleed hose -A- at slave cylinder (arrow) and open bleed valve.
- Connect bleed hose to pressure hose of collector.

- Then switch on bleeding appliance and allow approx. 100 cm3 of brake fluid to drain out.
  - Working pressure 2.5 bar

Note:

Make sure bleed hose is correctly fitted when bleeding.

- Close bleed valve (4.5 Nm).
- Press clutch pedal several times following completion of bleeding process.
- Bleed system again 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.

Vehicles with 6-cylinder engine:

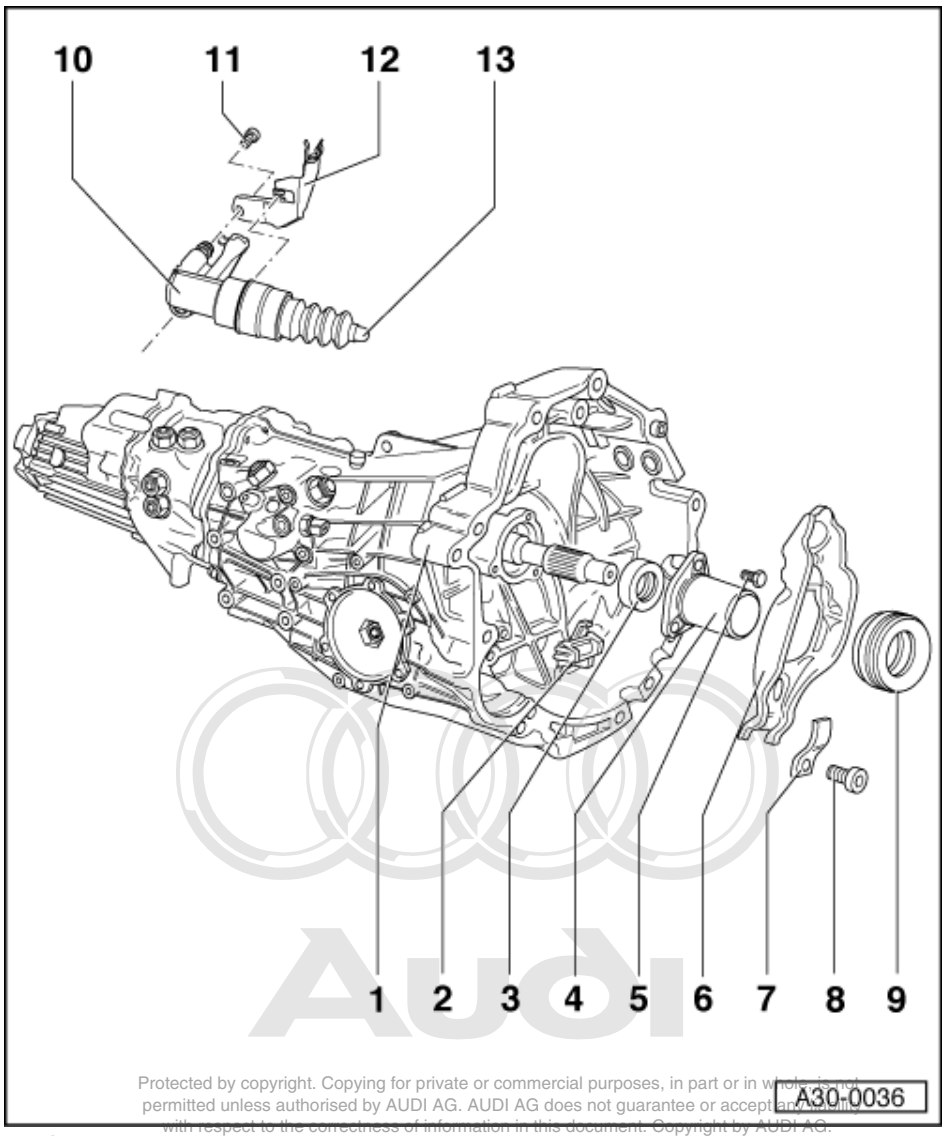
- Attach connector to speedometer sender.
- Screw left drive shaft to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- -> Screw (25 Nm) heat shield for inner left joint to gearbox -arrows-.

2 - Servicing clutch release mechanism

2.1 - Servicing clutch release 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.

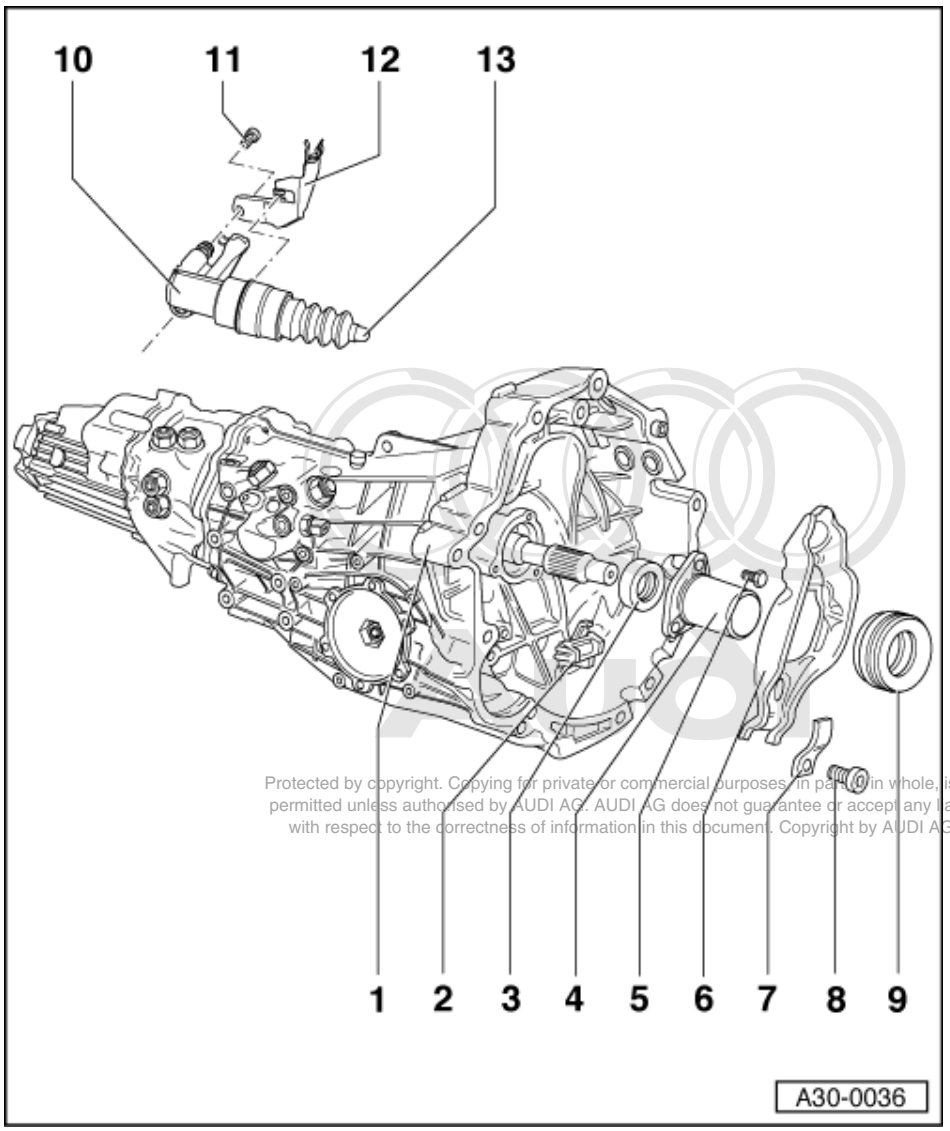
1 Gearbox

2 Intermediate piece
- Replace if damaged

3 Radial shaft seal
- For input shaft
- Removing => Fig. 1
- Installing => Fig. 2
- Standard press-in depth: 3.5 mm, service press-in depth: 4.5 mm

4 Guide sleeve

5 Bolt, 15 Nm
- 3x



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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

- Removing => Fig. 3
- Must engage in lugs of intermediate piece on assembly => Fig. 4
- Prior to installation, coat contact surface for plunger of clutch slave cylinder with small quantity of copper grease, e.g. Z 381 351 TE

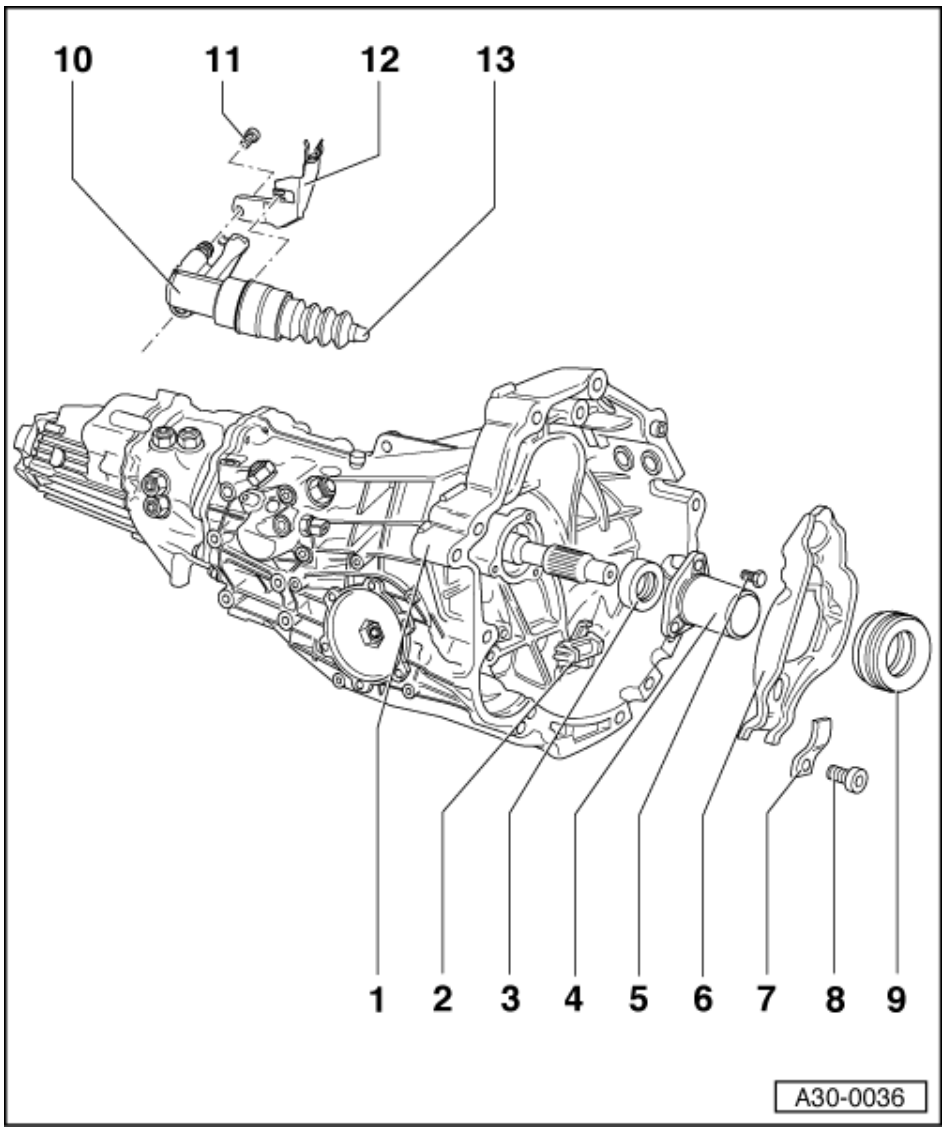
7 Leaf spring

8 Bolt, 25 Nm

- Self-locking
- Always replace

9 Release bearing

- With or without plastic ring depending on design => Fig. 5
- Bonding on detached plastic ring
  => Fig. 5
- Never wash out; only to be wiped over
- Replace noisy bearings
- Engage retainer tabs at release bearing in release lever



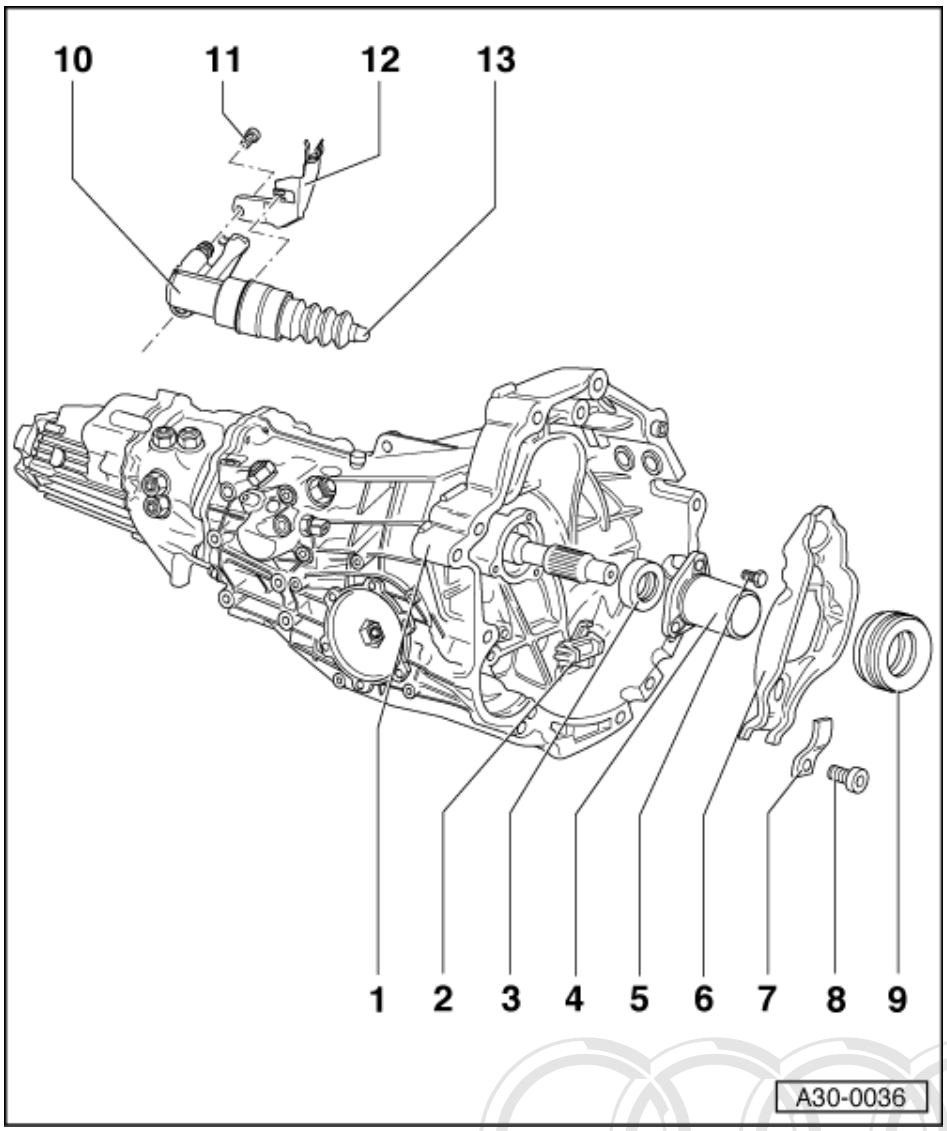
10 Clutch slave cylinder

- Removing and installing=>Page 42
- Do not press clutch pedal again following removal
- On insertion, press until bolt can be fitted
- Heed sequence of operations for bleeding => Page 35
- Tighten bleed valve to 4.5 Nm
- A broken-off bleed valve can be screwed out using a 3mm Allen key

11 Hexagon socket-head bolt - 23Nm

- 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.

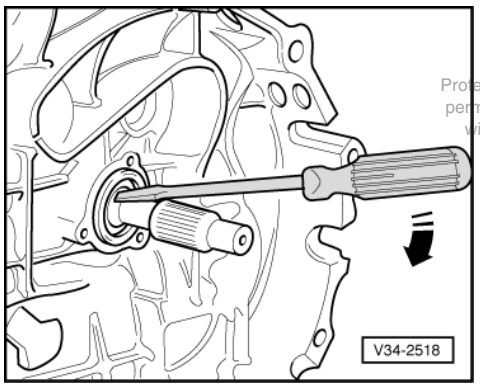


12 Holder

- For hose/pipe assembly
- Attached to gearbox with slave cylinder
- Bolt to gearbox with clutch slave cylinder
- Installing => Page 45

13 Plunger

- Apply copper grease, e.g. Z 381 351 TE, to end of plunger



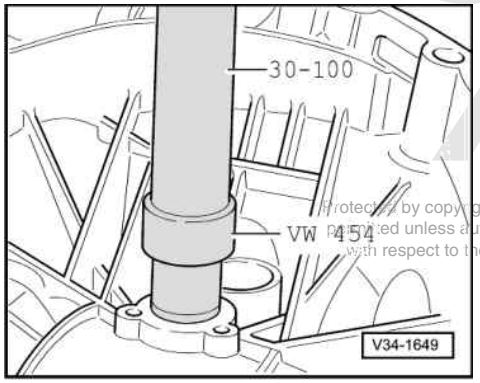
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.1 Removing radial shaft seal for input shaft

- Use screwdriver to carefully prise out oil seal.

Note:

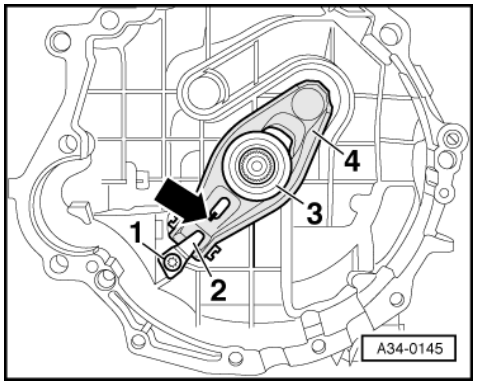
Take care not to damage running surface for radial shaft seal on input shaft.



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.

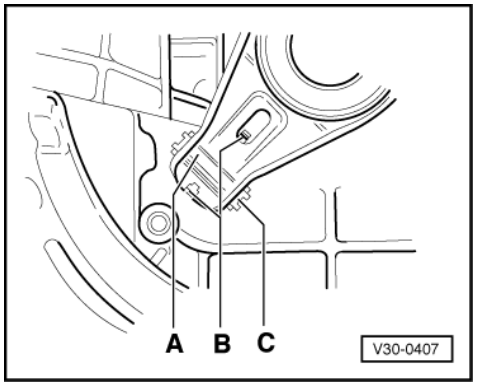
-> Fig.2 Installing radial shaft seal for input shaft

- Lightly lubricate outer periphery of new oil seal for input shaft.
- Fill space between sealing lip and dust lip with sealing grease G 052 128 A1.
- Tightly apply thin insulating sheath to splines of input shaft.
- Drive in input shaft oil seal.
  - Standard press-in depth: 3.5 mm
  - Service press-in depth: 4.5 mm
- Remove insulating sheath.



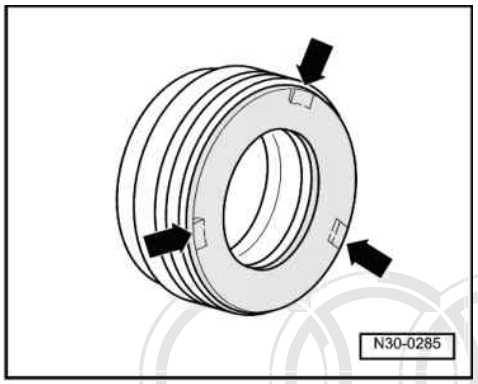
-> Fig.3 Removing clutch release lever

- Slacken off bolt -1-, detach leaf spring -2- and press back catch -arrow-.
- Remove clutch release lever -4- with release bearing -3-.
- Disengage retainer tabs of release bearing at release lever.



-> Fig.4 Installing clutch release lever

- Prior to installing clutch release lever, apply a thin coat of copper paste to contact surface for plunger of clutch slave cylinder.
- Insert clutch release lever -A- in intermediate piece -C- and allow to engage (catch -B- becomes visible).
- Insert leaf spring -Item 38 and tighten bolt to 25 Nm.



-> Fig.5 Servicing release bearing with plastic ring

In the case of release bearings with plastic ring, ring may become detached from release bearing on removing gearbox or release bearing, this is however not a reason for replacing the release bearing.

- Bond detached plastic ring back onto bearing race with adhesive AMV 195 KD1 01 before installing gearbox.

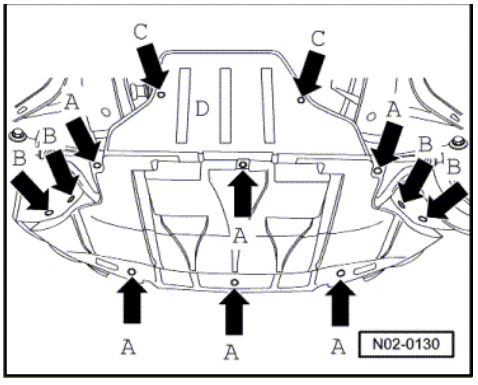
Three square lugs -arrows- of the plastic ring engage in the recesses of the bearing race.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

Release bearing must be replaced if there is more than 0.5 mm wear at the plastic ring contact surface.

2.2 - Removing and installing clutch slave cylinder

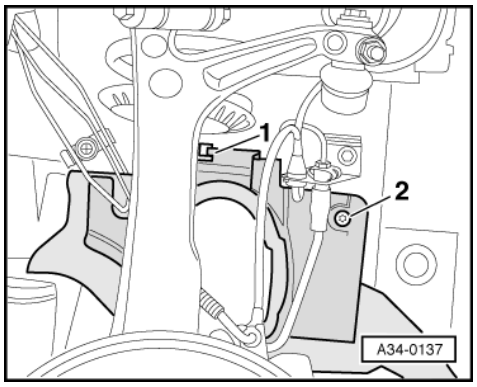


Removing

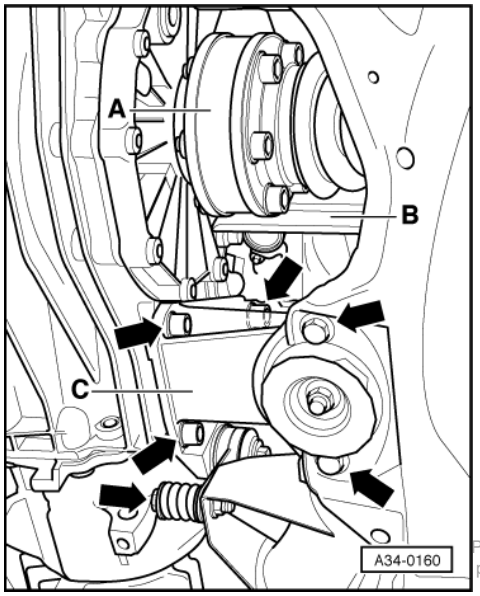
Note:

By way of example, removal is described in the following for a vehicle with V6 TDI engine.

- -> Remove rear section -D- of noise insulation.

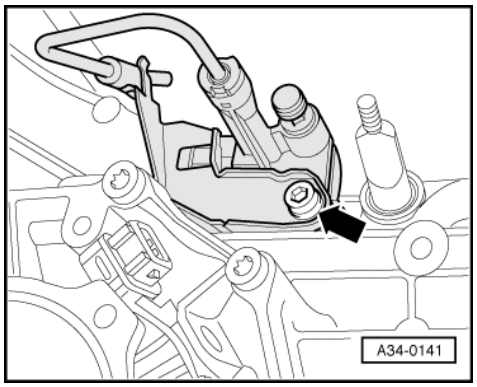


- -> Slacken off bolt -2- of noise insulation over left drive shaft.
- Disengage hook -1- and detach noise insulation.



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

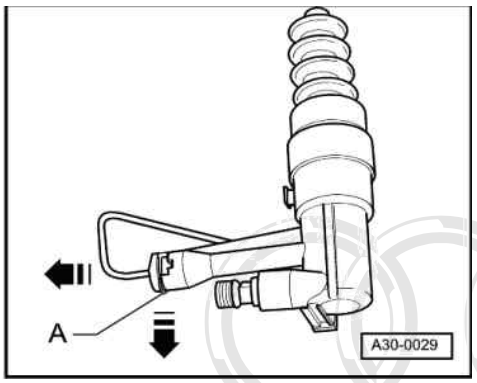
- -> Unscrew left drive shaft -A- from gearbox and lay it aside.
- Detach heat shield -B- from gearbox.
- Remove left gearbox support -C- complete with gearbox mounting. To do so, screw out bolts -arrows-.



- -> Screw out bolt -arrow- and pull out clutch slave cylinder to rear.

Note:

Do not press clutch pedal after removing slave cylinder.



- -> To remove pipe, prise out clip -A- as far as detent using a screwdriver. Pipe can then be pulled out.

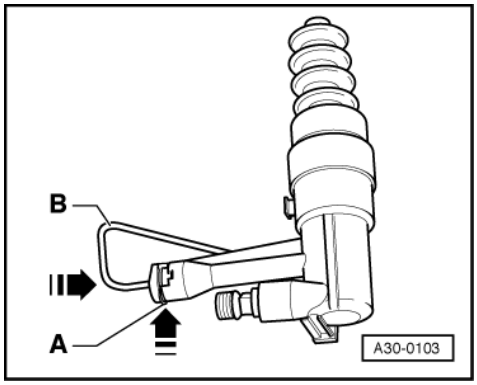
Installing

Install in reverse order, paying attention to the following:

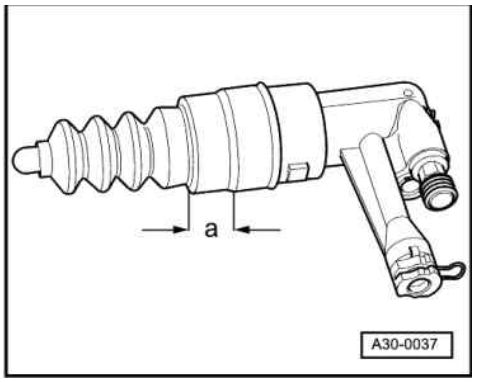
Notes:

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

- Brake fluid must not be allowed to come into contact with gearbox. Clean gearbox housing if necessary.
- Tilting clutch slave cylinder on insertion could cause plunger to move past clutch release lever.
- To facilitate assembly, engage 6th gear before fitting slave cylinder.
- Pretension clutch slave cylinder such that bolt can easily be inserted.
- Always replace bolt.

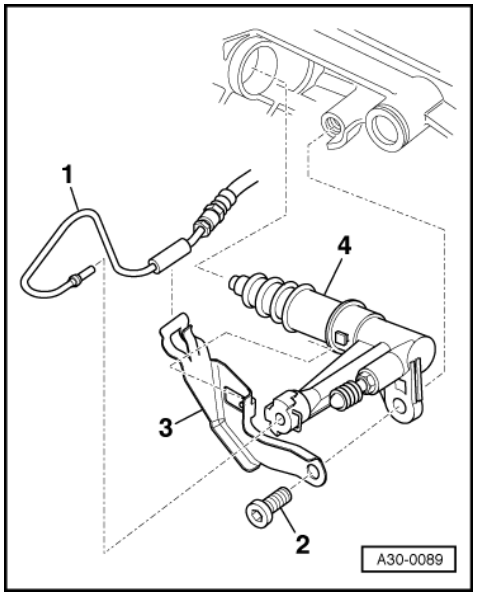


- -> Press in clip -A- as far as it will go to connect pipe to slave cylinder.
- Insert pipe -B- in slave cylinder until it is heard to engage.

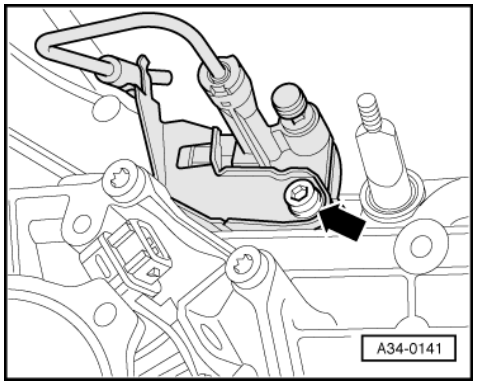


- -> Before installing slave cylinder in gearbox housing, area -a- of boot must be coated with lithium grease G 052 150 A2.

- Apply thin coat of copper grease, e.g. Z 381 351 TE, to contact surface for plunger at clutch release lever.

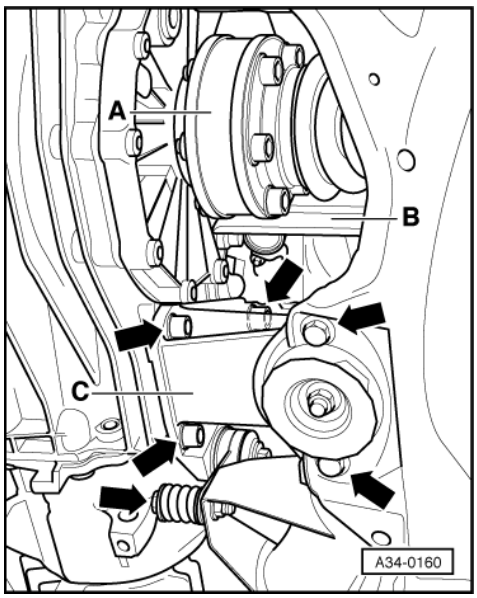


- -> Engage holder for hose/pipe assembly -3- at slave cylinder -4-.



- -> Guide clutch slave cylinder into mounting hole of gearbox housing without any major lateral deviation from operating direction of plunger and screw on -arrow-.
- If pipe has been disconnected at slave cylinder, clutch system must be bled => Page 35 after installing 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.



- -> Install gearbox support -C- with gearbox mounting.
- Screw drive shaft -A- to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- Screw heat shield -B- to gearbox.

Tightening torques

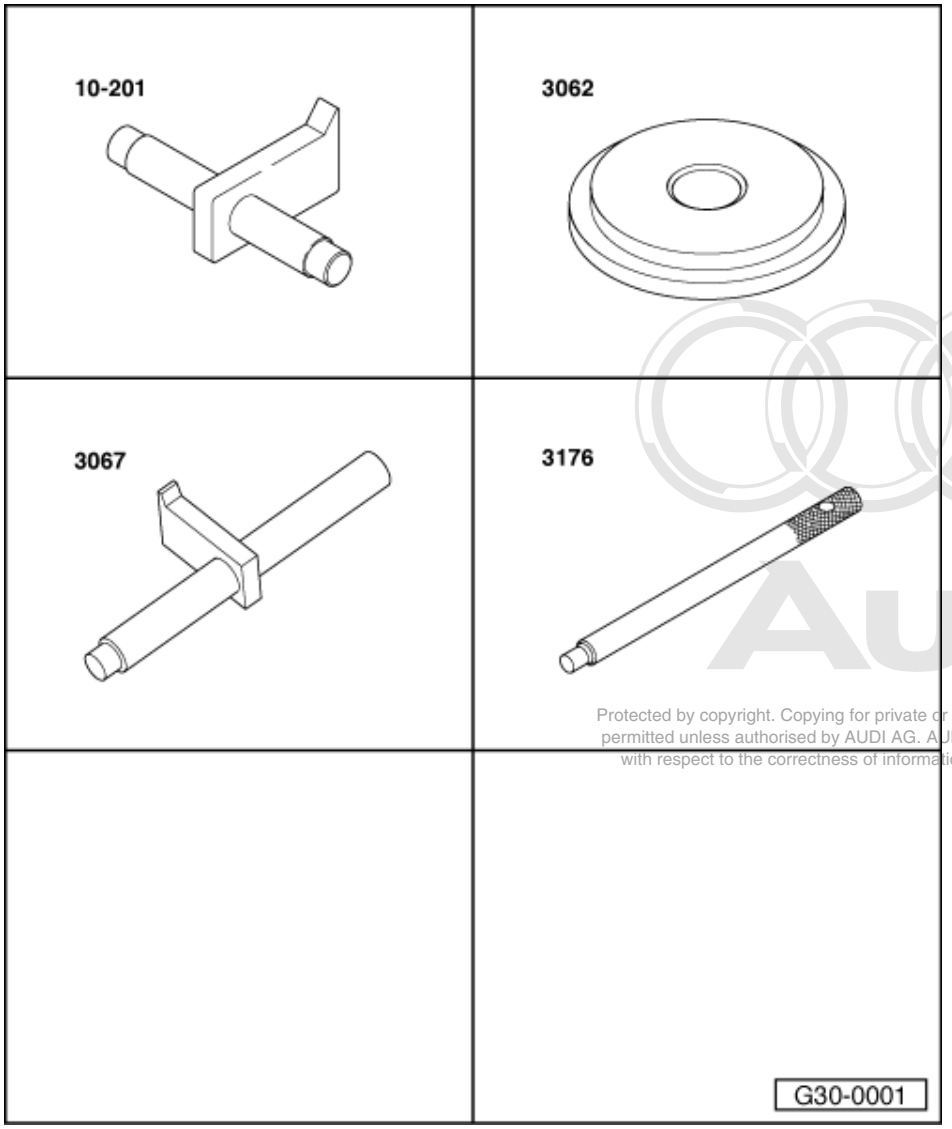
Component	Nm
Clutch slave cylinder to gearbox1)	23
Heat shield for drive shaft	25
Gearbox support to gearbox	40
Gearbox mounting to subframe	23

1) Replace 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.

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.

Special tools and workshop equipment required

- Counterhold 10-201
- Thrust pad 3062
- Counterhold 3067 (for vehicles with V6 TDI engine)
- Centring mandrel 3176
- Grease G 000 100

Notes:

- Heed general repair instructions =>Page 10 .
- Before replacing clutch plate and pressure plate, refer to

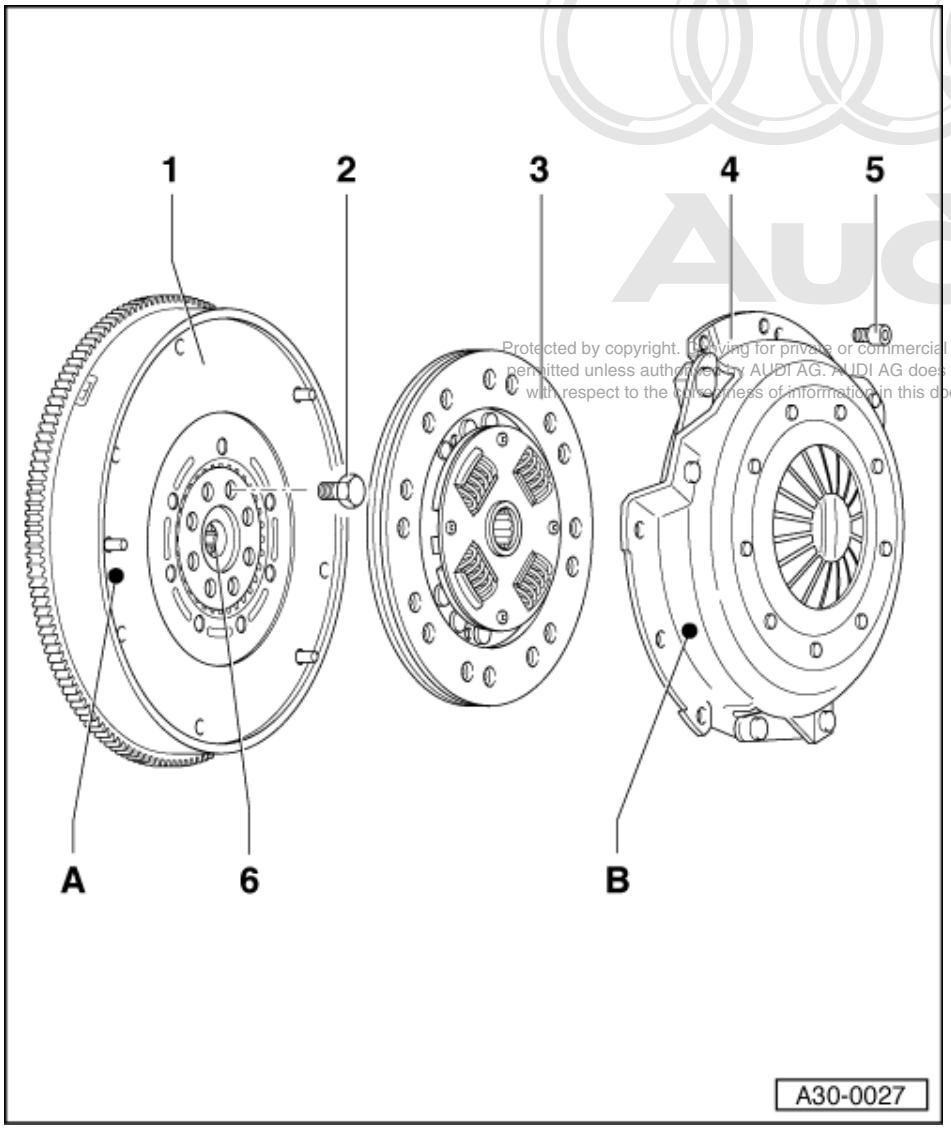
=> Fault-finding No. 9 - Complaints about clutch and clutch mechanism

- Vehicles with V6 2.7l bi-turbo engine (S4 and RS4) are fitted with an SAC pressure plate (SAC = self-adjusting clutch) which requires resetting of an adjuster ring => Page 57 if only the clutch plate is replaced.
- So as not to damage SAC pressure plate on removal and installation, pay attention to assembly specifications for SAC pressure plate
  => Page 56 .

- Checking SAC pressure plate for torsion => Page 56 , Fig. 2
- Replace clutch plates and pressure plates where riveted joint is damaged or loose.
- Assign clutch plate and pressure plate by way of engine code.

=> Parts List
- Clean input shaft splines and - in the case of used clutch plates - hub splines, remove corrosion and apply extremely thin layer of grease G 000 100 to splines. Then move clutch plate back and forth on input shaft until hub moves freely on shaft. Excess grease must be removed.
- Pressure plates have an anti-corrosion coating and are greased. Only the contact surface may be cleaned, as otherwise the clutch service life will be considerably shortened.
- To reduce the odour nuisance of a scorched clutch, thoroughly clean bell housing, flywheel and parts of engine facing gearbox.

3.2 - Clutch for vehicles with 4 and 6-cyl. TDI engine



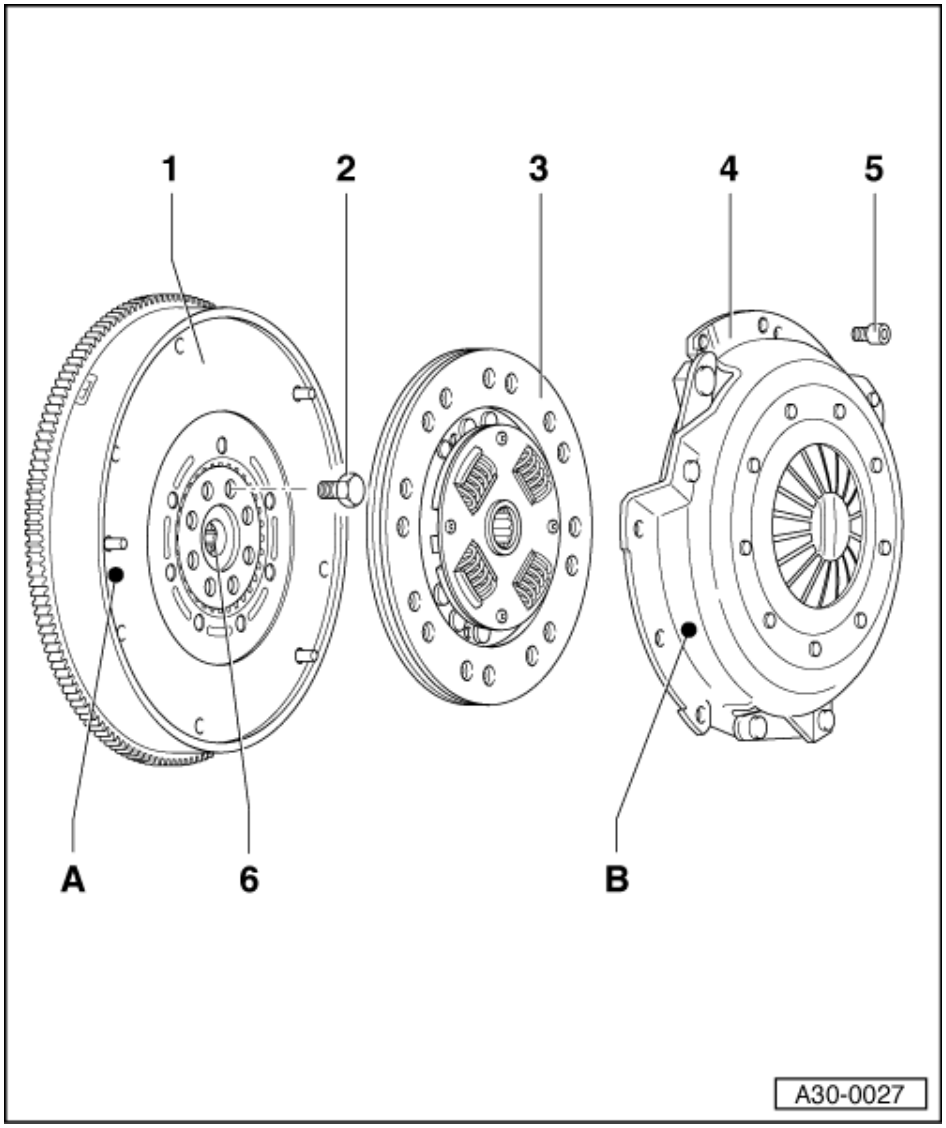
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Work on clutch involves removing gearbox => Page 118 .

1 Dual-mass flywheel
- If provided, white coloured dot -A- at dual-mass flywheel must be opposite white coloured dot -B- of pressure plate
- Make sure centring pins are a tight fit
- Contact surface for clutch lining must be free from grooves, oil and grease

- Removing and installing:

=> Engine, Mechanics; Repair Group 13



2 Bolt

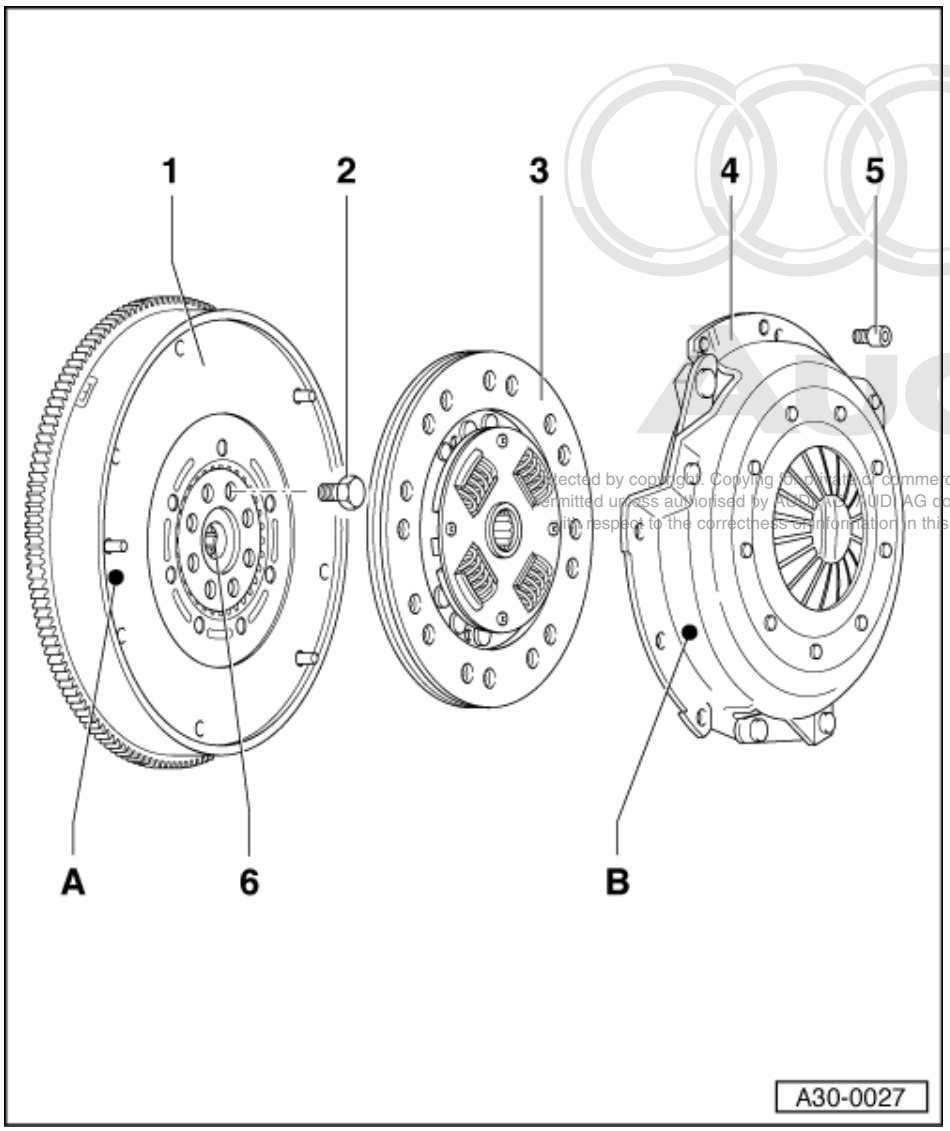
- Tightening torque with 22.5 mm long bolt: 60 Nm + further 90° turn
- Tightening torque with 43.5 mm long bolt: 60 Nm + further 180° turn
- Always replace

=> Engine, Mechanics; Repair Group 13

3 Clutch plate

- Installation position: Dampers (coil springs) or "gearbox end" label facing pressure plate or gearbox
- Centring => Fig. 1
- Do not grease
- Clutch plate diameter => 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.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Pressure plate

- Removing and installing => Fig. 1
- If provided, white coloured dot -A- at dual-mass flywheel must be opposite white coloured dot -B- of pressure plate
- Checking ends of diaphragm spring => Fig. 2
- Checking spring connection and riveted joints => Fig. 3

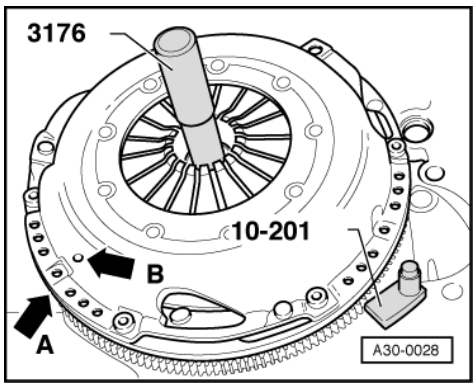
5 Bolt, 25 Nm

- Tighten gradually and diagonally

6 Needle bearing

- Driving out and fitting

=> Engine, Mechanics; Repair Group 13



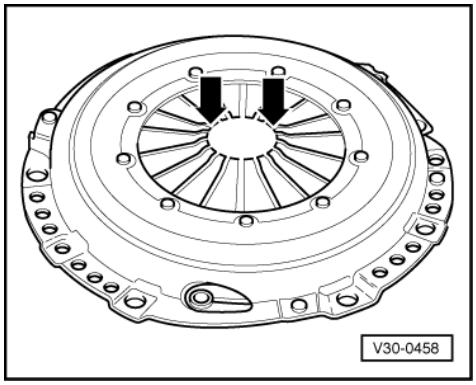
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.1 Removing and installing clutch

- Installation position of clutch plate: Dampers (coil springs) or "gearbox end" label must face pressure plate or gearbox.
- On installation, make sure white coloured dot -A- of dual-mass flywheel is aligned with white coloured dot -B- of pressure plate.
- Slacken off/tighten bolts gradually and in diagonal sequence (25 Nm).
- Re-position counterhold 10-201 when removing.
- Use guide mandrel 3176 to centre clutch plate.

Notes:

- Pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then are bolts to be fitted.
- Tighten bolts evenly, diagonally and in small steps so as not to damage centring holes in pressure plate and centring pins of flywheel.

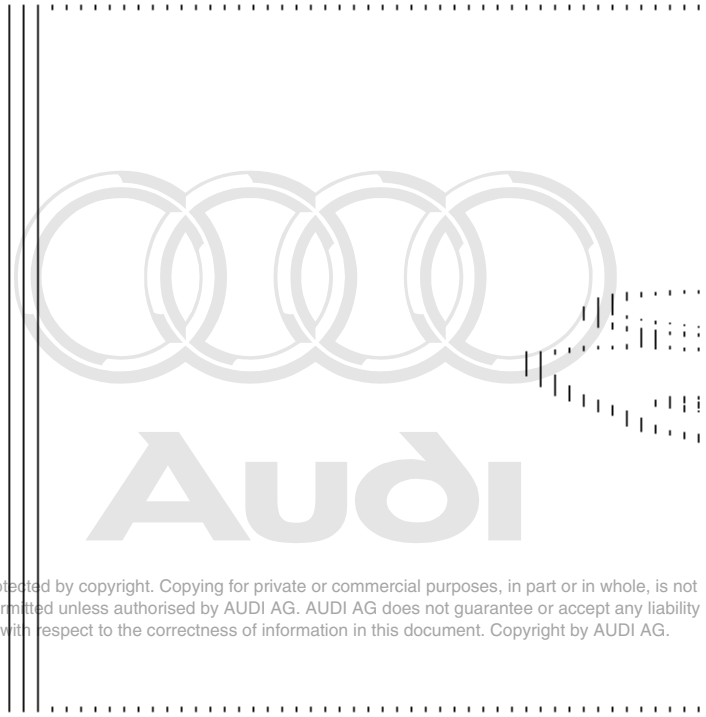


-> Fig.2 Checking ends of diaphragm spring

- Wear down to half diaphragm spring thickness is permitted

Note:

When performing repairs, always assign clutch pressure plate and clutch plate by way of engine code in line with Parts List.

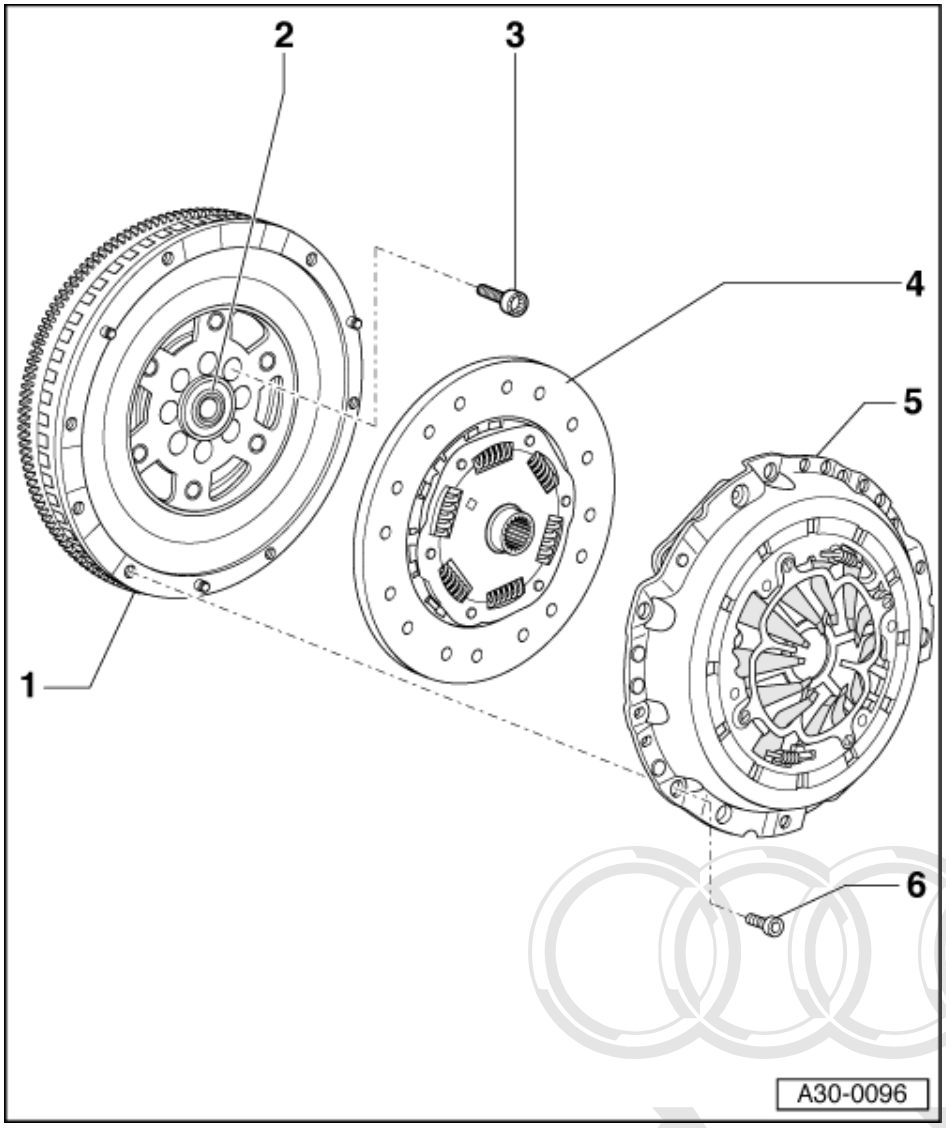


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.3 Checking spring connection and riveted joints

- Check spring connection between pressure plate and cover for cracks and riveted joints for firm attachment.
- Replace clutches with damaged springs or loose riveted joints -arrows-.

3.3 - Clutch with SAC pressure plate for vehicles with 6-cyl. 2.7l bi-turbo engine (S4 and RS4)



"SAC" stands for Self-Adjusting Clutch.

- Work on clutch involves removing gearbox =>Page 135 .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Dual-mass flywheel

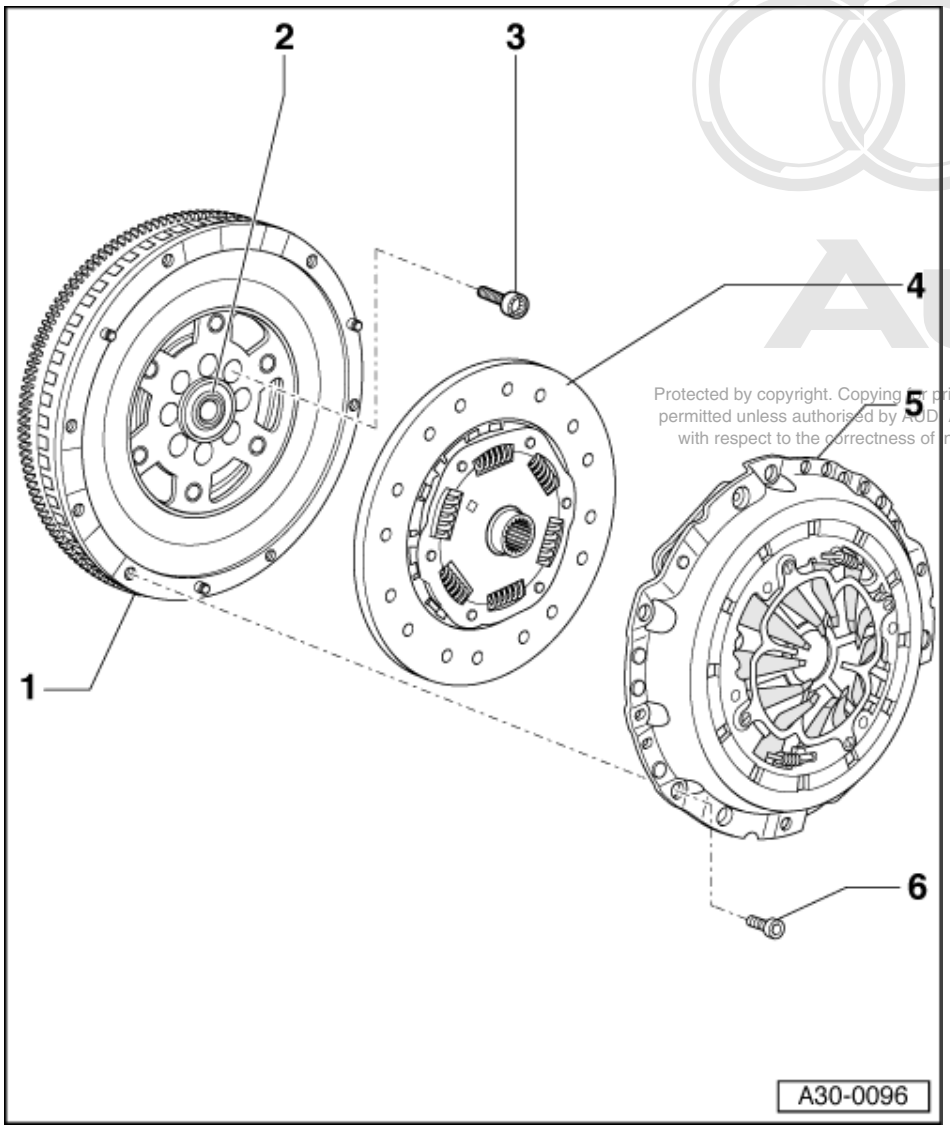
- Make sure centring pins are a tight fit
- Contact surface for clutch lining must be free from grooves, oil and grease
- Removing and installing:

=> Engine, Mechanics; Repair Group 13

2 Needle bearing

- Driving out and fitting

=> Engine, Mechanics; Repair Group 13



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

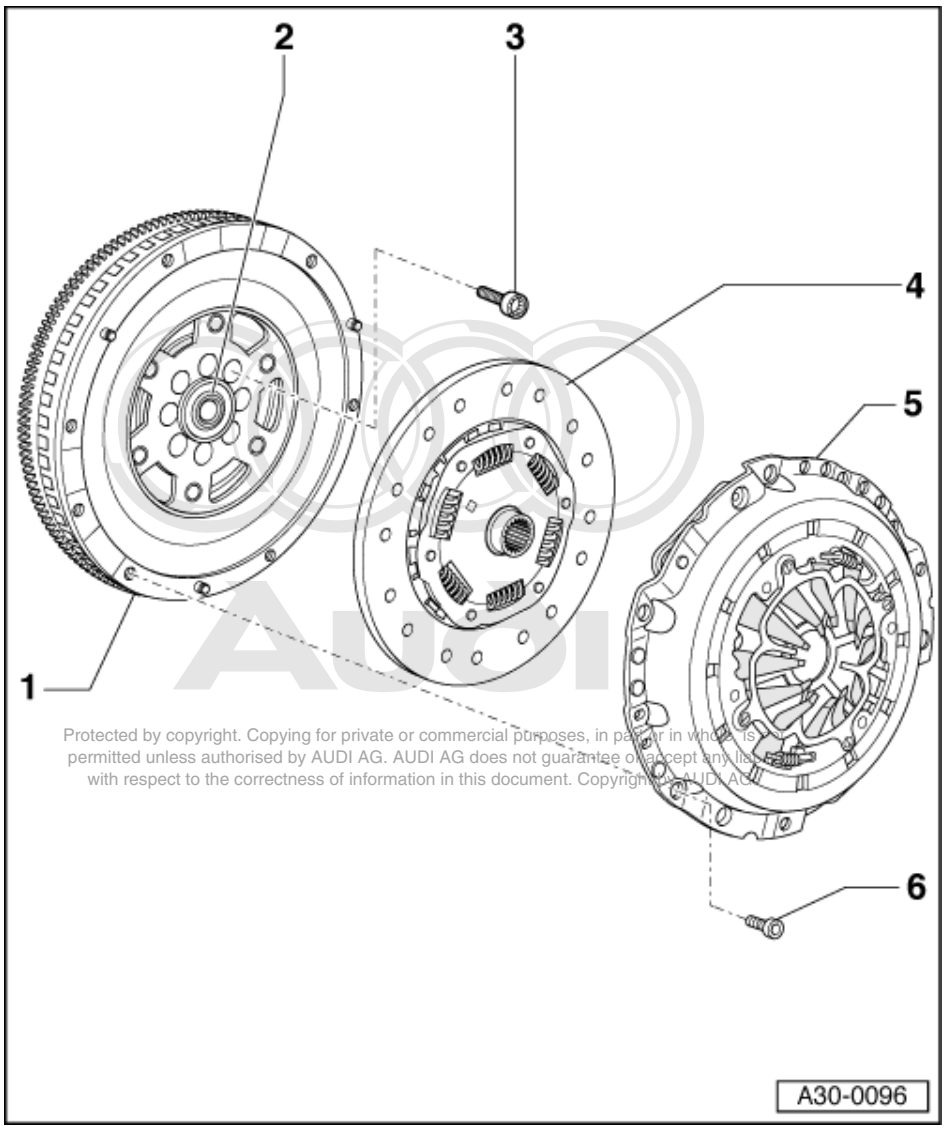
3 Bolt

- Tighten to 60 Nm and give a further 180° turn
- Always replace

=> Engine, Mechanics; Repair Group 13

4 Clutch plate

- Installation position: Dampers (coil springs) or "gearbox end" label facing pressure plate or gearbox
- Centring =>Page 57
- Do not grease
- Clutch plate diameter => Page 2 onwards



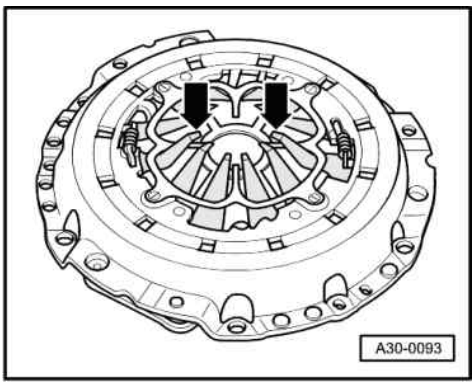
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © AUDI AG

5 SAC pressure plate

- Removing and installing =>Page 56
- Resetting adjuster ring => Page 57
- Checking ends of diaphragm spring => Fig. 1
- Checking pressure plate for torsion => Fig. 2
- Check spring connection and riveted joints

6 Bolt, 22 Nm

- Heed tightening specification => Page 56



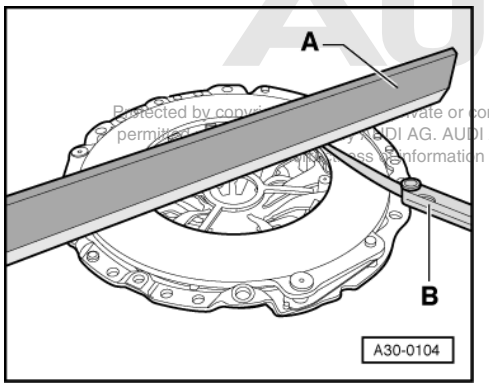
-> Fig.1 Checking ends of diaphragm spring

- Wear down to half diaphragm spring thickness is permitted

Note:

When performing repairs, always assign clutch pressure plate and clutch plate by way of engine code in line with Parts List.

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



-> Fig.2 Checking SAC pressure plate for torsion, cracks and scorching

A - Bevelled straightedge
B - Feeler gauge

- Pressure plate torsion of up to 1.0 mm is permitted

3.4 - Removing and installing clutch with SAC pressure plate

Removing

To prevent pressure plate torsion on removal (causes clutch grab when driving off), the following procedure is always to be employed when unscrewing pressure plate:

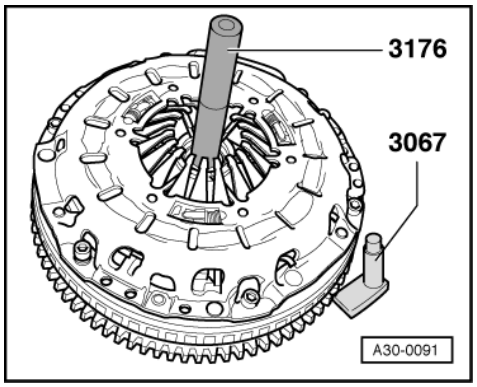
- Consecutively slacken off all 6 bolts in clockwise direction in 90° (1/4 turn) stages until pressure plate is released.

Installing

Note:

- Checking SAC pressure plate for torsion prior to renewed installation => Page 56 , Fig. 2
- Adjuster ring of SAC pressure plate must be turned back prior to assembly if only clutch plate is replaced => Page 57 onwards.

- Installation position of clutch plate: Dampers (coil springs) or "gearbox end" label must face pressure plate or gearbox.



- -> Re-position counterhold 10-201 or 3067 on removal.
- Use guide mandrel 3176 to centre clutch plate.

To prevent pressure plate torsion on installation (causes clutch grab when driving off), the following procedure is always to be employed when fitting pressure plate:

- Position pressure plate on fitted pins.
- Screw in all 6 bolts evenly by hand until bolt head makes contact with pressure plate.
- Consecutively tighten all 6 bolts in clockwise direction in 90° (1/4 turn) stages until housing makes contact with flywheel.
- Consecutively finish-tighten (22 Nm) all 6 bolts in clockwise direction.

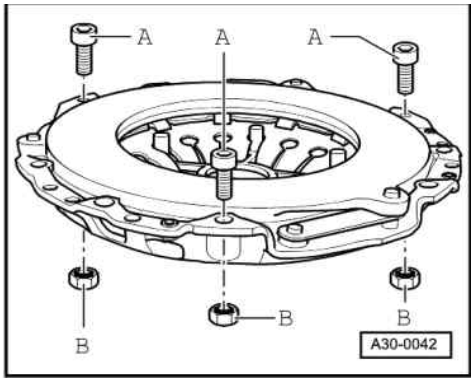
3.5 - Resetting adjuster ring of SAC pressure plate

Adjuster ring of pressure plate only has to be turned back as far as it will go on installing a new clutch plate with a used SAC pressure plate. If adjuster ring of pressure plate is not turned back, the SAC pressure plate will operate with a reduced contact pressure, resulting in greater wear on the clutch, particularly on the clutch plate (clutch slips).

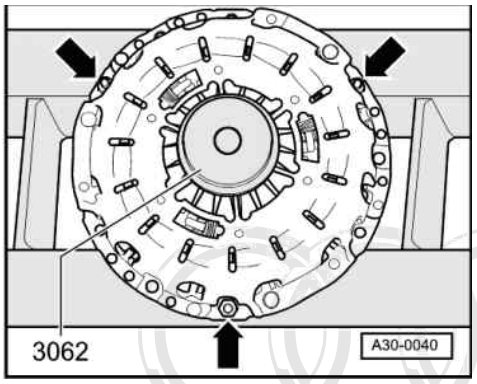
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Adjuster ring need not be turned back if clutch plate is not replaced.

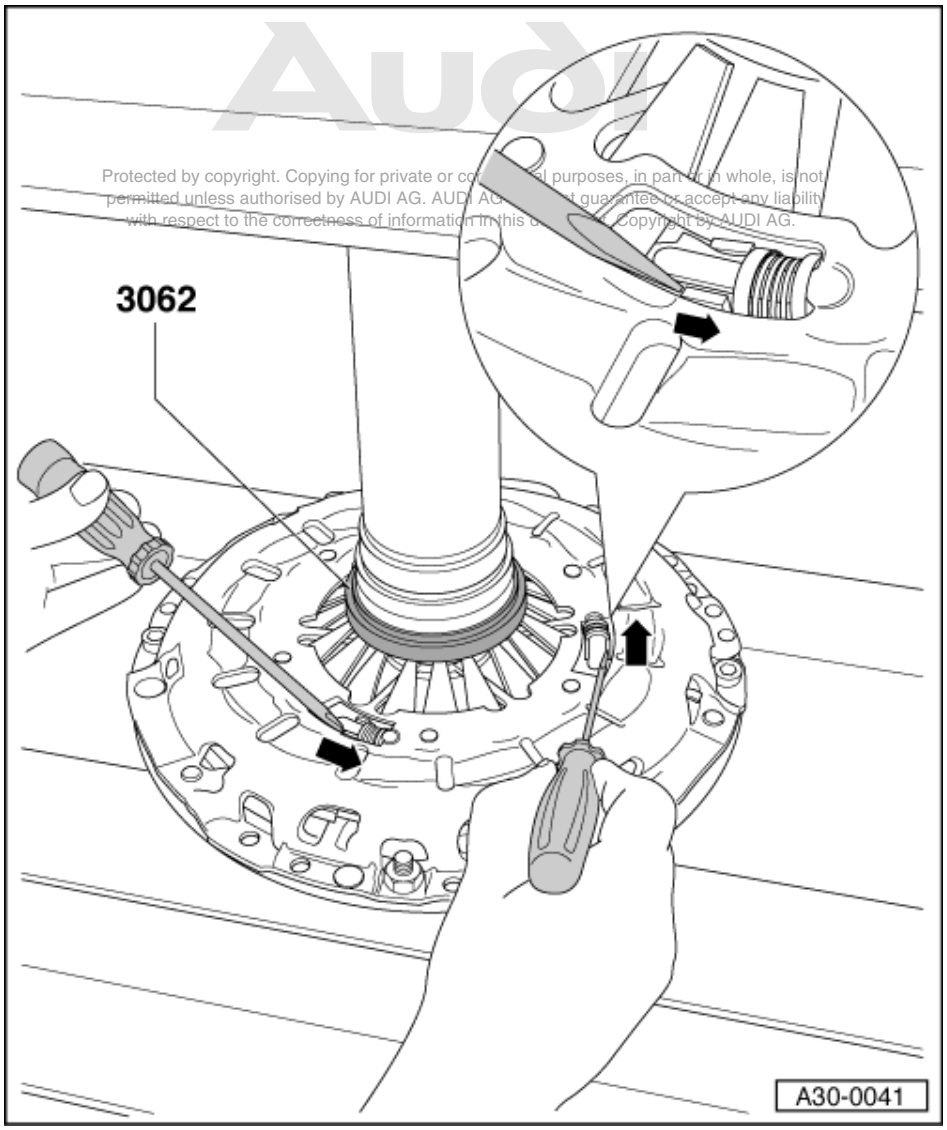
New SAC pressure plates are pre-adjusted and do not require resetting.



- -> As illustrated, insert 3 pressure plate bolts -A- at 120° intervals (1/3 of a turn) in securing holes of pressure plate.
- Screw 3 nuts -B- (M8) onto bolts -A-and tighten nuts slightly.



- -> Place SAC pressure plate on press such that only the 3 bolt heads -arrows- make contact.
- Centrally align special tool 3062 on pressure 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.

Do not employ force when performing the following operations as adjuster ring forks could break off.

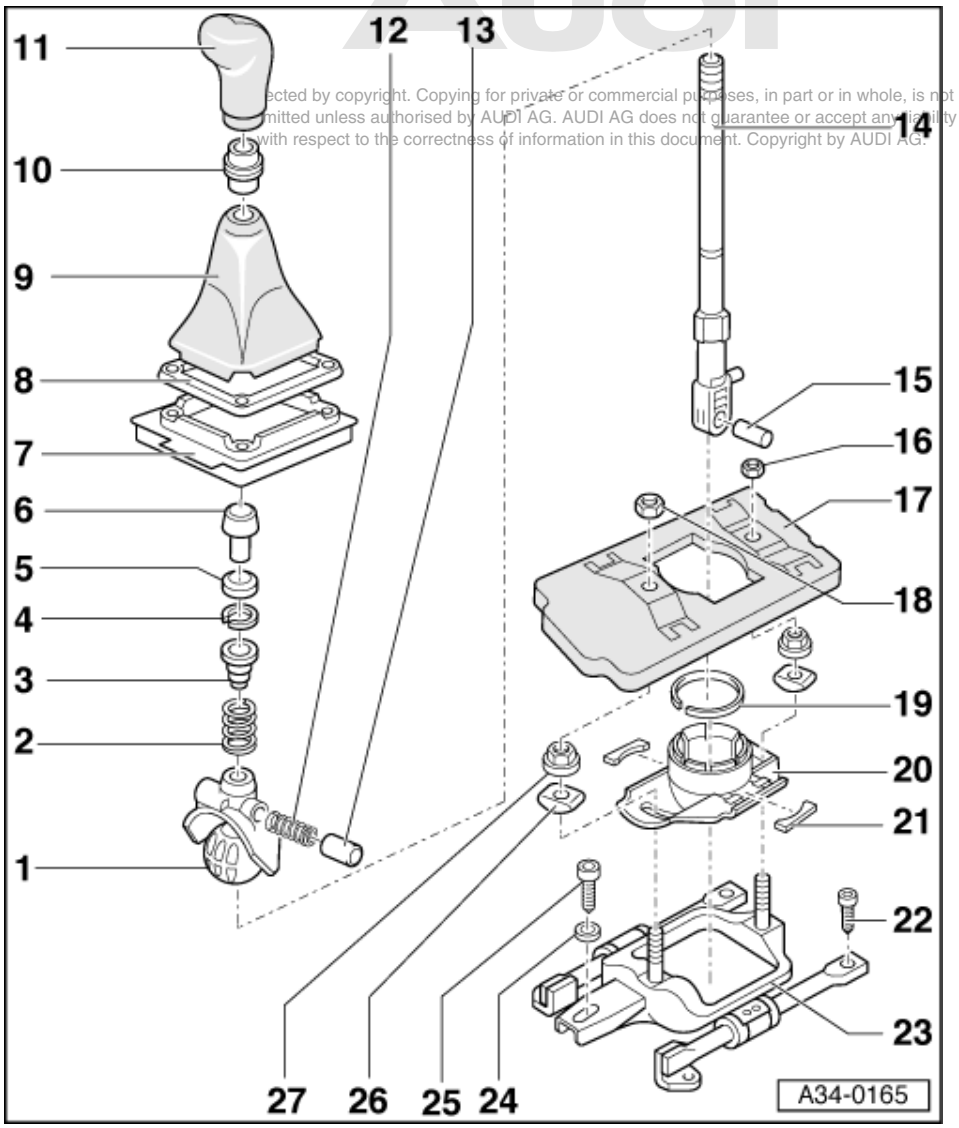
- Apply two screwdrivers to adjuster ring forks. Use press to apply pressure to pressure plate until adjuster ring can just be moved.
- Use the two screwdrivers to evenly turn adjuster ring in arrow direction as far back as it will go.
- Hold adjuster ring in this position and at the same time relieve pressure of press so that adjuster ring position is maintained.

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

34 - Controls, Housing

1 - Servicing shift mechanism

1.1 - Servicing shift mechanism



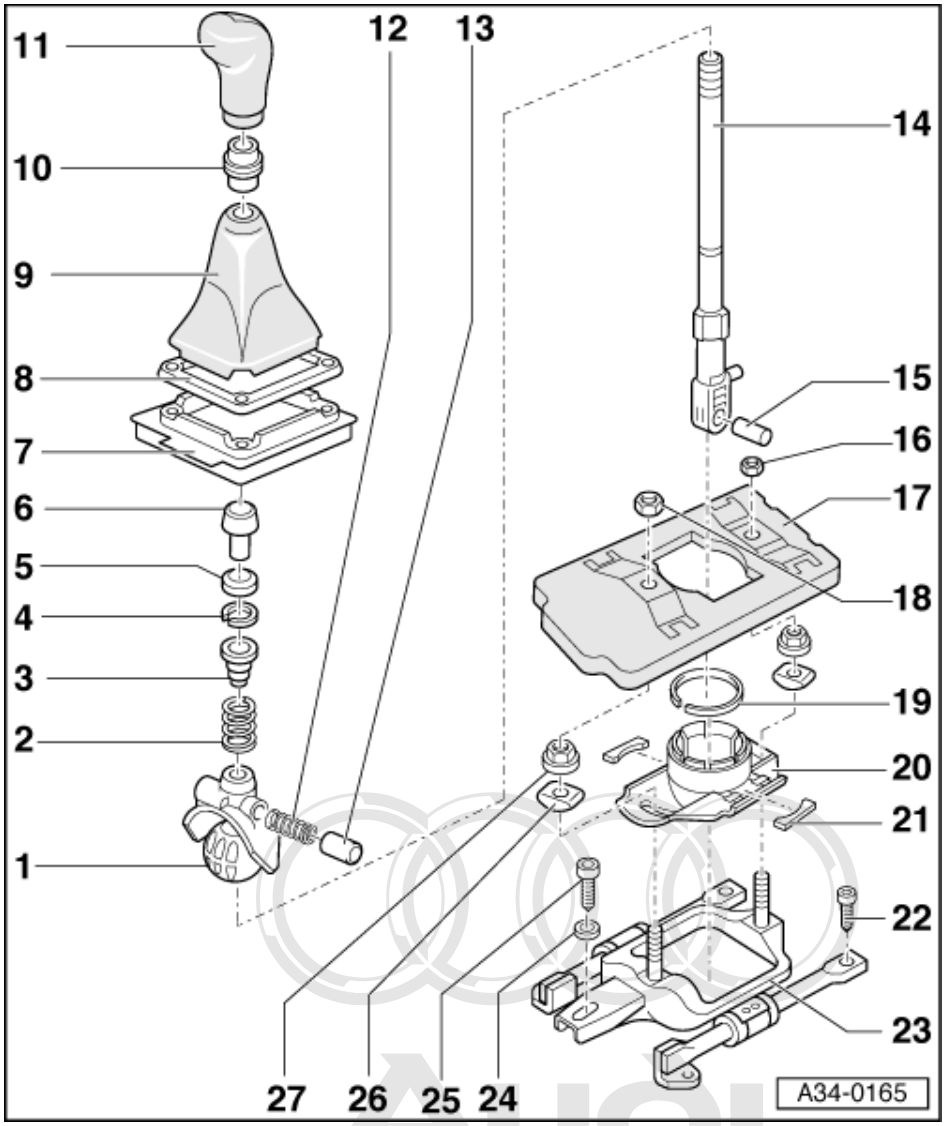
ected by copyright. Copying for private or commercial purposes, in part or in whole, is not
mitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
with respect to the correctness of information in this document. Copyright by AUDI AG.

1.2 - Servicing gear stick and push rod - rear

Notes:

- Apply polycarbamide grease, part no.
  G 052 142 A2 to bearings and contact surfaces.
- Disconnect earth strap from battery in engine compartment before working on shift mechanism.

Attention:
Heed appropriate instructions for battery disconnection.=>Electrical System; Repair Group 27



1 Ball stop
- Insert spring and bushing in ball stop and attach to gear stick such that spring and bushing are located on right in direction of travel
- Install before inserting circlip (Item 19)

2 Spring

3 Spacer bush

4 Circlip
- Replace strained circlips

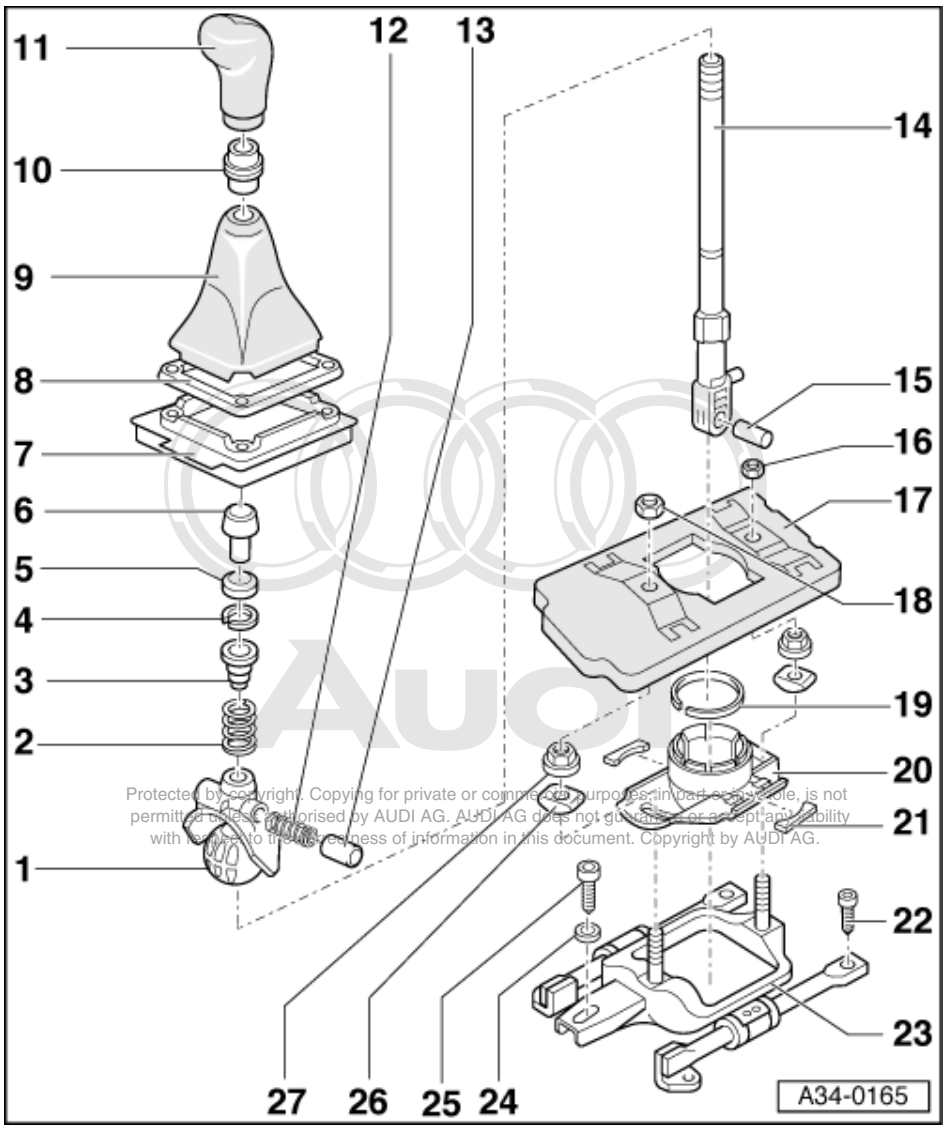
5 Collar

6 Bushing

7 Bottom part of mounting frame

8 Top part of mounting frame

The reproduction, 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.

9 Cover
- Working from centre console, carefully prise out fastener at rear

10 Bushing

11 Gear stick knob
- Screw off to remove

12 Spring

13 Bushing
- Installation position: Rounded side facing gear stick

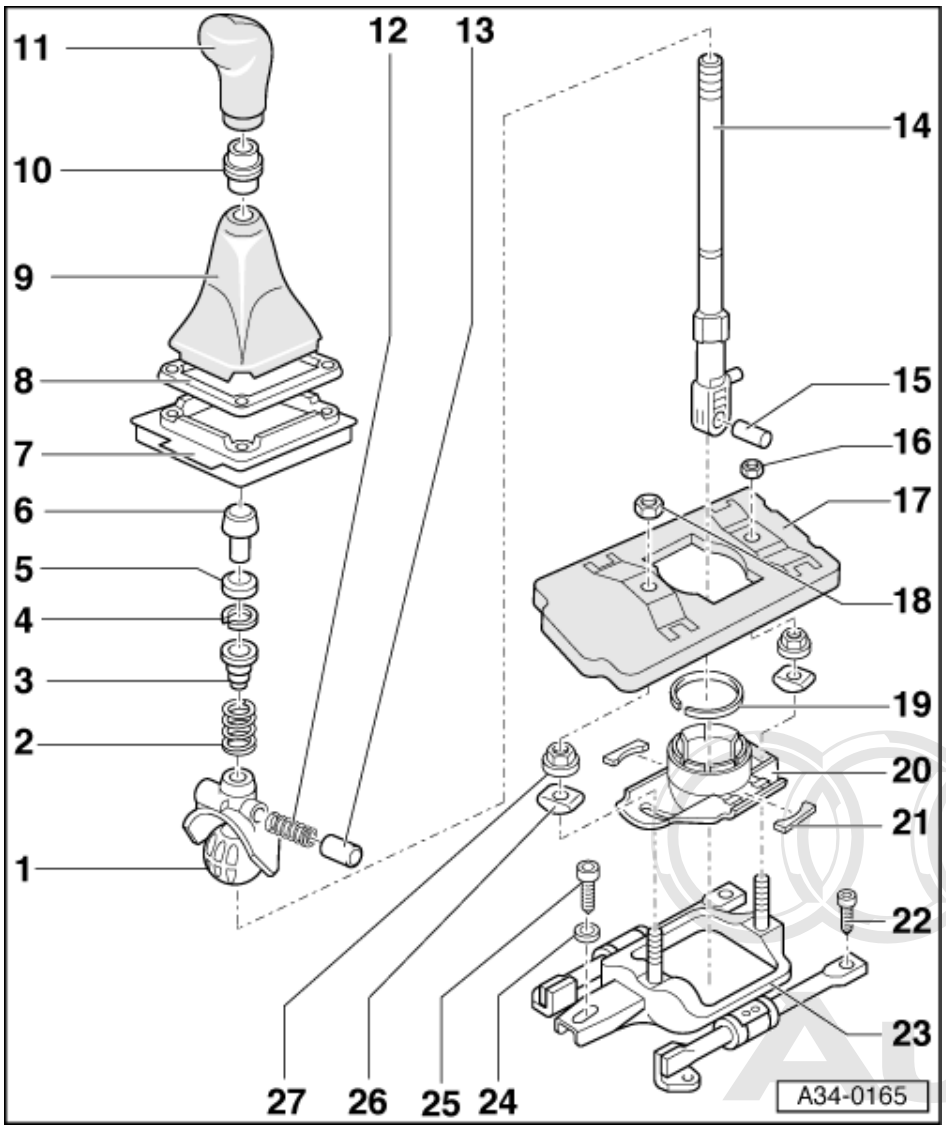
14 Gear stick
- Only fits in ball housing in one position

15 Spacer

16 Nut, 10 Nm

17 Noise insulation

18 Nut, 10 Nm



19 Circlip

- Replace
- Take out before removing ball stop
- Installation position: Rounded side facing ball housing (Item 20)

20 Ball housing

- Installation position: Detent segment for reverse gear facing to left

21 Buffer

22 Hexagon socket-head bolt - 10Nm

23 Push rod, rear

- In shift mechanism

24 Packing plate

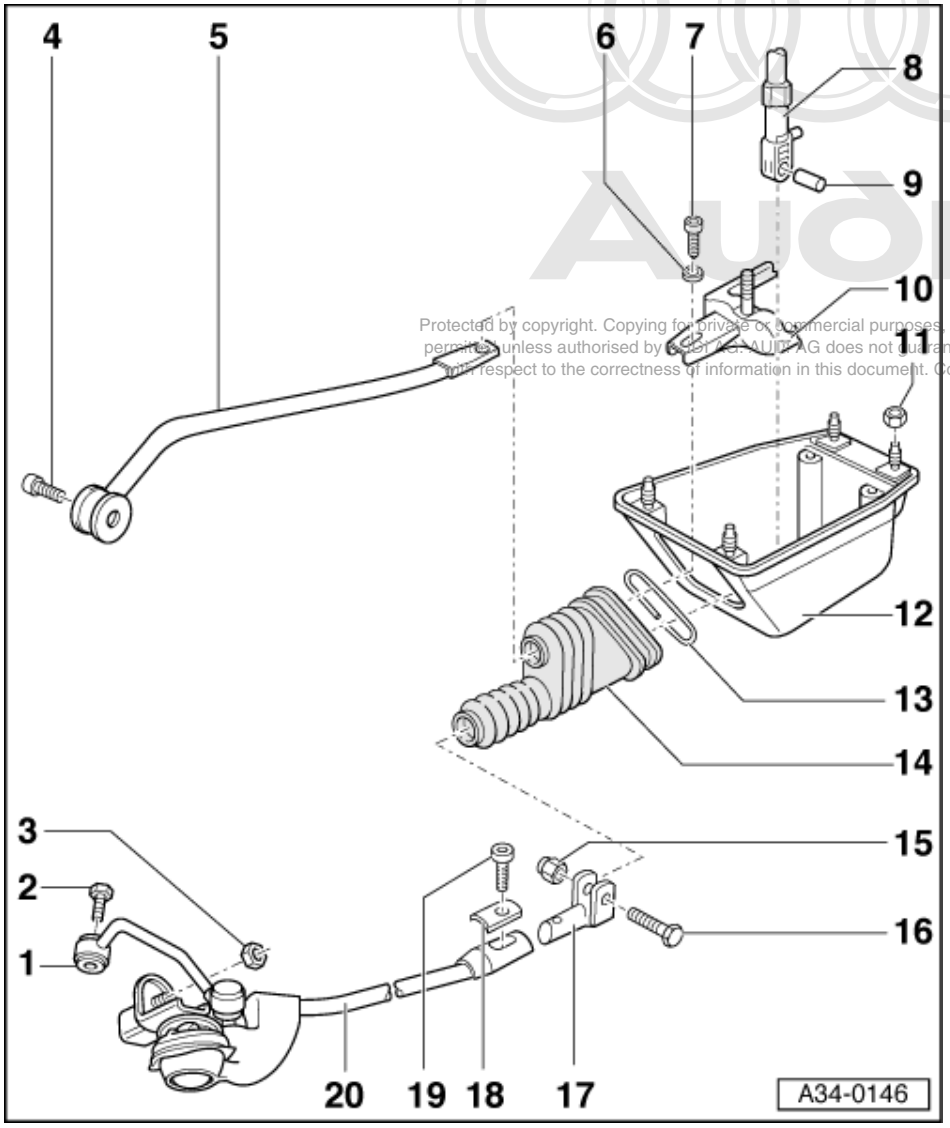
25 Hexagon socket-head bolt - 23Nm

26 Connection piece

27 Collared nut, 23 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.

1.3 - Servicing selector rod, connecting rod and push rod - front



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 **Connecting rod**
- Do not separate from selector rod; heed note =>Page 70

2 **Bolt, 23 Nm**

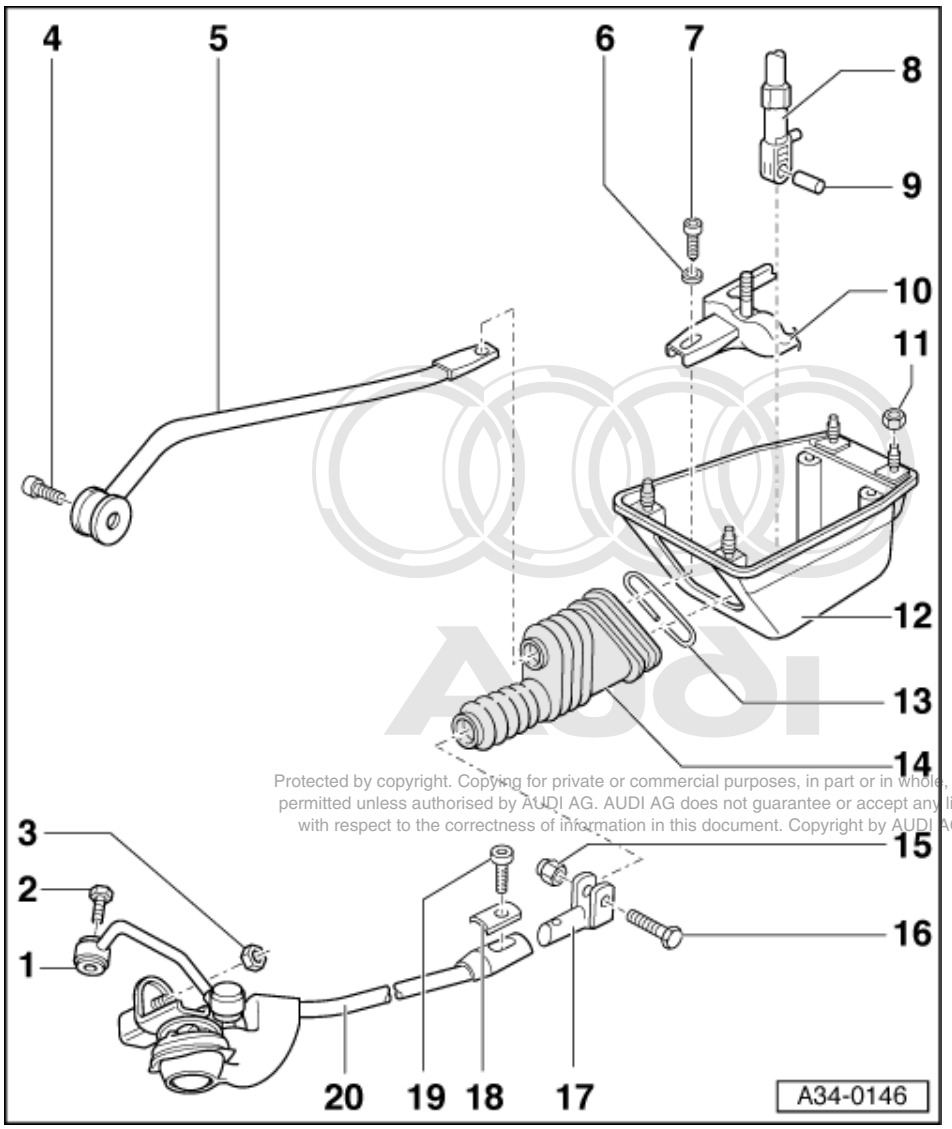
3 **Nut, 23 Nm**

4 **Bolt, 40 Nm**
- Part of push rod, front

5 **Push rod, front**
- With mounting bush, bolt and washers

6 **Packing plate**

7 **Hexagon socket-head bolt - 23Nm**



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Gear stick
- Only fits in ball housing in one position

9 Spacer

10 Push rod, rear
- In shift mechanism

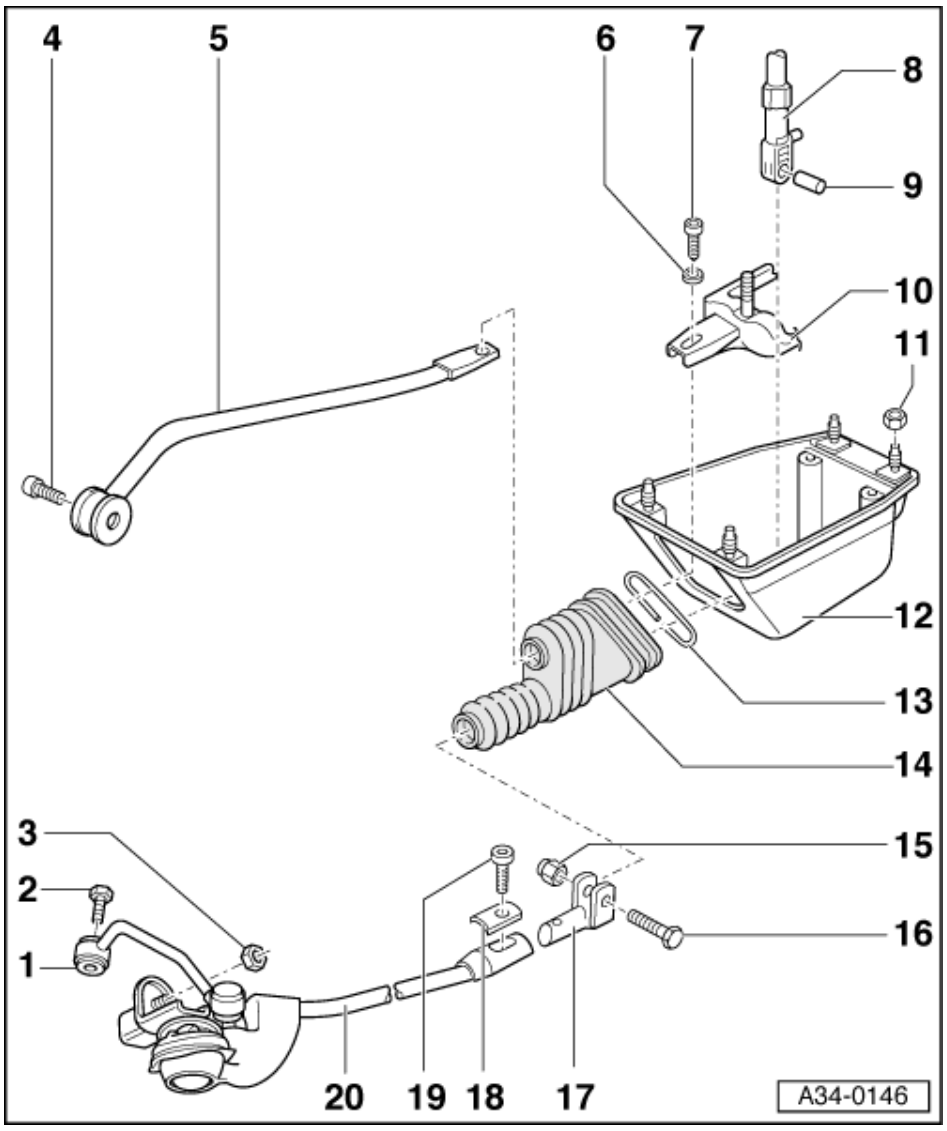
11 Nut, 10 Nm

12 Gear stick housing

13 Tensioning ring

14 Bellows
- To remove, pull carefully over selector rod
- On installation, place on marks of selector rod and push rod

15 Nut, 10 Nm
- Self-locking
- Replace

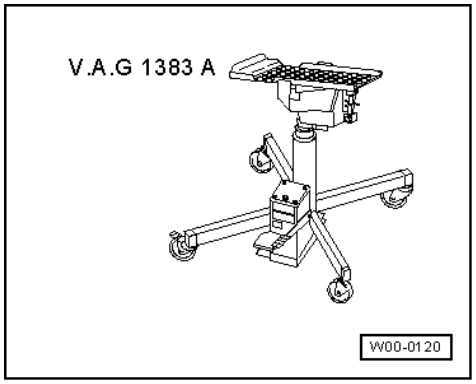


16 Bolt
17 Selector fork
18 Clamp
19 Hexagon socket-head bolt - 23Nm
20 Selector rod

- Do not separate connecting rod from selector rod; heed note=>Page 70

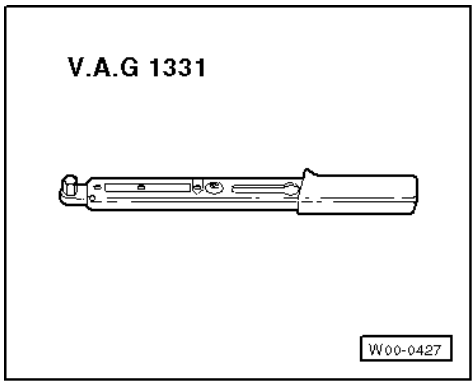
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1.4 - Removing and installing shift mechanism



Special tools and workshop equipment required

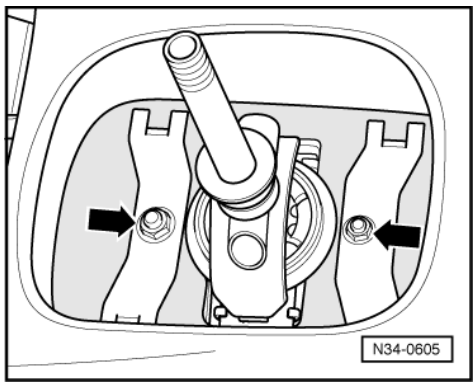
- Engine/gearbox lifter V.A.G 1383 A



- V.A.G 1331 Torque wrench

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

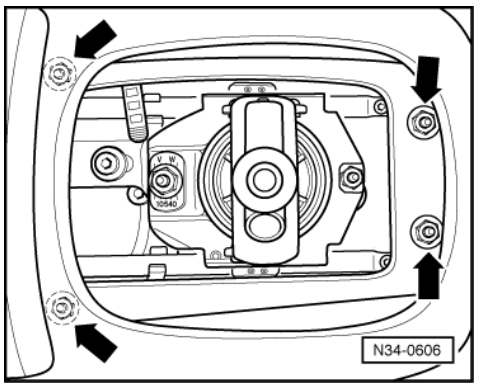
Removing



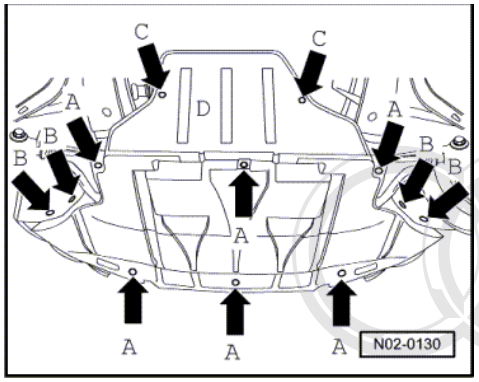
- Remove gear stick knob and cover for gear stick.
- Remove centre console.

=> General Body Repairs, Interior; Repair Group 68; Shelves/Trim; Removing and installing front centre console Shelves/Trim Removing and installing front centre console

- Detach noise insulation.
- -> Unscrew noise insulation for shift mechanism housing -arrows-.

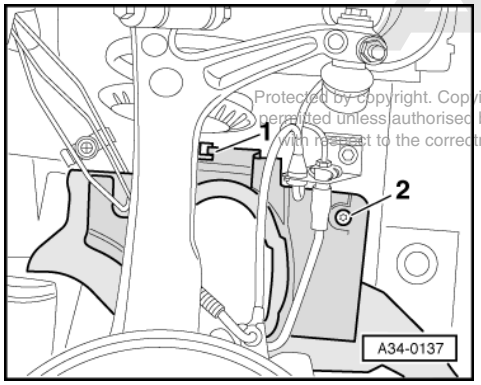


- -> Unscrew nuts for shift mechanism housing -arrows-.

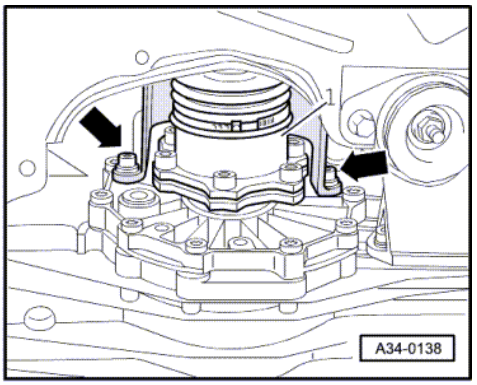


- -> If fitted, remove rear section -D- of noise insulation -arrows A and C-.

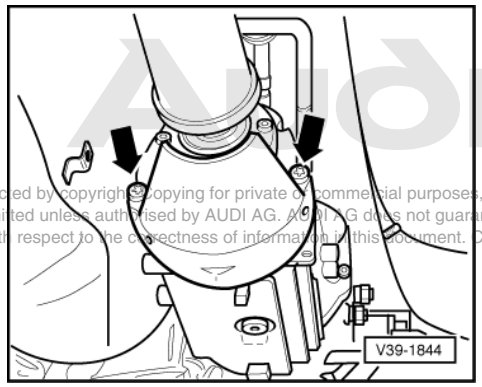
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Slacken off bolt -2- of noise insulation over left drive shaft.
- Disengage hook -1- and detach noise insulation.

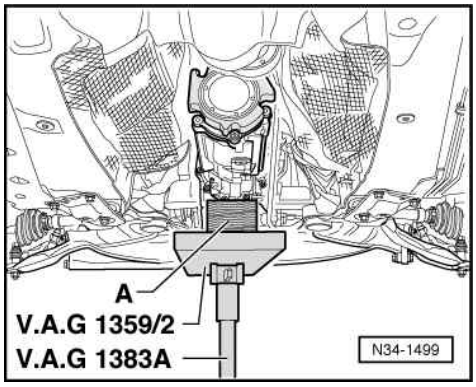


- -> Remove heat shield for inner left joint from gearbox -arrows-.
- Detach left drive shaft -1- and tie up to front.
- Remove rear section of exhaust system as of clamp(s).



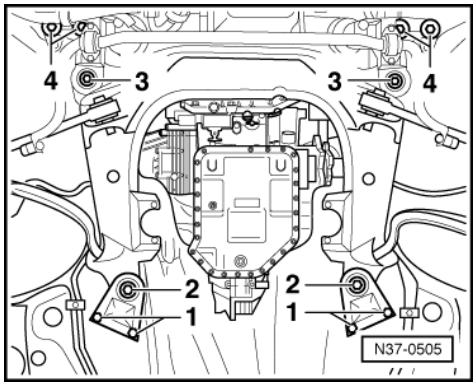
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Remove heat shield over propshaft.
- -> Unscrew heat shield for propshaft from cover for Torsen differential -arrows-.
- Remove propshaft => Page 348 .



- -> Use engine/gearbox lifter V.A.G 1383 A to provide some support for gearbox.

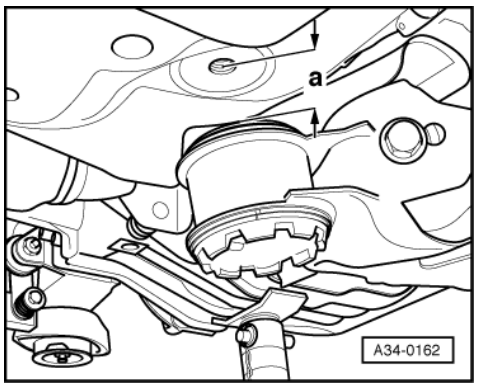
A - Wooden block



- -> Screw out bolts -1- and -2- on right and left side.

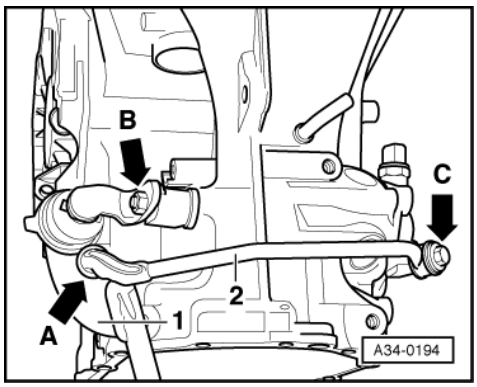
Note:

Bolts -3- and -4- are not to be screwed out, as otherwise wheel alignment would have to be performed.



- -> Lower gearbox lifter V.A.G 1383 A until subframe is released at rear.

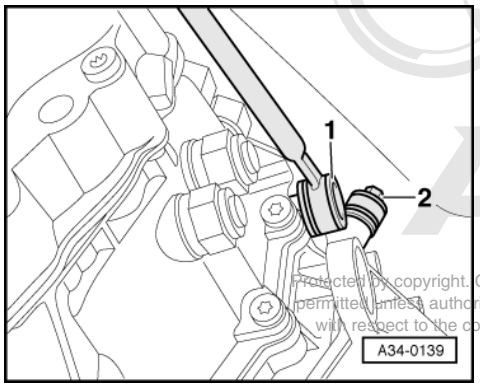
◆ Dimension -a- max. 50 mm



Important note on subsequent operations:

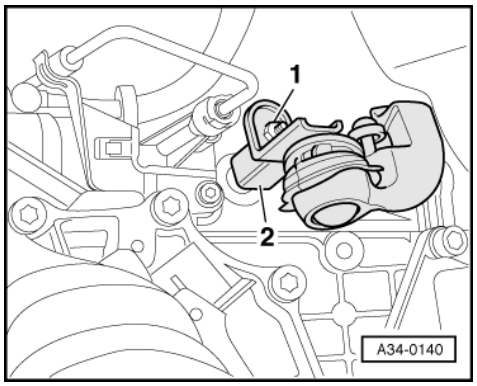
-> When removing shift mechanism, never detach ball end -arrow A- of connecting rod -2- from selector rod -1-.

Detaching would destroy ball end.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 connecting rod -2- on right side of gearbox.
- Screw out hexagon socket-head bolt of push rod -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.

- -> Unscrew nut -1- and pull lever -2- of selector rod off gearbox selector shaft.
- Swivel down and take out gear stick housing with selector rod and push rod.

Installing

Install in reverse order, paying attention to the following:

- Install subframe.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- Bolt drive shafts to flange shafts.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- Bolt on propshaft => Page 349 .
- Adjust propshaft => Page 351 .
- Perform stress-free alignment of exhaust system.

=> Engine, Mechanics; Repair Group 26

- Adjust shift mechanism => Page 71 .

Tightening torques

Component	Nm
Gear stick housing to body	10
Selector rod to gearbox	23
Connecting rod to gearbox	23
Push rod to gearbox	40
Heat shield for drive shaft	25

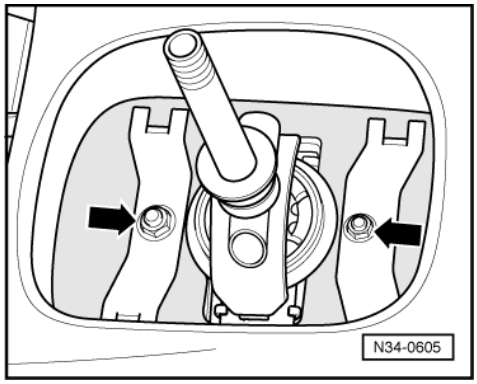
1.5 - Adjusting shift mechanism

Requirements:

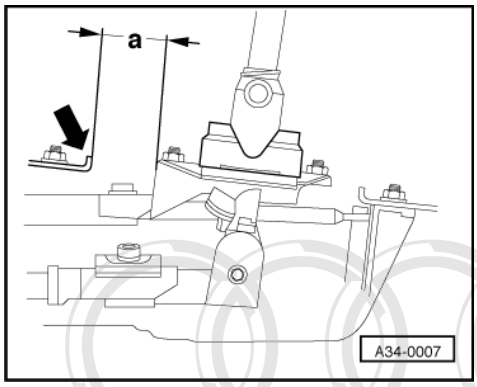
- Moving parts of shift mechanism and transmission elements must be in perfect condition
- Shift mechanism must move freely
- Gearbox, clutch and clutch mechanism in perfect working order
- Gearbox in neutral

- Twist knob off gear stick.

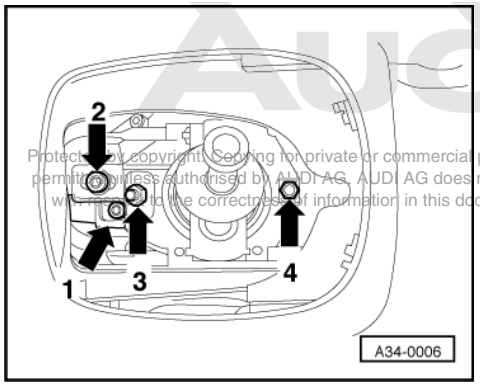
- Remove cover for gear stick.



- -> Unscrew noise insulation for shift mechanism housing -arrows-.

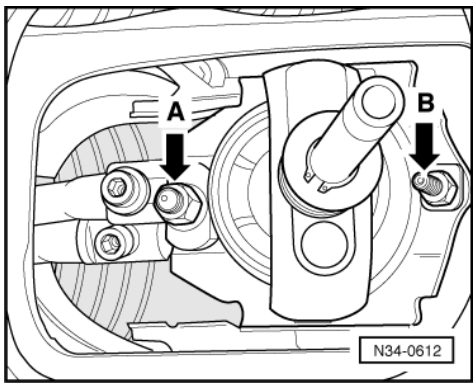


- Measure distance between body and rear push rod (in shift mechanism).
  - -> Specification: Dimension a = 37 mm

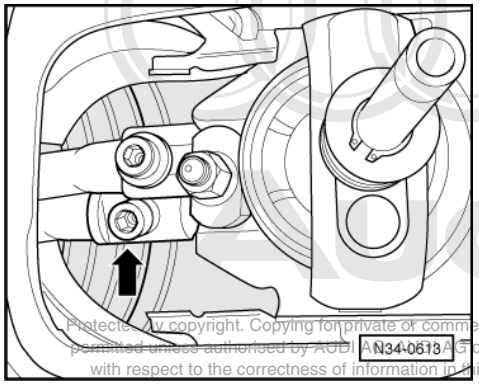


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- If this is not the case, distance -a- should be set as follows:
- -> Slacken off bolt -arrow 2- for push rod.
  - Rear push rod (in shift mechanism) must move freely back and forth on slider
- Set dimension -a- by adjusting rear push rod (in shift mechanism).
- Tighten bolt for push rod -2- to 23 Nm.

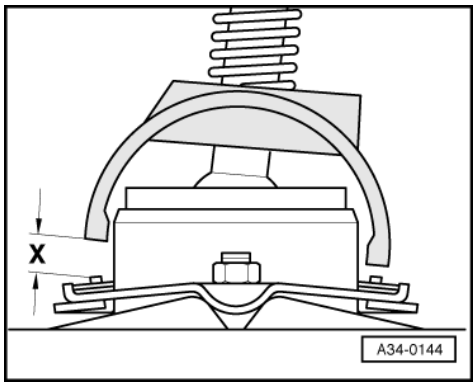


- -> Unfasten nuts for ball housing -arrow A- and -arrow B-.
- Horizontally align ball housing.
- Tighten nuts for ball housing -arrow A- and -arrow B- to 23 Nm.



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.

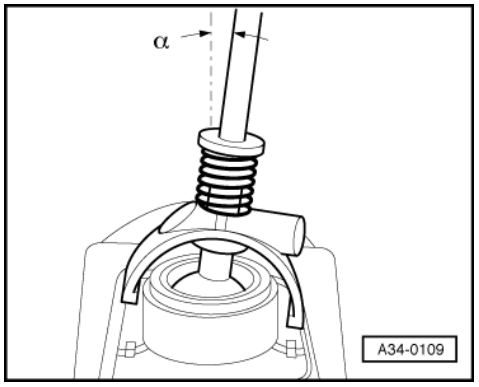
- -> Slacken off bolt -arrow- for selector rod.
  - Selector rod/shift mechanism connection must move freely



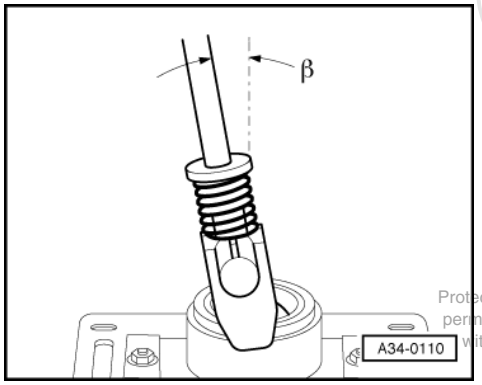
- Adjust gear stick as follows:
- -> Swivel gear stick to right or left until dimension x = 8.5 mm.

Note:

Fig. shows gear stick from rear in direction of travel.



- -> Gear stick is thus tilted 3°to right - angle α.



- -> Gear stick tilted slightly (approx. 7°) to rear - angleβ

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

Fig. shows gear stick from right.

- Hold gear stick in this position.
- Tighten bolt for selector rod to 23 Nm.

Note:

Position of gear stick must not be altered by tightening bolt.

- Check gear stick setting => Page 74 .

Tightening torque

Component	Nm
Selector rod to selector fork (in shift mechanism)	23
Front push rod to rear push rod (in shift mechanism)	23
Noise insulation on gear stick housing	10

1.6 - Checking gear stick setting

- Gear stick must be in 3rd/4th gear gate in neutral.

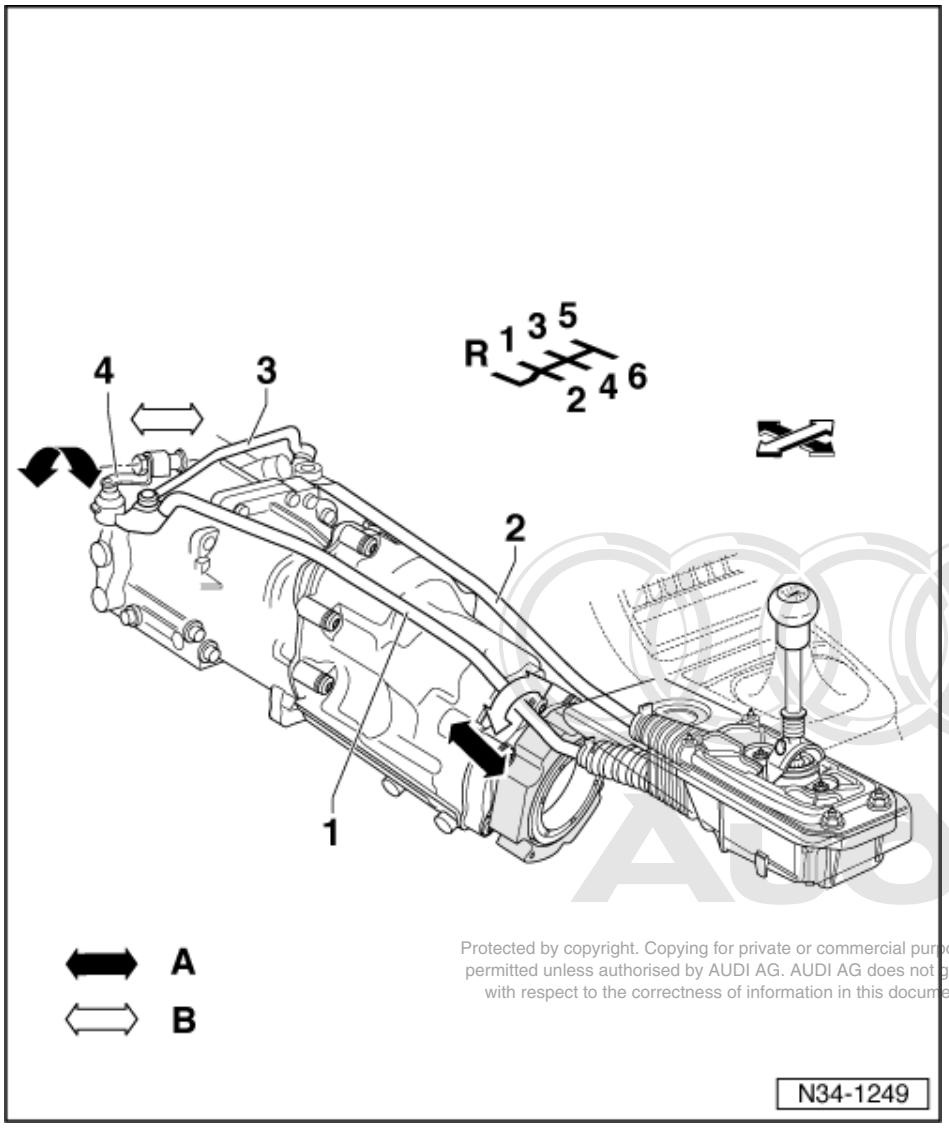
- Check operation of 1st/2nd gear stop.
- Engage 2nd gear and press gear stick to left as far as it will go.
- Reduce pressure at gear stick to enable it to return to presssure point.
  - Rebound measured at gear stick knob: 3 ... 5 mm

- Check gearshift operation in all gears.
- Check operation of reverse gear lock.
  - It should only be possible to engage reverse gear after actuating lock mechanism.
  - Without applying pressure or force, it must be possible to move gear stick forwards out of reverse gear lock to 3/4 gear plane

If catching occurs on repeatedly engaging a gear, perform adjustment procedure => Page 71 again.
- Fit covers and gear stick knob.

2 - Servicing shift mechanism for vehicles as of 05.99 to 11.00, ident. no. 8D-X-260 001 to 8D-1-100 000

2.1 - Servicing shift mechanism for vehicles as of 05.99 to 11.00, ident. no. 8D-X-260 001 to 8D-1-100 000



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.

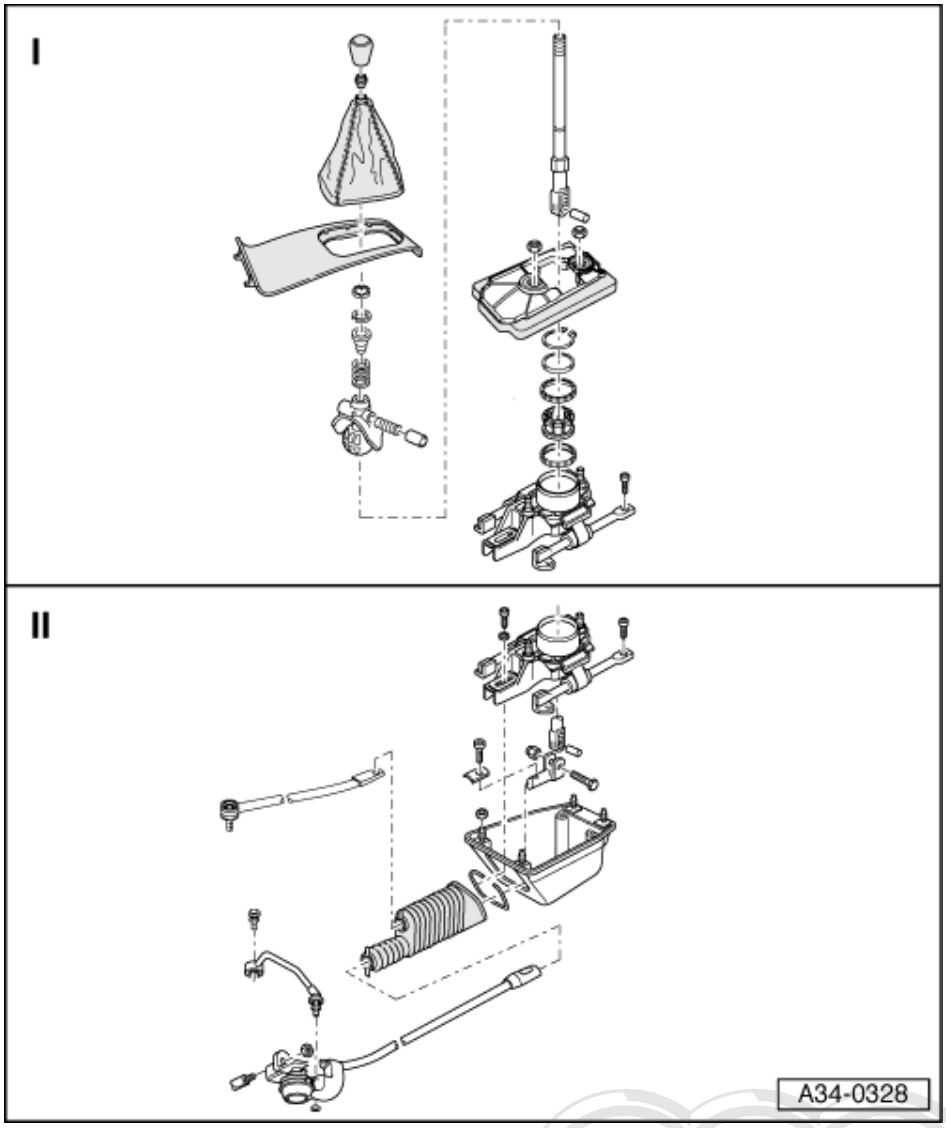
2.2 - Installation position of shift mechanism

1 Selector rod

2 Push rod - front
3 Connecting rod
4 Selector lever on gearbox

Arrow -A- gear selection movement

Arrow -B- gate selection movement



I - Servicing gear stick and push rod - rear=>Page 77
II - Servicing selector rod, connecting rod and push rod - front => Page 83

Removing and installing shift mechanism

=> Page 89

Adjusting shift mechanism => Page 94

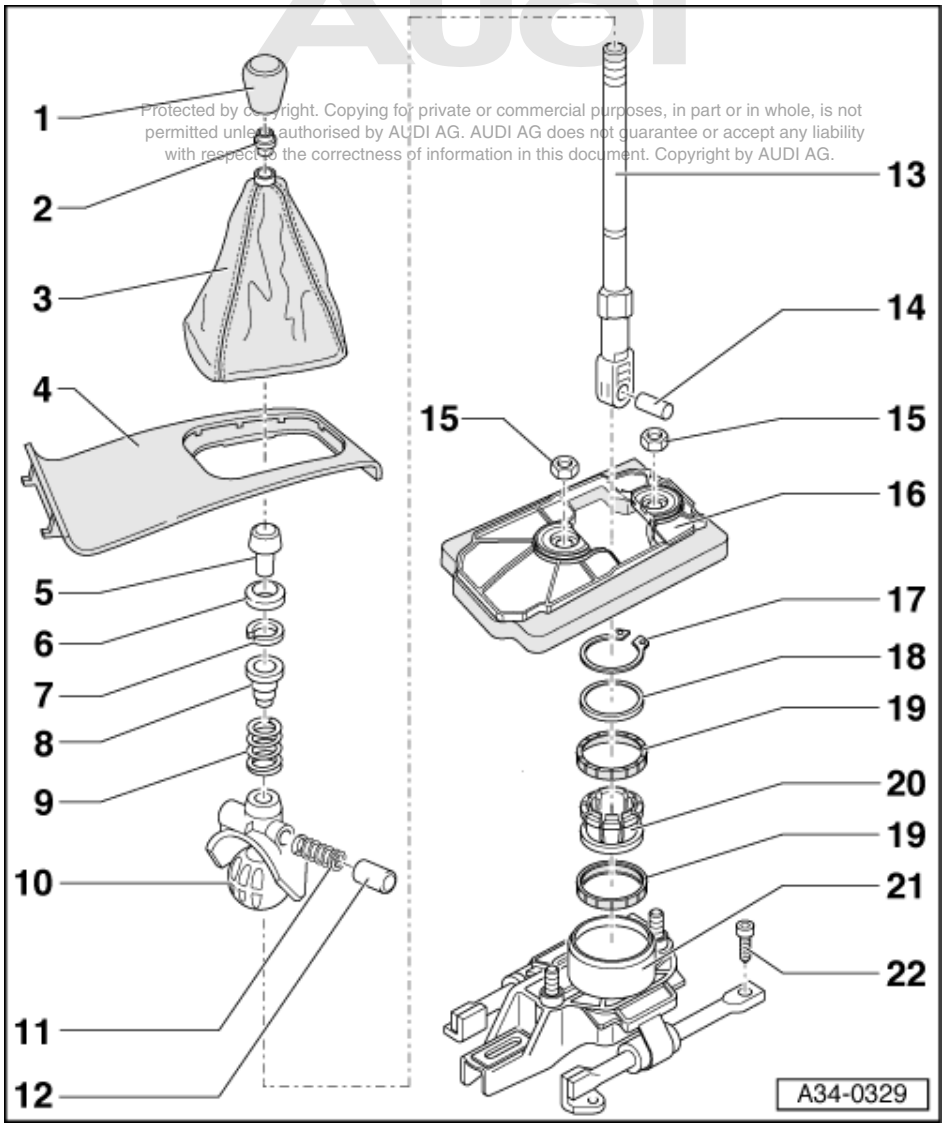
Note:

Disconnect earth strap from battery in engine compartment before working on 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.

Attention:
Heed appropriate instructions for battery disconnection.=>Electrical System; Repair Group 27

2.3 - Servicing gear stick and push rod - 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.

Note:

Apply polycarbamide grease, part no.

G 052 142 A2 to bearings and contact surfaces.

1 Gear stick knob
- Screw off to remove

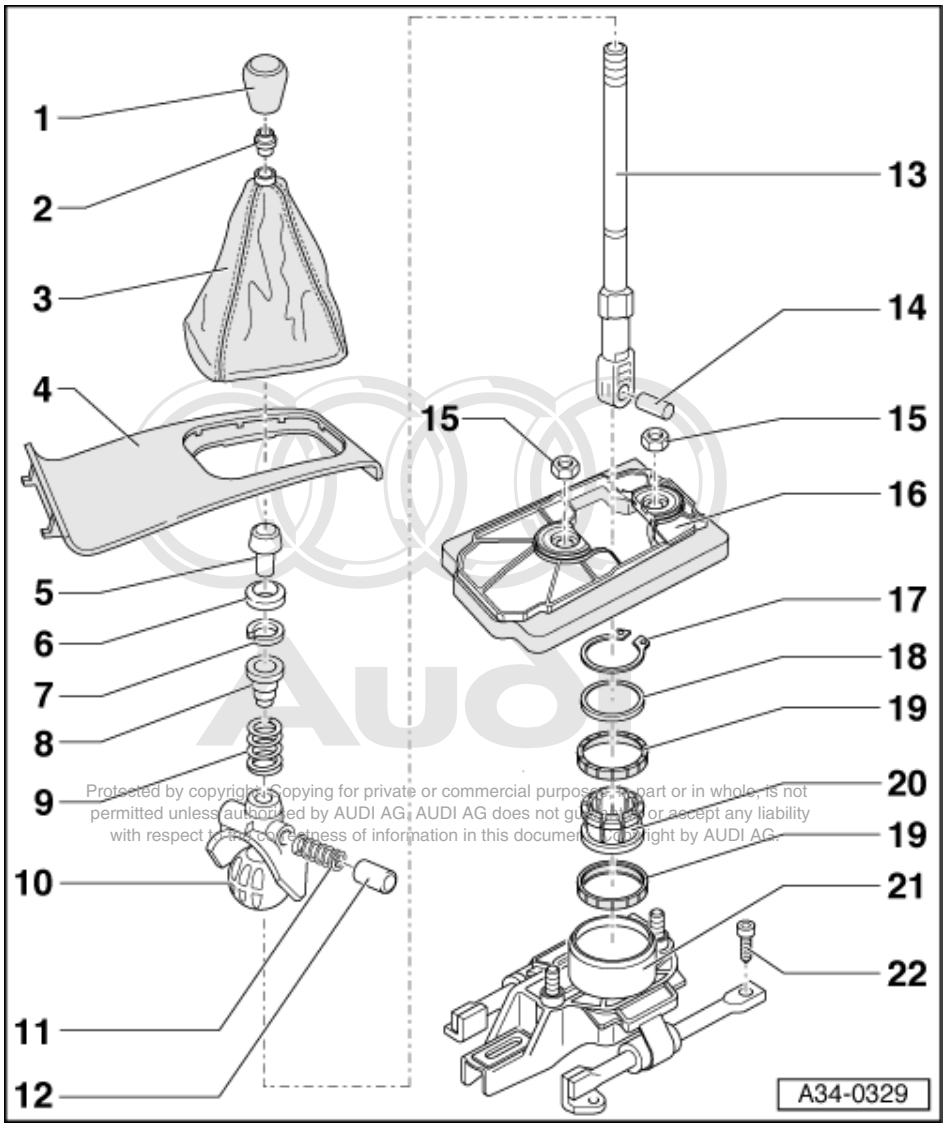
2 Upper bush

3 Gear stick cover

4 Cover for centre console
- Working from centre console, carefully prise out fastener at rear
- Removing and installing=>Page 81

5 Lower bush

6 Collar



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.

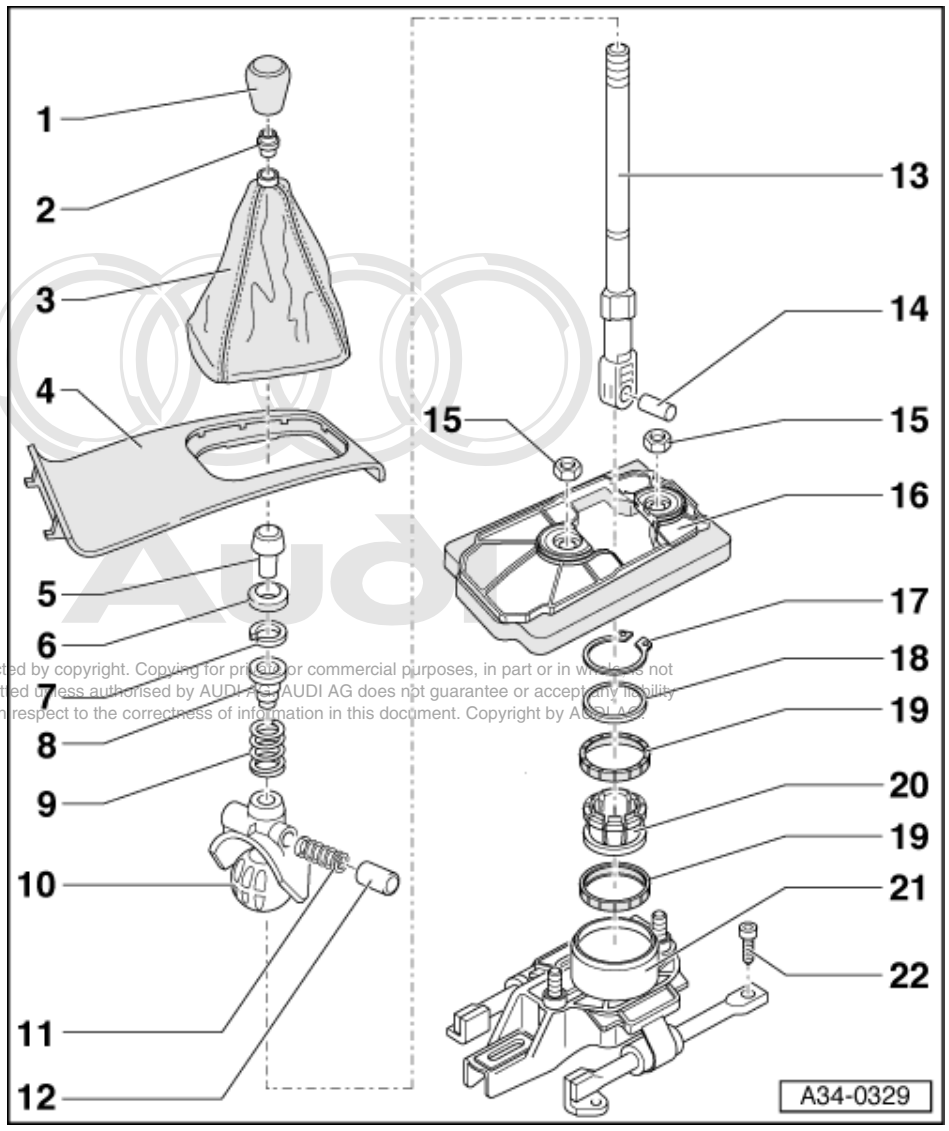
7 Circlip
- Replace

8 Spacer bush

9 Spring

10 Ball stop
- Removing and installing=>Page 81
- Apply polycarbamide grease G 052 142 A2 to ball
- Insert spring and bushing in ball stop and attach to gear stick such that spring and bushing are located on right in direction of travel
- Install before inserting circlip (Item 19)

11 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.

12 Bushing

- Installation position: Rounded side facing gear stick when installed
- Apply polycarbamide grease G 052 142 A2

13 Gear stick

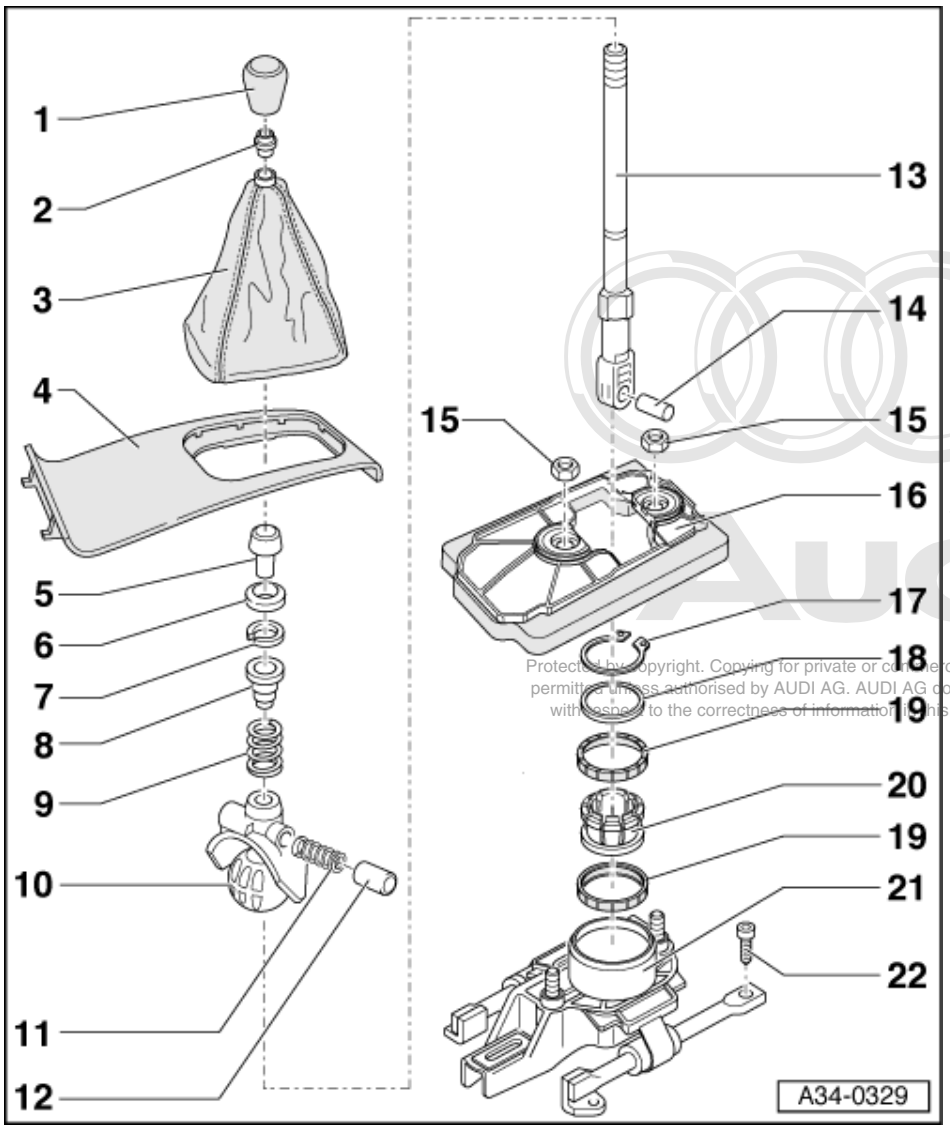
- Only fits in one position in ball stop (item 10)
- Removing and installing=>Page 81

14 Spacer

- Apply polycarbamide grease G 052 142 A2

15 Hexagon nut, 10 Nm

16 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.

17 Circlip

- Take out before removing ball stop

18 Washer

- Collar facing ball guide (Item 20)

19 Rubber ring

20 Ball guide

- Removing and installing=>Page 81

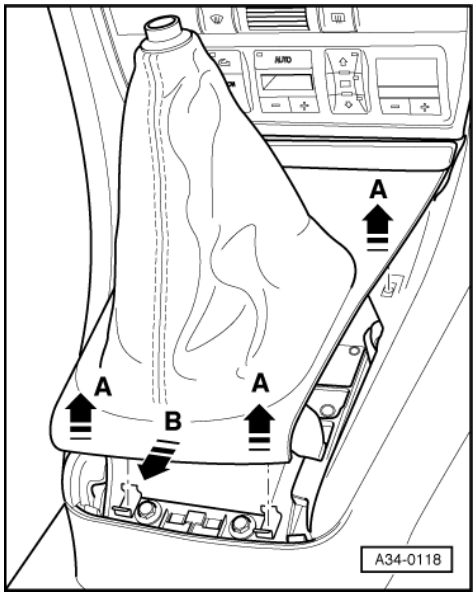
21 Push rod - rear

- With ball housing
- Removing and installing=>Page 81

22 Bolt, 6 Nm

- 4x
- For attaching push rod - rear to gear stick housing => Page 83

2.4 - Removing and installing gear stick with push rod - rear



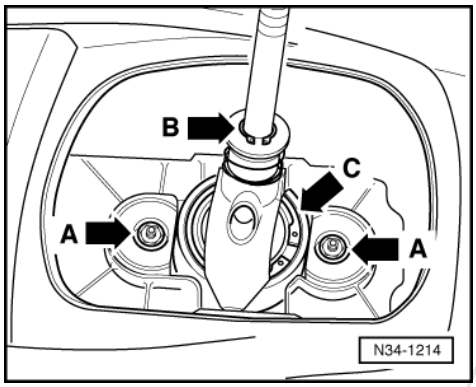
Removing

- Twist knob off gear stick.

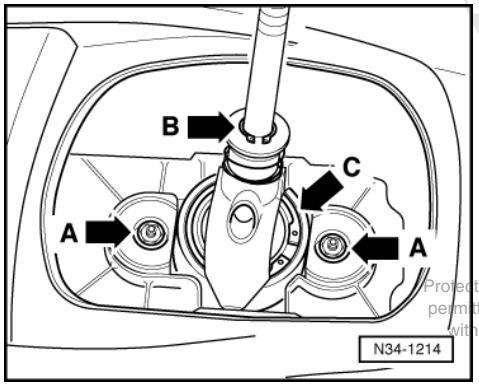
Note:

Gear stick cover is removed together with centre console cover.

- -> Lift off centre console cover slightly -arrows A-.
- Pull cover slightly to rear -arrow B- and then lift off entire cover assembly.

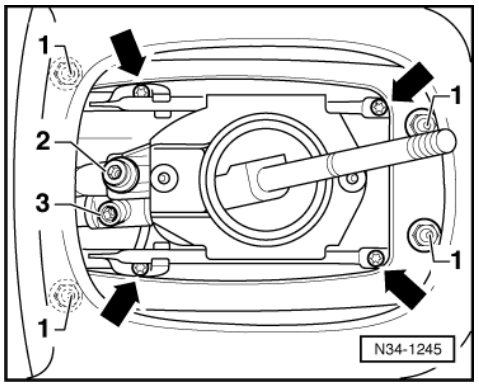


- -> Unscrew noise insulation for gear stick housing -arrow A-.



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.

- -> First remove circlip (arrow B). In doing so, carefully slacken off spring.
- Detach spacer bush and spring.
- Then remove circlip -arrow C-.
- Lift ball stop with ball guide and rubber rings out of ball housing of push rod - rear.
- Detach ball stop from gear stick. In doing so, carefully slacken off spring and bush.



- -> Then unscrew nuts -1- for gear stick housing.
  - This lowers gear stick housing
- Detach push rod - front; to do so, screw out hexagon socket-head bolt -2-.
- Detach selector rod; to do so, screw out hexagon socket-head bolt -3-.
- Then detach entire push rod - rear from gear stick housing (arrows).
- Take gear stick with push rod - rear out of housing.

Installing

Install in reverse order, paying attention to the following:

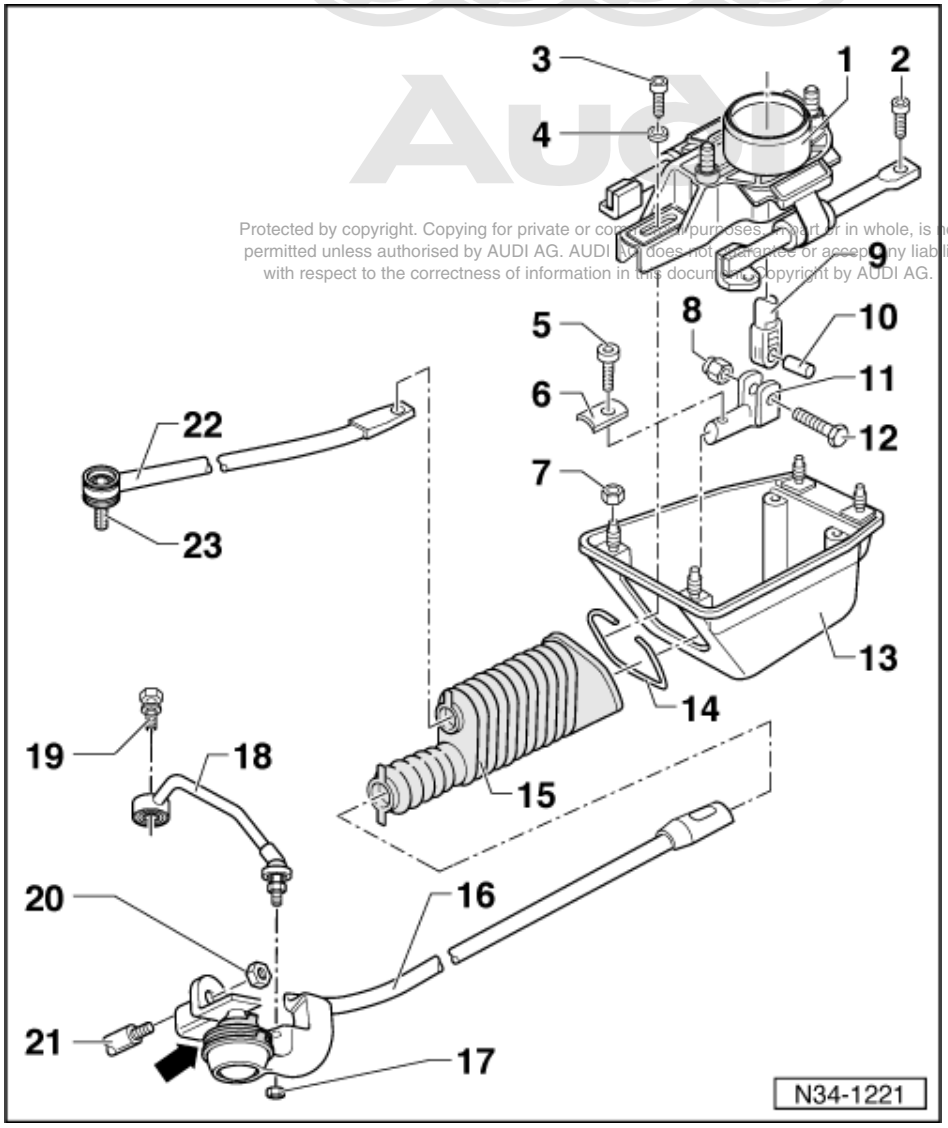
- Adjust shift mechanism => Page 94 .

Tightening torques

Component	Nm
Push rod - rear to gear stick housing	6
Selector rod to selector fork/gear stick	25
Push rod - front to push rod - rear	25
Gear stick housing to body	10
Cover to push rod - rear	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.

2.5 - Servicing selector rod, connecting rod and push rod - front



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

Apply polycarbamide grease, part no.

G 052 142 A2 to bearings and contact surfaces.

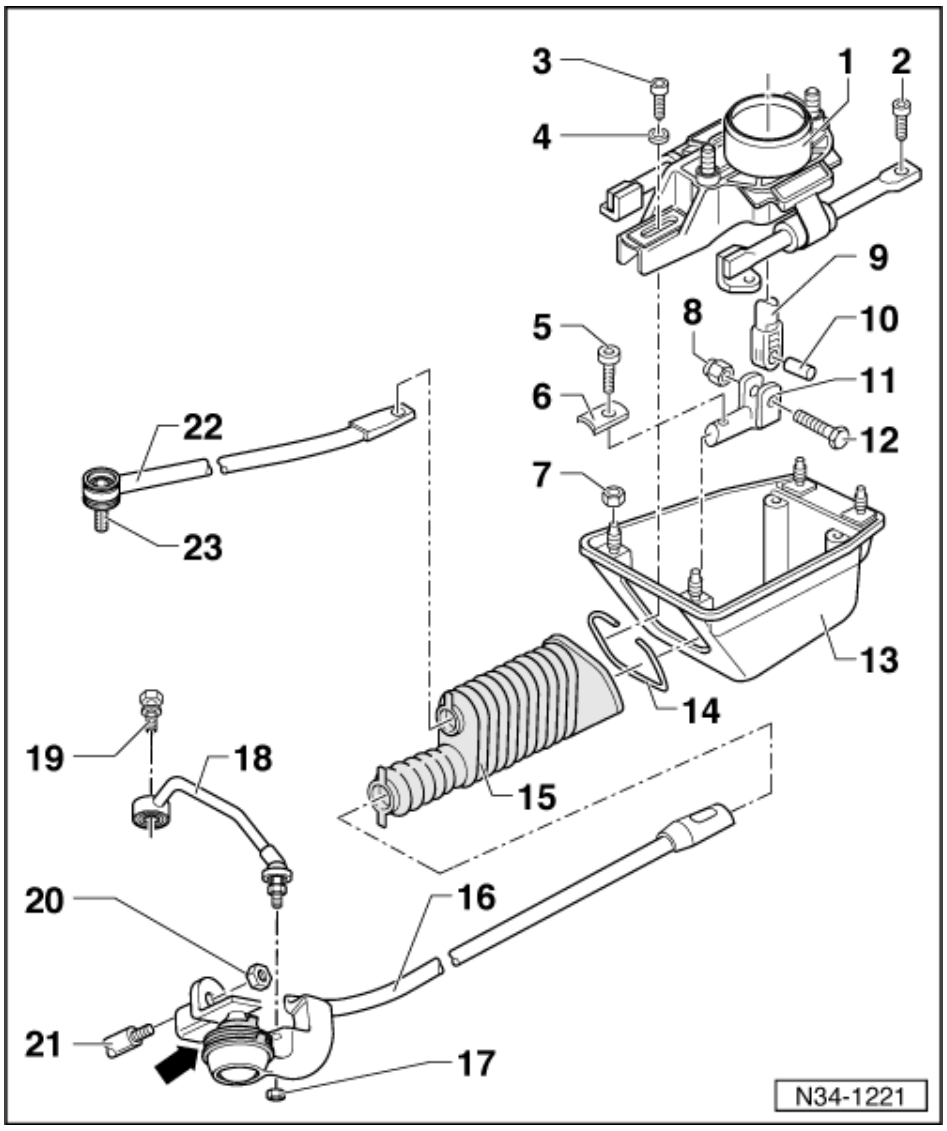
1 Push rod - rear
- With ball housing
- Removing and installing=>Page 81

2 Bolt, 6 Nm
- 4x
- For attaching push rod - rear to gear stick housing

3 Hexagon socket-head bolt - 25 Nm

4 Washer

5 Hexagon socket-head bolt - 25 Nm



6 Clamp

7 Hexagon nut, 10 Nm
- 4x
- For attaching gear stick housing to body

8 Hexagon nut, 10 Nm
- For attaching selector fork
- Self-locking
- Replace

9 Gear stick
- Only fits in ball housing in one position

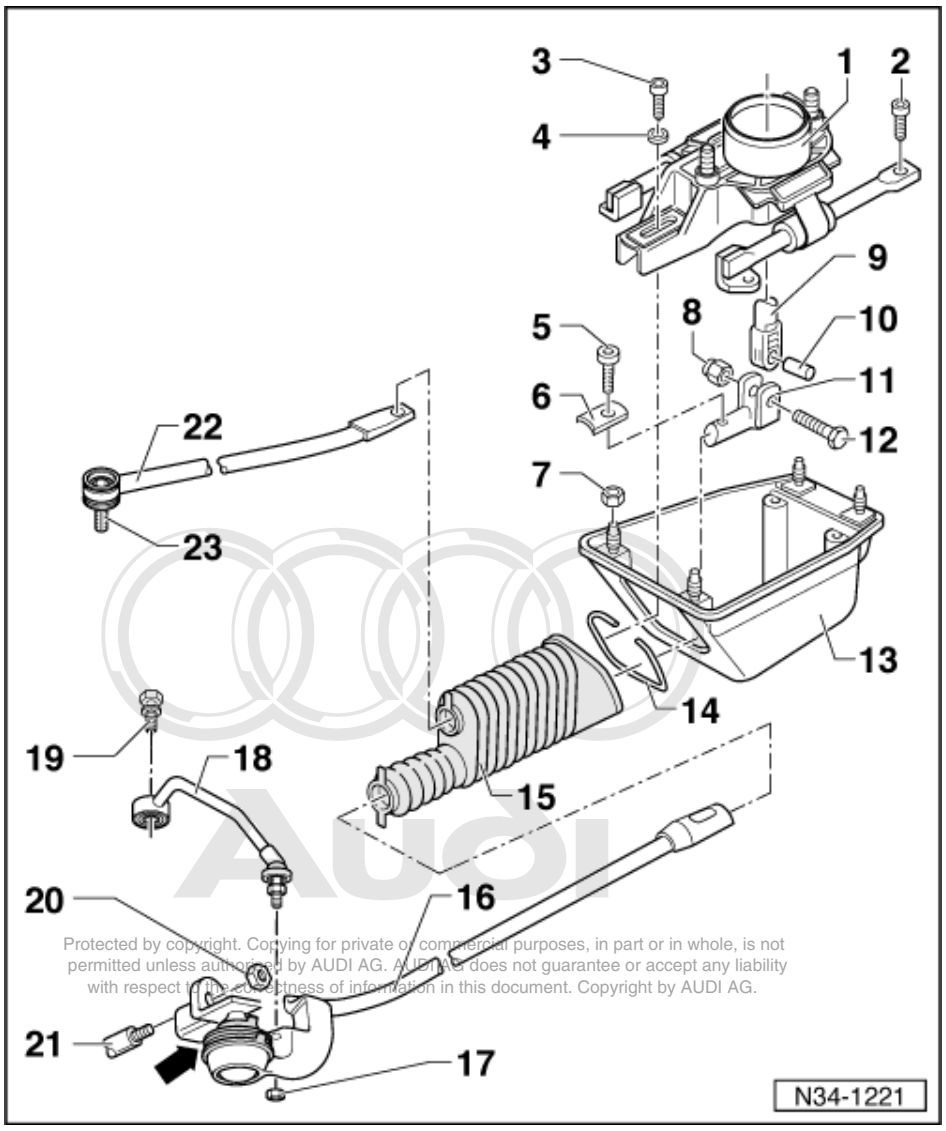
10 Spacer
- Apply polycarbamide grease G 052 142 A2

11 Selector fork

12 Bolt
- For attaching selector fork

13 Gear stick 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.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Tensioning ring

15 Bellows

Notes:

- Carefully pull bellows over selector rod
- Place bellows on marks of selector rod and push rod

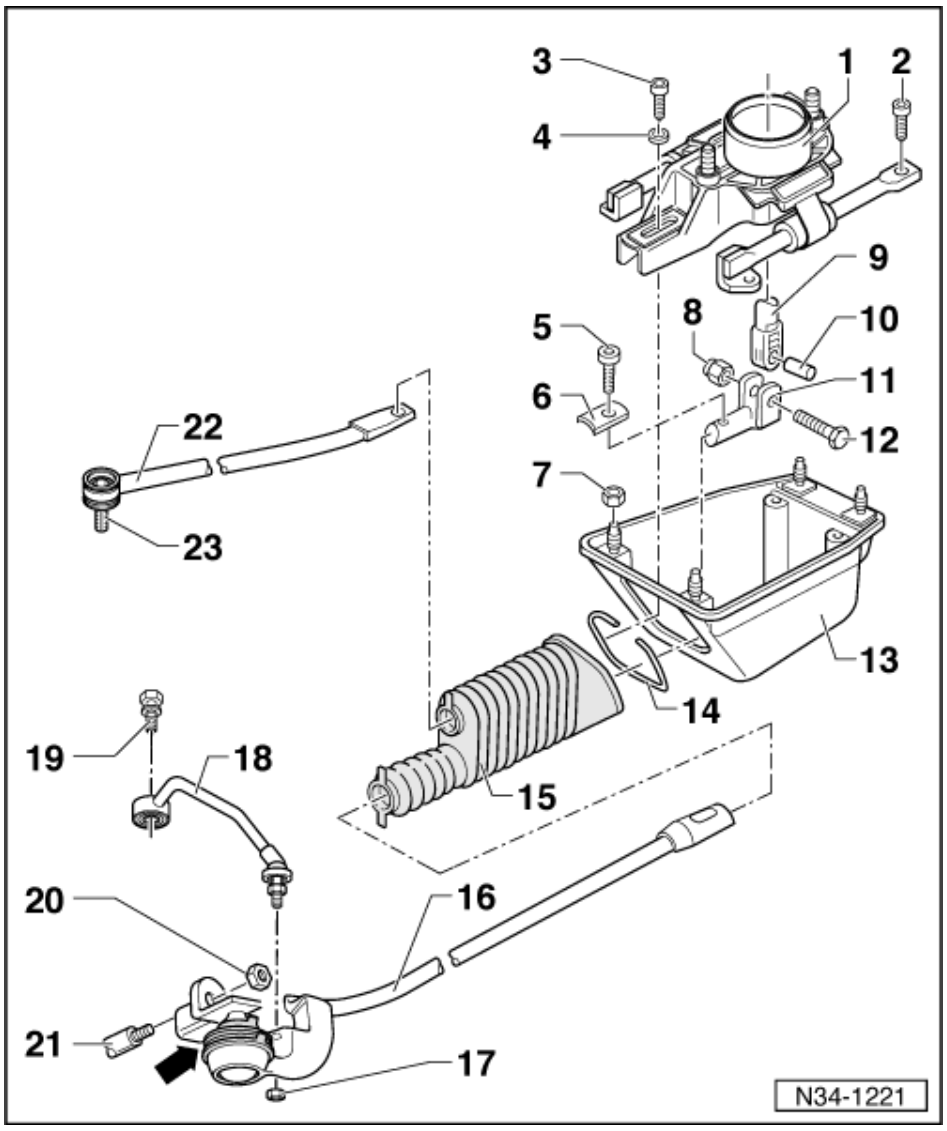
16 Selector rod

- Different versions =>Page 87
- Heed note=>Page 92

17 Nut, 10 Nm

18 Connecting rod

- Different versions =>Page 87
- Heed note=>Page 92



19 Bolt, 23 Nm
20 Nut, 23 Nm
21 Selector shaft/gearbox
22 Push rod - front

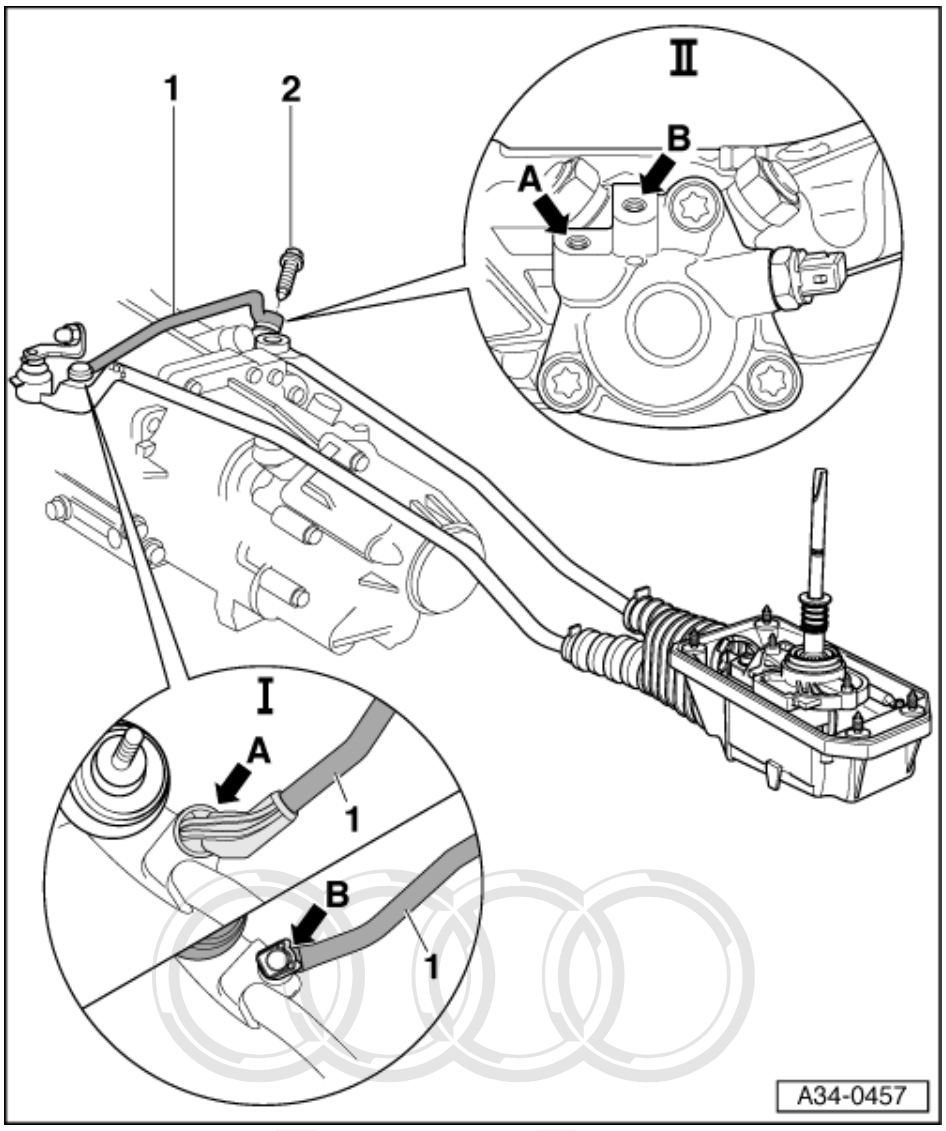
- Tighten hexagon socket-head bolt to 40 Nm when attaching to gearbox
- Assignment

=> Parts List

23 Washer

- Peened to push rod - front
- Re-install push rod - front with same number of 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.



Different connecting rod attachment methods

Method of attaching connecting rod was altered on vehicles as of approx. 11.00.

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.

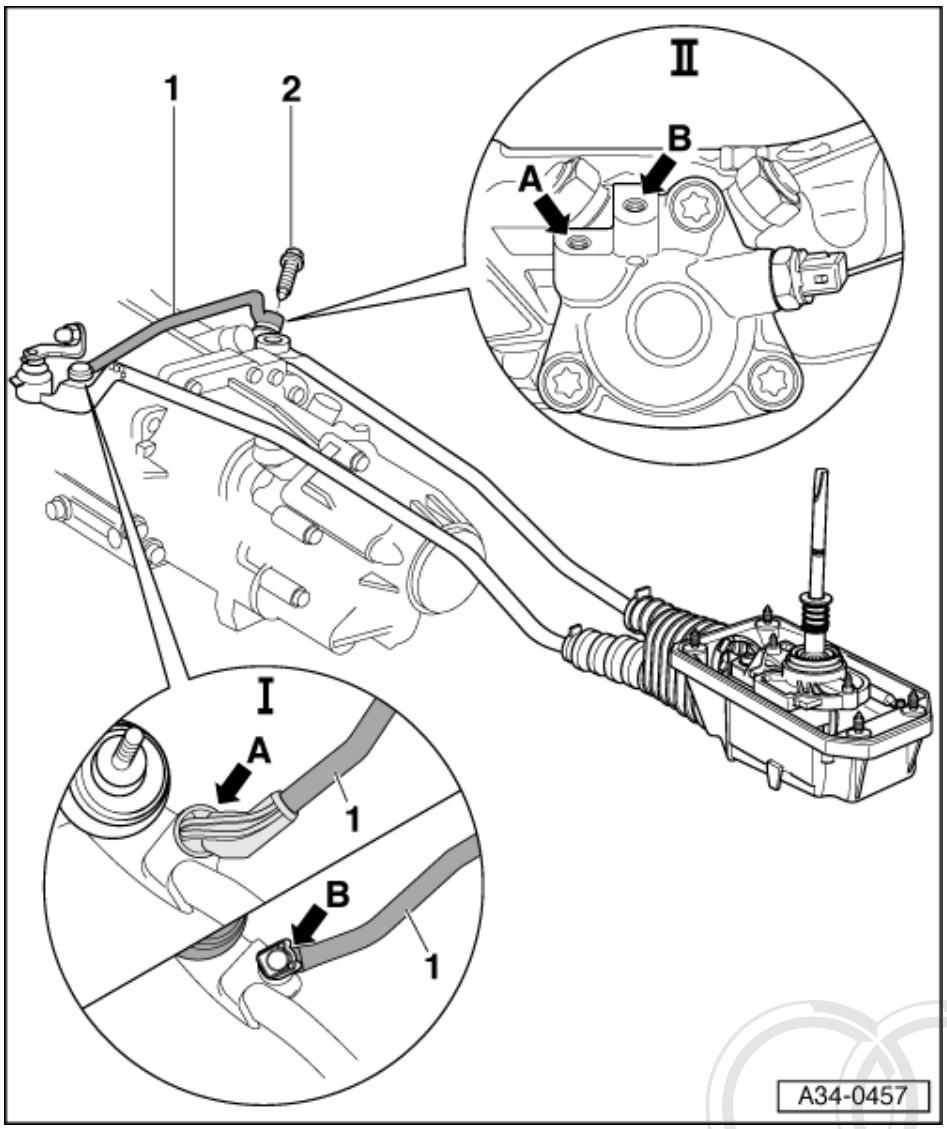
Magnified view I - Distinguishing feature

Arrow A - Old version (with ball end)

Arrow B - New version (with lock washer)

Note:

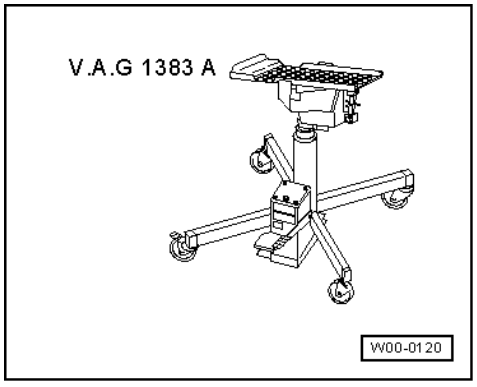
Old type of connecting rod is never to be detached from selector rod, as this would destroy ball end.



Magnified view II - Tapped holes

- Screw old version of connecting rod -1- with bolt -2- to rear hole -arrow A- of cover for selector shaft (25 Nm).
- Screw new version of connecting rod -1- with bolt -2- to front hole -arrow B- of cover for selector shaft (25 Nm).

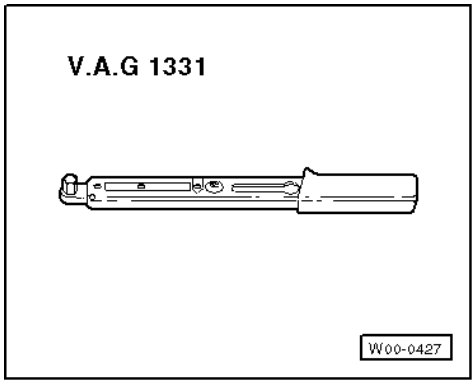
2.6 - Removing and installing shift mechanism



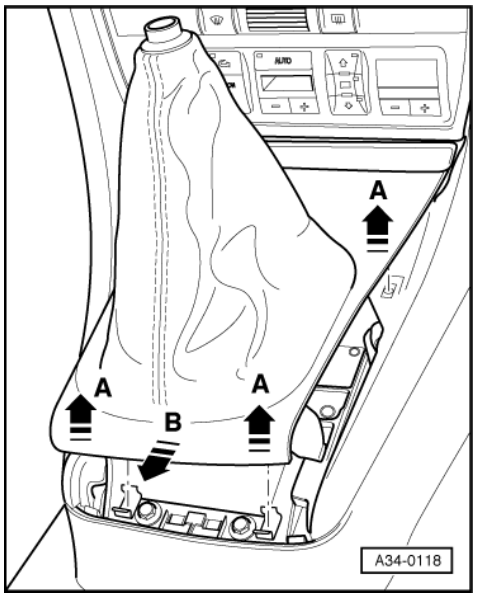
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Special tools and workshop equipment required

- Engine/gearbox lifter V.A.G 1383 A



- V.A.G 1331 Torque wrench



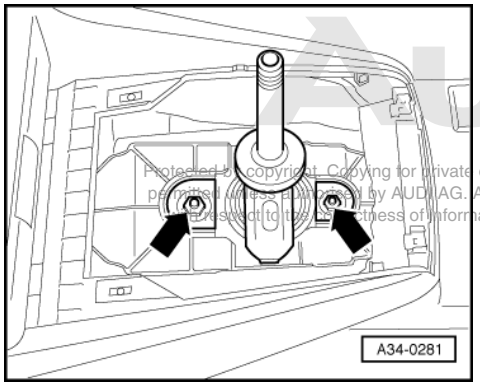
Removing

- Twist knob off gear stick.

Note:

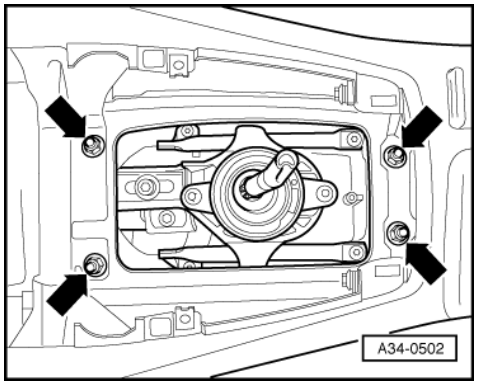
Gear stick cover is removed together with centre console cover.

- -> Lift off centre console cover slightly -arrows A-.
- Pull cover slightly to rear -arrow B- and then lift off entire cover assembly.

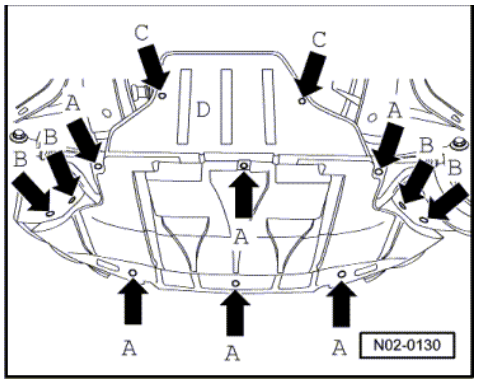


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

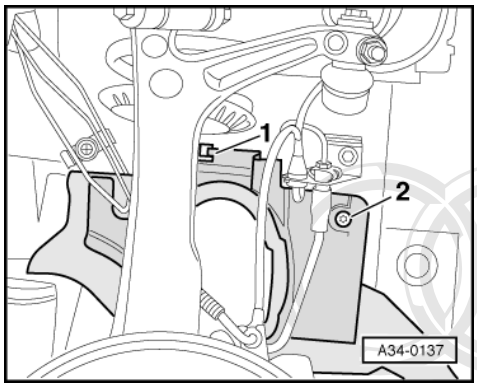
- If fitted, lift out additional noise insulation over shift mechanism.
- -> Unscrew noise insulation for shift mechanism housing -arrows-.



- -> Unscrew nuts for shift mechanism housing -arrows-.

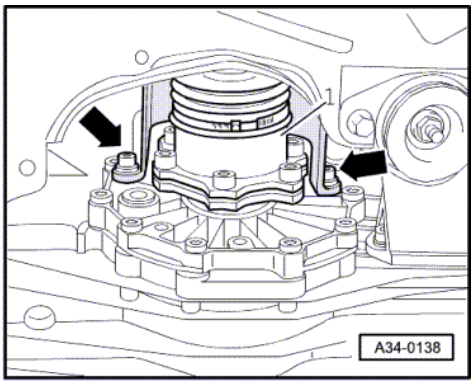


- -> If fitted, remove rear section -D- of noise insulation -arrows A and C-.



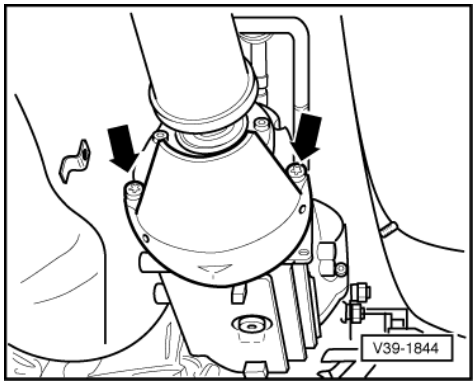
- -> If fitted, slacken off bolt -2- of noise insulation over left drive shaft.
- Disengage hook -1- and detach noise insulation.

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

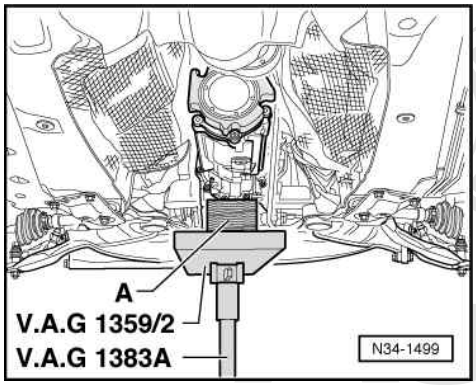


- -> Remove heat shield for inner left joint from gearbox -arrows-.
- Detach left drive shaft -1- and tie up to front.
- Remove rear section of exhaust system as of clamp(s).

=> Engine, Mechanics; Repair Group 26



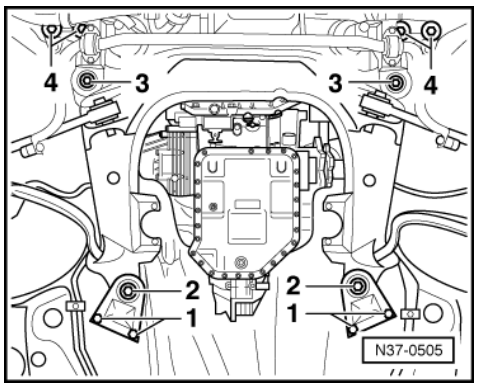
- Remove heat shield over propshaft.
- -> Unscrew heat shield for propshaft -arrows-.
- Remove propshaft => Page 348 .



- -> Use gearbox lifter V.A.G 1383 A to provide some support for gearbox.

A - Wooden block

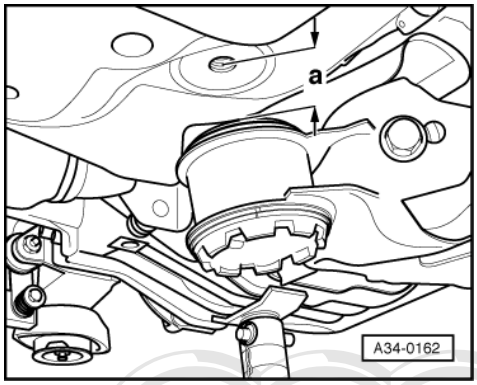
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Screw out bolts -1- and -2- on right and left side.

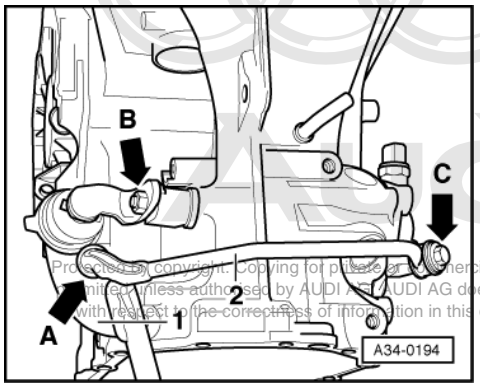
Note:

Bolts -3- and -4- are not to be screwed out, as otherwise wheel alignment would have to be performed.



- -> Lower gearbox lifter V.A.G 1383 A until subframe is released at rear.

- Dimension -a- max. 50 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.

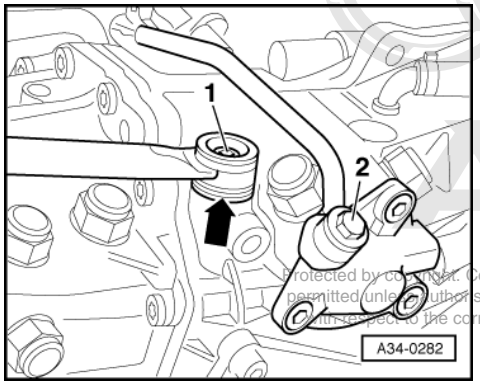
Important note on subsequent operations:

-> When removing shift mechanism (up to approx. 11.00), never detach ball end -arrow A- of connecting rod -2- from selector rod -1-.

Detaching would destroy ball end.

Removal of selector rod involves unscrewing nut -arrow B- and bolt

-arrow C-.

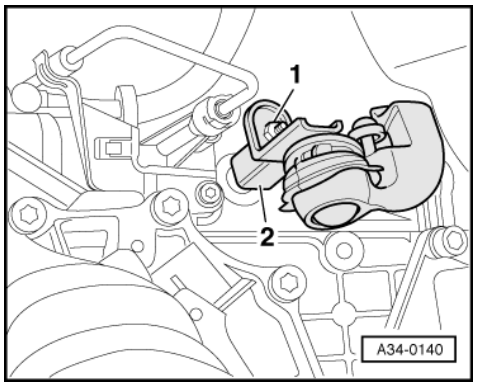


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Unscrew connecting rod -2- on right side of gearbox.
- Screw out hexagon socket-head bolt of push rod -1-.

Note:

Packing plates may have been fitted between gearbox and push rod -arrow-. If this is the case, they must be inserted again on assembly.



- -> Unscrew nut -1- and pull lever -2- of selector rod off gearbox selector shaft.
- Swivel down and take out gear stick housing with selector rod and push rod.

Installing

Install in reverse order, paying attention to the following:

- Install subframe.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- Bolt drive shaft to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40

- Bolt on propshaft => Page 349 .
- Adjust propshaft => Page 351 .
- Adjust shift mechanism => Page 94 .
- Install exhaust system and perform stress-free alignment.

=> Engine, Mechanics; Repair Group 26

Tightening torques

Component	Nm
Gear stick housing to body	10
Selector rod to gearbox	25
Connecting rod to gearbox	25
Push rod to gearbox	40
Heat shield for drive shaft	25

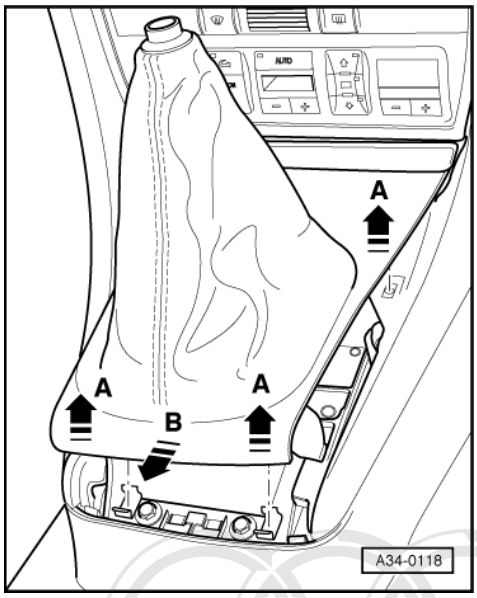
2.7 - Adjusting shift mechanism

Notes:

The following points are essential to ensure proper adjustment:

- Moving parts of shift mechanism and transmission elements must be in perfect condition
- Shift mechanism must move freely
- Gearbox, clutch and clutch mechanism in perfect working order

- Gearbox in neutral



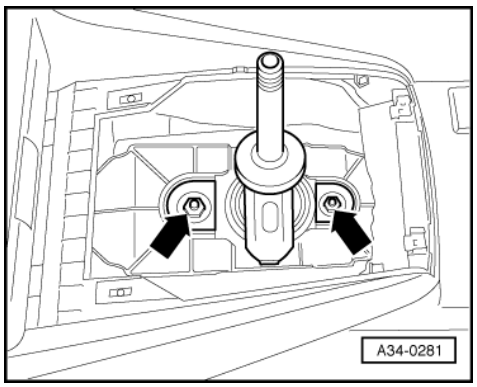
- Twist knob off gear stick.

Note:

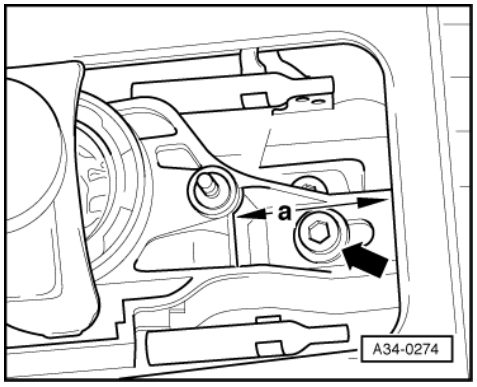
Gear stick cover is removed together with centre console cover.

- -> Lift off centre console cover slightly -arrows A-.
- Pull cover slightly to rear -arrow B- and then lift off entire cover assembly.
- If fitted, lift out noise insulation over 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.



- -> Unscrew noise insulation for shift mechanism housing -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.

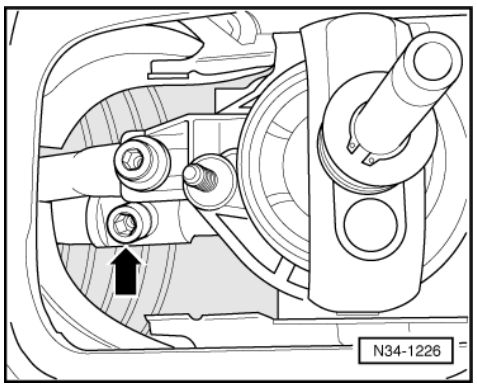
- Measure gap between body and shift mechanism.

• -> Gap -a- must be 43 mm

- If this is not the case, gap -a- should be set as follows:
- Slacken off bolt -arrow- for push rod.

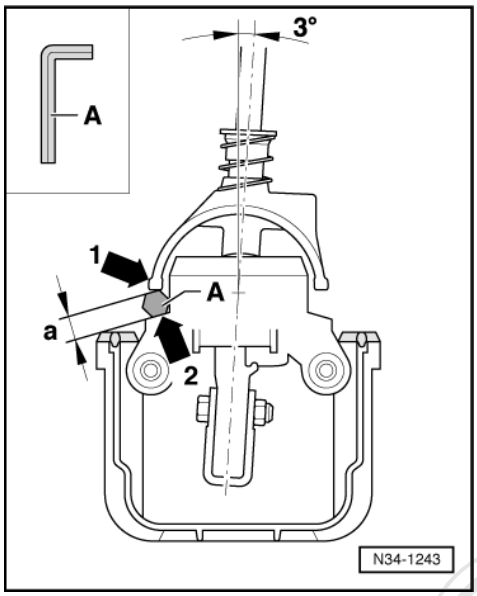
• Push rod/shift mechanism connection must move freely

- Set dimension -a- by moving shift mechanism.
- Tighten bolt for push rod to 25 Nm.

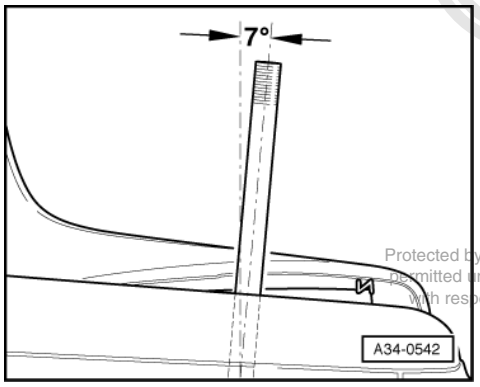


- -> Slacken off bolt -arrow- for selector rod.

• Selector rod/shift mechanism connection must move freely

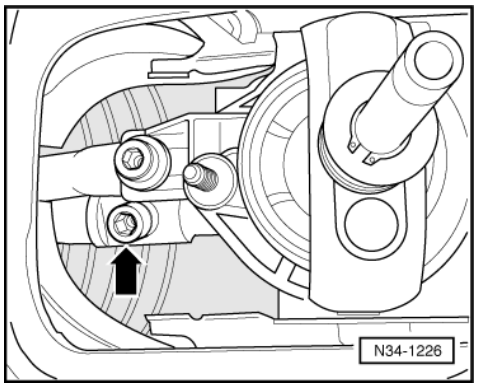


- -> Insert Allen key -A- (14 mm) between left lug -arrow 1- (in direction of travel) of ball stop and slanting side surface of ball stop -arrow 2- and hold in position.
- Key must make contact over entire length of slanting surface -arrow 2-.



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.

- -> At the same time, align gear stick such that it is slightly (7°) to rear.



- -> Tighten bolt for selector rod to 25 Nm.
  - In doing so, position of gear stick must not be altered

2.8 - Checking gear stick setting

- Gear stick must be in 3rd/4th gear gate in neutral.

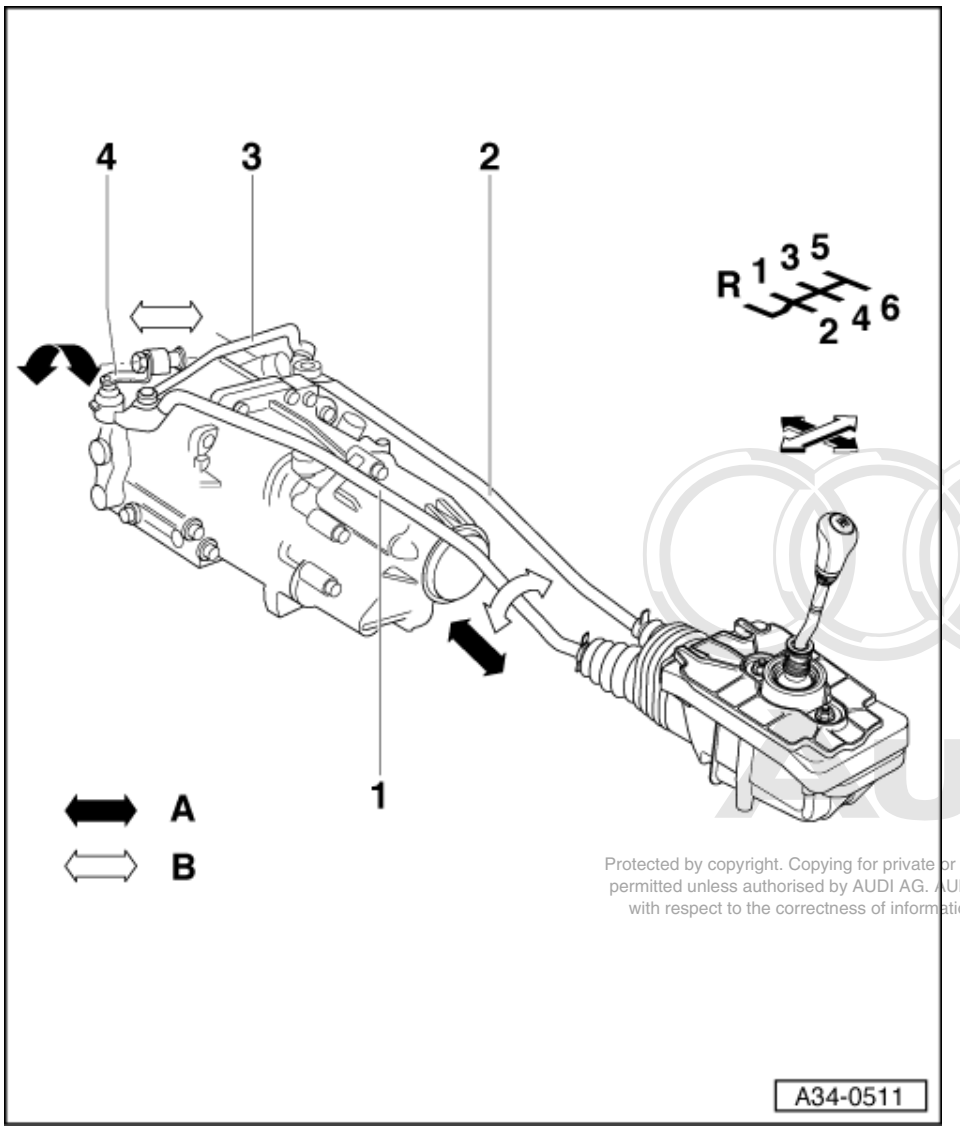
- Press clutch.
- Select all gears several times. Pay particular attention to operation of reverse gear lock.
- Check operation of reverse gear lock.
  - It should only be possible to engage reverse gear after actuating lock mechanism.
  - Gear stick must automatically move back from reverse gear gate into 3rd/4th gear gate.

If catching occurs on repeatedly engaging a gear, perform adjustment procedure again.

- Fit covers and gear stick knob.

3 - Servicing shift mechanism for vehicles as of 11.00, ident. no. 8D-1-100 001 ä

3.1 - Servicing shift mechanism for vehicles as of 11.00, ident. no. 8D-1-100 001 ä



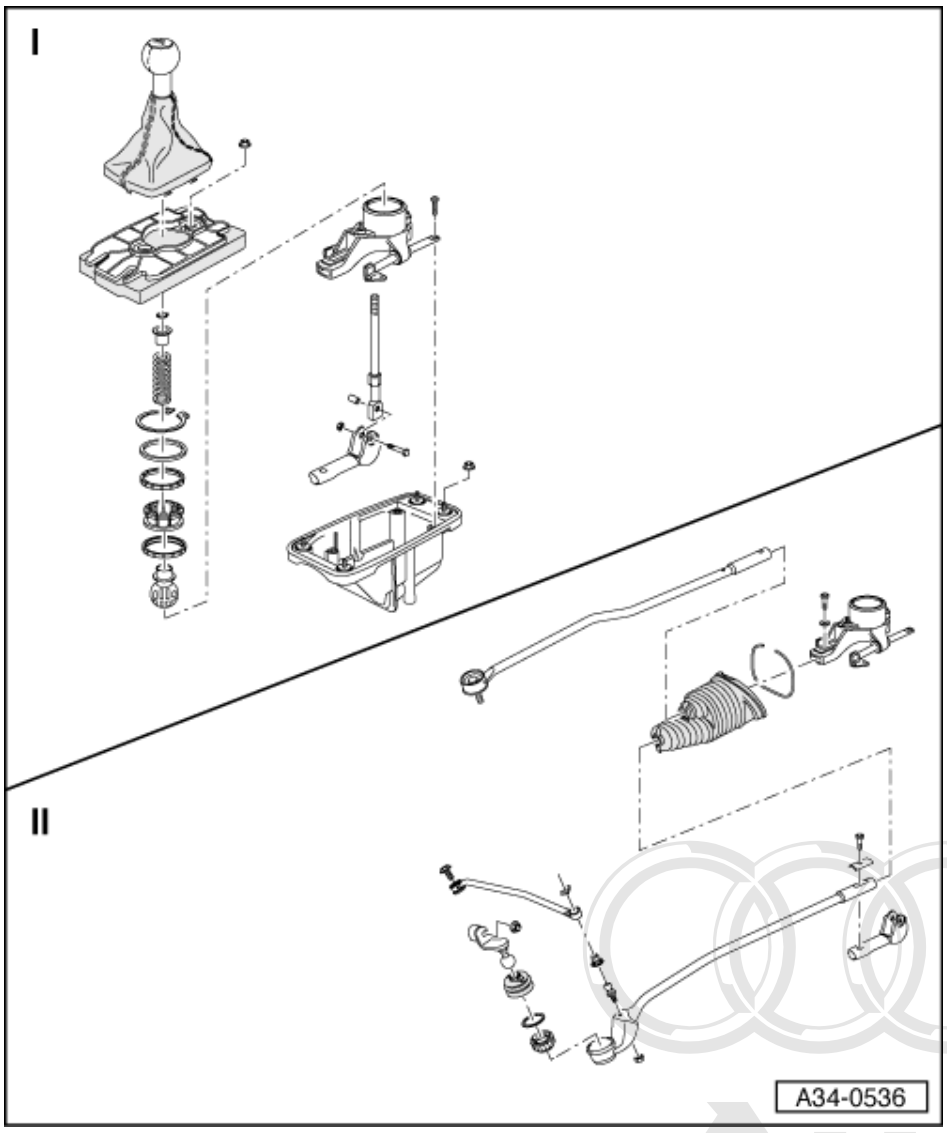
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3.2 - Installation position of shift mechanism

1 Selector rod
2 Push rod - front
3 Connecting rod
4 Selector lever on gearbox

Arrow -A- gear selection movement

Arrow -B- gate selection movement



I - Servicing gear stick and push rod - rear=>Page 99
II - Servicing selector rod, connecting rod and push rod - front => Page 102

Removing and installing gear stick with push rod - rear => Page 81

Removing and installing shift mechanism

=> Page 89

Adjusting shift mechanism => Page 104

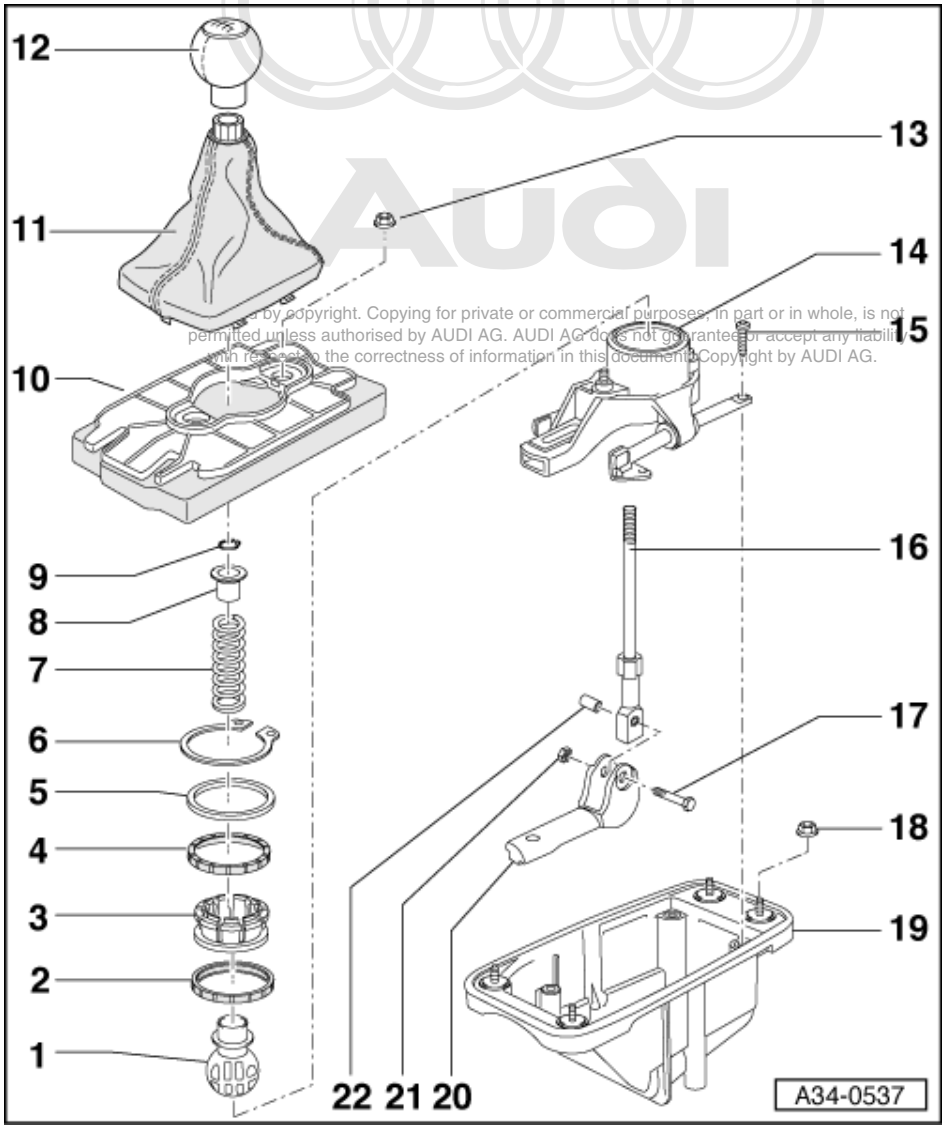
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

Disconnect earth strap from battery in engine compartment before working on shift mechanism.

Attention:
Heed appropriate instructions for battery disconnection.=>Electrical System; Repair Group 27

3.3 - Servicing gear stick and push rod - rear



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

Removing and installing gear stick with push rod - rear => Page 81

Removing and installing shift mechanism

=> Page 89

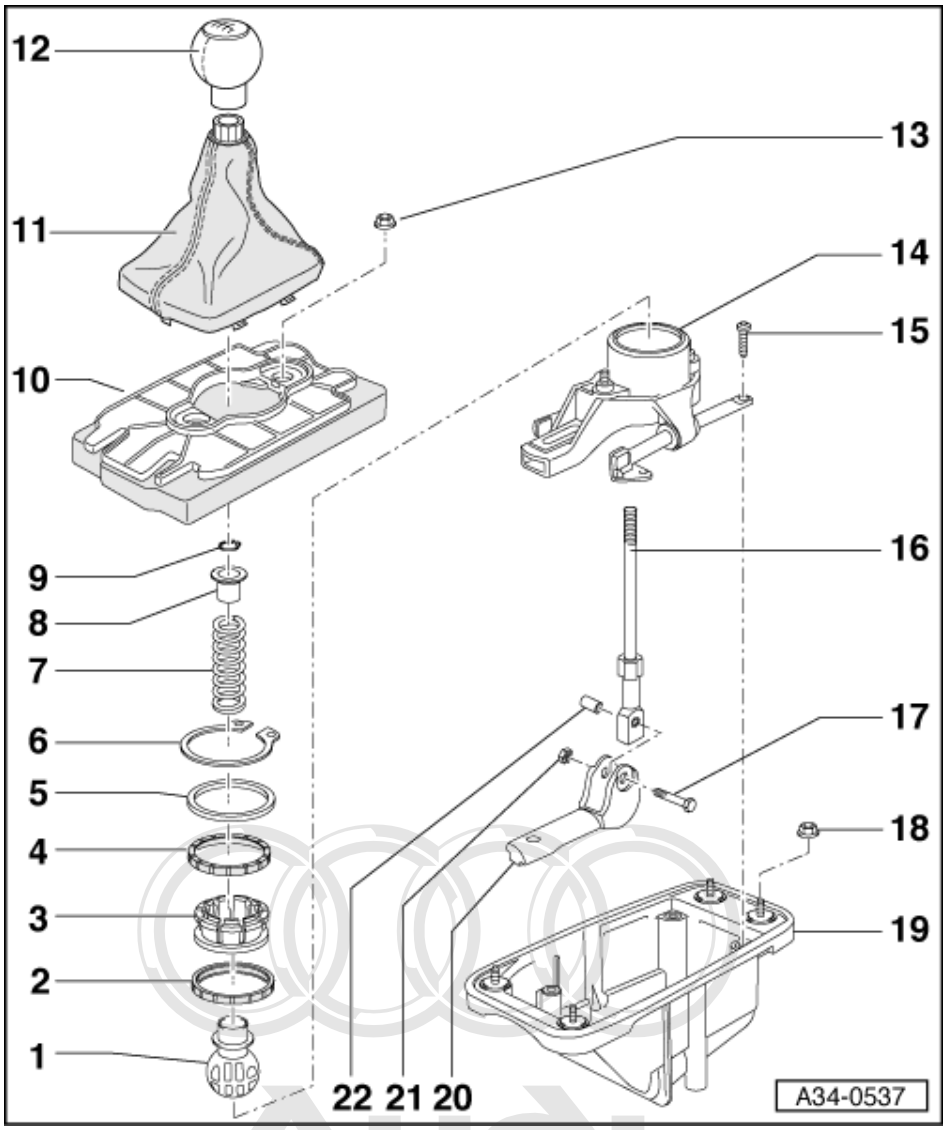
Note:

Apply polycarbamide grease, part no.

G 052 142 A2 to bearings and contact surfaces.

1 Ball
- Apply polycarbamide grease G 052 142 A2 to ball

2 Rubber ring
3 Ball guide
4 Rubber ring
5 Washer
- Collar facing ball guide (Item 20)



6 Circlip
- Take out to remove ball

7 Spring
8 Spacer bush
9 Circlip
10 Noise insulation
11 Gear stick cover
12 Gear stick knob
- Screw off to remove

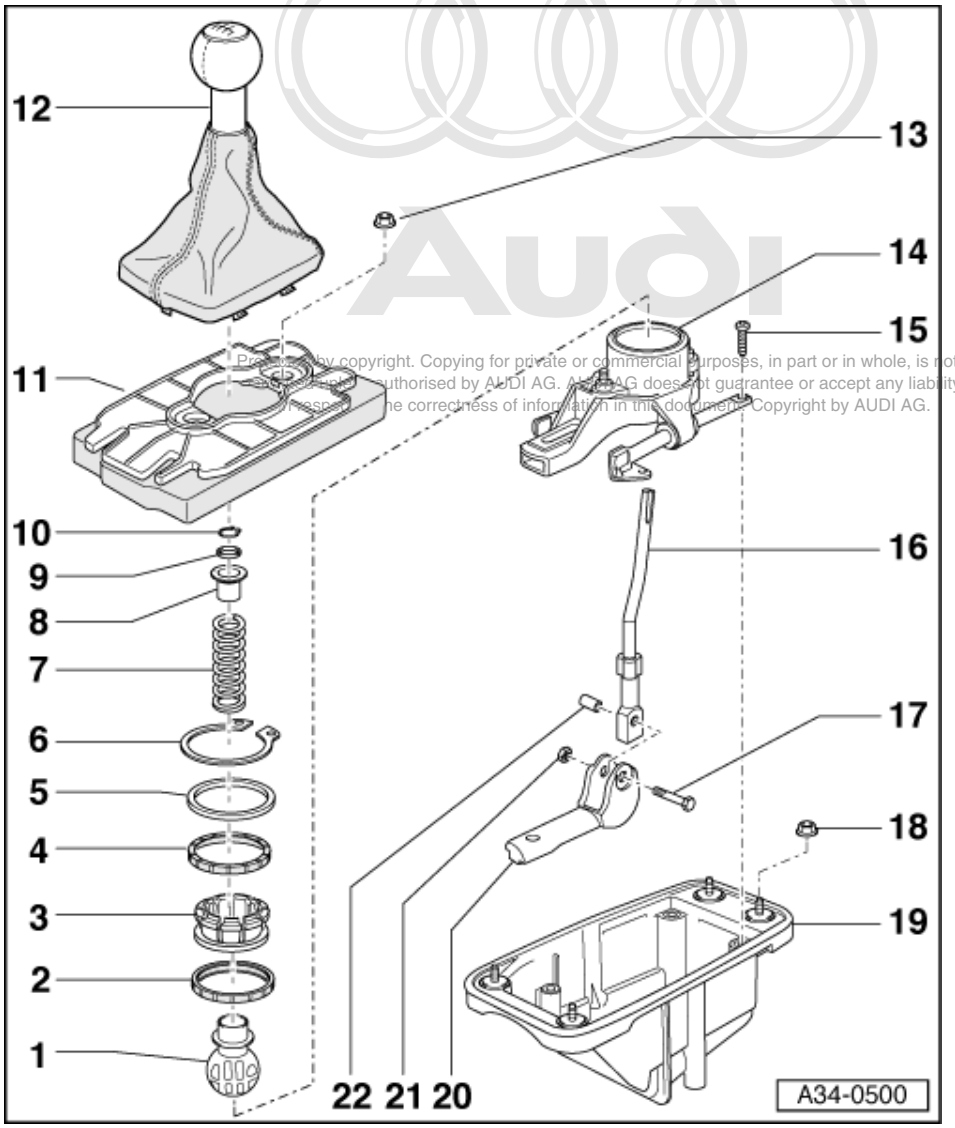
13 Nut, 10 Nm
14 Push rod - rear

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.

- With ball housing

15 Torx socket-head bolts, 6 Nm

- 4x
- For attaching push rod - rear to gear stick housing => Page 83



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Gear stick

- Only fits in one position in ball stop (item 10)
- Removing and installing=>Page 81

17 Bolt

18 Nut, 10 Nm

19 Gear stick housing

20 Selector fork

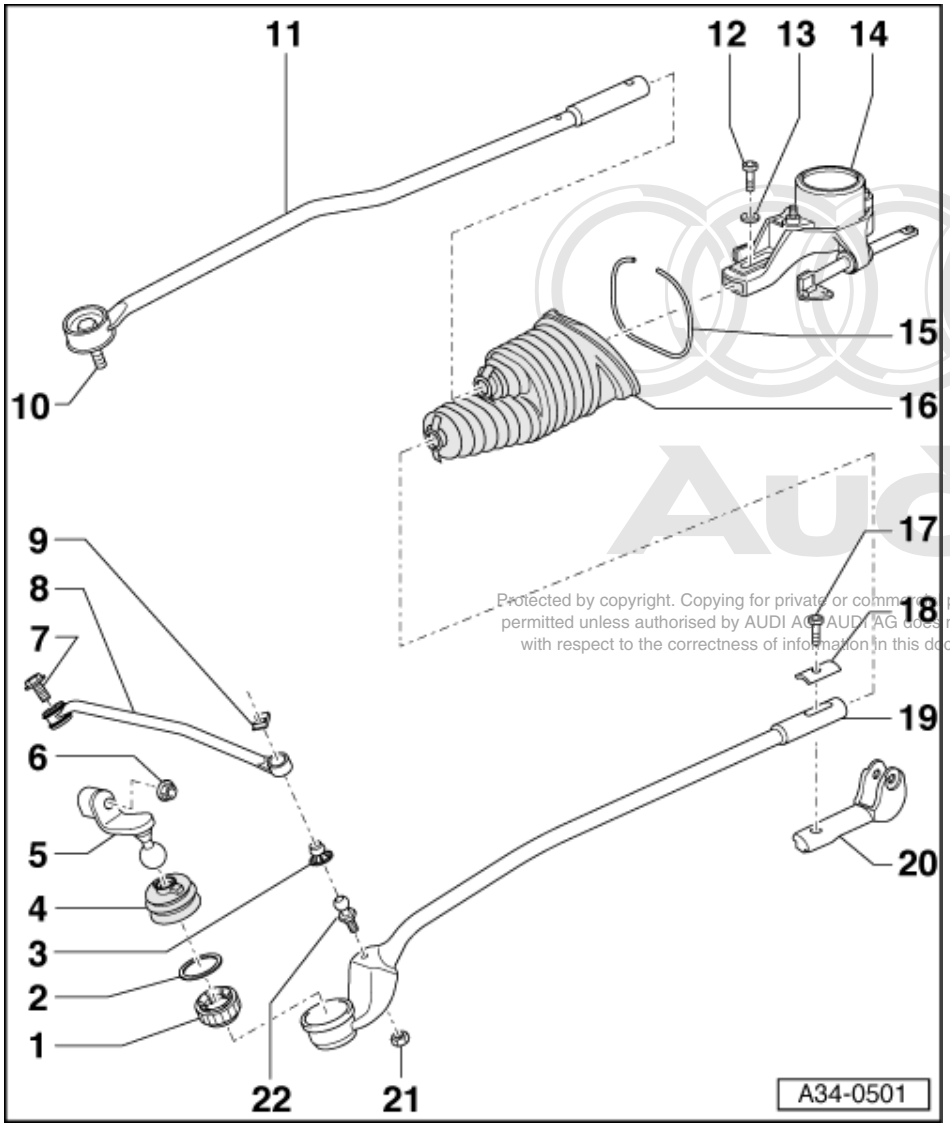
21 Nut, 10 Nm

- Self-locking
- Replace

22 Bushing

- Apply polycarbamide grease G 052 142 A2

3.4 - Servicing selector rod, connecting rod and push rod - front



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

Removing and installing gear stick with push rod - rear => Page 81

Removing and installing shift mechanism

=> Page 89

Note:

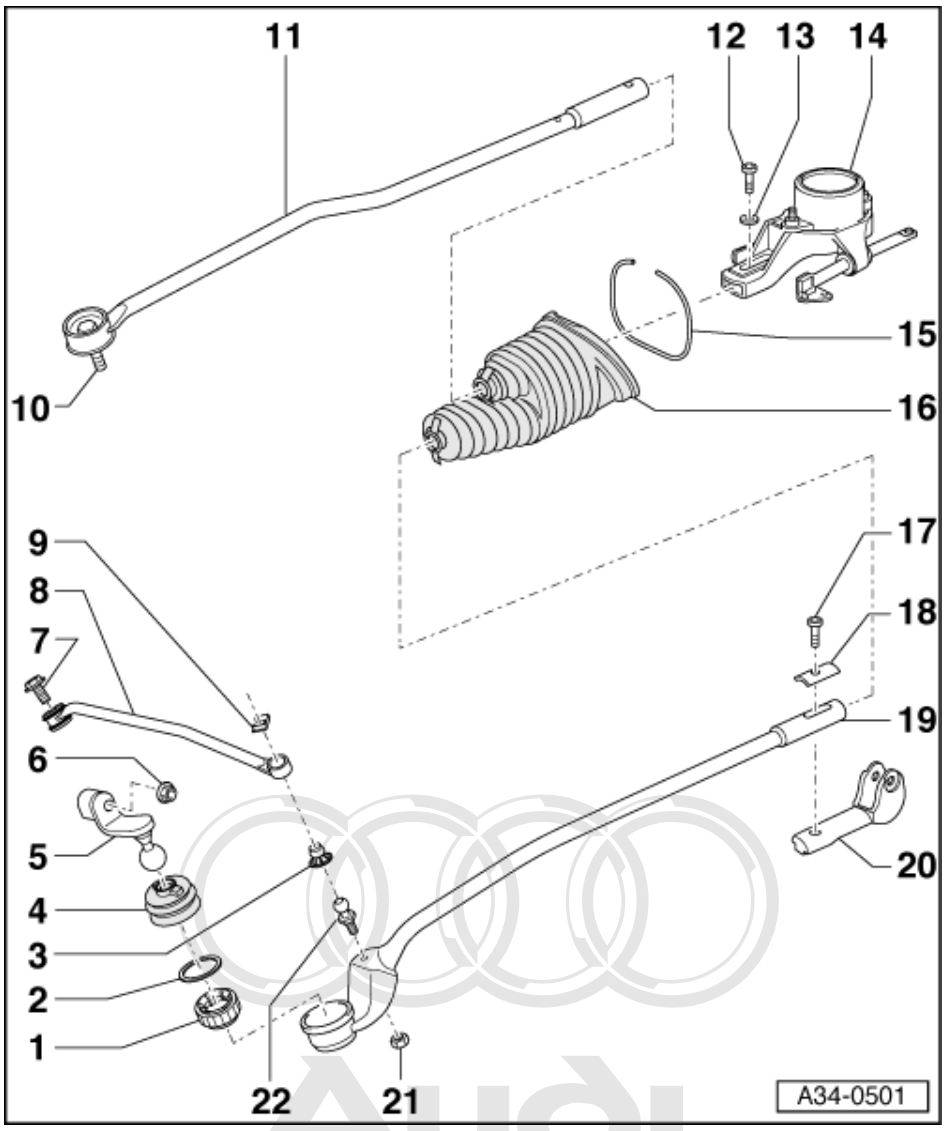
Apply polycarbamide grease, part no.

G 052 142 A2 to bearings and contact surfaces.

1 Ball socket
- To remove, bend open peened points at selector rod -Item 19 -

2 Washer

3 Ball socket
- To remove, detach clip -Item 9 -

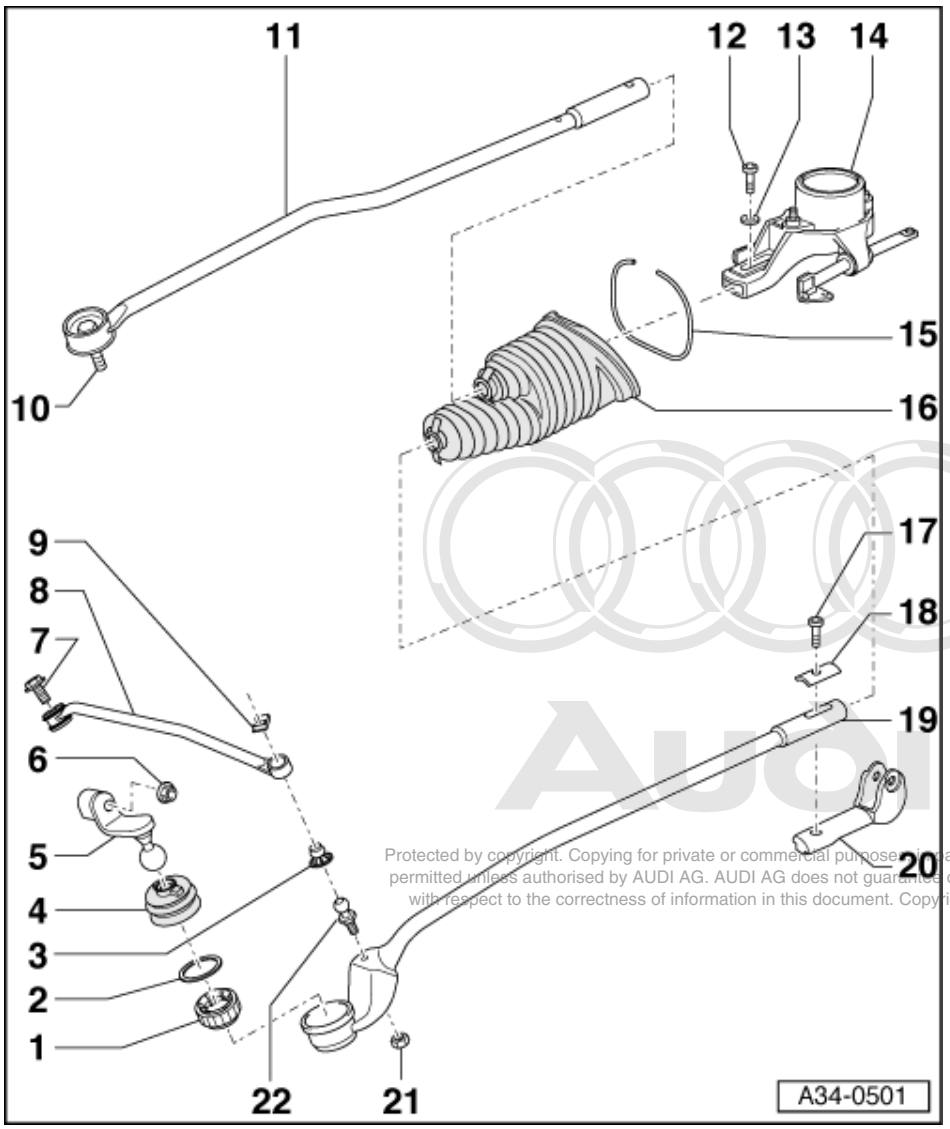


4 Bellows
5 Selector lever on gearbox
6 Nut, 23 Nm
7 Bolt, 23 Nm
8 Connecting rod
- To remove, detach clip -Item 9 -

9 Clip
10 Bolt, 40 Nm
11 Push rod - front
- With mounting bush, bolt and washers

12 Hexagon socket-head bolt - 25Nm
13 Washer
14 Push rod - rear
15 Tensioning ring

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Bellows

- To remove, pull carefully over selector rods
- On installation, place on marks of selector rod and push rod

17 Hexagon socket-head bolt - 25Nm

18 Clamp

19 Selector rod

20 Selector fork

21 Nut, 10 Nm

22 Ball pin

3.5 - Adjusting shift mechanism

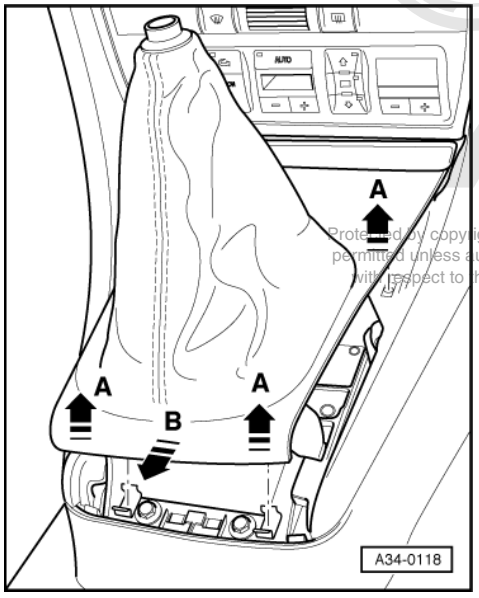
Note:

The following points are essential to ensure proper adjustment:

- Moving parts of shift mechanism and transmission elements must be in perfect condition
- Shift mechanism must move freely
- Gearbox, clutch and clutch mechanism in perfect working order

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

- Gearbox in neutral



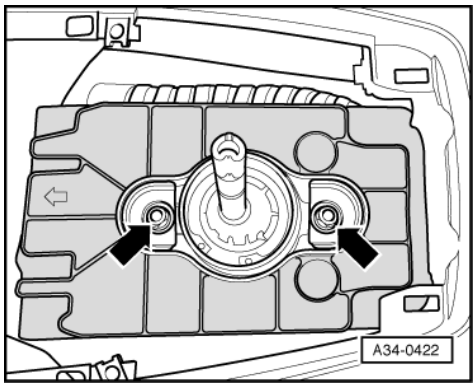
Sequence of operations

- Twist knob off gear stick.

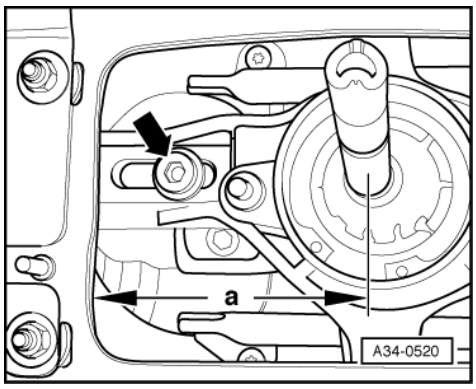
Note:

Gear stick cover is removed together with centre console cover.

- -> Lift off centre console cover slightly -arrows A-.
- Pull cover slightly to rear -arrow B- and then lift off entire cover assembly.
- If fitted, lift out noise insulation over shift mechanism.



- -> Unscrew noise insulation for gear stick housing -arrows-.

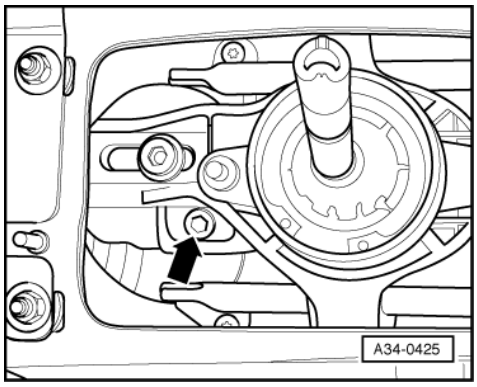


- -> Measure gap -a- between body and gear stick.
  - Specification: Dimension a = 95 mm

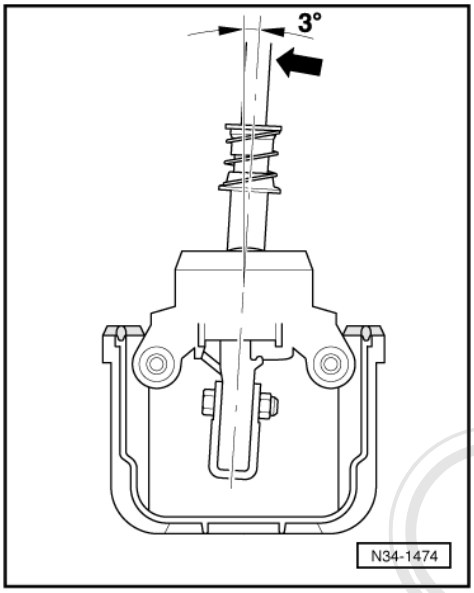
Note:

Measurement is taken from centre of gear stick to edge of body.

- If reading does not match specification, set dimension -a- as follows:
- Slacken off bolt -arrow- for push rod.
  - Rear push rod (in shift mechanism) must move freely back and forth on slider
- Set dimension -a- by adjusting rear push rod (in shift mechanism).
- Tighten bolt for push rod to 25 Nm.



- -> Slacken off bolt for selector rod -arrow-.
  - Selector rod/shift mechanism connection must move freely

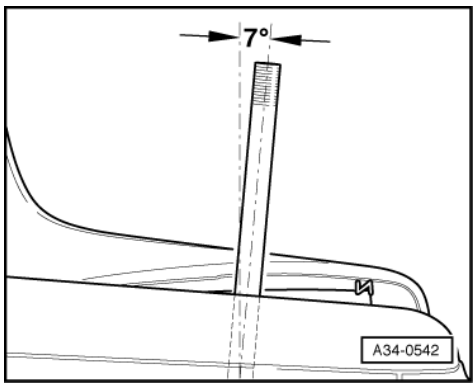


- Align gear stick such that it points slightly (3°)to right in direction of travel.

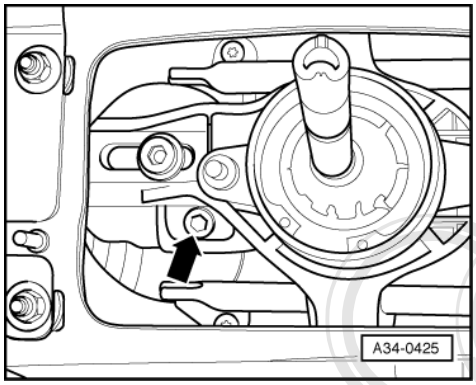
Note:

Fig. shows gear stick from rear 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.



- -> At the same time, align gear stick such that it is slightly (7°) to rear.
- Hold gear stick in this position.



- -> Tighten bolt for selector rod -arrow- to 25 Nm.

Note:

Position of gear stick must not be altered by tightening bolt.

3.6 - Checking gearshift setting

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

- Gear stick must be in 3rd/4th gear gate in neutral.

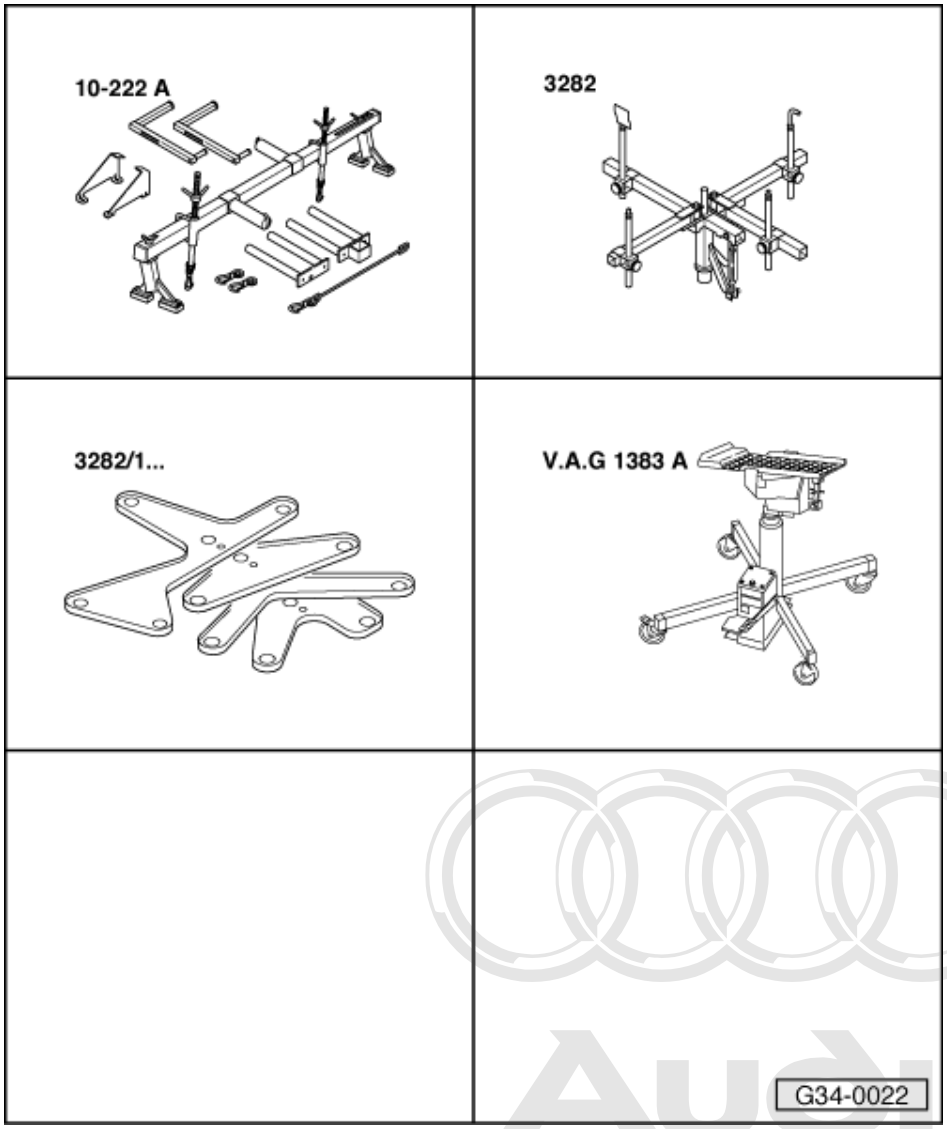
- Press clutch.
- Check gearshift operation in all gears.
- Check operation of reverse gear lock.
  - It should only be possible to engage reverse gear after actuating lock mechanism.
  - Gear stick must automatically move back from reverse gear gate into 3rd/4th gear gate.

Perform gearshift setting again if mechanism catches on repeatedly engaging a gear.

- Fit covers and gear stick knob.

4 - Removing and installing gearbox

4.1 - Removing and installing 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.

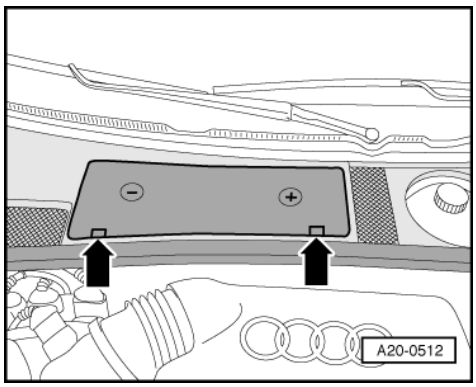
4.2 - Removal on vehicles with 4-cyl. TDI engine

Special tools and workshop equipment required

- Support bar 10-222 A
- Gearbox mount 3282
- Adjustment plate 3282/12
- Engine/gearbox lifter V.A.G 1383 A

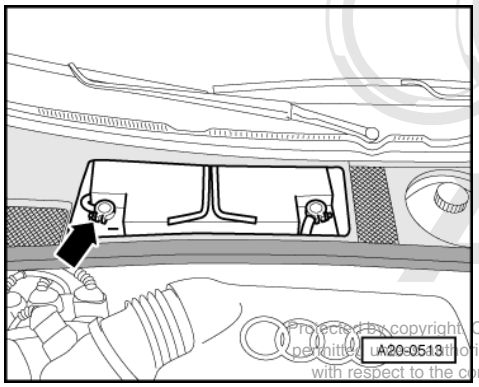
Note:

All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.



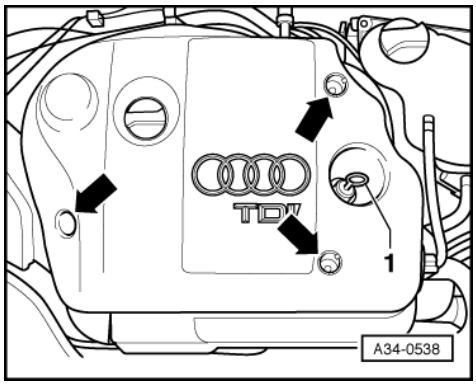
Attention:
Heed appropriate instructions for battery disconnection. =>Electrical System; Repair Group 27

- Heed (if necessary obtain) code for vehicles with encoded radio/radio navigation system (RNS).
- -> Remove cover over battery -arrows-.

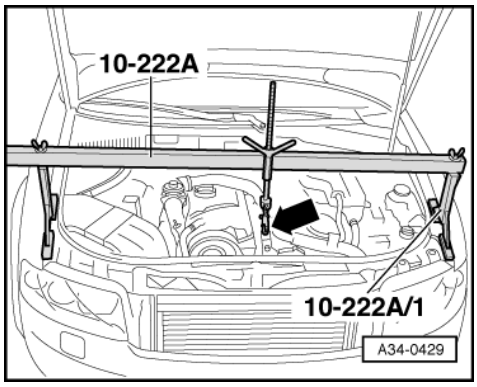


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Disconnect earth strap -arrow- at battery with ignition switched off.

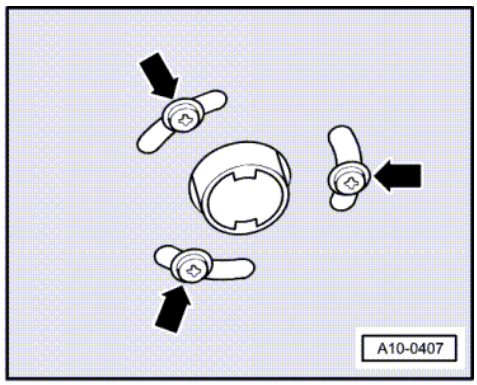


- -> Pull dipstick -1- out of guide tube.
- Unclip caps.
- Unfasten nuts -arrows- and detach engine cover.
- Re-insert dipstick in guide tube.

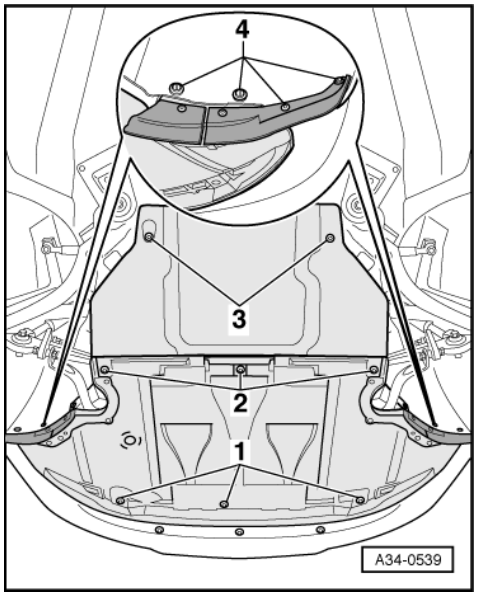


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

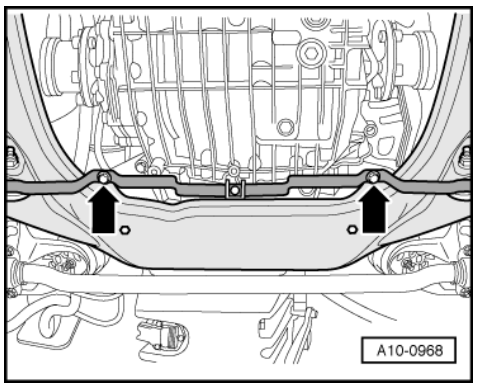
- -> Position support bar 10-222 A on wing mounting flange with spindle at front.
- Engage hook of spindle in shackle at front of engine -arrow-.
- Slightly pretension engine with spindle of support bar.



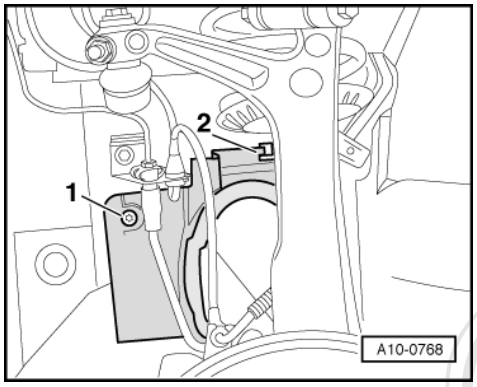
- Unscrew both front wheels.
- -> On vehicles with auxiliary heater, screw out bolts -arrows- for exhaust pipe of auxiliary/additional heater at noise insulation.



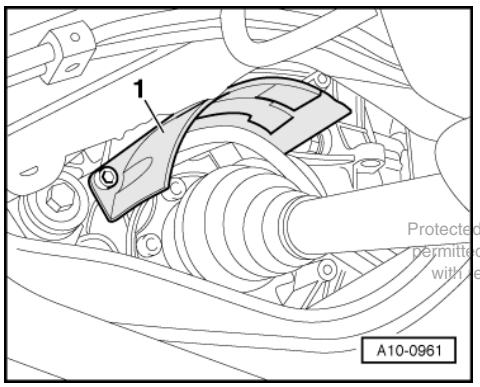
- -> Release fasteners -1 ... 4- and remove noise insulation (2 sections).



- -> Unscrew bracket for noise insulation -arrows-.



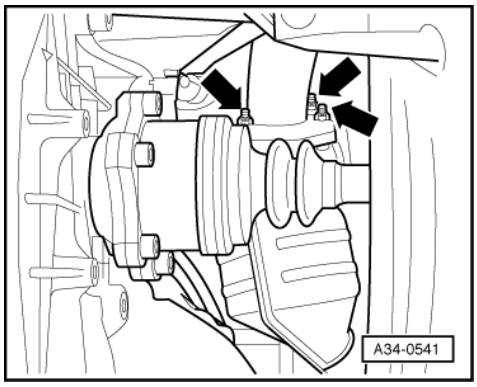
- -> Slacken off bolt -1- of noise insulation over left and right drive shaft.
- Disengage hook -2- and detach noise insulation.



- -> Detach heat shield -1- over right drive shaft from gearbox -arrows-.
- Unscrew drive shafts on left and right from gearbox flange.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive 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.

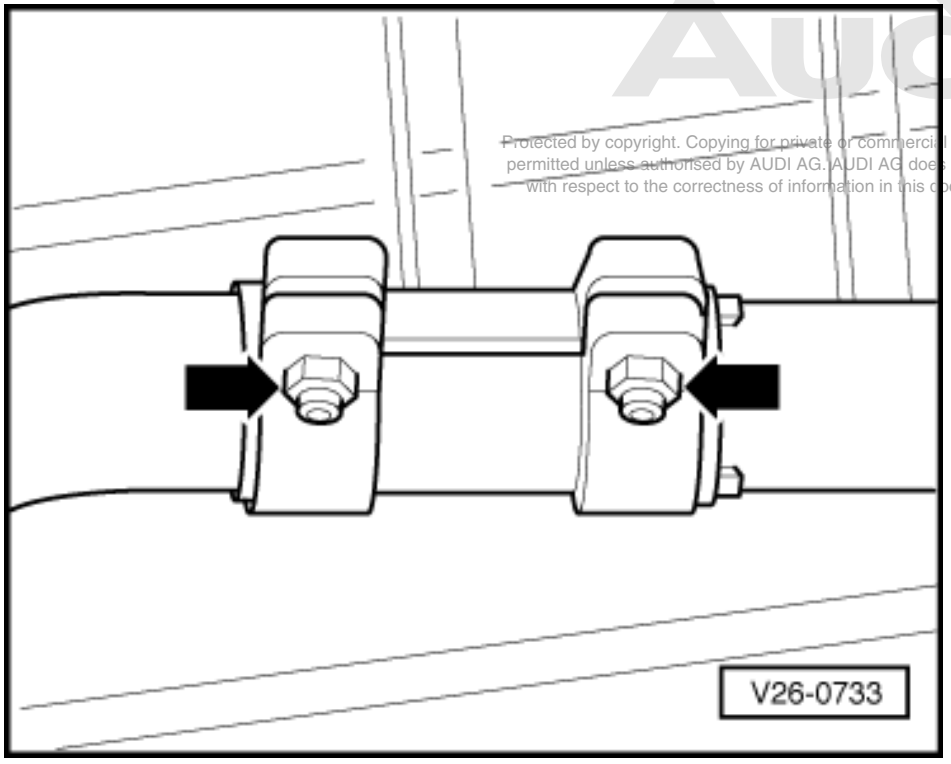


- -> Unscrew front exhaust pipe at catalytic converter -arrows-.

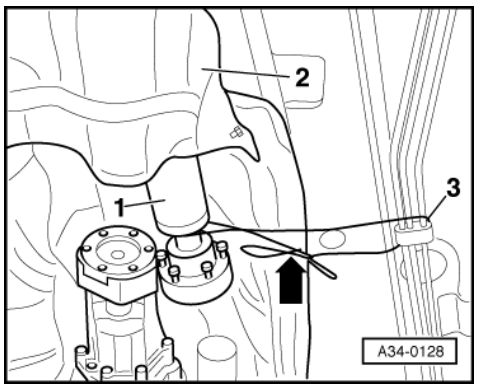
Note:

To avoid damage, decoupling element upstream of catalytic converter is never to be kinked by more than 10 °.

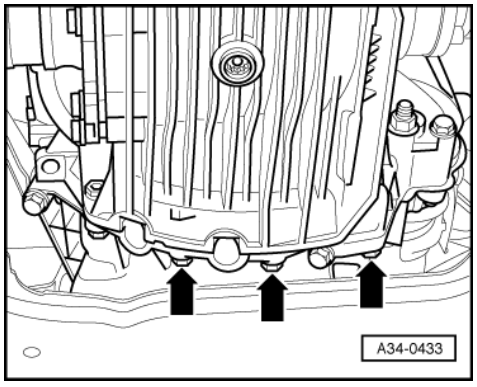
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Separate exhaust system at clamp -arrows- and take out front exhaust pipe.

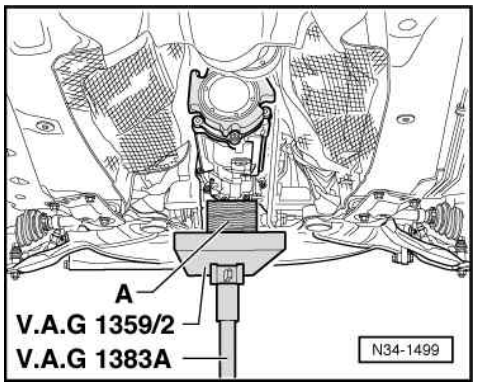


- -> Unscrew propshaft -1- at gearbox and set down on heat shield -2-.
- Use wire -arrow- to attach propshaft to holder -3- of fuel pipes.



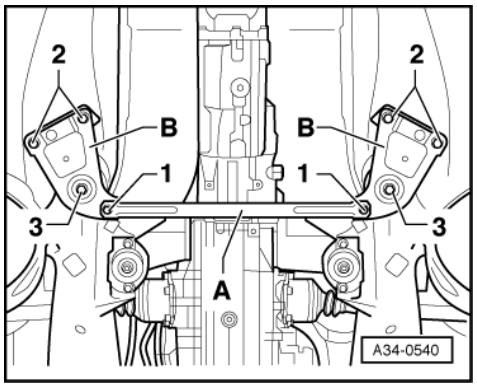
- -> Screw out the three engine/gearbox connecting bolts at bottom -arrow-.

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.

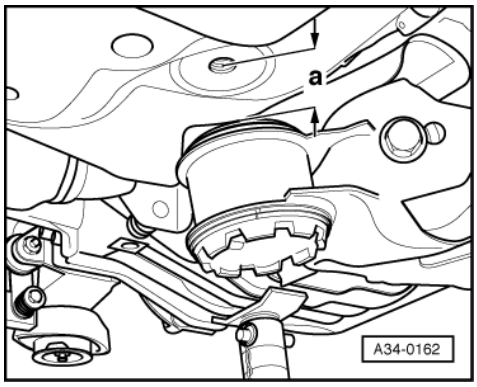


- -> Use engine/gearbox lifter V.A.G 1383 A to provide some support for gearbox.

A - Wooden block

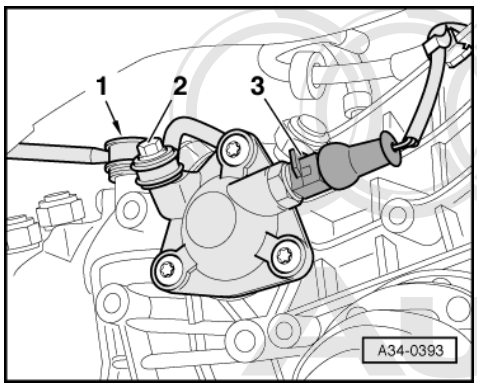


- -> If applicable, screw out bolts -1- and detach cross member -A-.
- Screw out bolts -2- and -3- on both sides and detach supports -B-.



- -> Lower gearbox lifter V.A.G 1383 A until subframe is released at rear.

◆ Dimension -a- max. 50 mm

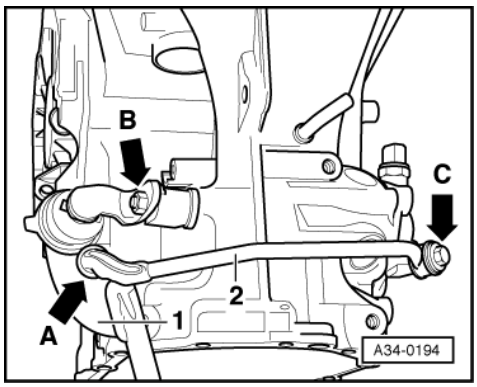


- -> Unscrew connecting rod -2- on right side of gearbox.
- Screw out 8 mm hexagon socket-head bolt of push rod -1-.
- Unplug connector -3- for reversing light switch on right of gearbox and lay bare wire.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

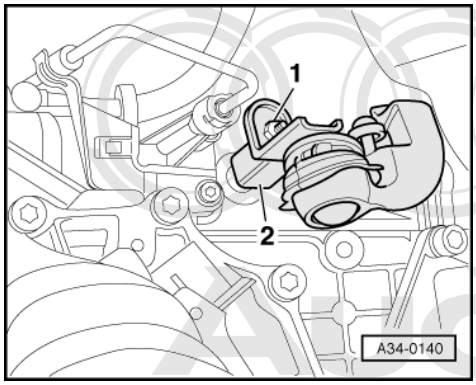
Packing plates may have been fitted between gearbox and push rod. If this is the case, they must be inserted again on assembly.



Important note on subsequent operations:

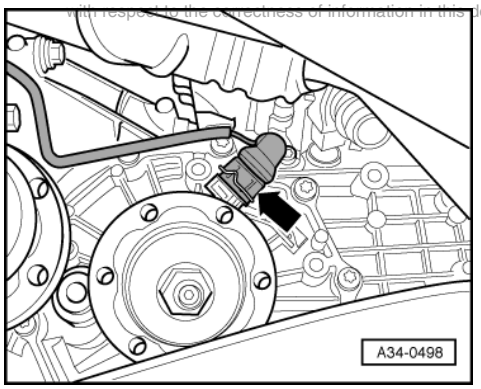
-> When removing shift mechanism (up to approx. 11.00), never detach ball end -arrow A- of connecting rod -2- from selector rod -1-.

Detaching would destroy ball end.

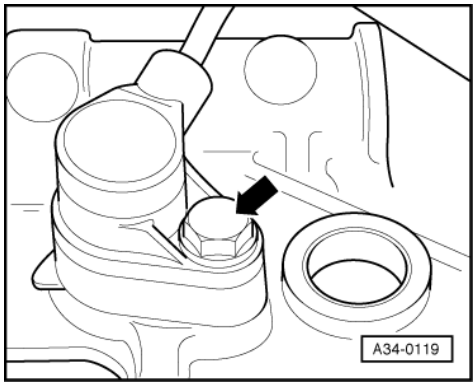


- -> Unscrew nut -1- and pull lever -2- of selector rod off gearbox selector shaft.

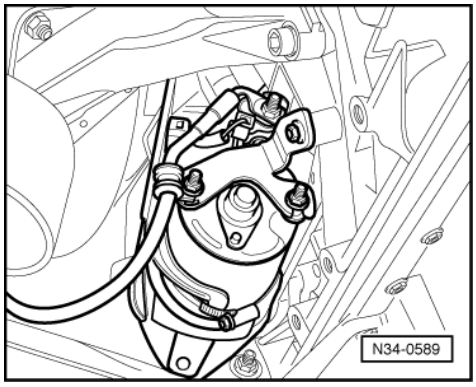
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Unplug connector -arrow-at speedometer sender -G22 on left of gearbox.



- -> If fitted, remove engine speed sender -G28 on left of gearbox -arrow- and lay aside.



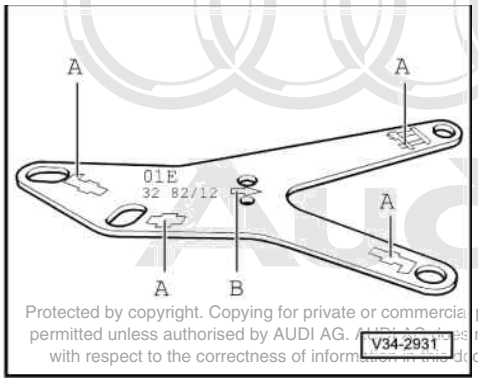
- -> Detach starter from engine/gearbox and secure if necessary.

=> Electrical System; Repair Group 27; Removing and installing starter Removing and installing starter

Note:

Starter cables do not have to be disconnected.

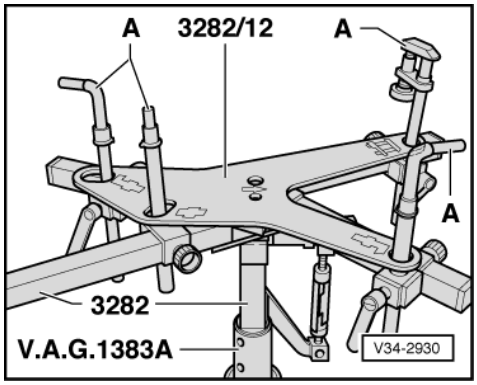
- With the exception of one holding bolt, screw out all engine/gearbox connecting bolts from underneath.



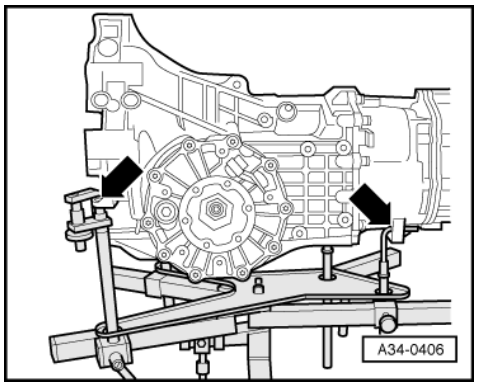
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Notes:

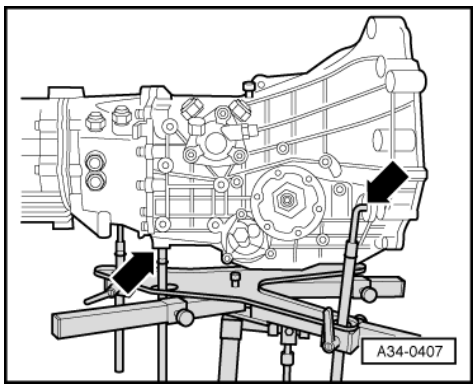
- -> Mounting elements -A- are illustrated symbolically, arrow -B- faces in direction of travel.
- Adjustment plate 3282/12 only fits in one position.



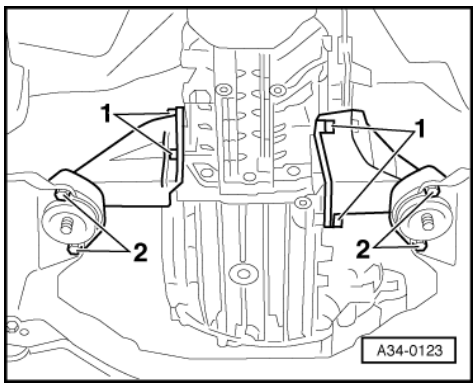
- -> Position gearbox mount 3282 on gearbox lifter V.A.G 1383 A.
- Align arms of gearbox mount to coincide with holes in adjustment plate.
- Screw in mounting elements -A- as shown on adjustment plate.



- -> Position gearbox lifter V.A.G 1383 A with gearbox mount 3282 beneath gearbox and attach as shown to left ...



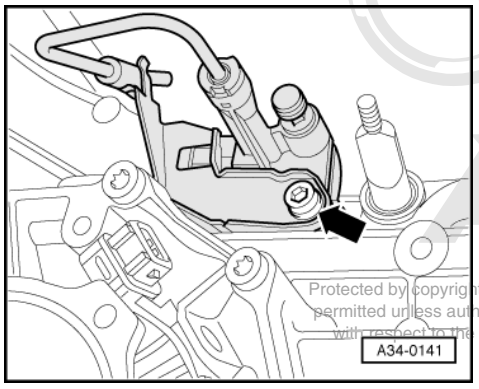
- -> ... and right side of gearbox.



- Detach heat shield over right gearbox support.
- -> Screw out bolts -2- for bonded rubber bushes on left and right.
- Raise gearbox slightly.
- Screw out bolts -1- and detach supports on left and right of gearbox.
- Move drive shafts to rear.
- Screw out remaining engine/gearbox connecting bolt.
- Press gearbox off dowel sleeves and carefully lower slightly using gearbox lifter V.A.G 1383 A until slave cylinder just becomes accessible.

Note:

On lowering gearbox, take care not to damage hydraulic pipe to 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.

- -> Screw out bolt -arrow- and pull out clutch slave cylinder to rear.
  Do not open piping system.

Note:

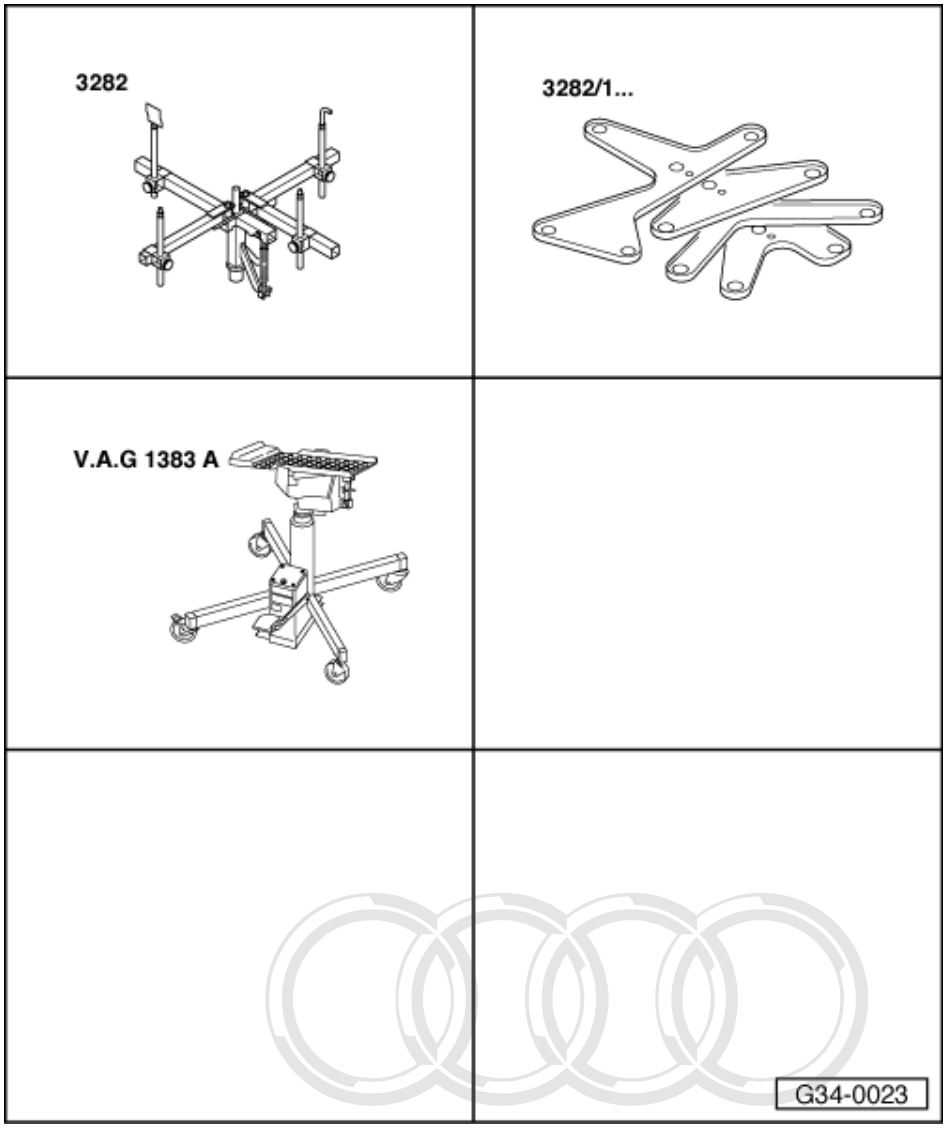
Do not press clutch pedal after removing slave cylinder.

- Completely set down gearbox.

Note:

On lowering, ensure clearance with respect to drive shafts.

4.3 - Removal on vehicles with V6 TDI engine



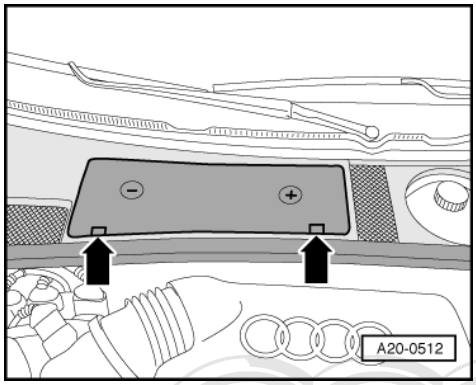
Special tools and workshop equipment required

- Gearbox mount 3282
- Adjustment plate 3282/12
- Engine/gearbox lifter V.A.G 1383 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.

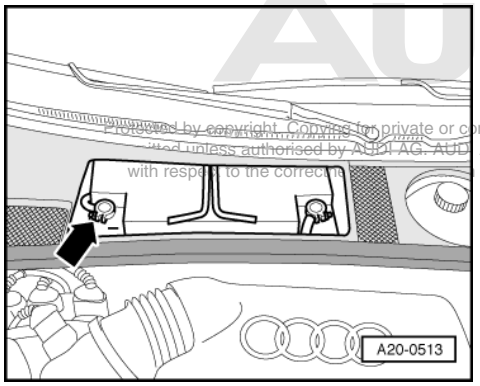
Note:

All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.



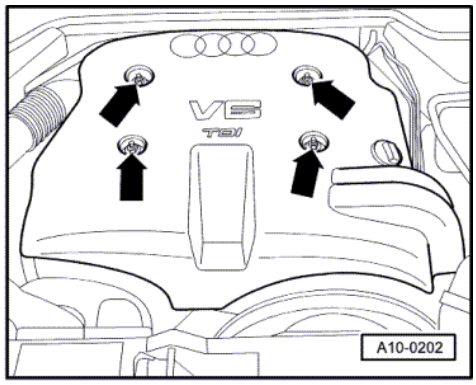
Attention:
Heed appropriate instructions for battery disconnection. =>Electrical System; Repair Group 27

- Heed (if necessary obtain) code for vehicles with encoded radio/radio navigation system (RNS).
- -> Remove cover over battery -arrows-.



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

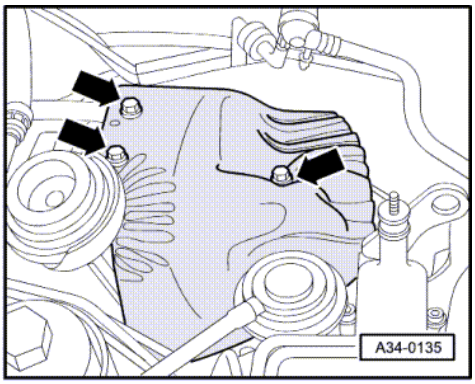
- -> Disconnect earth strap -arrow- at battery with ignition switched off.



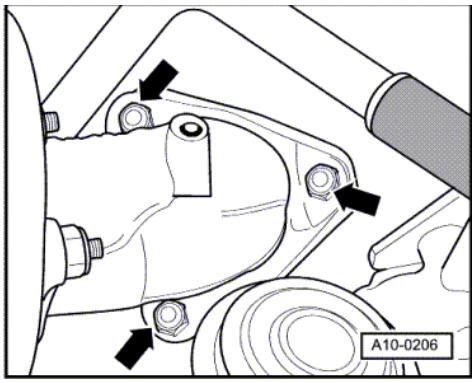
Note:

To facilitate access to engine/gearbox connecting bolts, start by removing exhaust pipe with catalytic converter.

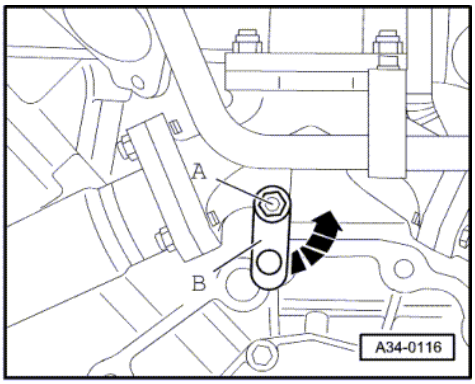
- -> Unscrew noise insulation over cylinder head cover -arrows-.



- -> Detach heat shield over turbocharger -arrows-.



- -> Unscrew exhaust pipe at turbocharger elbow -arrows-.

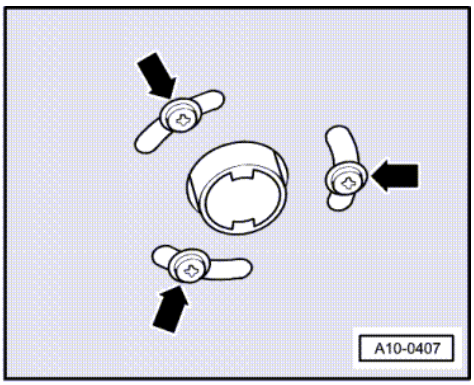


- Remove engine/gearbox connecting bolts accessible from above.
- -> Slacken off bolt -A- (at rear on turbocharger) a few turns and turn brace -B- aside in direction of arrow. Then tighten bolt -A- again slightly.

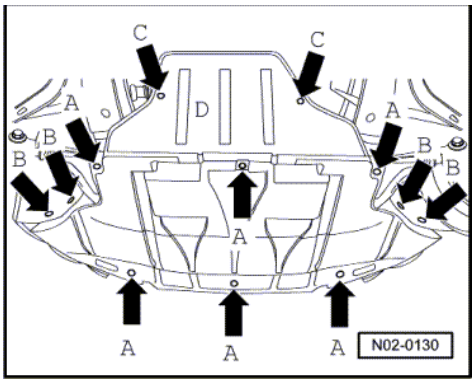
Note:

Illustration shows engine from rear with gearbox removed.

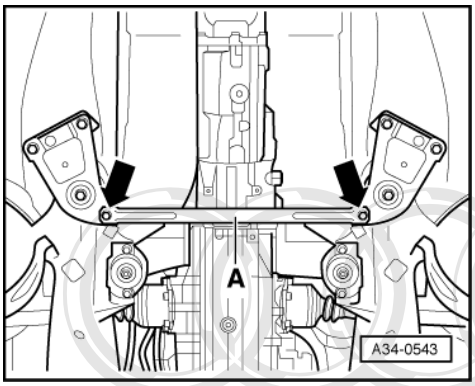
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



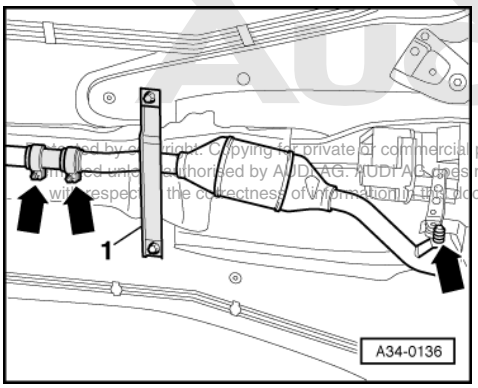
- -> On vehicles with auxiliary heater, screw out bolts -arrows- for exhaust pipe of auxiliary/additional heater at noise insulation.



- -> Remove 2-part noise insulation -arrows A ... C-.
- Unscrew holder for noise insulation.

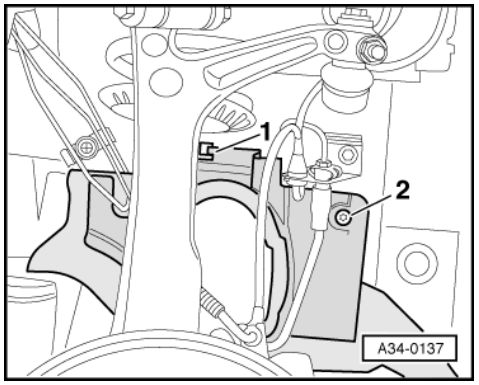


- -> If applicable, screw out bolts -arrows- and detach cross member -A-.

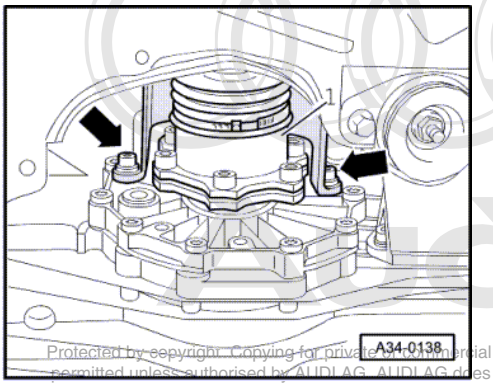


Printed by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> If applicable, unscrew support -1-.
- Remove exhaust pipe complete with catalytic converter -arrows-.



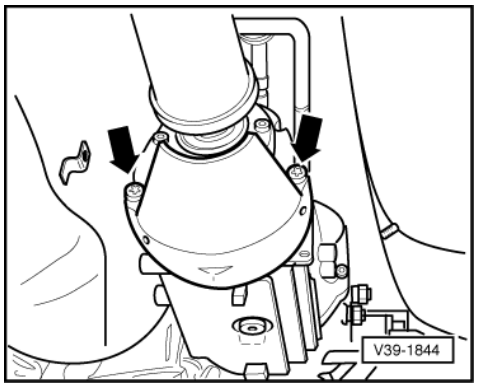
- -> Slacken off bolt -2- of noise insulation over left drive shaft.
- Disengage hook -1- and detach noise insulation.



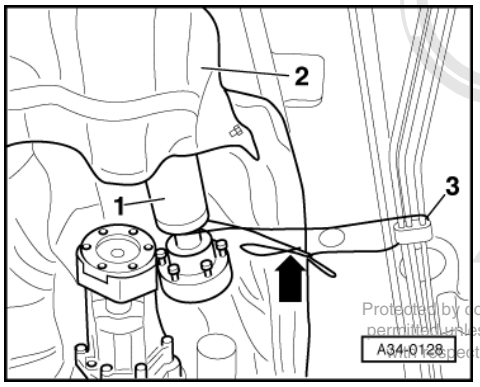
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Remove heat shield for inner left joint from gearbox -arrows-.
- Detach left -1- and right drive shaft and tie up.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

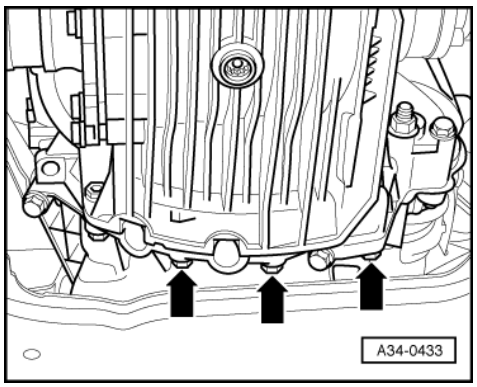


- -> Unscrew heat shield for propshaft from cover for Torsen differential -arrows-.

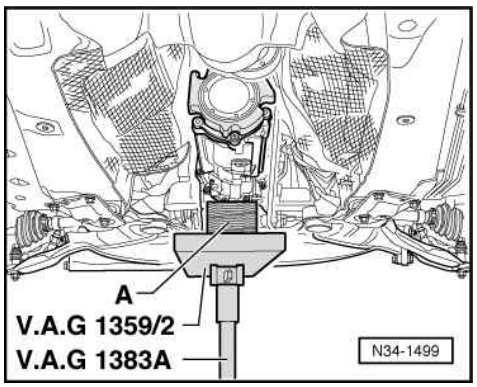


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Unscrew propshaft -1- at gearbox and set down on heat shield -2-.
- Use wire -arrow- to attach propshaft to holder -3- of fuel pipes.

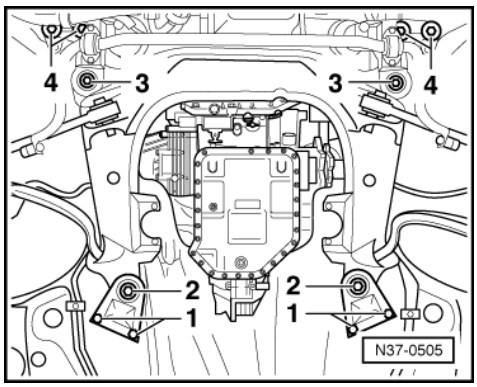


- -> Screw out the three engine/gearbox connecting bolts at bottom -arrow-.



- -> Use gearbox lifter V.A.G 1383 A to provide some support for gearbox.

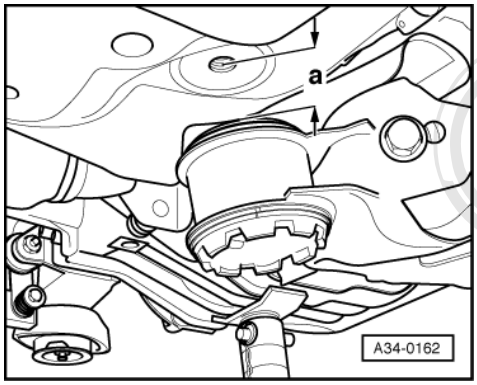
A - Wooden block



- -> Screw out bolts -1- and -2- on right and left side.

Note:

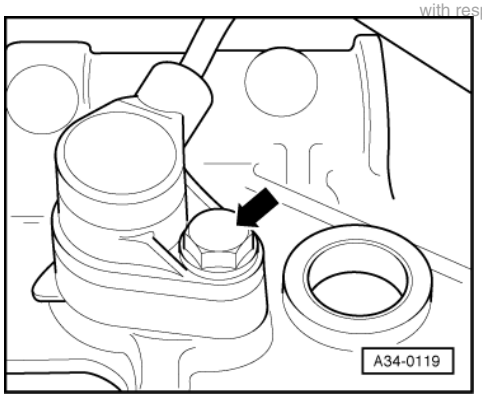
Bolts -3- and -4- are not to be screwed out, as otherwise wheel alignment would have to be performed.



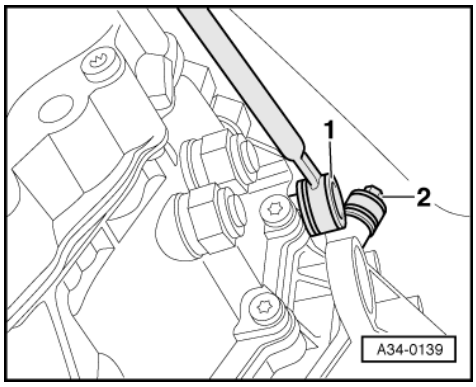
- -> Lower subframe at rear.

◆ Dimension -a- max. 50 mm

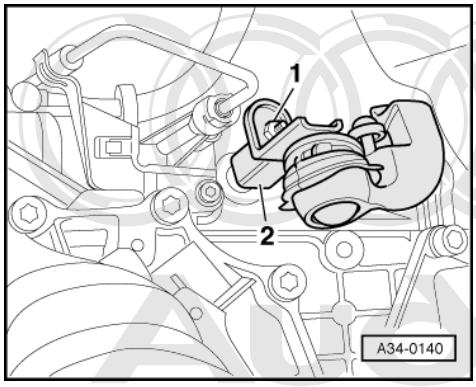
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Remove engine speed sender -G28 on left of gearbox -arrow- and lay aside.
- Unplug connector at speedometer sender.
- Unplug connector at reversing light switch.

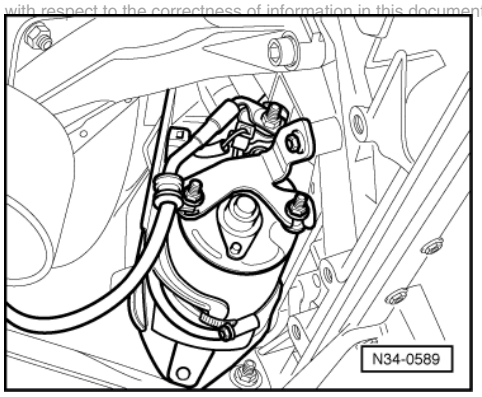


- -> Unscrew connecting rod -2- of selector rod on right side of gearbox.
- Screw out hexagon socket-head bolt of push rod -1-.



- -> Unscrew nut -1- and pull lever -2- of selector rod off gearbox 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.



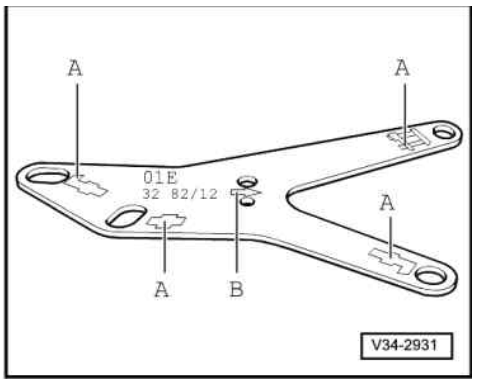
- -> Detach starter from engine/gearbox and secure if necessary.

=> Electrical System; Repair Group 27; Removing and installing starter Removing and installing starter

Note:

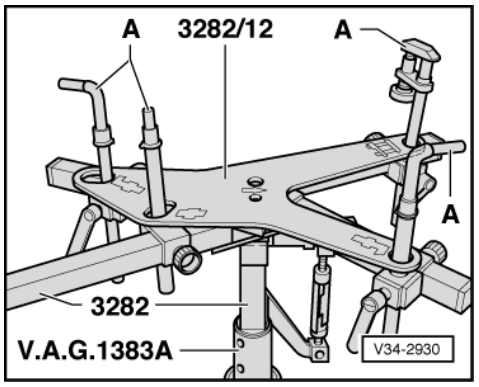
Starter cables do not have to be disconnected.

- With the exception of one holding bolt, screw out all engine/gearbox connecting bolts from underneath.

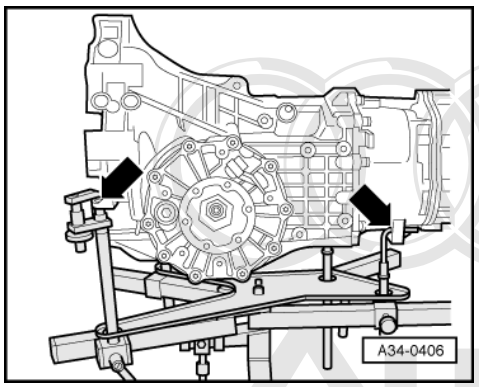


Notes:

- -> Mounting elements -A- are illustrated symbolically, arrow -B- faces in direction of travel.
- Adjustment plate 3282/12 only fits in one position.
- Elongated holes in adjustment plate 3282/12 can accommodate different gearbox housing and gearbox cover versions.

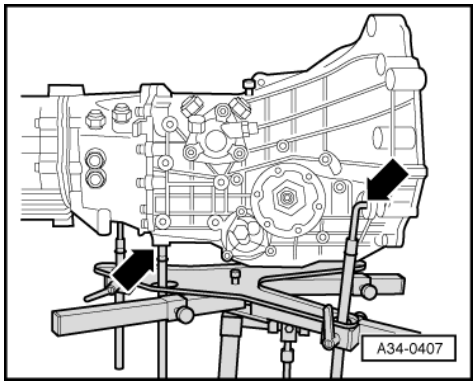


- -> Position gearbox mount 3282 on gearbox lifter V.A.G 1383 A.
- Align arms of gearbox mount to coincide with holes in adjustment plate.
- Screw in mounting elements -A- as shown on adjustment plate.

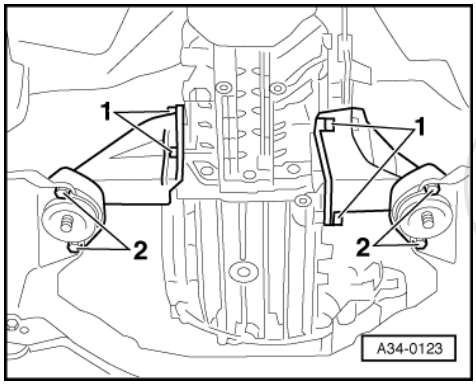


- -> Position gearbox lifter V.A.G 1383 A with gearbox mount 3282 beneath gearbox and attach as shown to left ...

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



- -> ... and right side of gearbox.

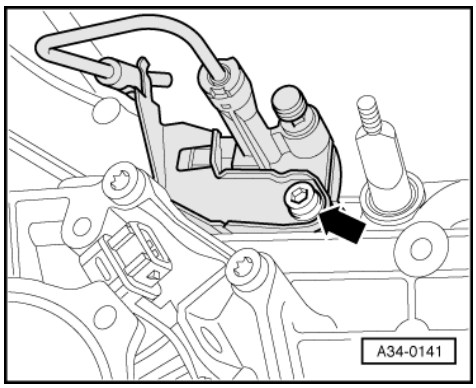


- Detach heat shield over right gearbox support.
- -> Screw out bolts -2- for bonded rubber bushes on left and right.
- Raise gearbox slightly.
- Screw out bolts -1- and detach supports on left and right of gearbox.
- Screw out remaining engine/gearbox connecting bolt.
- Press gearbox off dowel sleeves and carefully lower slightly using gearbox lifter V.A.G 1383 A until slave cylinder just becomes accessible.

Protected by copyright. Copying for private or commercial purposes, in part or 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.

Note:

On lowering gearbox, take care not to damage hydraulic pipe to slave cylinder.



- -> Screw out bolt -arrow- and pull out clutch slave cylinder to rear.
  Do not open piping system.

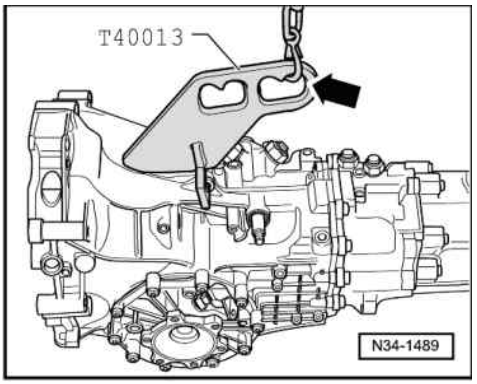
Note:

Do not press clutch pedal after removing slave cylinder.

- Completely set down gearbox.

Note:

On lowering, ensure clearance with respect to drive shafts.



Gearbox transportation

- -> Insert transportation device T40013 in lifting eye of gearbox and secure.
- Engage hook of workshop crane in 4th mount -arrow- of transportation device.
- Support gearbox with workshop crane and transportation device T40013.

4.4 - Installing gearbox on vehicles with 4 and 6-cyl. TDI engine

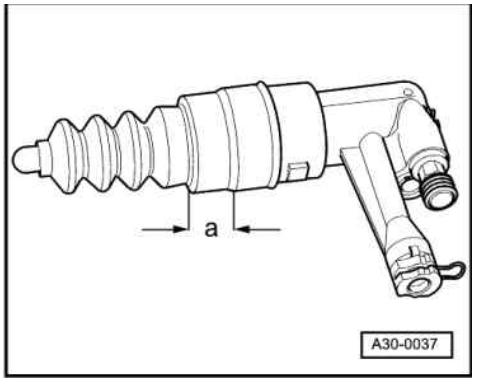
Install in reverse order, paying attention to the following:

Notes:

- Replace self-locking nuts and bolts when performing assembly work.

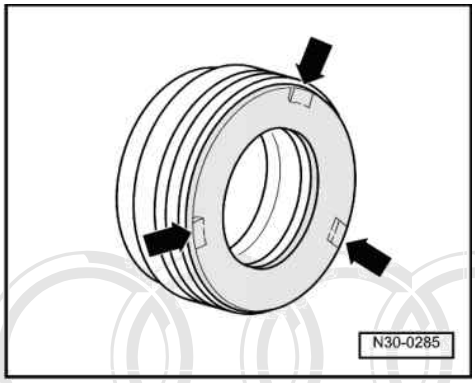
- Replace bolts tightened to torque as well as sealing rings and gaskets.
- All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.
- Before installing gearbox, tie wiring to one side so that it cannot be trapped between engine and gearbox.
- Check whether dowel sleeves for centring engine/gearbox have been fitted in engine flange and insert if necessary => Page 133 .
- If gearbox is replaced, transfer gearbox supports with gearbox mounting. Tightening torques => Page 134 .
- Tightening torques only apply to slightly greased, oiled, phosphated or blackened nuts and bolts.
- Additional lubricants, such as engine or gear oil are permitted, however not lubricants which contain graphite.
- Tolerance for tightening torques ±15%

Copyright by AUDI AG. The reproduction, transmission or use of this document or its contents is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

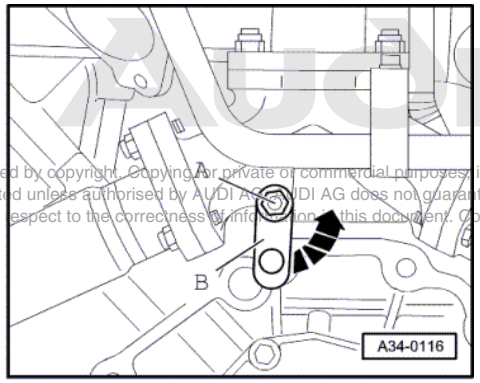


- -> Before installing slave cylinder in gearbox housing, area -a- of boot must be coated with lithium grease G 052 150 A2.
- Prior to assembly, always use thread tap to remove remnants of locking fluid from tapped holes in flange shaft of manual gearbox for propshaft.

- Clean input shaft splines and - in the case of used clutch plates - hub splines, remove corrosion and apply extremely thin layer of grease G 000 100 to splines. Do not grease guide sleeve.
- Check clutch release bearing for wear and replace if necessary.



- -> If plastic ring of release bearing is loose, bond it back onto bearing race with adhesive AMV 195 KD1 01.
  - Three square lugs -arrows- of the plastic ring engage in the recesses of the bearing race.
  - Release bearing must be replaced in the event of scoring deeper than 0.5 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.

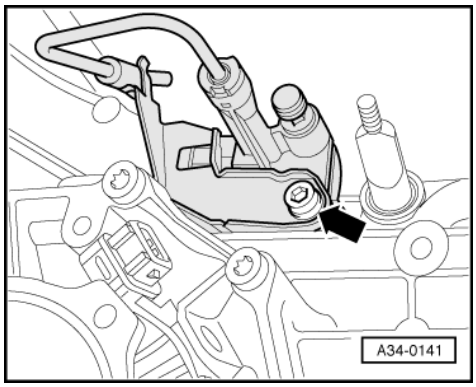
- Apply thin coat of copper grease, e.g. Z 381 351 TE, to contact surface for plunger at clutch release lever.

Vehicles with V6 TDI engine:

- -> Before installing gearbox with V6 TDI engine, check that brace -B- is still moved to one side -arrow direction-.

All models:

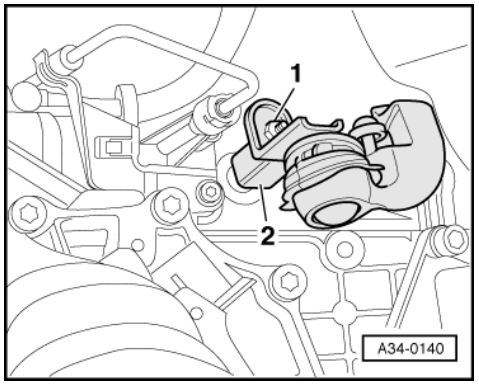
- Before installing gearbox, tie wiring to one side so that it cannot be trapped between engine and gearbox.



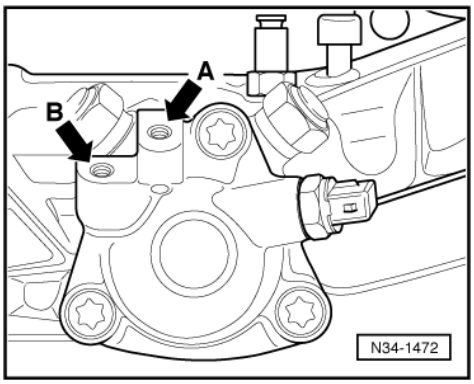
- -> Raise gearbox such that clutch slave cylinder can be installed with holder for hose/pipe assembly (arrow).
- Insert gearbox.
- Tighten engine/gearbox connecting bolts to torque => Page 133 onwards.

- Fit and secure starter.

=> Electrical System; Repair Group 27; Removing and installing starter Removing and installing starter



- -> Press selector lever on gearbox -2- onto gearbox selector shaft.
- Tighten nut -1- to 23 Nm.



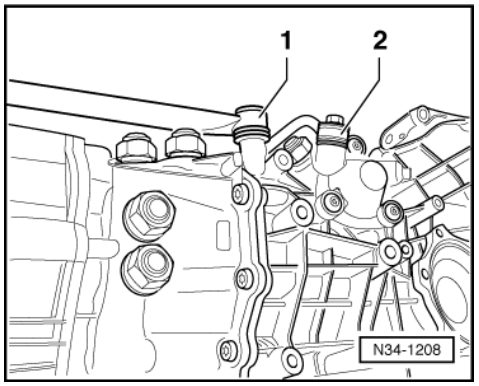
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

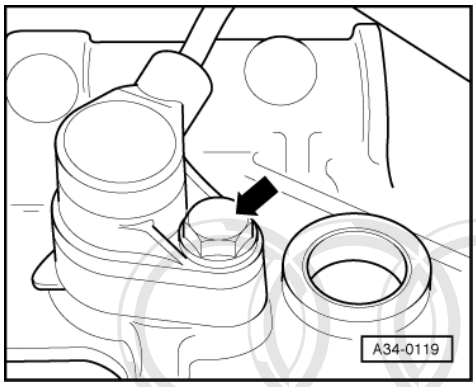
-> Cover for selector shaft is provided with an additional tapped hole

-arrow A- as attachment point for newer connecting rod versions.

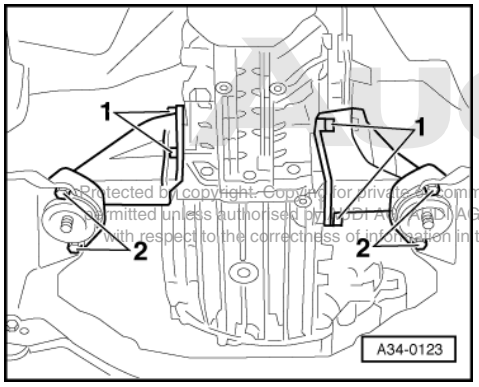
Distinguishing feature => Page 87



- -> Screw (40 Nm) push rod -1- to gearbox with washers if applicable.
- Screw (23 Nm) connecting rod of selector rod -2- to right side of gearbox.
- Attach reversing light connector.
- Attach connector of speedometer sender.

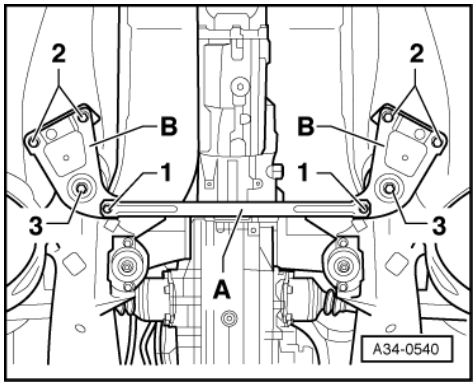


- -> Attach engine speed sender -G28- to gearbox housing -arrow-.



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

- -> Screw right and left gearbox support complete with bonded rubber bush to gearbox and subframe (bolts -1- and -2-). Tightening torques => Page 134 .

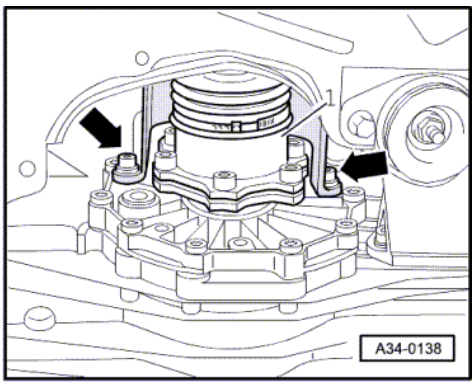


- -> Secure subframe with bolts -2- and -3-.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing subframe Removing and installing subframe

- If applicable, screw cross member -A- to subframe.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing subframe; Removing and installing lower cross member Removing and installing subframe Removing and installing lower cross member



- -> Attach drive shafts -1- to flange shafts.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

- Attach shield/drive shaft on right and left -arrows-. Third bolt is not shown.
- Install oil pipes => Page 157 .
- Replace seal at front of propshaft => Page 345 .
- Bolt on propshaft => Page 349 .
- Assemble exhaust system and perform stress-free alignment.

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Check and if necessary adjust setting of selector rod and push rod => Page 71 .
- Check gear oil level in manual gearbox => Page 156 .

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

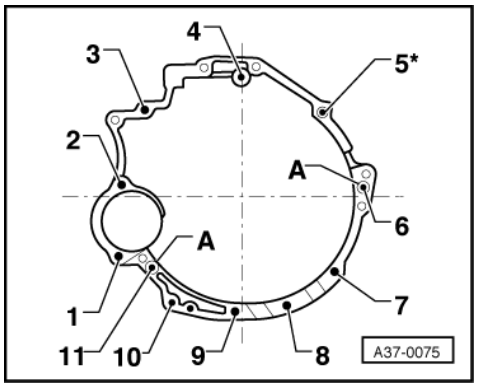
- Heed appropriate instructions for battery connection.

=> Electrical System; Repair Group 27

- After connecting battery, enter radio anti-theft code.

=> Radio operating instructions

- Use electric window lifters to completely close door windows.
- Then actuate all window lifter switches again for at least 1 second in "close" position to activate automatic one-touch function.
- Set clock to correct time.

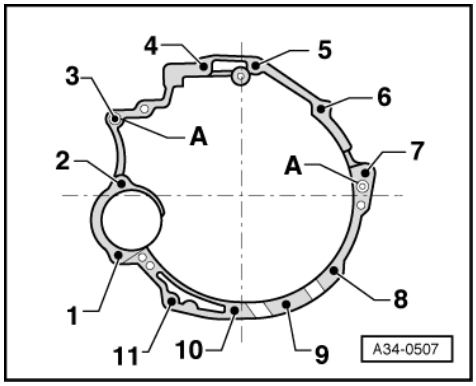


Tightening torques

-> Vehicles with 4-cyl. TDI engine:

Item	Bolt	Nm
1, 3, 4	M12 x 75	65
2, 6	M12 x 90	65
5, 11	M12 x 110	65
7	M10 x 50	45
8, 9, 10	M10 x 45	45

A: Dowel sleeves for centring



-> Vehicles with V6 TDI engine:

Item	Bolt	Nm
1, 2	M12 x 110	65
3, 4	M12 x 67	65
5, 7	M12 x 80	65
6	M12 x 90	65
8	M10 x 50	45
9, 10, 11	M10 x 45	45

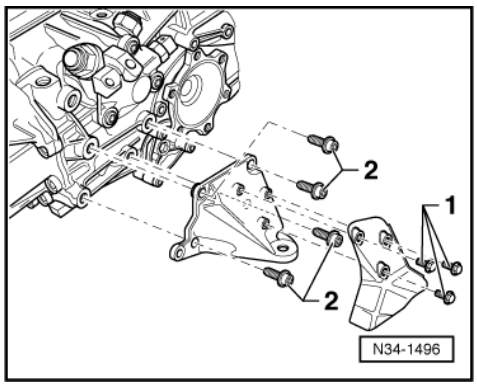
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

A: Dowel sleeves for centring

1) Bolt not fitted on all versions

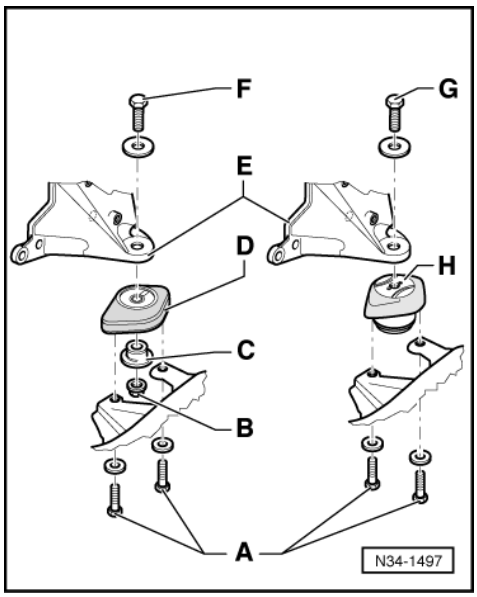
Component		Nm
Clutch slave cylinder to gearbox		23 1)
Engine speed sender -G28		10
Push rod to gearbox		40
Selector rod to gearbox		23
Connecting rod for selector rod to gearbox		23
Heat shields over drive shafts to gearbox		25
Holder for noise insulation to subframe		10
Heat shield for propshaft to cover for Torsen differential		25
Cross member for floor	M8	22
to body	M10	45

1) Always replace bolts



-> Right and left gearbox support to gearbox

Bolts -1-	10 Nm
Right and left gearbox support to gearbox	40



-> Right and left gearbox mounting to gearbox support/subframe

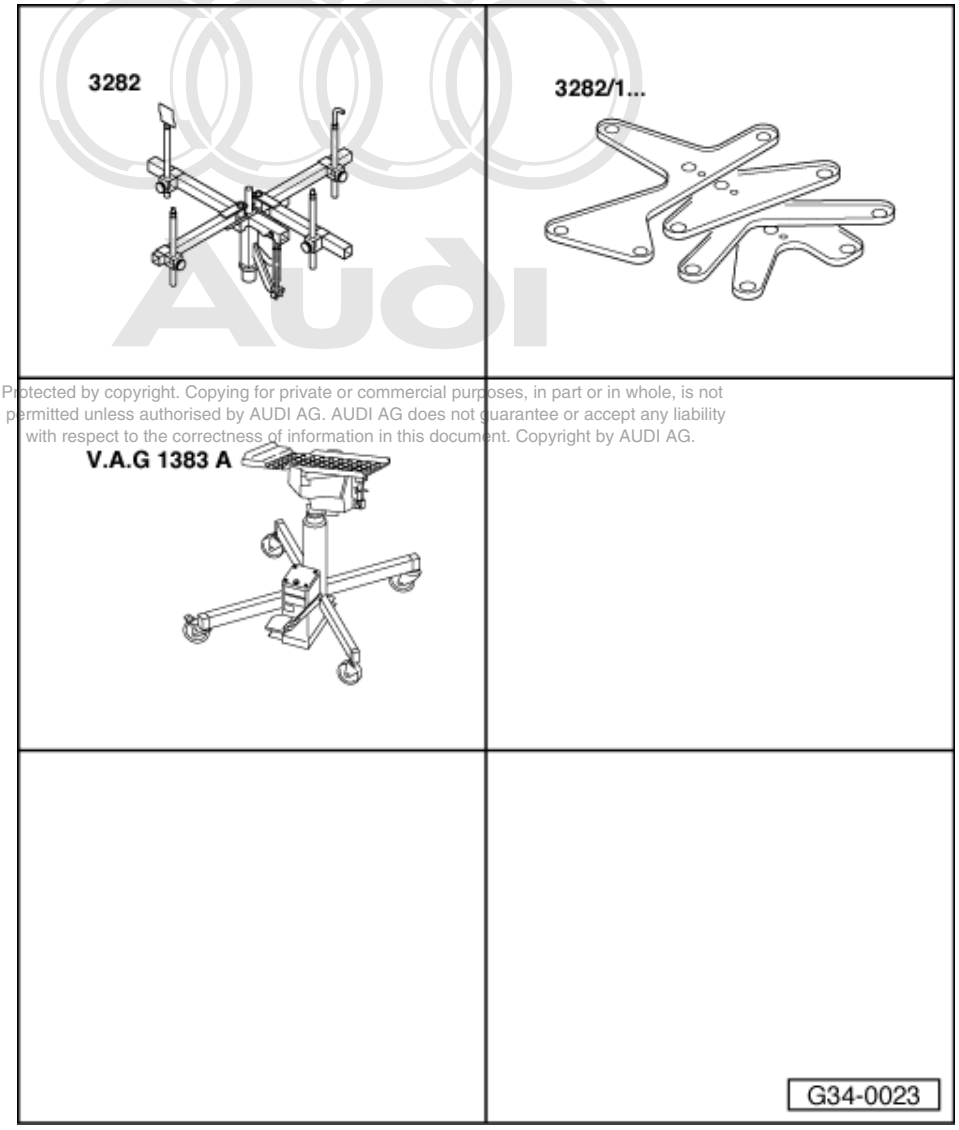
Bolts -A-	27 Nm
Nut -B- to bolt -F-	50 Nm
Bolt -G-1)	50 Nm

1) Bolt -G- is screwed directly into gearbox mounting -H-. Items -B- and -C- not applicable.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 - Removal on vehicles with V6 bi-turbo engine (S4, RS4)

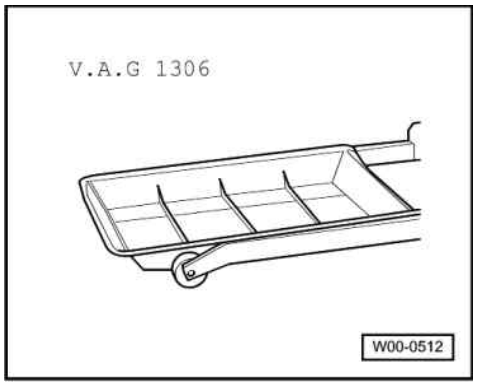
5.1 - Removal on vehicles with V6 bi-turbo engine (S4, RS4)



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

Special tools and workshop equipment required

- Gearbox mount 3282
- Adjustment plate 3282/12
- Engine/gearbox lifter V.A.G 1383 A



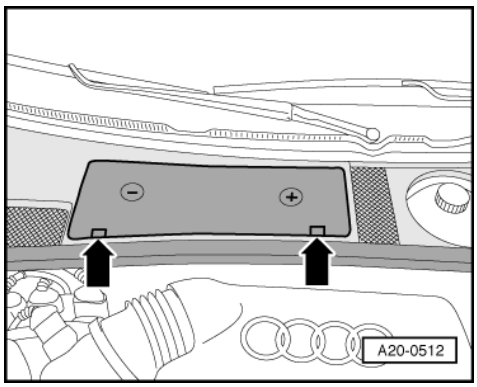
Special tools, testers and other items required

- Drip tray V.A.G 1306

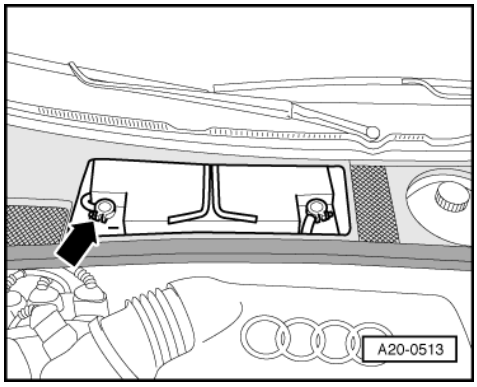
Note:

All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.

Attention:
Heed appropriate instructions for battery disconnection. =>Electrical System; Repair Group 27

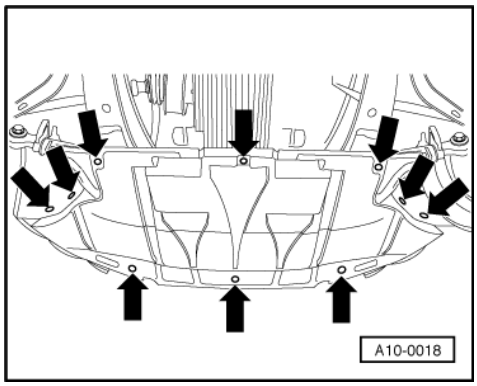


- Heed (if necessary obtain) code for vehicles with encoded radio/radio navigation system (RNS).
- -> Remove cover over battery -arrows-.

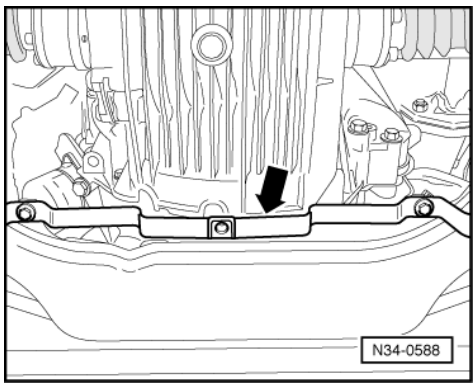


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

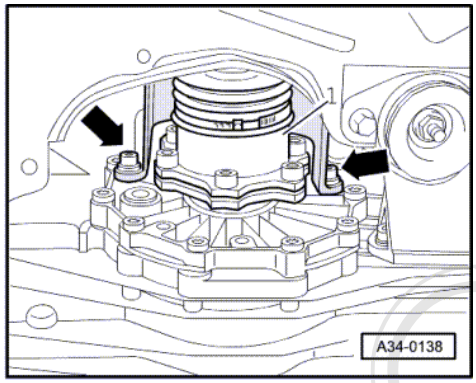
- -> Disconnect earth strap -arrow- at battery with ignition switched off.



- -> Detach noise insulation -arrows-.



- -> Unscrew holder for noise insulation -arrow-.



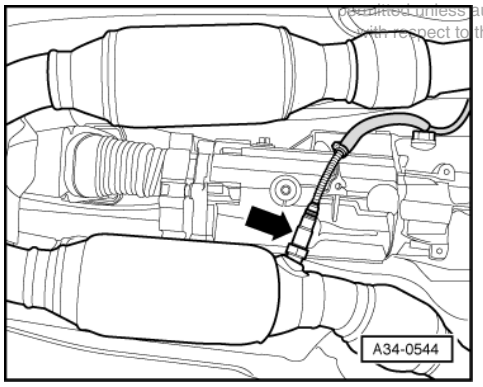
- -> Detach heat shield over left and right drive shaft from gearbox -arrows-. Third bolt is not shown.
- Unscrew drive shafts -1- on left and right from gearbox flange.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

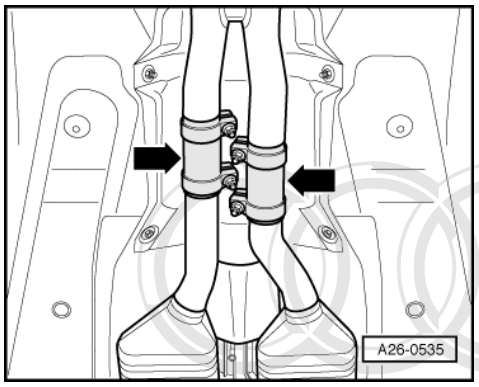
Note:

Take care not to damage surface protection of drive shafts.

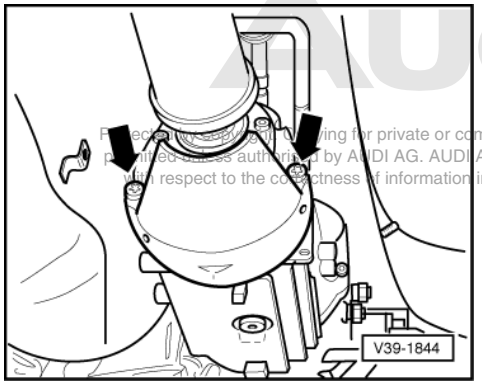
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> If fitted, screw out Lambda probe on left -arrow- and lay it aside.

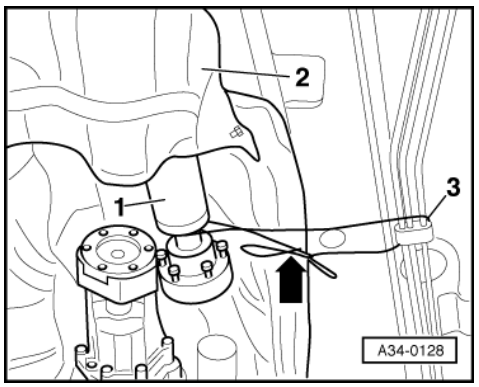


- -> Unfasten clamping sleeves -arrows- and slide to rear.

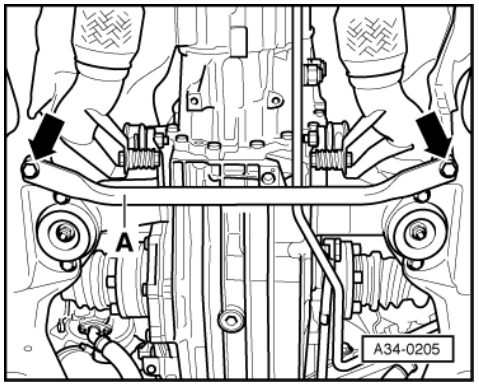


Reproduction or processing for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

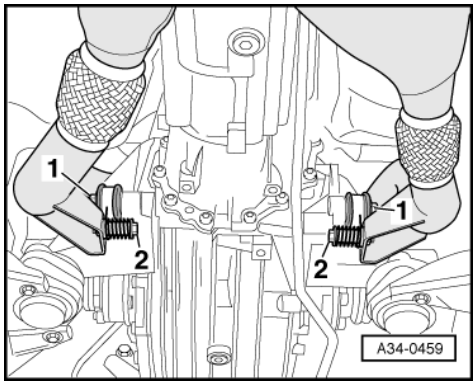
- -> Unscrew heat shield for propshaft from cover for Torsen differential -arrows-.



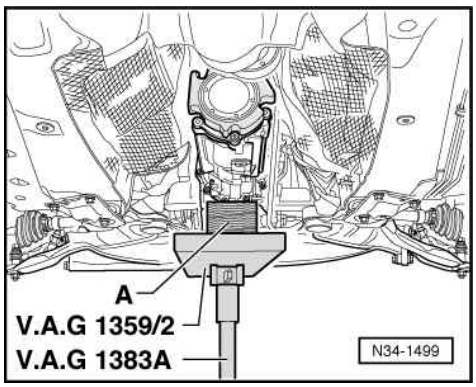
- -> Unscrew propshaft -1- at gearbox and set down on heat shield -2-.
- Use wire -arrow- to attach propshaft to holder -3- of fuel pipes.



- -> Slacken off bolts -arrows- and detach cross member -A-.

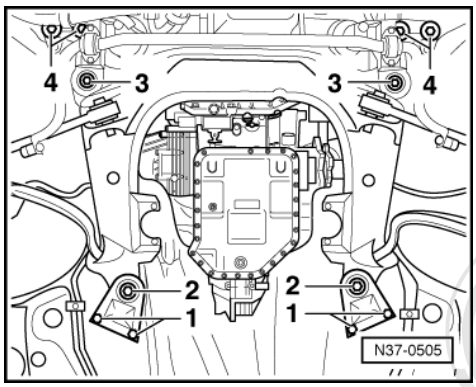


- -> Unscrew both exhaust system brackets. To do so, screw out bolts -1- and -2-.



- -> Use gearbox lifter V.A.G 1383 A to raise gearbox slightly.

A - Wooden block

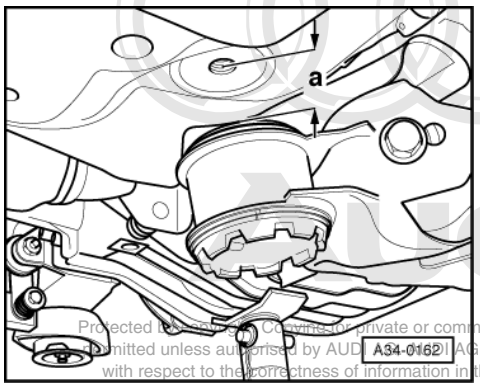


- -> Screw out bolts -1- and -2- on right and left side.

Note:

Bolts -3- and -4- are not to be screwed out, as otherwise wheel alignment would have to be performed.

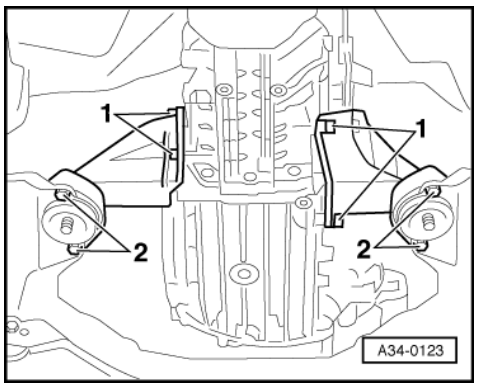
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



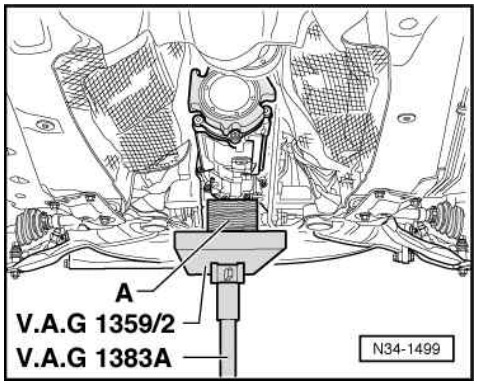
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Lower subframe at rear and insert spacer, e.g. wooden wedge, in gap.

◆ Dimension -a- max. 50 mm



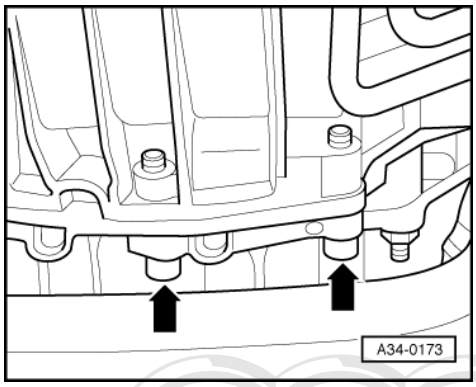
- -> Screw out bolts -2- on right and left side and use gearbox lifter V.A.G 1383 A to raise gearbox slightly again.
- Screw out bolts -1- and take out right and left gearbox supports complete with bonded rubber bush.



- -> Raise gearbox further.

Note:

Take care not to damage selector rods on further raising gearbox.

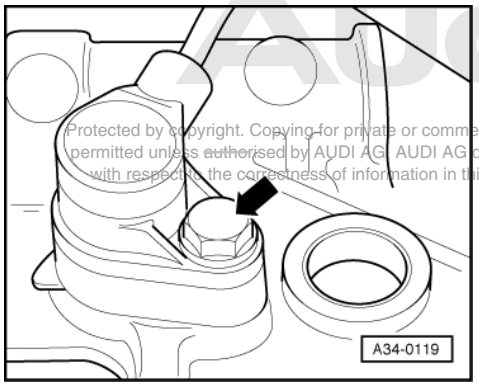


- -> Screw out the 2/3 lower engine/gearbox connecting bolts -arrows-.

Note:

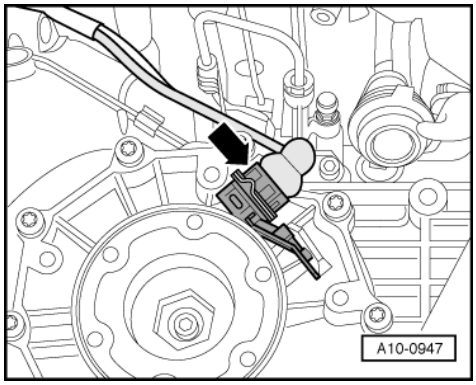
To permit tightening of the two bolts -arrows- with a torque wrench following gearbox installation, the two hexagon socket-head bolts M10x60 must be replaced with new hexagon bolts M10x55, part no. N 104 684 01.

- Slowly lower gearbox again and move gearbox lifter aside.

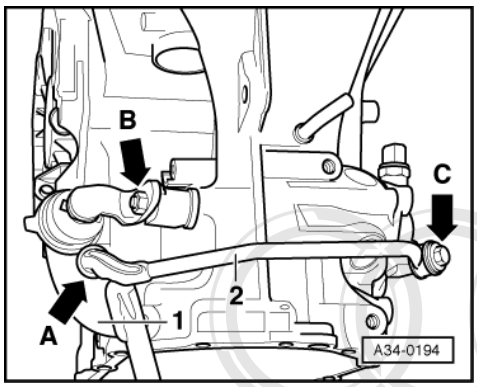


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Remove engine speed sender -G28 on left of gearbox -arrow- and lay aside.



- -> Unplug connector -arrow-at speedometer sender -G22 on left of gearbox.

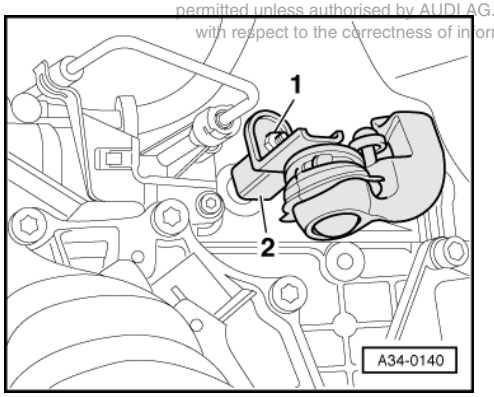


Important note on subsequent operations:

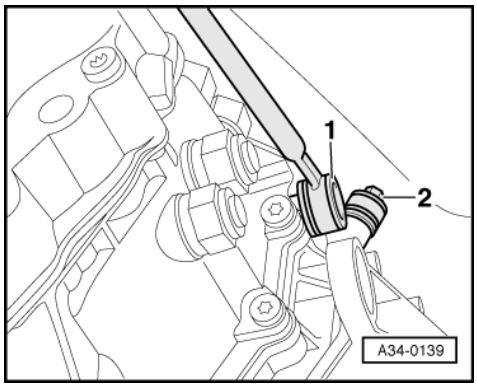
-> When removing shift mechanism (up to approx. 11.00), never detach ball end -arrow A- of connecting rod -2- from selector rod -1-.

Detaching would destroy ball end.

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



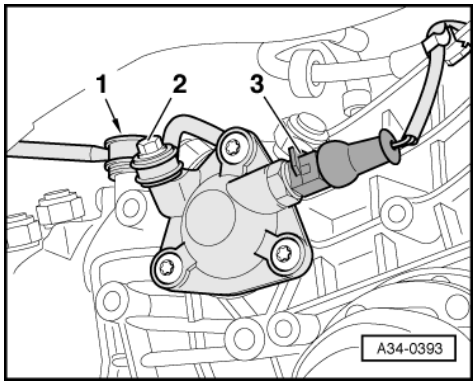
- -> Unscrew nut -1- and pull lever -2- of selector rod off gearbox selector shaft.



Version with push rod on side:

- -> Screw out hexagon socket-head bolt of push rod -1-.

Version with push rod at top:



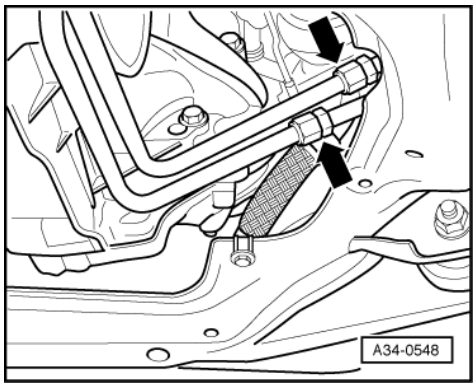
- -> Screw out 8 mm hexagon socket-head bolt of push rod -1-.

Note:

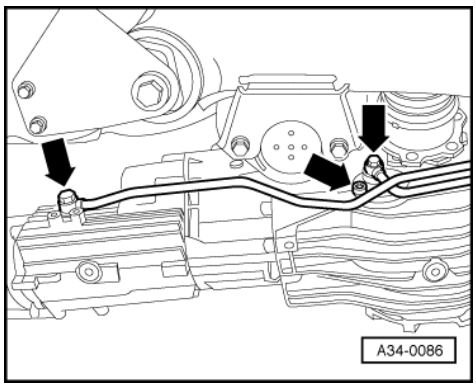
Packing plates may have been fitted between gearbox and push rod. If this is the case, they must be inserted again on assembly.

All models:

- Unscrew connecting rod -2- on right side of gearbox.
- Unplug connector -3- for reversing light switch on right of gearbox and lay bare wire.

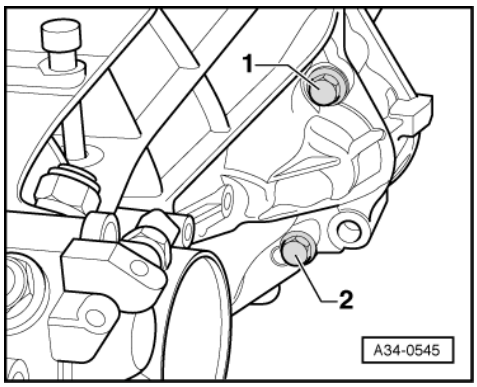


- Place drip tray V.A.G 1306 in position.
- -> Detach oil pipes for gear oil cooling at separation points -arrows- in front of right drive shaft.



- -> Unscrew oil pipes at gearbox -arrows-. Seal holes with plugs.

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

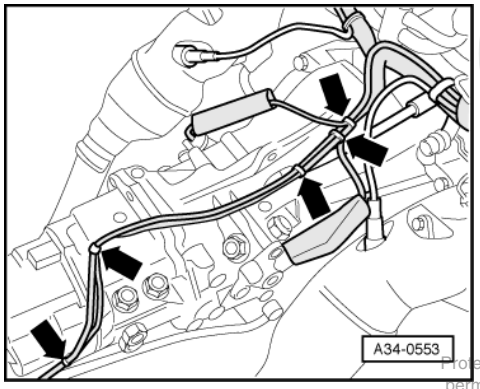


Notes:

- Starter cables do not have to be disconnected.
- Bolt -2- may make contact with drive shaft and cannot be pulled out entirely.

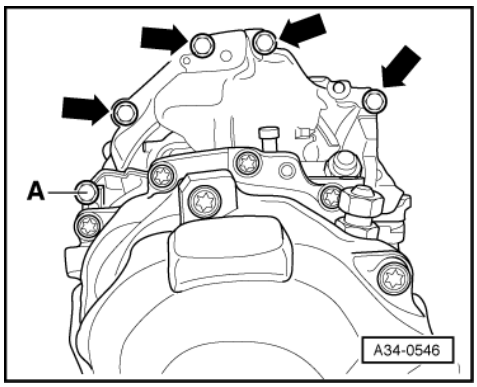
- -> Screw out starter bolts -1- and -2- or pull them out as far as possible. Secure starter to side of engine compartment if necessary.

=> Electrical System; Repair Group 27; Removing and installing starter Removing and installing starter



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

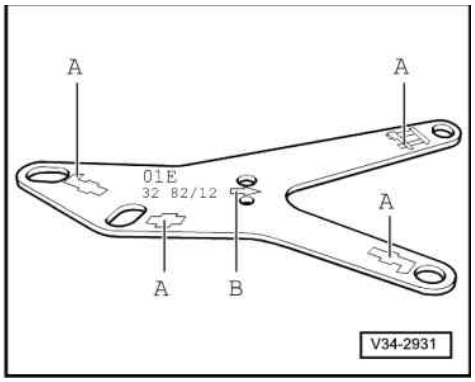
- -> Unfasten all cable ties/clips for attaching wiring harness to gearbox -arrows- and lay bare wiring harness over gearbox.



- -> Screw out engine/gearbox connecting bolts at top -arrows-.

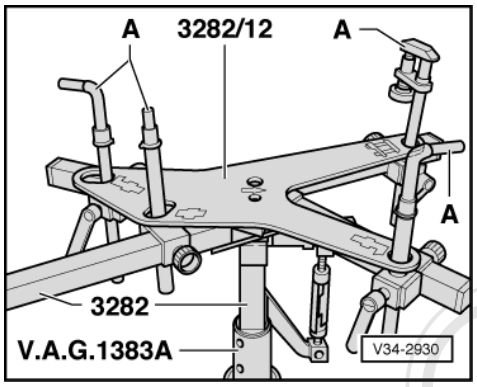
Note:

Leave connecting bolt -A- screwed in to hold in position.

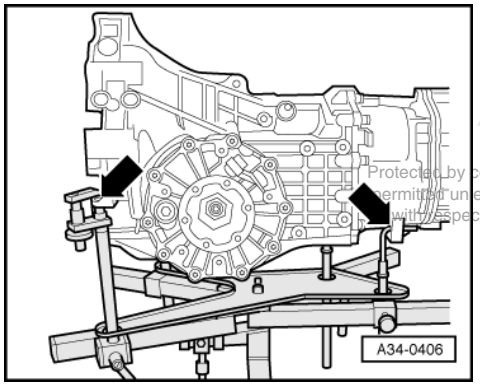


Notes:

- -> Mounting elements -A- are illustrated symbolically, arrow -B- faces in direction of travel.
- Adjustment plate 3282/12 only fits in one position.
- Elongated holes in adjustment plate 3282/12 can accommodate different gearbox housing and gearbox cover versions.

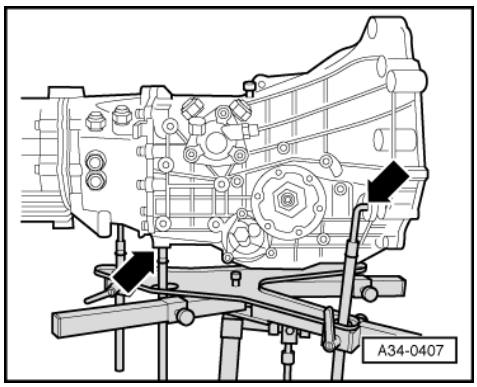


- -> Position gearbox mount 3282 on gearbox lifter V.A.G 1383 A.
- Align arms of gearbox mount to coincide with holes in adjustment plate.
- Screw in mounting elements -A- as shown on adjustment plate.

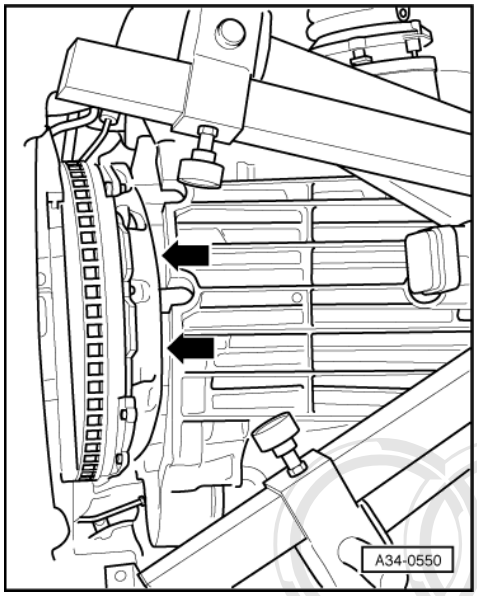


- -> Position gearbox lifter V.A.G 1383 A with gearbox mount 3282 beneath gearbox and attach as shown to left ...

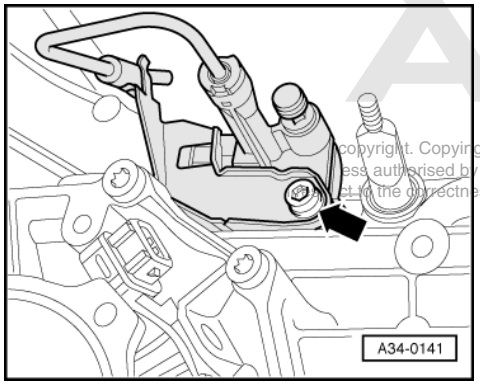
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> ... and right side of gearbox.



- Screw out remaining engine/gearbox connecting bolts.
- -> Press gearbox off dowel sleeves and move gearbox away from engine and parallel with it until there is a small gap -arrows- between gearbox and clutch.

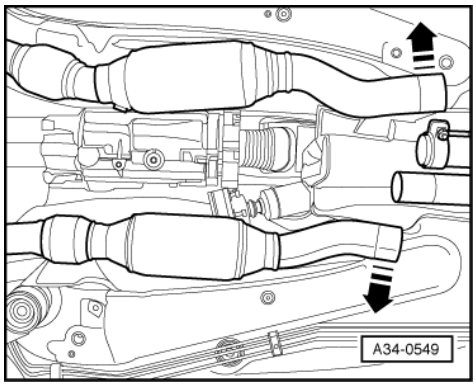


Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Lower gearbox slightly with gearbox lifter V.A.G 1383 A until bolt -arrow- at slave cylinder is just accessible.
- Screw out bolt -arrow- and pull out clutch slave cylinder to rear. Do not open piping system.

Note:

Do not press clutch pedal after removing slave cylinder.



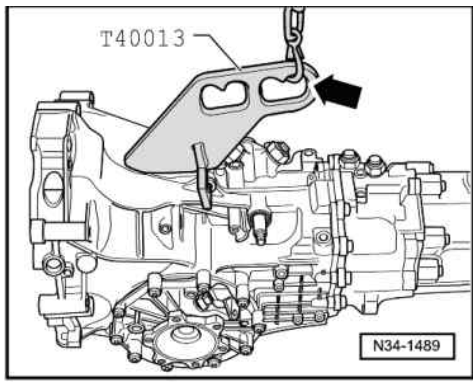
Note:

Take care not to over-deflectdecoupling element (flexible pipe connection) at front exhaust pipe. Catalytic converter must notbe offset by more than 10 °with respect to front exhaust pipe as otherwise decoupling element would be damaged.

- -> Press the two catalytic converters apart (max. 10°) and completely lower gearbox.

Note:

On lowering, ensure clearance with respect to drive shafts.



Gearbox transportation

- -> Insert transportation device T40013 in lifting eye of gearbox and secure.
- Engage hook of workshop crane in 4th mount -arrow- of transportation device.
- Support gearbox with workshop crane and transportation device T40013.

5.2 - Fitting gearbox on vehicles with V6 bi-turbo engine (S4, RS4)

Install in reverse order, paying attention to the following:

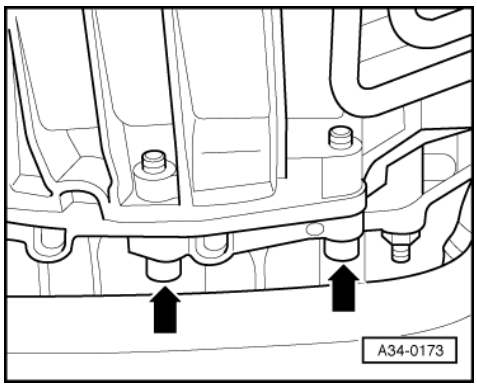
Notes:

- Replace self-locking nuts and bolts when performing assembly work.
- Replace bolts tightened to torque as well as sealing rings and gaskets.
- Secure all hose connections with standard hose clamps.

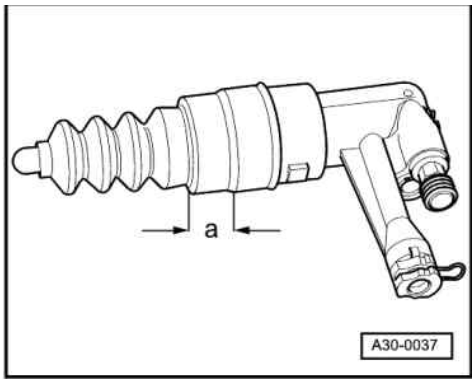
=> Parts List

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

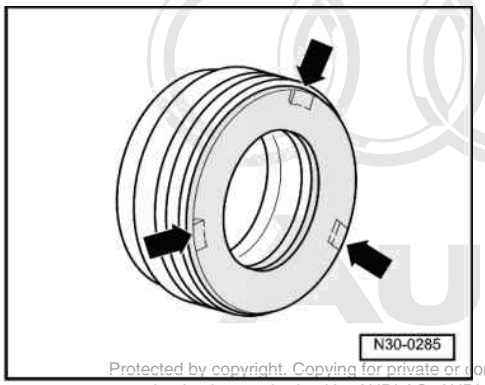
- All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.
- Before installing gearbox, tie wiring to one side so that it cannot be trapped between engine and gearbox.
- Check whether dowel sleeves for centring engine/gearbox have been fitted in engine flange and insert if necessary => Page 154 .
- If gearbox is replaced, transfer gearbox supports with gearbox mounting. Tightening torques => Page 155 .



- -> To permit tightening of the two bolts -arrows- with a torque wrench following gearbox installation, the two hexagon socket-head bolts M10x60 must be replaced with new hexagon bolts M10x55, part no. N 104 684 01.
- Tightening torques only apply to slightly greased, oiled, phosphated or blackened nuts and bolts.
- Additional lubricants, such as engine or gear oil are permitted, however not lubricants which contain graphite.
- Use is never to be made of degreased parts.
- Tolerance for tightening torques ±15%



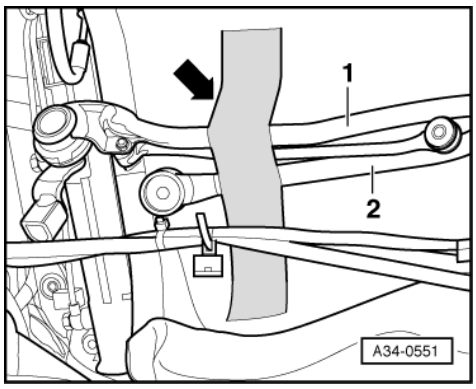
- -> Before installing slave cylinder in gearbox housing, area -a- of boot must be coated with lithium grease G 052 150 A2.
- On vehicles with gear oil cooling, blow out oil pipes and cooler with compressed air on completion of gearbox repairs/replacement.
- Prior to assembly, always use thread tap to remove remnants of locking fluid from tapped holes in flange shaft of manual gearbox for propshaft.



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

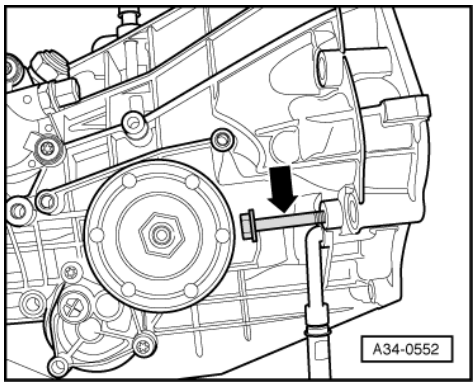
- Clean input shaft splines and - in the case of used clutch plates - hub splines, remove corrosion and apply extremely thin layer of grease G 000 100 to splines. Do not grease guide sleeve.
- Check clutch release bearing for wear and replace if necessary.

- -> If plastic ring of release bearing is loose, bond it back onto bearing race with adhesive AMV 195 KD1 01.
  - Three square lugs -arrows- of the plastic ring engage in the recesses of the bearing race.



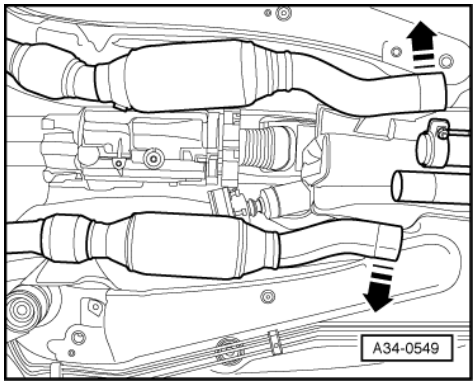
- Release bearing must be replaced in the event of scoring deeper than 0.5 mm.

Apply thin coat of copper grease, e.g. Z 381 351 TE, to contact surface for plunger at clutch release lever.
-> Use adhesive tape -arrows- to attach selector rod -1- and push rod -2- to underside of vehicle (propshaft tunnel).
Before installing gearbox, tie wiring to one side so that it cannot be trapped between engine 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.

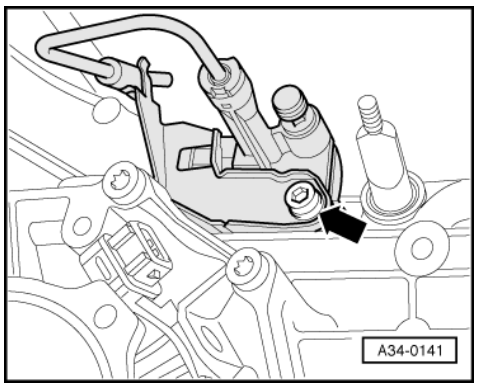
- Position intermediate plate on dowel sleeves.
- -> Insert lower starter bolt -arrow- in gearbox housing. It may not be possible to fit bolt with gearbox in position.



Note:

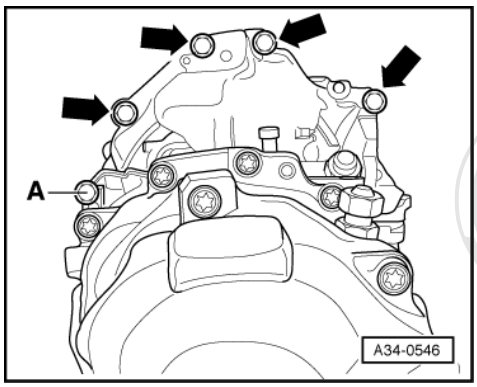
Take care not to over-deflectdecoupling element (flexible pipe connection) at front exhaust pipe. Catalytic converter must notbe offset by more than 10 °with respect to front exhaust pipe as otherwise decoupling element would be damaged.

- -> Press the two catalytic converters apart (max. 10°) and raise gearbox. In doing so, pay attention to clearance with respect to drive shafts, propshaft and subframe.



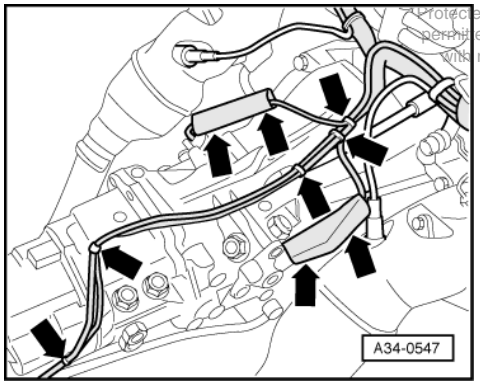
- -> Raise gearbox such that clutch slave cylinder can be installed with holder for hose/pipe assembly (arrow).

- Insert gearbox.

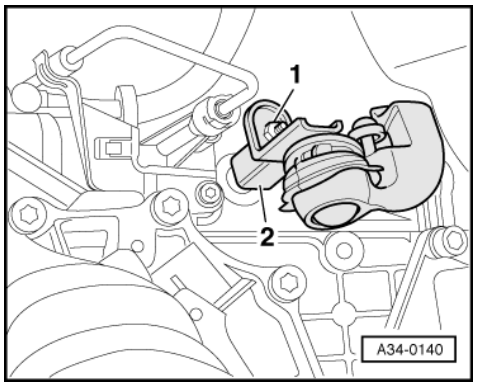


- -> Tighten upper engine/gearbox connecting bolts -arrows- to torque
  => Table, Page 154 .
- Detach gearbox lifter from gearbox after bolting gearbox to engine.

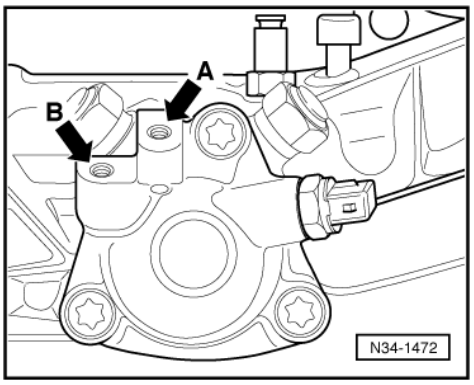
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Re-attach all cable ties, clips and heat insulation mats -arrows- at original locations.



- -> Press selector lever on gearbox -2- onto gearbox selector shaft.
- Tighten nut -1- to 23 Nm.

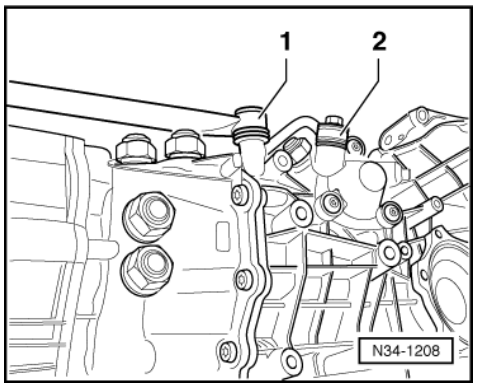


Note:

-> Cover for selector shaft is provided with an additional tapped hole

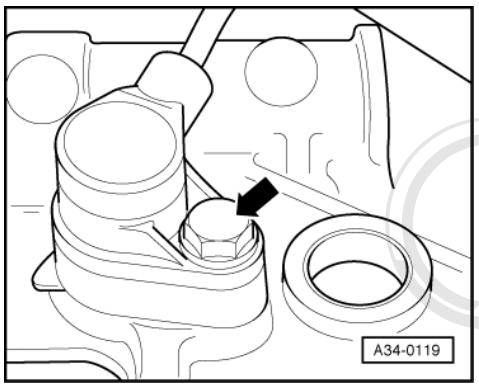
-arrow A- as attachment point for newer connecting rod versions.

Distinguishing feature => Page 87



- -> Screw (40 Nm) push rod -1- to gearbox with washers if applicable.
- Screw (23 Nm) connecting rod of selector rod -2- to right side of gearbox.
- Attach reversing light connector.
- Attach connector of speedometer sender.

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



- -> Attach engine speed sender -G28 to gearbox housing -arrow-.
- Raise gearbox with gearbox lifter V.A.G 1383A.

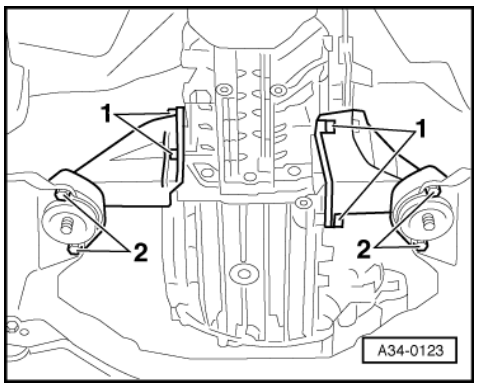
Note:

Take care not to damage selector rods on further raising gearbox.

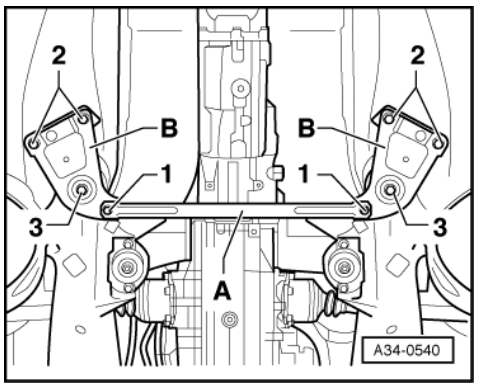
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Screw in bolts for engine/gearbox attachment at bottom as well as for starter; to do so, insert starter.
- Fit and secure starter.

=> Electrical System; Repair Group 27; Removing and installing starter Removing and installing starter



- -> Screw right and left gearbox support complete with bonded rubber bush to gearbox and subframe (bolts -1- and -2-).

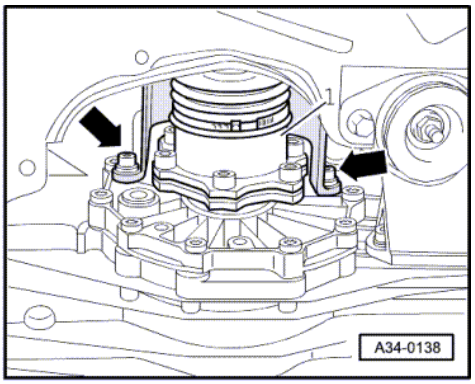


- -> Secure subframe with bolts -2- and -3-.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing subframe Removing and installing subframe

- Install subframe and, if applicable, cross member at subframe.

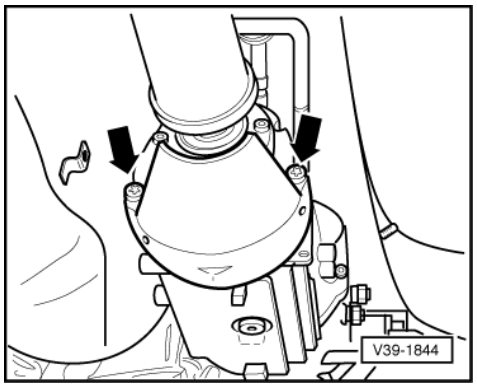
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing sub-frame; Removing and installing lower cross member Removing and installing subframe Removing and installing lower cross member



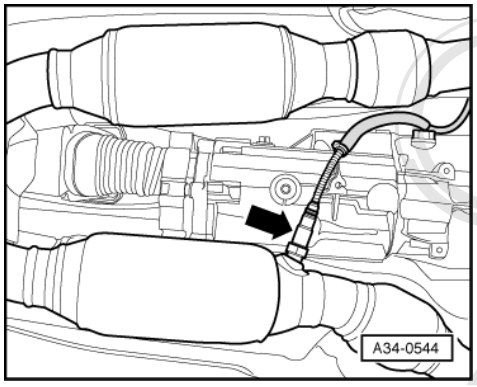
- -> Attach drive shafts -1- to flange shafts.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

- Attach shield/drive shaft on right and left -arrows-. Third bolt is not shown.



- Install oil pipes => Page 157 .
- Replace seal at front of propshaft => Page 345 .
- Bolt on propshaft => Page 349 .
- -> Attach shield for propshaft -arrows-.



- -> Fit Lambda probe -arrow-, assemble exhaust system and perform stress-free alignment.

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

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

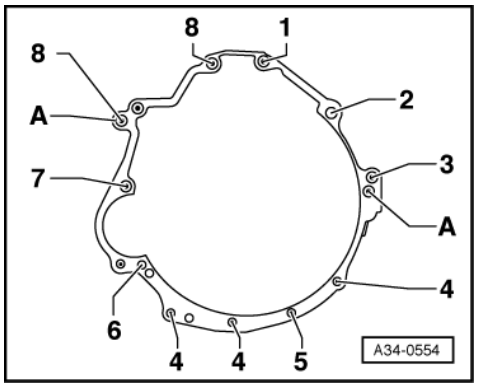
- Check and if necessary adjust setting of selector rod and push rod => Page 71 .
- Check gear oil level in manual gearbox => Page 156 .
- Heed appropriate instructions for battery connection.

=> Electrical System; Repair Group 27

- After connecting battery, enter radio anti-theft code.

=> Radio operating instructions

- Use electric window lifters to completely close door windows.
- Then actuate all window lifter switches again for at least 1 second in "close" position to activate automatic one-touch function.
- Set clock to correct time.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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

Note:

Depending on version, bolts of differing length may be used for a given item.

Item	Bolt	Qty.	Nm
1	M 12x80 or M 12x90	1	65
2	M 12x95 or M 12x100	1	65
3	M 12x90	1	65
4	M 10x60	3	45
5	M 10x601)	1	45
6	M 10x150	1	65
7	M 12x130	1	65
8	M 12x75 or M 12x80	2	65

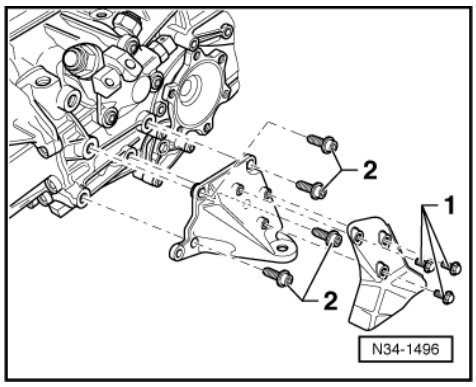
Dowel sleeves -A- for centring

1) Bolt not fitted on all versions

Component	Nm
Clutch slave cylinder to gearbox1)	23
Engine speed sender -G28	10
Push rod to gearbox	40
Selector rod to gearbox	23
Connecting rod for selector rod to gearbox	23
Heat shields over drive shafts to gearbox	25
Holder for noise insulation to subframe	10

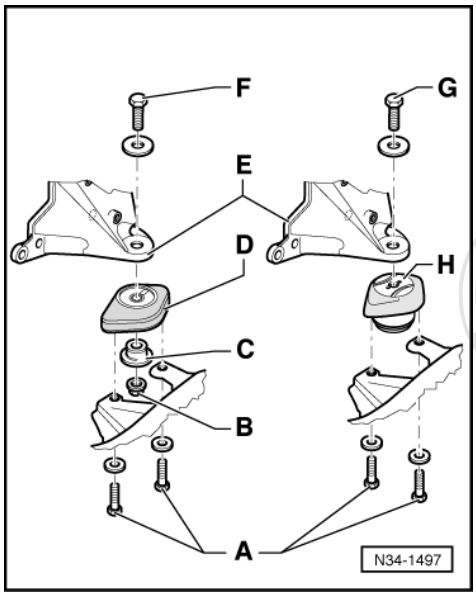
Component	Nm
Heat shield for propshaft to cover for Torsen differential	25

1) Always replace bolts



-> Right and left gearbox support to gearbox

Bolts -1-	10 Nm
Right and left gearbox support to gearbox	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.

-> Right and left gearbox mounting to gearbox support/subframe

Bolts -A-	27 Nm
Nut -B- to bolt -F-	50 Nm
Bolt -G-1)	50 Nm

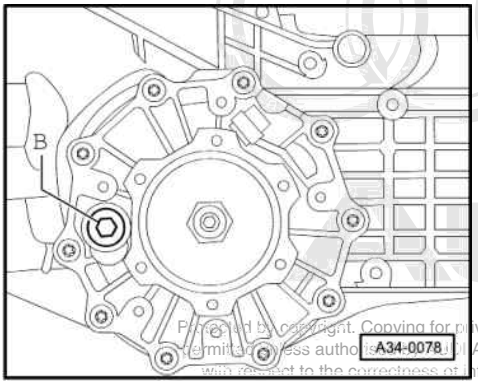
1) Bolt -G- is screwed directly into gearbox mounting -H-. Items -B- and -C- not applicable.

6 - Checking gear oil level in manual gearbox

6.1 - Checking gear oil level in manual gearbox

Notes:

- Vehicle must be standing on an absolutely flat surface for checking gear oil level. This is best done over an assembly pit or using a 4-column lifting platform.
- Prescribed oil level must be precisely maintained; gearbox reacts extremely sensitively to overfilling.
- On vehicles with gear oil cooling, a short test drive must be performed before checking gear oil level following gearbox repairs, gearbox replacement and work on gear oil pipes/cooler.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 out oil filler plug -B- (in front of flange shaft) to check gear oil level.
- Use improvised tool, e.g. angled piece of wire, to check oil level.

Vehicles without gear oil cooling:

- Specification: Oil level 4 mm ±1 below lower edge of oil filler hole

Vehicles with gear oil cooling:

- Specification: Oil level 9 mm ±1 below lower edge of oil filler hole

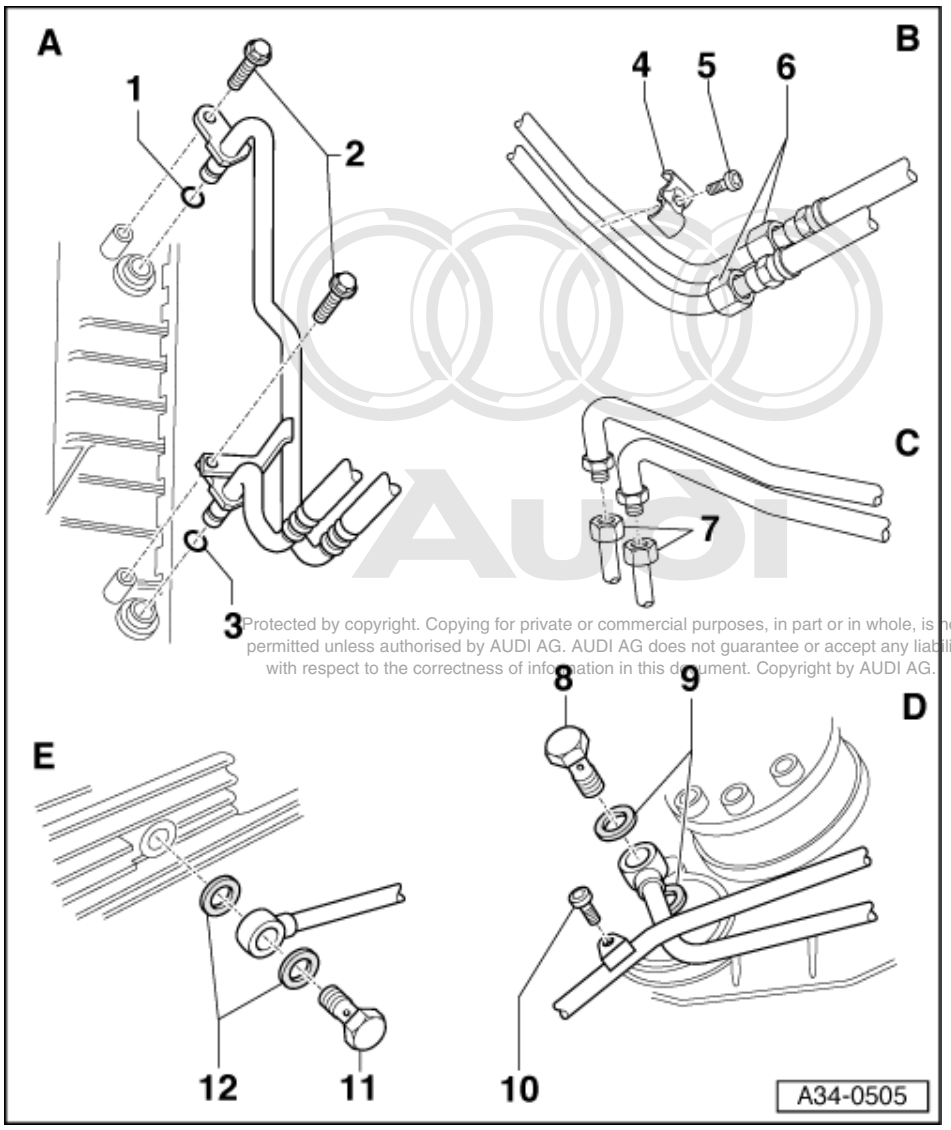
- Top up gear oil if necessary. Specification => Page 2 .
- Screw in oil filler plug.

Tightening torque

Component	Nm
Oil filler plug	40

7 - Removing and installing oil pipes

7.1 - Removing and installing oil pipes



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

Blow out oil pipes and cooler with compressed air on completion of gearbox repairs/replacement.

A - Connection to cooler

1 O-ring
- Replace

2 5 Nm

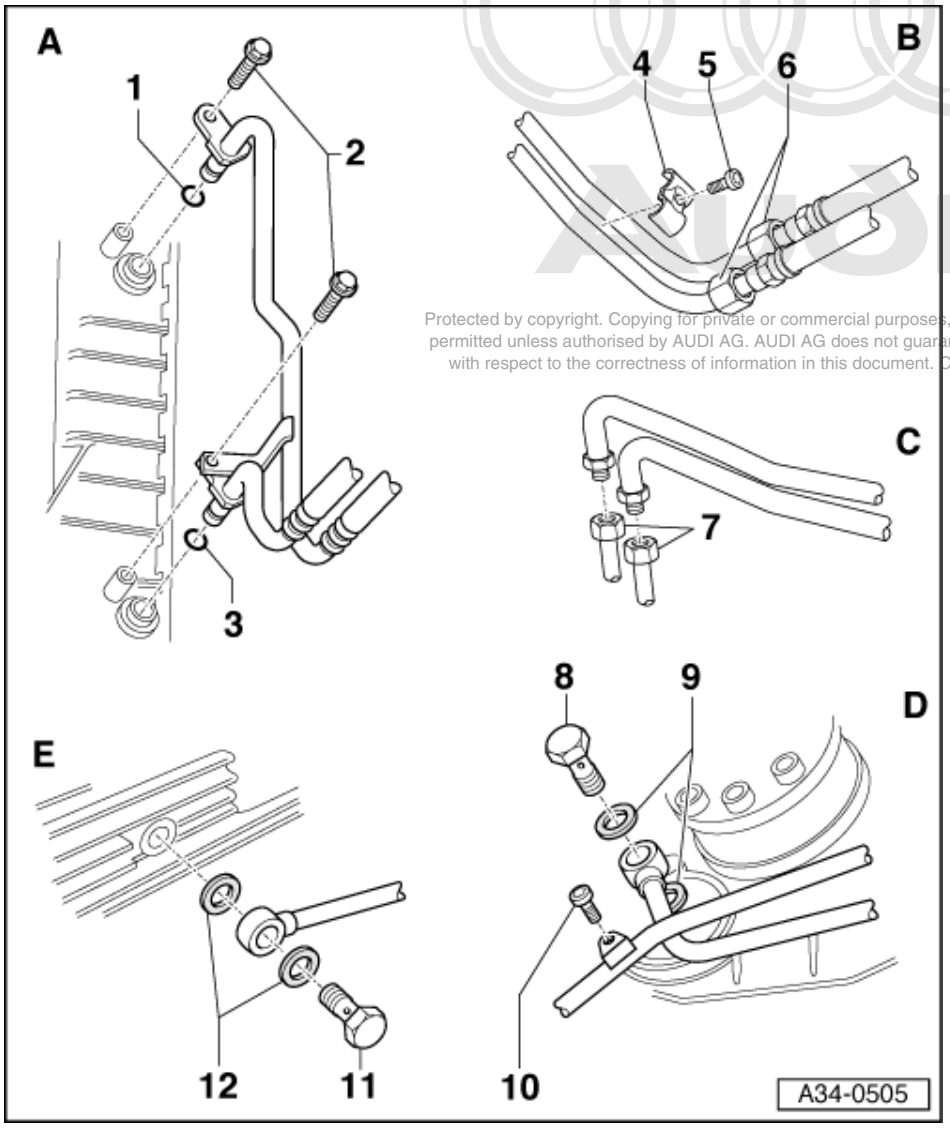
3 O-ring
- Replace

B - Fastener at front right of engine

4 Clamp

5 5 Nm

6 Union nut, 29 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.

C - Fastener at rear right of engine

7 Union nut, 29 Nm

D - Connection to oil pump

8 Banjo bolt, 25 Nm
9 Oil seals
- Replace

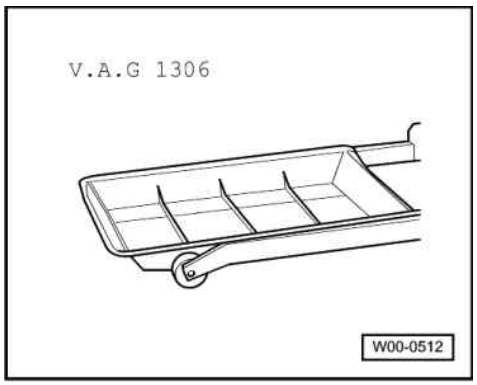
10 24 Nm

E - Connection to gearbox housing

11 Banjo bolt, 25 Nm
12 Oil seals
- Replace

8 - Removing and installing oil pump

8.1 - Removing and installing oil pump

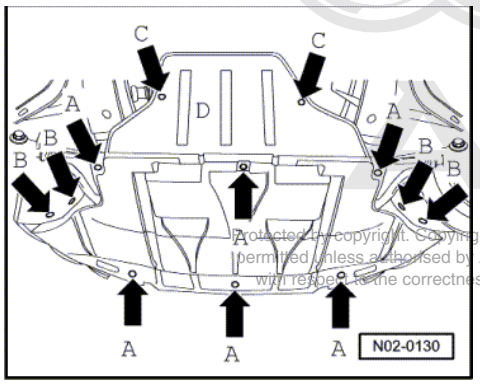


Special tools, testers and other items required

- V.A.G 1306 Drip tray

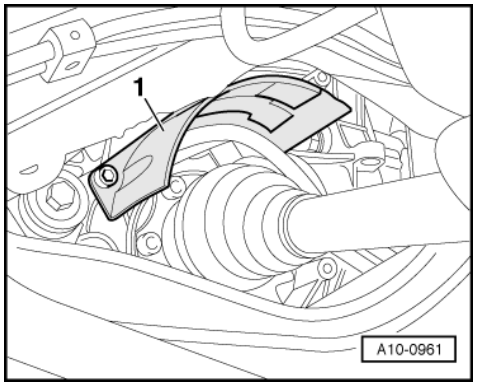
Removing

- Gearbox fitted



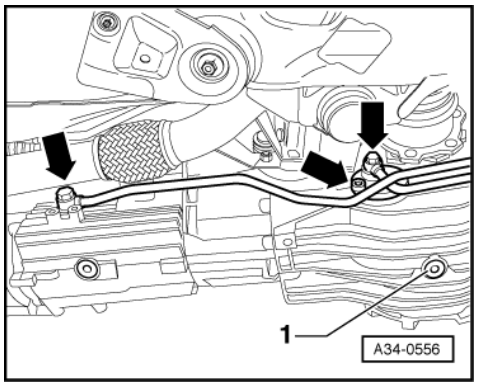
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> If fitted, remove rear section -D- of noise insulation -arrows A and C-.

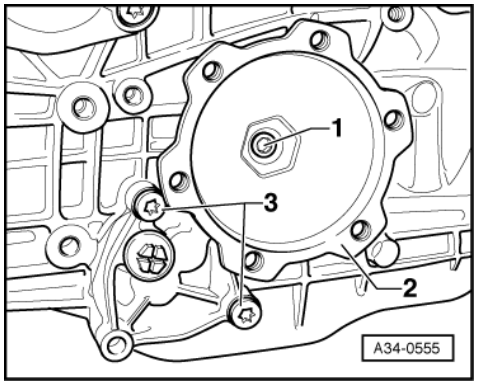


- -> Detach heat shield -1- over right drive shaft from gearbox -arrows-.
- Unscrew right drive shafts.

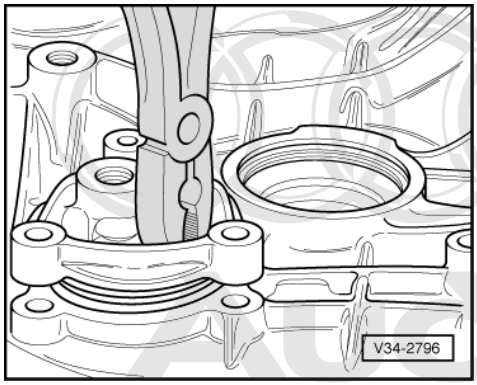
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft



- Place drip tray V.A.G 1306 in position.
- -> Open plugs -1- and drain off gear oil.
- Unscrew oil pressure pipes at gearbox -arrows-.



- -> Screw out bolt -1- and pull right flange shaft -2- out of gearbox.
- Screw out bolts of oil pump cover -3-.



- -> Grip oil pump with pliers at stiffening web of oil pump cover and pull out in axial direction.
- Take care not to tilt oil pump.

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

Installing

Install in reverse order, paying attention to the following:

- Replace O-ring.
- On replacing oil pump, make sure input pinion meshes with input gear.
  - In this process, oil pump cover makes full contact with housing flange
- Install right flange shaft.
- Replace oil seals at oil pressure pipes.

- Attach drive shaft to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

- Attach shield/right drive shaft.
- Top up gear oil in manual gearbox and check oil level => Page 156 .

Tightening torques

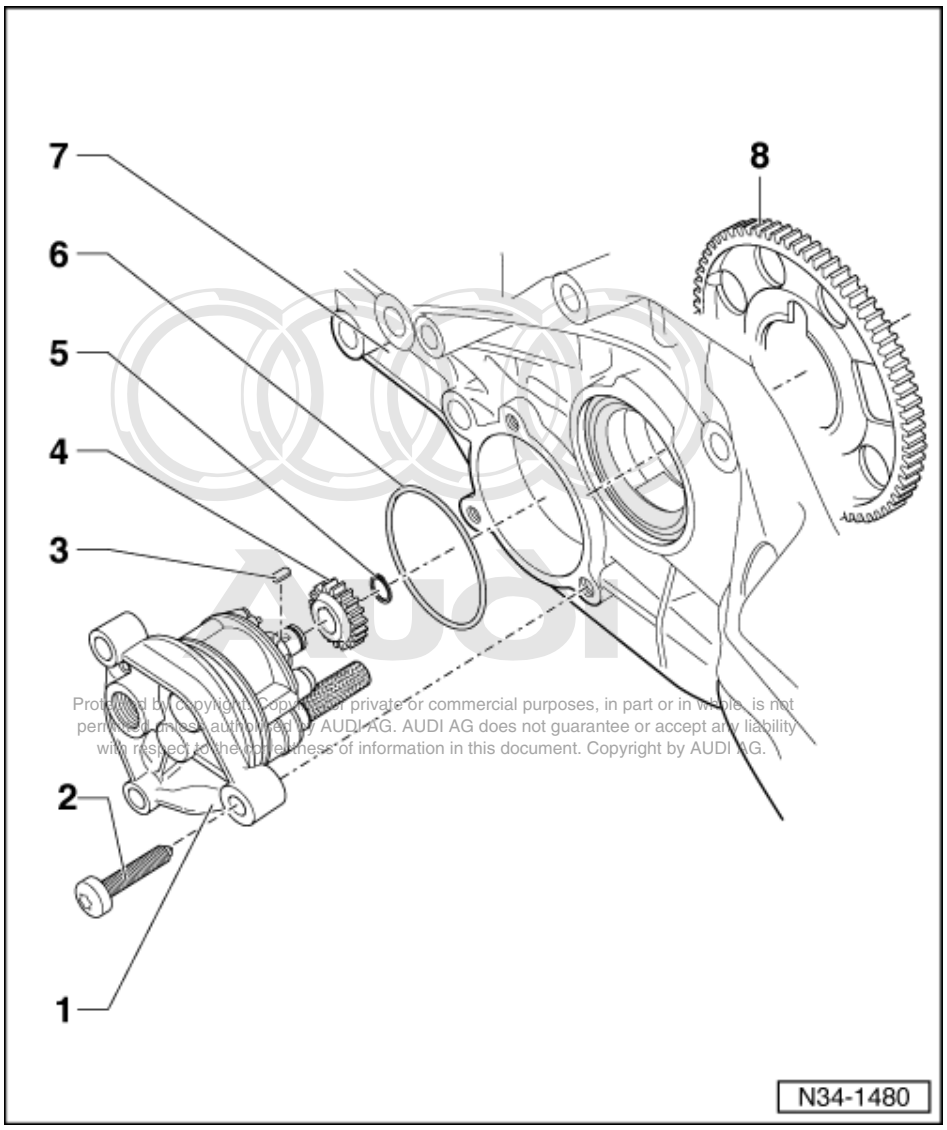
Component	Nm
Oil drain plug	40
Oil pump cover to gearbox housing	25
Return pipe bracket to oil pump cover	25
Banjo bolt to oil pump cover 1)	25
Banjo bolt to end cover 1)	25
Heat shields over drive shafts to gearbox	25

1) Replace oil seals

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 - Servicing oil pump

9.1 - Servicing oil pump



Protected by Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 pump
- Replace only as complete assembly
- Removing =>Page 159
- Clean strainer
- Installing =>Page 160

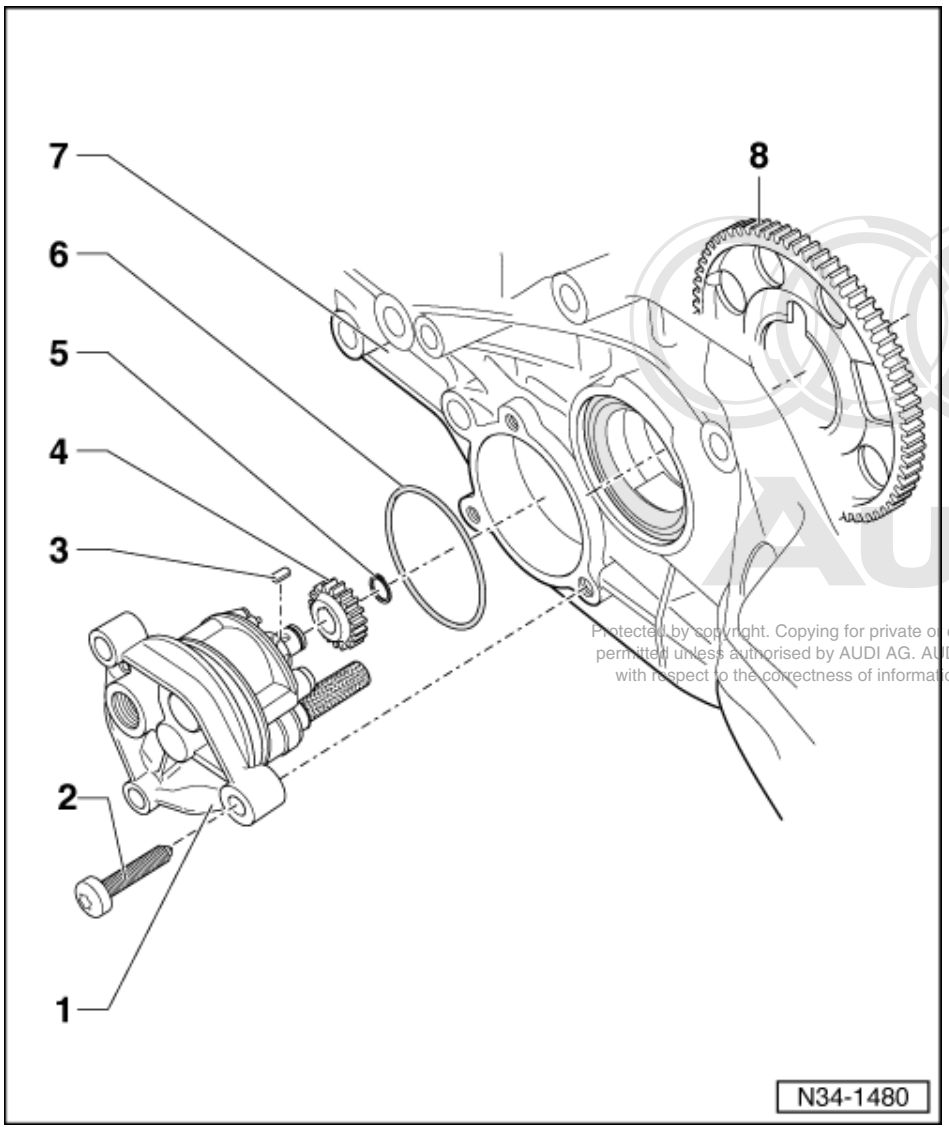
2 Torx bolt, 25 Nm
- 3x

3 Fitted key

4 Small drive gear
- Installation position: Collar facing oil pump

5 Circlip

6 O-ring
- Always replace
- Apply gear oil on insertion



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

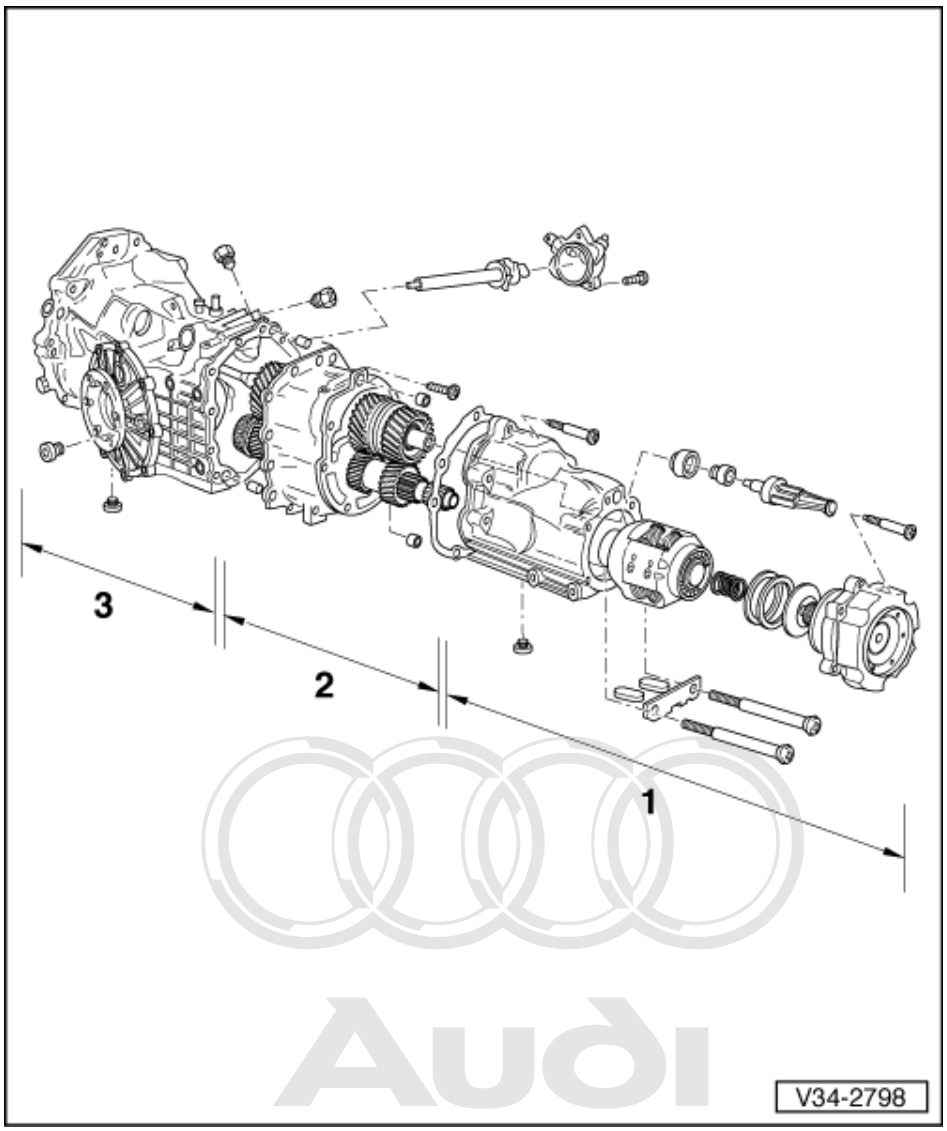
7 Gearbox housing

8 Large drive gear

- Replacing =>Page 296 onwards
- Located on differential housing =>Page 296 onwards

10 - Dismantling and assembling gearbox

10.1 - Dismantling and assembling gearbox



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

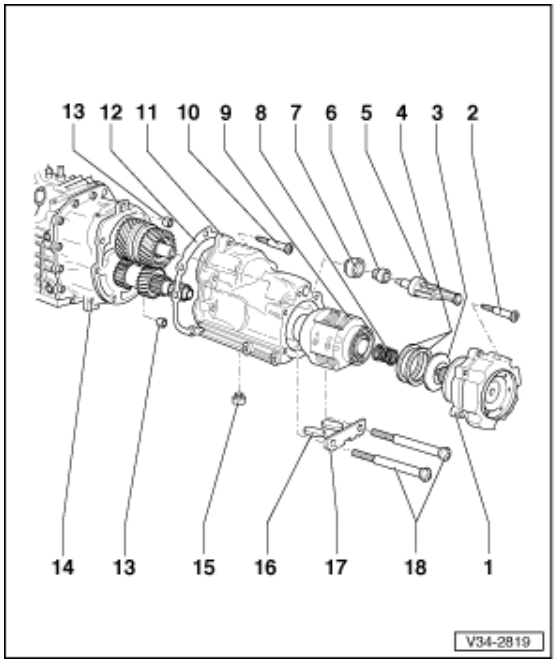
Assembly sequence=> Page 177.

1 **Bearing housing, Torsen differential and end cover**
- Removing and installing
  => Page 165

2 **Manual gearbox and selector shaft**
- Removing and installing
  => Page 168

3 **Gearbox housing with differential**
- Removing and installing differential => Page 294
- Servicing gearbox housing
  => Page 233

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



1 Bearing housing
- Dismantling and assembling => Page 202

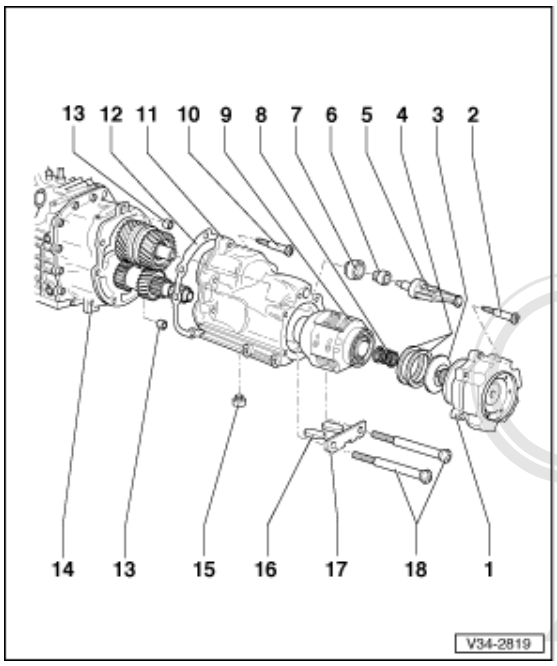
2 Bolt, 25 Nm
- 6x

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

4 Shim
- 2 or 3x
- Re-determining thickness => Page 200

5 Oil collector
- Dismantling and assembling => Page 198
- Removing => Page 181
- Installing => Page 198

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



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

6 Multi-point socket-head bolt - 150 Nm

- Screwing out => Page 183
- Screwing in => Page 198

7 2nd inner race for ball bearing for input shaft

- Removing => Page 183
- Installing => Page 198

8 Spring

9 Torsen differential

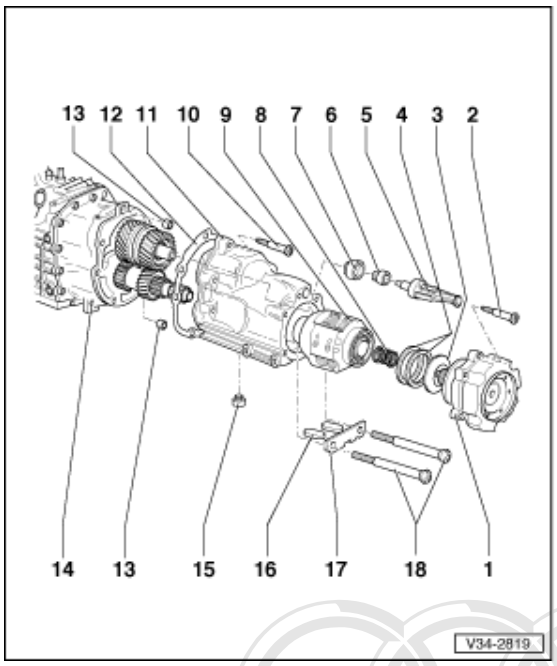
- Can only be serviced by the manufacturer
- Servicing bearing system for Torsen differential => Page 209

10 Bolt, 25 Nm

- 5x

11 End cover

- Servicing => Page 215



12 Gasket

- Replace

13 Dowel sleeve

- 2x

14 Manual gearbox

- 5. Removing and installing 5th and 6th gear => Page 170
- Removing and installing input shaft, drive pinion, hollow shaft and gearbox shift mechanism=> Page 174

15 Oil drain plug, 40 Nm

16 Magnet

- 2x
- Clean

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

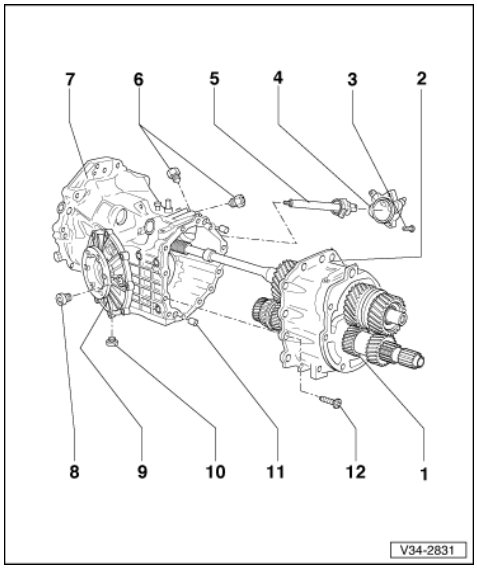
17 Support plate

- Installation position: Lug facing magnets

18 Bolt, 25 Nm

- 2x

10.3 - Removing and installing manual gearbox and selector shaft



1 5th and 6th gear

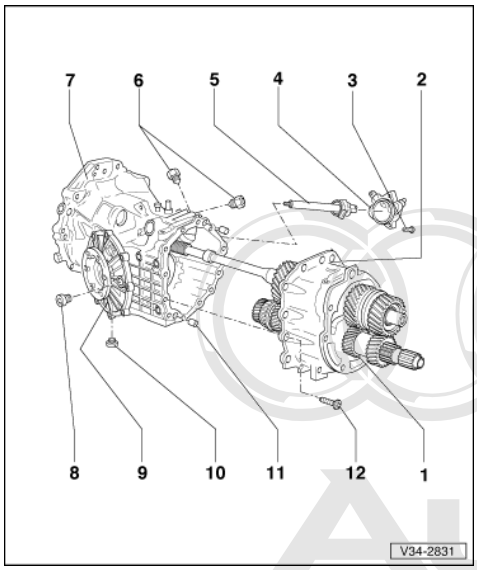
- Manual gearbox remains flange-mounted to gearbox housing
- Removing and installing
  => Page 170

2 Manual gearbox

- Removing and installing input shaft, drive pinion, hollow shaft and internal selector mechanism=> Page 174

3 Bolt, 25 Nm

- 3x
- Apply sealing paste AMV 188 001 02 on insertion



4 Cover for selector shaft

- Removing => Page 182
- Installing => Page 200

The reproduction, distribution and copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Selector shaft assembly

- Removing => Page 182
- Installing => Page 200
- Dismantling and assembling
  => Page 250

6 Locking bolt

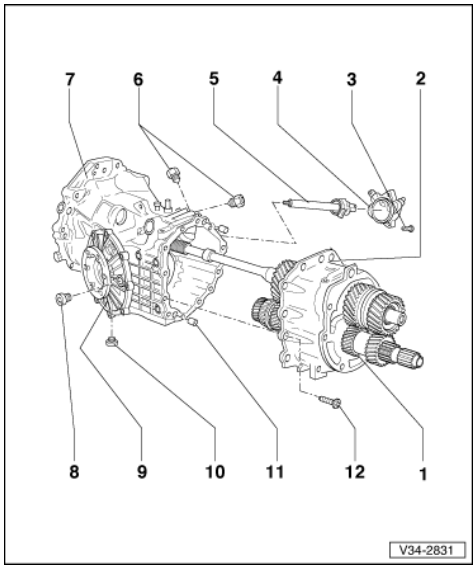
- Aluminium: 50 Nm

- Steel: 70 Nm
- Mark fitting location of aluminium/steel bolts; do not interchange
- Apply sealing paste AMV 188 001 02 on insertion

7 Gearbox housing

- Servicing => Page 233

8 Oil filler plug, 40 Nm



9 Differential

- Concealed by differential cover
- Removing and installing=>Page 294

10 Oil drain plug, 40 Nm

11 Dowel sleeve

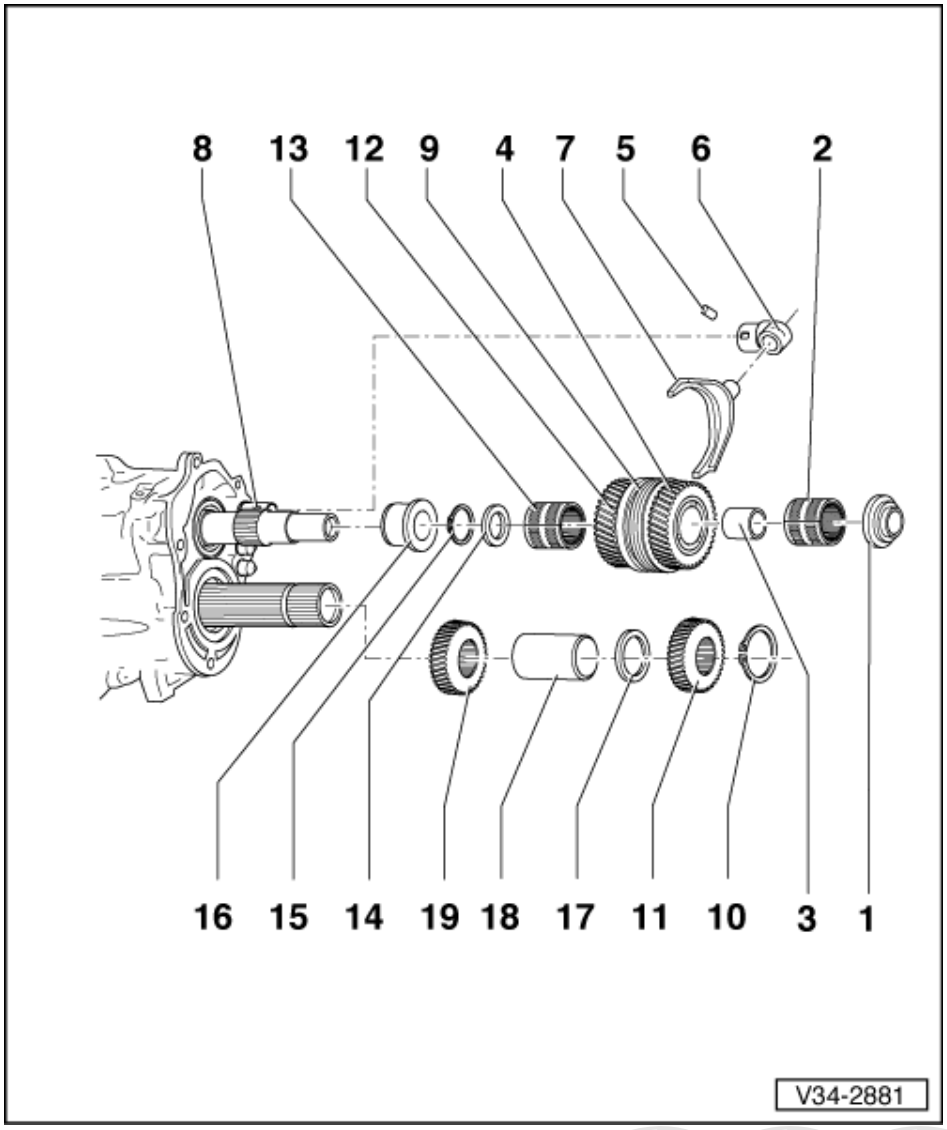
- 2x

12 Bolt, 25 Nm

- 12x

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

10.4 - Removing and installing 5th and 6th gear



1 1st inner race for ball bearing for input shaft
- Removing => Page 184
- Installing => Page 197

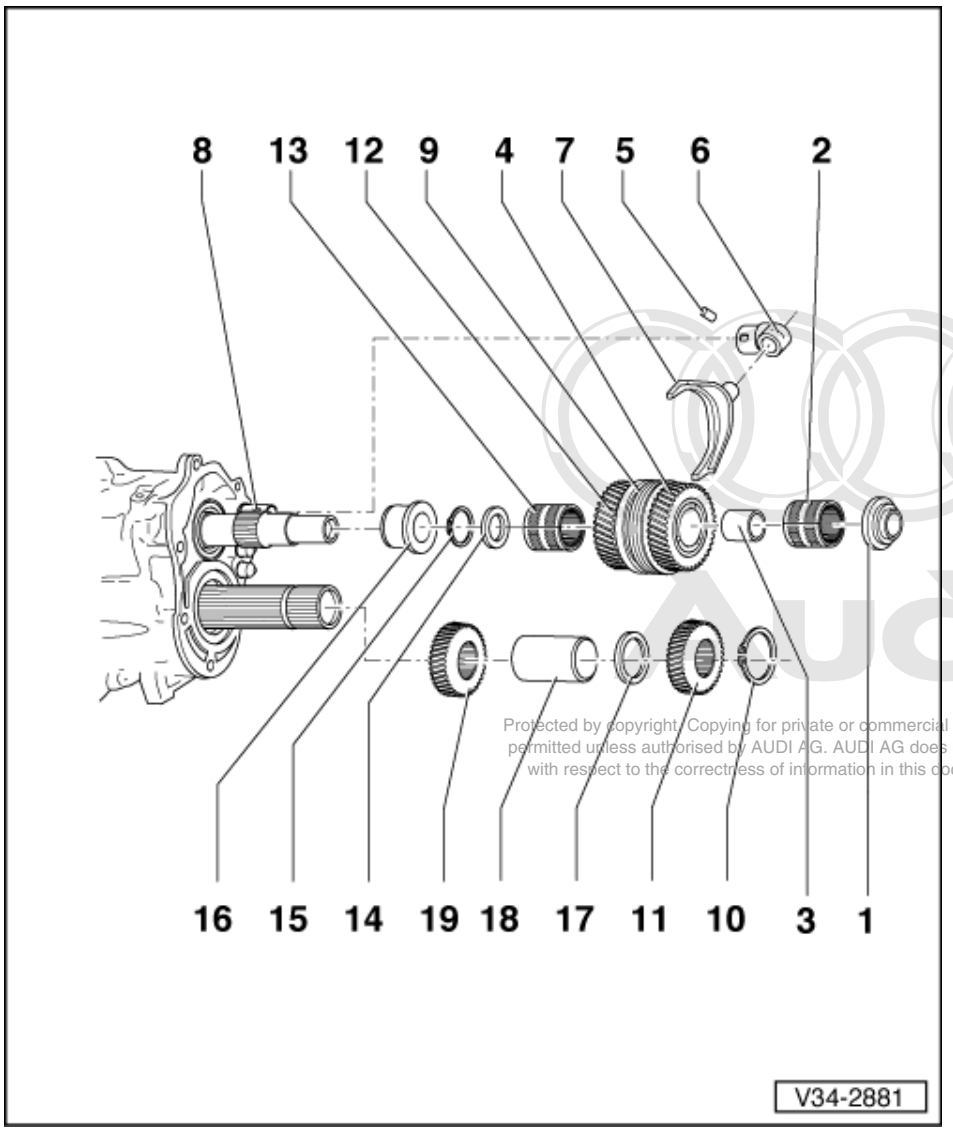
2 Needle bearing for 5th gear

3 Inner race for 5th speed sliding gear
- Removing => Page 185
- Fitting => Page 196

4 5th speed sliding gear
- Removing => Page 184
- Installing => Page 196

5 Spring pin
- Pressing out => Page 184
- Pressing in => Page 194

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

6 Actuating arm driver for 5th and 6th gear

- Only to be replaced complete with selector rod for 5th and 6th gear -Item 8 -
- Removing => Page 185
- Fitting => Page 194

7 5th and 6th gear selector fork

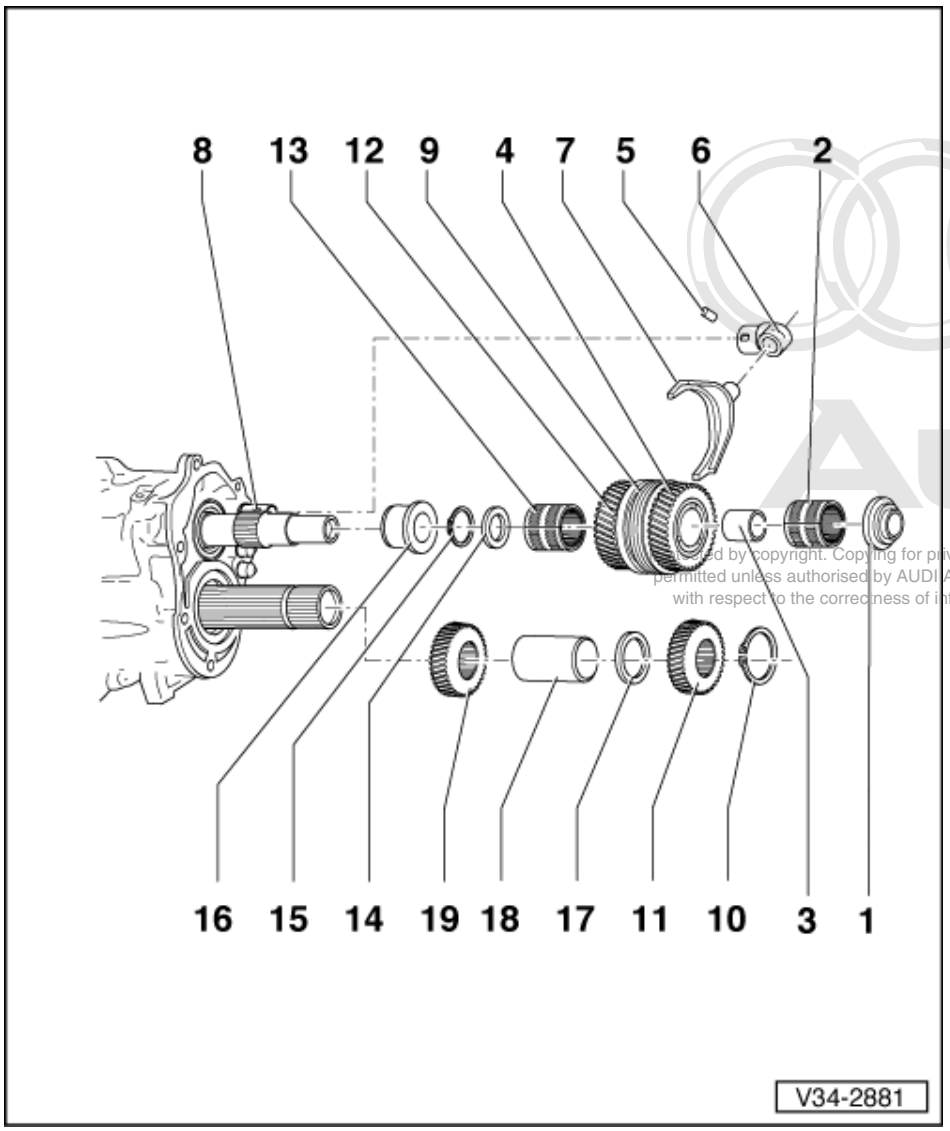
- Can be replaced separately

8 Selector rod for 5th and 6th gear

- Only to be replaced complete with actuating arm driver for 5th and 6th gear
- Removing => Page 184
- Installing => Page 191

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

- Removing => Page 185
- Installing => Page 194



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Circlip

- Re-determining => Page 196

11 5th gear wheel

- Removing => Page 184
- Pressing on => Page 196

12 6th speed sliding gear

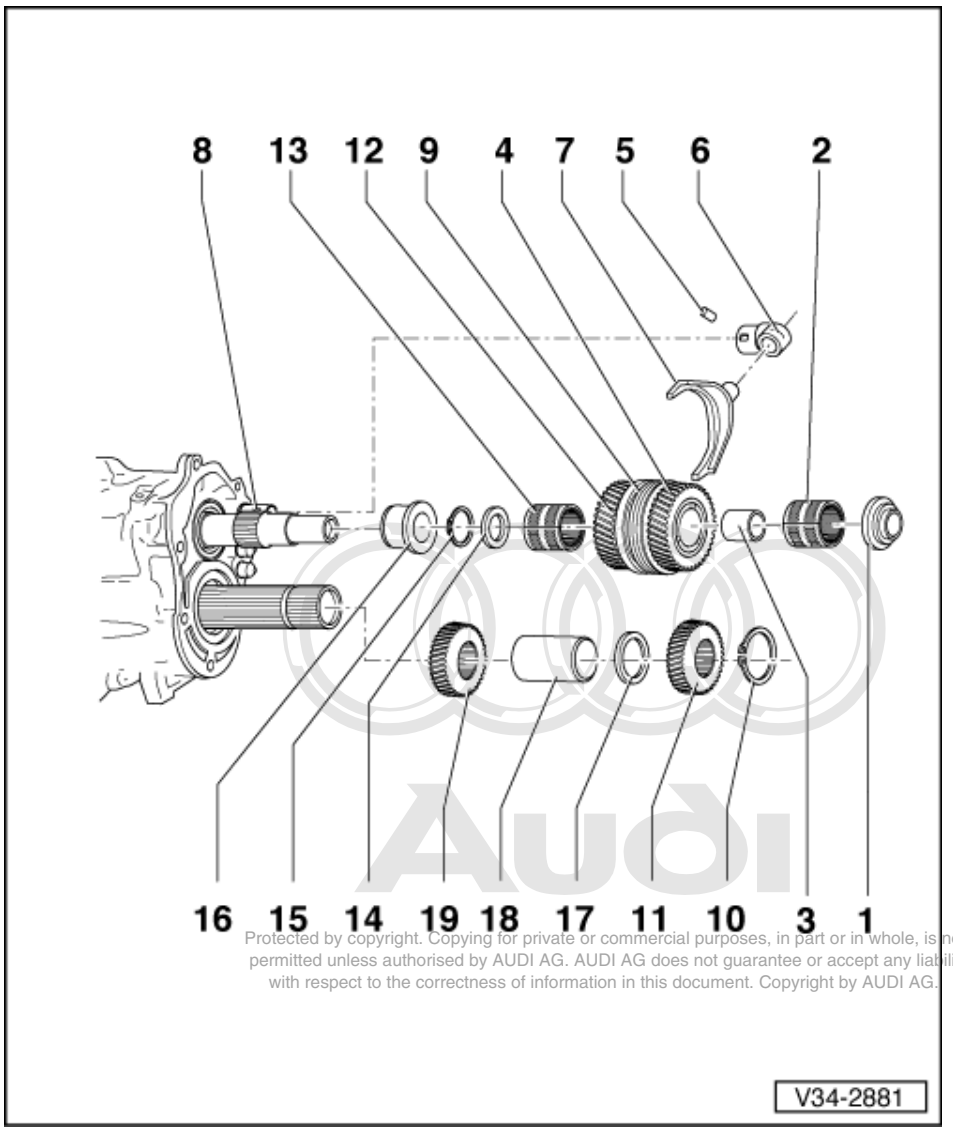
- Remove together with synchro-hub and inner race for 5th gear=>Page 185

13 Needle bearing for 6th gear

14 Thrust washer for needle bearing for 6th gear

- Installation position: Recess facing circlip, smooth thrust face towards needle bearing

15 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.

16 Inner race for cylindrical roller bearing

- Detaching by hand => Page 187

17 Shim

- Re-determining thickness
  => Page 195

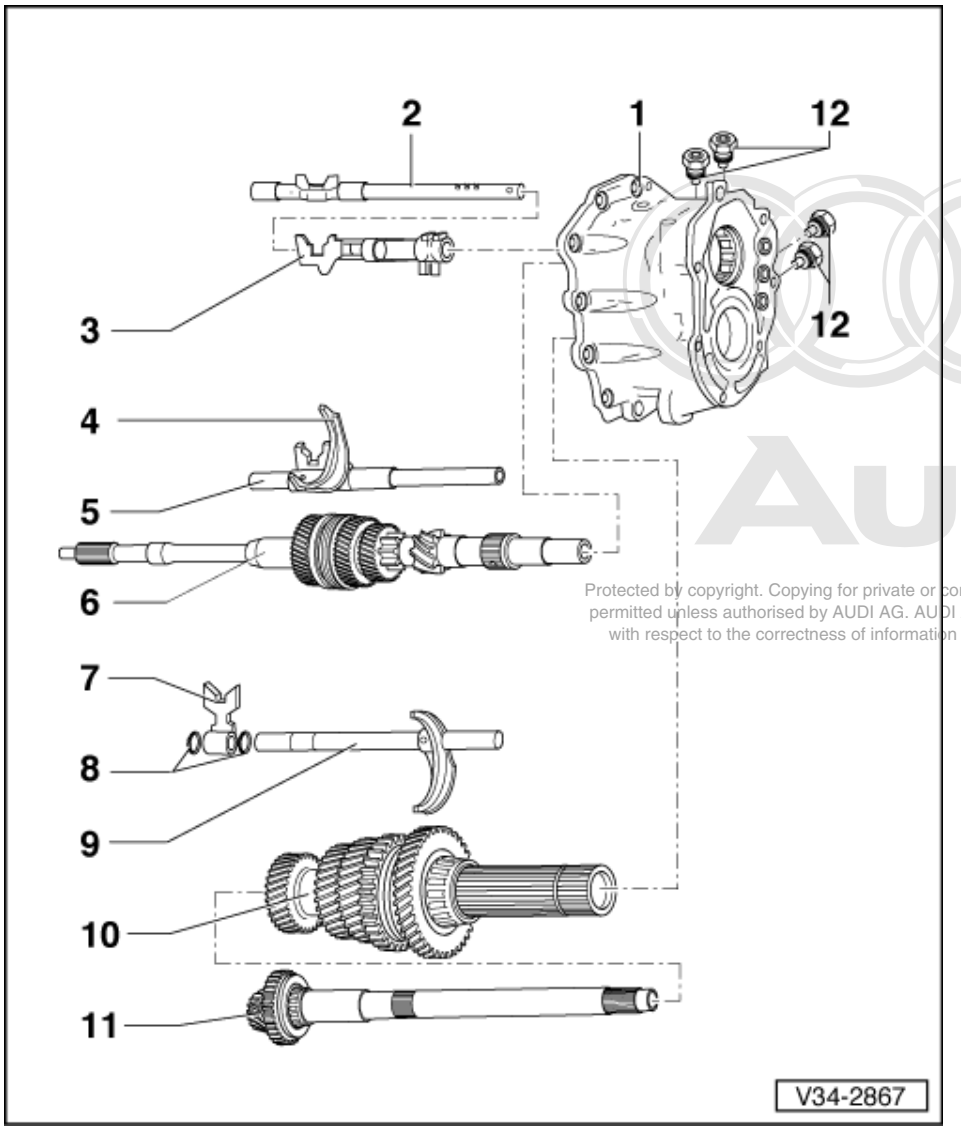
18 Spacer sleeve

- Length 39.6 mm

19 6th gear wheel

- To press off, remove bearing plate
  => Page 186
- Pressing off => Page 188
- Pressing on => Page 189

10.5 - Removing and installing input shaft, drive pinion, hollow shaft and gearbox shift mechanism

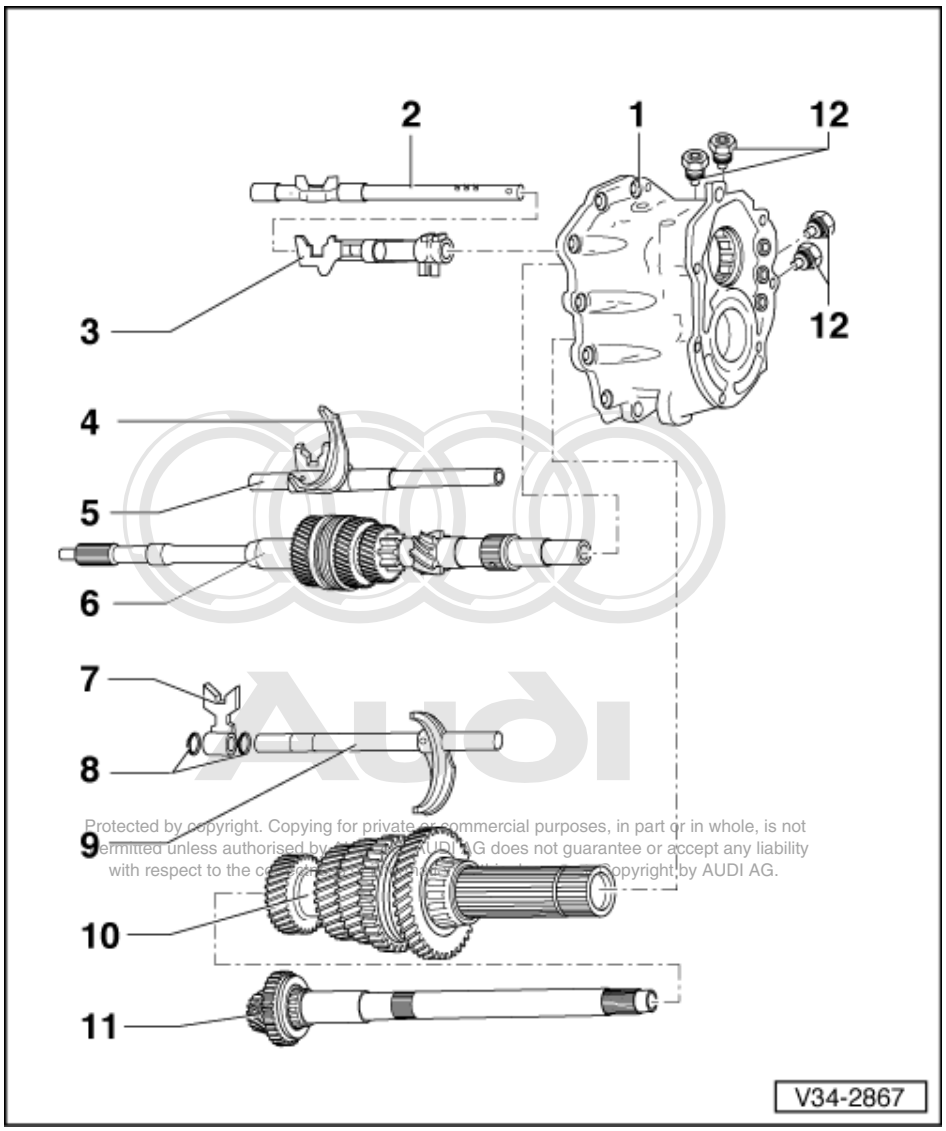


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

1 **Bearing plate**
- Servicing => Page 222

2 **Selector rod for 5th and 6th gear**
- Only to be replaced complete with actuating arm driver for 5th and 6th gear => Page 171 , Item 6

3 **Actuating arm driver for reverse gear**
- Extracting ball sleeve => Fig. 227
- Driving in ball sleeve => Fig. 227



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the c... opyright by AUDI AG.

4 3rd and 4th gear selector fork

- Can be replaced separately
- Installation position: Rib facing actuating arm driver

5 Selector rod for 3rd and 4th gear

- Only to be replaced complete with actuating arm driver for 3rd and 4th gear

6 Input shaft

- Dismantling and assembling
  => Page 253

7 Actuating arm driver for 1st and 2nd gear

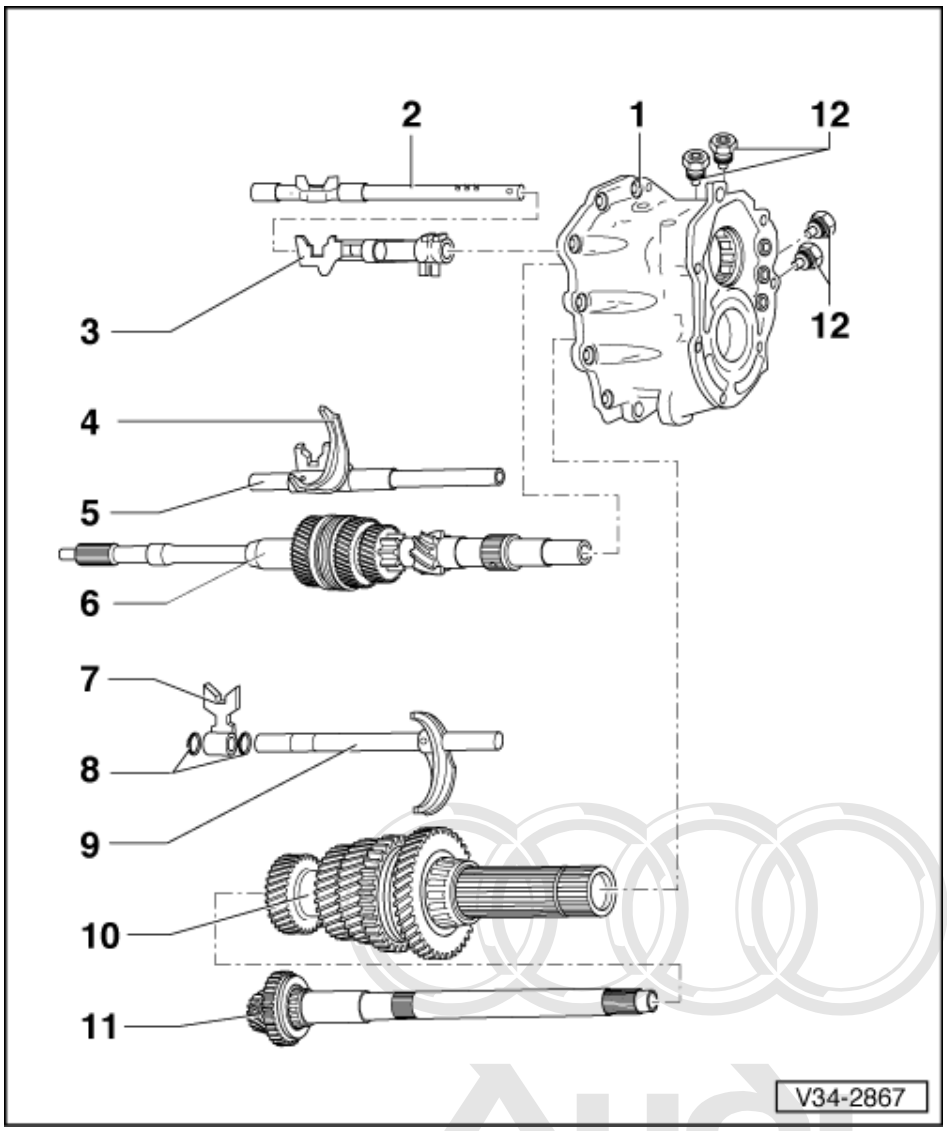
- Can be replaced separately

8 Circlip

- 2x

9 Selector rod for 1st and 2nd gear

- Only to be replaced complete with pinned 1st and 2nd gear selector fork



10 Hollow shaft

- Dismantling and assembling
  => Page 265

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Drive pinion

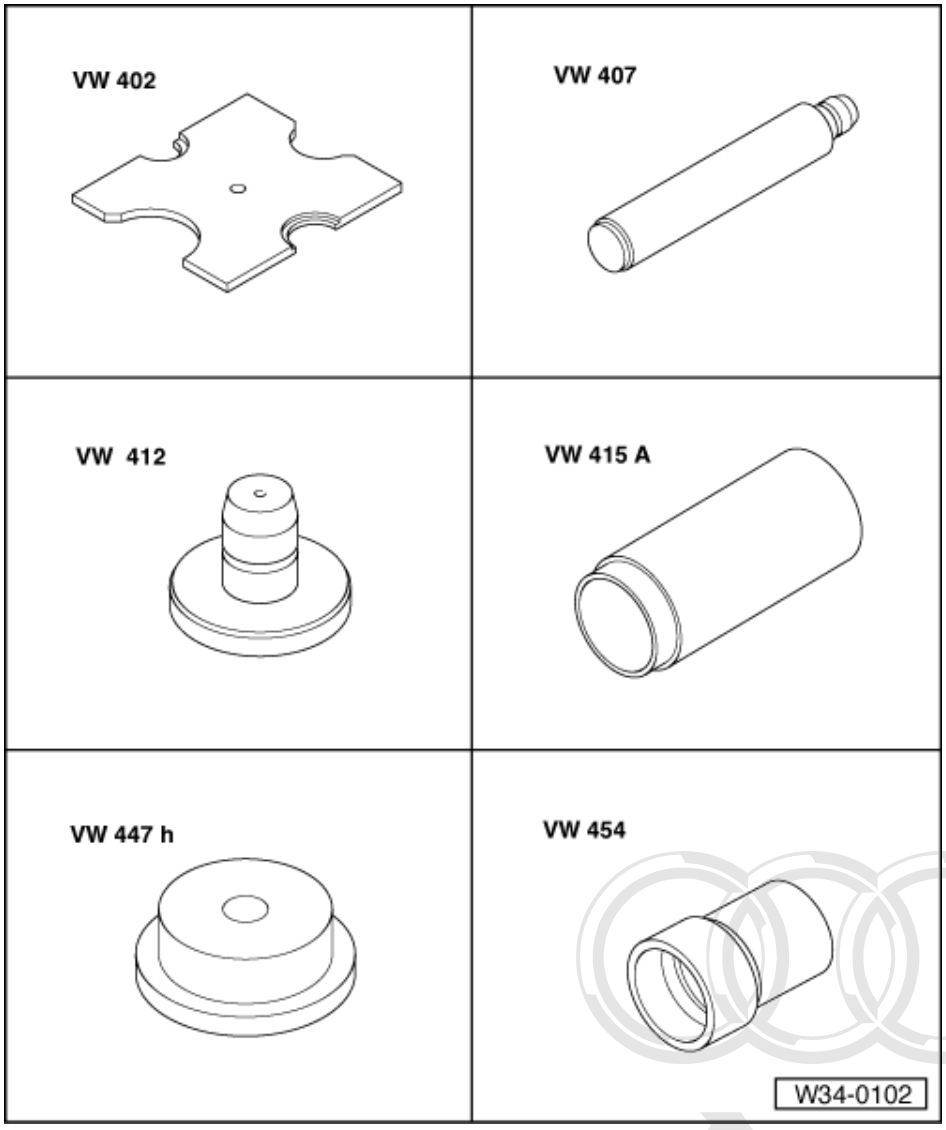
- Dismantling and assembling
  => Page 265

12 Locking bolts

- 4x
- Aluminium: 50 Nm
- Steel: 70 Nm
- Mark fitting location of aluminium/ steel bolts; do not interchange
- Apply sealing paste AMV 188 001 02 on insertion

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

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

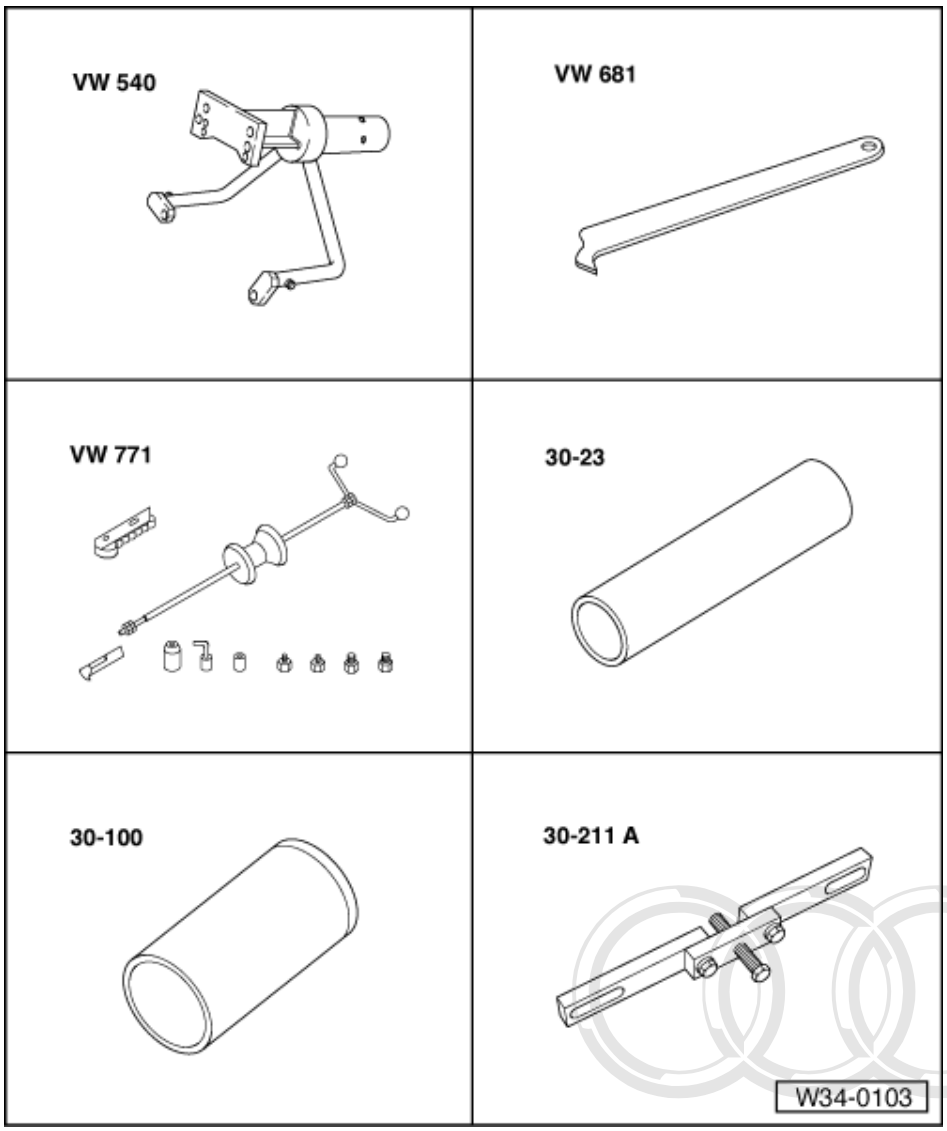


11.2 - Assembly sequence

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

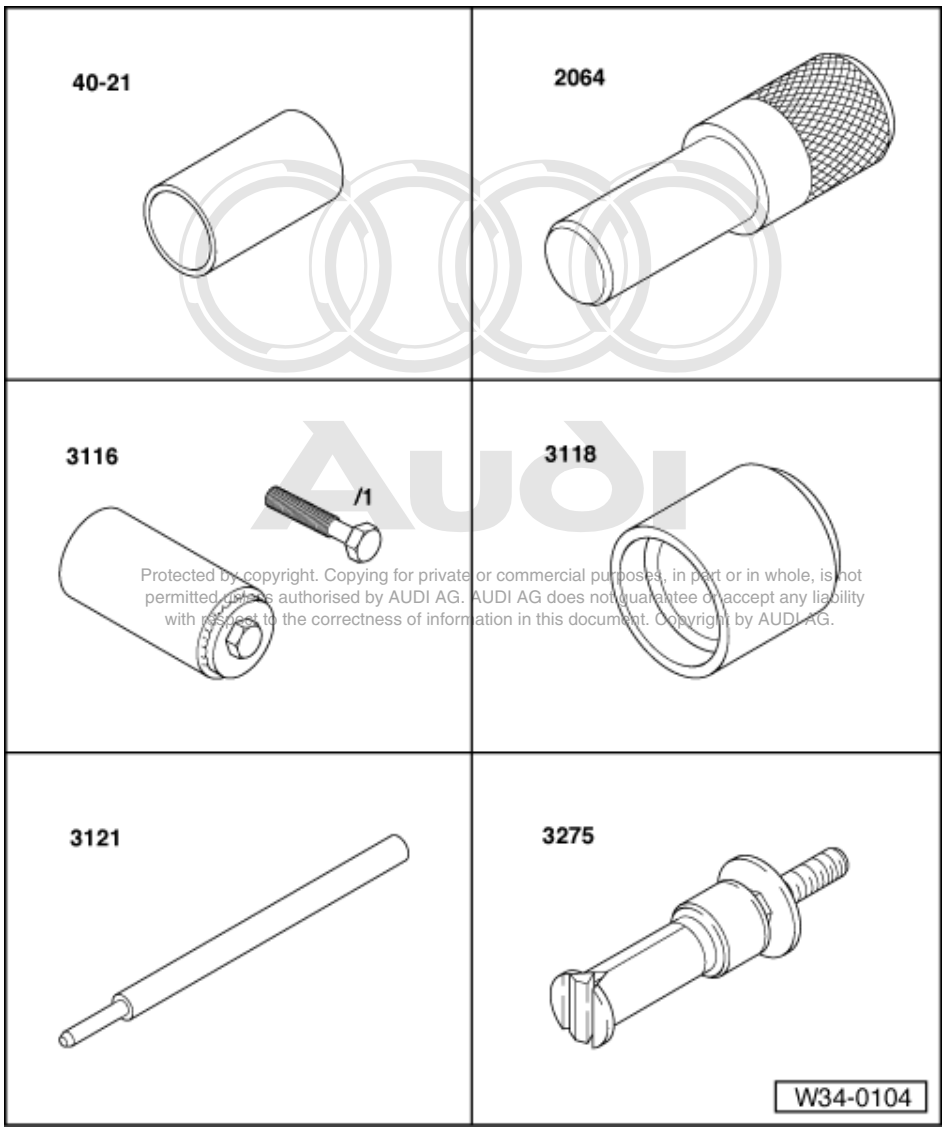
Special tools and workshop equipment required

- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 412
- Tubular section VW 415 A
- Thrust pad VW 447 H
- Thrust pad VW 454



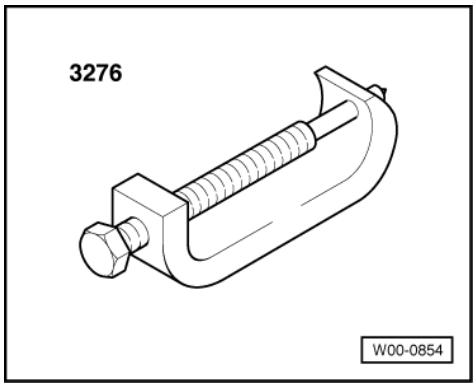
- Engine and gearbox holder VW 540
- Pressing-out lever VW 681
- Multi-purpose tool VW 771
- Attachment 30-23
- Fitting sleeve 30-100
- Support bridge 30-211 A

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.

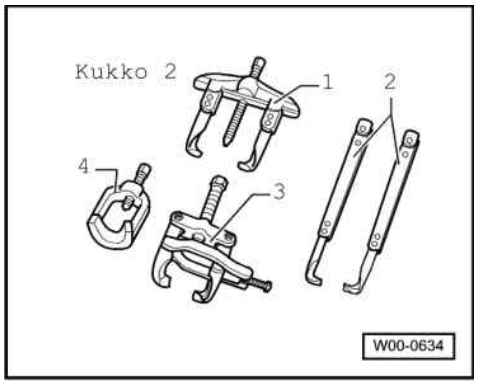


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

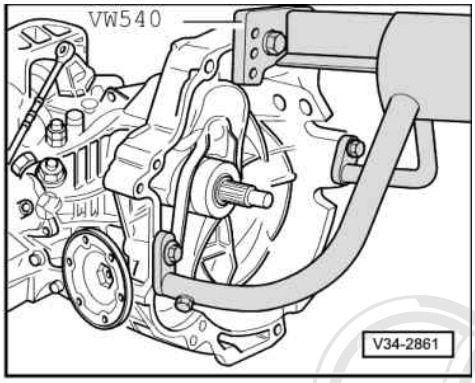
- Fitting sleeve 40-21
- Mandrel 2064
- Clamping sleeve 3116
- Thrust pad 3118
- Drift 3121
- Internal puller 3275



- Pressing tool 3276



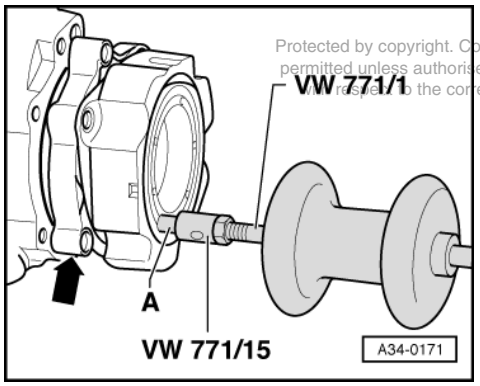
- 1 - Two-arm puller Kukko 20/10
- 2 -Hook Matra V/170
- Drip tray
- Depth gauge



Dismantling

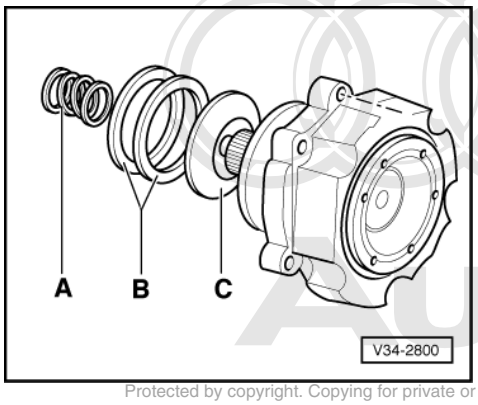
- -> Mount gearbox in repair stand VW 540.
- Place drip tray under gearbox.
- Drain off gear oil.
- Remove release bearing, clutch release lever and guide sleeve => Page 37 .

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



- -> Unscrew bearing housing -arrow- and detach.

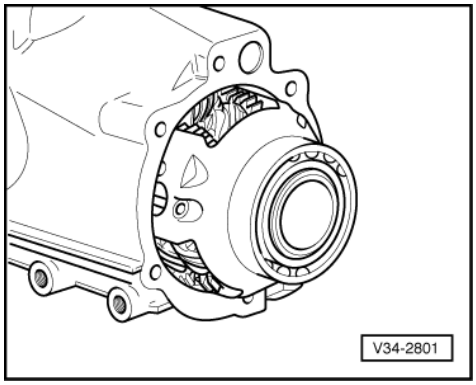
A - Stud M8/M10



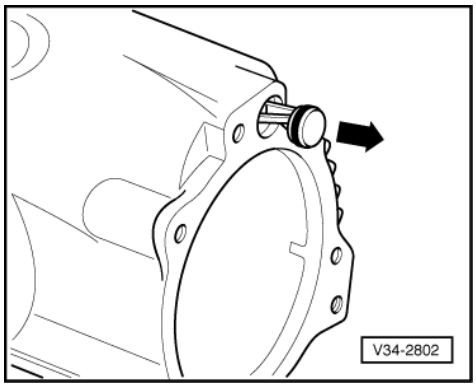
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> On detaching, bearing housing is pressed off end cover slightly by coil spring -A-.

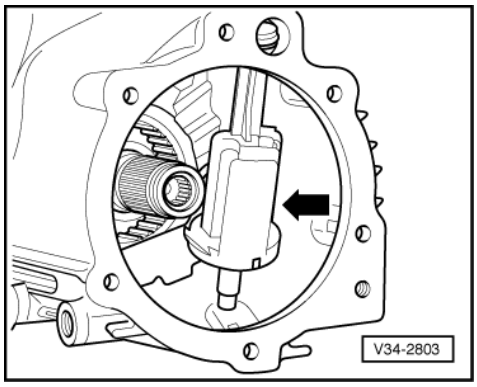
- Heed installation position of dished washer -C- on detaching bearing housing.
  - Outer diameter (concave side) faces shims
- Remove shims -B-, note down thickness and re-determine if necessary => Page 200 .



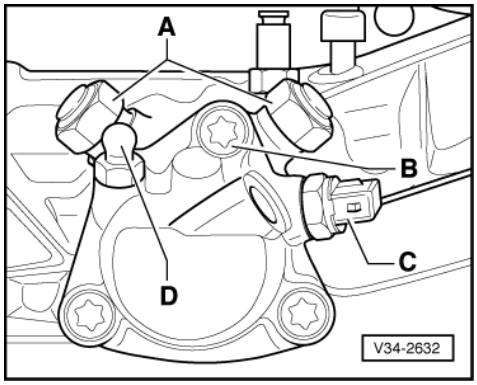
- -> Pull Torsen differential out of end cover.



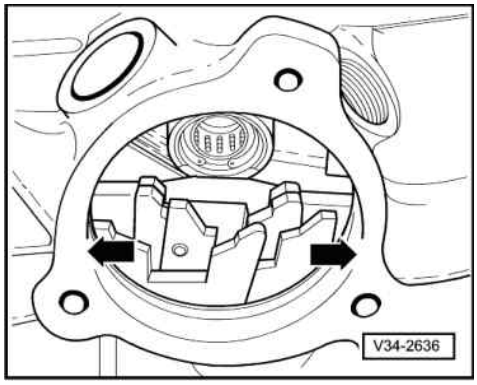
- -> Pull oil collector out of end cover -arrow- until it is free to move.



- -> Swivel oil collector -arrow- downwards and guide out through hole of end cover.
- Remove oil collector.

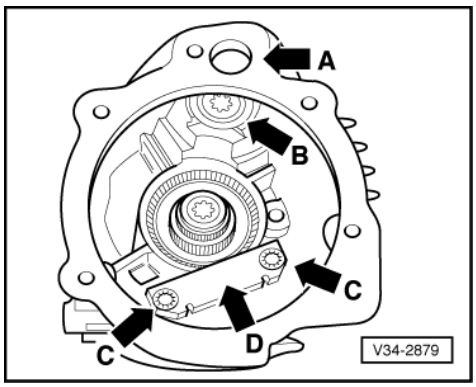


- -> Remove locking bolts -A- for selector shaft from gearbox housing.
- Mark fitting location of aluminium/ steel bolts; do not interchange.
- Screw out 3 bolts -B- for selector shaft cover and remove cover.
- Pull out selector shaft.

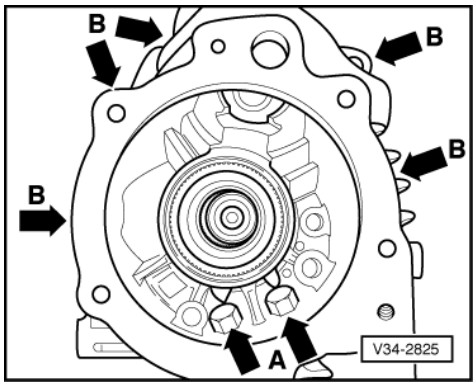


- -> Lock input shaft in position by engaging 2 gears (e.g. reverse and 2nd gear); to do so, shift 2 selector plates -arrows-.

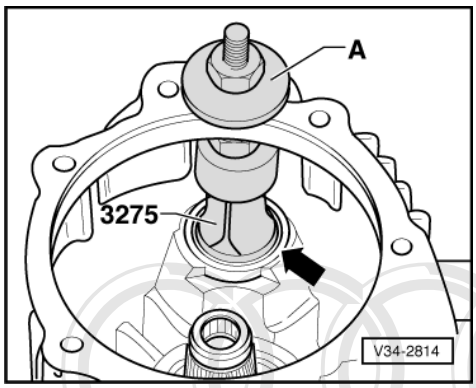
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Through hole -arrow A- in end cover, slacken off and screw out multi-point socket-head bolt -arrow B- in input shaft.
- Slacken off and screw out 2 bolts -arrow C- for end cover for manual gearbox at support plate for needle bearing -arrow D-.
- Remove support plate.



- -> Remove and clean 2 magnets -arrows A-.
- Slacken off and screw out 5 bolts -arrows B- securing end cover for manual gearbox.



- -> Remove 2nd input shaft ball bearing inner race from input shaft.

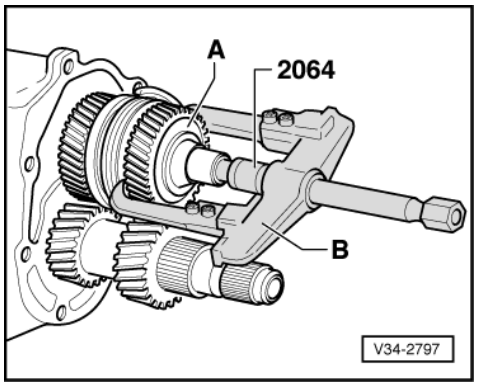
A - Shim

Note:

On extraction, internal puller 3275 engages in all-round groove of inner race -arrow-.

- Detach end cover with end cover/bearing plate gasket.
- Extract dowel sleeves from bearing plate.

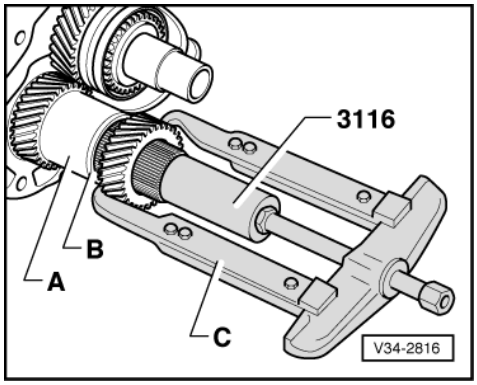
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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

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

- Detach synchro-ring for 5th gear.
- Detach 5th gear wheel 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.

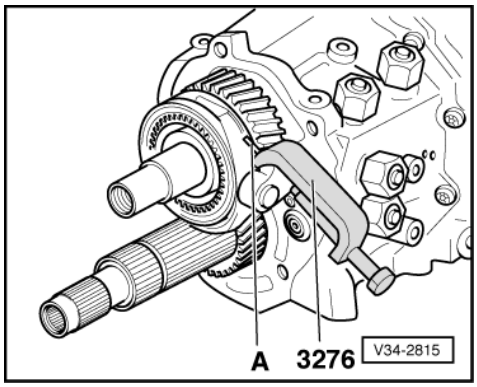
- -> Detach 5th gear wheel. To do so, block hollow shaft by engaging 2 gears => Page 182 .

Note:

Only use hexagon bolt of clamping sleeve 3116, length 50 mm.

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

- Remove shim -B- for 5th gear wheel, note down thickness and re-determine if necessary => Page 195 .
- Detach spacer sleeve -A-.

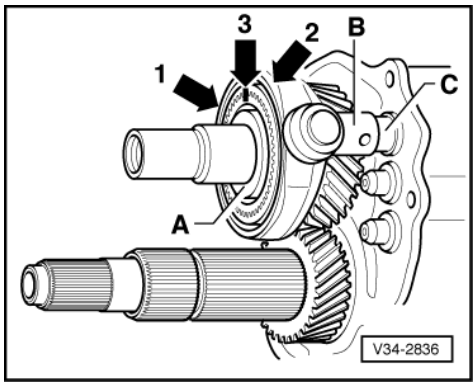


- -> Press out spring pin -A- for 5th and 6th gear selector fork.

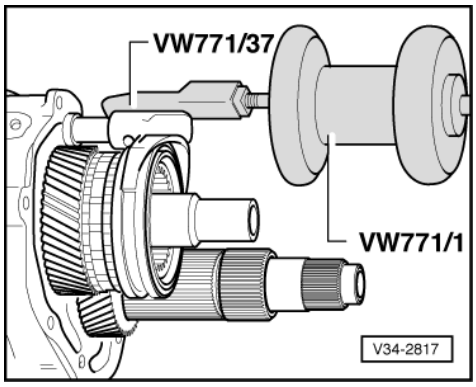
Note:

Do not drive out spring pin as this could damage selector rod mount.

- Pull selector rod at actuating arm driver together with selector fork for 5th and 6th gear and locking collar as far as possible away from bearing plate (resistance is felt).

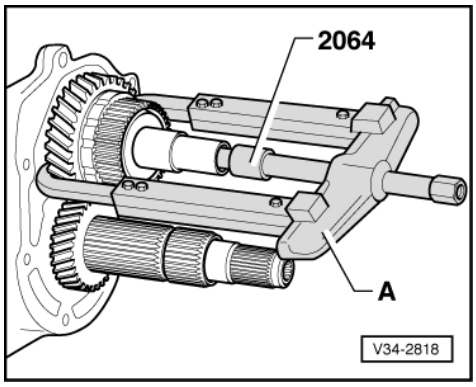


- -> Mark locking collar for 5th and 6th gear -arrow 1- and synchro-hub -A- (paired) in installation position -arrow 3-.



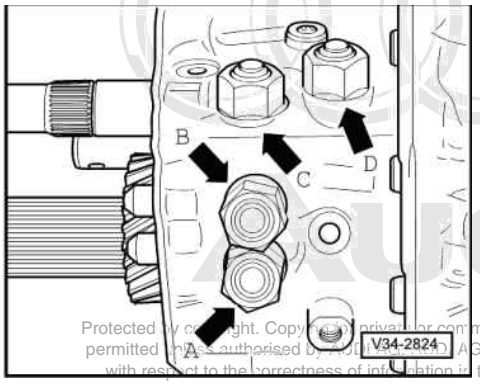
- -> Pull actuating arm driver together with selector fork and locking collar off selector rod.

Printed by Audi Technical Publication. Copyright by AUDI AG. Reproduction 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.



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

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

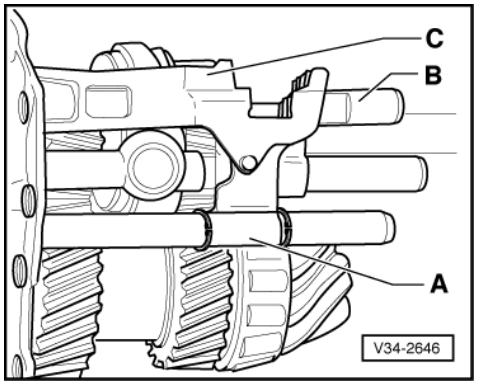


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Unscrew locking bolts for selector rods.

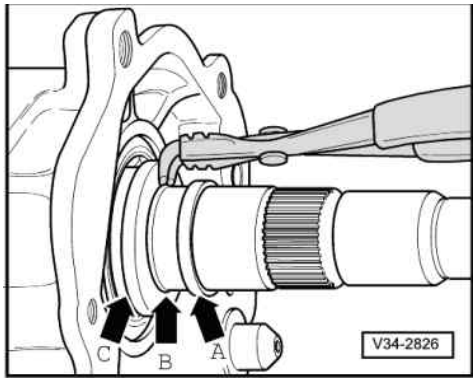
A - 1st and 2nd gear
B - 3rd and 4th gear
C - 5th and 6th gear
D - Reverse gear

- Mark fitting location of aluminium/ steel bolts; do not interchange.
- Drive out dowel sleeves at bearing plate and unscrew bearing plate from gearbox housing.
- Secure drive pinion with respect to hollow shaft to stop it slipping using hose clamp for example.

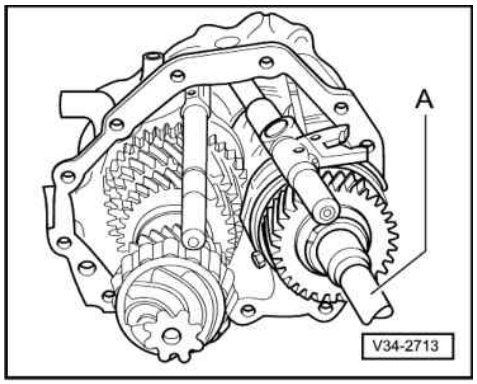


- Separate bearing plate with input shaft, drive pinion, hollow shaft and internal selector mechanism from gearbox housing.

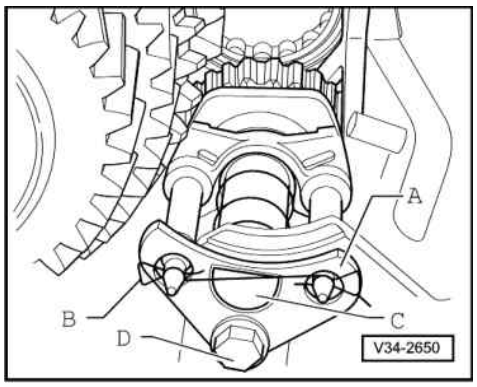
- -> Remove circlip from selector rod for 1st and 2nd gear and detach actuating arm driver -A-.
- Pull out selector rod -B- for 5th and 6th gear.
- Remove actuating arm driver -C- for reverse gear.



- -> Remove thrust washer -arrow A- for 6th gear needle bearing from shaft.
- Use offset pliers to remove circlip -arrow B- for cylindrical roller bearing inner race.
- Take out inner race -arrow C- for cylindrical roller bearing (not fixed).



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



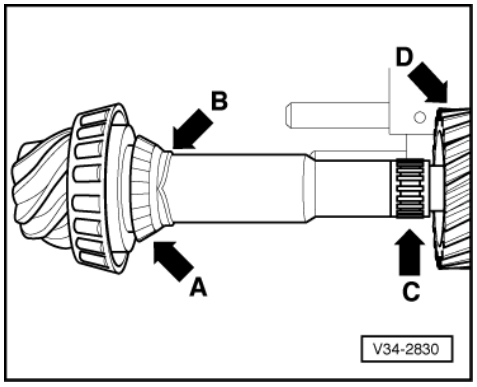
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Screw out hexagon bolt -D-, detach spring clip -B- and retainer -A-and pull out shaft -C- for reverse idler gear.
- Take out spring, synchro-ring and reverse idler gear.
- Detach actuating arm for reverse gear.
- Removing and installing reverse gear => Page 223

Notes:

- Drive pinion and hollow shaft can be removed complete if 6th gear wheel can easily be prised off.
- If, however, it is necessary to press off 6th gear wheel, drive pinion must be pulled out of hollow shaft.

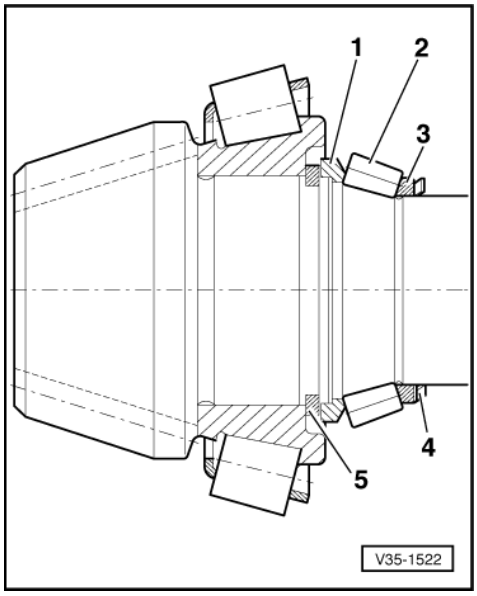
- Remove temporary drive pinion securing element (hose clamp).



- -> Pull drive pinion out of hollow shaft -D- and collect taper rollers -A- (23x).
- Detach corrugated spring -B- and needle ring -C-.

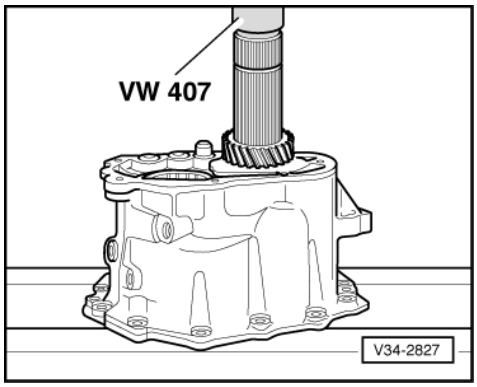
Note:

Take care to avoid bearing contamination and clean if necessary.



- -> Check that bearing is complete.

1 - Collar ring (conical contact surface facing taper rollers)
2 - Taper rollers (23x) with large diameter facing end of drive pinion
3 - Support ring (conical contact surface facing taper rollers)
4 - Corrugated spring
5 - Circlip for drive pinion taper roller bearing



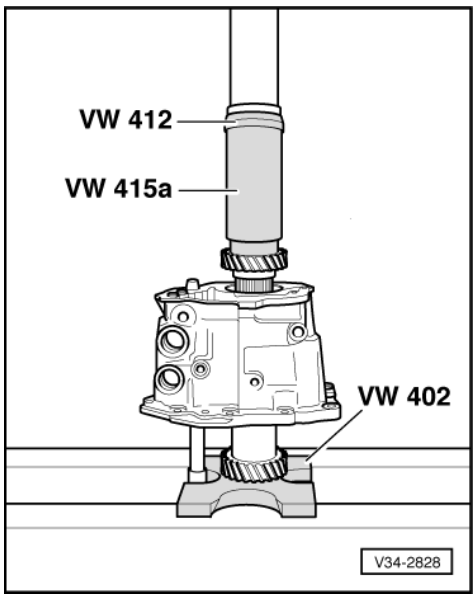
- -> Remove 6th gear wheel.

Note:

Slight pressure may have to be exerted on account of type of 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 hollow shaft or drive pinion and hollow shaft with selector rod and selector fork for 1st and 2nd gear out of bearing plate.

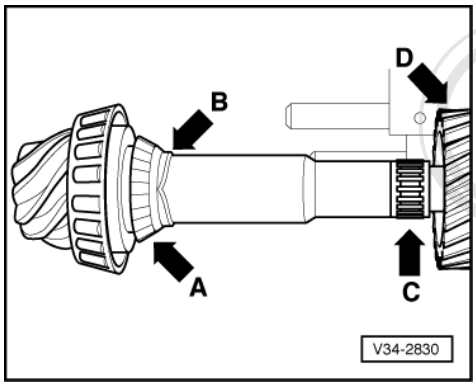


Assembly

- Insert hollow shaft with selector fork and selector rod for 1st and 2nd gear (without actuating arm driver) in bearing plate.
- -> Heat 6th gear wheel to approx. 100 °C and fit.
  - Installation position: Collar facing taper roller bearing

Attention:
Wear protective gloves.

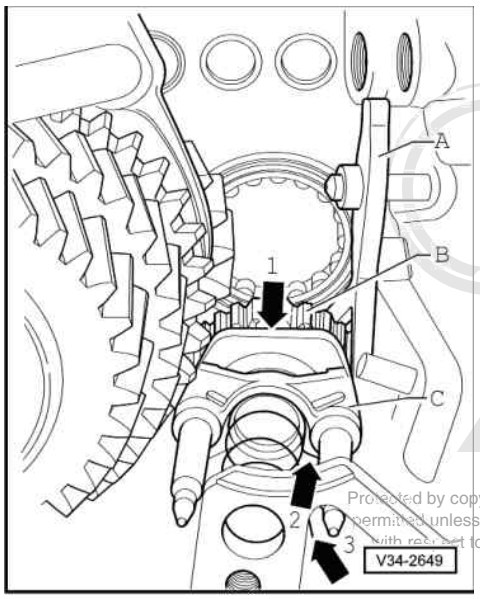
- Press home such that there is no clearance.
- Apply multi-purpose grease to drive pinion/hollow shaft taper roller bearings.
  - Layout => Page 188



A - -> Collar ring, taper rollers (23x) and support ring
B - Corrugated spring
C - Needle ring
D - Hollow shaft

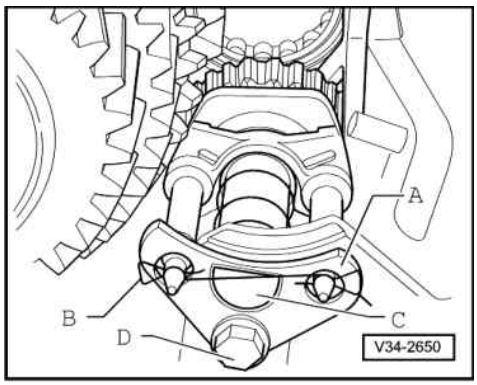
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Thoroughly lubricate needle bearing.
- Insert drive pinion in hollow shaft and use hose clamp to stop it slipping out.

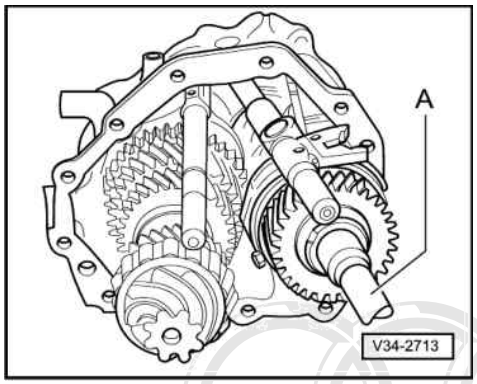


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

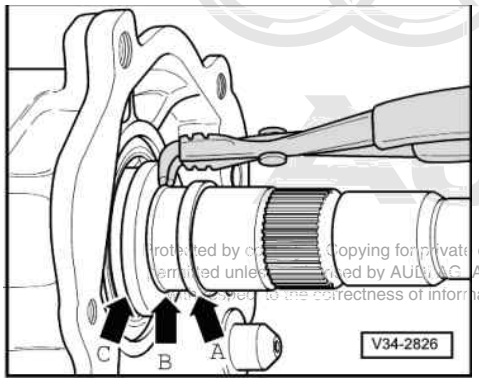
- -> Place actuating arm -A- for reverse gear on bolt for actuating arm. In doing so, pay attention to pin (for limiting travel of actuating arm with respect to synchro-ring).
- Insert sliding gear -B- and engage actuating arm in groove at sliding gear.
- Fit synchro-ring -C-.
  - Installation position: Align chamfer at periphery of synchro-ring with input shaft (not yet installed) -arrow 1-
- Insert spring.
  - Installation position: Engage single-offset end in recess at synchro-ring -arrow 2-. Turn double-offset end anti-clockwise and engage in opening at bearing plate -arrow 3-.



- -> Insert shaft -C-.
- Fit retainer -A-.
  - Installation position: Chamfers of holes for synchro-ring locking pins facing bearing plate
- Insert spring clip -B- in synchro-ring locking pins.
- Replace self-locking bolt -D- and tighten to 25 Nm.

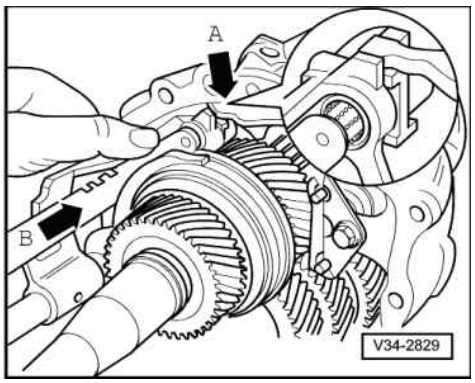


- -> Insert input shaft -A- with selector rod and selector fork for 3rd and 4th gear in bearing plate at an angle.
  - Installation position of selector fork: Rib facing actuating arm driver => Page 175

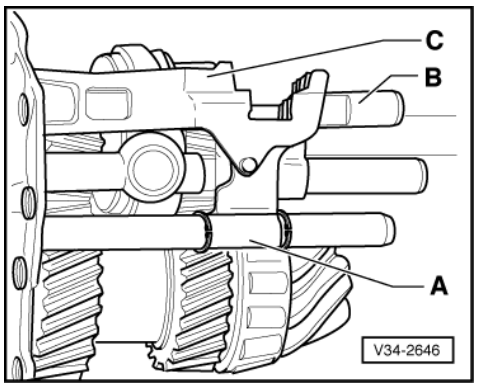


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

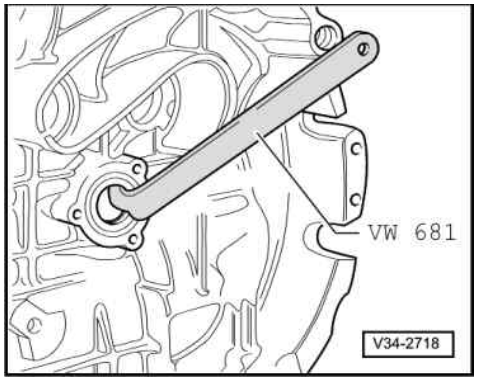
- -> Slide inner race -arrow C- for cylindrical roller bearing onto main shaft at flange for end cover (clearance fit).
- Use offset pliers to fit circlip -arrow B-.



- -> Engage recess in reverse-gear actuating arm driver in free end of actuating arm -arrow A-.
- Use reverse-gear actuating arm driver to move selector rod for 5th and 6th gear in direction of -arrow B-.



- -> Slide actuating arm driver for 1st and 2nd gear -A- onto selector rod and secure with circlips.
- Lubricate all bearing points of input shaft and drive pinion/hollow shaft in gearbox housing, as well as bearing flange and selector rods with gear oil.



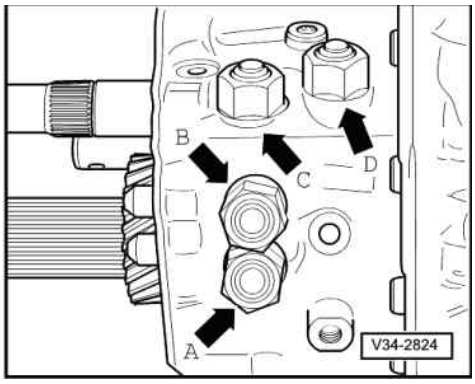
- -> Use VW 681 to carefully prise old oil seal for input shaft out of gearbox housing.
- Coat sealing surfaces between bearing plate and gearbox housing with sealing paste AMV 188.000 02.
- Insert complete bearing plate in gearbox housing.

Note:

On inserting complete bearing plate, make sure selector rods are aligned with bearing points.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 2 dowel sleeves for bearing flange/gearbox housing.
- Diagonally tighten 12 bolts.

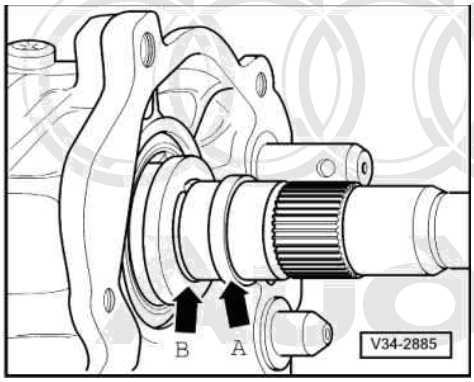


- -> Coat locking bolts for selector rods with sealing paste AMV 188 001 02 and screw in.

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

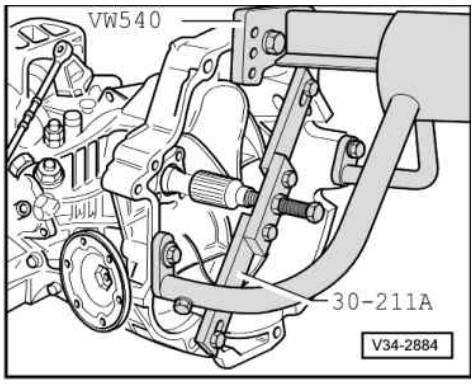
D - Reverse gear

- Do not interchange aluminium/ steel bolts.
  - Tightening torque:
    Aluminium locking bolt 50 Nm
    Steel locking bolt 70 Nm

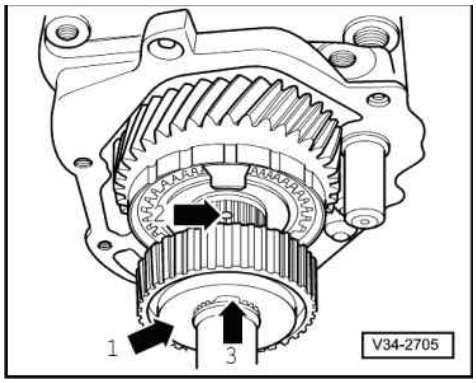


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness, timeliness or completeness of copyright by AUDI AG.

- -> Fit thrust washer -arrow A- for 6th gear needle bearing.
  - Installation position: Collar facing circlip -arrow B- smooth thrust surface facing shaft end
- Lubricate needle bearing for 6th speed sliding gear with gear oil and place in position.
- Fit 6th speed sliding gear with spring and synchro-ring.
  - Installation position of synchro-ring: Lugs of synchro-ring engage in recesses of sliding gear below

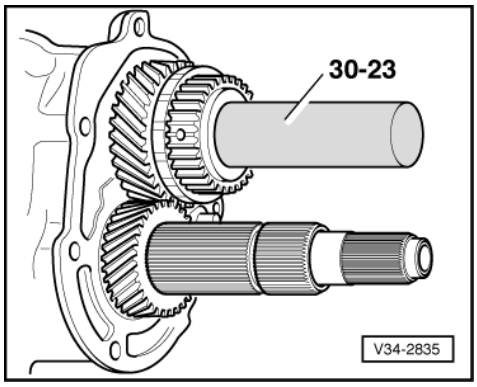


- -> Support input shaft with bridge 30-211 A.



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

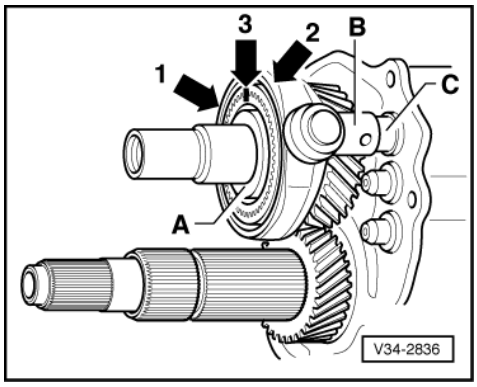
- Projecting end face -arrow 1- facing shaft end
- Oil drilling of input shaft -arrow 2- and oil groove of synchro-hub -arrow 3- in alignment



- -> Heat synchro-hub for 5th and 6th gear to approx. 100 °C, place in position and drive on such that there is no clearance.

Attention:
Wear protective gloves.

- Check for axial clearance at 6th speed sliding gear.
  - Permissible axial clearance: 0.15 ... 0.35 mm

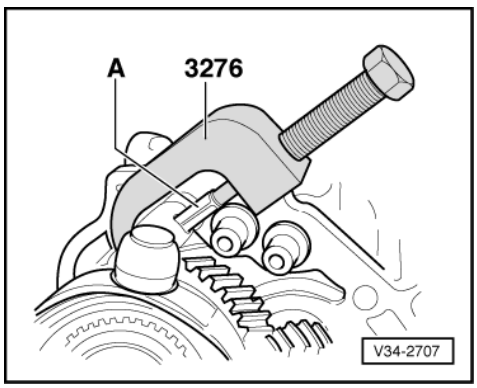


- -> Align mark -arrow 3- of paired synchro-hubs -A- and locking collar for 5th and 6th gear -arrow 1-.
- Simultaneously fit locking collar -arrow 1- with selector fork -arrow 2- on synchro-hub -A- and actuating arm driver for 5th and 6th gear -B- on selector rod -C-.

Notes:

- Selector fork rib -arrow 2- must face shaft end.
- Pay attention to holes for spring pin when fitting actuating arm driver on selector rod for 5th and 6th gear.

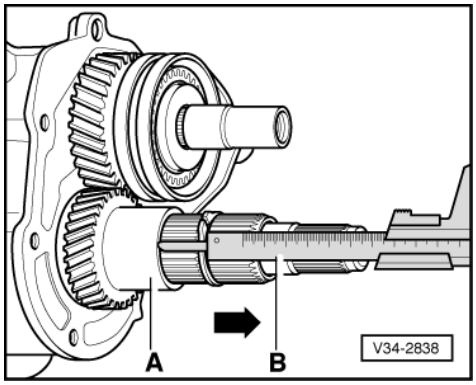
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- -> Press in spring pin -A- such that it is flush.

Notes:

- Do not drive in spring pin as this could damage selector rod mount.
- Fit spring pin such that groove is in direction of force transmission as illustrated.

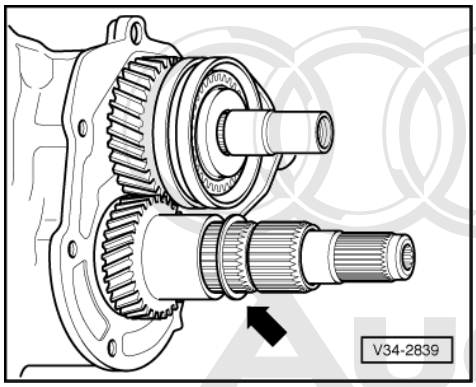


- Re-determine shim for 5th gear wheel.
  - -> Place spacer sleeve -A- (length 39.6 mm) on hollow shaft.
  - On fitting, press circlip home in direction of arrow.
  - Use depth gauge -B- to determine dimension between sleeve and circlip fitted.
  - Determine shim as per table. Part numbers

=> Parts List

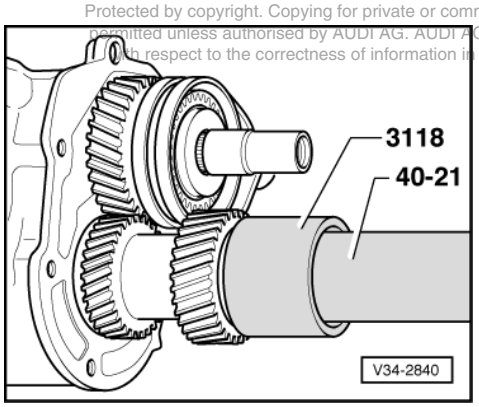
Shims available:

Measurement 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



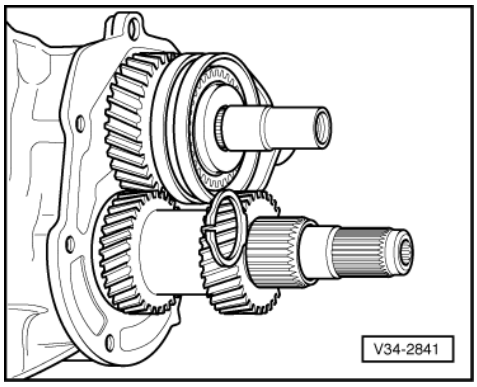
- -> Fit selected shim -arrow- on hollow shaft.

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.



- -> Heat 5th gear wheel to approx. 100 °C, fit and drive home such that there is no clearance.
  - Installation position: Collar facing spacer sleeve

Attention:
Wear protective gloves.



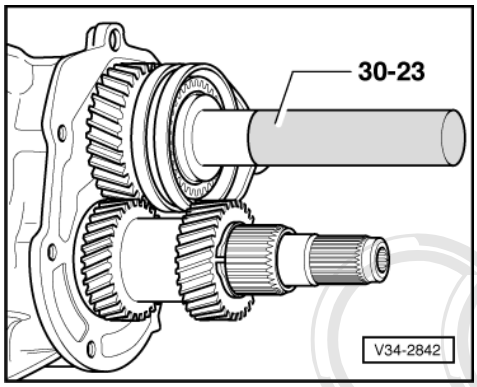
- -> Re-determine circlip for 5th gear wheel:
  - Determine thickest circlip which can still just be fitted.
  - Determine circlip from table. Part numbers

=> Parts List

Circlips available:

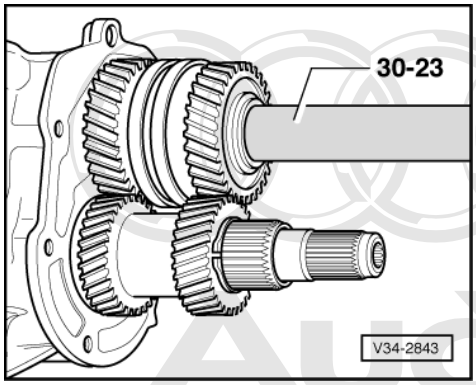
Circlip thickness (mm)		
2.32	2.40	2.48
2.34	2.42	2.50
2.36	2.44	
2.38	2.46	

- Fit circlip.



- -> Fit inner race for 5th speed sliding gear such that there is no axial clearance.
- Lubricate needle bearing with gear oil and fit.
- Place synchro-ring for 5th gear in locking collar.
- Fit 5th speed sliding gear with 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.

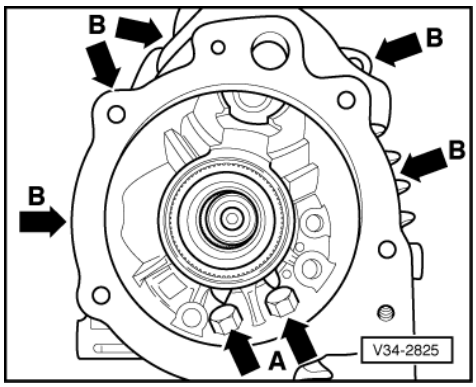


- -> Heat 1st inner race for input shaft ball bearing to approx. 100 °C, fit on input shaft and drive home such that there is no clearance.

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

Attention:
Wear protective gloves.

- Check for axial clearance at 5th speed sliding gear.
  - Permissible axial clearance: 0.15 ... 0.35 mm
- Insert dowel sleeves in bearing plate.
- Fit new gasket for end cover.

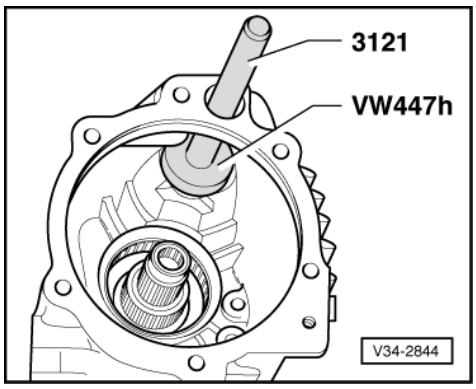


- -> Fit end cover and screw in bolts -arrows B-.

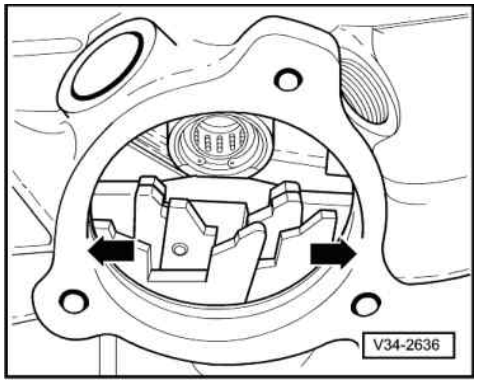
Note:

Do not tighten bolts.

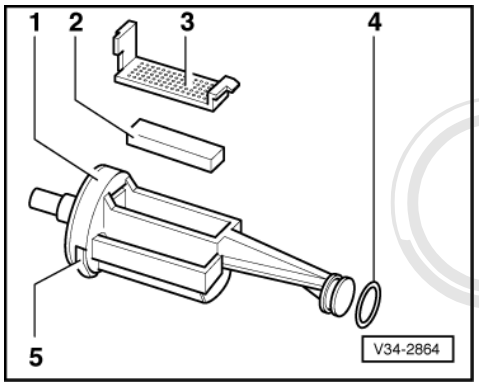
- Clean and insert 2 magnets -arrows A-.
- Insert and hand-tighten support plate.
  - Installation position: Lugs facing magnets
- Diagonally tighten bolts for end cover.



- -> Lubricate 2nd inner race and attach to input shaft with ball contact surface facing input shaft ball bearing and drive on through hole in end cover.
- Remove support bridge 30-211 A.



- -> Lock input shaft in position by engaging 2 gears (e.g. reverse and 2nd gear); to do so, shift 2 selector plates -arrows-.
- Tighten multi-point socket-head bolt to 150 Nm.
- Check neutral position of actuating arm drivers.
  - Selector gates must be aligned

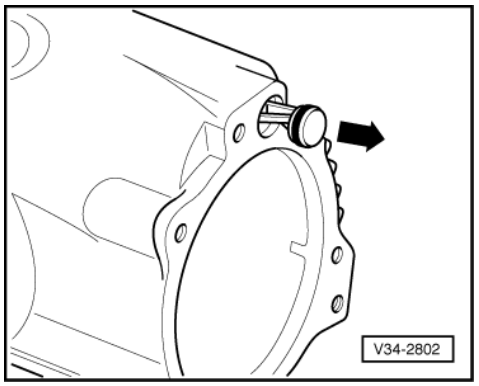


- -> Use screwdriver to unclip cover for oil collector -3- from oil collector -1- at long end and remove magnet -2-.

4 - O-ring
5 - Locating segment

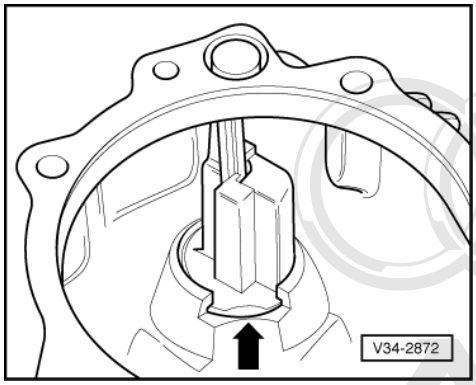
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Clean oil collector.
- Assemble oil collector.



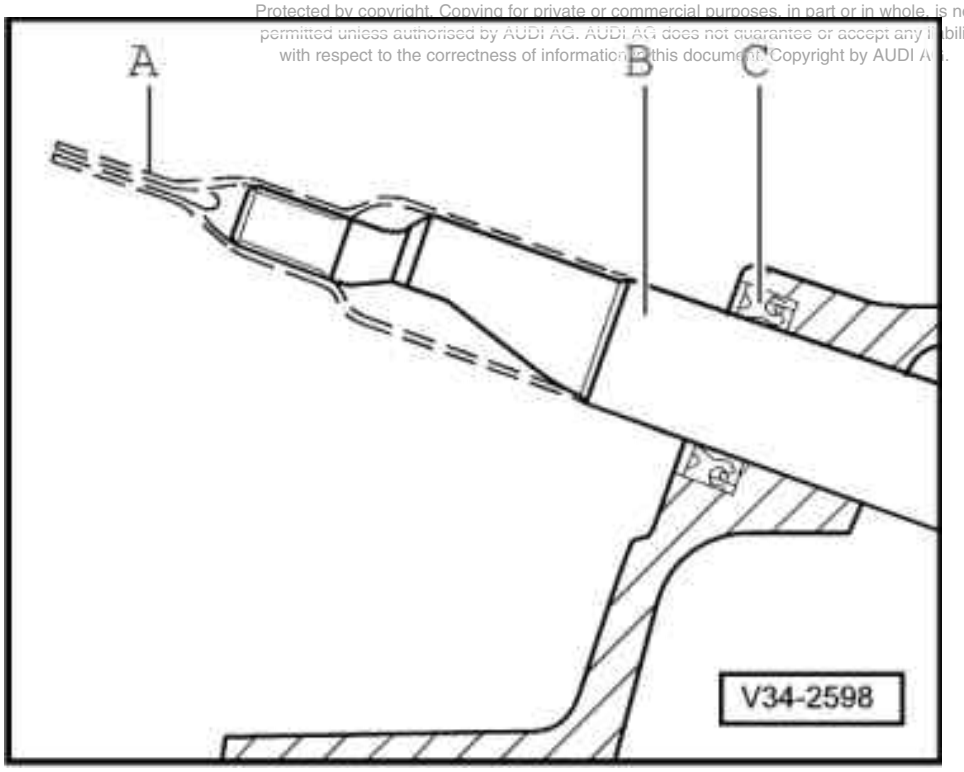
- -> Working from inside end cover, guide oil collector support arm first through hole of end cover -arrow- until it is possible to fit O-ring onto oil collector from outside.

- Lightly lubricate new O-ring and insert.

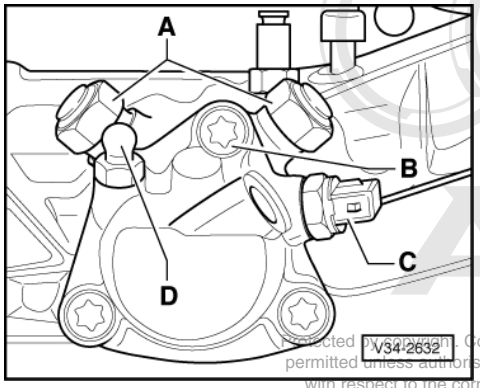


- Insert oil pipe of oil collector in input shaft.
- -> Turn oil collector until locating segment comes to rest in milled recess of end cover -arrow-.
- Press home oil collector.

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

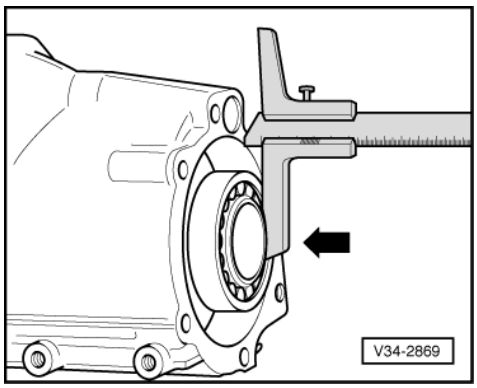


- -> Slide assembly sleeve -A-, part no. 01E 311 120, onto selector shaft -B-.
- Install complete selector shaft.
  - Installation position: Chamfer of selector shaft facing downwards



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

- -> Coat locking bolts -A- for selector shaft with sealing paste AMV 188 001 02 and screw into gearbox housing.
- Do not interchange aluminium/ steel bolts.
  - Tightening torque:
    Aluminium locking bolt 50 Nm
    Steel locking bolt 70 Nm
- Lightly lubricate new O-ring for selector shaft cover and insert.
- Fit cover for selector shaft.
- Coat bolts -B- (3 x) with sealing paste AMV 188 001 02, insert and tighten to 25 Nm.



- Slide Torsen differential onto splines of hollow shaft.
- -> Press Torsen differential in direction of arrow and measure distance between top edge of bolted-on end cover and front edge of Torsen differential ball bearing outer race.
- Determine shim(s) required as per the following table. Part numbers

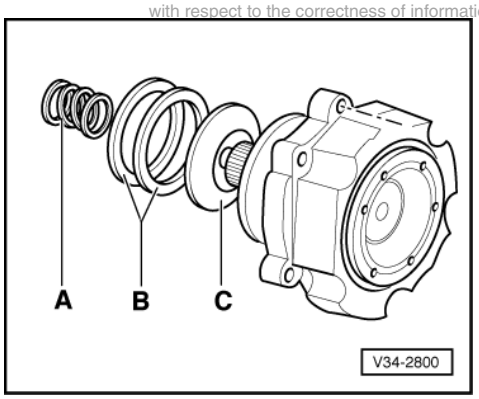
=> Parts List

Shims available:

Measurement range mm	Quantity	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 0.45
8.05 ... 8.25	2	1.65

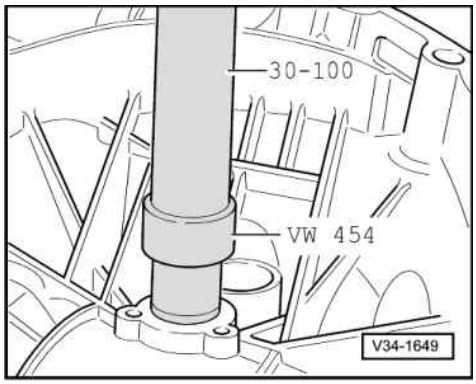
Measurement range mm	Quantity	Shim thickness (mm)
8.25 ... 8.50	1 1	1.65 1.45
8.50 ... 8.75	1 1	1.65 1.20
8.75 ... 9.00	1 1	1.65 0.95
9.00 ... 9.25	1 1	1.65 0.70
9.25 ... 9.50	1 1	1.65 0.45

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- in bearing housing.
  - Installation position: Large diameter (concave side) facing shims
- Fit shims -B- determined on the basis of table above.
- Attach spring -A- to end of flange shaft.
- Lightly lubricate new O-ring for bearing housing and insert.
- Lubricate small needle bearing in drive pinion.
- Insert complete bearing housing and pre-tighten evenly.

- Diagonally finish-tighten bearing housing bolts.

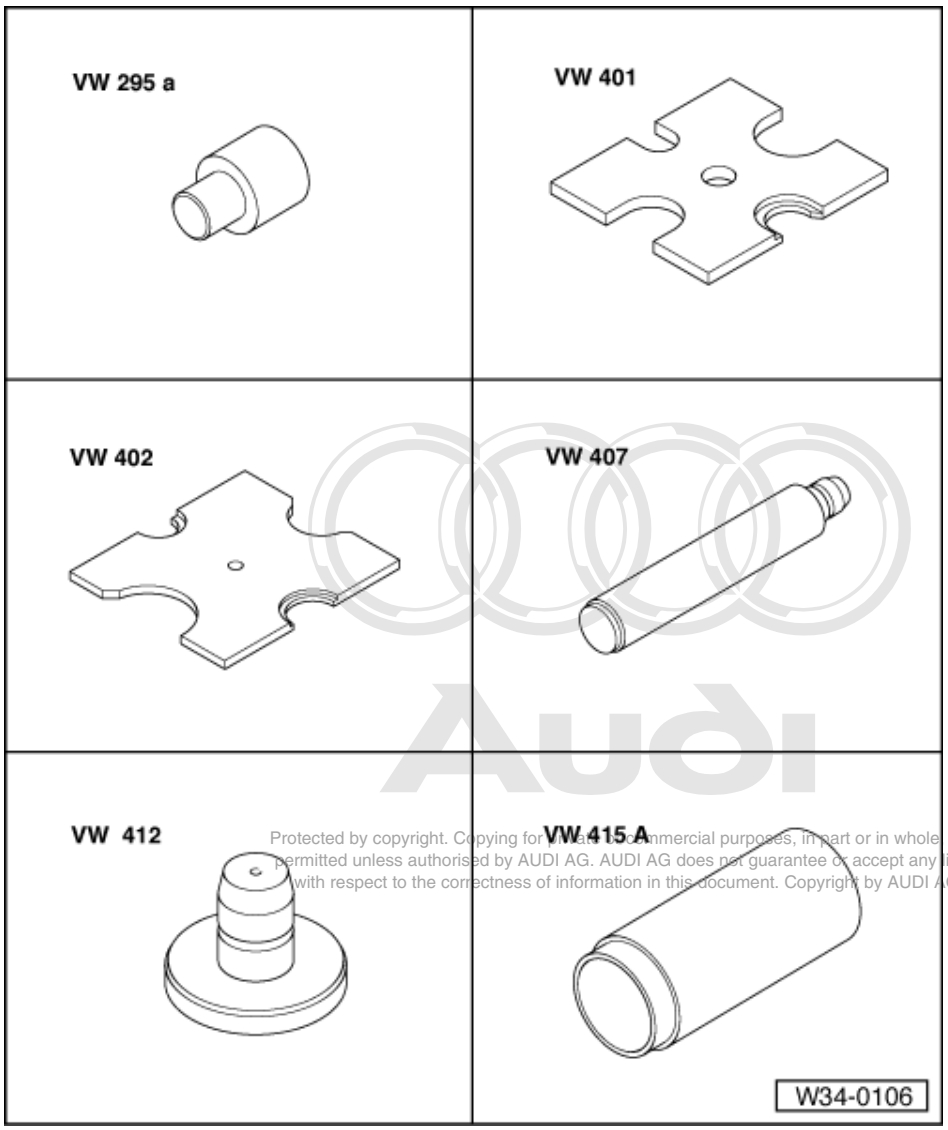


- Prepare new input shaft oil seal by half filling space between sealing lip and dust lip with sealing grease G 052 128 A1.
- Lightly lubricate outer periphery of oil seal.
- Tightly apply thin insulating sheath to splines of input shaft.
- -> Drive in input shaft oil seal.
  - Standard press-in depth: 3.5 mm
  - Service press-in depth: 4.5 mm (if using old input shaft)
- Remove insulating sheath.
- Install release bearing, clutch release lever and guide sleeve
  => Page 37 .
- Check gearshift operation of gearbox.
- Attach connecting rod.

- Top up gear oil in manual gearbox and check oil level => Page 156 .

12 - Dismantling and assembling bearing housing

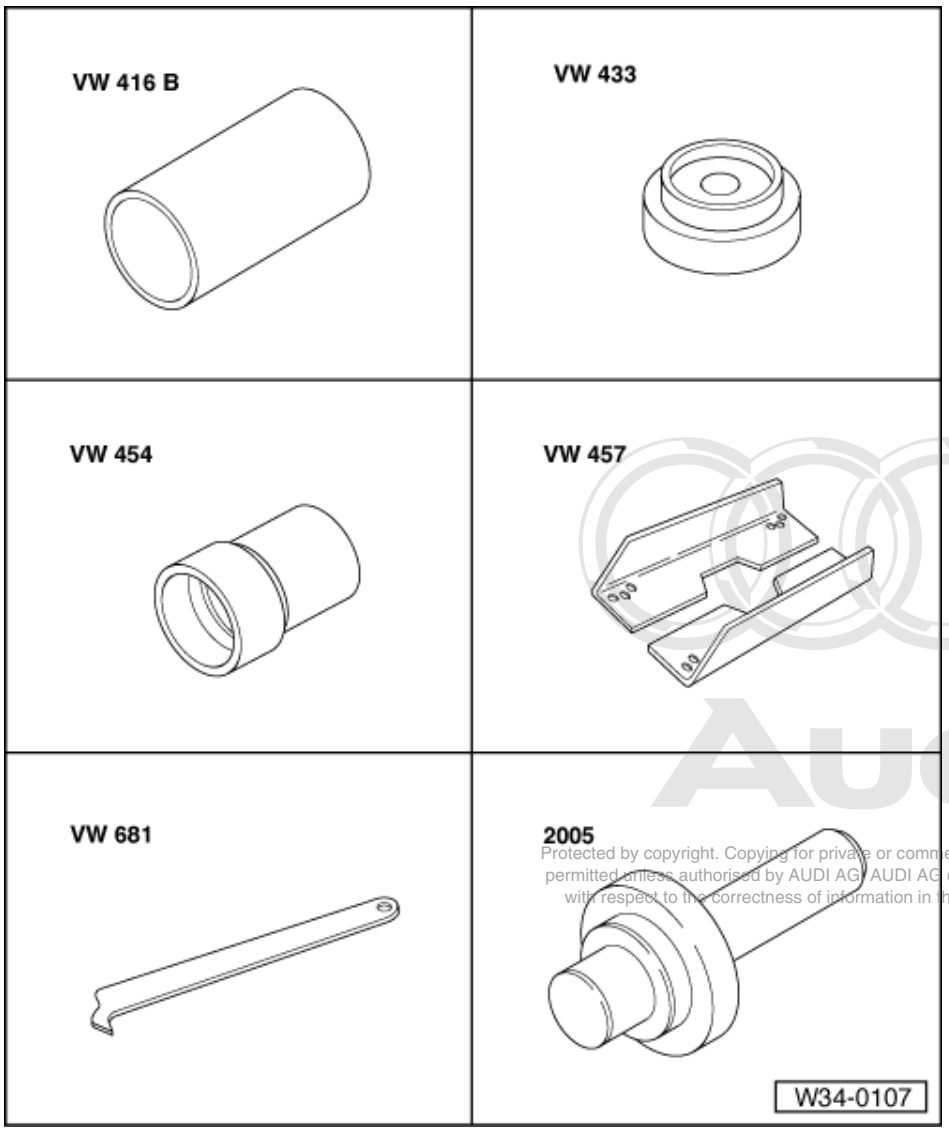
12.1 - Dismantling and assembling bearing housing



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.

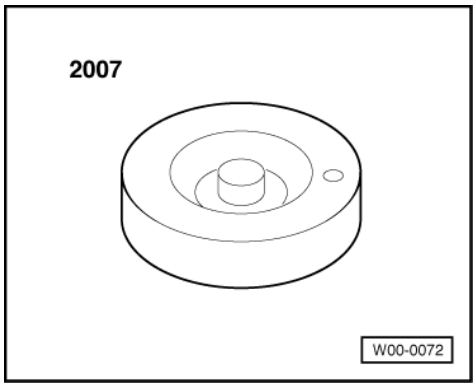
Special tools and workshop equipment required

- Adapter VW 295 A
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 412
- Tubular section VW 415 A



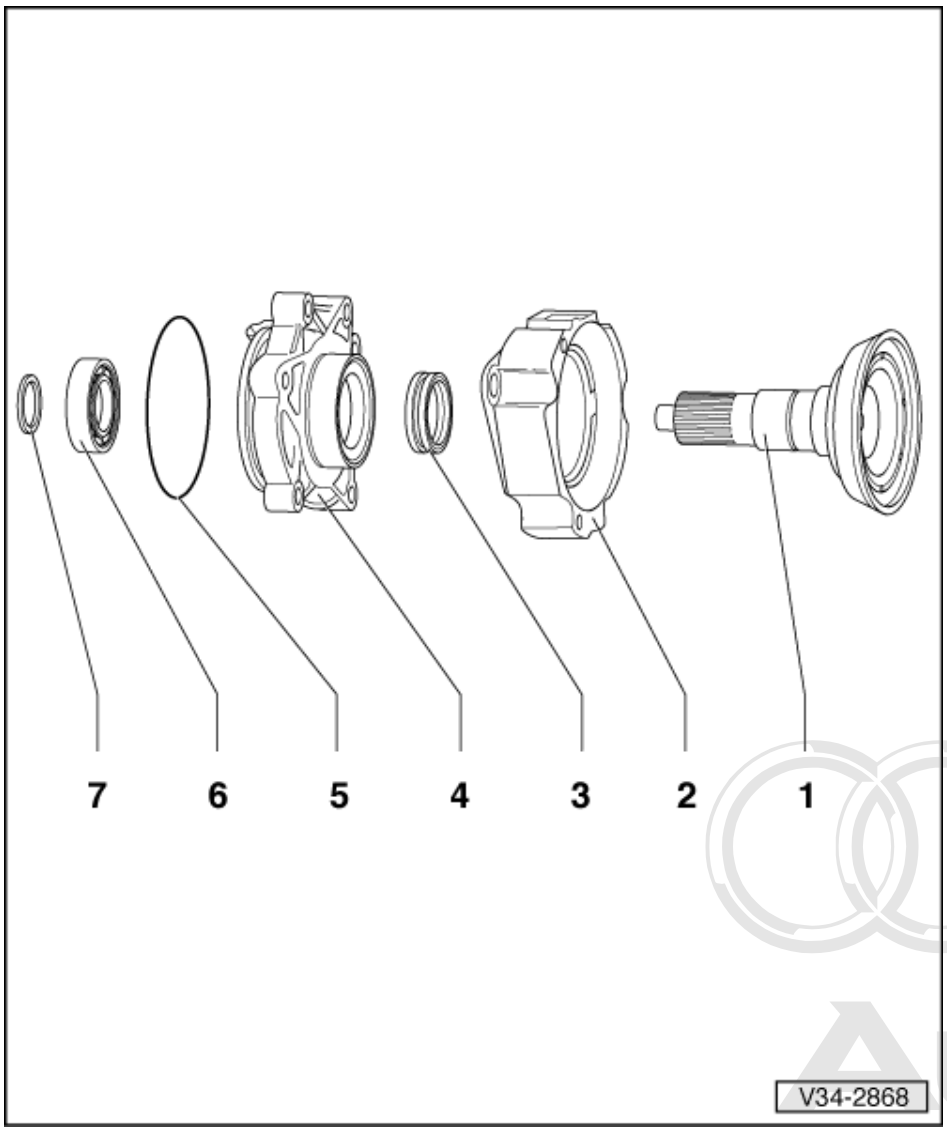
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Tubular section VW 416 B
- Thrust pad VW 433
- Thrust pad VW 454
- Support rails VW 457
- Pressing-out lever VW 681
- Fitting mandrel 2005



- Thrust pad 2007

- Washer, part no. 016 311 391 B



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
- Extracting => Fig. 5
- Preparation for fitting => Fig. 6
- Driving in => Fig. 7

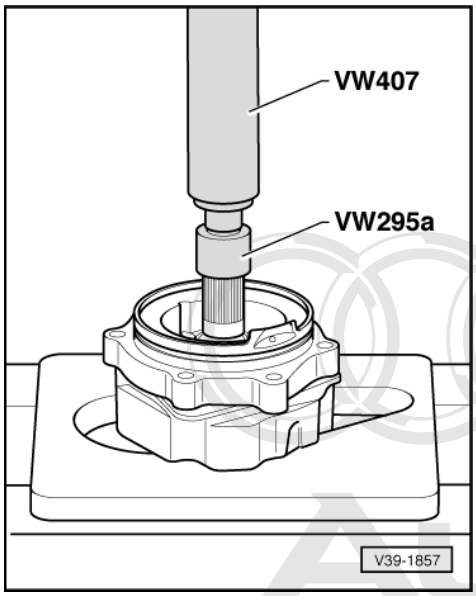
4 Bearing housing

5 O-ring
- Always replace
- Lubricate slightly before fitting

6 Ball bearing for flange shaft
- Pressing out => Fig. 8
- Pressing in => Fig.9

7 Circlip

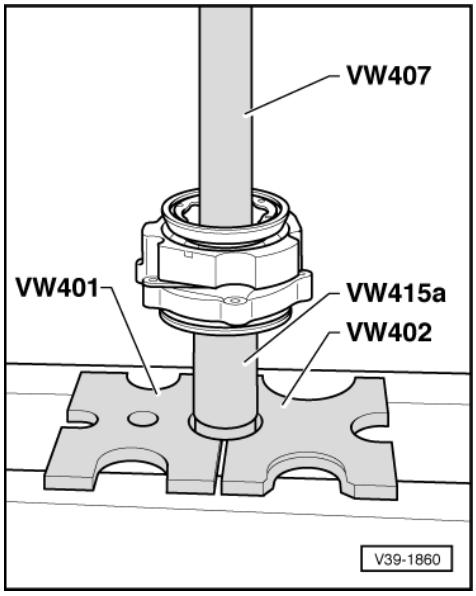
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.1 Pressing out flange shaft

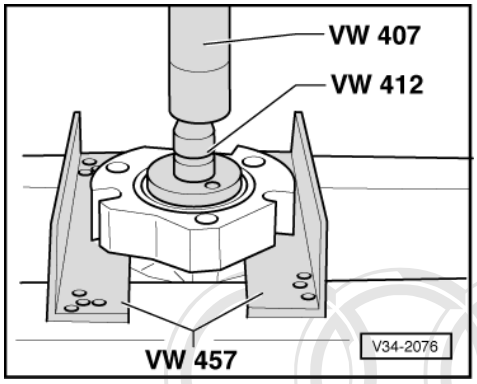
Copyright by AUDI AG. Any use for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Detach circlip before pressing out flange shaft.

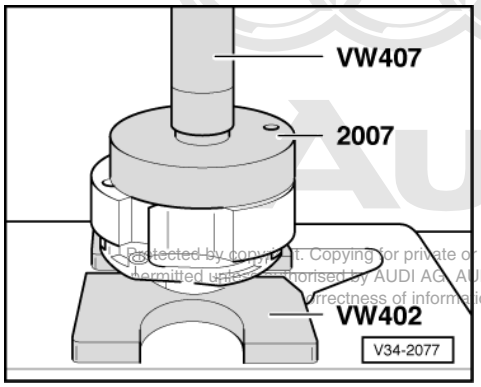


-> Fig.2 Pressing in flange shaft

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



-> Fig.3 Pressing off vibration damper

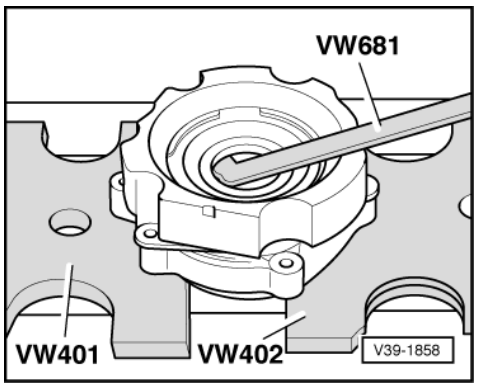


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to correctness of information in this document. Copyright by AUDI AG.

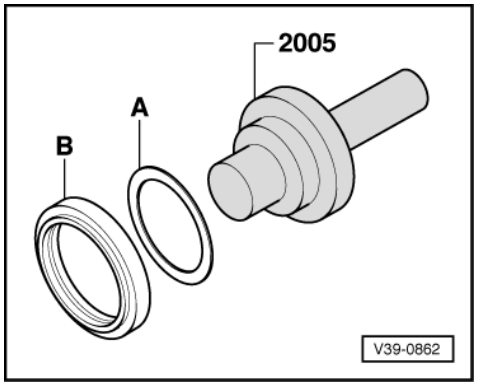
-> Fig.4 Pressing on vibration damper

Note:

Heed position of holes.



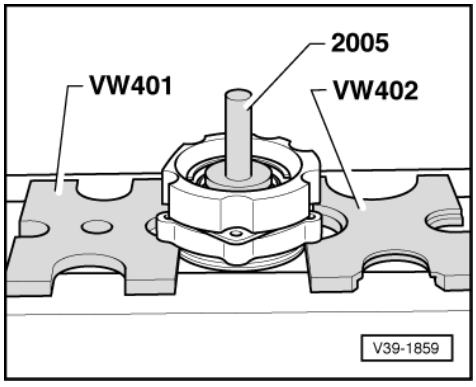
-> Fig.5 Extracting oil seal



-> Fig.6 Preparing oil seal for fitting

A - Washer, part no. 016 311 391 B (1.7 mm thick)
B - Oil seal

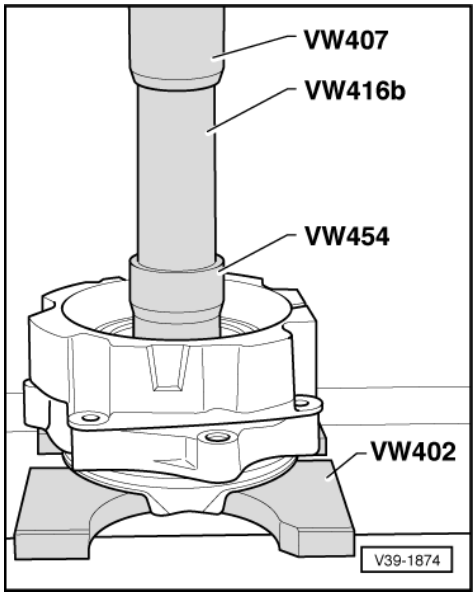
- Half-fill space between sealing lip and dust lip with sealing grease G 052 128 A1.
- Lightly lubricate outer periphery of oil seal.
- Consecutively place washer and oil seal on tool.
  - Installation position: Open side of oil seal facing bearing housing



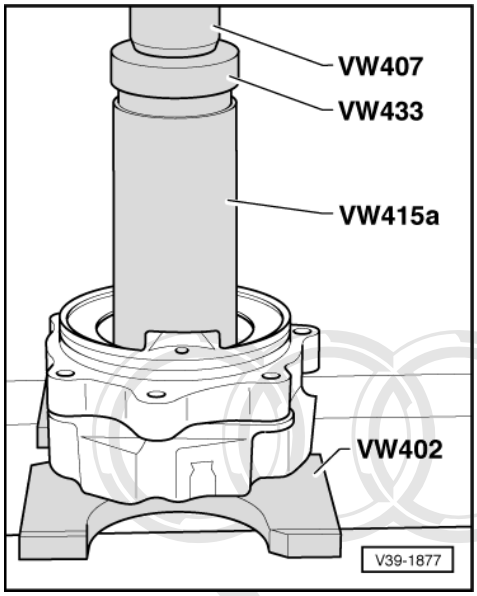
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.7 Driving in oil seal

- Detach washer.



-> Fig.8 Pressing out flange shaft ball bearing

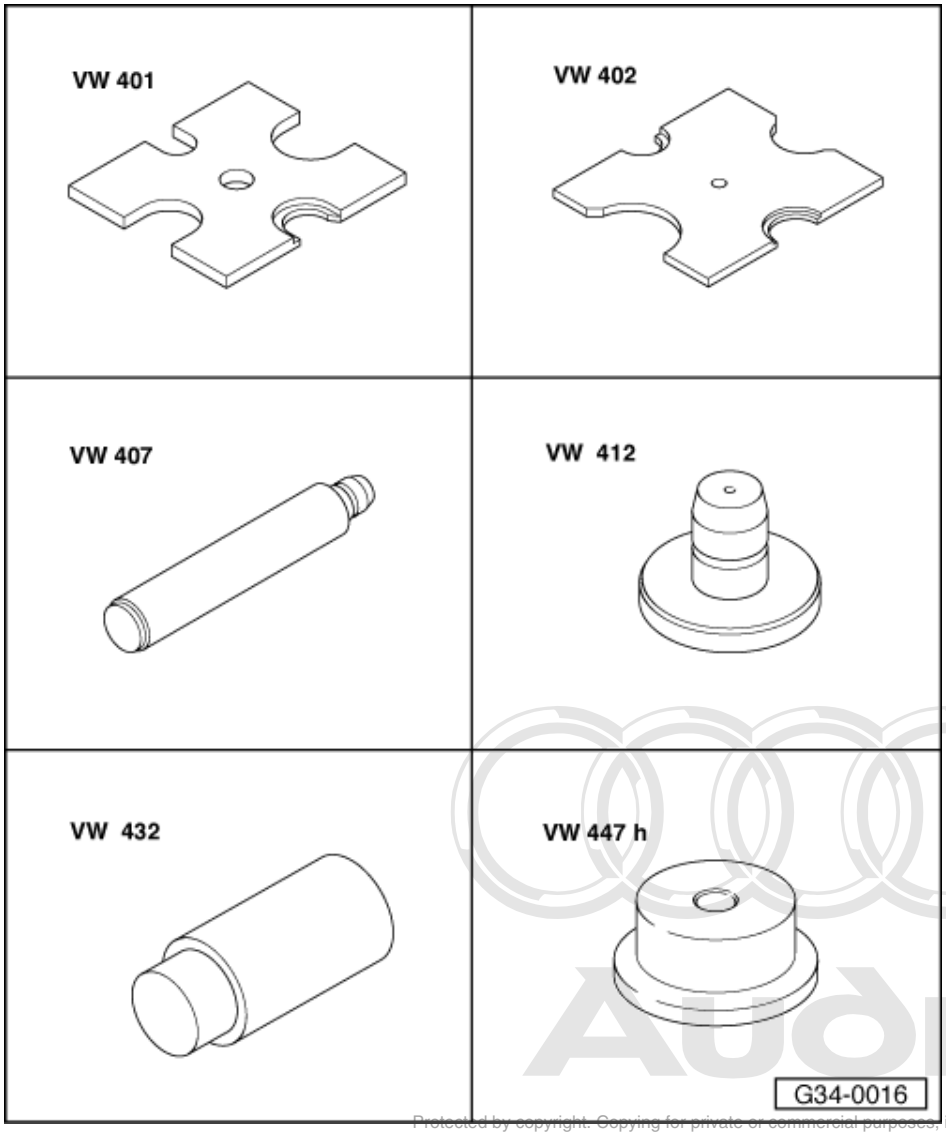


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.9 Pressing in flange shaft ball bearing

13 - Servicing bearing system for Torsen differential

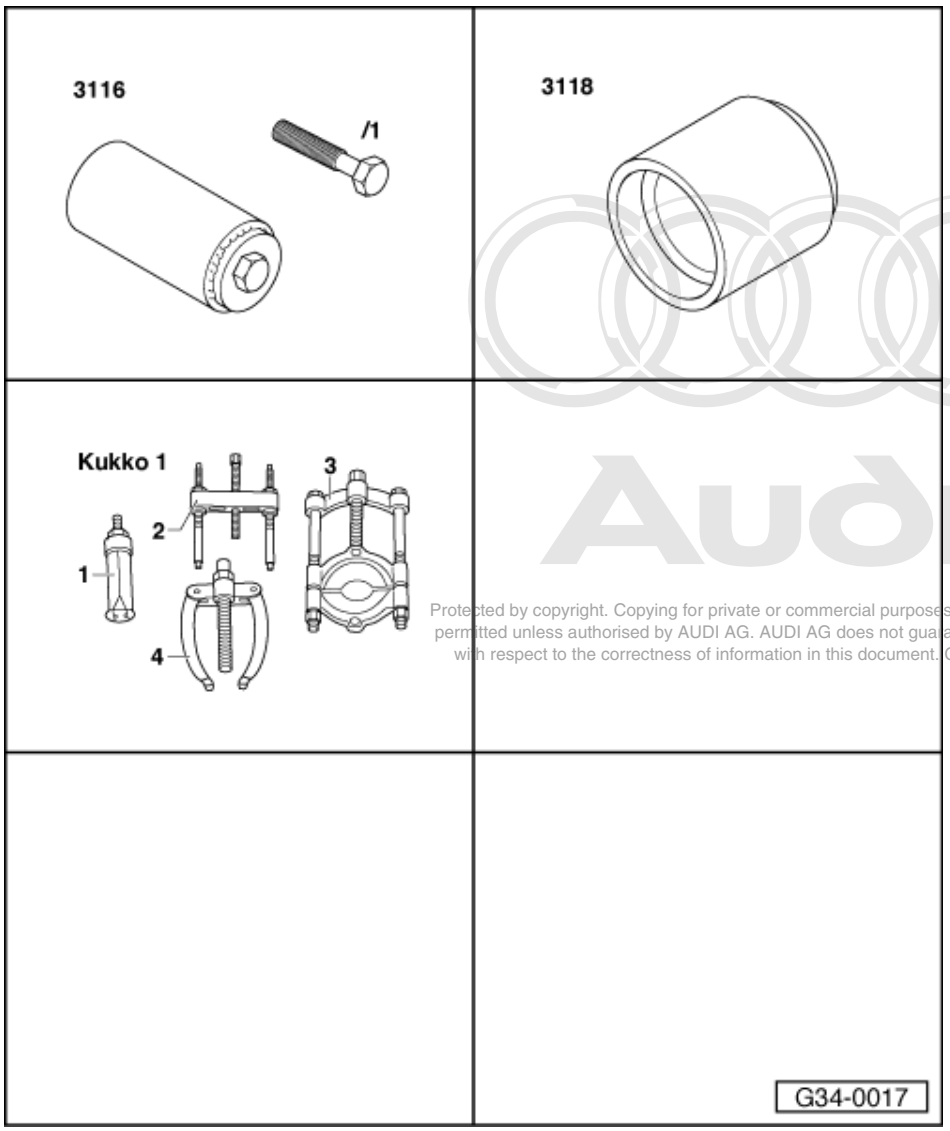
13.1 - Servicing bearing system for Torsen differential



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.

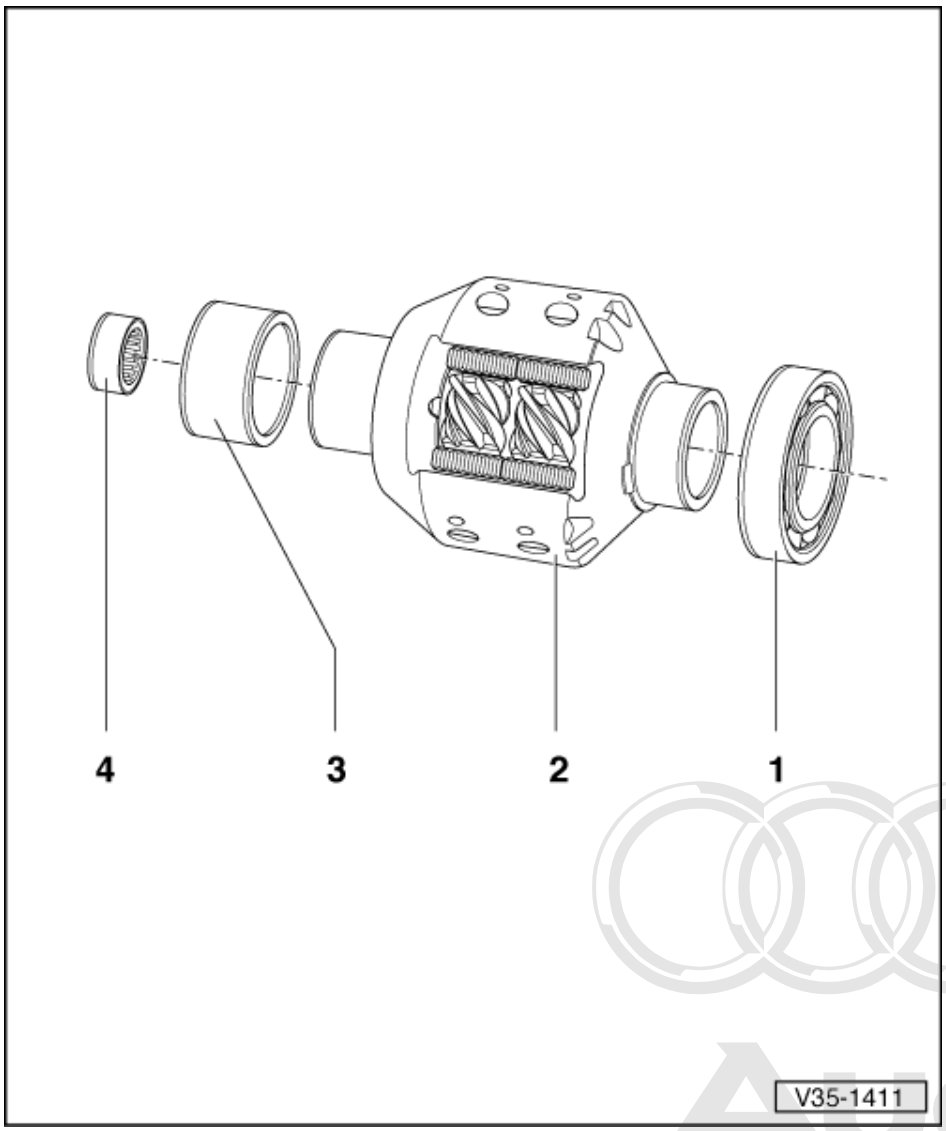
Special tools and workshop equipment required

- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 412
- Thrust pad VW 432
- Thrust pad VW 447 H



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

- Clamping sleeve 3116
- Thrust pad 3118
- 1 - Internal puller Kukko 21/5
- 3 - Parting tool Kukko 17/2
- 4 - Counter-support Kukko 22/1



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 accuracy of information. Vehicle specific data are subject to change. © Copyright by AUDI AG.

Shims for Torsen differential are to be re-determined after replacing the following components =>Page 200 :

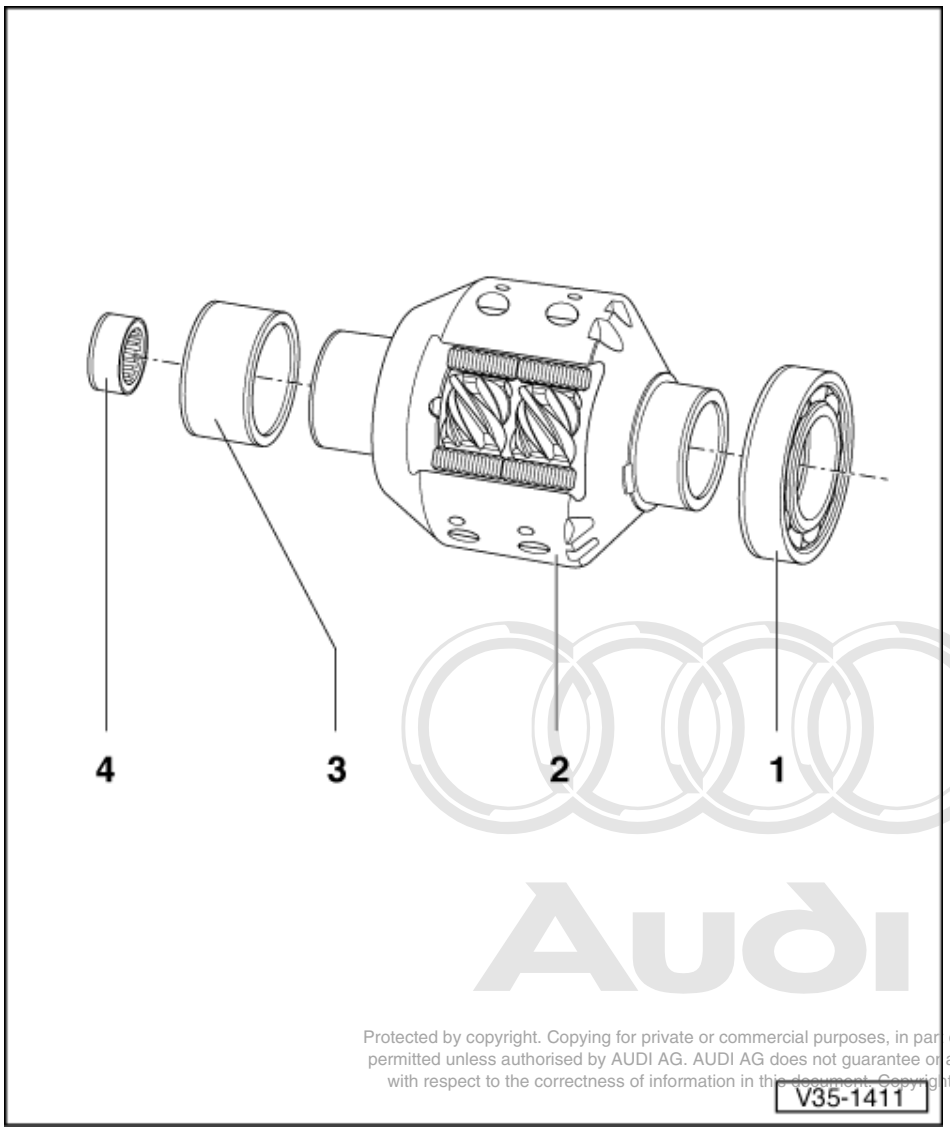
- End cover
- Inner race for needle bearing
- Torsen differential
- Torsen differential ball bearing

1 Ball bearing for Torsen differential

- Pressing off => Fig. 1
- Pressing on => Fig. 2

2 Torsen differential

- Do not dismantle
- Can only be serviced by the manufacturer
- Replace if damaged



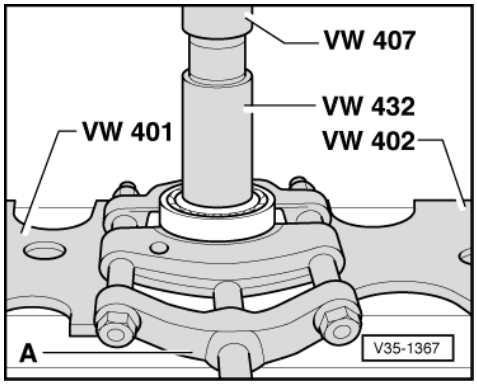
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3 Inner race for Torsen differential needle bearing

- Pulling off => Fig. 3
- Pressing on => Fig. 4

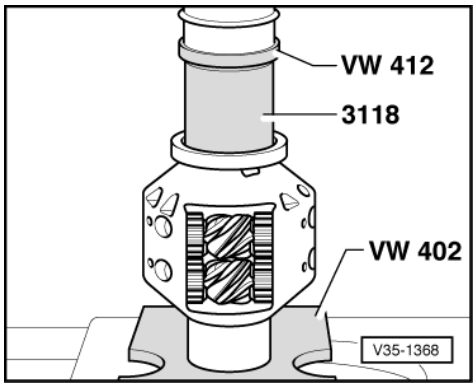
4 Needle bearing for drive pinion/Torsen differential

- Extracting => Fig. 5
- Pressing in => Fig. 6



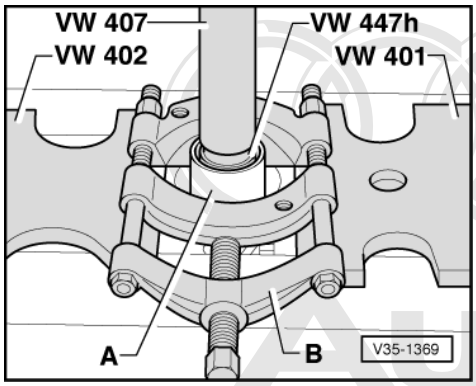
-> Fig.1 Pressing off ball bearing for Torsen differential

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



-> Fig.2 Pressing on ball bearing for Torsen differential

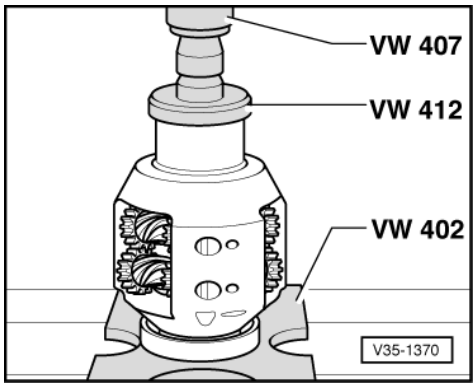
- Shoulder of thrust piece 3118 faces press tool VW 412



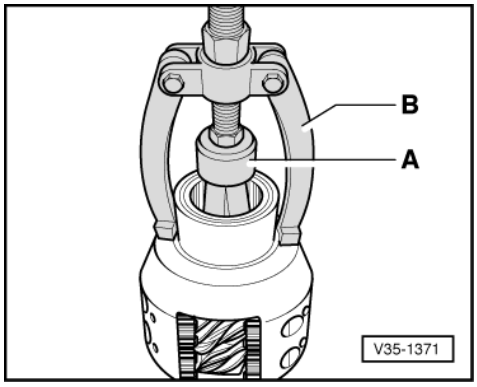
-> Fig.3 Pulling off inner race for Torsen differential needle bearing

Printing of this document is permitted for personal use only and individual non-commercial use only. Any other printing, use or reproduction is not permitted unless authorised by AUDI 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 - Inner race
B - Parting tool 22 ... 115 mm, e.g. Kukko 17/2



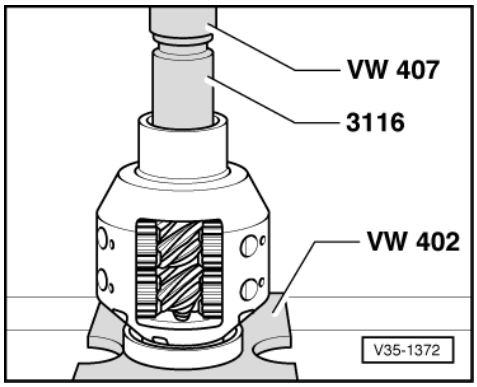
-> Fig.4 Pressing on inner race for Torsen differential needle bearing



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

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

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.

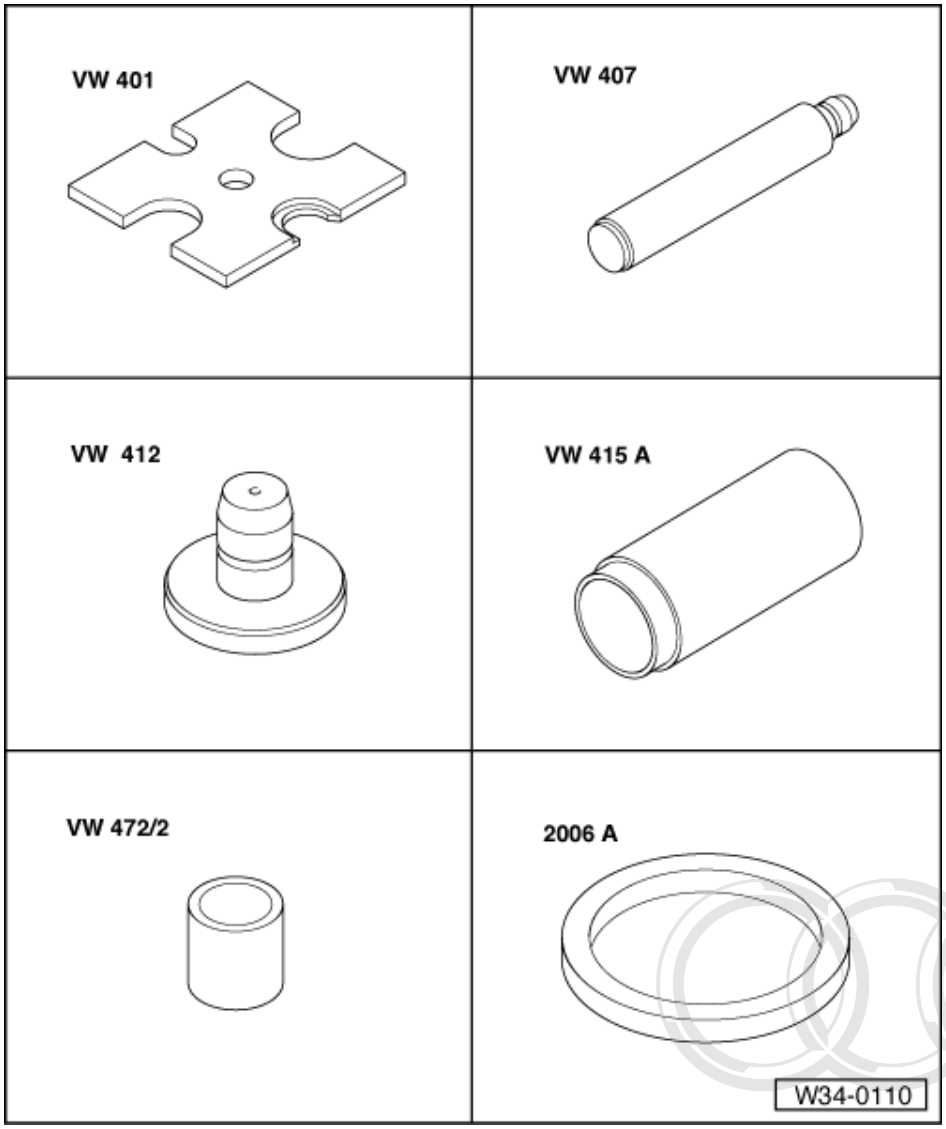


-> Fig.6 Pressing in needle bearing for drive pinion/Torsen differential

- Press in needle bearing such that it is flush on inside.

14 - Servicing end cover

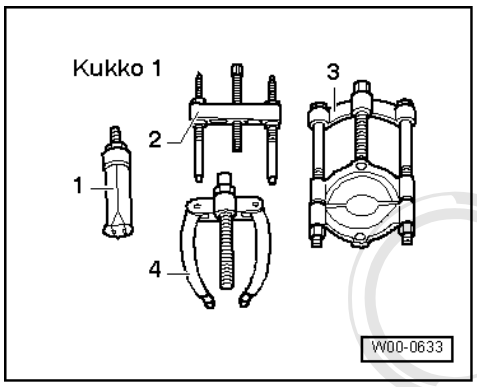
14.1 - Servicing end cover



Special tools and workshop equipment required

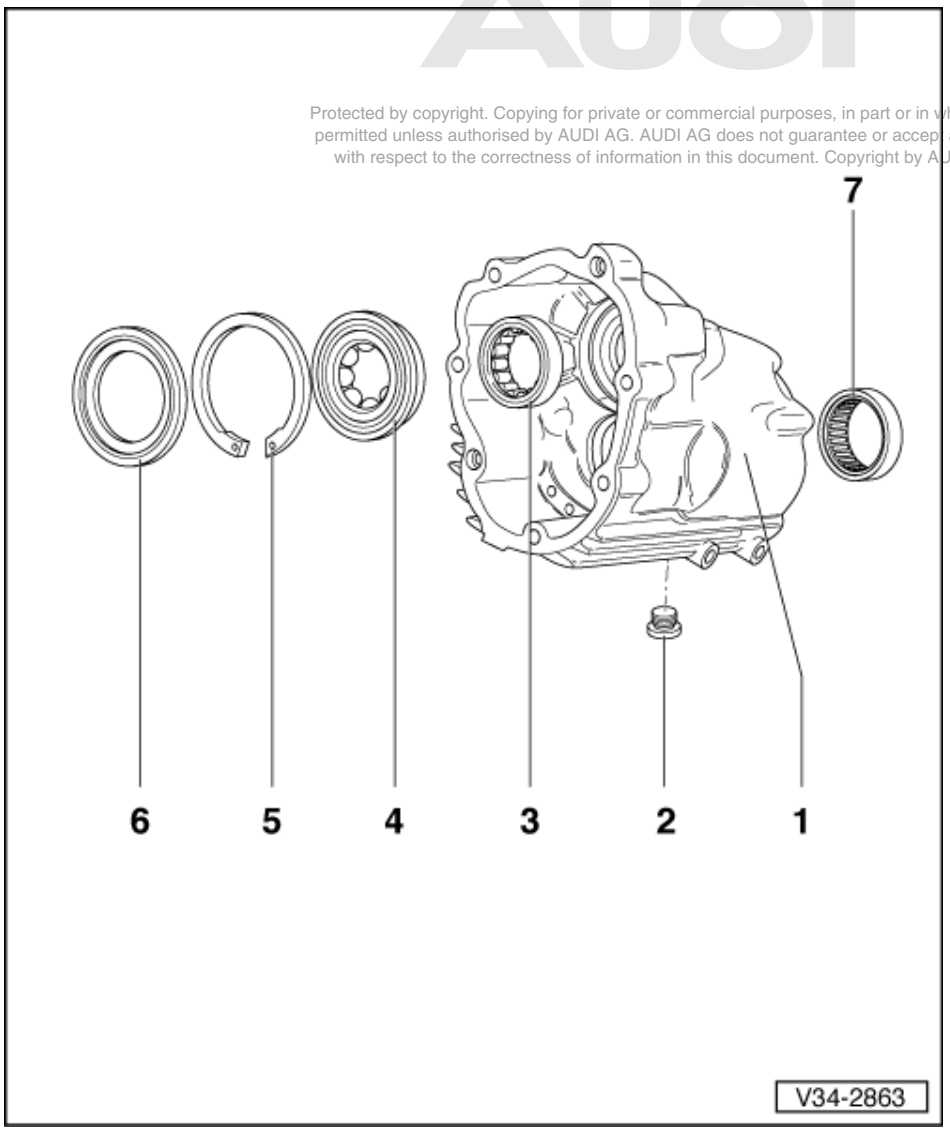
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 412
- Tubular section VW 415 A
- Spacer sleeve VW 472/2
- Support ring 2006 A

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.



- 1 - Internal puller Kukko 21/6 and internal puller Kukko 21/7
- 4 - Counter-support Kukko 22/2

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



1 End cover

- If replaced:
- Re-determine thickness of circlip -Item 5 -
- Re-determine shims for Torsen differential => Page 200

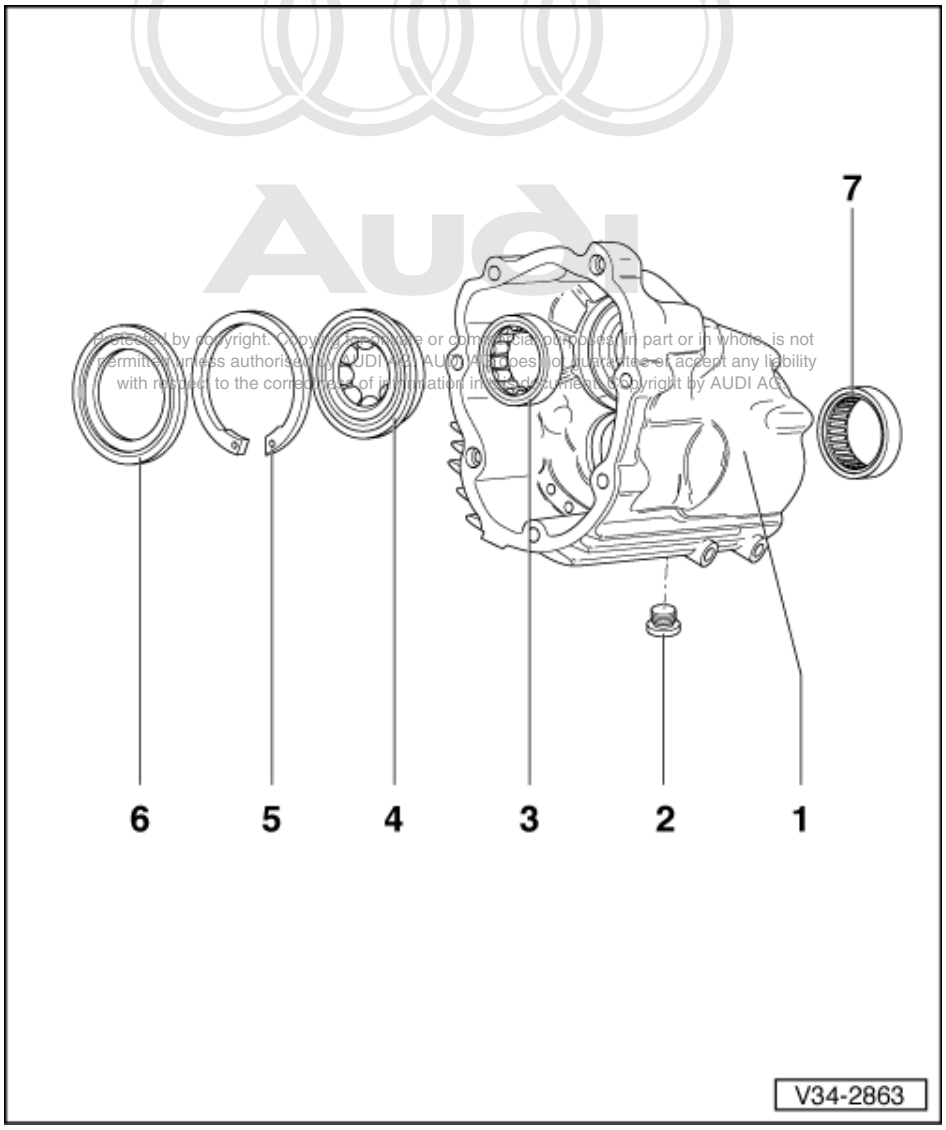
2 Oil drain plug, 40 Nm

3 Cylindrical roller bearing for input shaft

- Extracting => Fig. 1
- Pressing in flush => Fig. 2

4 Ball bearing for input shaft

- Removing => Fig. 3
- Installing => Fig. 4
- On replacement, re-determine thickness of circlip -Item 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.

5 Circlip

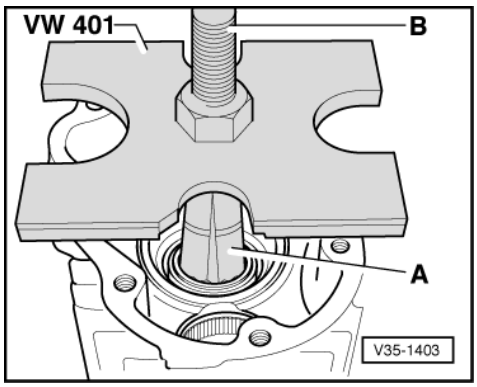
- Re-determining thickness
  => Page 219
- Installing => Fig. 4

6 Baffle plate

- Replace
- Removing => Fig. 3
- Installing and peening on replacing ball bearing for input shaft => Fig. 5
- Installing and peening on replacing end cover => Fig. 6

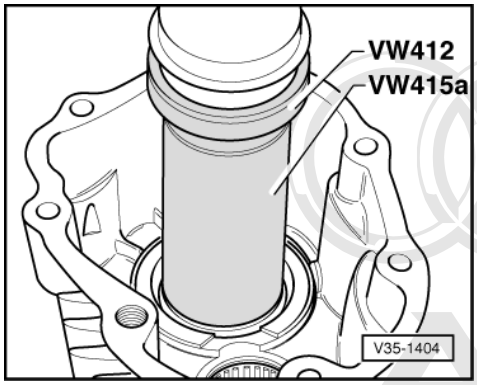
7 Torsen differential needle bearing

- Extracting => Fig. 7
- Driving in => Fig. 8



-> Fig.1 Extracting cylindrical roller bearing for input shaft from end cover

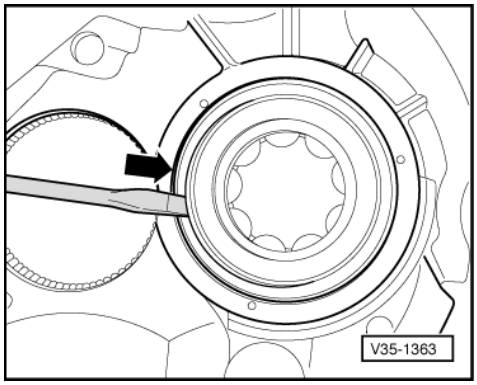
A - Internal puller 37 ... 46 mm, e.g. Kukko 21/6
B - Spindle from counter-support Kukko 22/2



-> Fig.2 Pressing cylindrical roller bearing for input shaft into end cover so as to be flush

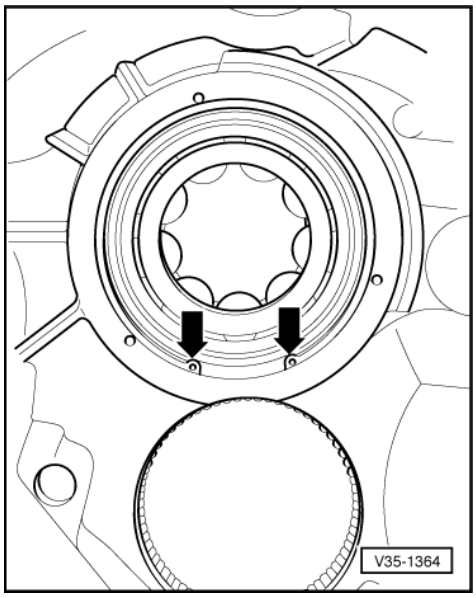
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not
permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
with respect to the correctness of information in this document. Copyright by AUDI AG.

- Shoulder of tubular section VW 415 a faces press tool VW 412



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

- Apply screwdriver as shown, knock into baffle plate -arrow- and prise out.
- Remove circlip.
- Take out bearing and eliminate peening depressions if necessary.



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

Installation position of circlip:

- Ends of circlip -arrows- face needle bearing

Note:

Circlip thickness must be re-determined on replacing bearing or end cover.

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

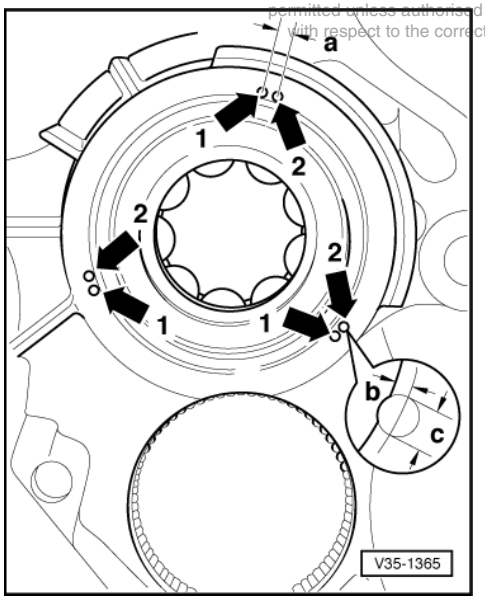
=> Parts List

Circlips available:

Circlip thickness (mm)	
2.55	2.65
2.60	2.70

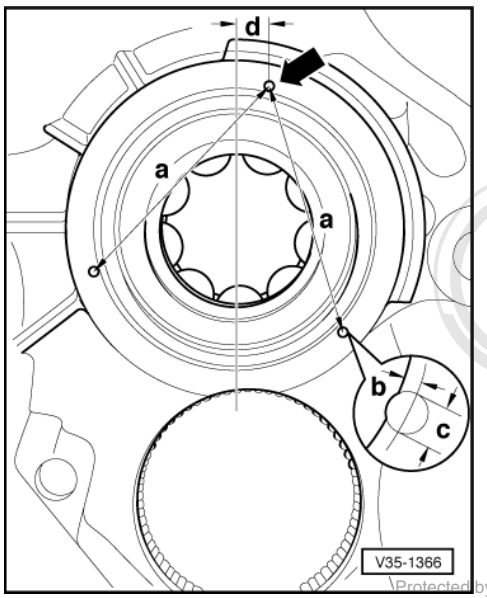
- Fit circlip.

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.



-> Fig.5 Peening baffle plate on replacing ball bearing for input shaft

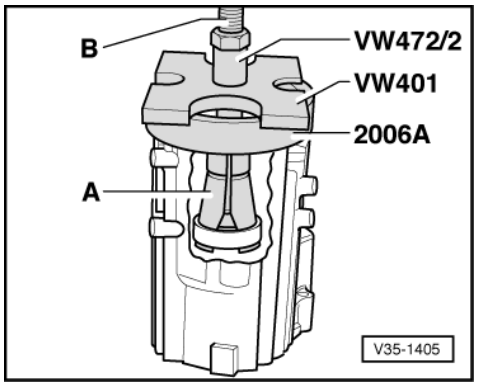
- For peening, make use of blunt centre punch with spherical end (ball ø 5 mm).
- Insert baffle plate.
- Perform initial peening -arrows 1-.
- Perform second peening operation -arrows 2- at a distance -a- from initial peening operation.
  - Dimension a = 5 mm
- Observe position and ø of peening points:
  - Dimension b = 2 mm
  - Dimension c = 3 mm



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

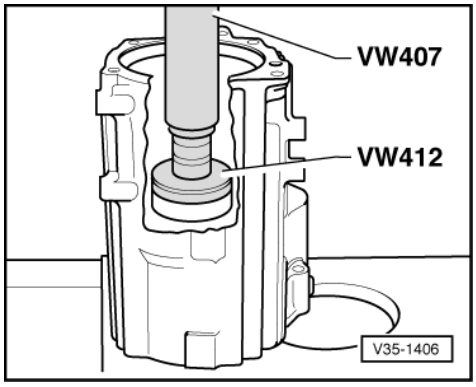
-> Fig.6 Peening baffle plate on replacing end cover

- For peening, make use of blunt centre punch with spherical end (ball ø 5 mm).
- Insert baffle plate.
- Set first peening point -arrow- at a distance -d- from connecting line of shaft centres.
  - Dimension d = 10 mm
- Observe position and ø of peening points:
  - Dimension b = 2 mm
  - Dimension c = 3 mm
- Set second and third peening points in the same manner at distance -a-.
  - Dimension a = 70 mm



-> Fig.7 Extracting needle bearing for Torsen differential out of end cover

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

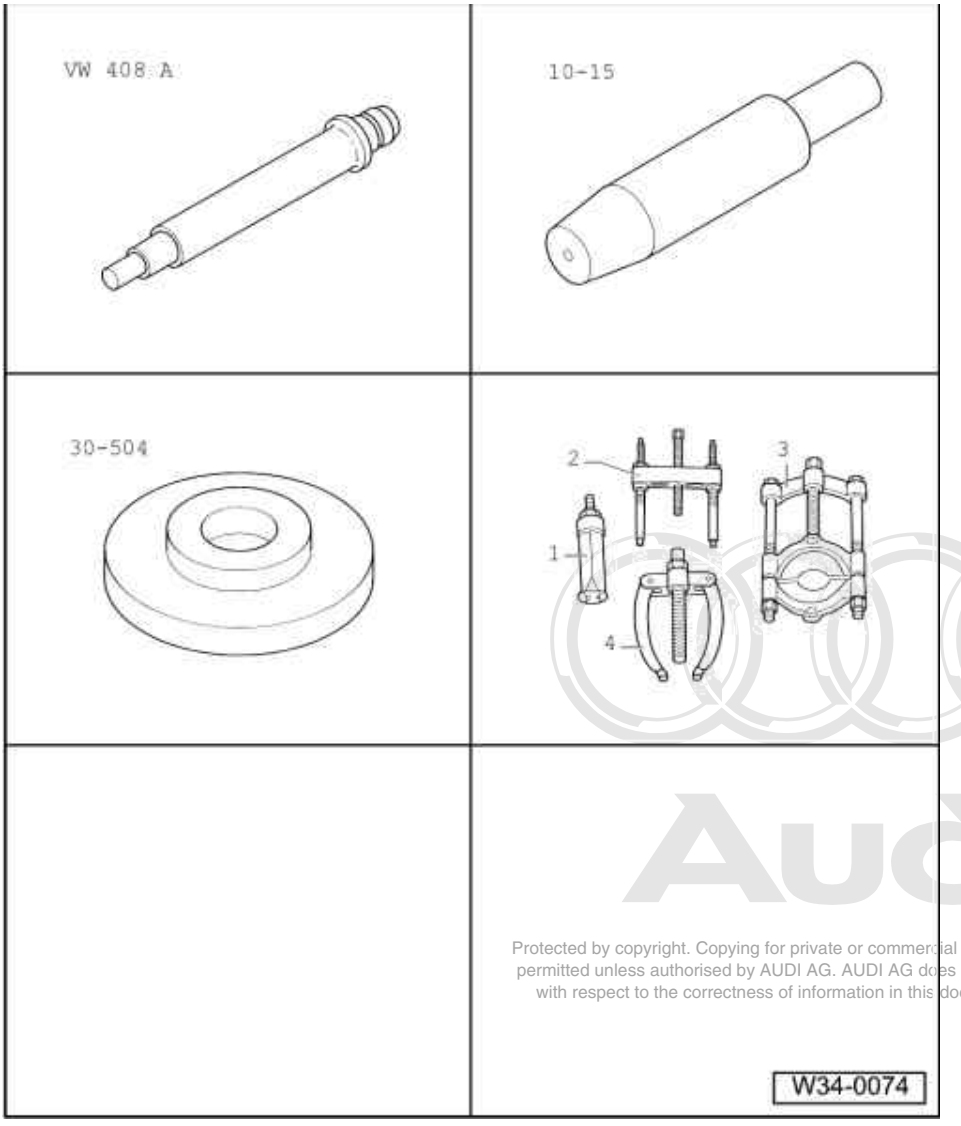


-> Fig.8 Driving needle bearing for Torsen differential flush into end cover

- Place press tool VW 412 with shoulder facing upwards on bearing.

15 - Servicing bearing plate

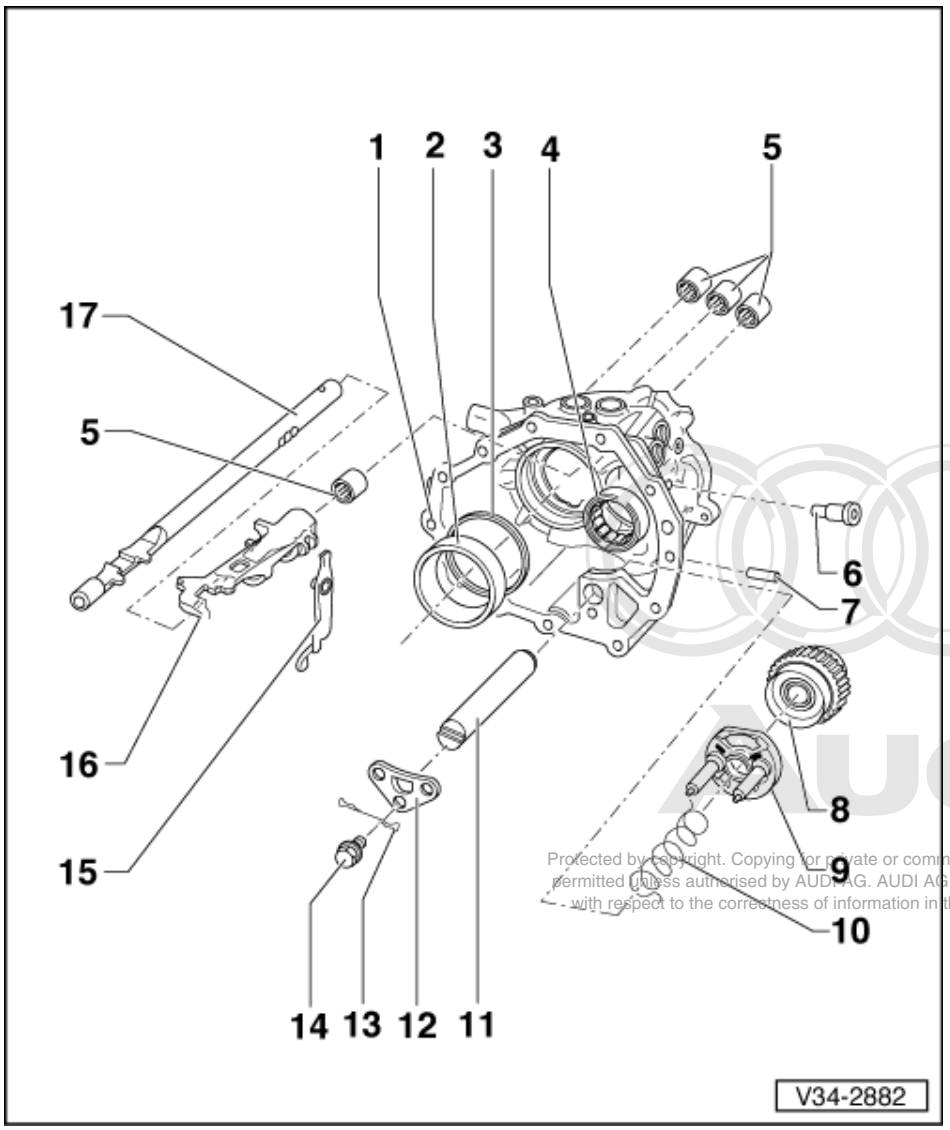
15.1 - Servicing bearing plate



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.

Special tools and workshop equipment required

- Press tool VW 408 A
- Guide pin 10-15
- Pressing-in tool 30-504
- 1 - Internal puller Kukko 21/2
- 4 - Counter-support Kukko 22/1
- Depth gauge



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

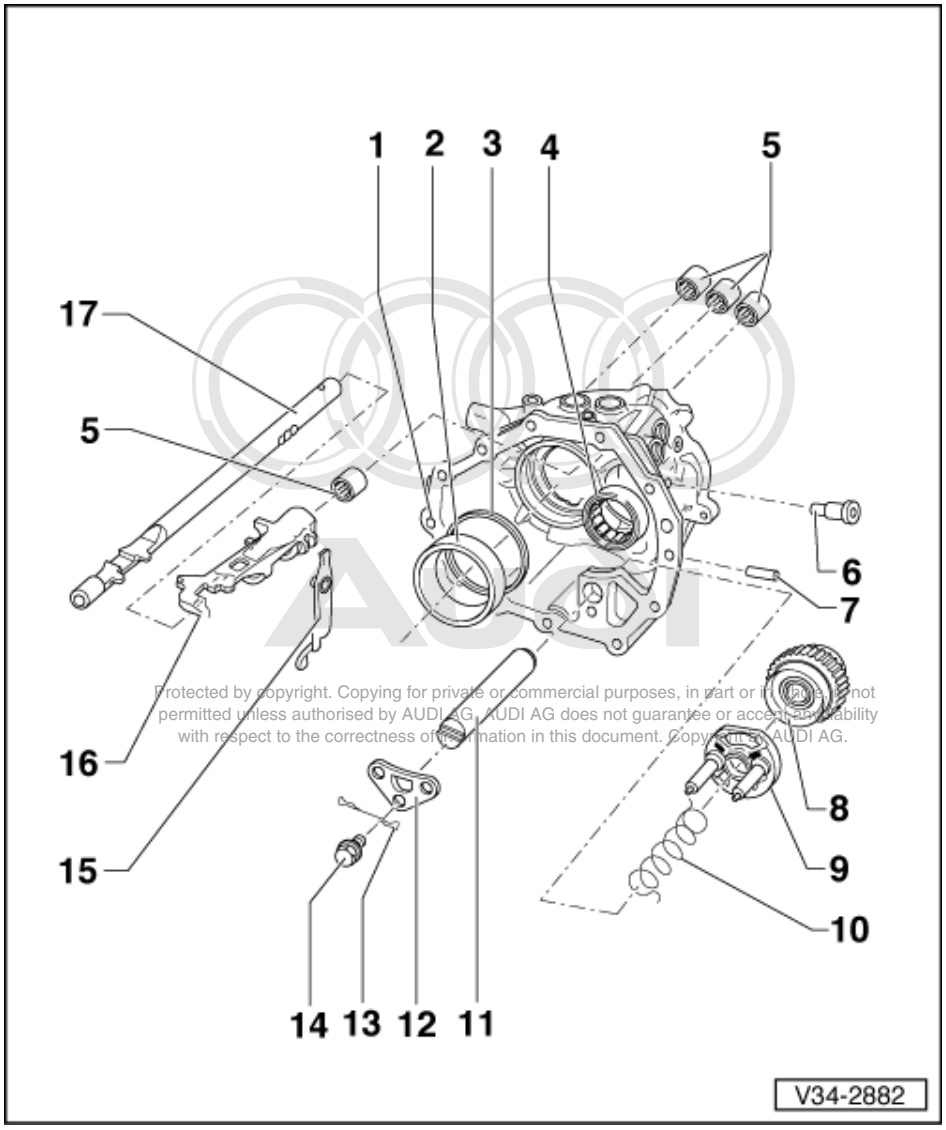
1 **Bearing plate**
- On replacement, re-determine shim "S4"

2 **Outer race for drive-pinion taper roller bearing**
- Driving out => Page 280
- Pressing in => Page 280
- On replacement, re-determine shim "S4"

3 **Shim "S4"**
- Adjustment table => Page 326
- Re-determining => Page 228

4 **Cylindrical roller bearing for input shaft**
- Pressing out => Fig. 5
- Pressing in => Fig. 6

- Measuring pressing-in depth =>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.

5 Ball sleeves

- 4x
  For selector rods
- Driving out and fitting => Fig. 1
  For actuating arm driver for reverse gear
- Extracting => Fig. 3
- Driving in => Fig. 4

6 Bolt, 35 Nm

- For actuating arm

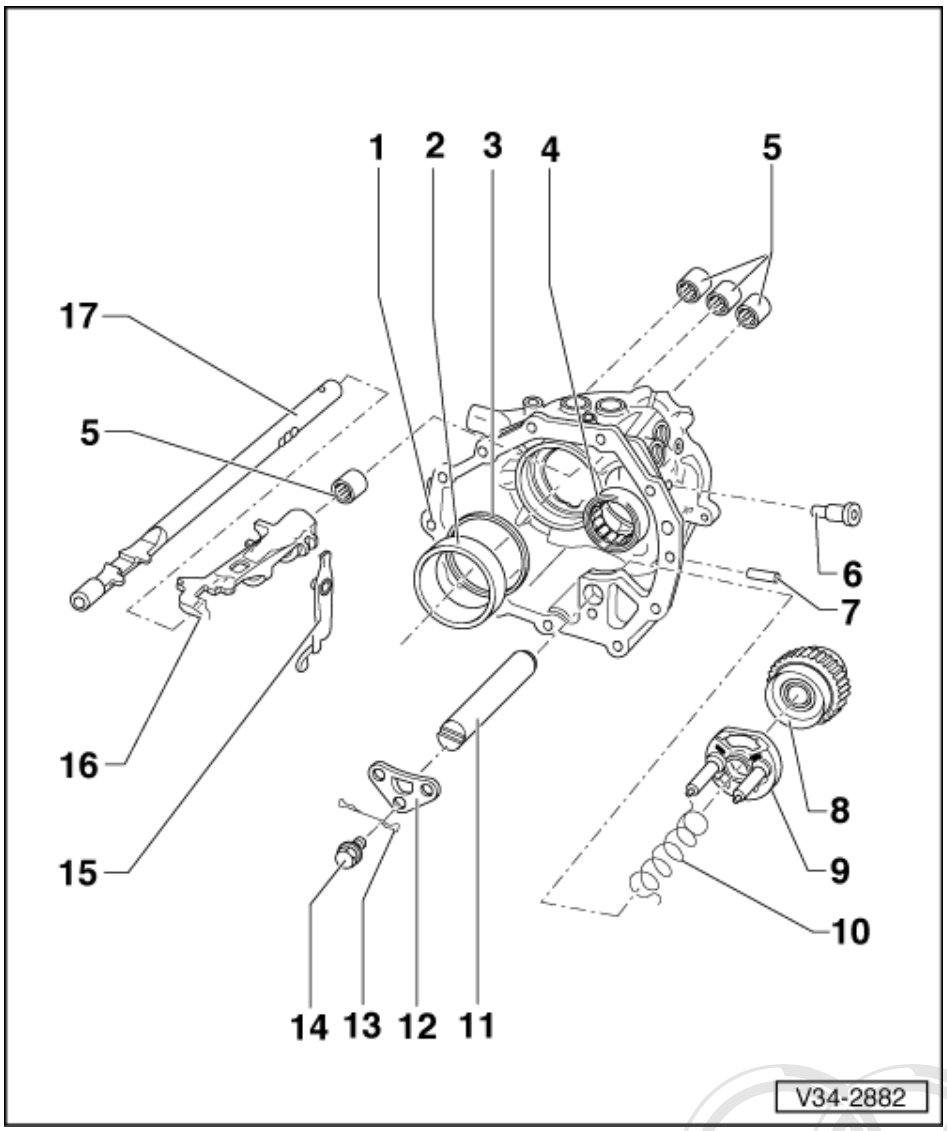
7 Straight pin 7 x 28

- Press in flush

8 Sliding gear for reverse

9 Synchro-ring for reverse gear

- With locking pins
- Checking for wear => Fig. 2
- Installation position: Aligning chamfer at periphery of synchro-ring with respect to input shaft => Page 190



10 Spring

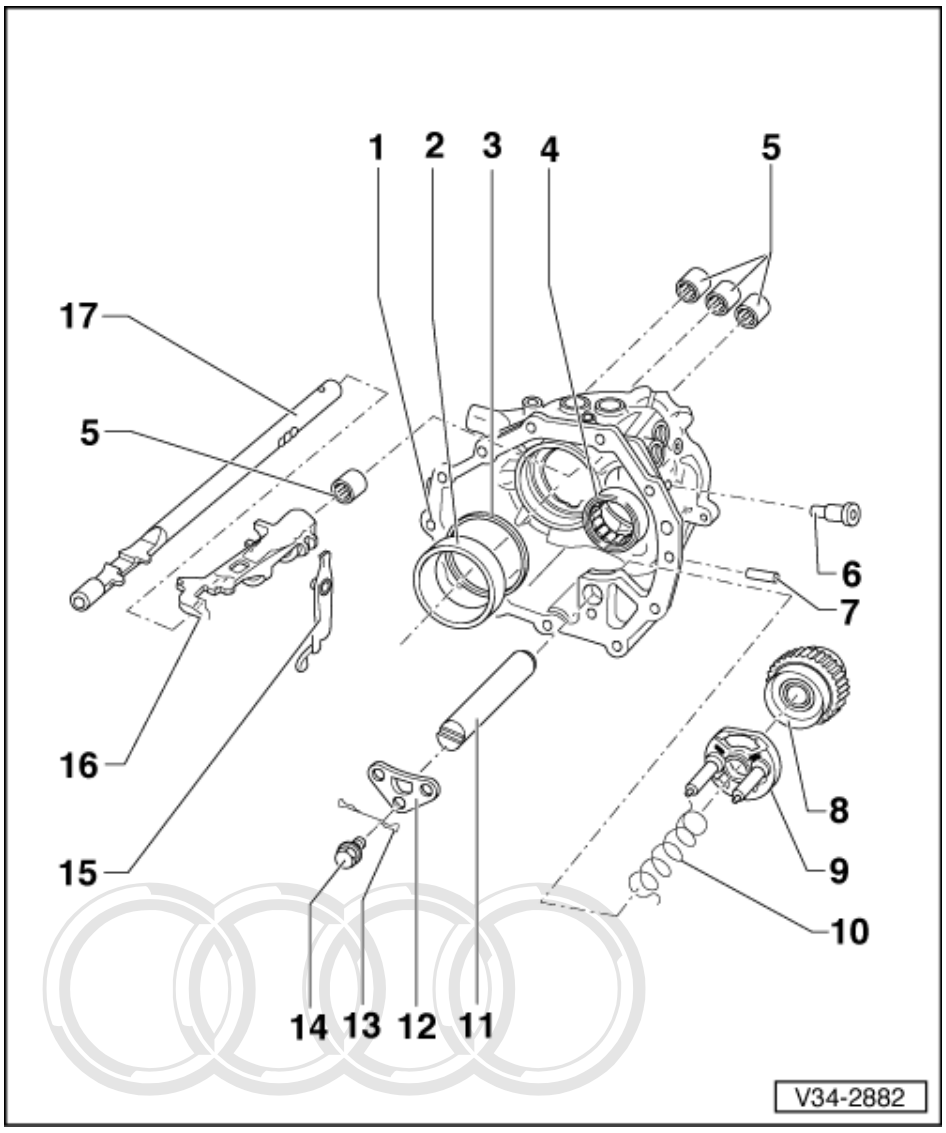
- Installation position: Engage single-offset end in recess at synchro-ring; turn double-offset end anti-clockwise and engage in opening at bearing plate

11 Shaft for reverse sliding gear

12 Retainer

- Installation position: Chamfers of holes for synchro-ring locking pins facing bearing plate=> Page 190

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Spring clip

14 Bolt, 25 Nm

- Self-locking
- Replace

15 Actuating arm for reverse gear

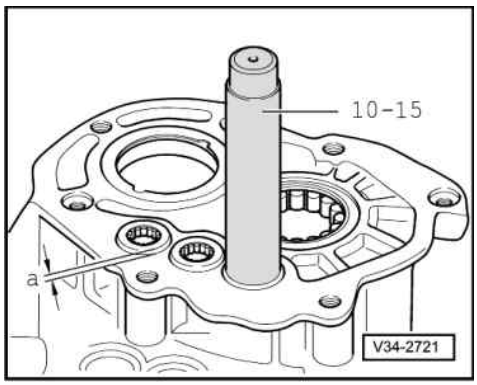
16 Actuating arm driver for reverse gear

- Extracting ball sleeve => Fig. 3
- Driving in ball sleeve => Fig. 4

17 Selector rod for 5th and 6th gear

- Only replace complete with actuating arm driver => Page 171 , Item 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 and completeness of this document. Copyright by AUDI AG.

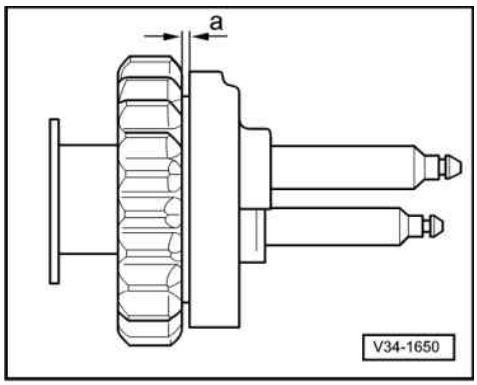


-> Fig.1 Driving out and fitting ball sleeves for selector rods

- Replace ball sleeves removed

Fit ball sleeve with labelled side (thicker metal) facing fitting tool.

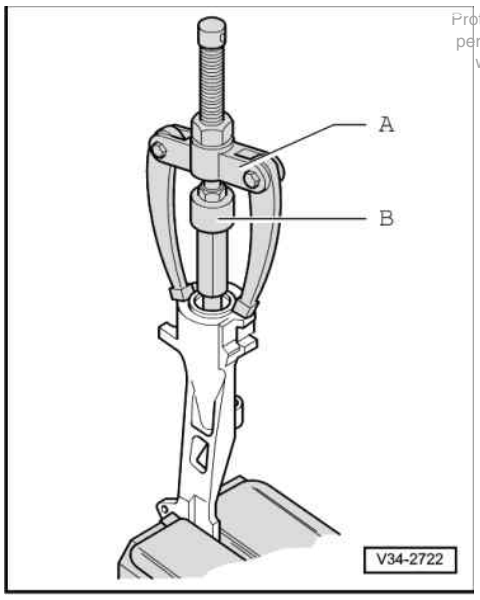
- Pressing-in dimension a = 2.5 mm



-> Fig.2 Checking synchro-ring for wear

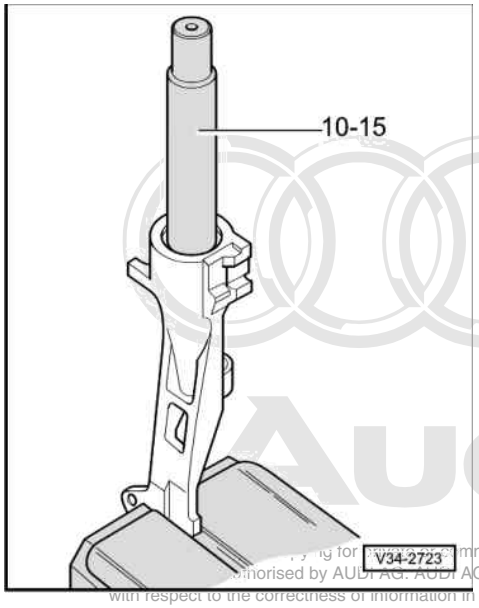
- Press synchro-ring onto taper of gear wheel.
- Use feeler gauge to measure gap width "a":
  - As-new installation dimension: 0.75 ... 2.3 mm
  - Wear limit: 0.2 mm

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.3 Extracting ball sleeve from reverse-gear actuating arm driver

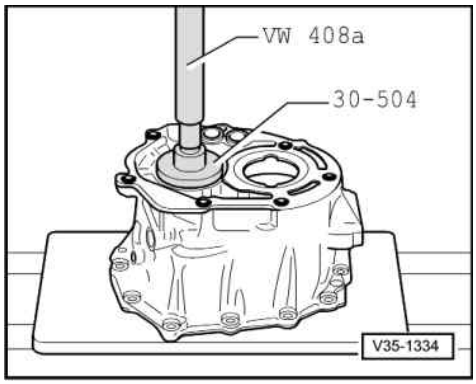
A - Counter-support, e.g. Kukko 22/1
B - Internal puller 18.5 ... 23.5 mm, e.g. Kukko 21/3



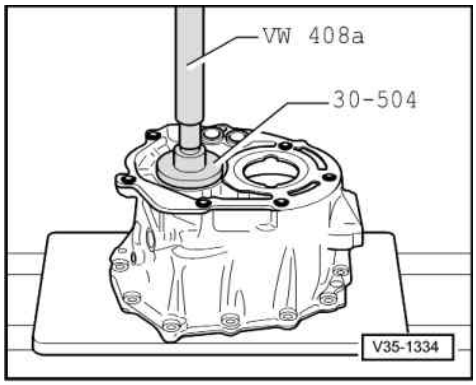
Copying for commercial purposes, in part or in whole, is not authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.4 Driving ball sleeve into reverse-gear actuating arm driver such that it is flush

Fit ball sleeve with labelled side (thicker metal) facing fitting tool.

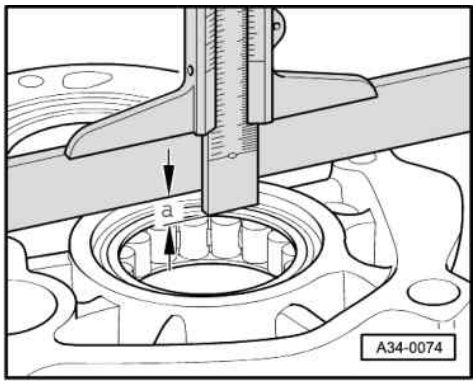


-> Fig.5 Pressing cylindrical roller bearing for input shaft out of bearing plate



-> Fig.6 Pressing cylindrical roller bearing for input shaft into bearing plate

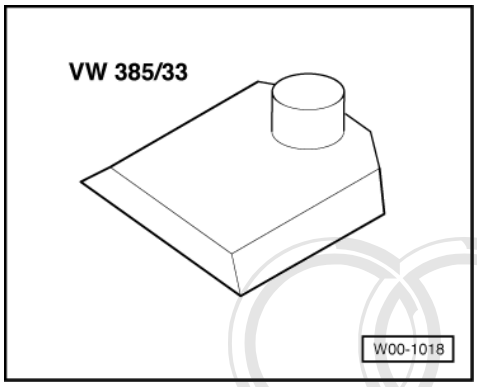
- Measuring pressing-in depth =>Fig. 7



-> Fig.7 Measuring pressing-in depth of cylindrical roller bearing for input shaft

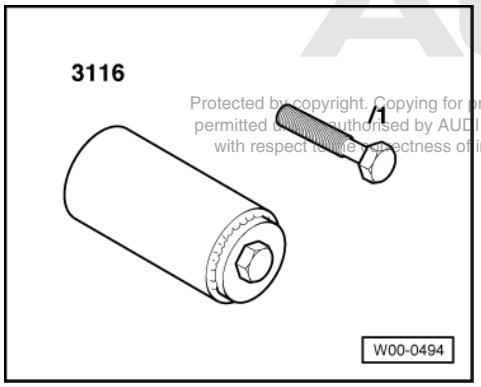
Dimension a = 7 mm

15.2 - Re-determining shim "S4"



Special tools, testers and other items required

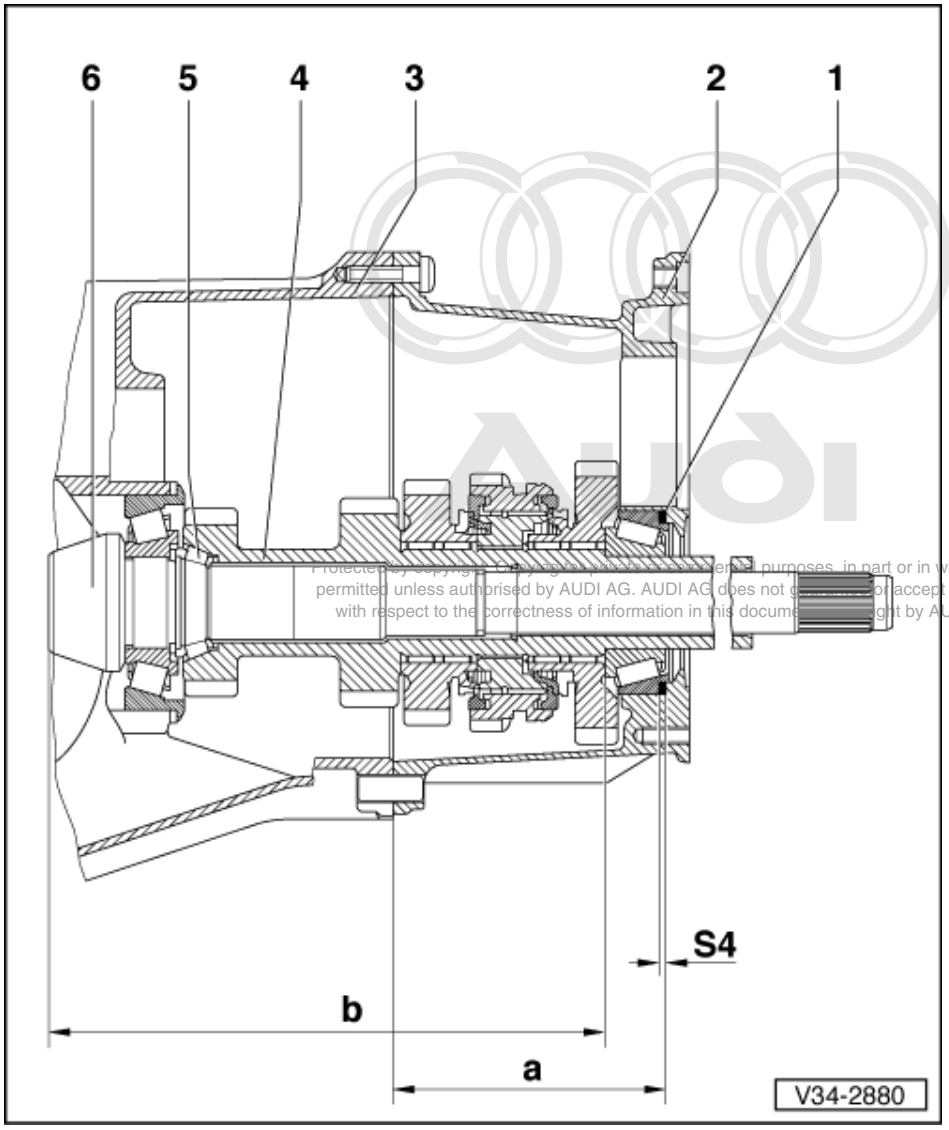
- Gauge block plate VW 385/32



- Clamping sleeve 3116
- Hexagon bolt 3116/1
- Digital depth gauge with a measurement accuracy of at least

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

5/100 mm



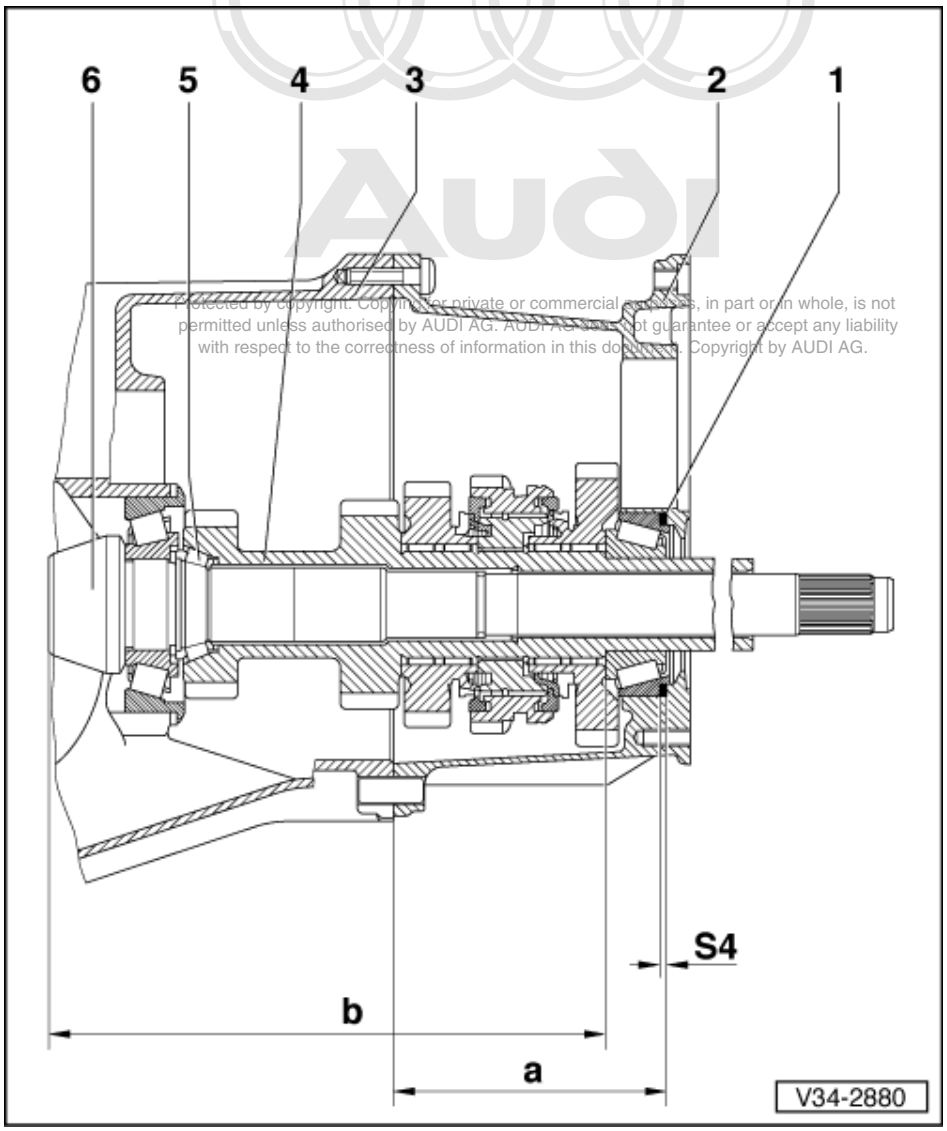
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

This operation is necessary on replacement of the following components:

- Bearing plate => Page 231
- Hollow shaft => Page 231

This adjustment operation re-establishes pre-load of taper roller bearings for drive pinion and hollow shaft.

1 Shim "S4"
2 Bearing plate
3 Gearbox housing
4 Hollow shaft
5 Drive pinion/hollow shaft taper roller bearings
6 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.

a - Housing depth of bearing plate

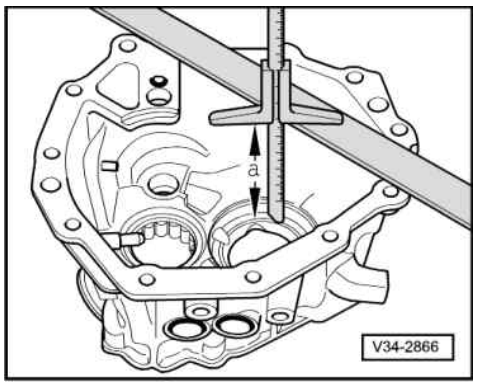
b - Dimension between end of drive pinion and contact collar of taper roller bearing on hollow shaft

- Taper roller bearings (drive pinion / hollow shaft) pre-loaded, 10 Nm
  => Page 232

S4 - Thickness of shim "S4"

Note:

On replacing drive pinion (pinion set) heed adjustment table =>Page 326 .



Determining shim on bearing plate replacement

- Make use of depth gauge with a measurement accuracy of at least 5/100 mm.
- -> Measure difference in depth "a" between old and new bearing plate.

Example:

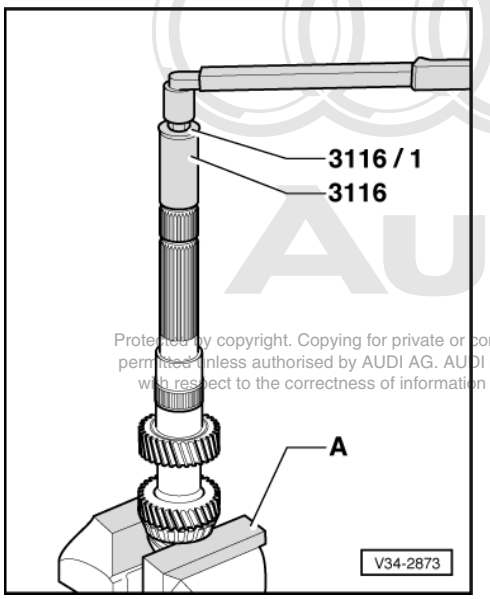
	Depth "a", old bearing plate	124.40 mm
	Depth "a", new bearing plate	124.65 mm
=	Difference	0.25 mm

- Fit thicker shim "S4" if new bearing plate is deeper.
- Fit thinner shim "S4" if old bearing plate is deeper.

Example:

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

Shims available => Table on Page 232 .

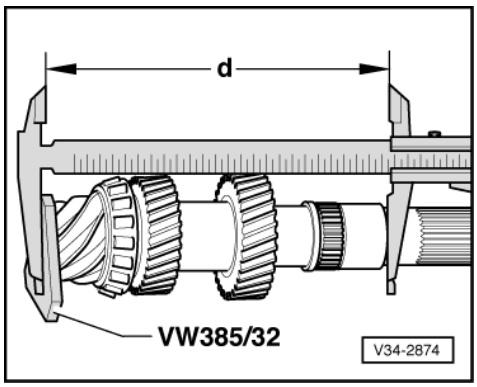


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Determining shim on hollow shaft replacement

- -> Tighten clamping sleeve to exactly 10 Nm.

A - Soft jaws



- -> Place gauge block plate VW 385/32 on end of drive pinion and measure dimension "d".
  - Upper measurement point is contact collar for small taper roller bearing inner race

  Example: 248.50 mm

- Fit new hollow shaft and measure dimension "d" again.

  Example: 248.70 mm

- Determine difference:

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

- Fit correspondingly thinner shim "S4" if dimension "d" of new hollow shaft is larger.
- Fit correspondingly thicker shim "S4" if dimension "d" of new hollow shaft is smaller.
- Determine shim(s) as per table. Part numbers

=> Parts List

Shims available for "S4"

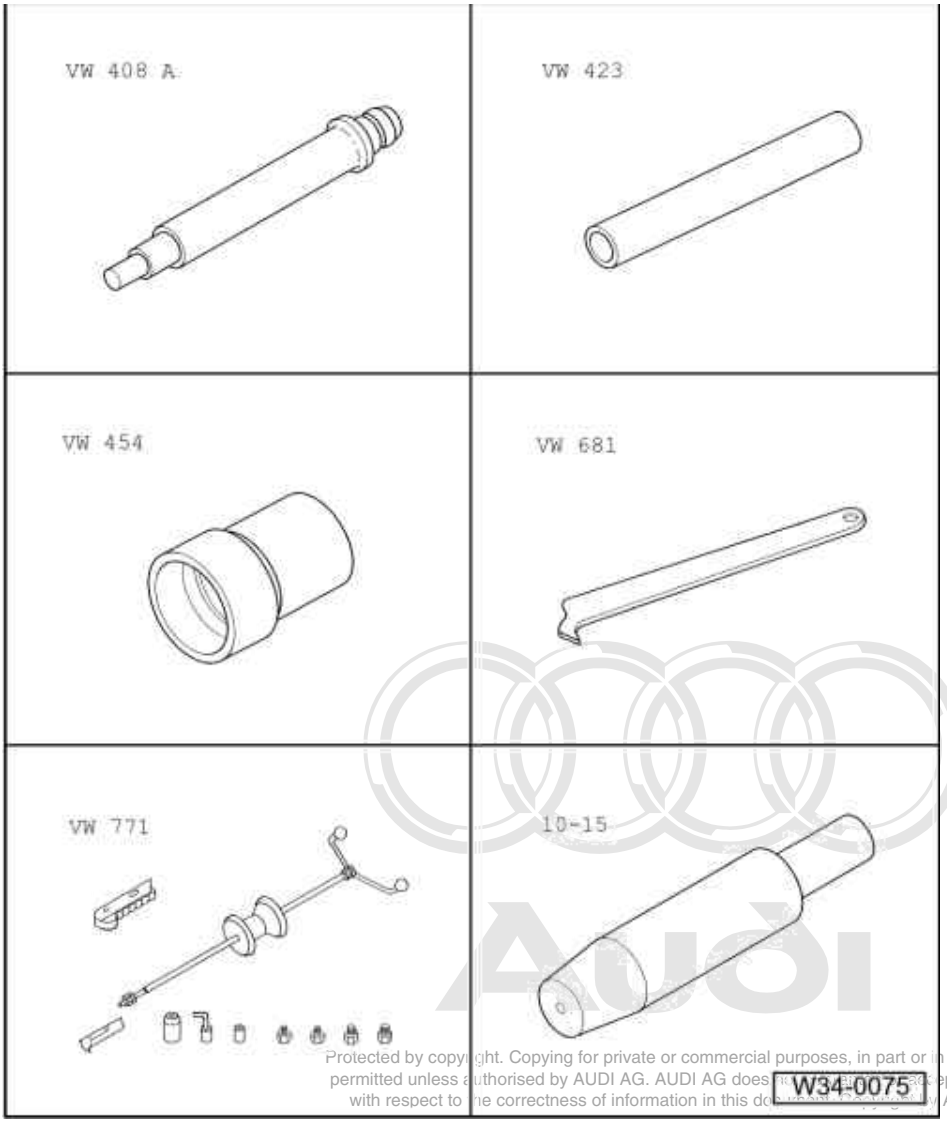
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

16 - Servicing gearbox housing

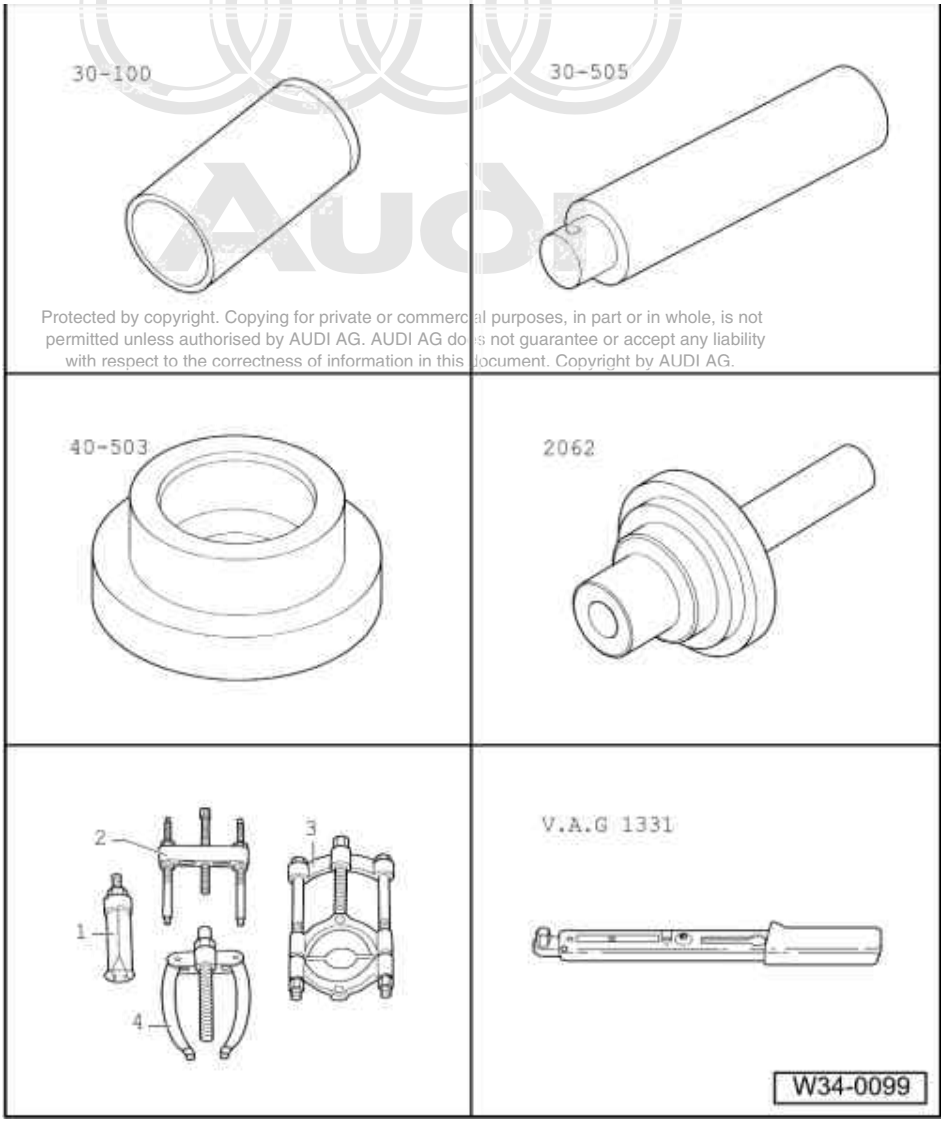
16.1 - Servicing gearbox housing



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.

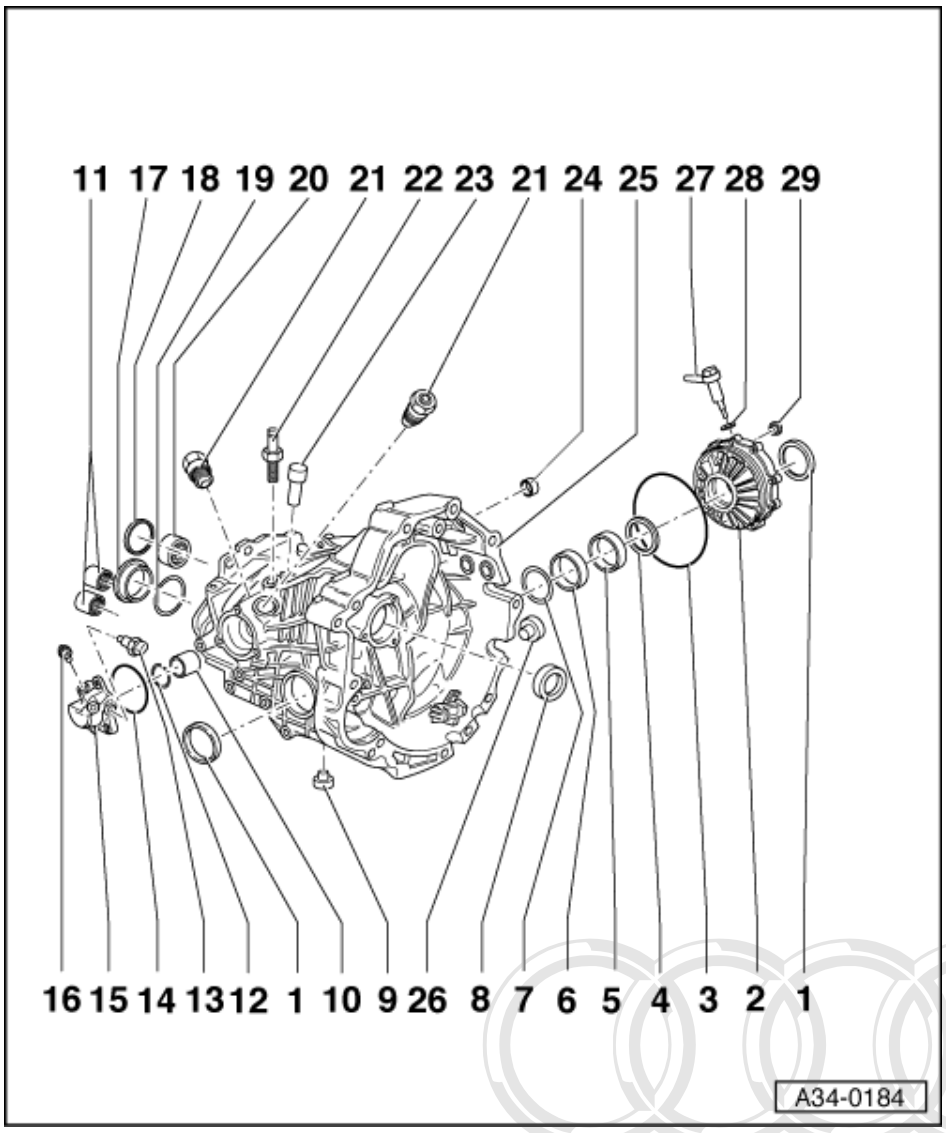
Special tools and workshop equipment required

- Press tool VW 408 A
- Tubular section VW 423
- Thrust pad VW 454
- Pressing-out lever VW 681
- Multi-purpose tool VW 771
- Guide pin 10-15



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

- Fitting sleeve 30-100
- Fitting mandrel 30-505
- Pressing-in tool 40-503
- Fitting mandrel 2062
- 1 - Internal puller Kukko 21/2
  and internal puller Kukko 21/5
- Torque wrench V.A.G 1331 (5...50 Nm)
- Depth gauge
- Assembly sleeve
  Part No. 01E 311 120



Notes:

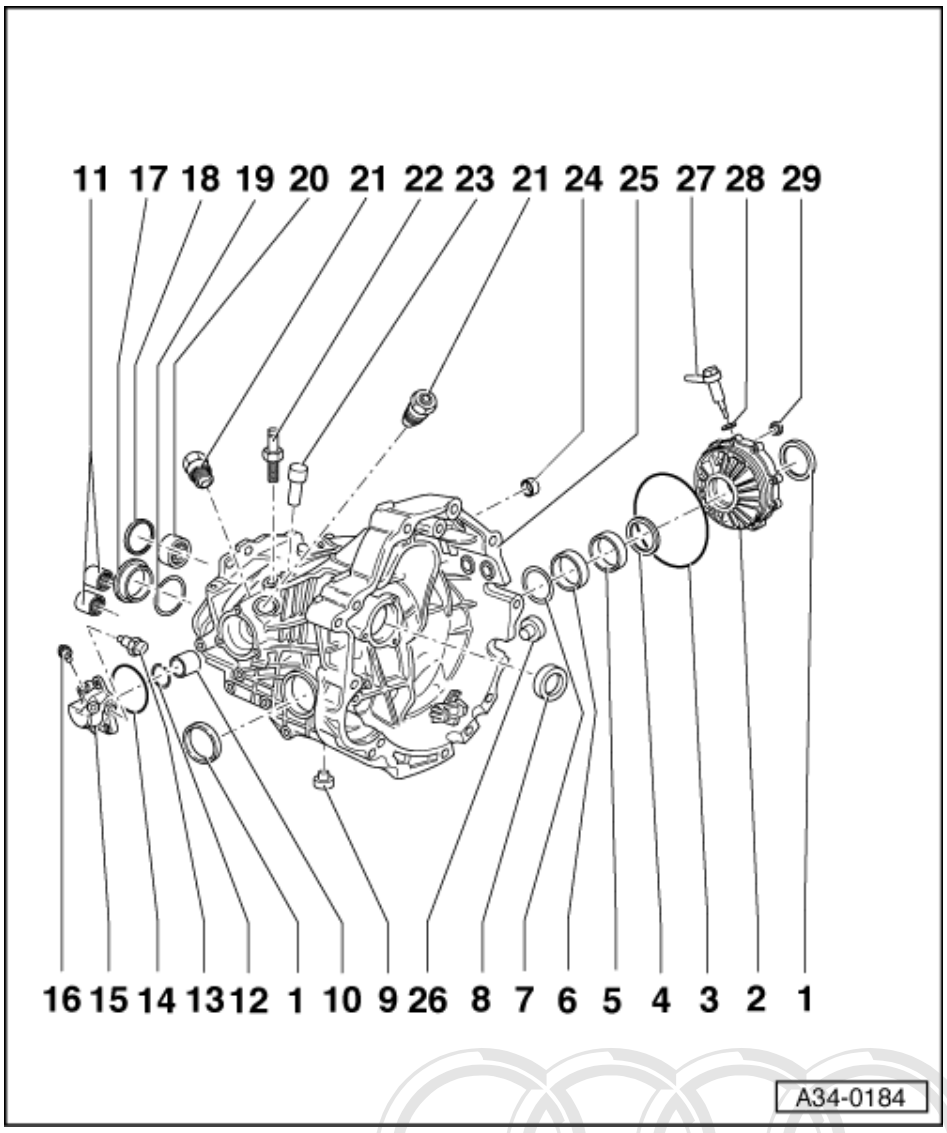
- Heed general repair instructions
  =>Page 10 .
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 326 .

1 Oil seal
- For flange shaft
- Extracting => Fig. 1
- Driving in => Fig. 2
- Fill space between sealing lips with multi-purpose grease
- Replacing with gearbox installed
  => Page 284

2 Cover for differential 1)

3 O-ring
- For differential cover
- 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.



4 Shim "S1"

- Note thickness
- Adjustment table => Page 326

5 Outer race for taper roller bearing, large 1)

- For differential
- Driving out/driving in => Page 308

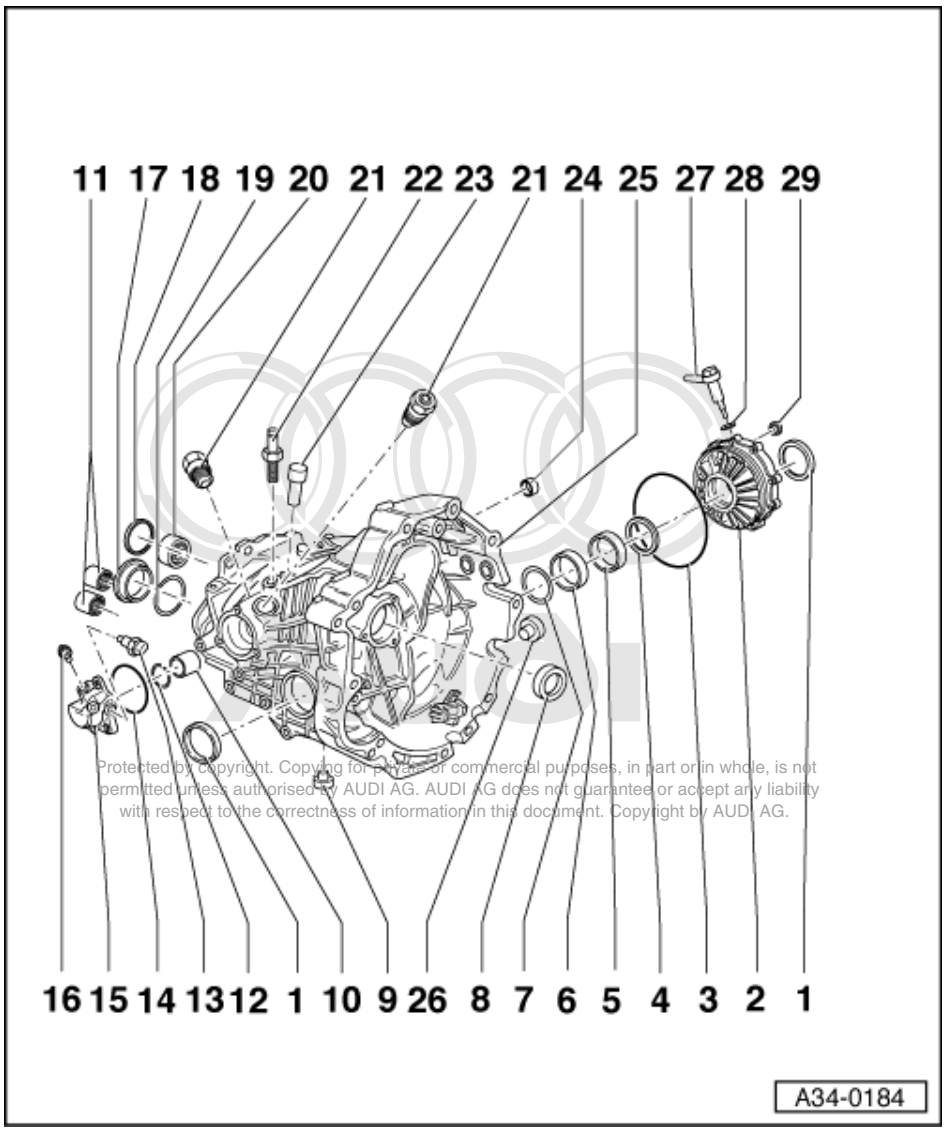
6 Outer race for taper roller bearing, small 1)

- For differential
- Driving out/driving in => Page 308

7 Shim "S2"

- Note thickness
- Adjustment table => Page 326

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

8 Oil seal

- For input shaft
- Prising out => Fig. 3
- Driving in => Fig. 5
- Always replace if input shaft is removed
- Replacing without dismantling gearbox => Fig. 4 and Fig. 5

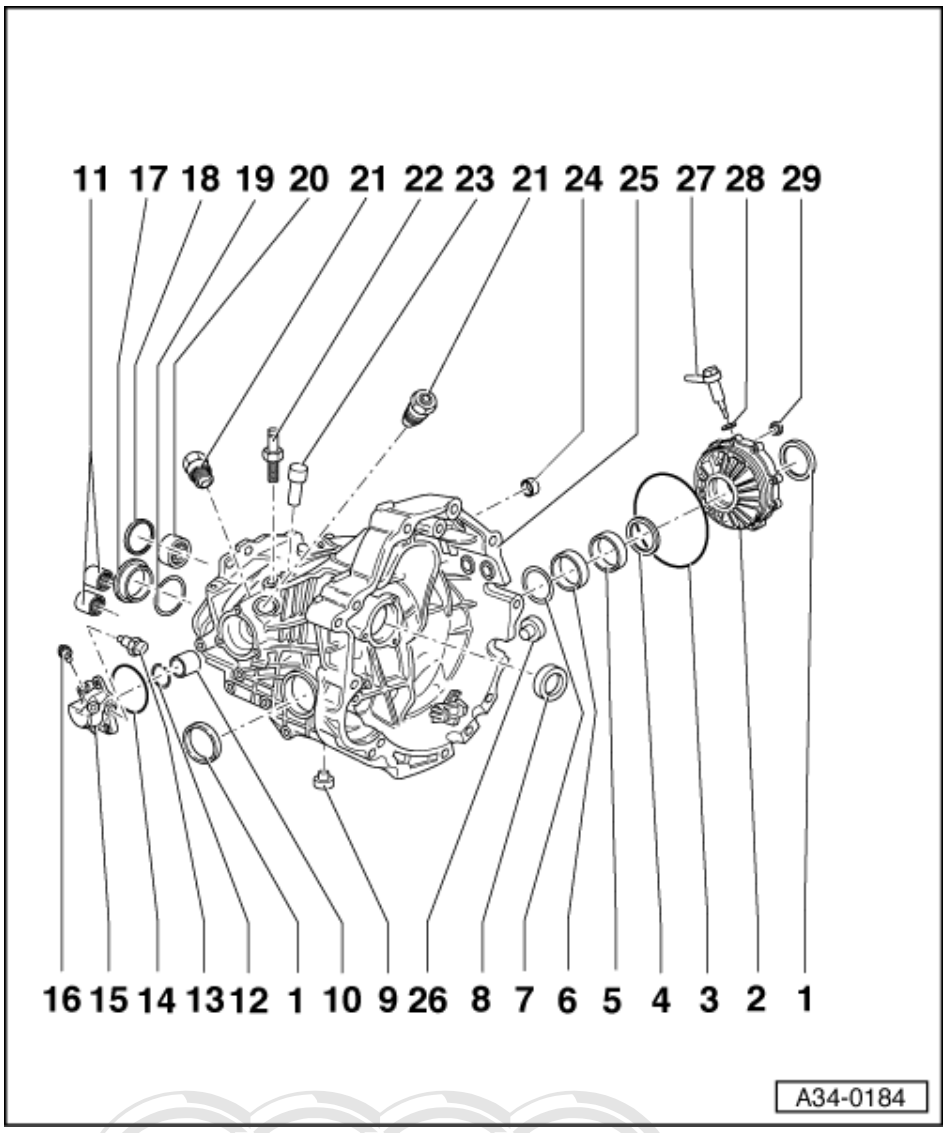
9 Oil drain plug, 40 Nm

10 Ball sleeve

- For selector shaft
- Extracting => Fig. 6
- Driving in => Fig. 7

11 Ball sleeves

- For selector rods
- Extracting as for -Item. 10 -, => Fig. 6
- Driving in as for -Item. 10 -, => Fig. 7



12 Circlip

- Installation position: Lugs facing upwards

13 Reversing light switch - 20 Nm

- Removing and installing =>Fig. 18

14 O-ring

- For selector shaft cover
- Replace

15 Cover for selector shaft

- Removing => Page 182
- Installing => Page 200

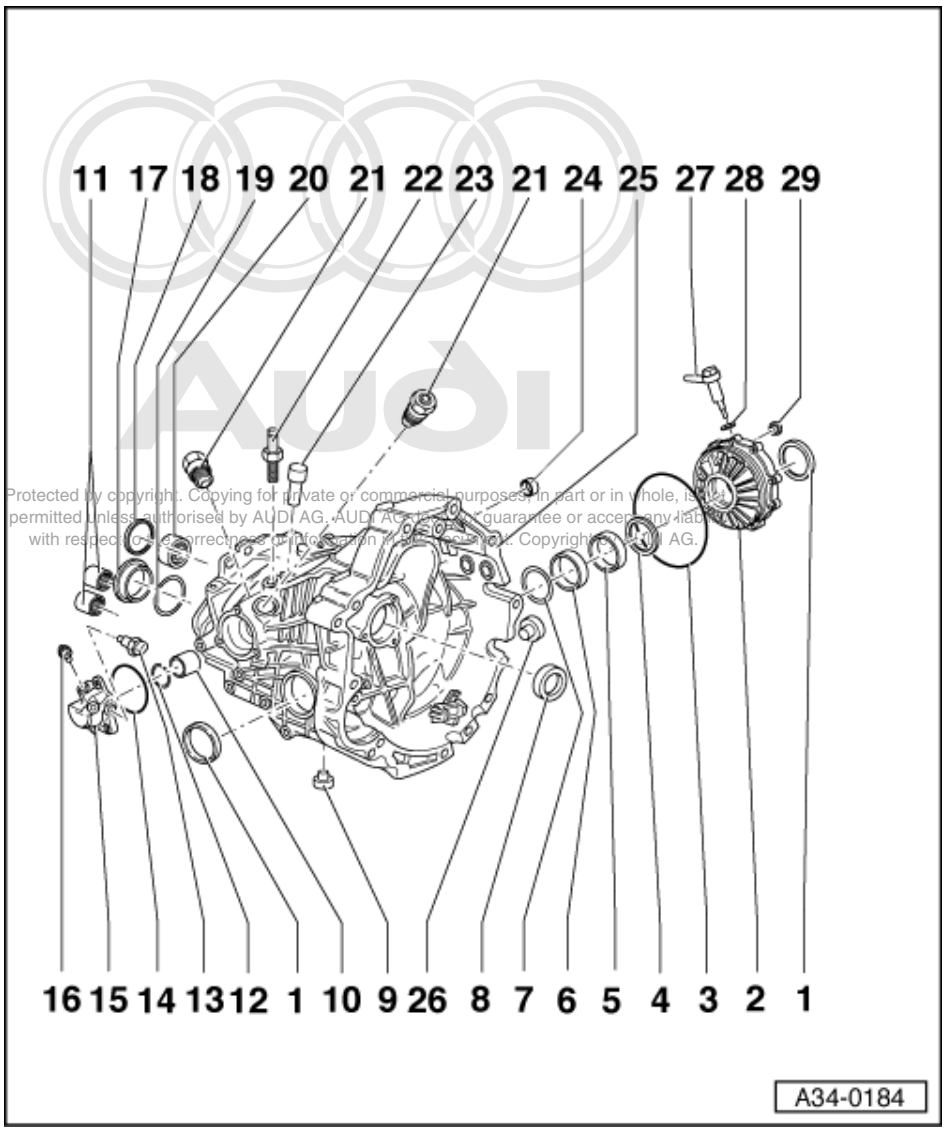
16 Ball stud, 20 Nm

- For connecting rod

17 Outer race for taper roller bearing, large 1)

- For drive pinion
- Extracting => Fig. 274
- Pressing in => Fig. 275

Note: Reproduction or copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability whatsoever with respect to the correctness of information. 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 Circlip

- Removing => Fig. 16

19 Shim "S3"

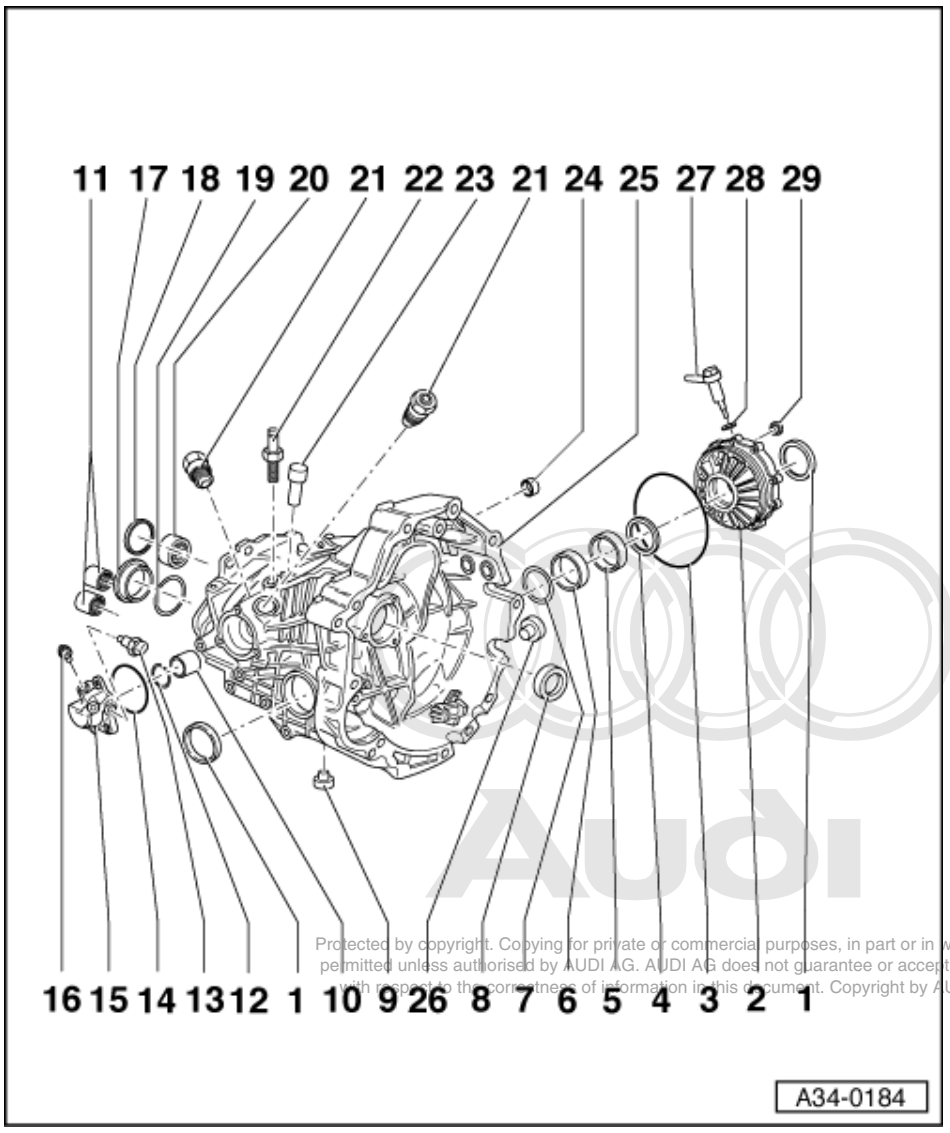
- Note thickness
- Adjustment table => Page 326

20 Needle bearing

- For input shaft
- Extracting => Fig. 13
- Driving in => Fig. 14
- Measuring driving-in depth => Fig. 15

21 Locking screw

- For selector shaft
- Apply sealing paste AMV 188 001 02 on insertion in gearbox housing
- Tightening torque:
  Aluminium: 50 Nm
  Steel: 70 Nm
- Removing => Page 182
- Installing => Page 200



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

22 Trunnion bolt, 40 Nm

- For push rod

23 Breather

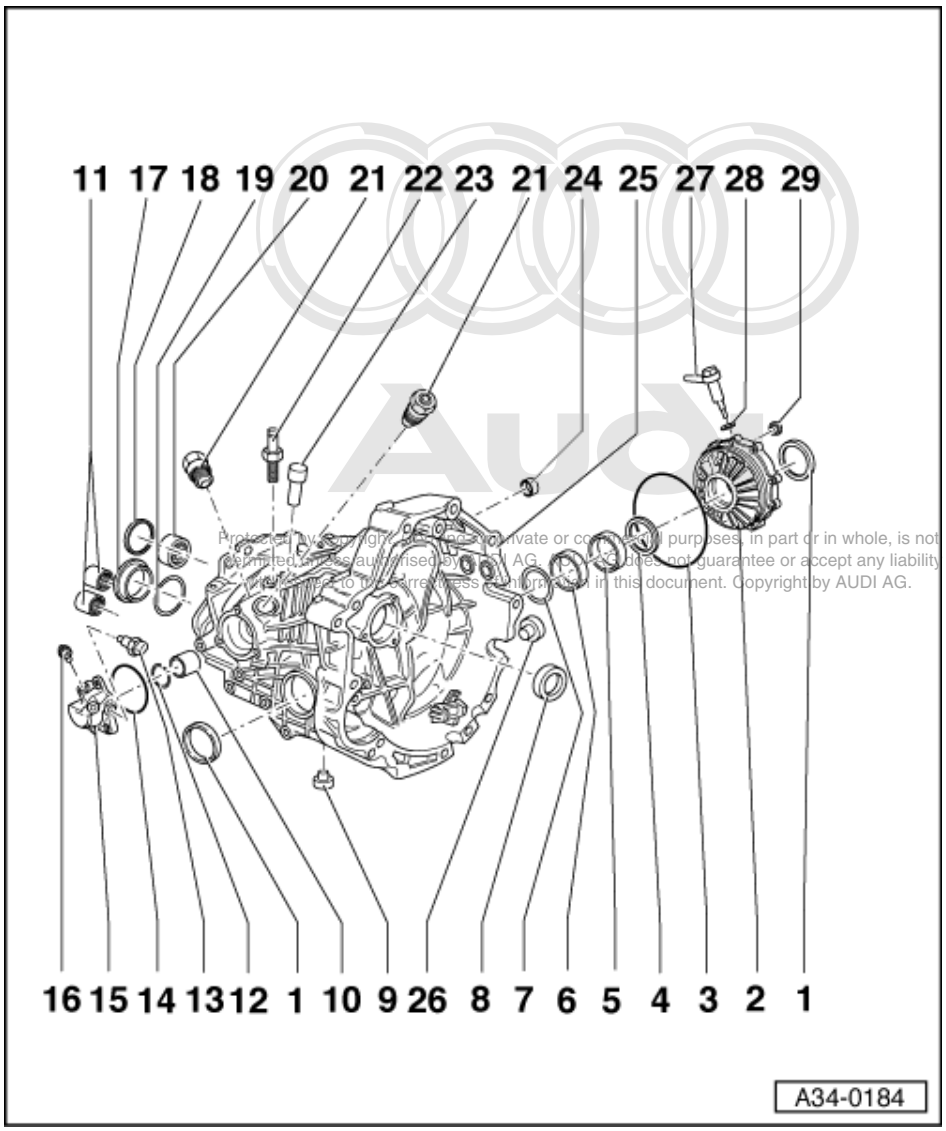
- For gearbox with no breather hose - pressing-in depth of sleeve => Fig. 11
- Clip on cap
- For gearbox with additional breather hose => Fig. 12

24 Oil seal for selector shaft

- Can be replaced with gearbox removed but not dismantled
- Replace
- Extracting => Fig. 8
- Driving in => Fig. 9
- Alway use assembly sleeve when fitting => Fig. 10

25 Gearbox housing 1)

- Possibly with oil baffle plate
- Installation position of oil baffle plate => Fig. 17



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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
- On replacing gearbox housing, drive in e.g. using press tool VW 408 A

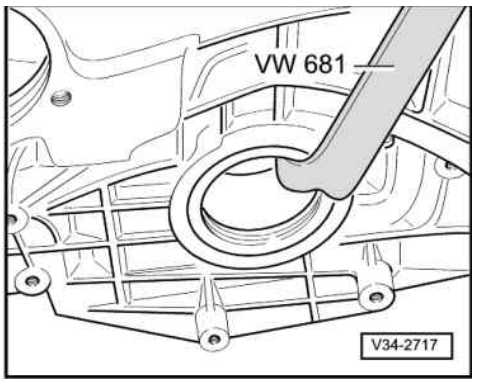
27 Speedometer sender -G22

- Replacing => Page 286

28 O-ring

- Replace

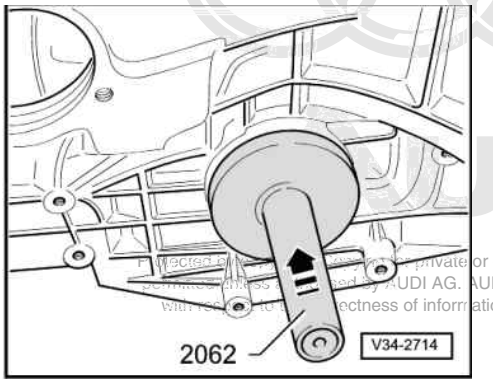
29 Oil filler plug, 40 Nm



-> Fig.1 Extracting oil seal for flange shaft

Notes:

- Fig. illustrates removal on right side of gearbox.
- Procedure is identical for left and right oil seal.



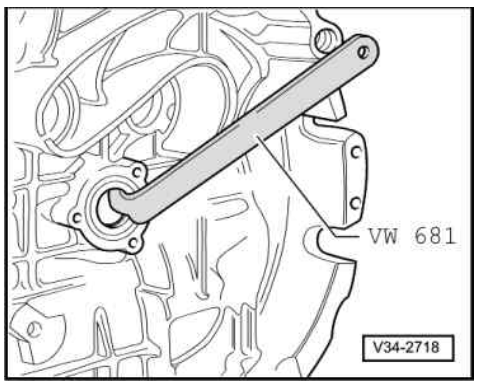
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.2 Driving in oil seal for flange shaft

- Standard press-in depth 5.5 mm
- Service press-in depth 6.5 mm if using old flange shaft.

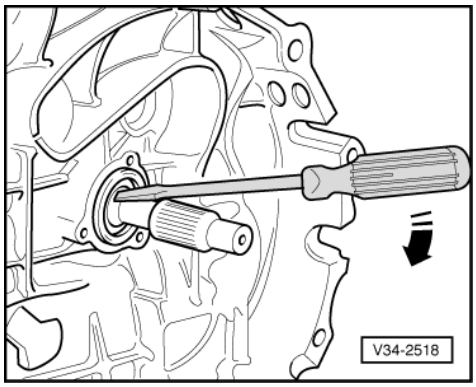
Notes:

- Fig. illustrates driving-in on right side of gearbox.
- Procedure is identical for left and right oil seal.



-> Fig.3 Prising out oil seal for input shaft with gearbox dismantled

- Use VW 681 to carefully prise out oil seal.

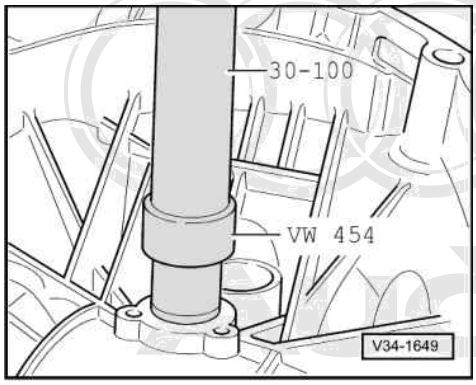


-> Fig.4 Removing oil seal for input shaft with gearbox not dismantled

- Use screwdriver to carefully prise out oil seal.

Note:

Take care not to damage contact surface for radial shaft seal on input shaft.



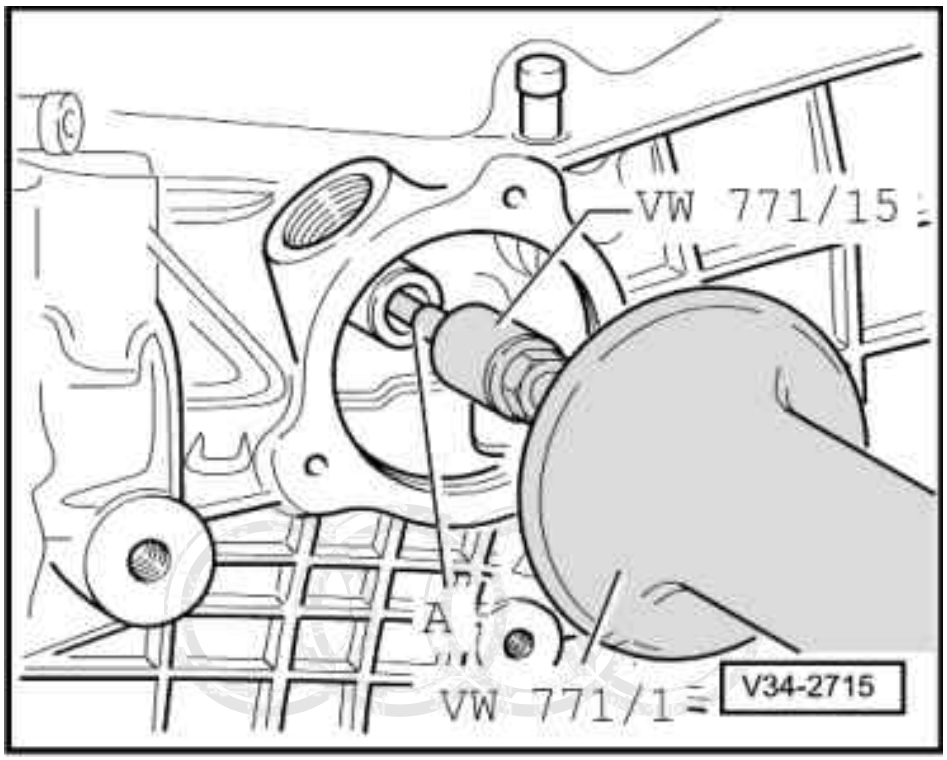
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.5 Driving in oil seal for input shaft

- Half-fill space between sealing lip and dust lip with sealing grease G 052 128 A1.
- Lightly lubricate outer periphery of oil seal.
- Tightly apply thin insulating sheath to splines of input shaft.
- Drive in input shaft oil seal.

- Standard press-in depth 3.5 mm
- Service press-in depth 4.5 mm if using old input shaft.

- Remove insulating sheath.

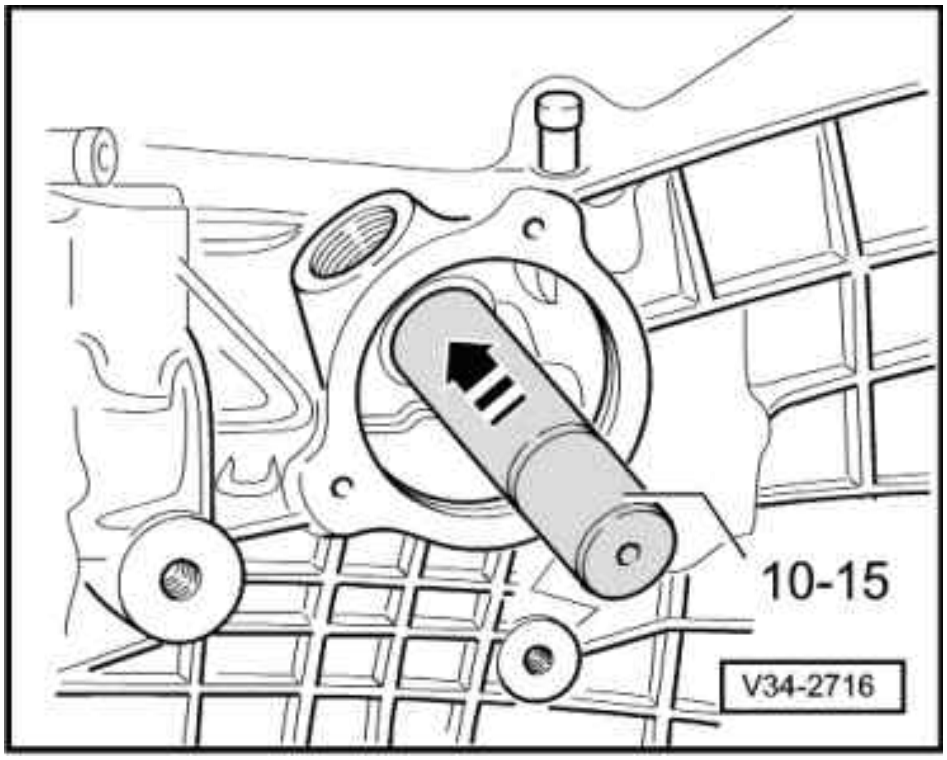


-> Fig.6 Extracting ball sleeve

- Remove circlip.

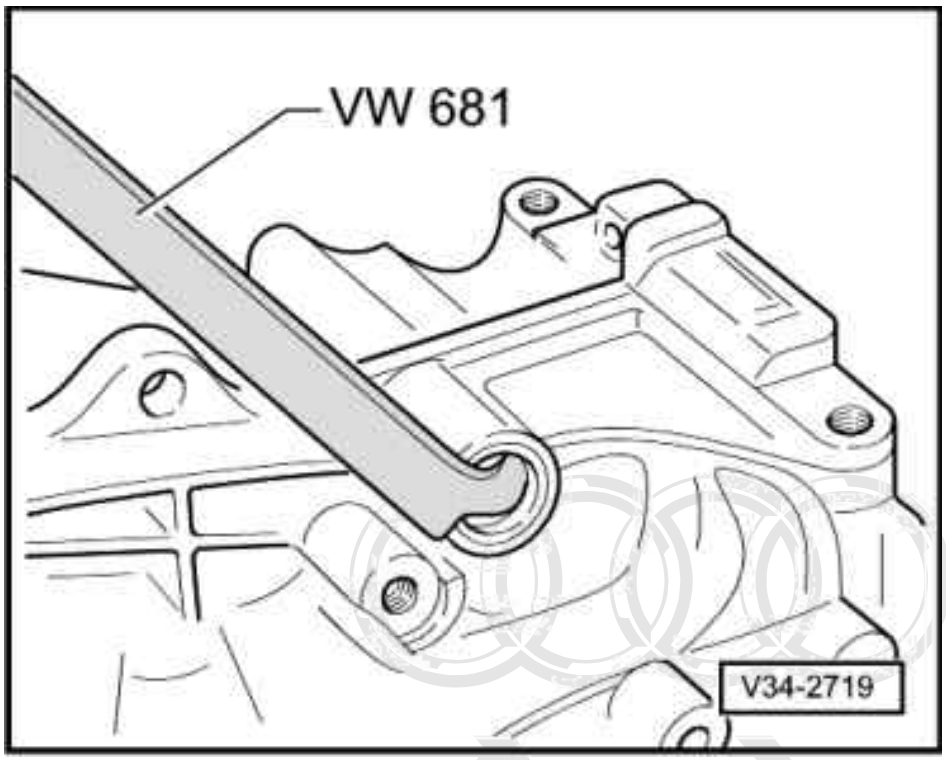
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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



-> Fig.7 Driving in ball sleeve

- Fit ball sleeve with labelled side (thicker metal) facing fitting tool.
- Drive home.
- Fit circlip.

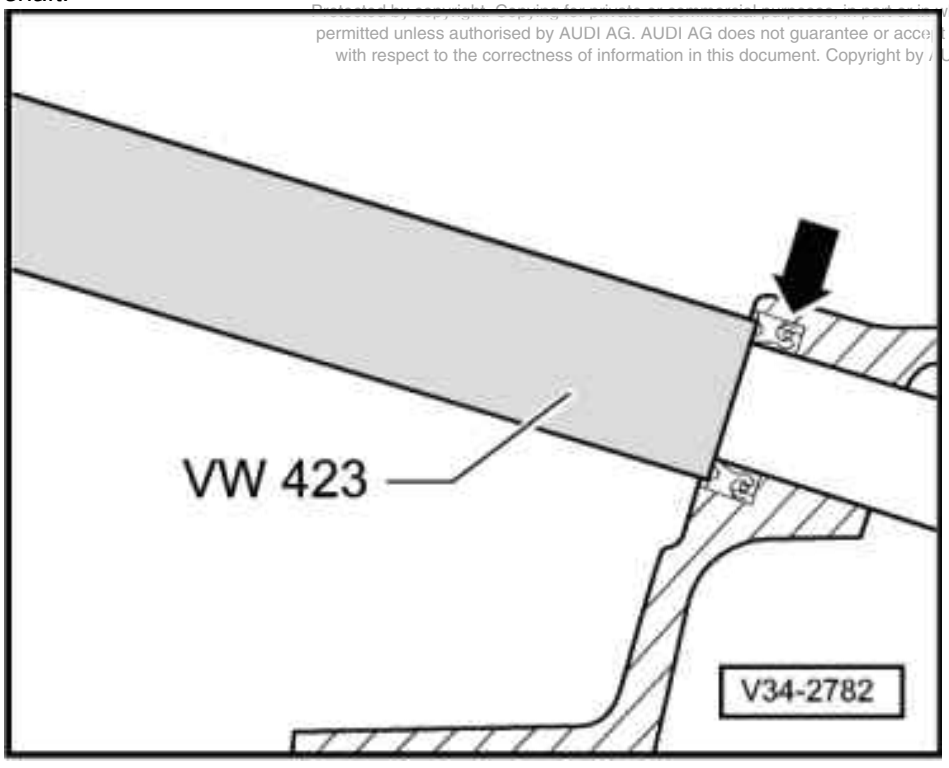


-> Fig.8 Extracting oil seal for selector shaft

Note:

With gearbox removed but not dismantled, take care to prise out oil seal with screwdriver without damaging shaft.

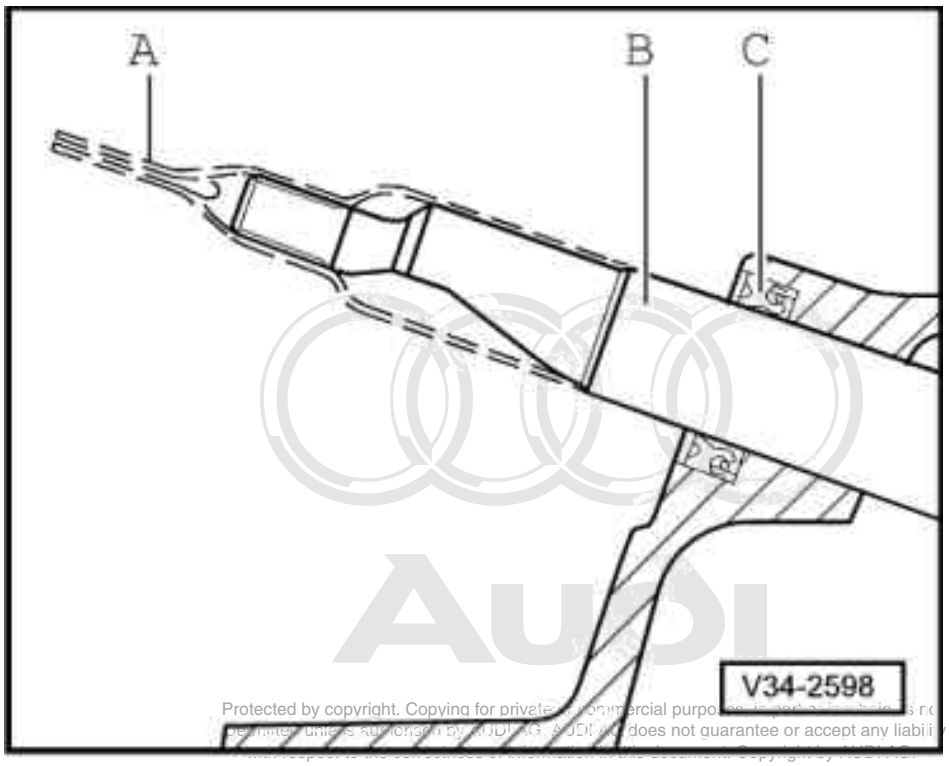
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



-> Fig.9 Driving in oil seal for selector shaft

- Selector shaft installed or removed

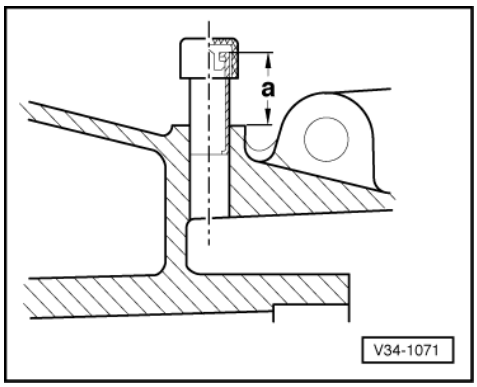
- Half-fill space between sealing lip and dust lip with sealing grease G 052 128 A1.
- Lightly lubricate outer periphery of oil seal.
- Pull assembly sleeve onto selector shaft => Fig. 10 .
- Drive home oil seal in housing.



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

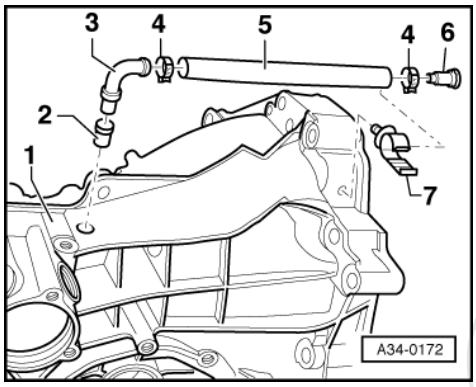
-> Fig.10 Fitting oil seal and selector shaft using assembly sleeve

- To avoid damaging oil seal -C-, oil seal and selector shaft are only to be fitted using assembly sleeve -A- Part no. 01E 311 120.



-> Fig.11 Pressing-in depth of breather sleeve for gearbox with no breather hose

- Dimension a = 21 mm



-> Fig.12 Gearbox CSY breather

1 - Gearbox

2 - Sleeve - drive home

3 - Pipe - drive home

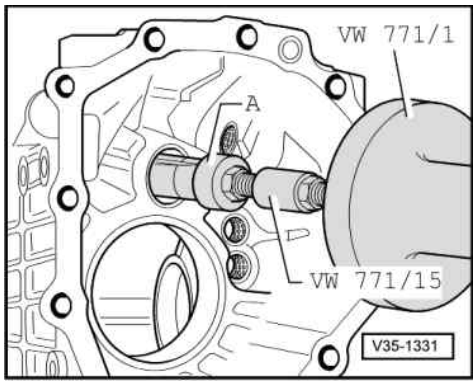
4 - Clamp

5 - Hose

6 - Breather pipe

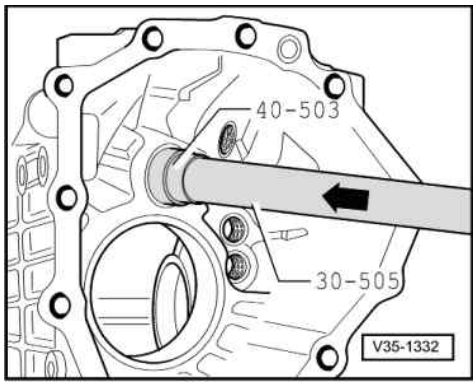
7 - Clip

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



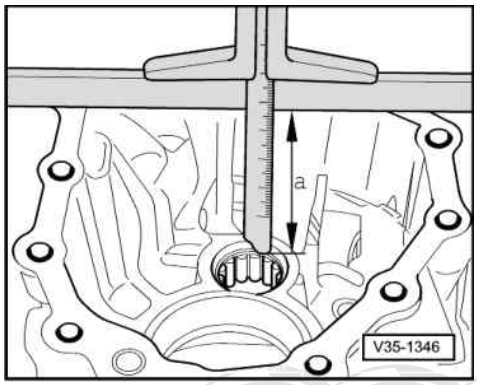
-> Fig.13 Extracting needle bearing from gearbox housing

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



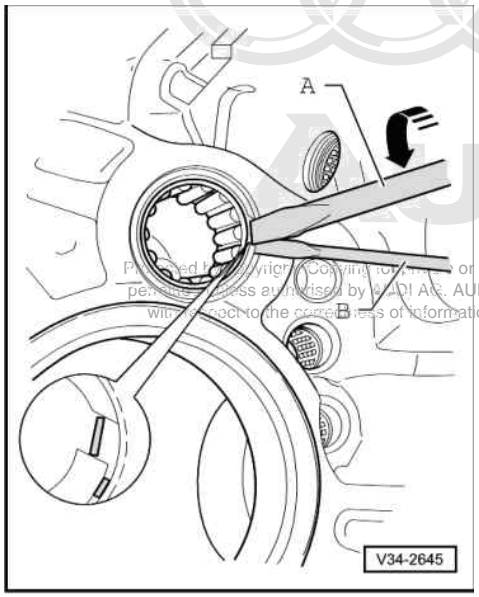
-> Fig.14 Driving needle bearing into gearbox housing

- Installation position: Labelling on bearing facing fitting mandrel
- Driving-in depth => Fig. 15



-> Fig.15 Driving-in depth of needle bearing

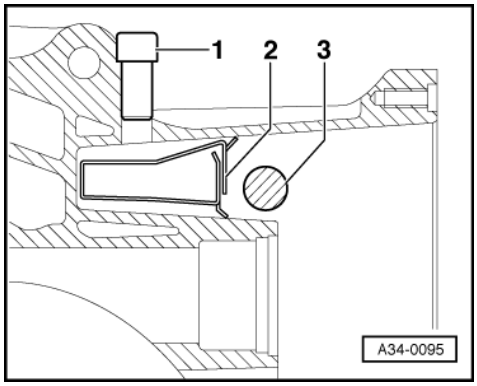
- Dimension a = 105 mm



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.16 Removing circlip

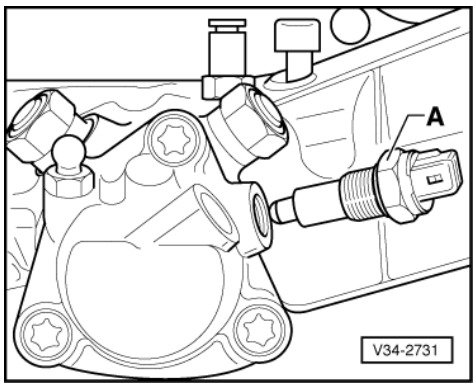
- Lift one end of circlip out of groove by twisting with screwdriver -A-.
- Use screwdriver -B- to hold this end in position.
- Prise out rest of circlip by applying screwdriver -A- again.



-> Fig.17 Installation position of oil baffle plate

- Only fitted on gearboxes for vehicles with high-powered engines

1 - Breather
2 - Oil baffle plate
3 - Selector shaft

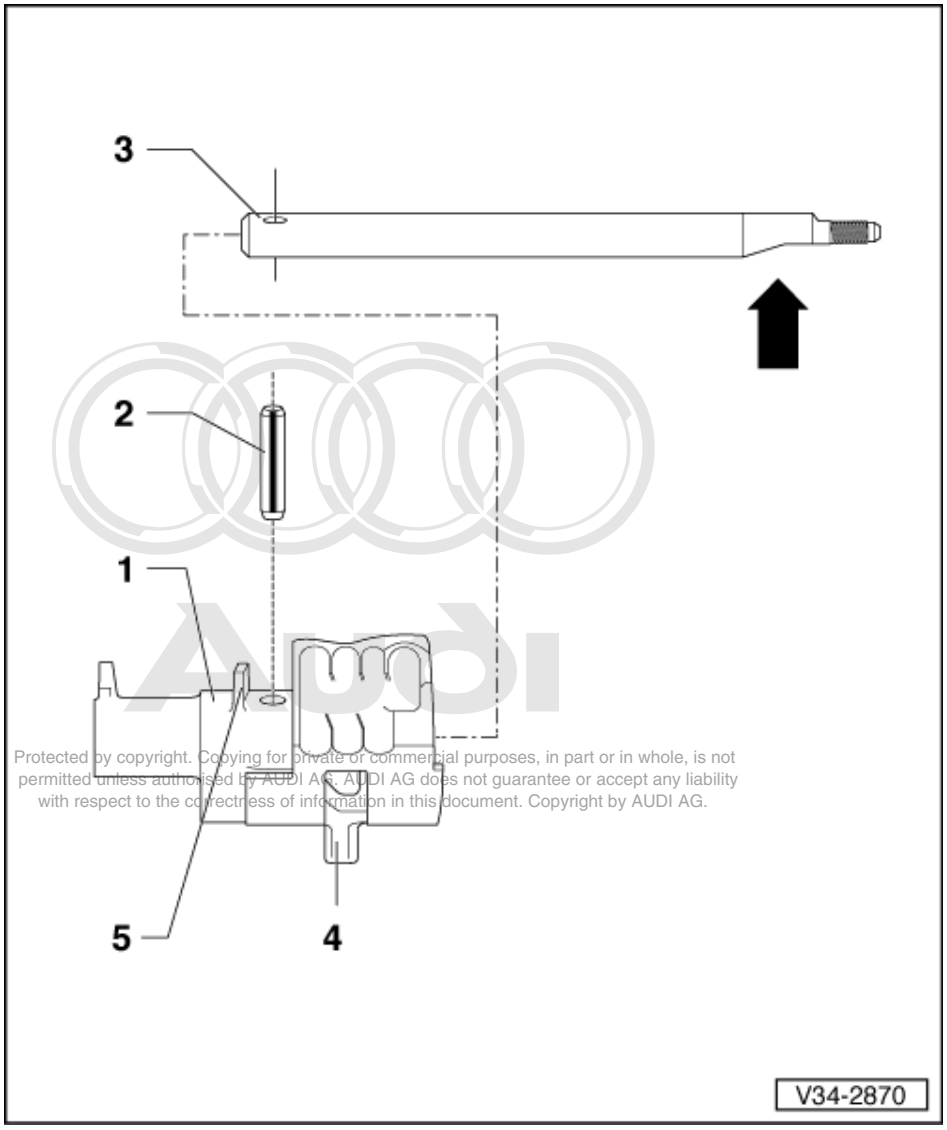


-> Fig.18 Removing and installing switch for reversing lights

- On installation, tighten switch for reversing lights -A- to 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.

16.2 - Dismantling and assembling selector shaft as complete 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.

1 **Selector cylinder**

2 **Spring pin**

- Driving out and fitting flush => Fig. 1
- Installation position of spring pin: Slot longitudinal to direction of force

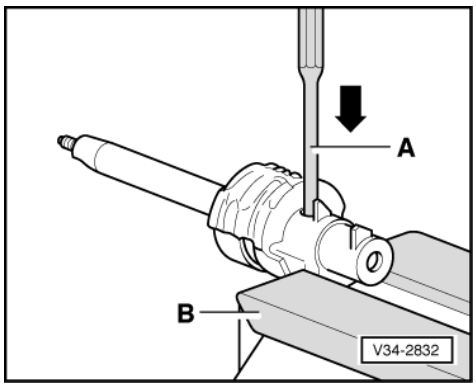
3 **Selector shaft**

- Driving out => Fig. 2
- Driving in => Fig. 3
- Installation position: Chamfer (arrow) and selector finger -Item 4 - facing in same direction

4 **Selector finger**

- Heed installation position as per -Item 3 -

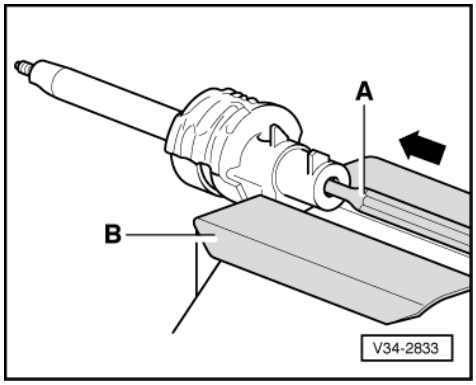
5 **Cam for reversing light switch**



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.

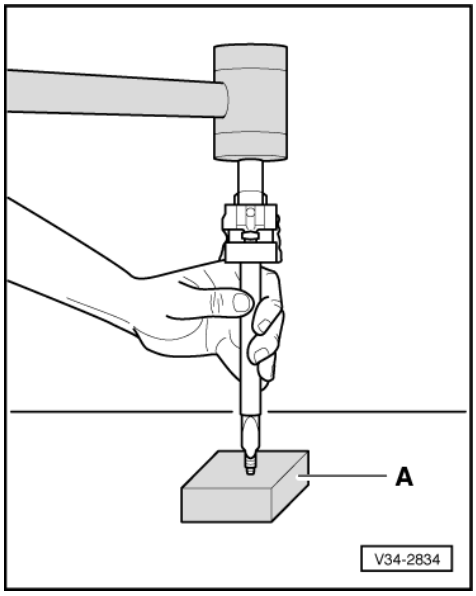
-> Fig.1 Driving out spring pin and driving in flush

A - Mandrel
B - Soft jaws



-> Fig.2 Driving out selector shaft

A - Mandrel
B - Soft jaws



-> Fig.3 Driving in selector shaft

A - Wooden block

Notes:

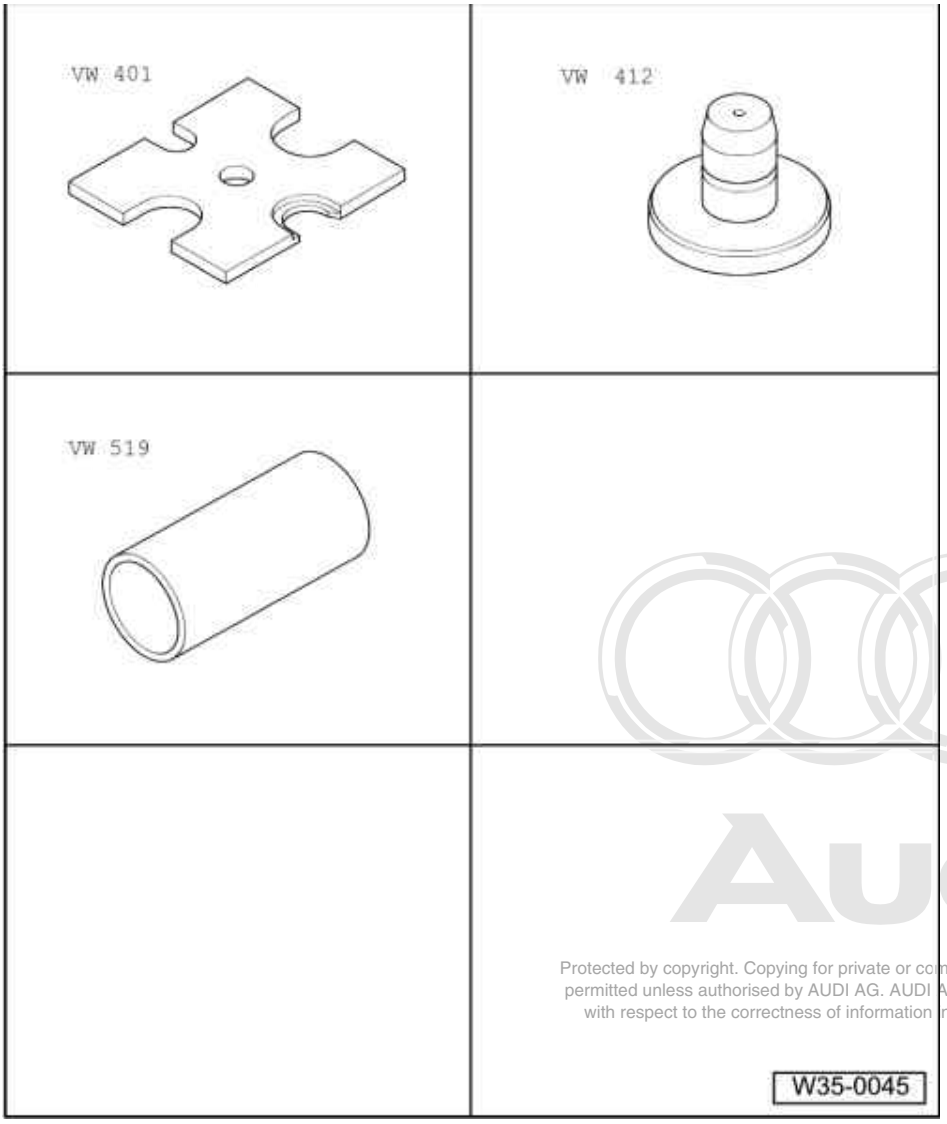
- Align holes.
- Chamfer at selector shaft and selector finger of selector cylinder face in one direction.

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

35 - Gears, Shafts

1 - Dismantling and assembling input shaft

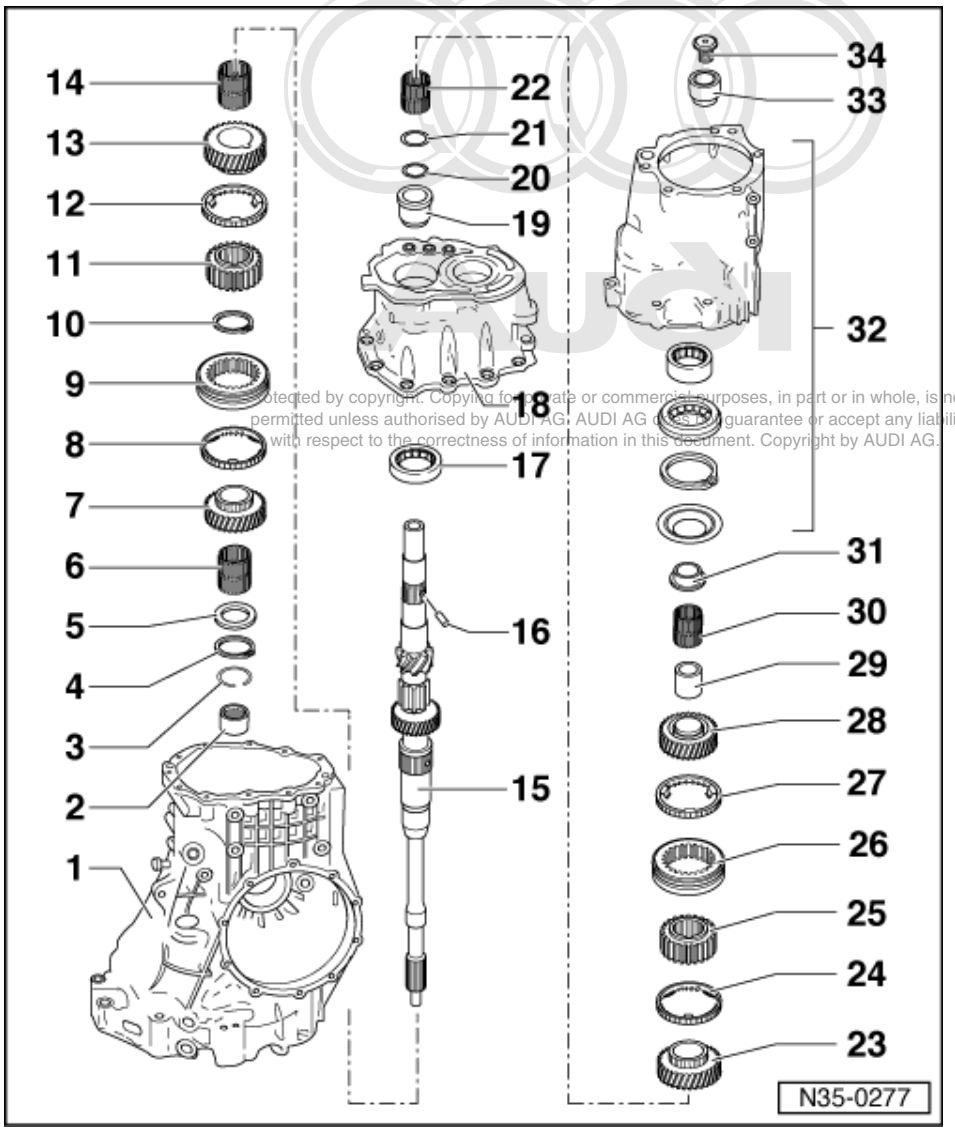
1.1 - Dismantling and assembling input shaft



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.

Special tools and workshop equipment required

- Thrust plate VW 401
- Press tool VW 412
- Tubular section VW 519
- Feeler gauge



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

- On fitting new gear wheels or input shaft, heed technical data =>Page 2 .

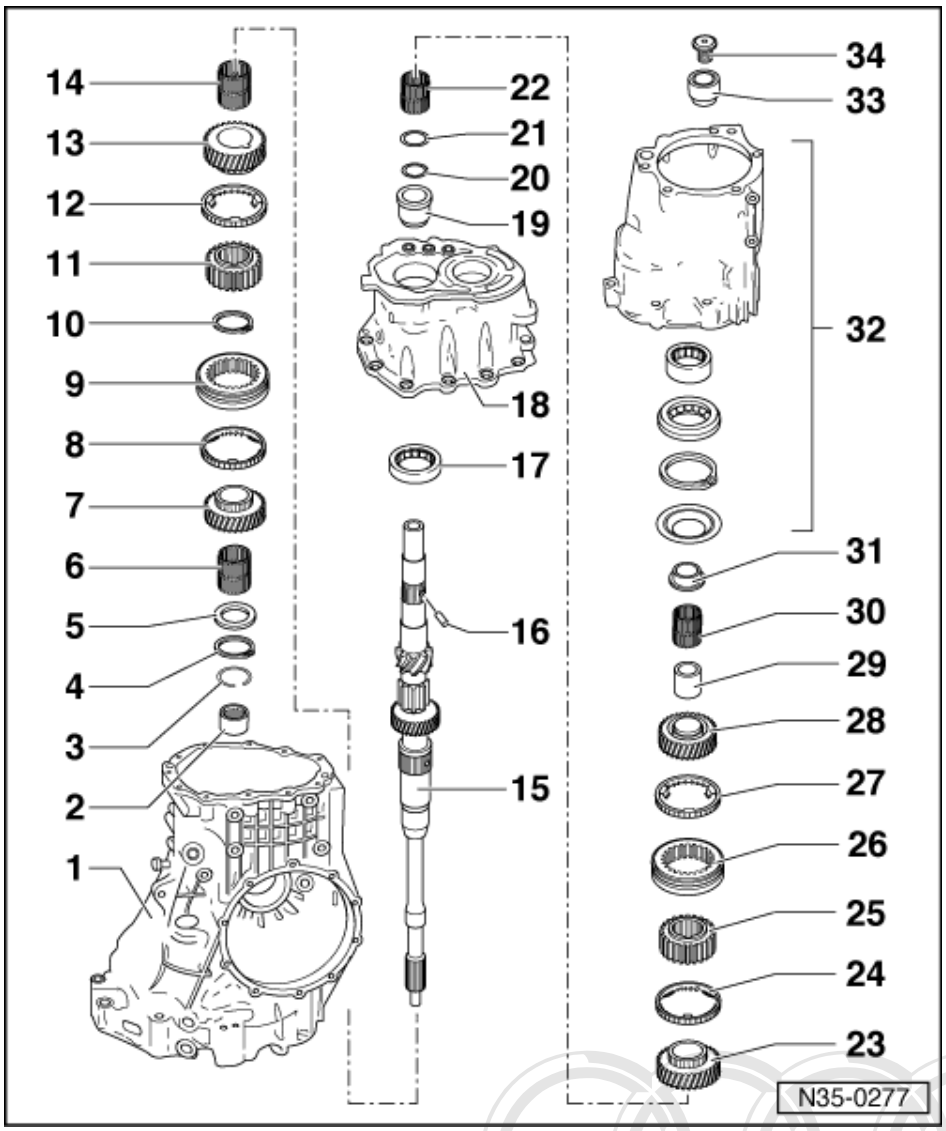
1 Gearbox housing
- Servicing => Page 233

2 Needle bearing
- For input shaft
- Extracting => Page 247 , Fig. 13
- Driving in => Page 248 , Fig. 14

3 Circlip
- For needle bearing

4 Circlip
- For input shaft

5 Thrust washer



6 Needle bearing for 4th gear

- Mark before removing
- Do not interchange with needle bearing for 3rd gear
- Lubricate with gear oil before installing

7 4th speed sliding gear

- Before fitting, insert spring => Fig. 1
- Following installation, check axial clearance with feeler gauge (0.15 ... 0.35 mm)

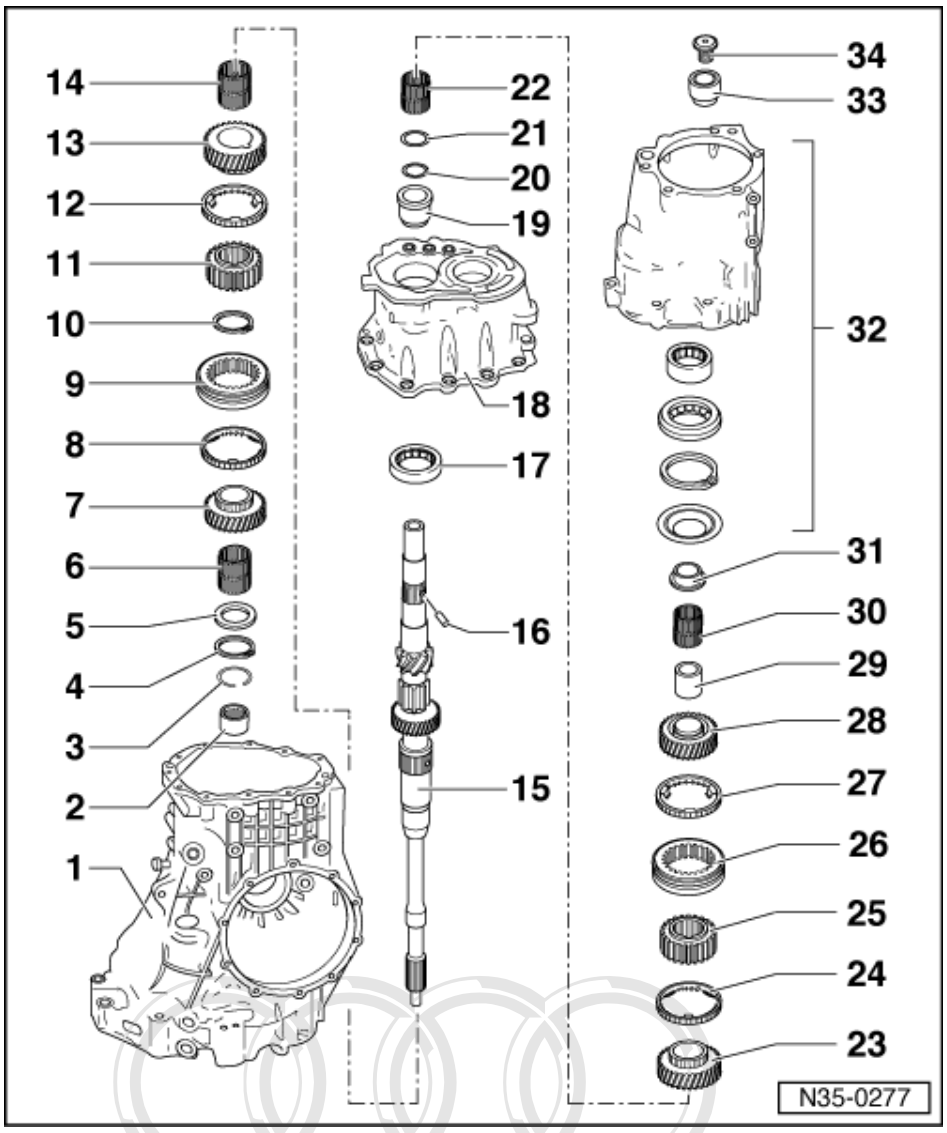
8 4th gear synchro-ring

- Checking for wear => Fig. 2 and Fig. 3

9 Locking collar

- Paired with synchro-hub
- Mark before removing=>Page 185

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Circlip

- Re-determining thickness on replacing synchro-hub => Fig. 4
- Installation position: Ends coincide with groove of synchro-hub

11 3rd and 4th gear synchro-hub

- Pressing off => Fig. 5
- Installation position: => Fig. 6
- Pressing on => Fig. 7

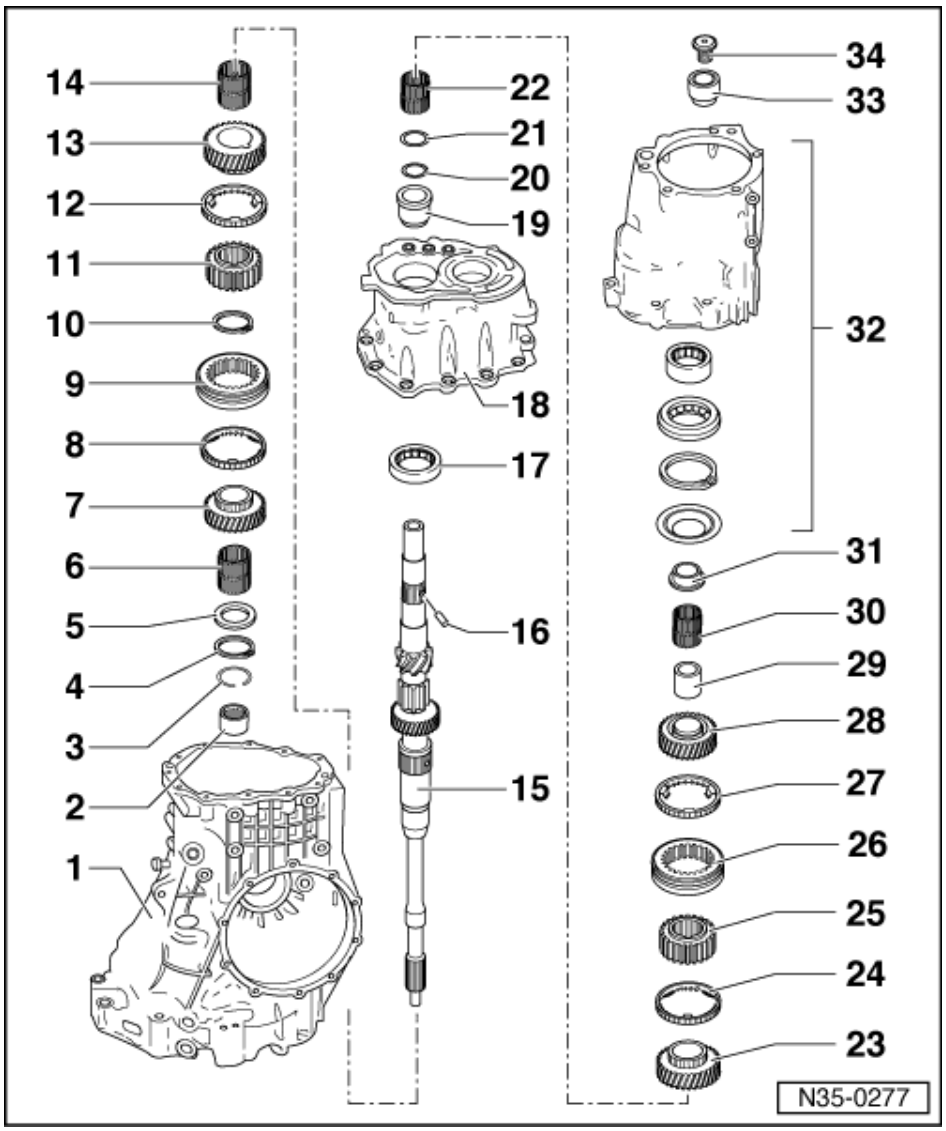
12 3rd gear synchro-ring

- Coated with molybdenum
- Checking for wear => Fig. 2 and Fig. 3

13 3rd speed sliding gear

- Before fitting, insert spring => Fig. 1
- After pressing on -Item 11 - check axial clearance with feeler gauge (0.15 ... 0.35 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.



14 Needle bearing for 3rd gear

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

15 Input shaft

16 Spring pin

- Driving in on replacing input shaft => Fig. 8

17 Cylindrical roller bearing

- For input shaft
- Pressing out => Page 227 , Fig. 5
- Pressing in => Page 228 , Fig. 6

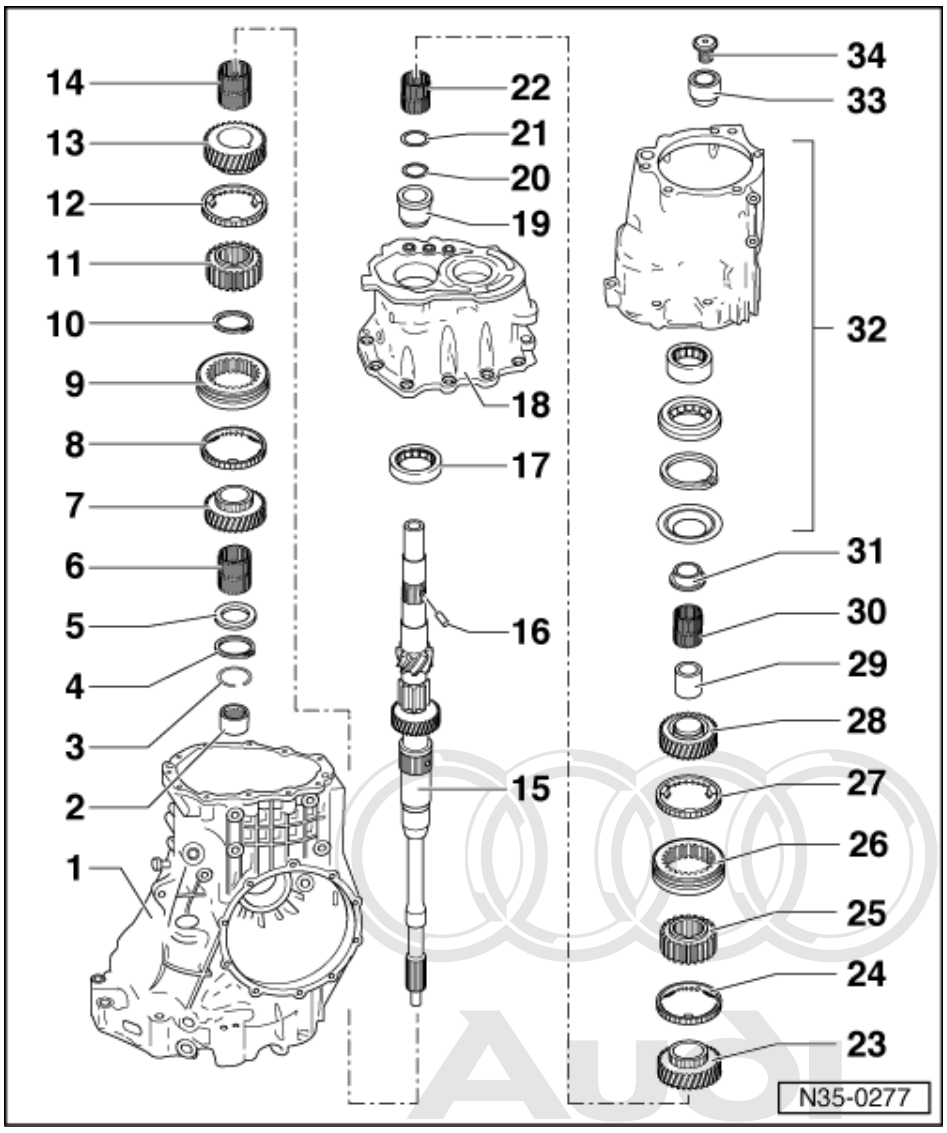
18 Bearing plate

- Servicing => Page 222

19 Inner race for cylindrical roller bearing

- Detach/fit 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.



20 Circlip

21 Thrust washer for needle bearing for 6th gear

- Installation position: Collar facing circlip, smooth thrust face towards needle bearing => Page 193

22 Needle bearing for 6th gear

- Lubricate with gear oil before installing

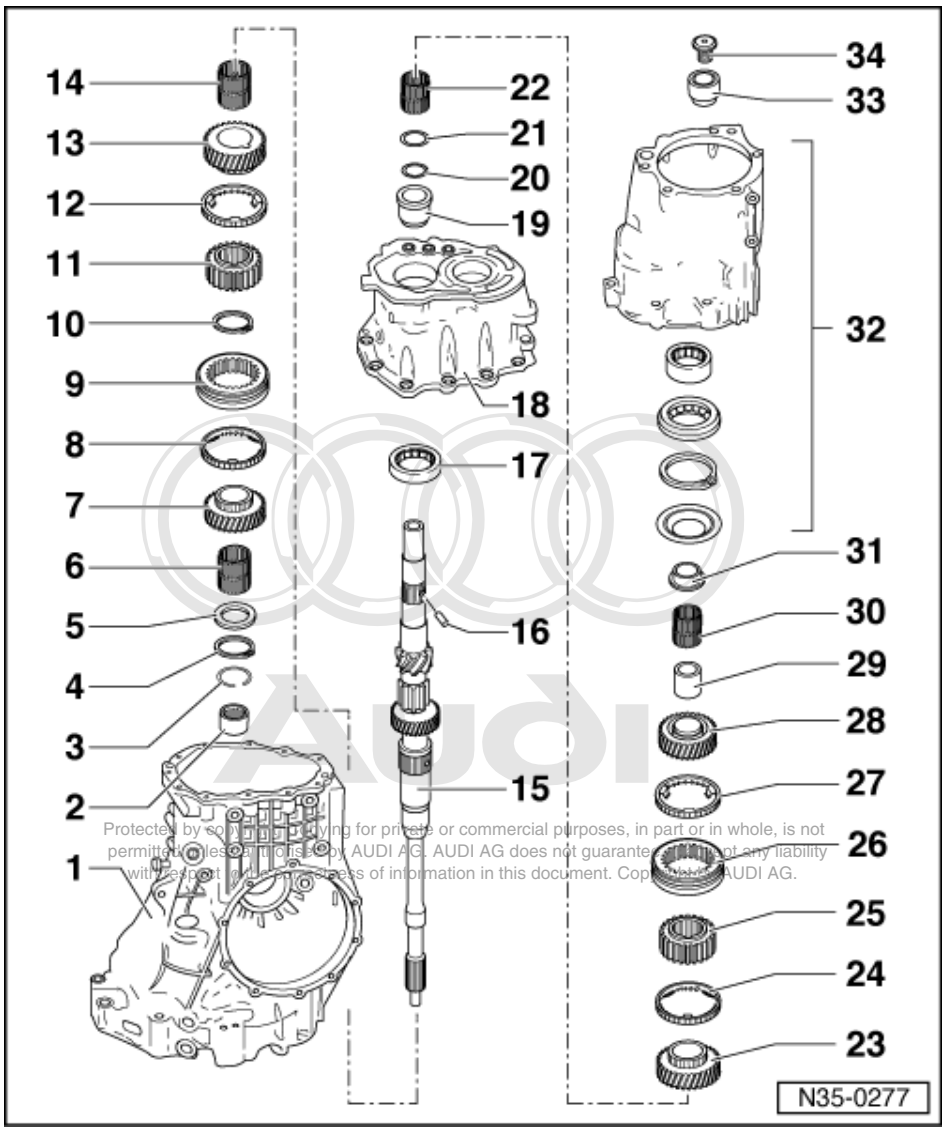
23 6th speed sliding gear

- Before fitting, insert spring => Fig. 1
- Following installation, check axial clearance with feeler gauge (0.15 ... 0.35 mm)

24 6th gear synchro-ring

- Checking for wear => Fig. 2 and Fig. 3

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 accuracy of information in this document. Copyright by AUDI AG.

25 5th and 6th gear synchro-hub

- Removing => Page 185
- Fitting => Page 194
- Installation position: Projecting hub facing 5th speed sliding gear

26 Locking collar

- Paired with synchro-hub
- Mark before removing=>Page 185

27 5th gear synchro-ring

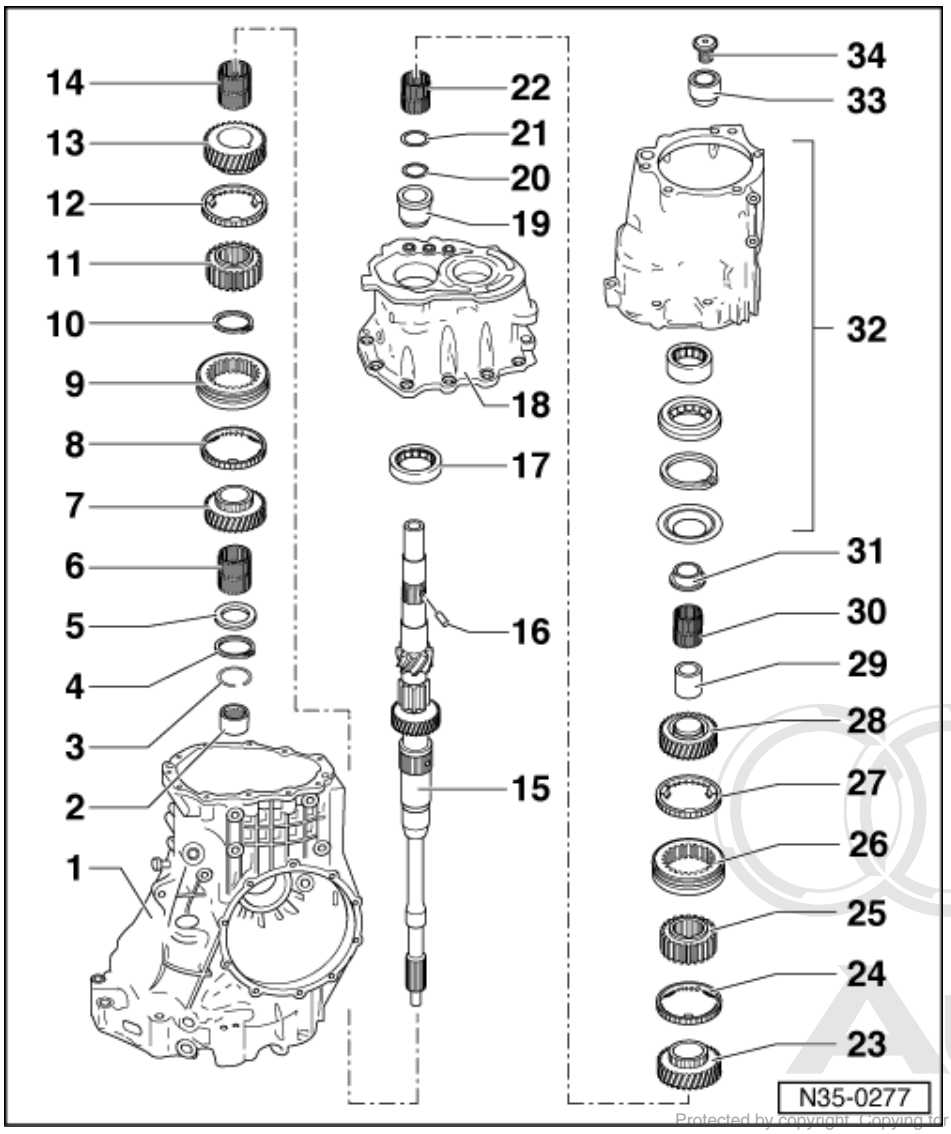
- Checking for wear => Fig. 2 and Fig. 3

28 5th speed sliding gear

- Before fitting, insert spring => Fig. 1
- After installing, check axial clearance => Page 197

29 Inner race for needle bearing

- For 5th speed sliding gear
- Removing => Page 185
- Fitting => Page 196



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Needle bearing for 5th gear

- Lubricate with gear oil before installing

31 1st inner race for ball bearing for input shaft

- Removing => Page 184
- Fitting => 197

32 End cover

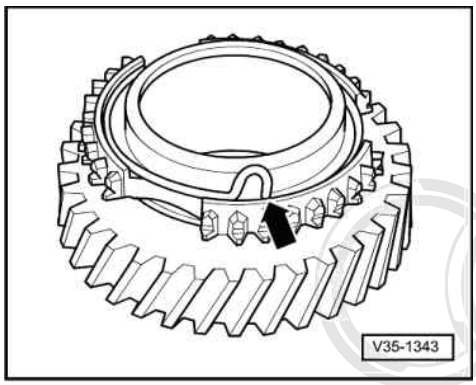
- Servicing => Page 215

33 2nd inner race for ball bearing for input shaft

- Removing => Page 183
- Fitting => Page 198

34 Multi-point socket-head bolt - 150 Nm

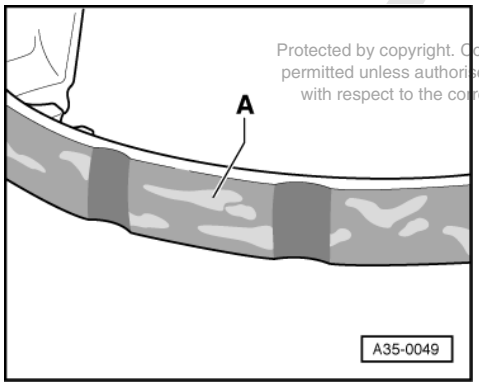
- Slackening off and tightening
  => Page 183



-> Fig.1 Fitting spring in sliding gear

- Insert spring -arrow- in sliding gear, engaging offset end in hole.

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

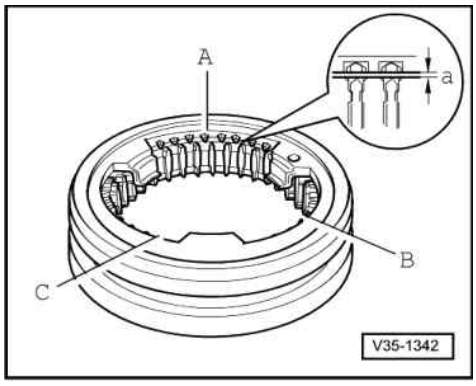


-> Fig.2 Checking molybdenum-coated synchro-ring for wear

Note:

Friction surface of intact synchro-ring has a graphite grey, slightly porous appearance.

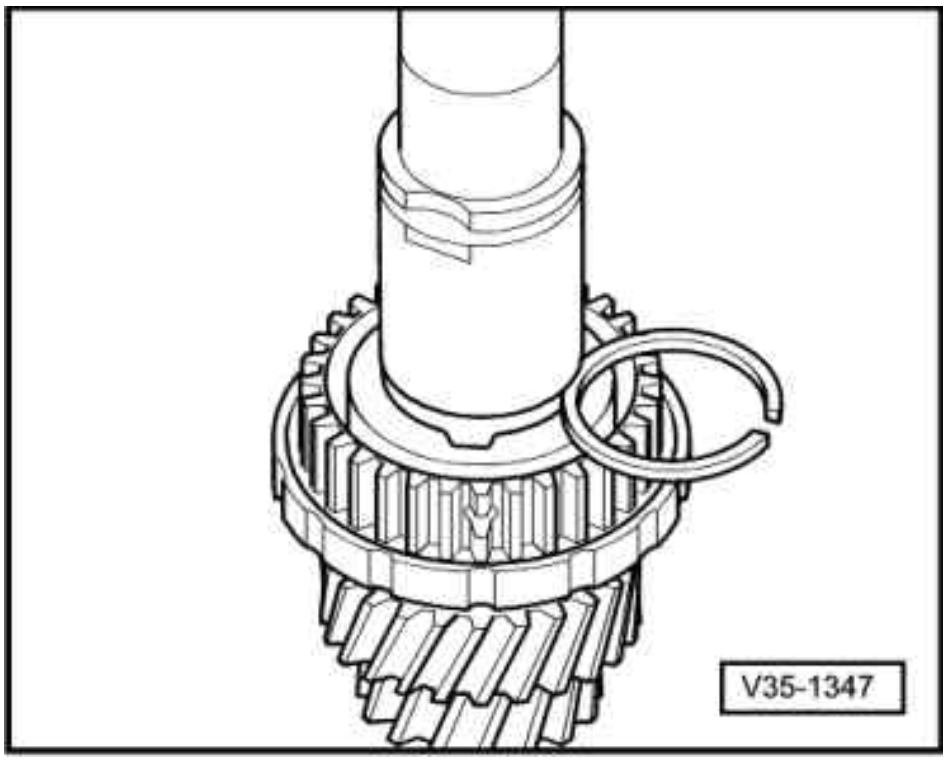
- Clean synchro-ring. Friction surface must be free from oil.
- Synchro-ring is to be replaced if very shiny areas -A- have formed on friction surface or if brass-coloured surface underneath is already visible.



-> Fig.3 Checking synchro-ring with fine thread for wear

- Press synchro-ring into locking collar and use feeler gauge to measure gap width "a" in positions -A-, -B- and -C-.
- Add up measured values and divide by 3.

- Value determined must not be less than 0.5 mm



-> Fig.4 Re-determining thickness of circlip

- Press home synchro-hub.

Note:

Pay attention to installation position for pressing on =>Fig. 6 .

- Determine thickest circlip which can still just be fitted.

Note:

Opening of circlip must coincide with groove in synchro-hub.

- Determine circlip from table. Part numbers

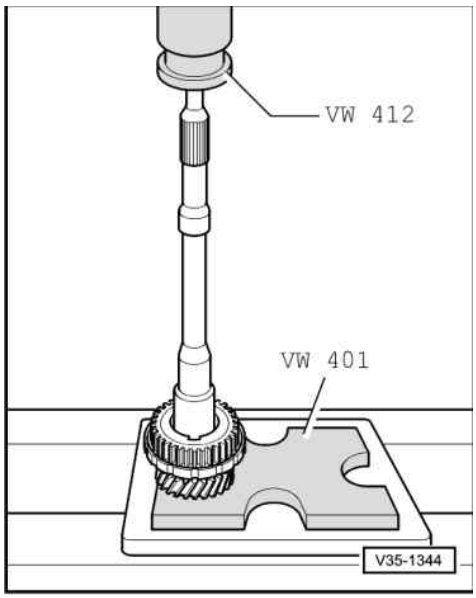
=> Parts List

Circlips available

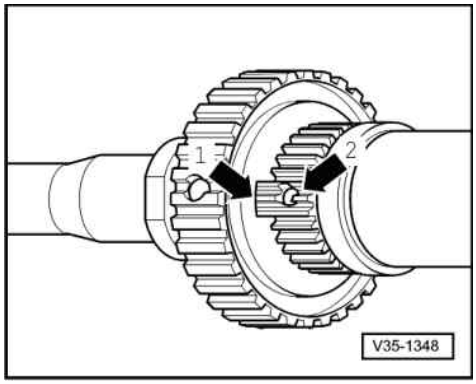
Circlip thickness (mm)		
1.90	1.96	2.02
1.93	1.99	2.05

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.

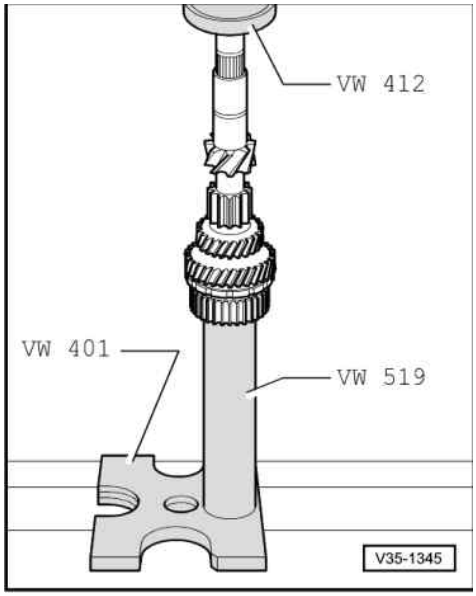


-> Fig.5 Pressing off synchro-hub for 3rd and 4th gear



-> Fig.6 Installation position of synchro-hub

- Oil groove in synchro-hub -arrow 1- must coincide with oil drilling -arrow 2- of input shaft.



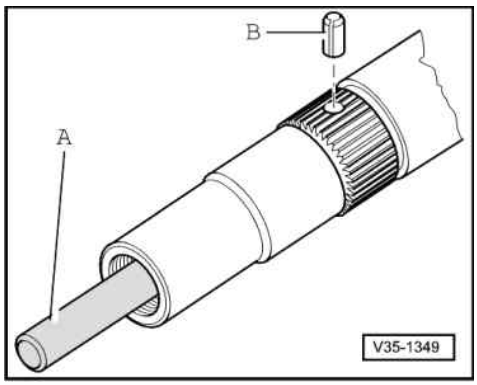
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.7 Pressing on synchro-hub for 3rd and 4th gear

- Heat synchro-hub to approx. 100 °C, place in position and press home.

Attention: Wear protective gloves.

- Fit circlip.



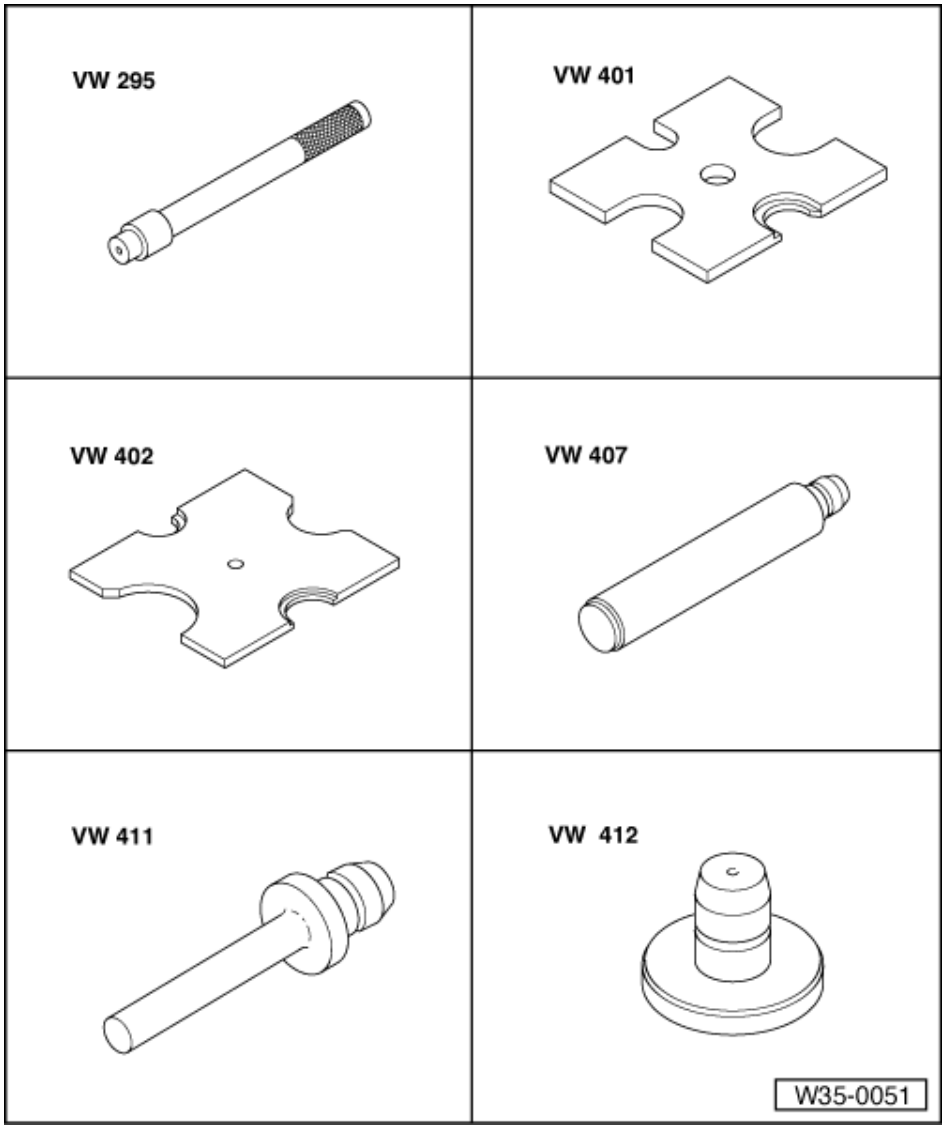
-> Fig.8 Driving spring pin into input shaft

- Insert mandrel -A- ø 9 mm in oil drilling and drive in spring pin -B- until it makes contact with mandrel.

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

2 - Dismantling and assembling drive pinion and hollow shaft

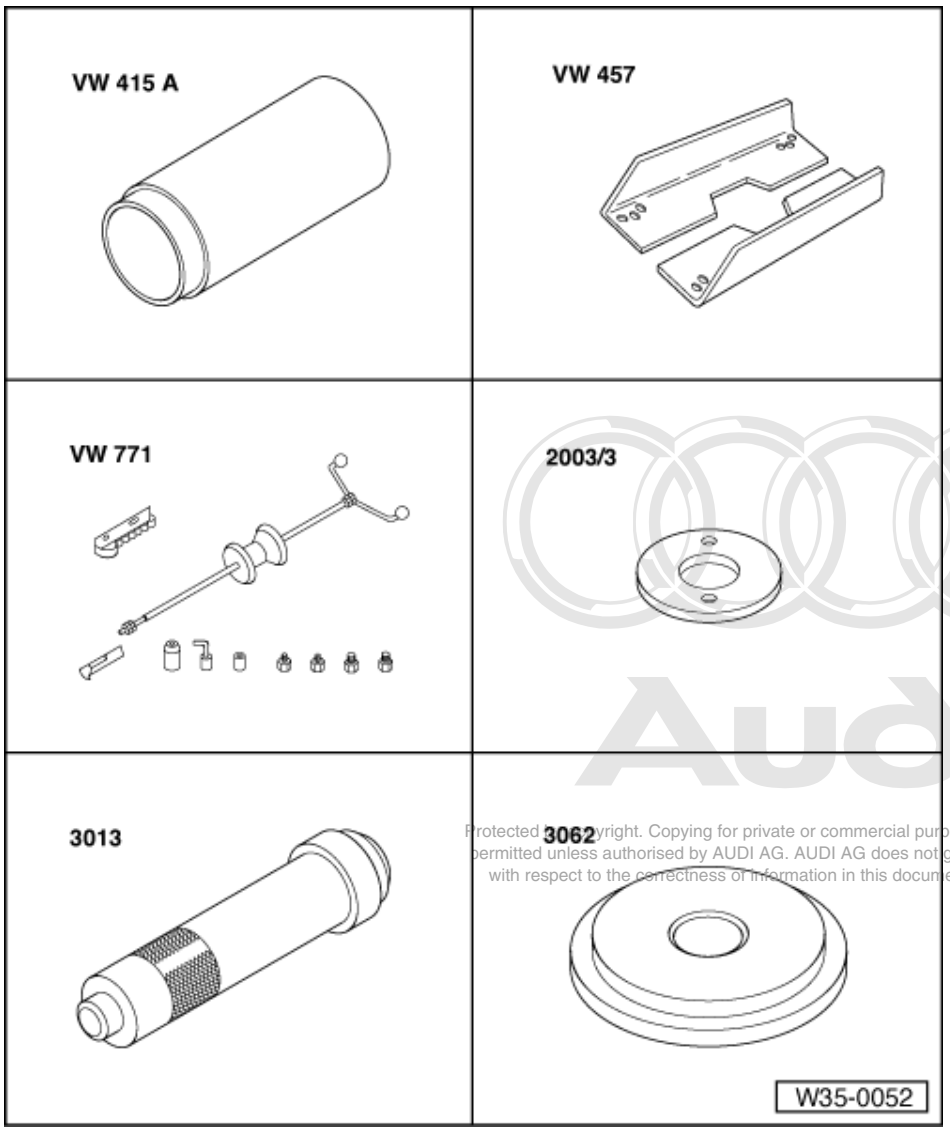
2.1 - Dismantling and assembling drive pinion and hollow shaft



Special tools and workshop equipment required

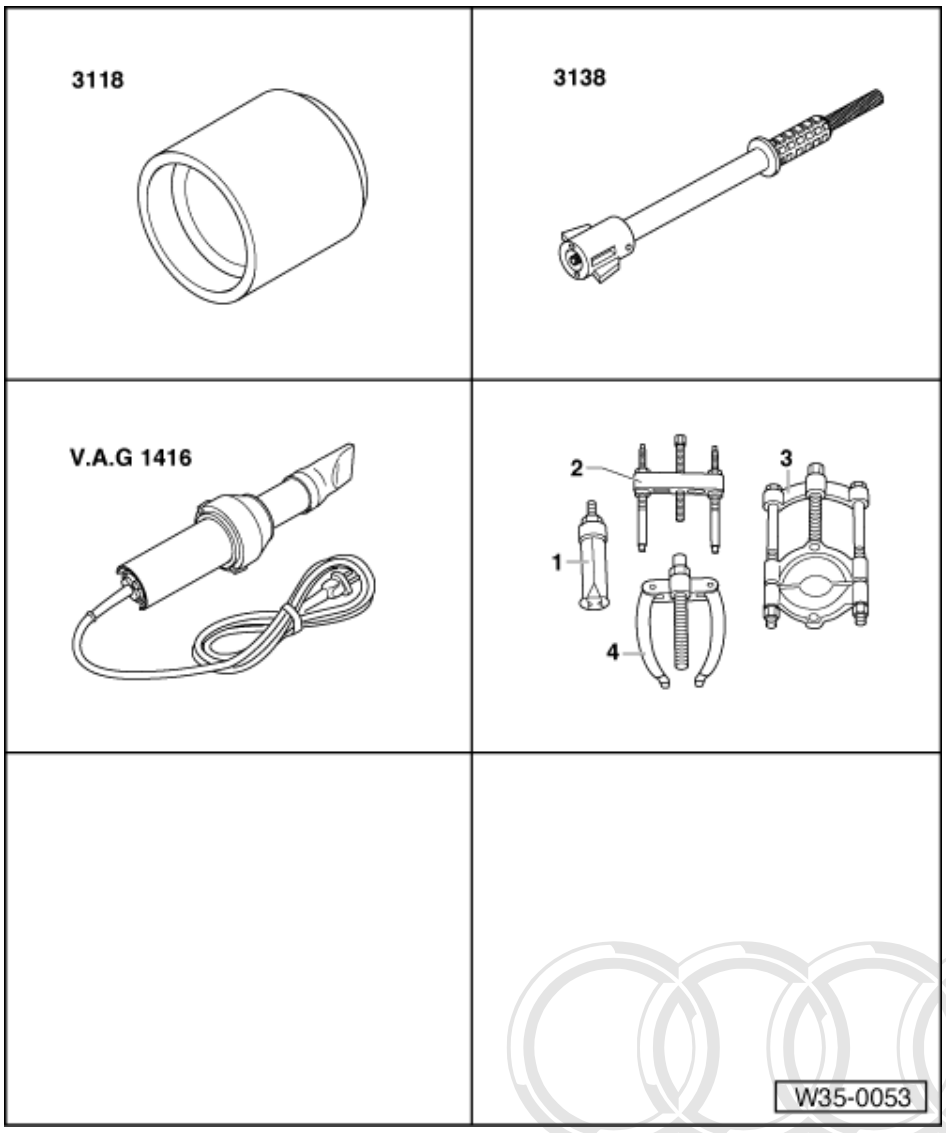
- Mandrel VW 295
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 411
- Press tool VW 412

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



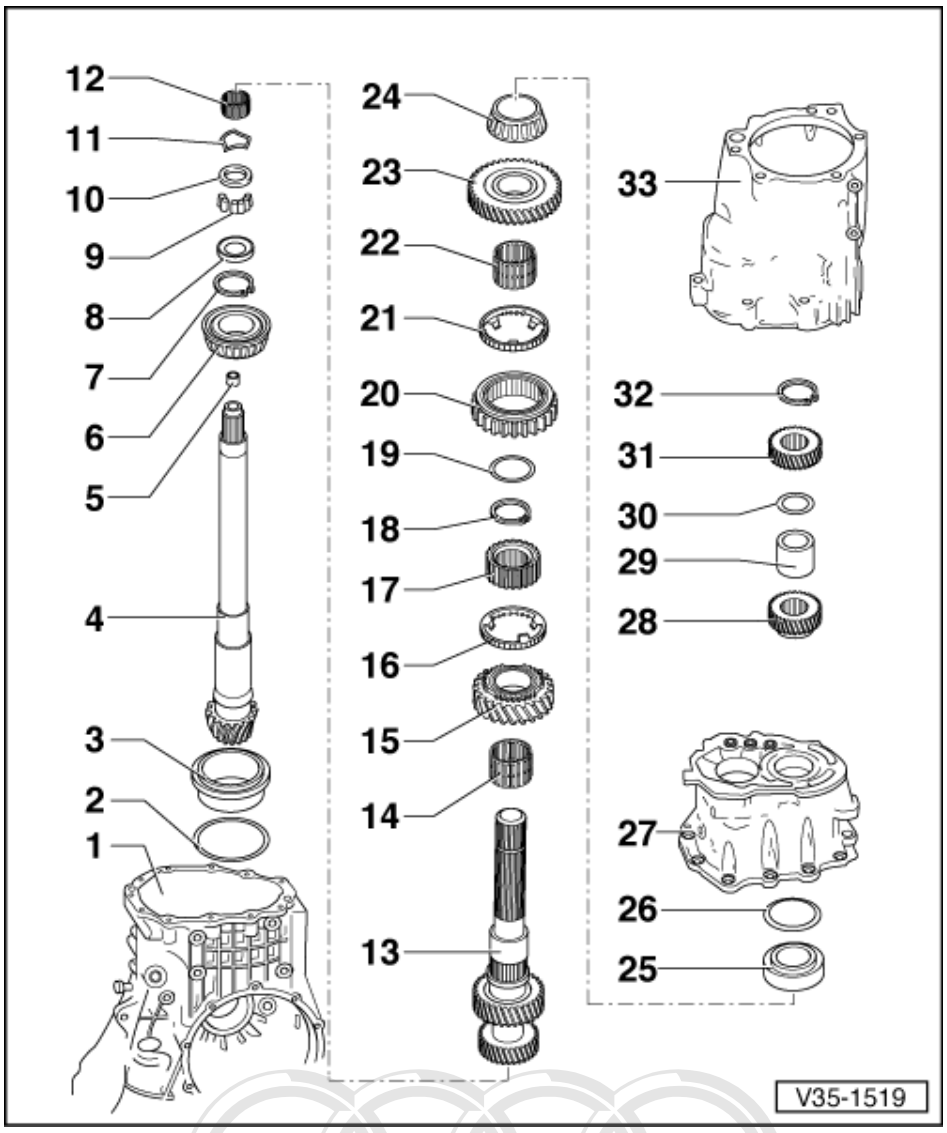
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Tubular section VW 415 A
- Support rails VW 457
- Multi-purpose tool VW 771
- Fitting ring 2003/3
- Fitting mandrel 3013
- Thrust pad 3062



- Thrust pad 3118
- Driving-out tool 3138
- Hot-air blower V.A.G. 1416
- 1 - Internal puller Kukko 21/1
- 3 - Parting tool 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.



Notes:

- For installation of new gear wheels or pinon set =>Technical Data,Page 2 .
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 326 .

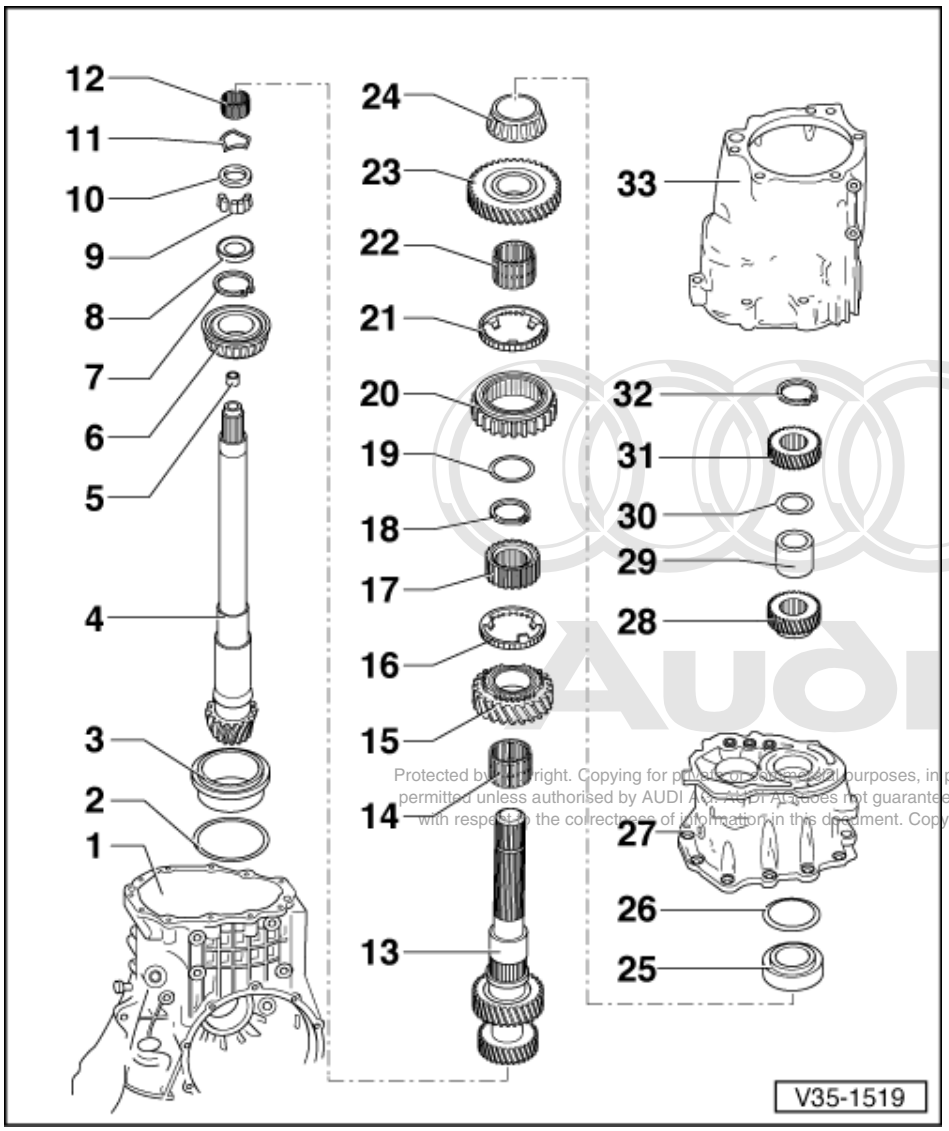
1 Gearbox housing
- Servicing => Page 233

2 Shim "S3"
- Adjustment table => Page 326

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

4 Drive pinion 1)
- Paired with crown wheel (pinion set)
- Adjusting drive pinion and crown wheel => Page 401

Protected by Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

5 Needle bearing for flange shaft/drive pinion

- Extracting => Fig. 4
- Driving in => Fig. 5

6 Inner race for taper roller bearing, large 1)

- Pressing off => Fig. 6
- Pressing on => Fig. 7
- Low-friction bearing; do not lubricate for friction torque measurement

7 Circlip

- Re-determining => Fig. 8

8 Collar ring

- Installation position => Page 188

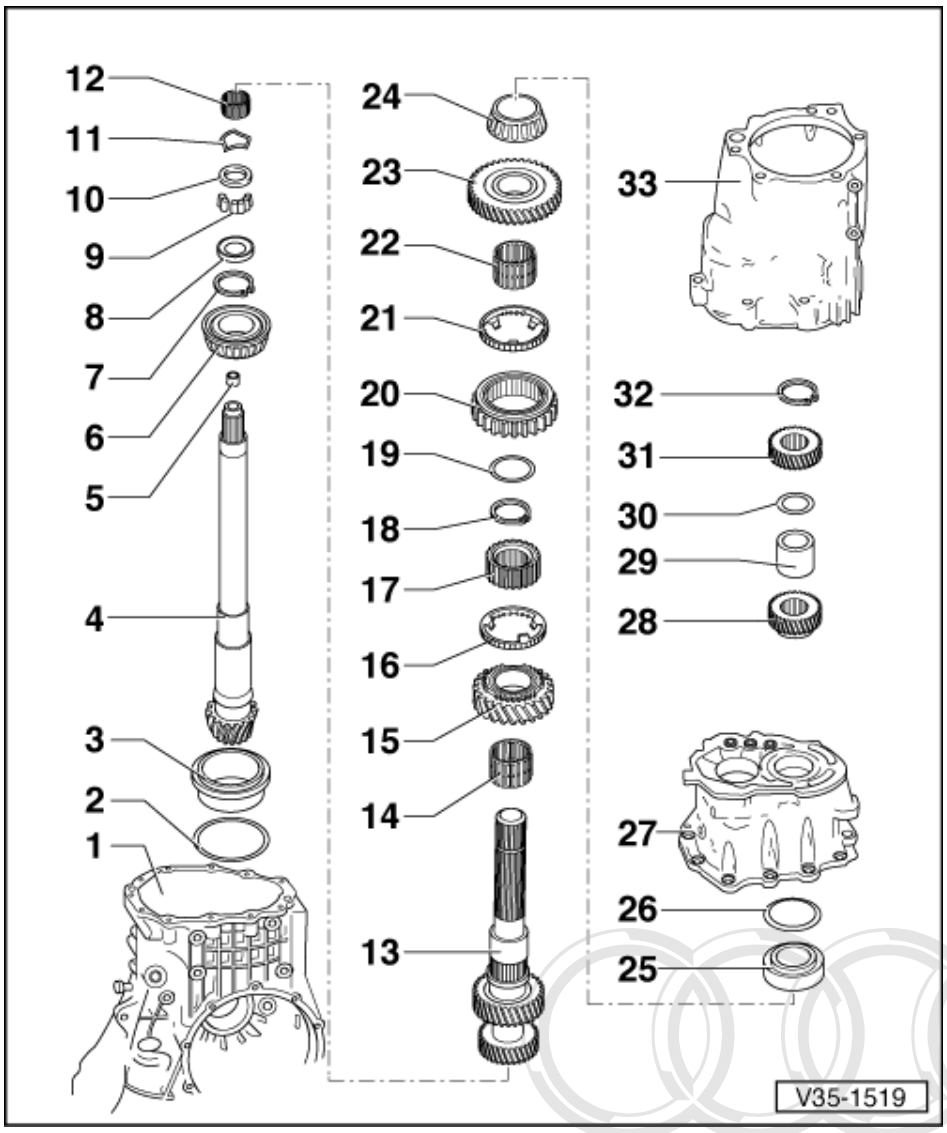
9 Taper rollers

- 23x
- Installation position => Page 188

10 Support ring

- Installation position => Page 188

11 Corrugated spring



12 Drive pinion/hollow shaft needle bearing

- Lubricate before fitting

13 Hollow shaft with 3rd and 4th gear wheels 1)

14 2nd speed sliding-gear needle bearing

- Split
- Lubricate with gear oil before installing

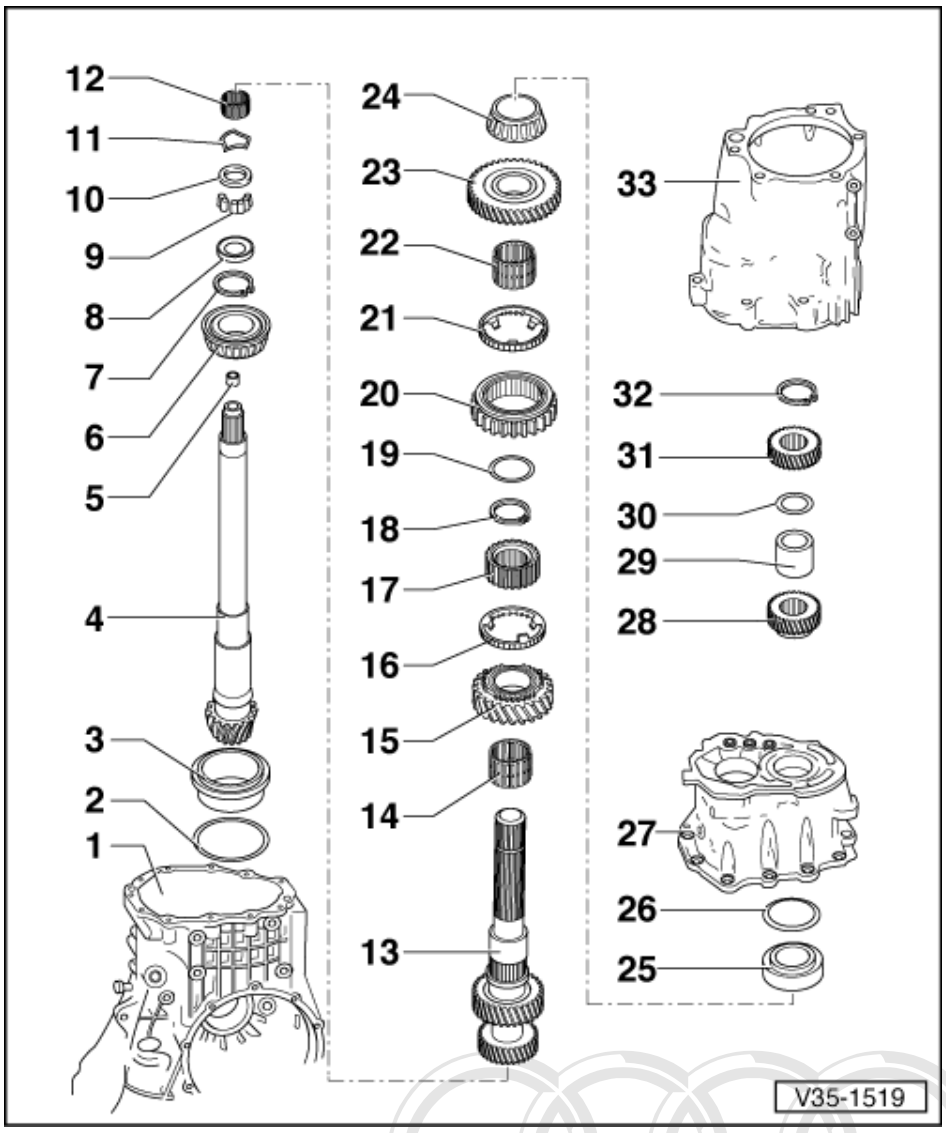
15 2nd speed sliding gear

- Pressing off => Fig. 12
- Prior to installation, insert spring and slip needle bearing onto hollow shaft
- Following installation, use feeler gauge to check axial clearance (0.15 ... 0.35 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.

16 2nd gear synchro-ring

- Coated with molybdenum as standard
- Optimised synchro-ring with carbon coating=> Page 281
- Checking for wear => Fig. 17 and Fig. 18



17 1st and 2nd gear synchro-hub

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

18 Circlip

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

19 Washer

- For 1st speed sliding-gear needle bearing
- Removing and installing => Fig. 11

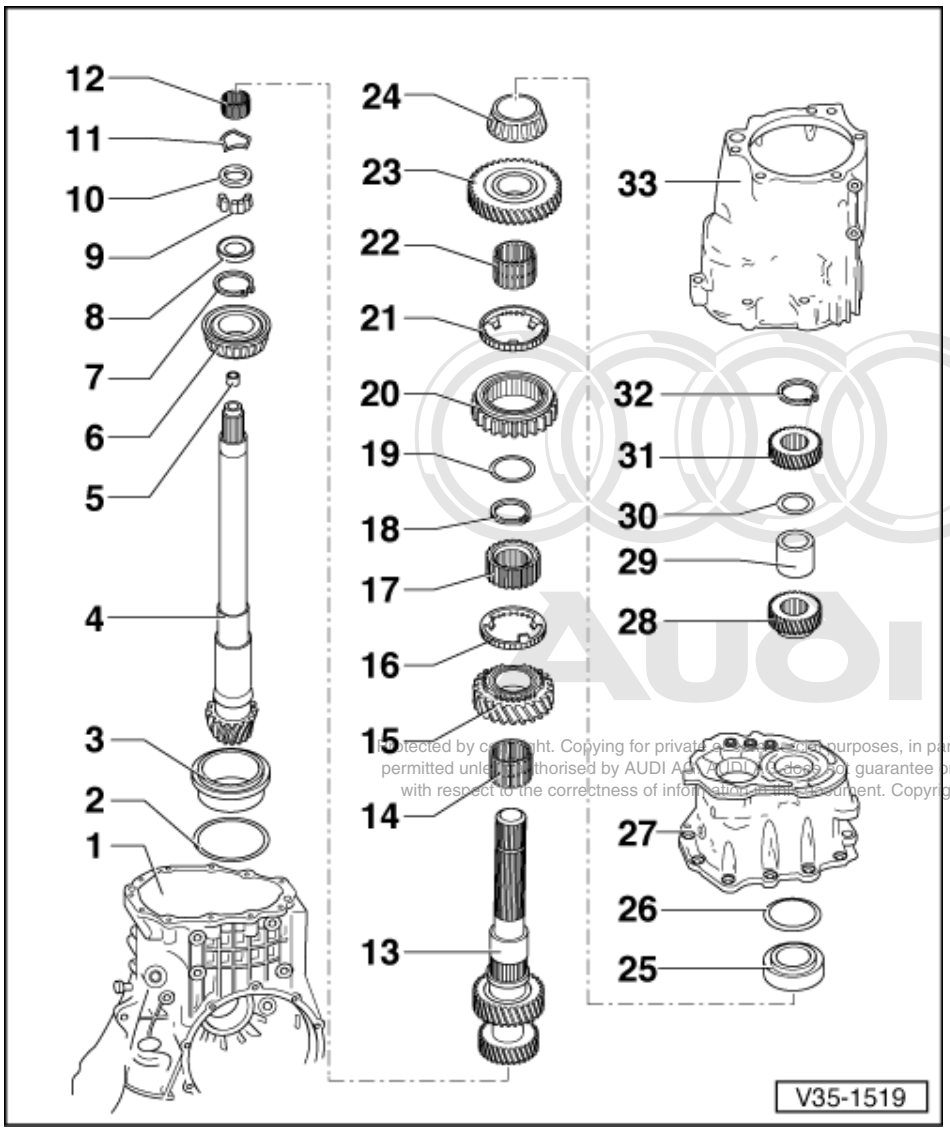
20 Locking collar for 1st and 2nd gear

- Modified locking collar for optimised synchronisation => Page 281
- Installation position: Splines for reverse gear facing 2nd gear synchro-ring

21 1st gear synchro-ring

- Optimised synchro-ring with carbon coating=> Page 281
- Checking for wear => Fig. 17 and Fig. 18

Audi
This 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.



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

22 1st speed sliding-gear needle bearing

- Lubricate with gear oil before installing

23 1st speed sliding gear

- Before installing, fit spring => Fig. 261
- After pressing on -Item 24 - check for axial clearance

24 Inner race for taper roller bearing, small 1)

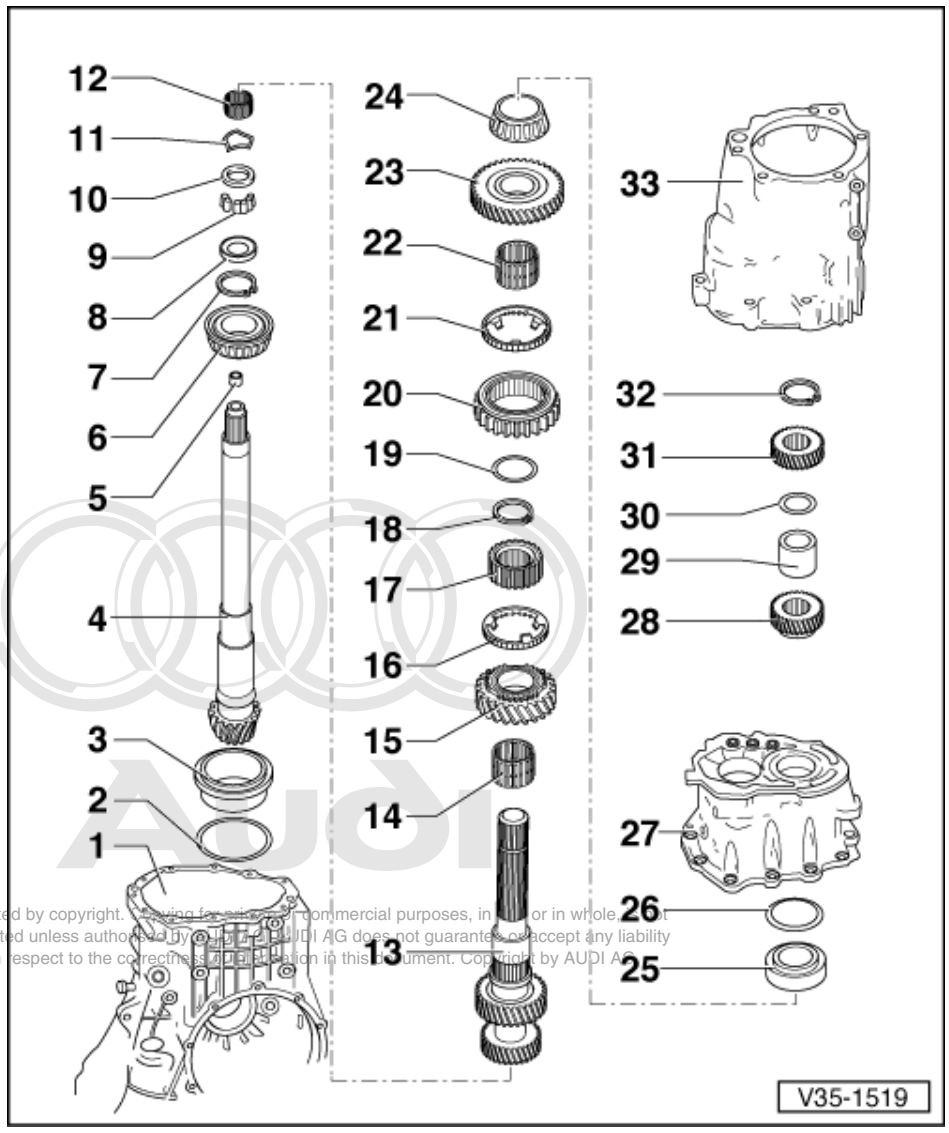
- Pressing off => Fig. 9
- Pressing on => Fig. 10
- Low-friction bearing; do not lubricate for friction torque measurement

25 Outer race for taper roller bearing, small 1)

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

26 Shim "S4"

- Adjustment table => Page 326



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

27 Bearing plate 1)

- Servicing => Page 222

28 6th gear wheel

- Pressing off => Page 188
- Pressing on => Page 189
- Installation position: Collar facing inner race for taper roller bearing, small

29 Spacer sleeve

30 Shim

- Re-determining => Page 195

31 5th gear wheel

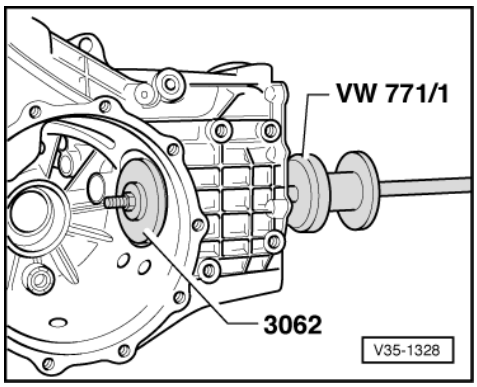
- Removing => Page 184
- Fitting => Page 196

32 5th gear wheel circlip

- Re-determining => Page 196

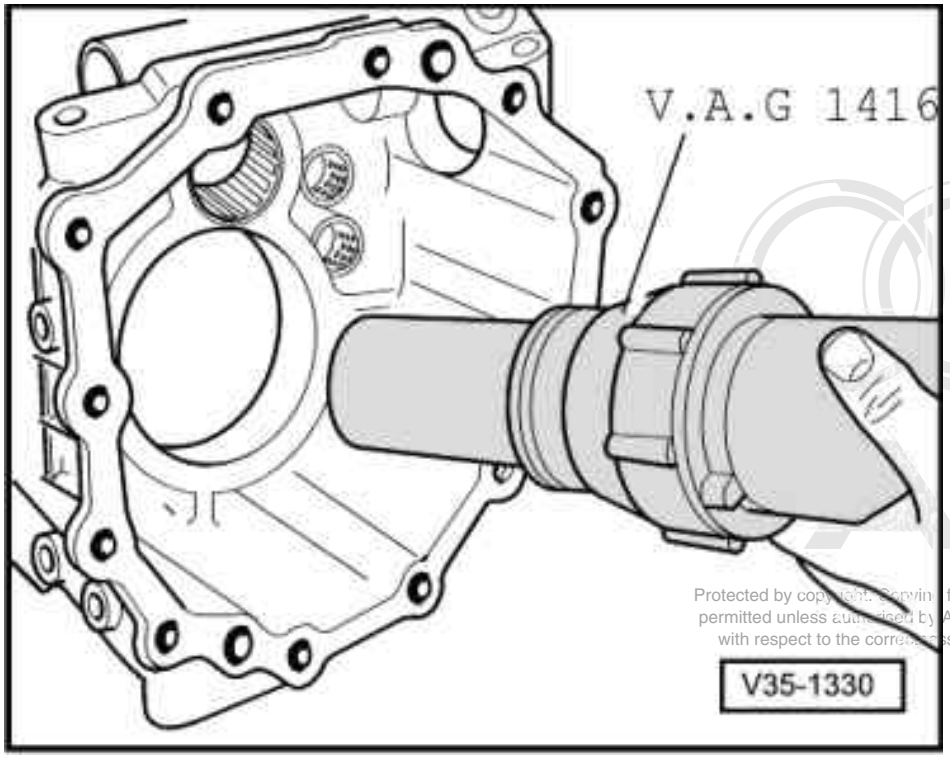
33 End cover

- Servicing => Page 215



-> Fig.1 Extracting outer race for taper roller bearing, large

- Stepped side of thrust pad 3062 makes contact with outer race

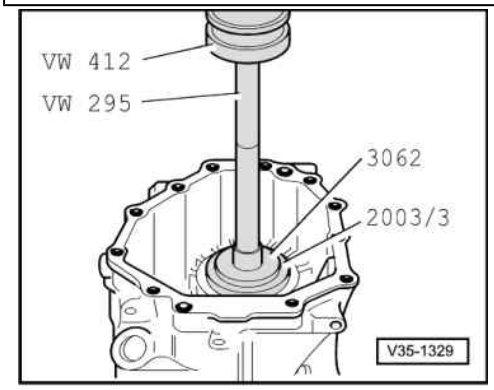


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.2 Heating gearbox housing for insertion of outer race for taper roller bearing, large

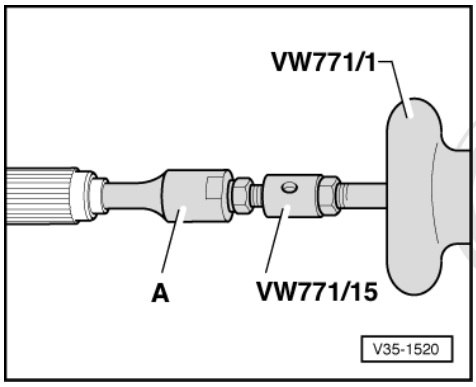
- Heat gearbox housing with hot-air blower in area of bearing seat for approx. 15 minutes to roughly 100 °C.

Attention:
Wear protective gloves.



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

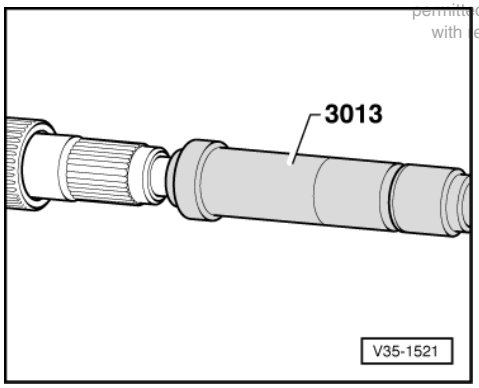
- Insert outer race in heated housing only and press home with service press for a further 1 ... 2 minutes until heat exchange has taken place.



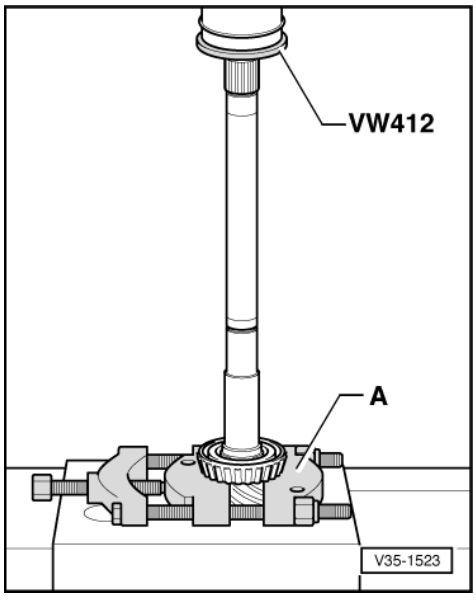
-> Fig.4 Extracting needle bearing for flange shaft/drive pinion

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.



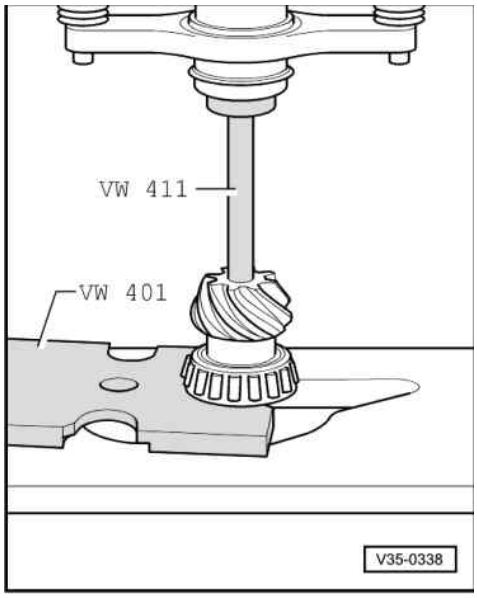
-> Fig.5 Driving in needle bearing for flange shaft/drive pinion so as to be flush



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

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

- Pressing off destroys bearing

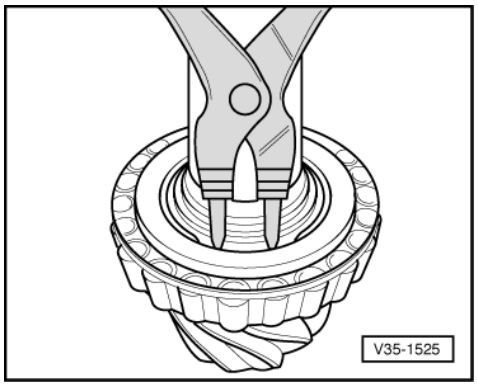


-> Fig.7 Pressing on inner race for taper roller bearing, large

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

Attention:
Wear protective gloves.

- Press home such that there is no axial clearance.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Determining circlip for drive pinion taper roller bearing, large

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

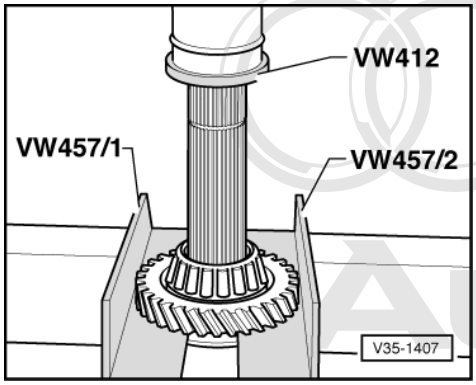
=> Parts List

Circlips available:

Circlip thickness (mm)		
2.34	2.40	2.46

Circlip thickness (mm)		
2.36	2.42	2.48
2.38	2.44	

- Fit circlip.

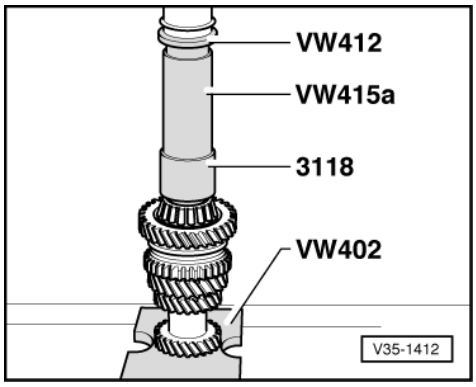


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.9 Pressing off inner race for taper roller bearing, small 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 gear.



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

- Fit circlip, shim for 1st speed sliding gear, synchro-ring for 1st gear and 1st speed sliding gear with spring and needle bearing.
- Heat inner race to approx. 100 °C and fit in position.

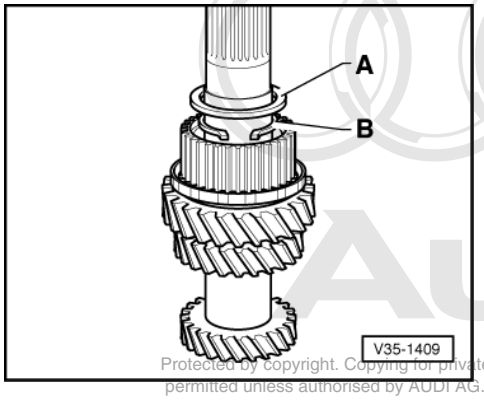
Attention: Wear protective gloves.

- Press home such that there is no axial clearance.

Notes:

- Press down onto bearing inner race only with collar of thrust pad 3118.
- Position shoulder of tubular section VW 415 A facing upwards towards press tool VW 412.

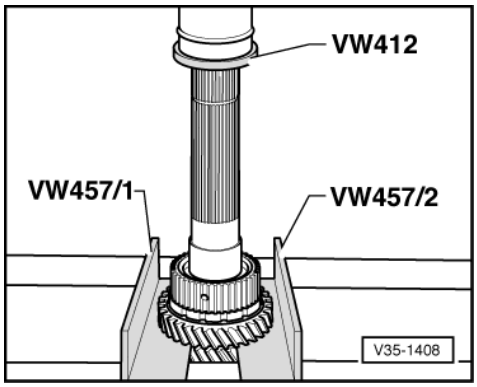
- After pressing on, check axial clearance of 1st speed sliding gear.



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.

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

- On removal, detach shim -A-, then circlip -B-.
- On installation, fit circlip -B-, then shim -A-.

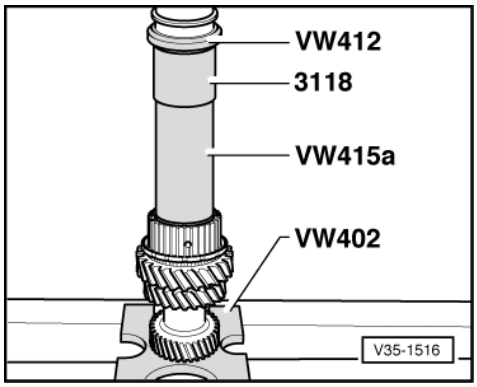


-> Fig.12 Pressing off 2nd speed sliding gear with synchro-hub for 1st and 2nd gear

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

Note:

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



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

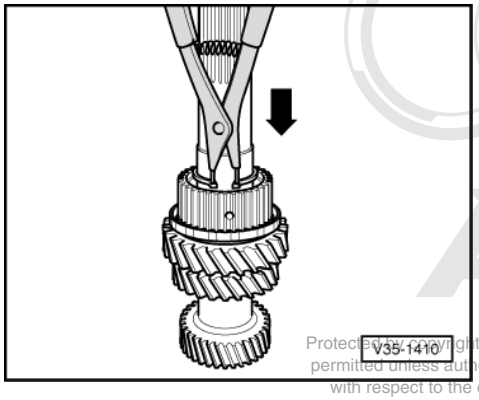
- Fit needle bearing (split), sliding gear with spring and synchro-ring for 2nd gear.
- Lubricate needle bearing.
- Heat synchro-hub to approx. 100°C and fit in position.

Attention: Wear protective gloves.

- Press home such that there is no axial clearance.

Notes:

- Fit tubular section VW 415 a with collar facing synchro-hub.
- Position thrust piece 3118 with shoulder facing 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.14 -> Determining circlip for synchro-hub for 1st and 2nd gear

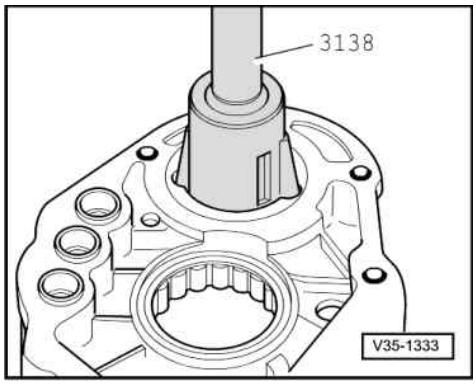
- Determine thickest circlip which can still just be fitted.
- Determine circlip from table. Part numbers

=> Parts List

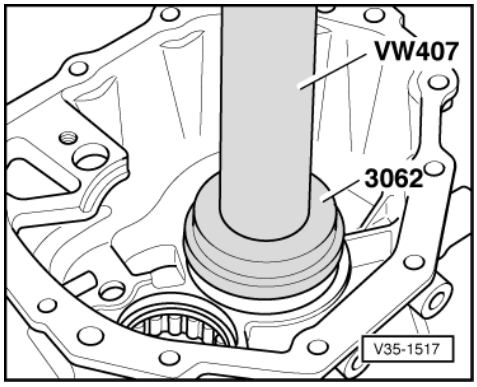
Circlips available:

Circlip thickness (mm)		
1.90	1.96	2.02
1.93	1.99	

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



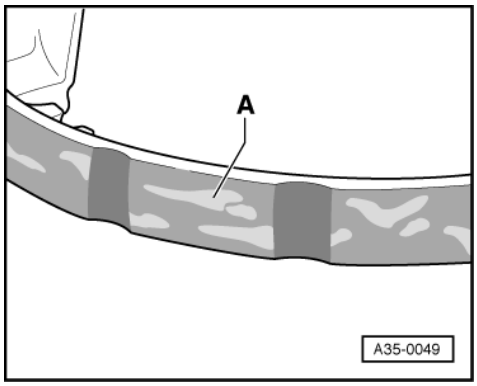
-> Fig.15 Driving out outer race for taper roller bearing, small



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 taper roller bearing, small

- Insert shim "S4" in bearing flange behind bearing seat.
- Position shoulder of thrust pad 3062 facing press tool VW 407.
- Press home small taper roller bearing outer race.

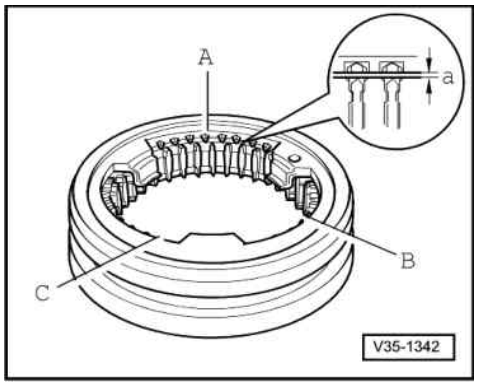


-> Fig.17 Checking molybdenum-coated synchro-ring for wear

Note:

Friction surface of intact synchro-ring has a graphite grey, slightly porous appearance.

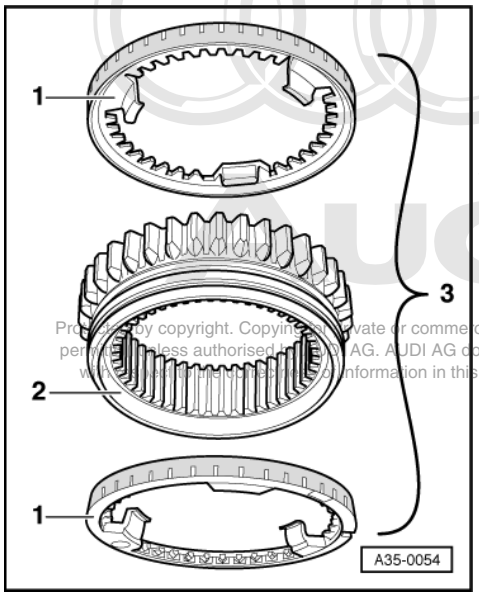
- Clean synchro-ring. Friction surface must be free from oil.
- Synchro-ring is to be replaced if very shiny areas -A- have formed on friction surface or if brass-coloured surface underneath is already visible.



-> Fig.18 Checking synchro-ring with fine thread for wear

- Press synchro-ring into locking collar and use feeler gauge to measure gap width "a" in positions -A-, -B- and -C-.
- Add up measured values and divide by 3.
  - Value determined must not be less than 0.5 mm

2.2 - Optimised synchronisation for 1st and 2nd gear on gearboxes with gearbox code letters FZV, FZW and FZY (repair option for all 01E gearboxes)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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:

Heed fitting instructions => Page 282

Scope of optimisation:

-> 1 - Carbon-coated 1st and 2nd gear synchro-rings (both synchro-rings identical)

- Part no. 012 311 247 H

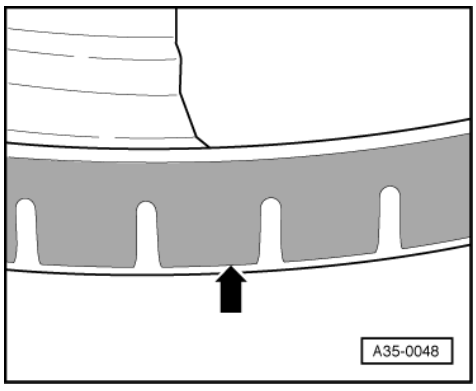
Distinguishing feature => Page 282

2 - 1st/2nd gear locking collar with modified friction surface taper angle

- Part no. 01E 311 255 F

3 - Complete repair set

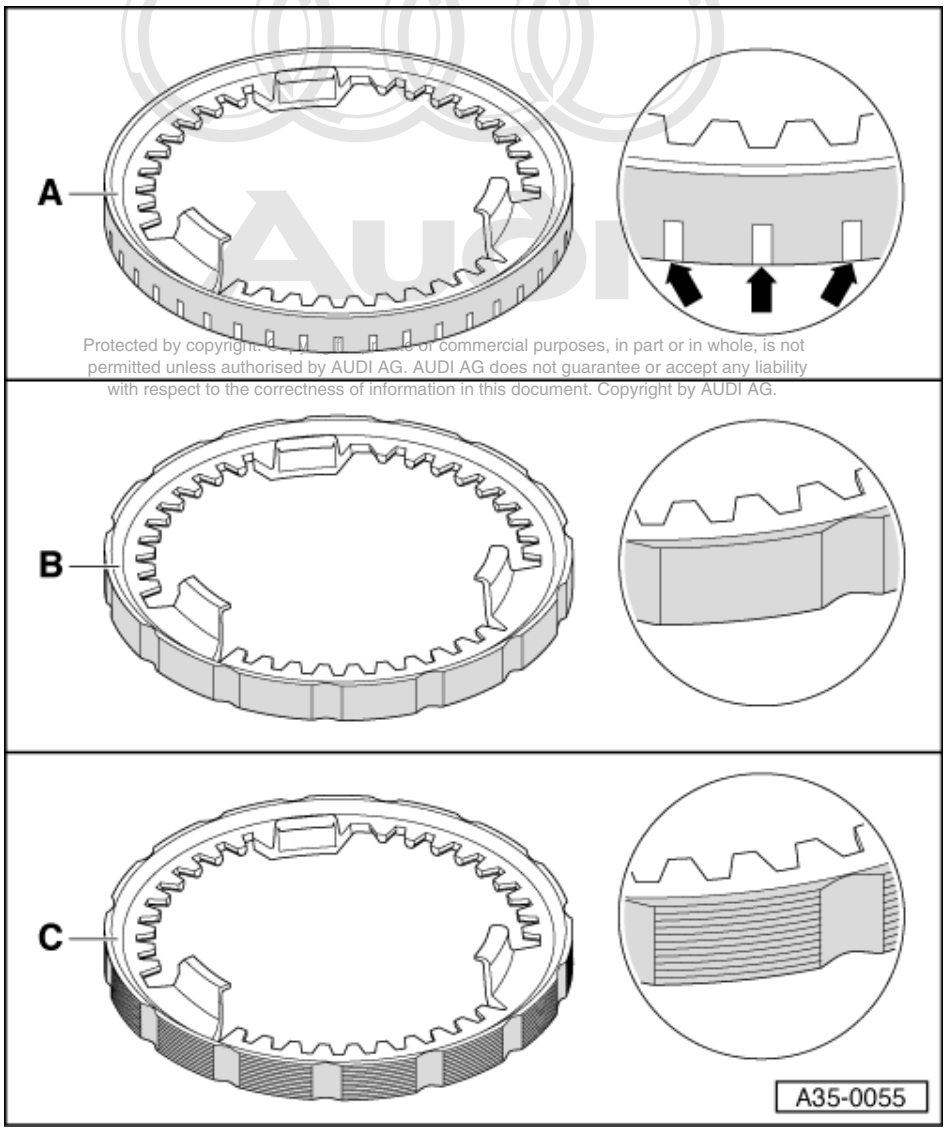
- Part no. 01E 398 270



Important fitting instructions:

- -> New synchro-rings for 1st and 2nd gear feature a wear-resistant carbon coating -arrow-. The taper angle has also been altered.
- On the 1st/2nd gear locking collar, the friction surface taper angle has been matched to that of the synchro-rings.
- Carbon-coated synchro-rings are only to be fitted in conjunction with the optimised locking collar.
- On gearboxes fitted as standard with optimised 1st and 2nd gear synchronisation, the synchro-rings can also be replaced separately. Distinguishing feature => Page 282
- Optimised synchronisation is a repair option for all 01E gearboxes.

Part no. for complete repair set: 01E 398 270



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

Optical distinguishing feature of synchro-rings

A - Optimised synchro-ring with carbon coating

- With recesses in friction surface -arrows-

B - Previously fitted synchro-ring with molybdenum coating

- Graphite grey, slightly porous friction surface with no recesses

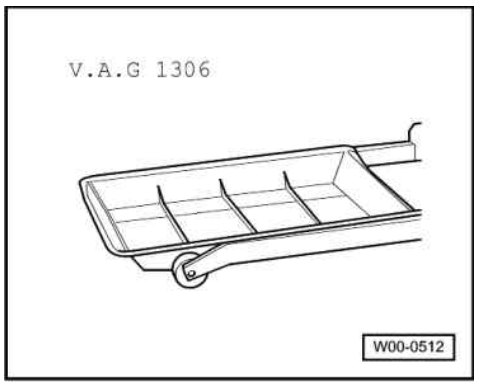
C - Previously fitted synchro-ring with fine thread

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 oil seal for flange shaft

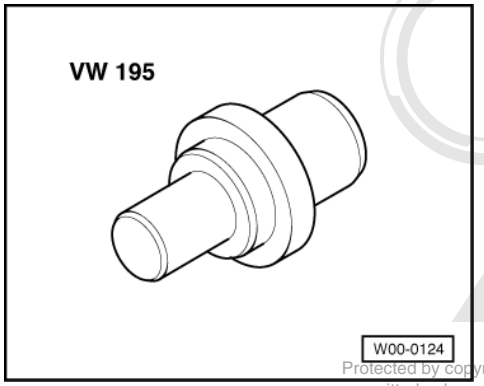
1.1 - Replacing oil seal for flange shaft



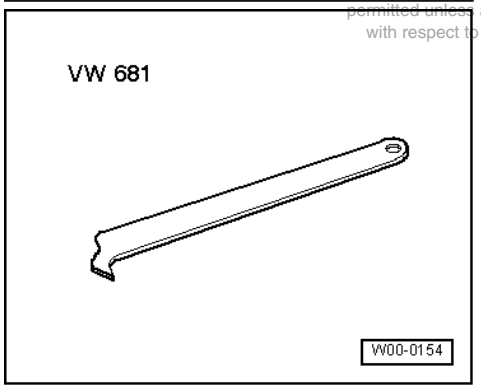
Special tools, testers and other items required

- Drip tray V.A.G 1306

- Fitting mandrel VW 195



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



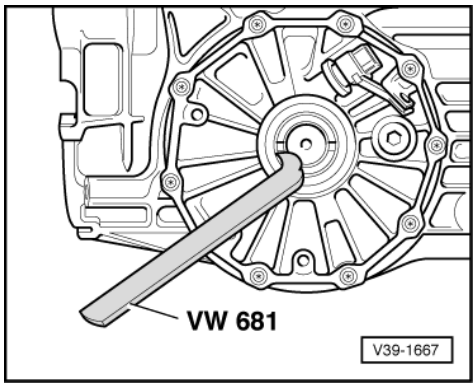
- Pressing-out lever VW 681

Removing

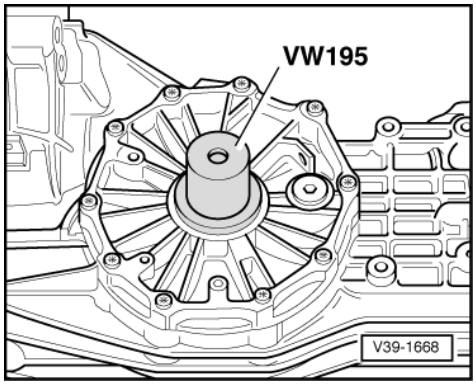
- Gearbox fitted

Notes:

- Fig. shows removal and installation of left oil seal.
- Procedure is identical for left and right oil seal.



- Unscrew heat shield.
- Disconnect drive shaft.
- Place drip tray in position.
- Remove flange shaft (hold shaft in position with mandrel to stop it turning).
- -> Use pressing-out lever VW 681 to extract 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.

Installing

- Lightly lubricate outer periphery of new oil seal.
- Fill space between sealing lip and dust lip with sealing grease G 052 128 A1.
- -> Drive in flange shaft oil seal.
  - Standard press-in depth 5.5 mm
  - Service press-in depth 6.5 mm if using old flange shaft.
- Install flange shaft.
- Attach drive shaft to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

- Top up gear oil in manual gearbox and check oil level => Page 156 .

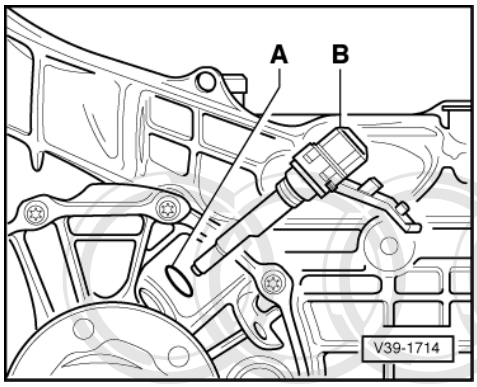
Tightening torques

Components	Nm
Flange shaft to gearbox	10 + 90°1)

1) 90°corresponds to quarter turn

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



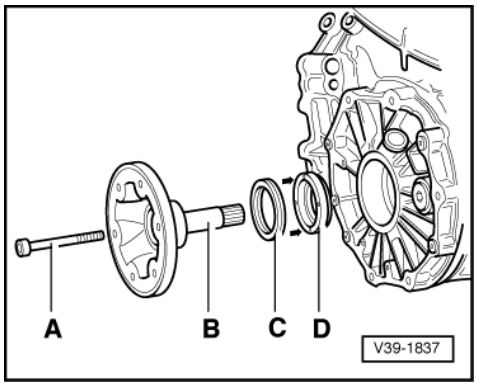
- Gearbox fitted

Removing and installing speedometer sender -G22

- -> Unplug connector of sender -B-.
- Press down retainer of sender, twist and take out sender.
- Replace O-ring -A-.

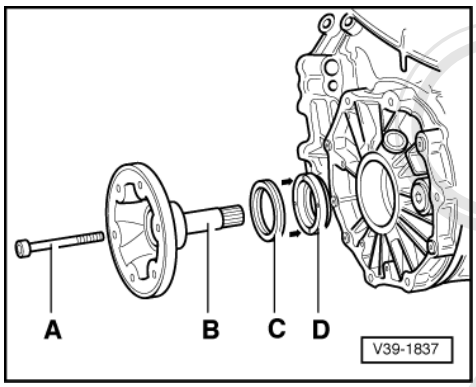
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing and installing drive wheel for speedometer sender -G22



Removing:

- Unscrew drive shaft from left flange shaft -B-.
- -> Screw out bolt -A-, holding flange shaft in position with mandrel to stop it turning.
- Remove flange shaft and oil seal -C-.



- -> Apply screwdriver alternately to drive pins -arrows- and prise out drive wheel for speedometer sender -D-.

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

Installing:

- Insert drive wheel for speedometer sender such that drive pins -arrows- are facing oil seal.

Note:

Attach drive wheel carefully to differential, taking care to keep it straight. Do not use force as this could cause drive wheel to break off.

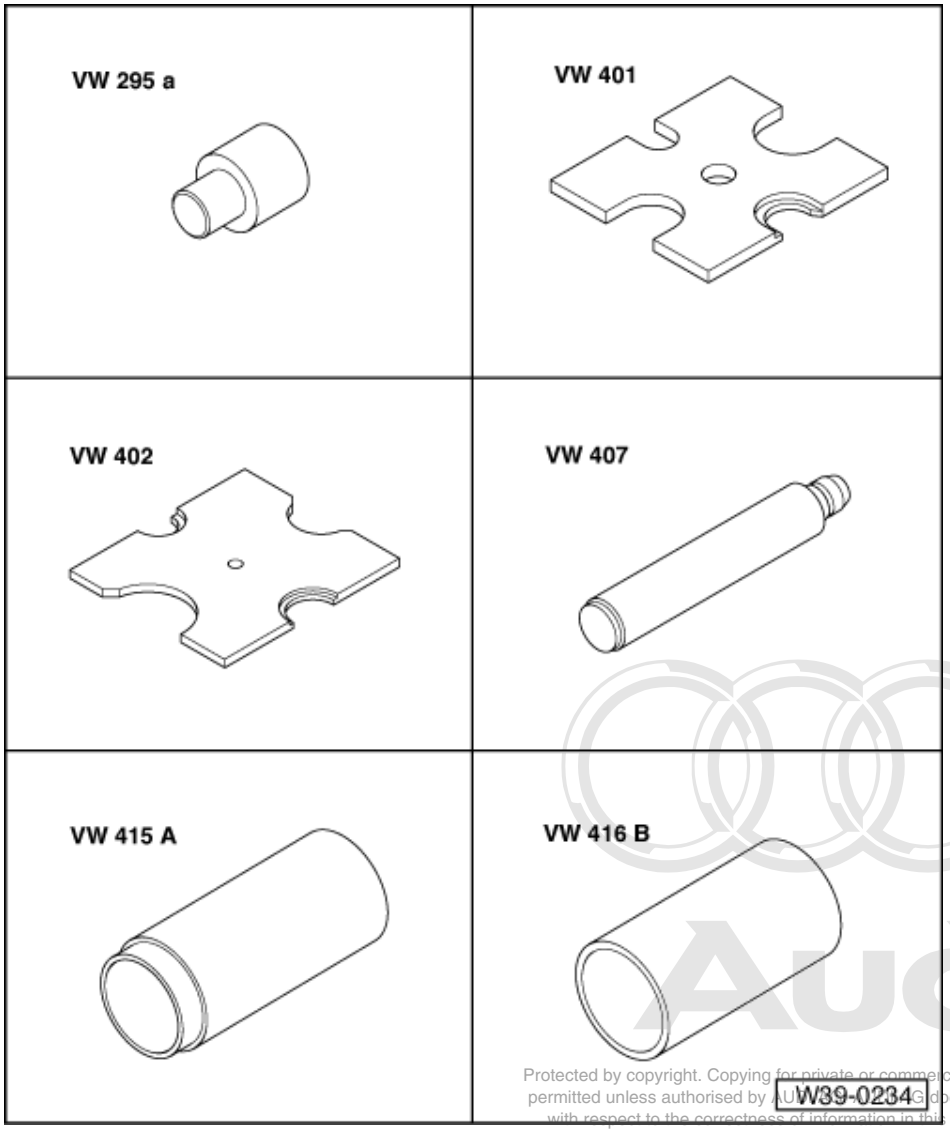
- Engage drive pins in grooves of differential housing.
- Replace oil seal for flange shaft and install flange shaft => Page 284 .
- Install flange shaft.
- Attach drive shaft to flange shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 40; Removing and installing drive shaft Removing and installing drive shaft

- Top up gear oil in manual gearbox and check oil level => Page 156 .

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

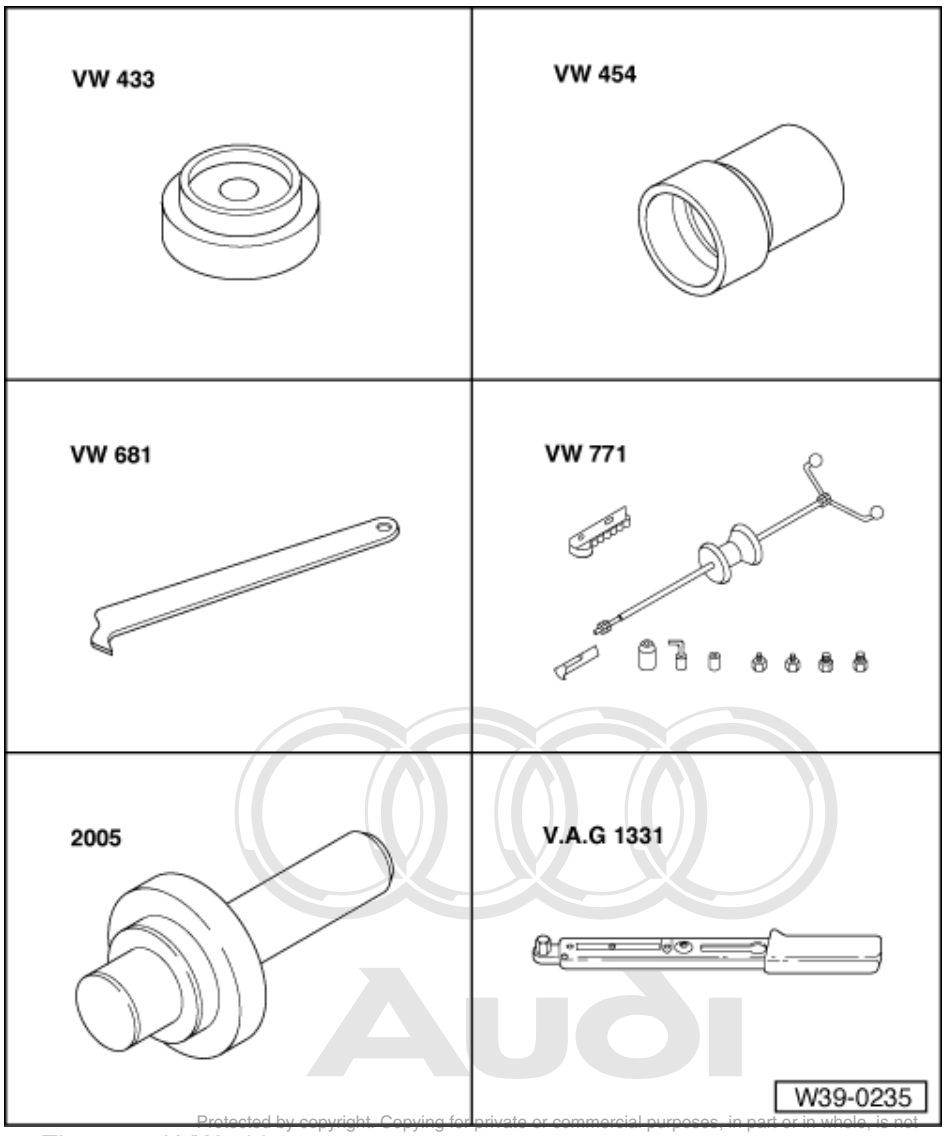
3.1 - Replacing oil seal and grooved ball bearing for propshaft flange at gearbox



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.

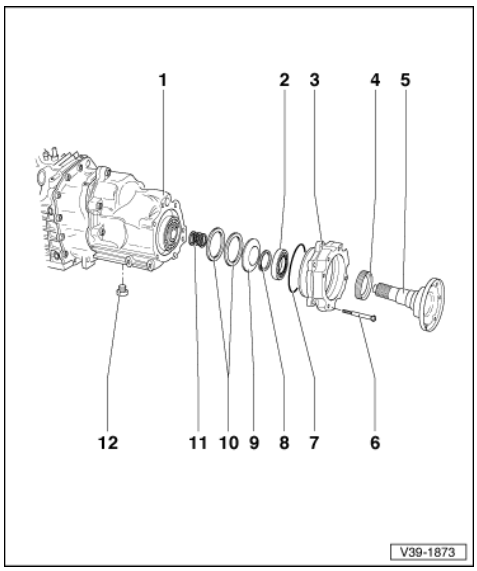
Special tools and workshop equipment required

- Adapter VW 295 A
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Tubular section VW 415 A
- Tubular section VW 416 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.

- Thrust pad VW 433
- Thrust pad VW 454
- Pressing-out lever VW 681
- Multi-purpose tool VW 771
- Fitting mandrel 2005
- Torque wrench V.A.G 1331 (5...50 Nm)
- Drip tray V.A.G 1306
- Shim
  Part no. 016 311 391 B



1 Gearbox
2 Grooved ball bearing
3 Bearing housing at vibration damper
4 Oil seal
- Driving in => Page 293

5 Flange shaft
6 Bolt, 25 Nm
- 6x

7 O-ring
- Replace

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

10 Shims
11 Spring
12 Oil drain plug, 40 Nm

Removing

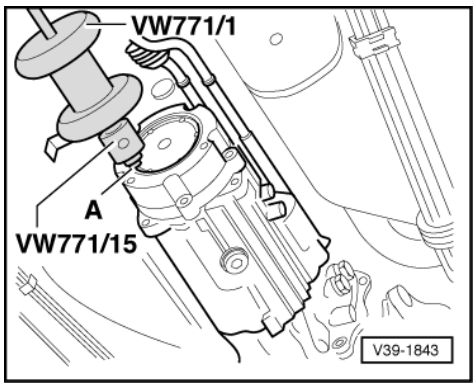
- Gearbox fitted

- Unscrew propshaft at front=>Page 348 and tie to gear shift linkage.
- Place drip tray in position.
- Screw out rear oil drain plug (at end cover) and drain off gear oil.
- Screw out bolt for bearing housing.

Note:

On slackening off bolts, bearing housing is generally pressed off end cover by coil 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.

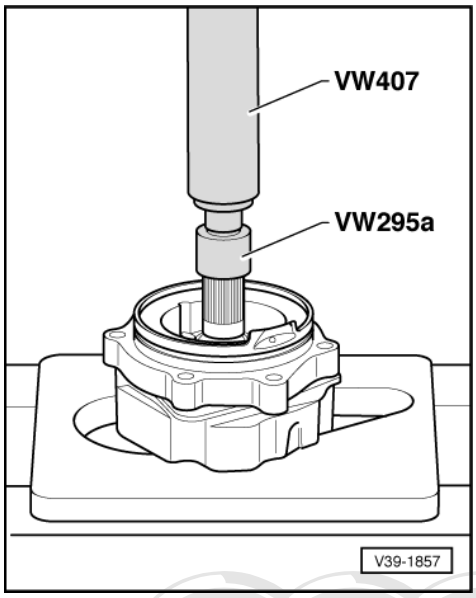


If bearing housing is not pressed off:

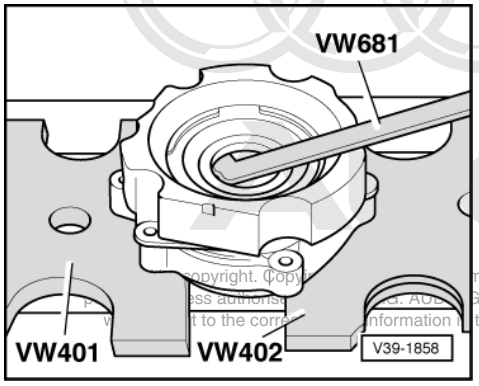
- -> Remove flange shaft together with bearing housing and vibration damper from end cover.

  A - Stud M8/M10

- Detach bearing housing.



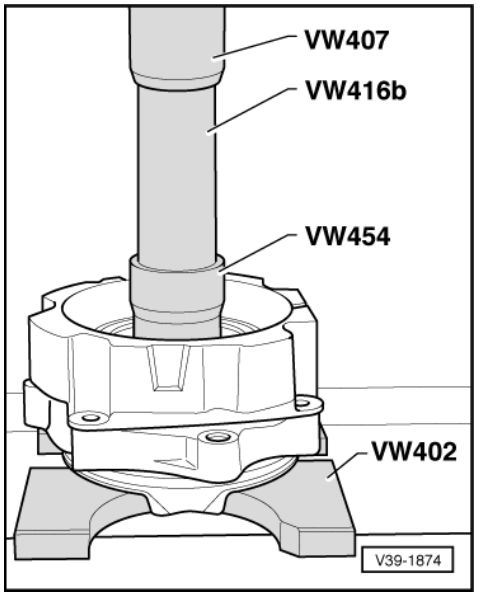
- Remove circlip from flange shaft.
- -> Press out flange shaft.



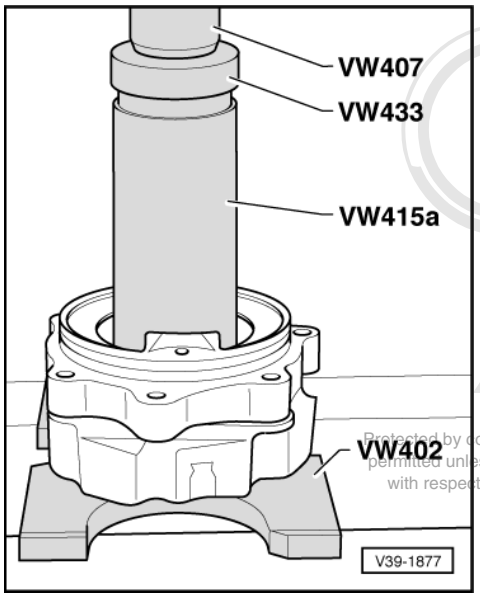
Copyright. Copy mercial purposes, in part or in whole, is not
ss authorised G does not guarantee or accept any liability
t to the corre nformation this document. Copyright by AUDI AG.

- -> Extract oil seal for flange shaft.

- Thoroughly clean oil seal seat.



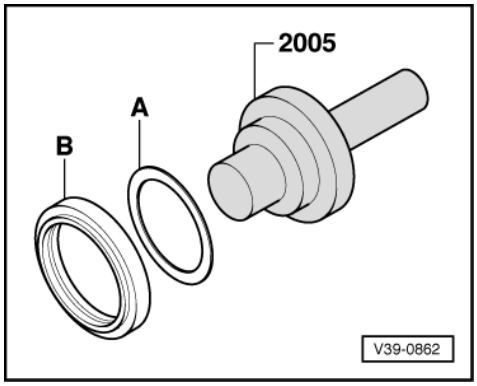
- -> Press out grooved ball bearing.



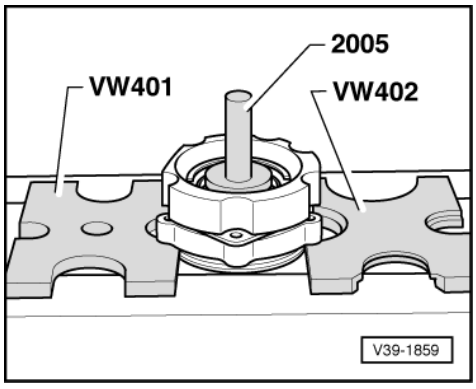
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Installing

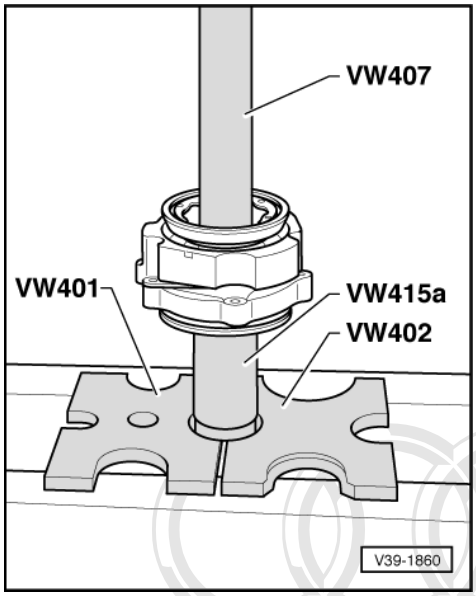
- -> Press grooved ball bearing into bearing housing.



- -> Lightly lubricate outer diameter of oil seal -B-.
- Place oil seal with shim -A- part no. 016 311 391 B (1.7 mm thick) on driving-in mandrel 2005.
  - Installation position: Open side of oil seal facing manual gearbox



- -> Drive in flange shaft oil seal.
- Remove shim after fitting.
- Half-fill space between sealing lip and dust lip with sealing grease G 052 128 A1.

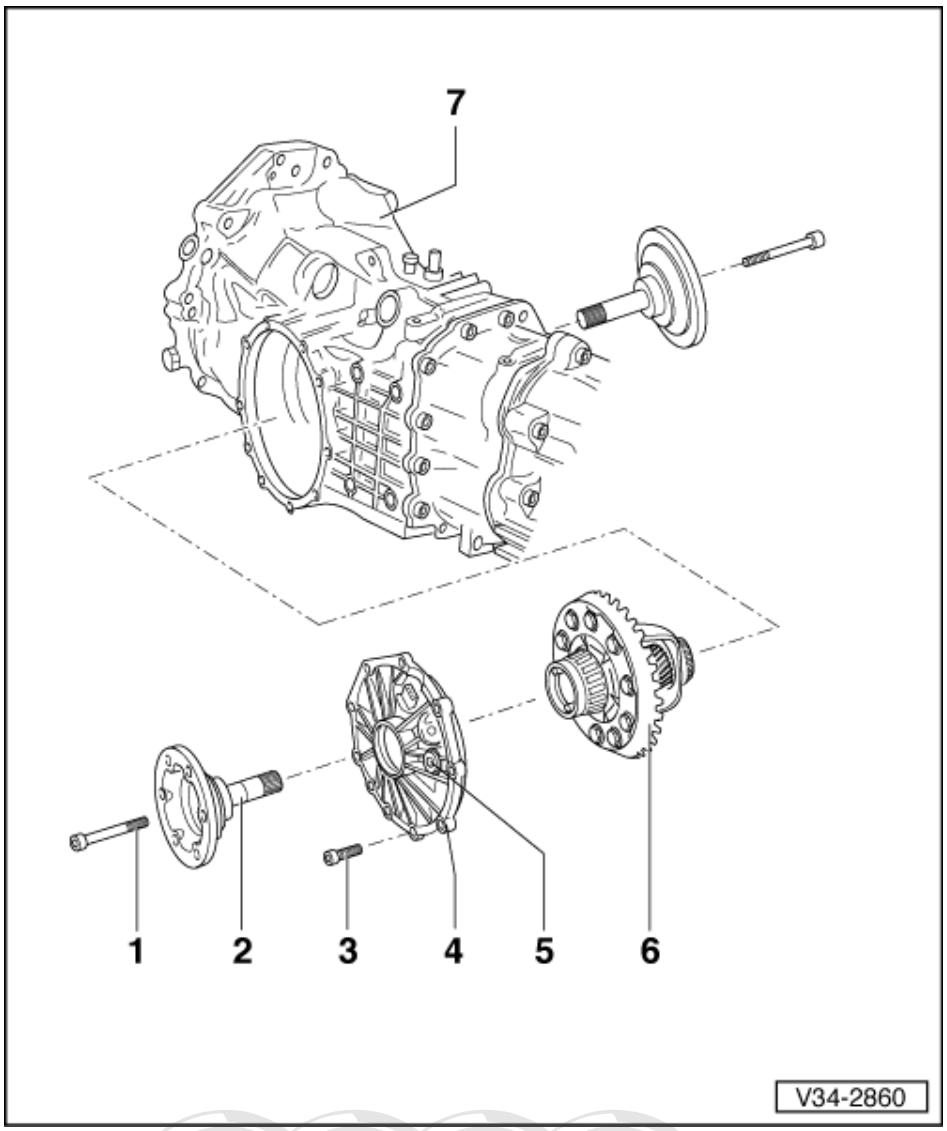


- -> Press in flange shaft.
- Fit circlip on flange shaft.
- Lightly lubricate new O-ring and insert in groove of bearing housing.
- Insert dished washer and shims in bearing housing.
  - Installation position => Page 290
- Slide coil spring onto flange shaft.
- Tighten bolts for bearing housing diagonally in small steps.
- Bolt on propshaft => Page 349 .
- Top up gear oil in manual gearbox and check oil level => Page 156 .

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 - Removing and installing differential

4.1 - Removing and installing differential



Note:

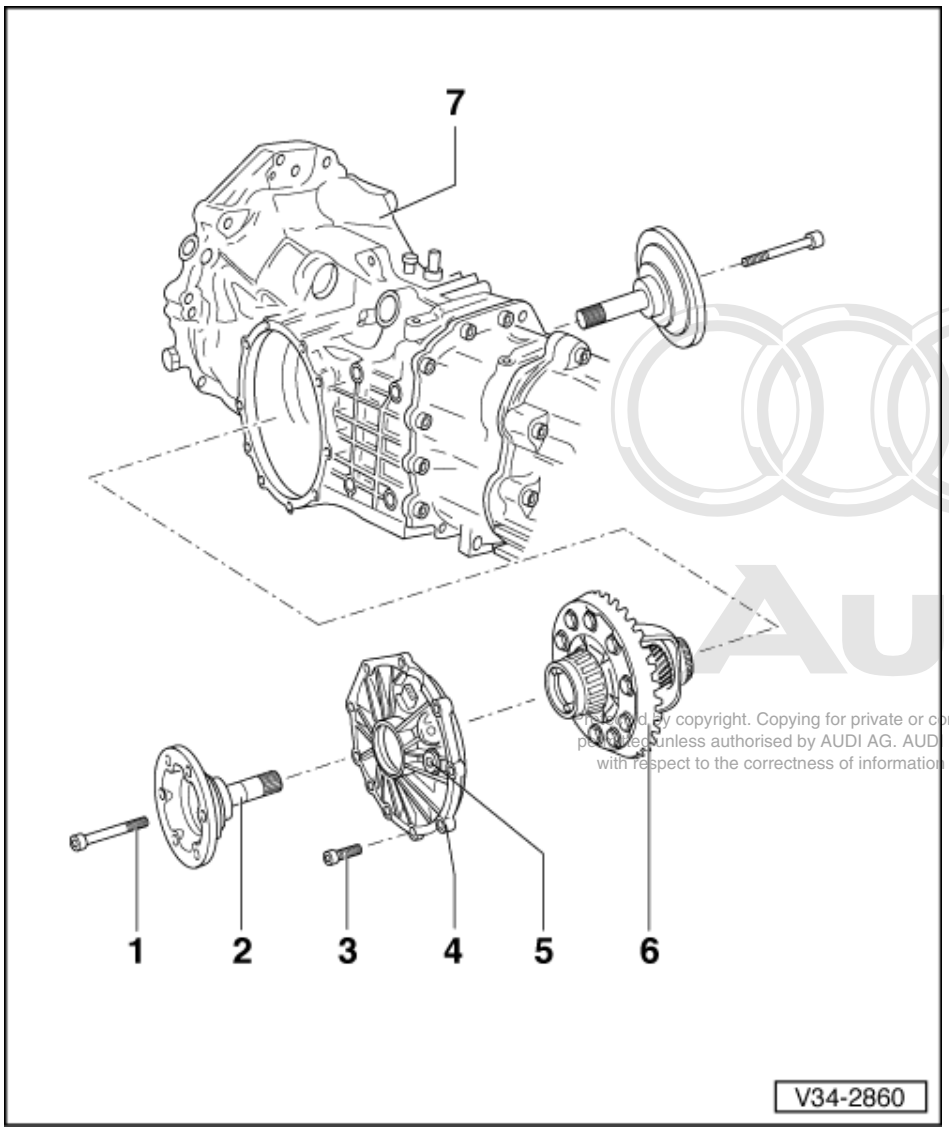
Removal and installation can also be performed with gearbox fitted.

1 **Bolt, 10 Nm + further 1/4 (90°) turn**
2 **Flange shaft**
- Hold in position with mandrel to prevent turning on unscrewing

3 **Bolt, 25 Nm**
- 10x

4 **Cover for differential**
- Removing and installing drive wheel for speedometer sender -G 22 => Page 286
- If replaced: Adjust crown wheel => Page 337

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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.

5 Oil filler plug, 40 Nm

- Checking oil level in manual gearbox => Page 156

6 Differential

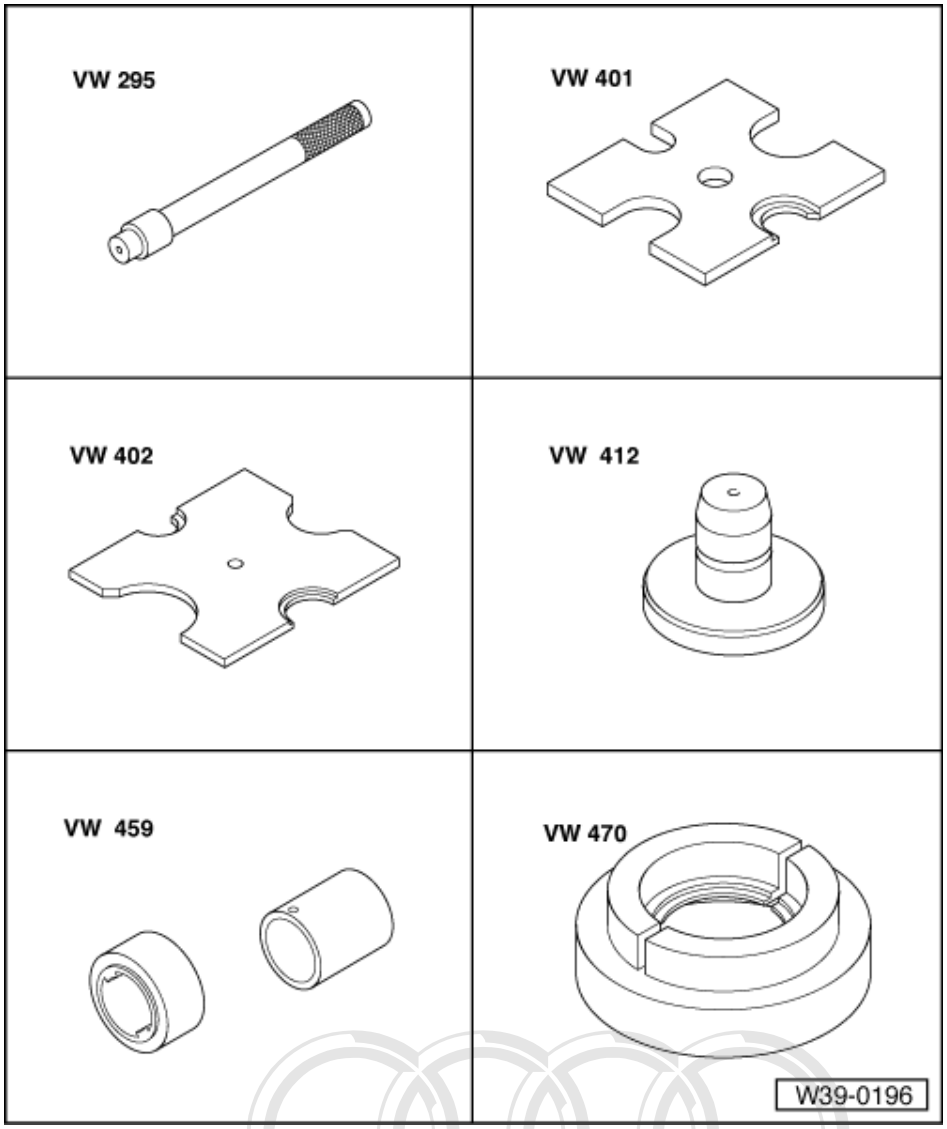
- Dismantling and assembling => Page 296
- If replaced: Adjust crown wheel => Page 337

7 Gearbox housing

- Servicing => Page 233

5 - Dismantling and assembling differential (gearbox with no oil pump)

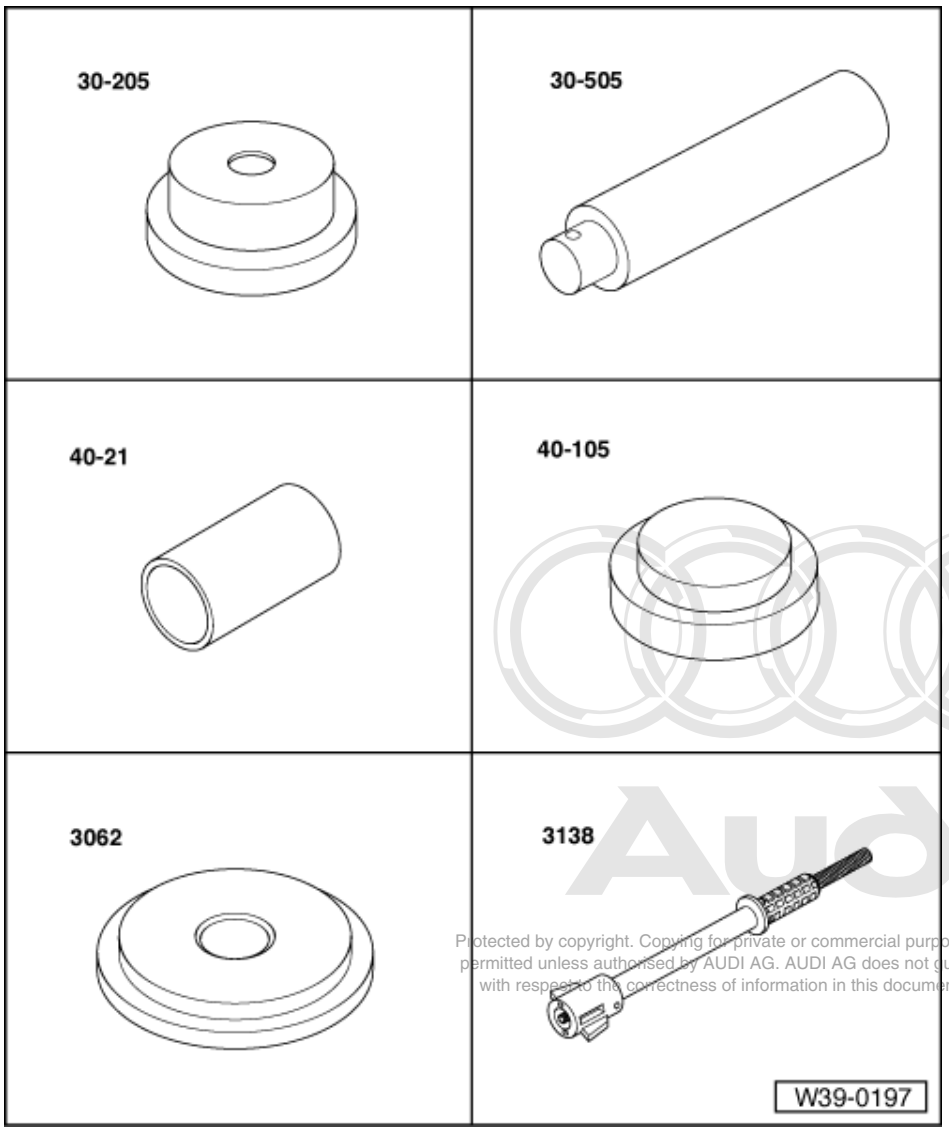
5.1 - Dismantling and assembling differential (gearbox with no oil pump)



Special tools and workshop equipment required

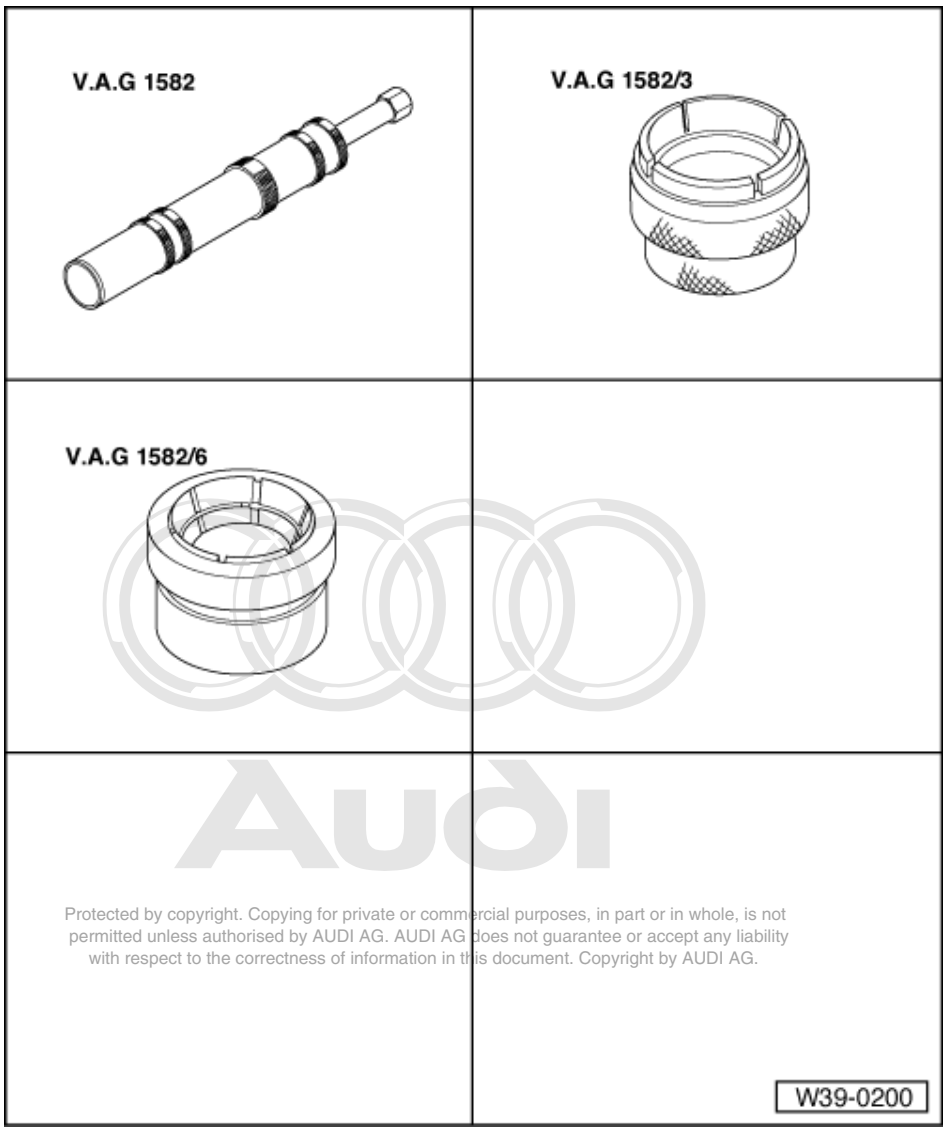
- Mandrel VW 295
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 412
- Pressing-out and pressing-in tool VW 459
- Pressing-off tool for drive pinion bearing VW 470

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



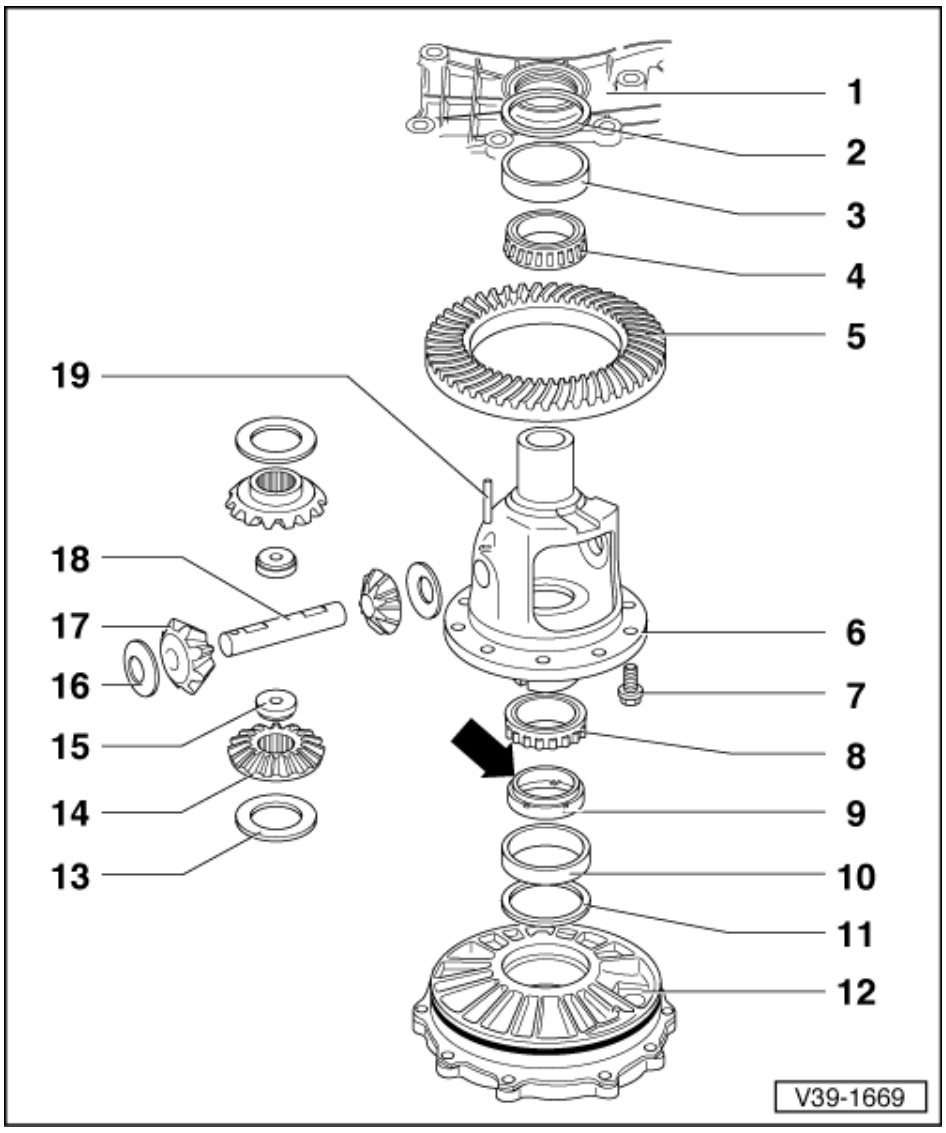
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Thrust plate 30-205
- Fitting mandrel 30-505
- Fitting sleeve 40-21
- Thrust plate 40-105
- Thrust pad 3062
- Driving-out tool 3138



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

- Taper roller bearing puller V.A.G 1582
- Gripper V.A.G 1582/3
- Gripper V.A.G 1582/6



Notes:

- Removing and installing differential
  =>Page 294
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 326 .

1 Gearbox housing 1)

2 Shim "S2"

- Note thickness
- Adjustment table => Page 326

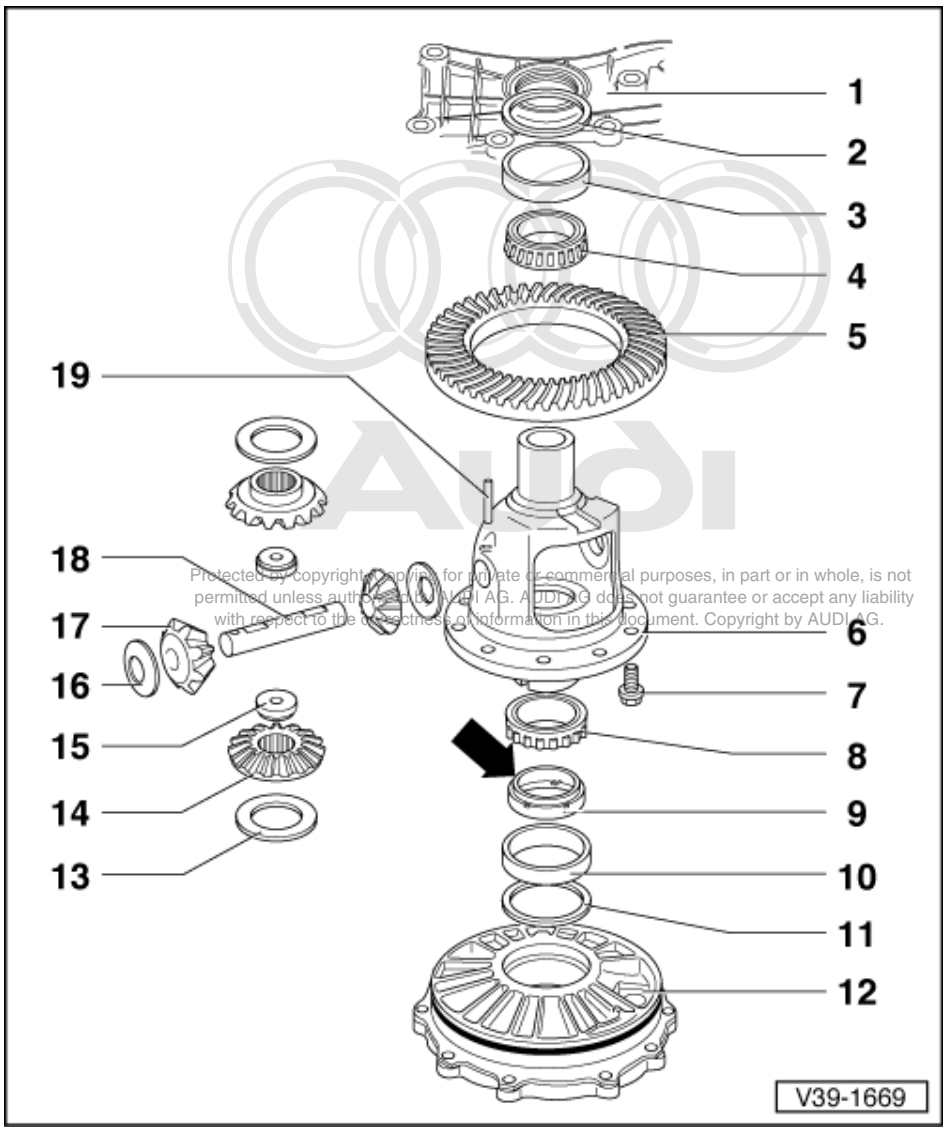
3 Outer race for taper roller bearing, small 1)

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

4 Inner race for taper roller bearing, small 1)

- Pulling off => Fig. 1
- Pressing on => Fig. 3
- Low-friction bearing; do not lubricate for friction torque measurement

Audi
Commercial use or distribution of the data is not permitted. 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.

5 Crown wheel 1)

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

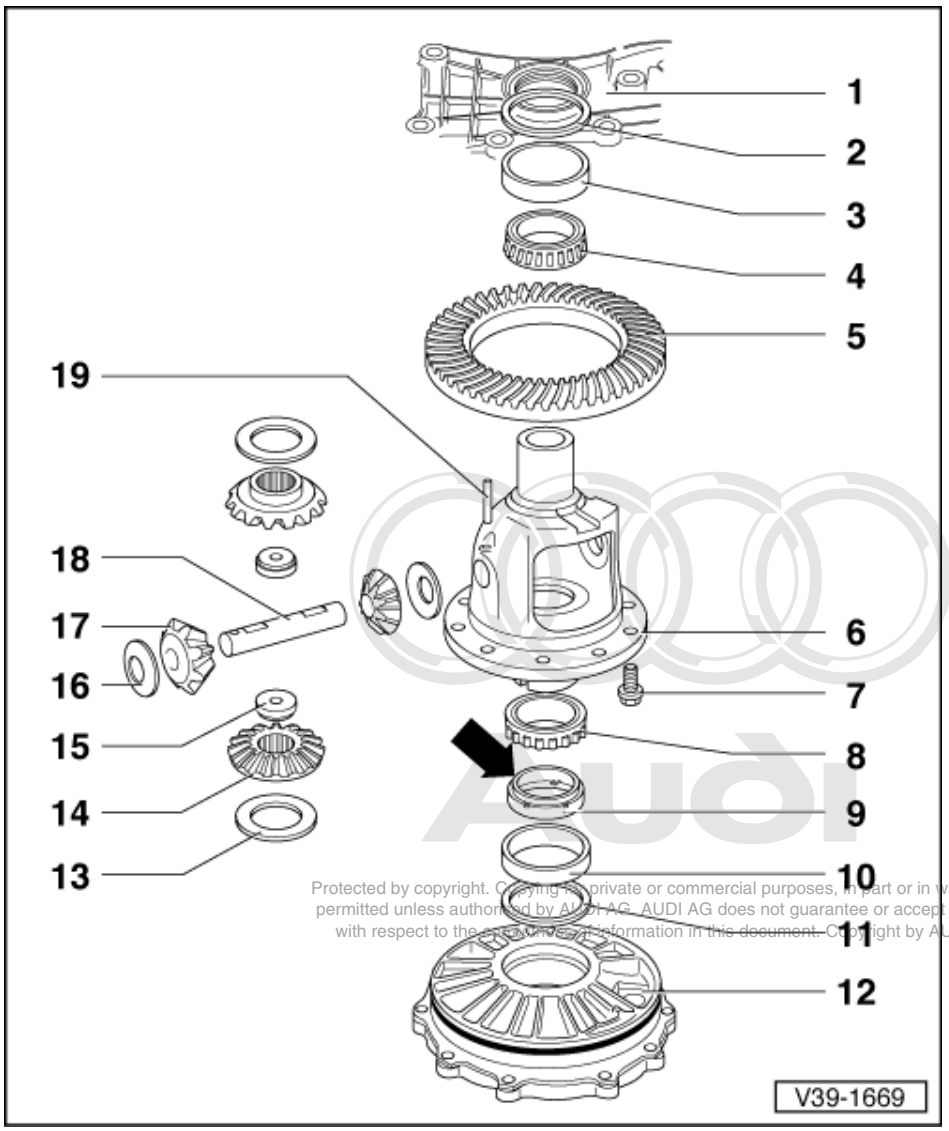
6 Differential housing 1)

7 Hexagon bolt, 60 Nm + further 45° turn

- Always replace
- Exclusive use is to be made of genuine bolts

8 Inner race for taper roller bearing, large 1)

- Pulling off => Fig. 2
- Pressing on => Fig. 4
- Low-friction bearing; do not lubricate for friction torque measurement



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Drive wheel

- For speedometer sender
- Removing and installing => Page 286
- Attach carefully to differential, taking care not to tilt; do not use force as this could break drive wheel
- Installation position: Web -arrow- facing differential

10 Outer race for taper roller bearing, large 1)

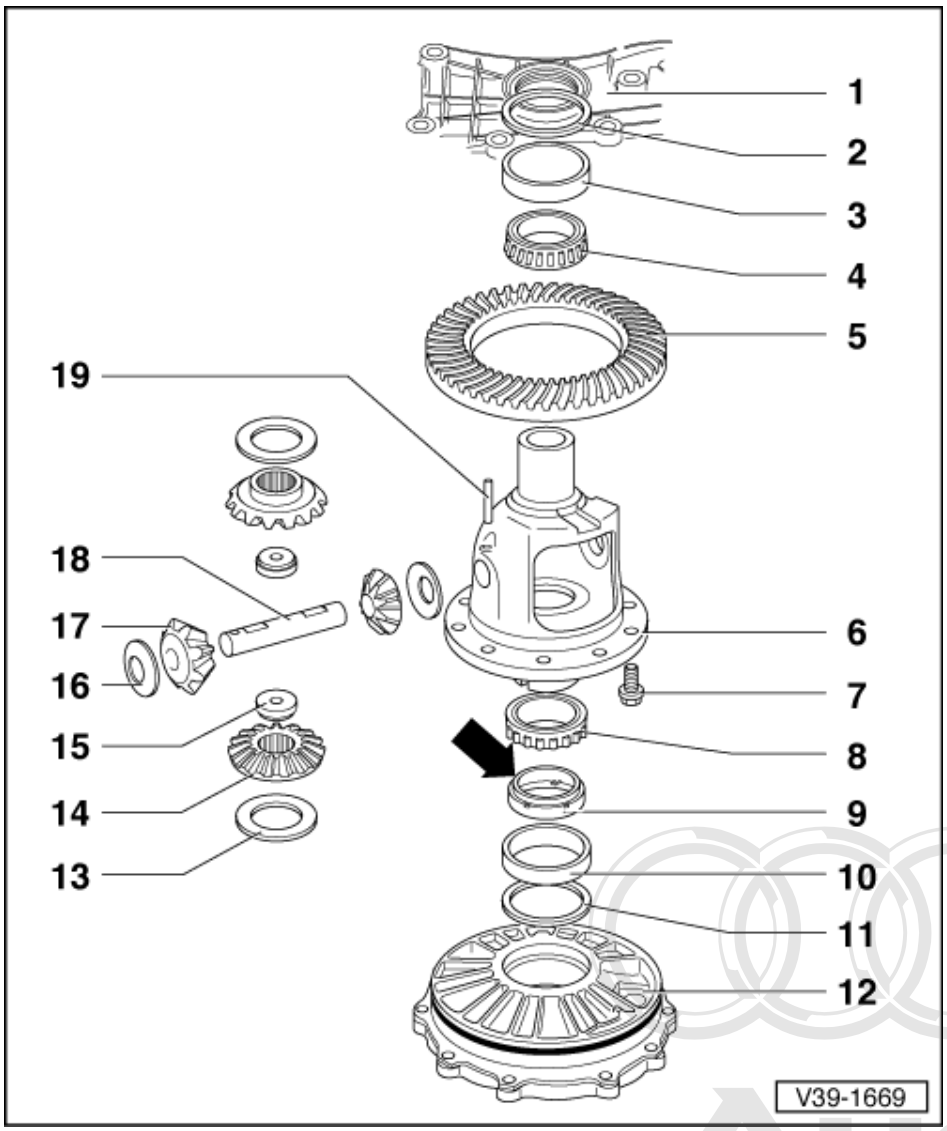
- Driving out => Fig. 11
- Driving in => Fig.12

11 Shim "S1"

- Note thickness
- Adjustment table => Page 326

12 Cover for differential1)

- With O-ring
- Replace O-ring
- Lubricate O-ring when fitting



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 pinions

- Installing => Fig. 7

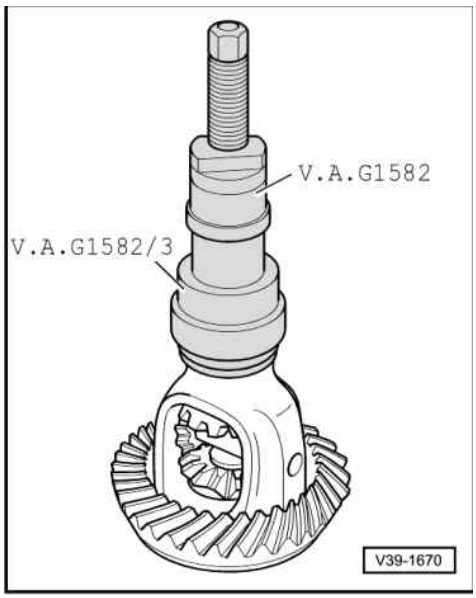
18 Shaft for bevel gears

- Drive out with mandrel after removing spring pin
- Align thrust washers before driving in

19 Spring pin

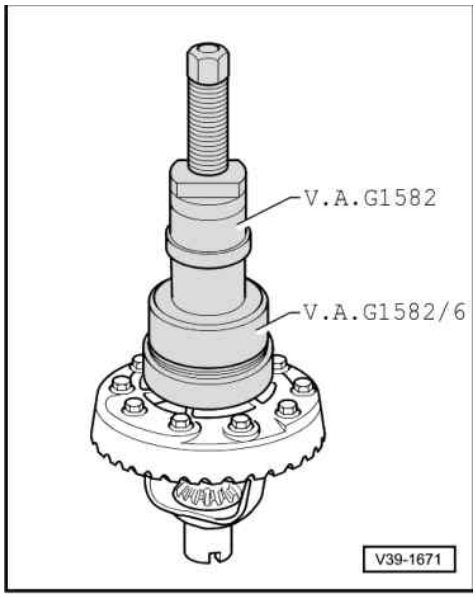
- Replace
- Drive in flush

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Pulling inner race for taper roller bearing, small off housing

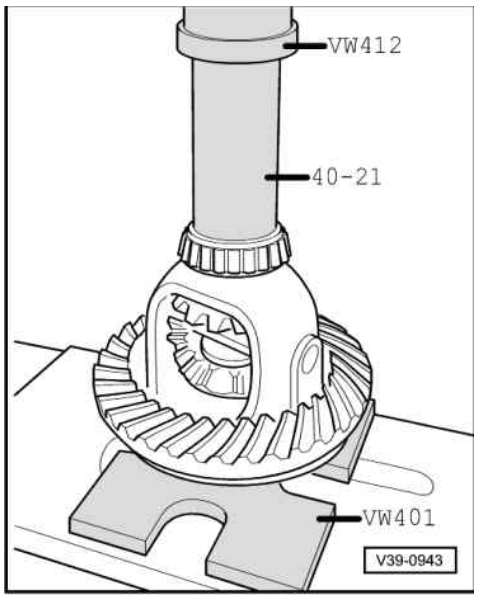
- Fit thrust plate 40-105 before positioning puller.



-> Fig.2 Pulling inner race for taper roller bearing, large off housing

- Detach drive gear for speedometer.
- Fit thrust plate 40-105 before positioning puller.

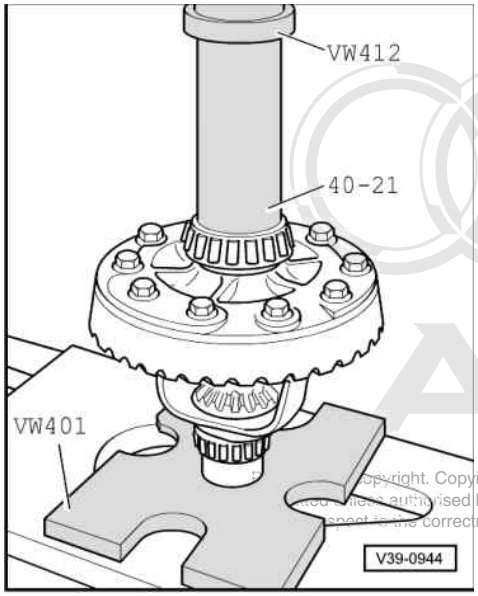
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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

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

Attention:
Wear protective gloves.

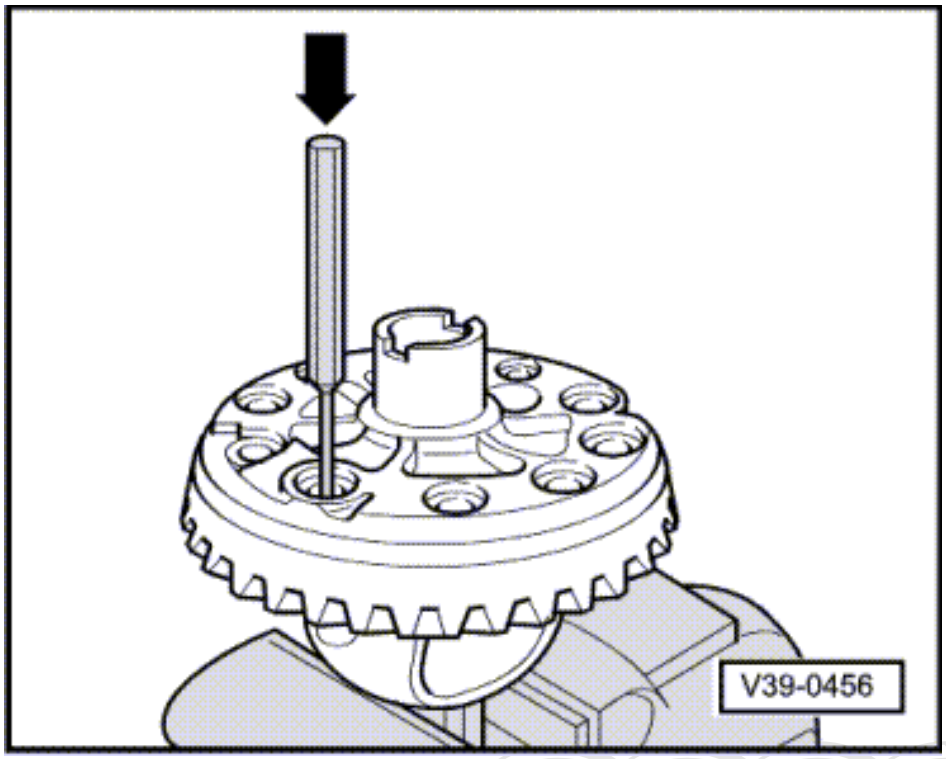


Copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

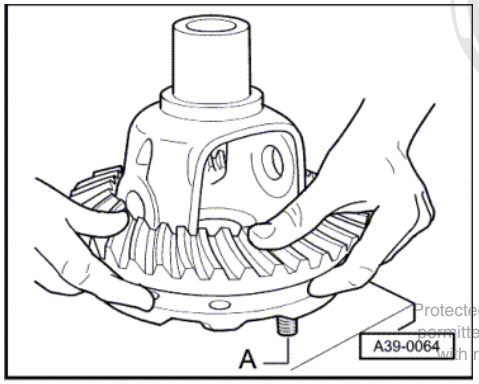
-> Fig.4 Pressing on inner race for taper roller bearing, large

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

Attention:
Wear protective gloves.



-> Fig.5 Driving crown wheel off housing



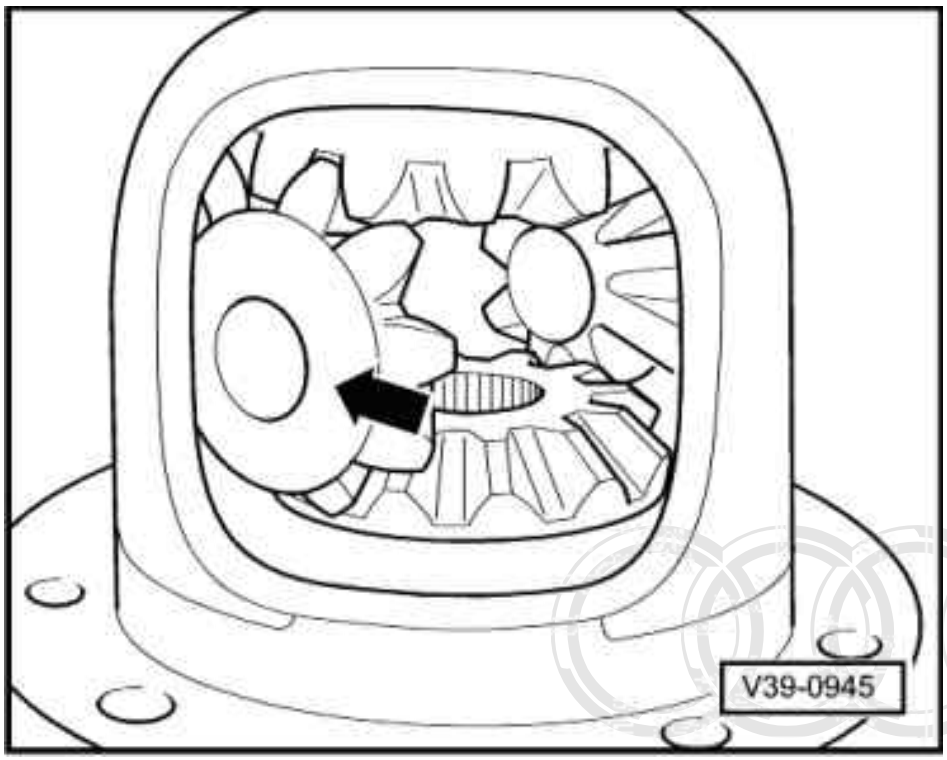
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.6 Fitting crown wheel

- Use 2 improvised centring pins -A- as a guide.
- Heat crown wheel to approx. 100 °C and fit in position.

Attention: Wear protective gloves.

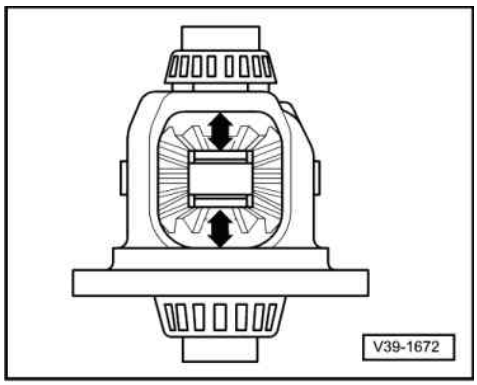
- Allow to cool slightly before screwing in bolts. Then tighten to torque.



-> Fig.7 Installing bevel gears

- Use screwdriver to carefully prise off drive wheel for speedometer sender.
- Apply small quantity of grease to thrust washers for planet pinions and insert.
- Insert sun wheels with selected shims => Fig. 8 .
- Insert planet pinions with 180° offset and swivel in -arrow-.
- Fit threaded pieces.
  - Installation position: Shoulder facing sun wheel
- Align thrust washers and bevel gears so that they coincide with hole.
- Drive bevel gear shaft into final position and secure.

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

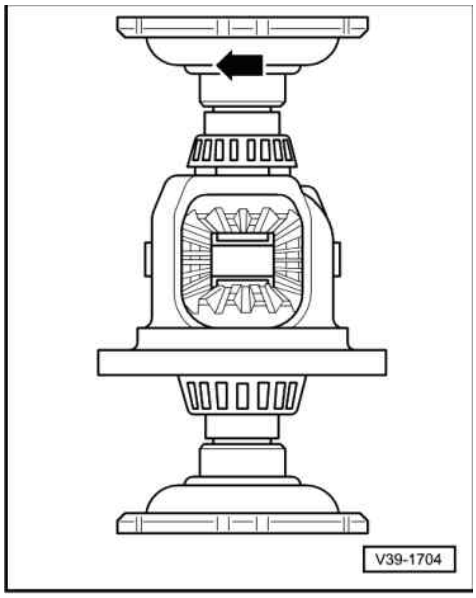


-> Fig.8 Adjusting bevel gears

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

Note:

From now on bevel gears and thrust washers are not to be interchanged.



- Press planet pinions outwards and check clearance of sun wheels by hand -arrows-.
- Adjust clearance by inserting appropriate shim => Page 307 .
  - Specification: max. 0.10 mm

Note:

-> Correct setting has also been made if there is no perceptible clearance, but bevel gears can still just be turned -arrow-.

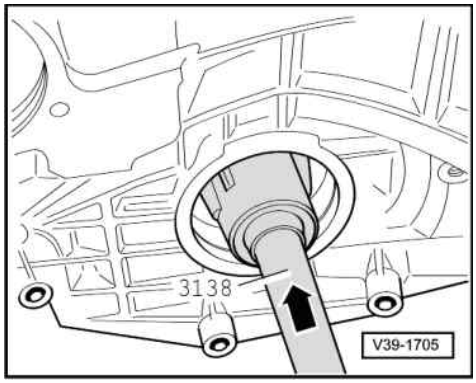
- Determine shim as per table. Part numbers

=> Parts List

Shims 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 outer race for taper roller bearing, small out of gearbox housing

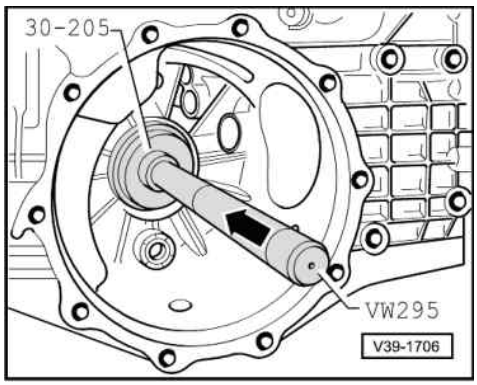
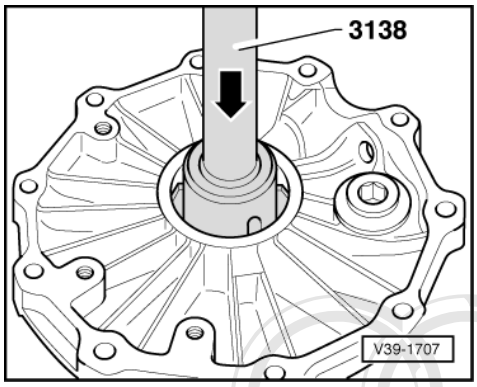
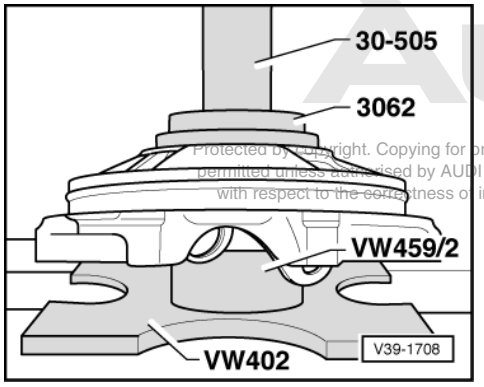


Fig.10 -> Driving outer race for taper roller bearing, small into gearbox housing



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

- Use suitable support, e.g. VW 470 with recess facing cover.

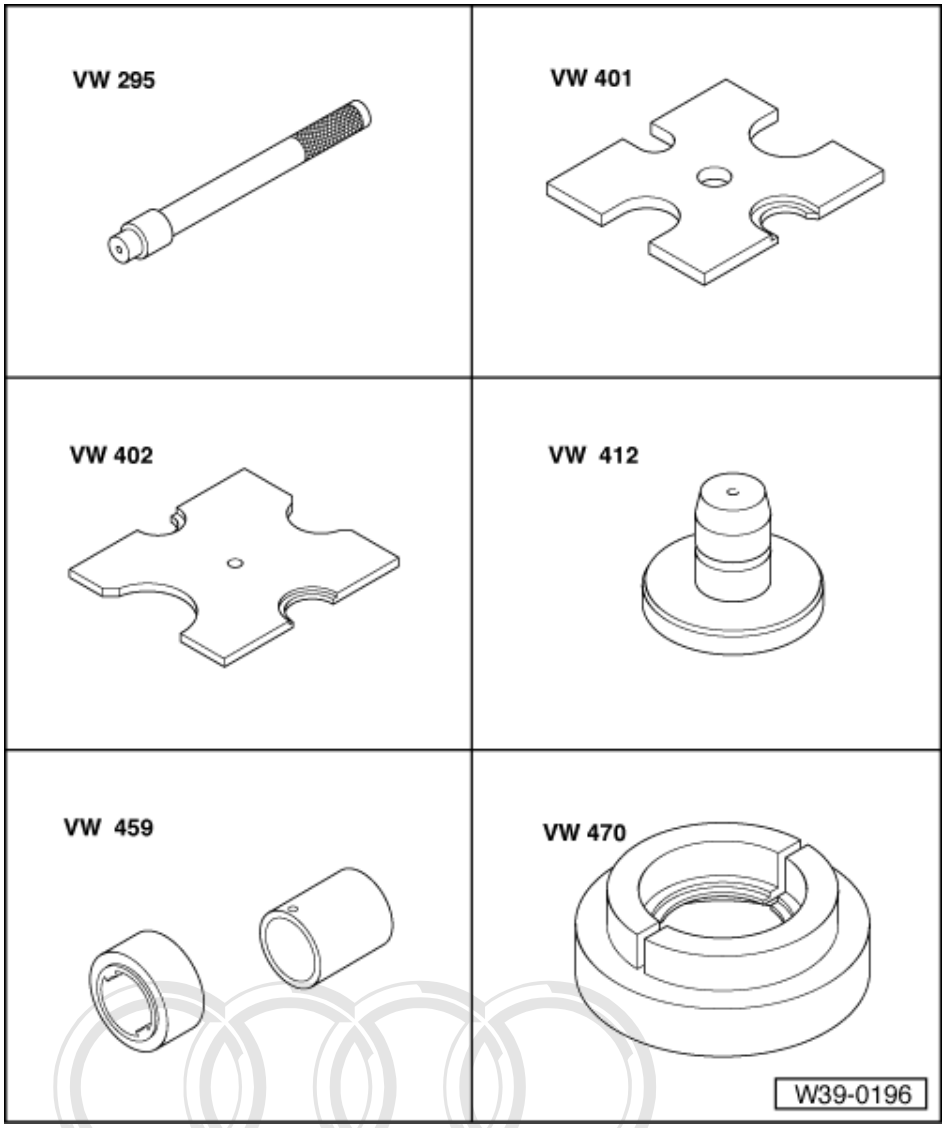


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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

6 - Dismantling and assembling differential (gearbox with oil pump)

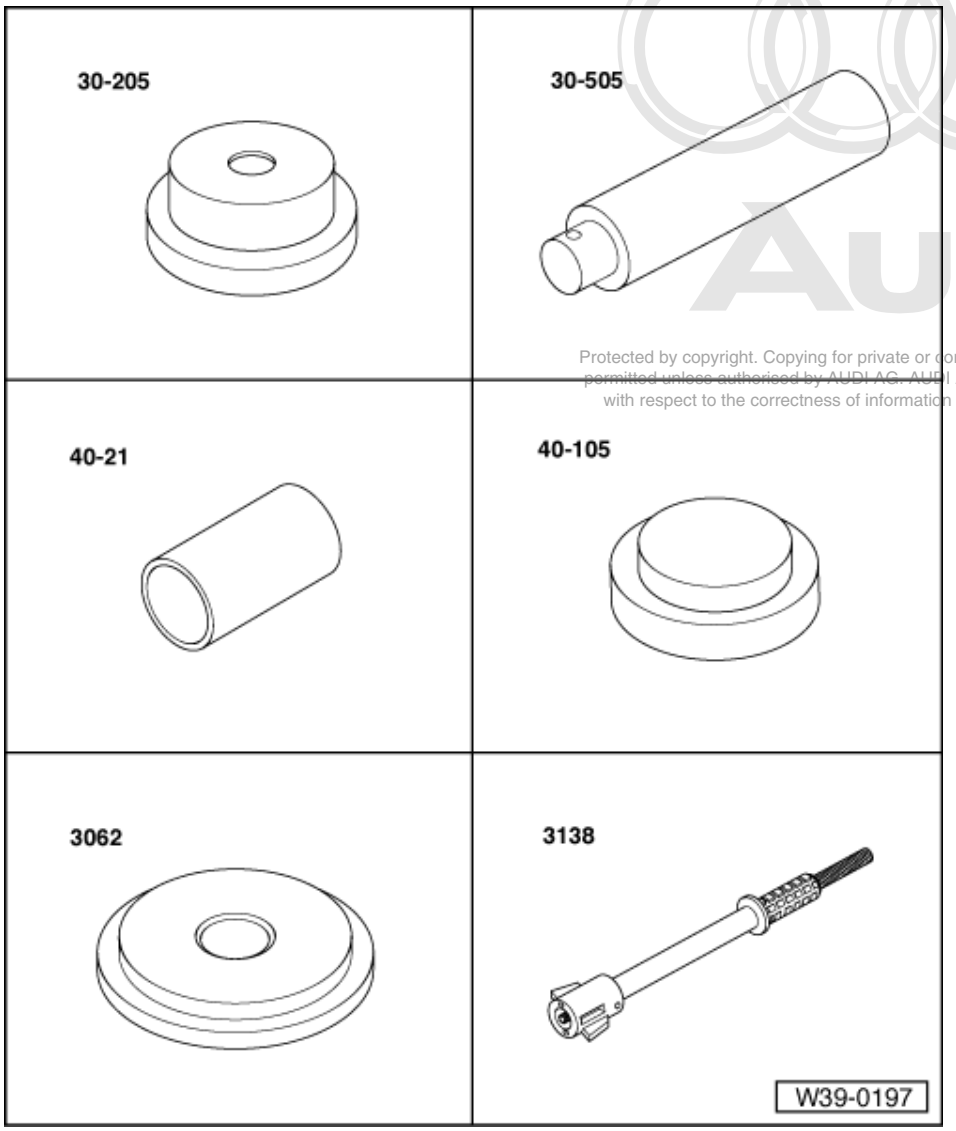
6.1 - Dismantling and assembling differential (gearbox with oil pump)



Special tools, workshop equipment, testers, measuring instruments and other items required

- VW 295 Mandrel
- VW 401 Pressure plate
- VW 402 Pressure plate
- VW 412 Press tool
- VW 459 Pressing-out and pressing-in tool
- VW 470 Pressing-off tool for drive pinion bearing

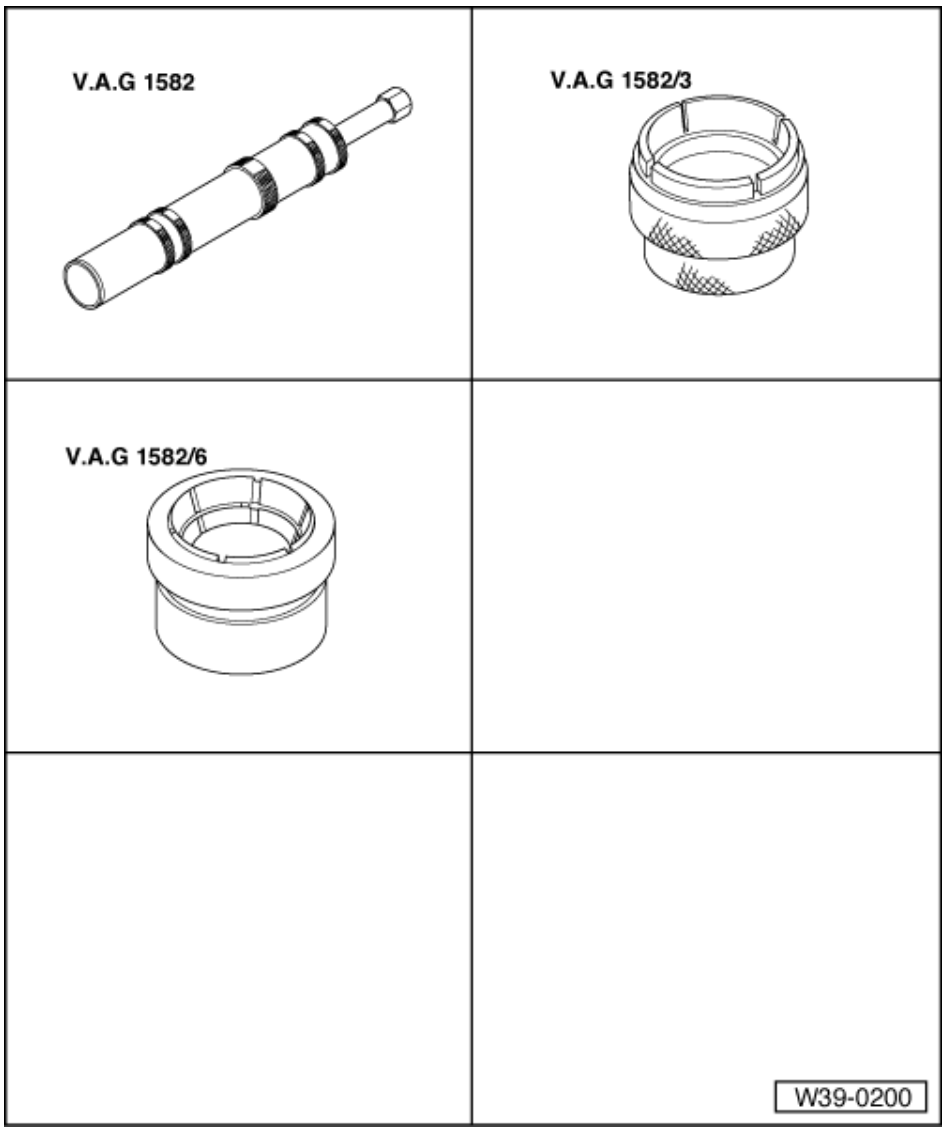
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



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

Special tools, workshop equipment, testers, measuring instruments and other items required

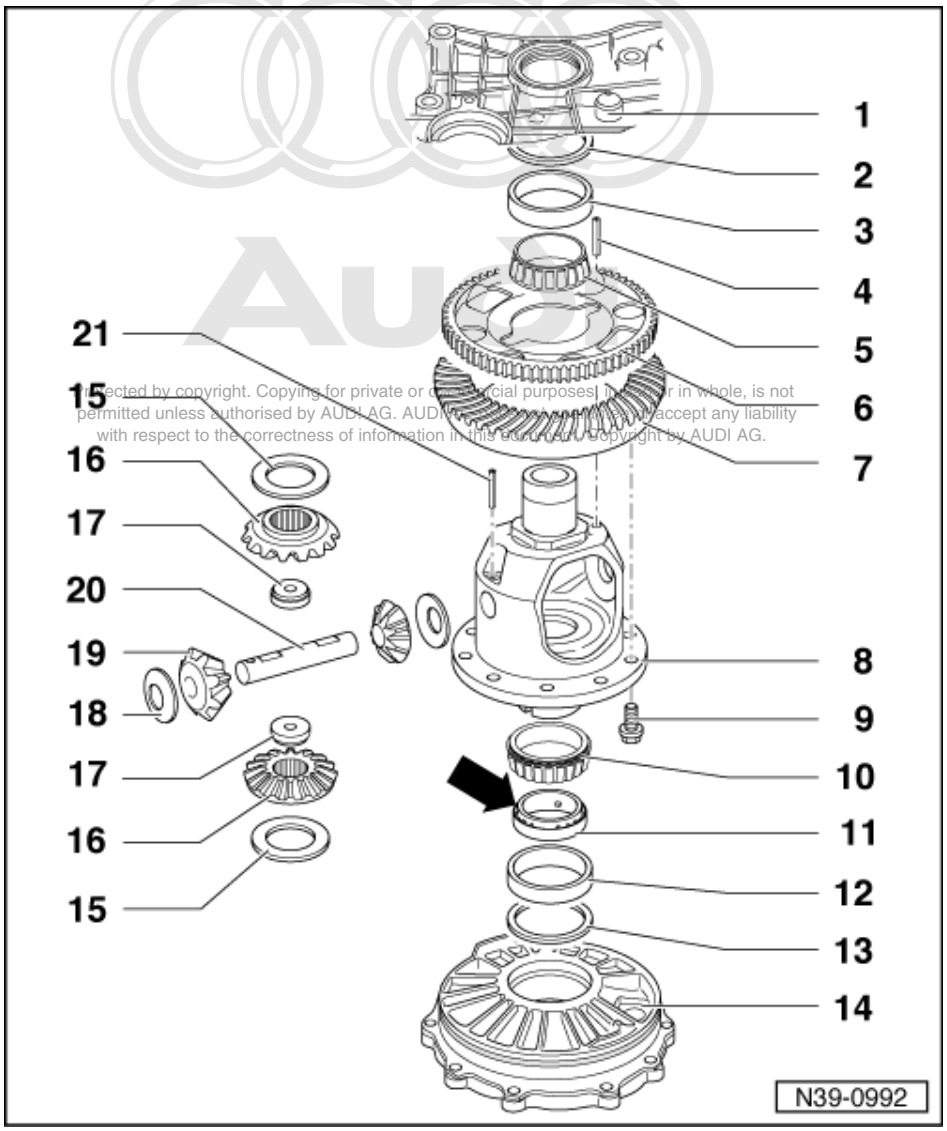
- 30-205 Thrust plate
- 30-505 Insertion mandrel
- 40-21 Fitting sleeve
- 40-105 Thrust plate
- 3062 Thrust piece
- 3138 Driving-out tool



Special tools, workshop equipment, testers, measuring instruments and other items required

- V.A.G 1582 Taper roller bearing puller
- V.A.G 1582/3 Gripper
- V.A.G 1582/6 Gripper

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



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

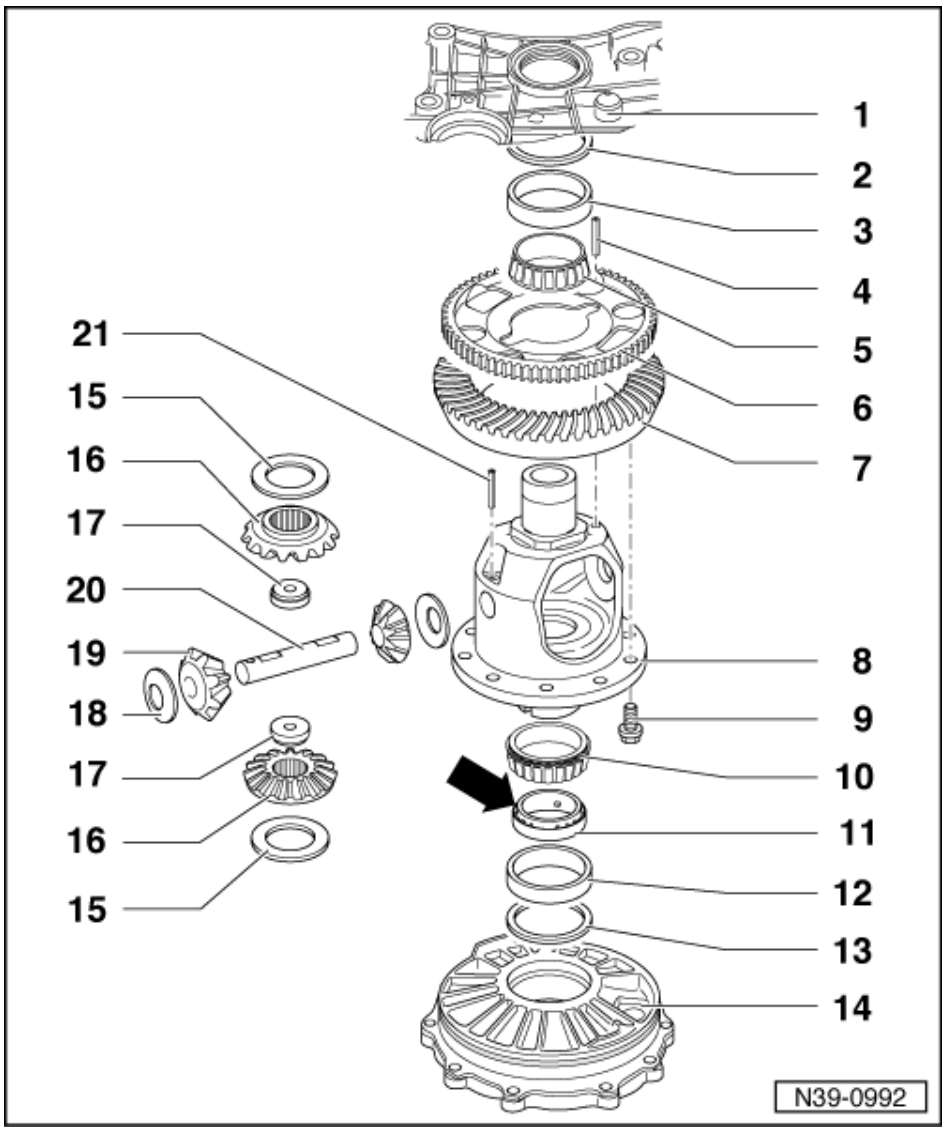
Notes:

- Removing and installing differential
  =>Page 294
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 326 .

1 **Gearbox housing1)**

2 **Shim S2**
- Note thickness
- Adjustment table => Page 326

3 **Outer race for taper roller bearing, small 1)**
- Driving out => Fig. 11
- Driving in => Fig. 12



4 Spring pin

- Secures drive gear for oil pump on differential housing
- Need not be removed to replace drive gear
- Remove bevel gears and drive out with mandrel
- Driving in => Fig. 6

5 Inner race for taper roller bearing, small1)

- Pulling off => Fig. 1
- Pressing on => Fig. 3

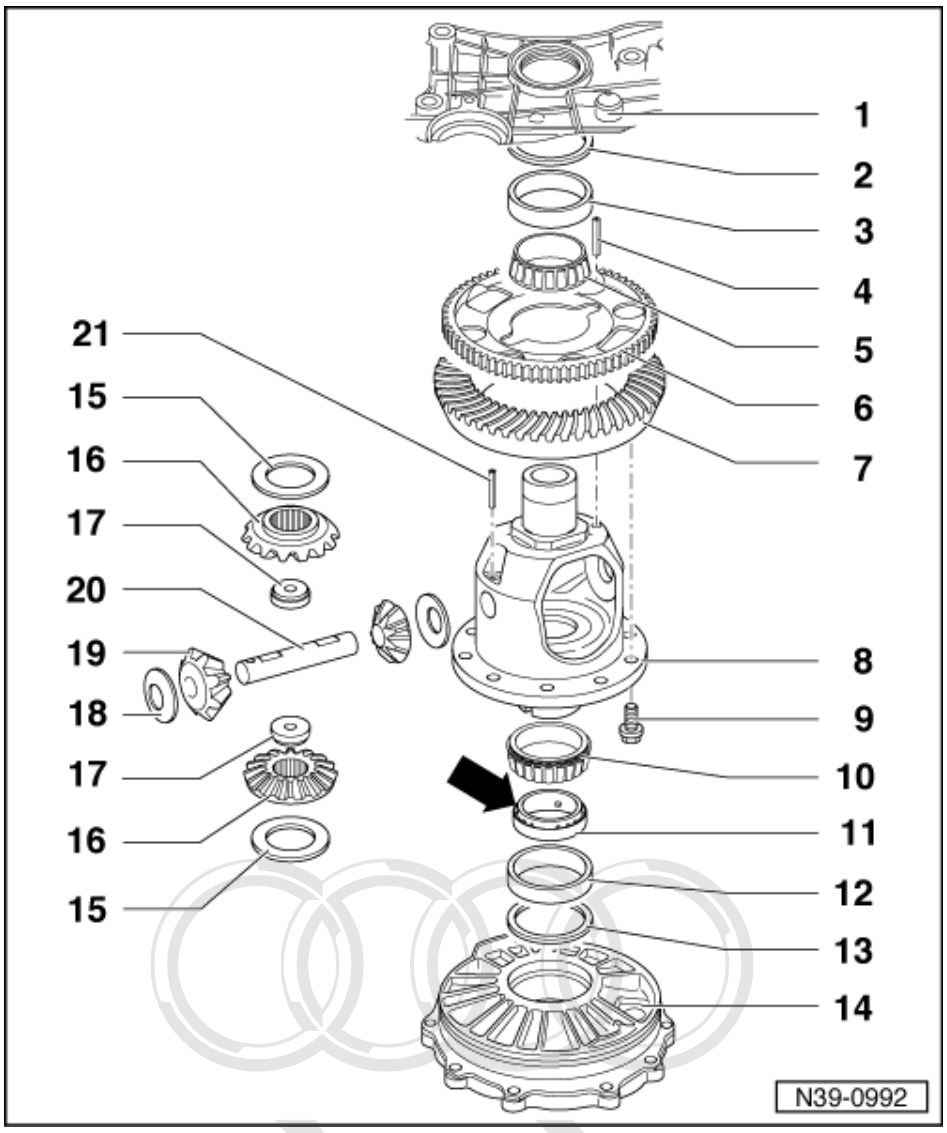
6 Large drive gear1)

- For oil pump
- Installation position => Fig. 5

7 Crown wheel1)

- Paired with drive pinion (pinion set)
- Use mandrel to drive off => Fig. 7
- Fitting on differential housing=>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.



8 Differential housing1)

9 Hexagon bolt, 60 Nm + further 45° turn

- Always replace
- Exclusive use is to be made of genuine replacement parts

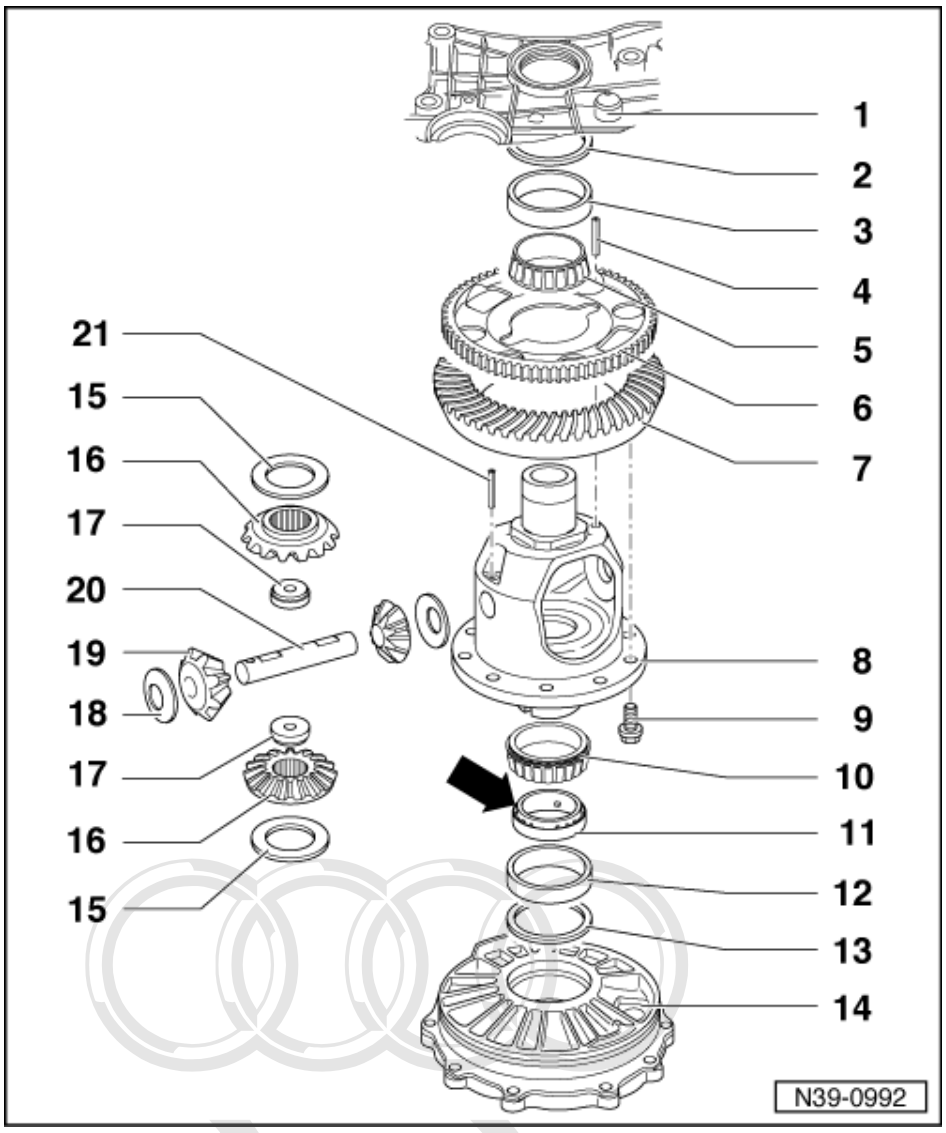
10 Inner race for taper roller bearing, large 1)

- Pulling off => Fig. 2
- Pressing on => Fig. 4

11 Drive gear for speedometer

- Removing and installing => Page 286
- Installation position: Collar -arrow- facing differential; drive pin in differential housing recess
- Do not tilt

Copyright by AUDI AG. 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.



12 Outer race for taper roller bearing, large 1)

- Driving out => Fig. 13
- Driving in => Fig.14

13 Shim S1

- Note thickness
- Adjustment table => Page 326

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Cover for differential1)

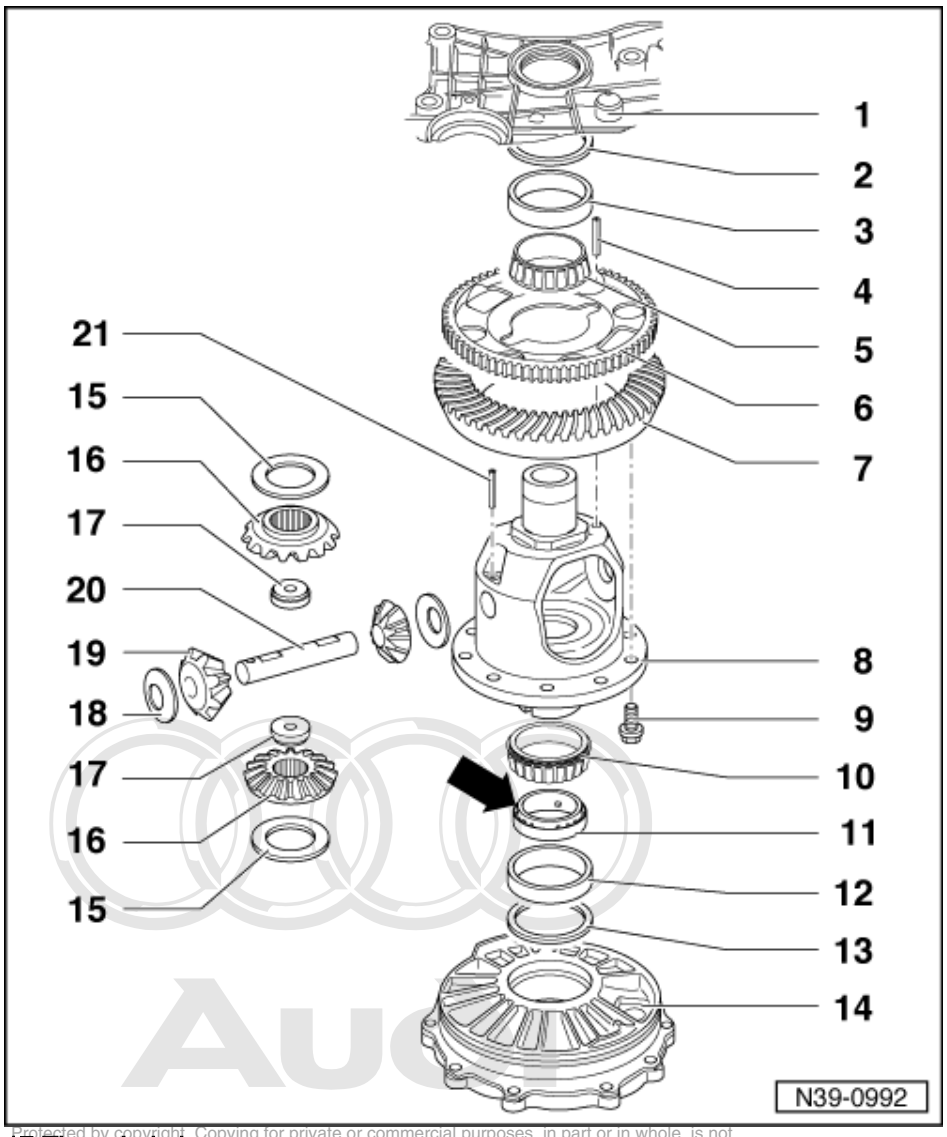
- With O-ring
- Replace O-ring
- Lubricate O-ring when fitting

15 Shim

- Re-determining thickness => Fig. 10

16 Sun wheel

- Installing => Fig. 9
- Adjusting => Fig. 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.

17 Threaded piece

18 Thrust washer

- Check for cracks and chipping

19 Planet pinion

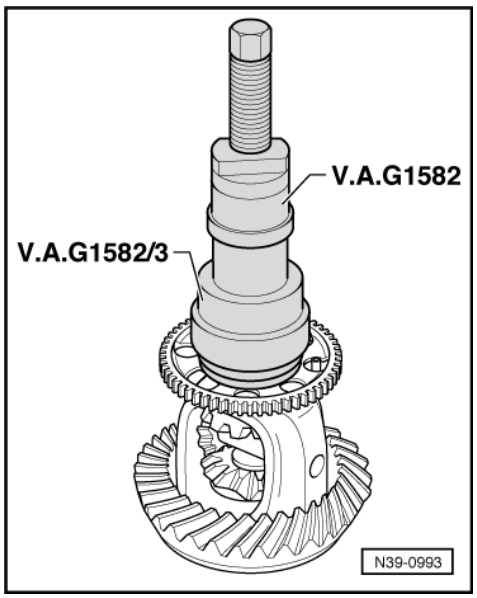
- Installing => Fig. 9
- Adjusting => Fig. 10

20 Shaft for bevel gears

- Drive out with mandrel after removing spring pin
- Align thrust washers before driving in

21 Spring pin

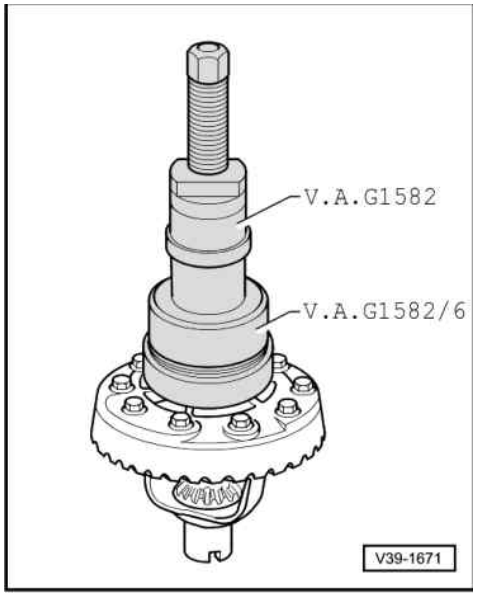
- Always replace
- Drive in flush



-> Fig.1 Pulling off small taper roller bearing inner race

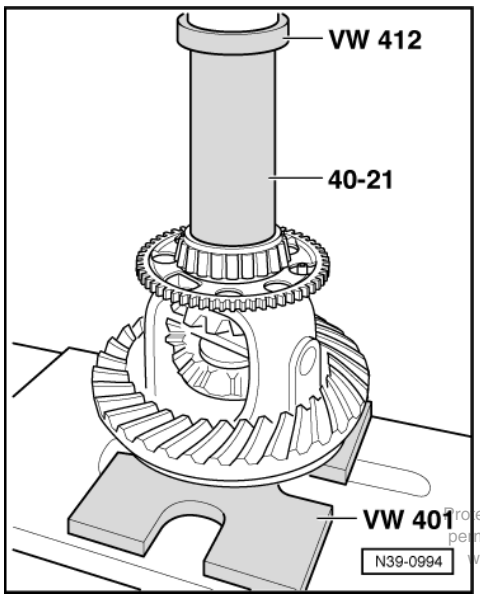
- Position thrust plate 40-105 on differential housing before setting up puller.

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 off large taper roller bearing inner race

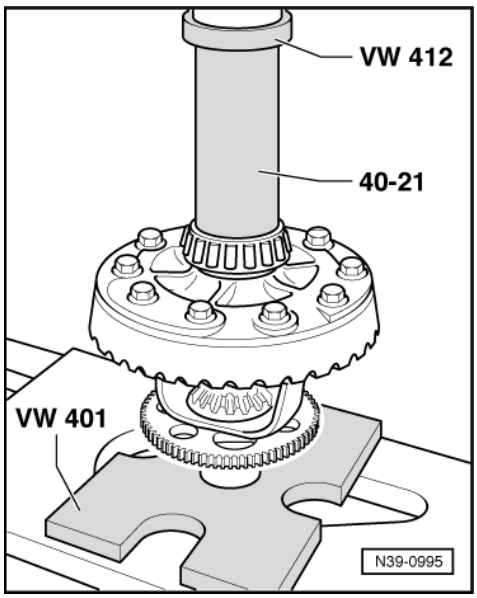
- Detach drive gear for speedometer.
- Position thrust plate 40-105 on differential housing before setting up puller.



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.

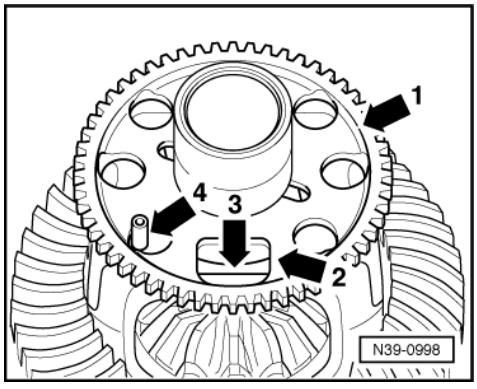
-> Fig.3 Pressing on small taper roller bearing inner race

- Press home inner race/taper roller bearing on differential housing.



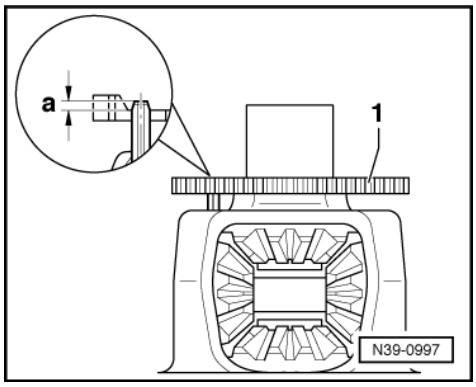
-> Fig.4 Pressing on large taper roller bearing inner race

- Press home inner race/taper roller bearing on differential housing.
- Fit drive gear for speedometer.



-> Fig.5 Installation position of large drive gear for oil pump

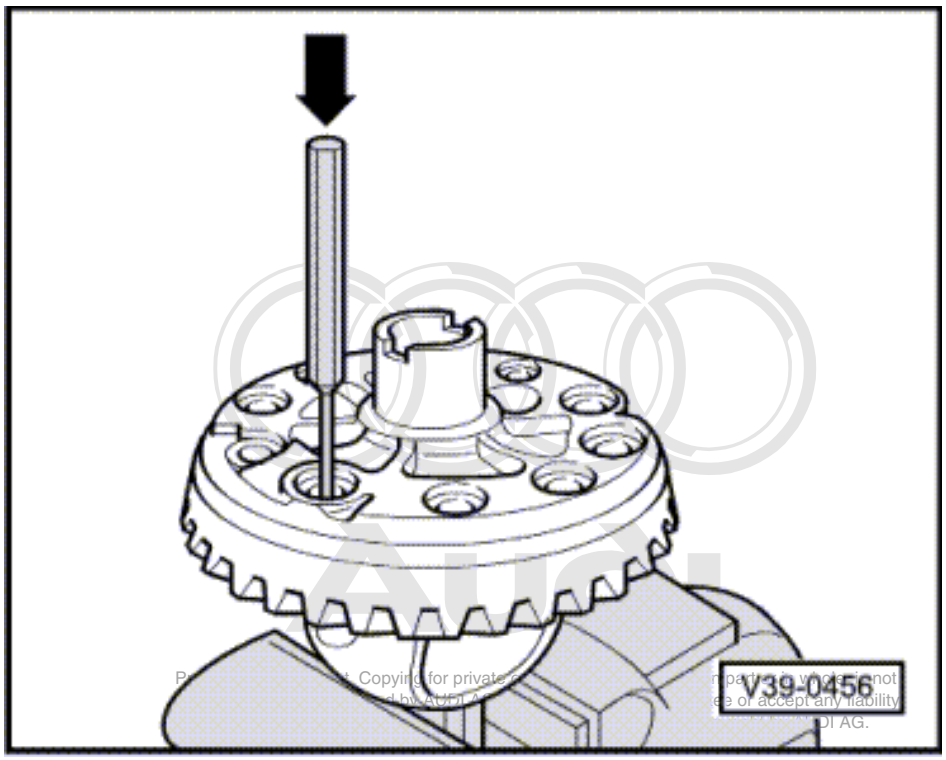
- Shoulder -arrow 1- faces away from differential housing.
- Recess -arrow 2- points towards opening in housing -arrow 3-.
- Spring pin -arrow 4- acts as driver for fitting large drive gear =>Fig. 6 .



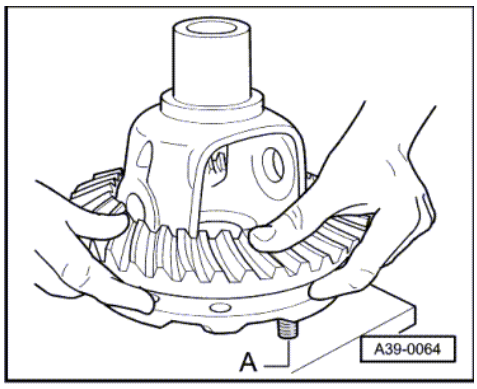
-> Fig.6 Driving in spring pin for large drive gear -1-

- Carefully drive in spring pin as far as dimension -a-, taking care not to damage large drive gear -1-.

  Dimension -a- = 1 mm



-> Fig.7 Driving crown wheel off housing

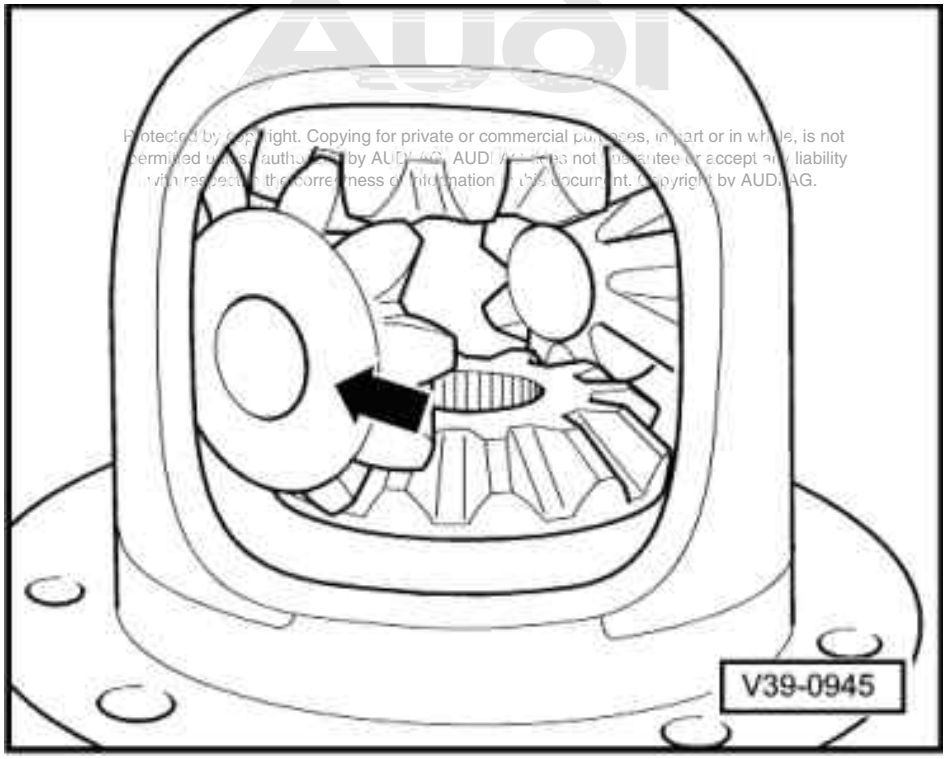


-> Fig.8 Heating crown wheel to approx. 100 °C and fitting

- When fitting, guide crown wheel with improvised centring pins -A-.

Attention:
Wear protective gloves.

- Allow to cool slightly before screwing in bolts. Then tighten to torque.

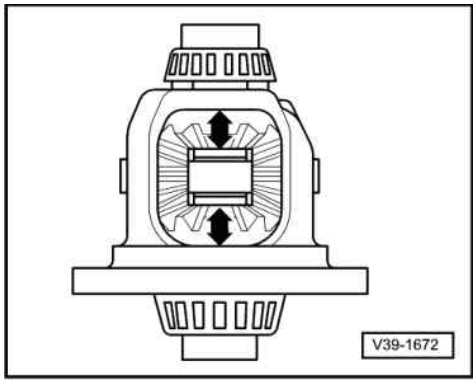


-> Fig.9 Installing bevel gears

- Apply small quantity of grease to thrust washers for planet pinions and insert.
- Insert sun wheels with selected shims => Fig. 10 .
- Insert planet pinions with 180° offset and swivel in (arrow).
- Fit threaded pieces.

Installation position: Shoulder facing sun wheel

- Align thrust washers so that they coincide with hole.
- Drive bevel gear shaft into final position and secure.



-> Fig.10 Adjusting bevel gears

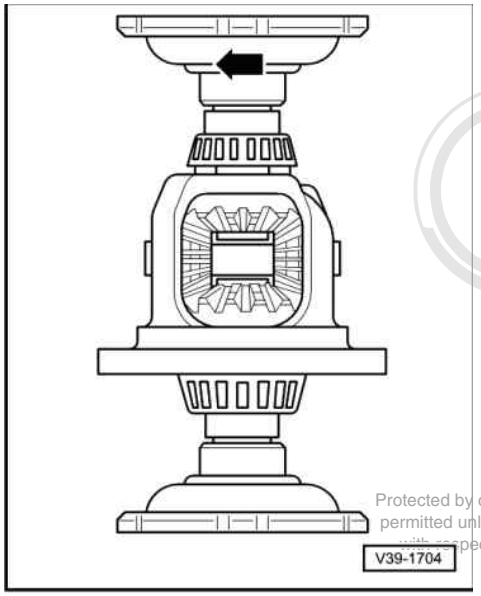
- Insert sun wheels with thinnest shims (0.5 mm).
- Insert planet pinions with thrust washers and press in shaft.

Note:

From now on sun wheels and thrust washers are not to be interchanged.

- Press planet pinions outwards and check clearance of sun wheels by hand -arrows-.
- Adjust clearance by inserting appropriate shim => Page 322 .

  Specification: max. 0.10 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.

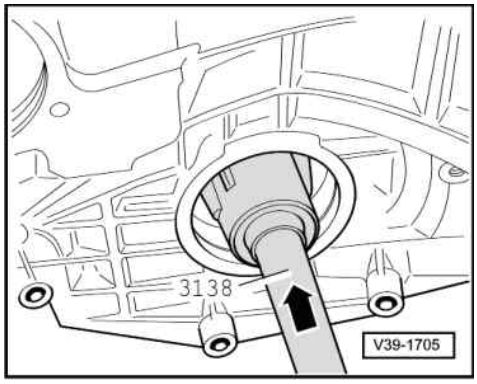
Note:

-> Correct setting has also been made if there is no perceptible clearance, but bevel gears can still just be turned -arrow-.

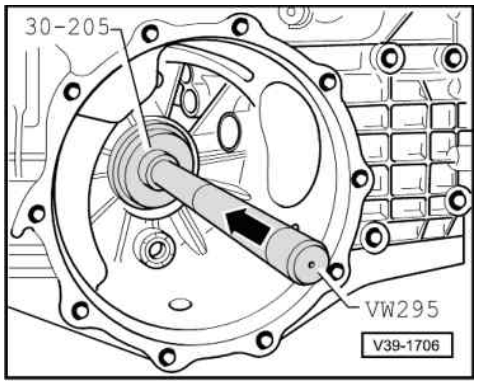
Assign shims by way of Parts List.

Shims available

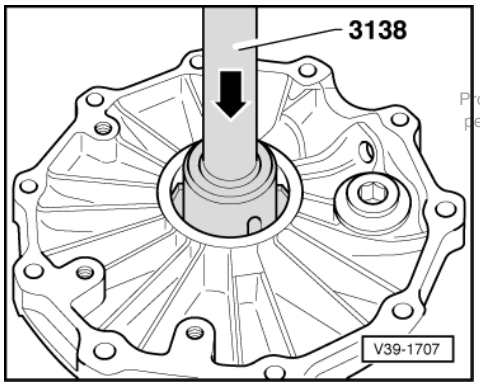
Shim thickness (mm)		
0.50	0.70	0.90
0.60	0.80	1.00



-> Fig.11 Driving small taper roller bearing outer race out of gearbox housing



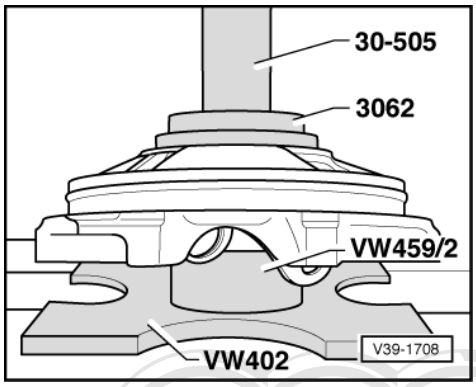
-> Fig.12 Driving small taper roller bearing outer race into gearbox housing



-> Fig.13 Driving large taper roller bearing outer race out of cover

- Use suitable support, e.g. VW 470 with recess facing 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.



-> Fig.14 Driving large taper roller bearing outer race into cover

7 - Adjusting drive pinion and crown wheel

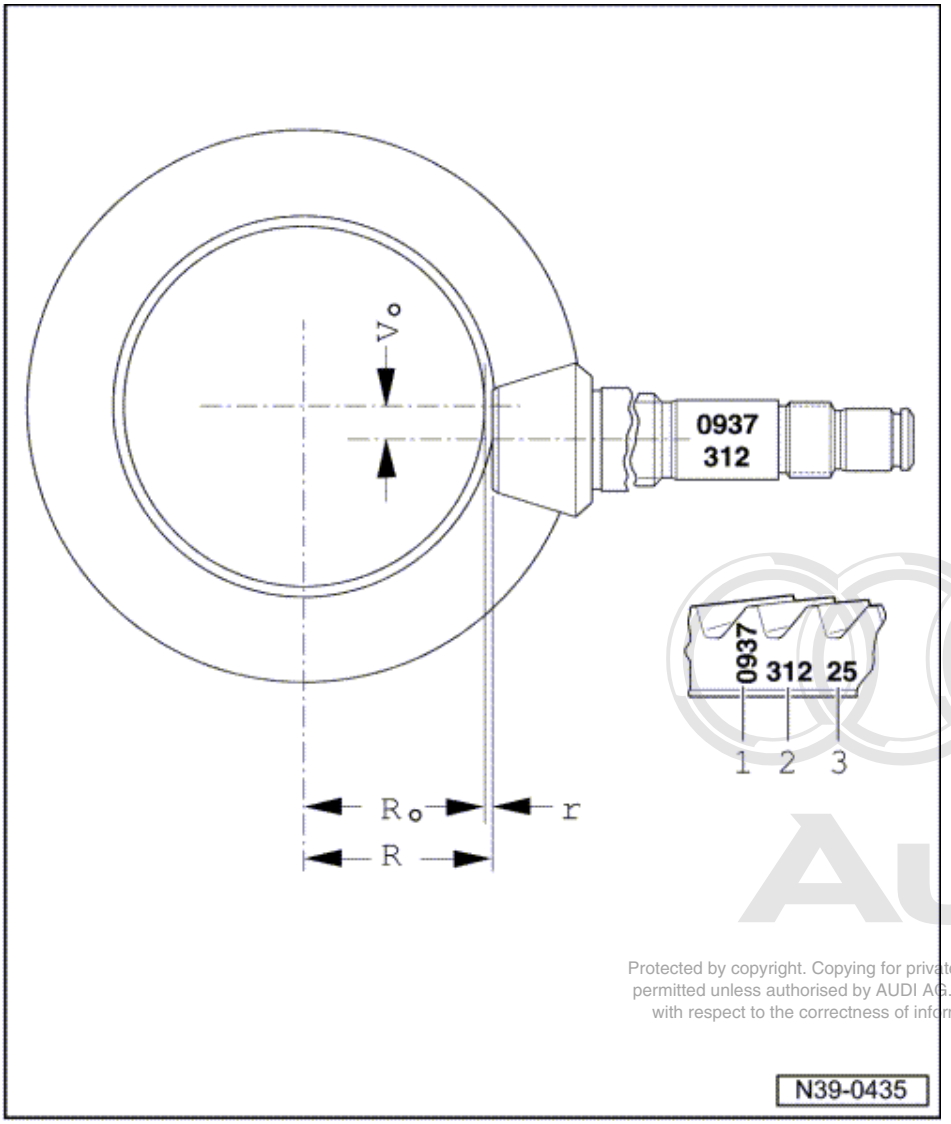
7.1 - Adjusting drive pinion and crown wheel

General notes:

- Careful setting of drive pinion and crown wheel is essential to long service life and smooth running of final drive. Drive pinion and crown wheel are checked at the production stage for proper contact pattern and low noise in both directions of rotation. The position providing the smoothest running is established by axially shifting the drive pinion, with the crown wheel being constantly kept out of no-play meshing to the extent required to ensure that the backlash is within the specified tolerance.
- The aim of the adjustment process is to re-attain the position providing the smoothest running as determined on the test machine in the production phase.
- The deviation "r" referenced to the master gauge "Ro" is measured for the replacement pinion sets and marked on the outer periphery of the crown wheel. Pinion sets (= drive pinion and crown wheel) are only to be replaced as a complete assembly.
- Pay attention to the general repair instructions for taper roller bearings and shims.
- Friction torque measurement is intended only as a final check of the adjustment.

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

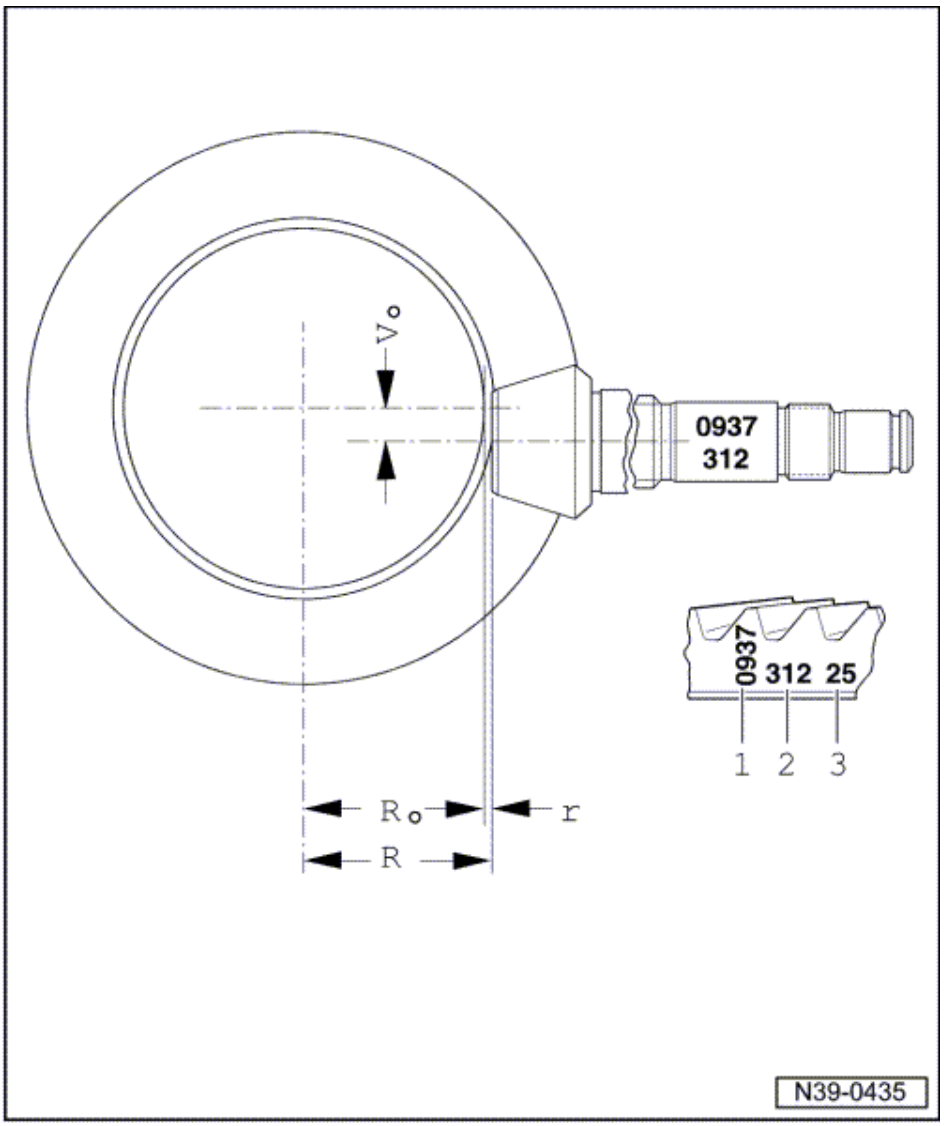
7.2 - Adjustment and labelling of pinion sets



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Marking "K831" indicates Klingelnberg pinion set with a ratio of 31 : 8.
2 Pairing number (312) of pinion set
3 Deviation "r" referenced to master gauge of test machine used in production; "r" is always given in 1/100 mm; Example: "25" signifies r = 0.25 mm

Ro - Length of master gauge of test machine used
"Ro" = 59.65 mm

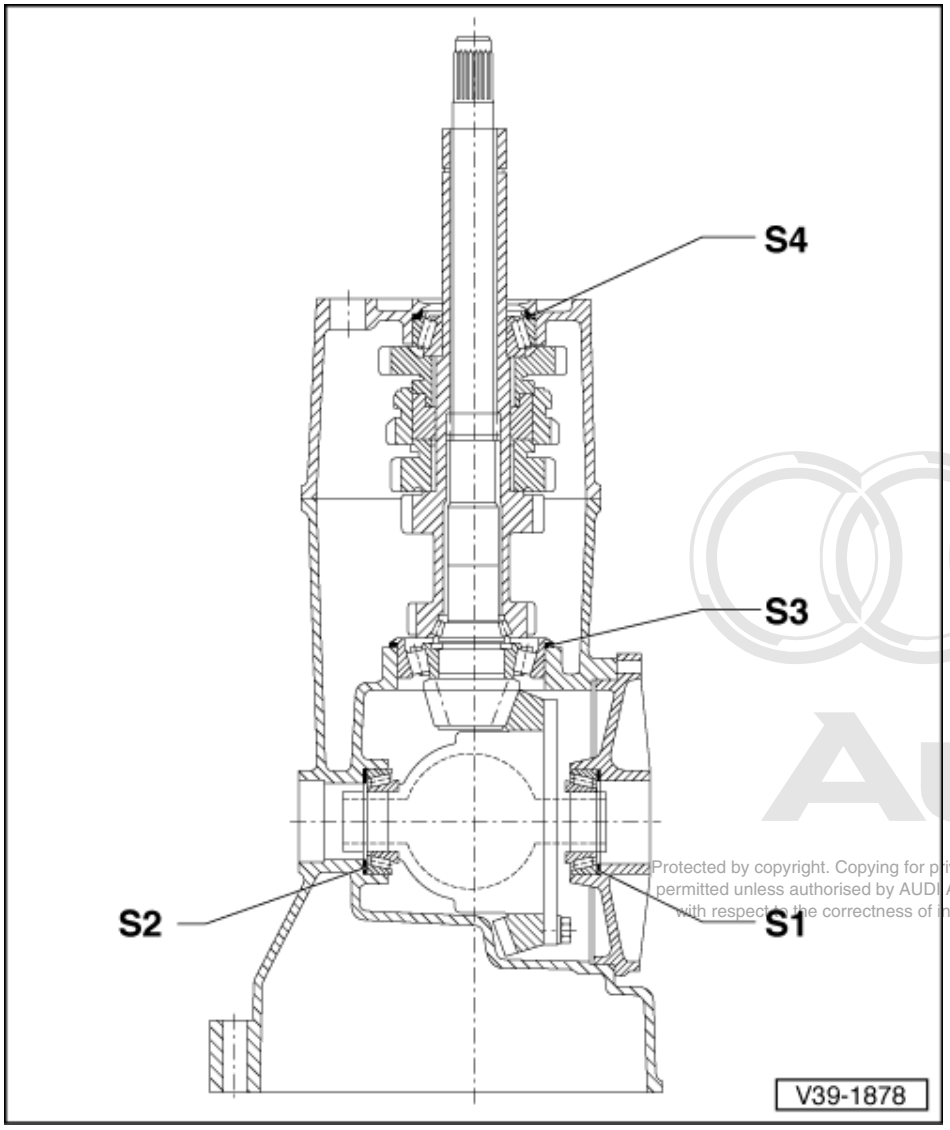


R - Actual dimension between crown wheel shaft and end face of drive pinion at smoothest running point for this pinion set
R = Ro + r

Vo - Hypoid offset

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

7.3 - 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 table for replacement of individual gearbox components =>Page 326

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

7.4 - Adjustment table

Note:

When performing gearbox assembly work, re-adjustment of drive pinion, crown wheel or pinion set is only necessary if components directly affecting setting of final drive are replaced. Refer to the following table so as to avoid unnecessary adjustment.

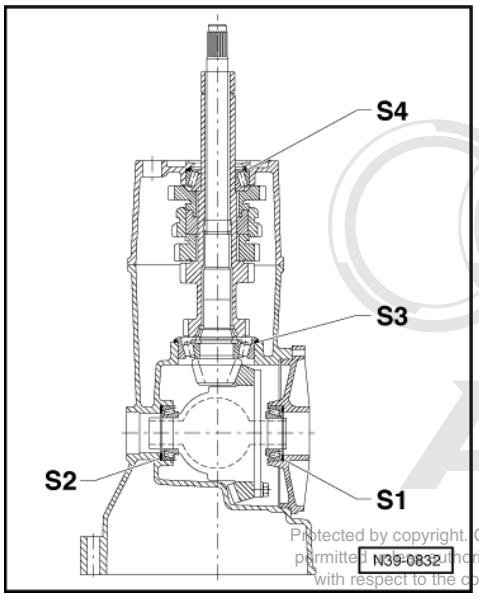
Component replaced: ▼	To be adjusted:			
	Crown wheel "S1"+"S2" 1) => Page 337	Drive pinion "S3"+"S4" 1) via deviation "r" => Page 328	Drive pinion "S4" 1) => Page 228	Backlash check => Page 342
Gearbox housing	X	X		X
Bearing plate			X	X
Differential housing	X			X
Taper roller bearing for drive pinion		X		X
Differential taper roller bearing	X			X
Pinion set 2)	X	X		X
Hollow shaft			X	X
Cover for differential	X			X

1) Shims; Installation position => Page 326

2) Drive pinion and crown wheel; always to be jointly replaced

7.5 - Pinion set readjustment sequence

If drive pinion and crown wheel have to be adjusted, it is appropriate to adhere to the following sequence in the interests of rational working:



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

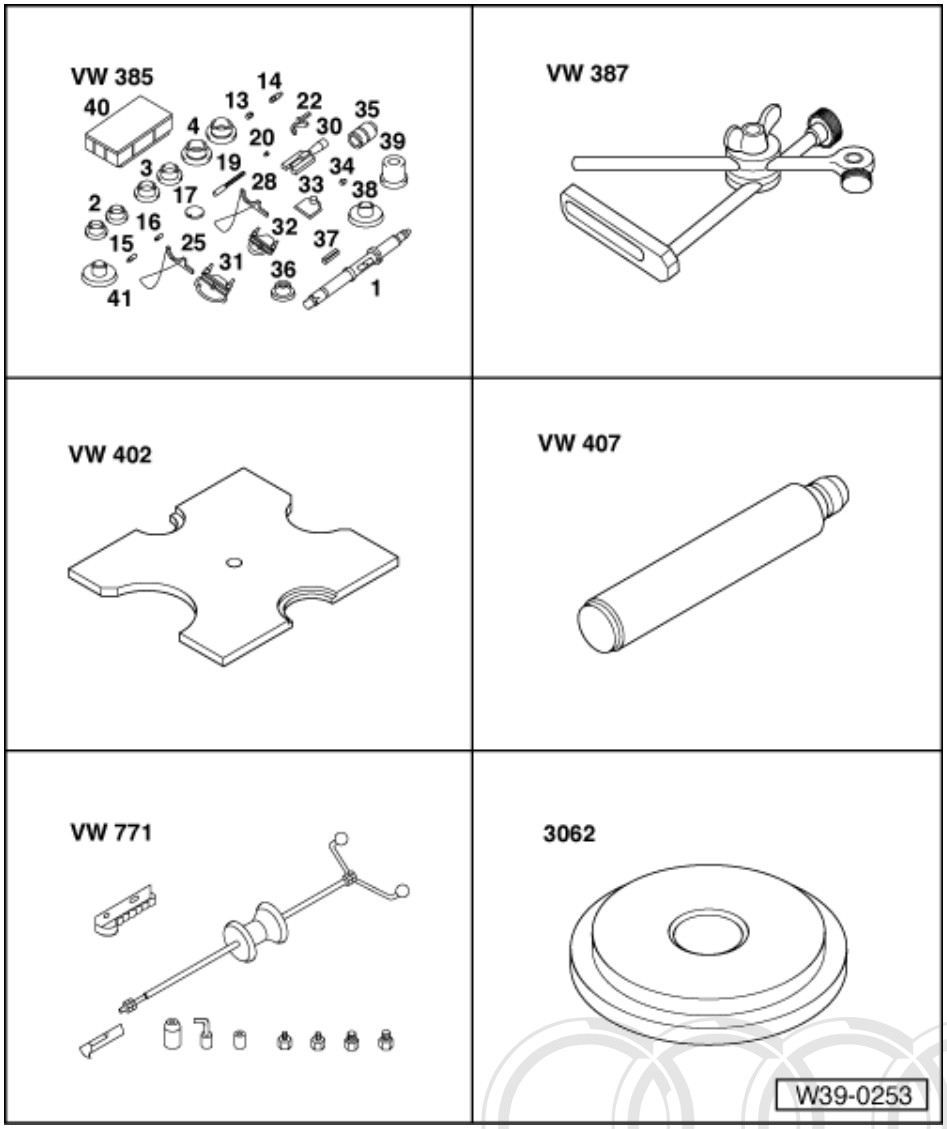
- -> Determine total shim thickness "Stot" (S1 plus S2) for specified pre-load of differential taper roller bearings.
- Determine total shim thickness "Stot" (S3 plus S4) for specified pre-load of drive pinion taper roller bearings.
- Divide up total shim thickness "Stot" (S3 plus S4) such that dimension from centre of crown wheel to end face of drive pinion corresponds to installation dimension "R" determined during production.
- Divide up total shim thickness "Stot" (S1 plus S2) such that prescribed backlash is attained between crown wheel and drive pinion.

Note:

Table of components and shims=> Page 326

8 - Adjusting drive pinion

8.1 - Adjusting drive pinion



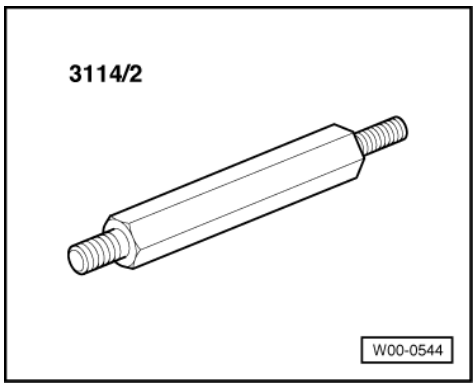
(adjusting drive pinion and hollow shaft)

Operations following which drive pinion has to be adjusted => Table, Page 326

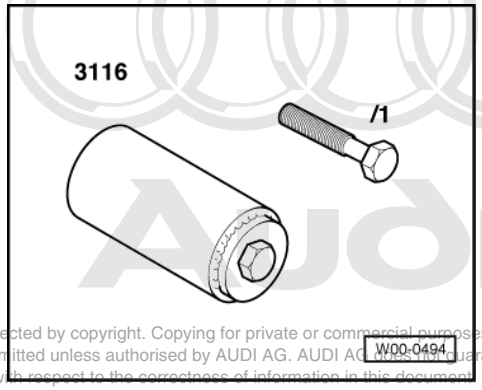
Special tools and workshop equipment required

- Universal measuring tool VW 385
- Universal dial gauge holder VW 387
- Thrust plate VW 402
- Press tool VW 407
- Multi-purpose tool VW 771
- Thrust pad 3062

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

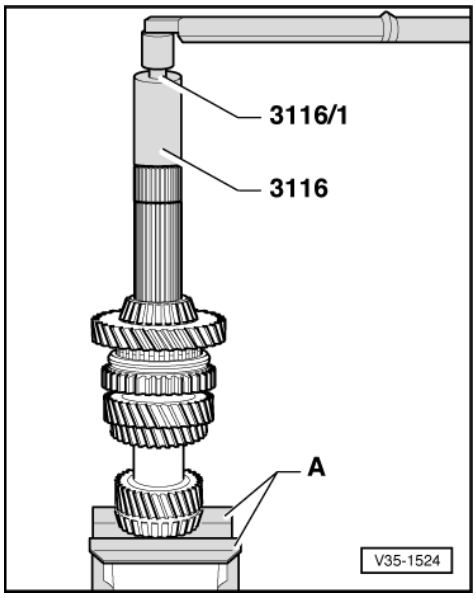


- Pin 3114/2



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.

- Clamping sleeve 3116
- Torque gauge 0 ... 600 Ncm
- Dial gauge
- Dial gauge extension 6.5 mm
- Dial gauge extension 30 mm



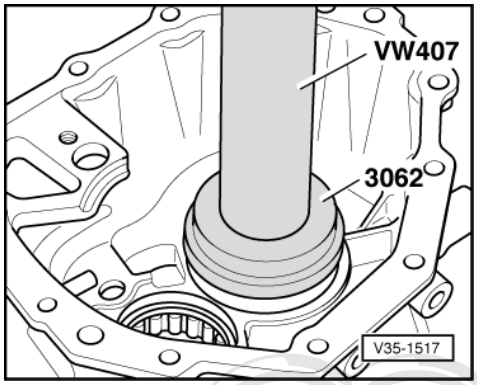
Re-adjustment of drive pinion as described in the following is only necessary on replacement of pinion set, taper roller bearing for drive pinion and gearbox housing.=> Adjustment table, Page 326 .

Determining total thickness "Stot" for shims "S3" + "S4"

(adjustment of pre-load of taper roller bearings for drive pinion with hollow shaft)

- Differential removed

- -> Clamp drive pinion in vice with soft jaws -A-.
- Apply grease to taper rollers on insertion, assemble drive pinion and hollow shaft.
- Give hollow shaft 5 turns in each direction against drive pinion to allow taper roller bearing to settle.
- Pretension drive pinion/hollow shaft to 10 Nm, holding hollow shaft in position.
- Insert outer race for drive pinion taper roller bearing without shims in gearbox housing => Fig. 275 .

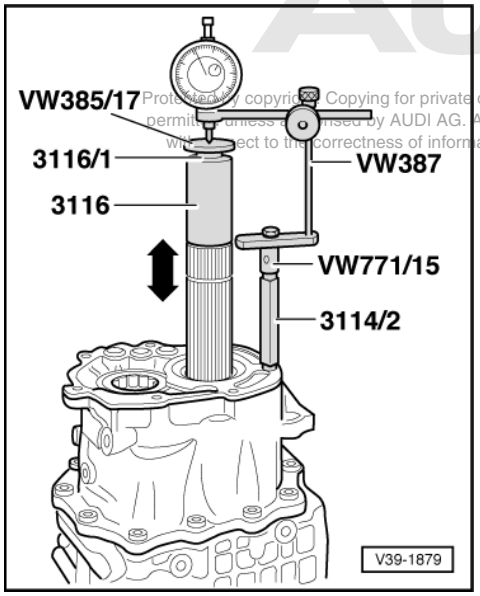


- -> Insert outer race for drive pinion taper roller bearing with shim "S4*" (1.0 mm thick) in bearing plate.

Note:

A 1.0 mm shim "S4" is provisionally inserted as standard measure. This is referred to in the following as "S4". "S4*" is replaced with the final shim "S4" after determining measured value "e".*

- Insert completely assembled drive pinion in 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.

- Fit bearing plate with dowel sleeves and tighten bolts to 25 Nm.
- Give drive pinion with hollow shaft 5 turns in each direction to allow taper roller bearing to settle.
- -> Attach measuring tool, making use of 30 mm dial gauge extension.
- Set dial gauge (3 mm measuring range) to "0" with 2 mm pre-load.

Note:

Tip of dial gauge must be located at centre of drive pinion.

- Raise drive pinion without turning and read clearance off dial gauge.
  - Measured value in example: 0.90 mm

Note:

If measurement is to be repeated, drive pinion with hollow shaft must first be turned again5 times in each direction to allow taper roller bearing to settle. Set dial gauge to "0" again with 2 mm pre-load.

Formula:
"Stot" = "S4*" + Measured value + Bearing preload

Example:		
	Shim "S4*" fitted	1.00 mm
+	Measured value (example)	0.90 mm
+	Bearing pre-load (constant value)	0.15 mm
=	Total shim thickness "Stot" for "S3" + "S4"	2.05 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.

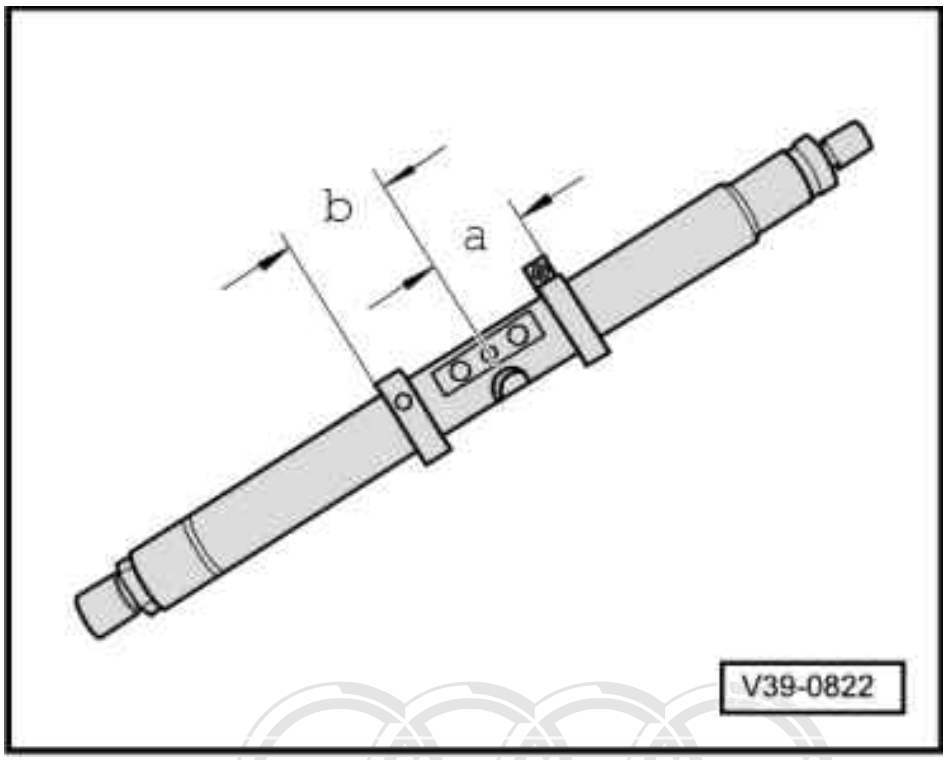
Determining thickness of shim "S3*"

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

Example:		
	Total shim thickness "Stot" for "S3" + "S4"	2.05 mm
-	Shim "S4*" fitted	1.00 mm
=	Thickness of shim "S3*"	1.05 mm

- Remove outer race for taper roller bearing, insert shim "S3*" in gearbox housing and re-install outer race => Fig. 275 .
- Re-insert completely assembled drive pinion in gearbox housing.
- Fit bearing plate with dowel sleeves and tighten bolts to 25 Nm.
- Give drive pinion with hollow shaft 5 turns in each direction to allow taper roller bearing to settle.

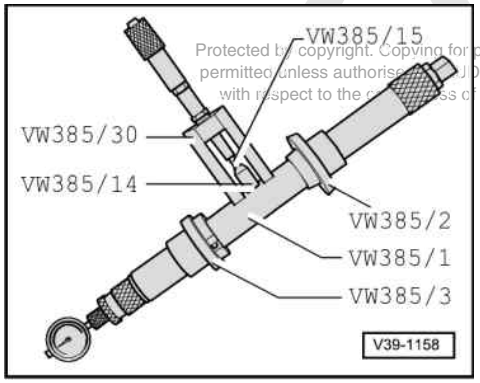
Determining dimension "e"



Note:

Dimension "e" is required for determining ultimate shim thickness of "S3" and "S4".

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

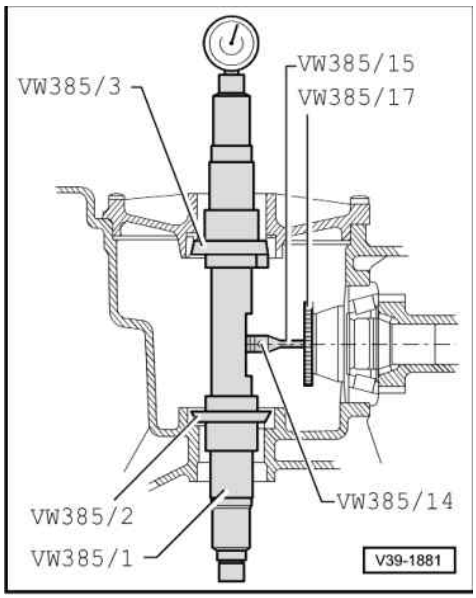


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Set up universal mandrel VW 385/1 as shown.
  - 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 attach to mandrel.
- Set dial gauge (3 mm measuring range) to "0" with 2 mm pre-load.

Note:

Instead of adjustable master gauge VW 385/30, use can also be made of master gauge VW 385/27 (Ro = 59.65).



-> Positioning of measurement tools for determination of dimension "e"

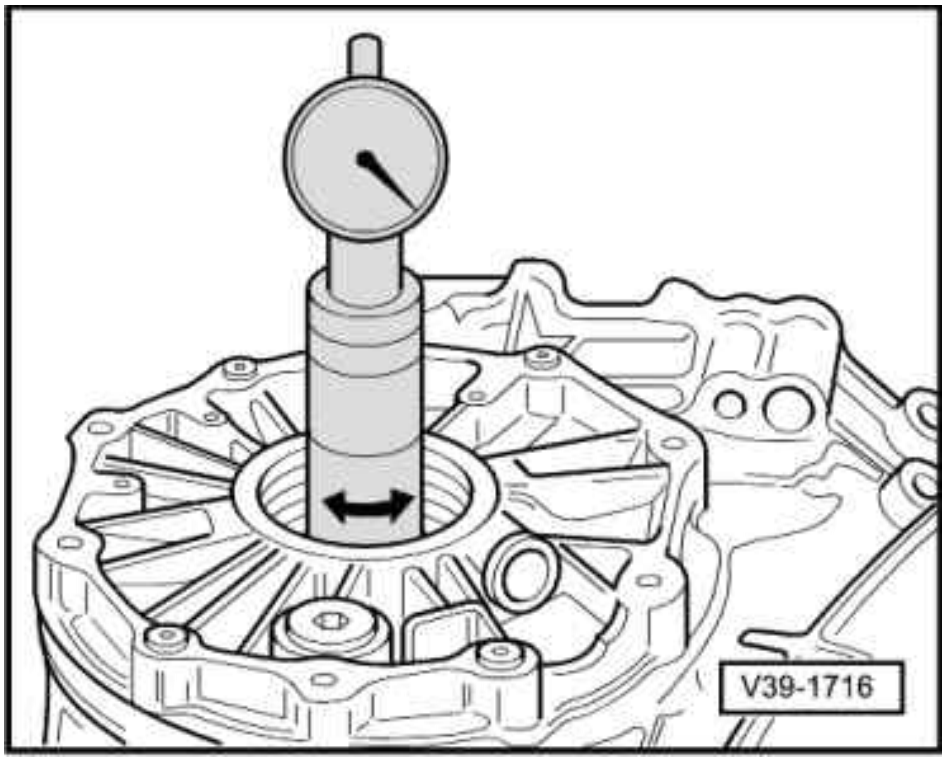
- Place gauge block plate VW 385/17 on end of drive pinion.

Note:

Ensure plate makes accurate oil-free contact.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 master gauge from mandrel.
- Insert mandrel in gearbox housing.
  - Centring disc VW 385/3 faces differential cover
- Fit cover for differential and tighten 4 bolts to 25 Nm.
- Pull 2nd centring disc VW 385/2 outwards via movable adjusting ring such that mandrel can still just be turned by hand.



- -> Turn mandrel until tip of dial gauge makes contact with gauge plate at end of drive pinion and indicates max. deflection (reversal point).
  - Measured value in the following example: "e" = 0.16 mm (red number band)

Determining thickness of shim "S3"

Formula:
"S3" = "S3*" + "r" + "e"
("e" in black number band)
or
"S3" = "S3*" + "r" - "e"
("e" in red number band)

Notes:

- The deviation "r" referenced to the master gauge "Ro" is measured for the replacement pinion sets and marked on the outer periphery of the crown wheel.
- If measurement is in red number band, measured value "e" must be subtracted.
- If measurement is in black number band, measured value "e" must be added.

Example:		
	Shim "S3*" fitted	1.05 mm
+	Deviation "r"	0.38 mm
-	Value "e" determined (red number band)	0.16 mm
=	Thickness of shim "S3"	1.27 mm

- Determine shim(s) as per table. Part numbers

=> Parts List

Shims available for "S3"

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

1) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

Determining thickness of shim "S4"

Formula:
"S4" = "Stot" - "S3"

Example:		
	Total shim thickness "Stot" for "S3" + "S4"	2.05 mm
-	Thickness of shim "S3"	1.27 mm
=	Thickness of shim "S4"	0.78 mm

- Determine shim(s) as per table. Part numbers

=> Parts List

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

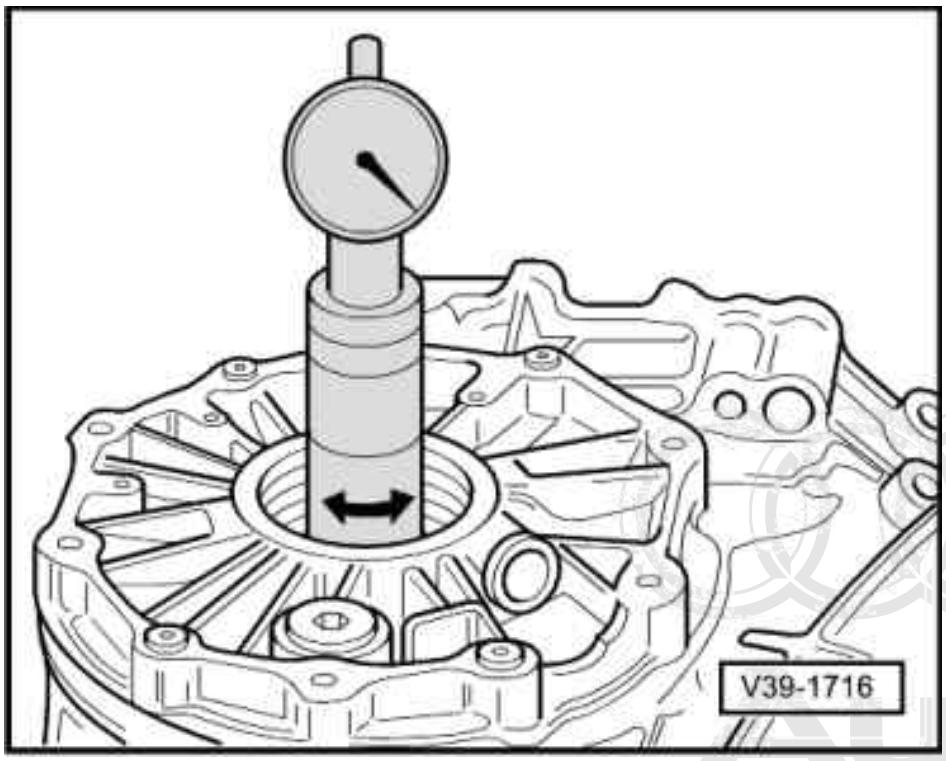
Shims available for "S4"

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) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

Performing check measurement

Checking dimension "r"



- Fit drive pinion with determined shims "S3" and "S4" and give 5 turns in each direction.
- -> Fit universal mandrel => "Determining dimension 'e'", Page 332 and perform check measurement.
- Take dial gauge reading in anti-clockwise direction (red number band).
  - If shims have been selected correctly, deviation "r" (marked on outer periphery of crown wheel) must be indicated with a tolerance of ± 0.04 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.

Note:

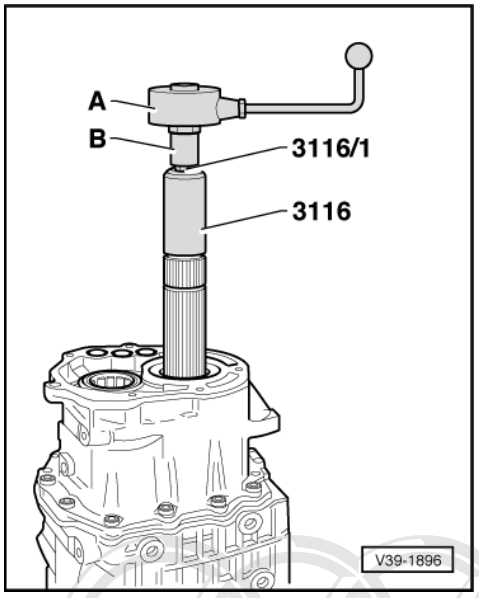
Then - after removing universal mandrel - check again to establish whether dial gauge is set to "0" with 2 mm pre-load and master gauge VW 385/30 in position. If not, correct adjustment.

Measuring friction torque (check)

Notes:

- Taper roller bearings for drive pinion/hollow shaft are of low-friction design. Friction torque can therefore only be used to a limited extent for check purposes. Correct setting is only possible by means of determining total shim thickness "Stot"

- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.



- -> Apply torque gauge 0 ... 600 Ncm -A- at drive pinion.

  B - Socket attachment

- Apply clamping sleeve 3116.

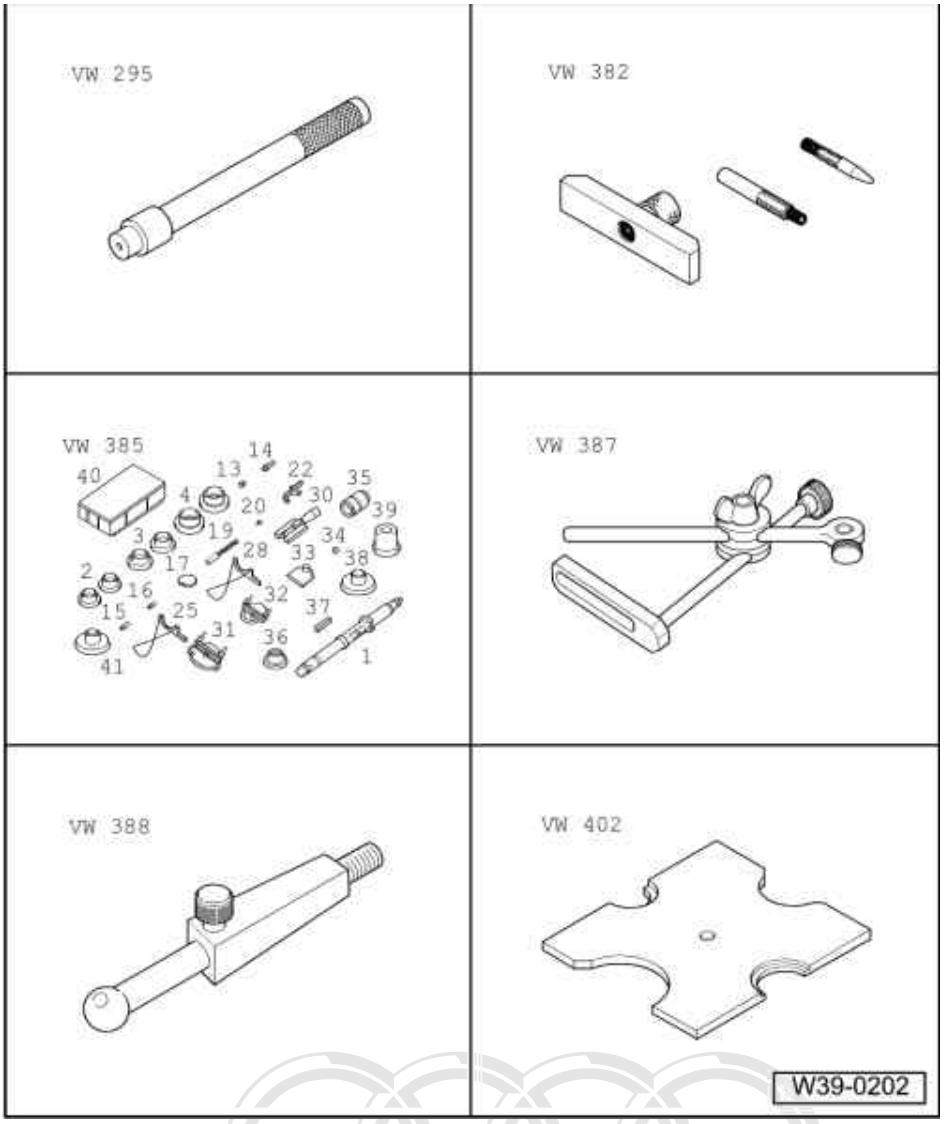
Friction torque specifications:

New bearings	Used bearings
80 ... 150 Ncm	30 ... 60 Ncm

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 - Adjusting crown wheel

9.1 - Adjusting crown wheel



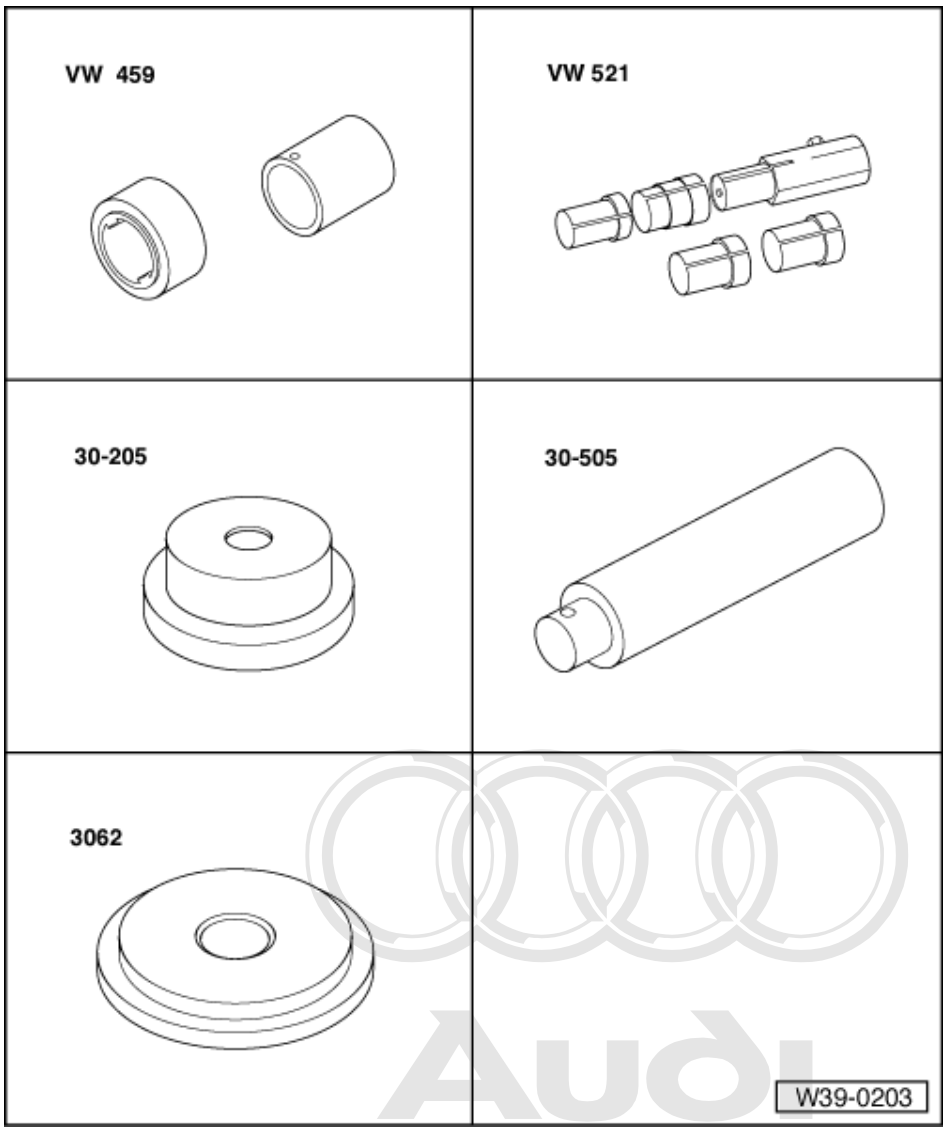
(differential adjustment)

Operations following which crown wheel has to be adjusted => Table, Page 326

Special tools, workshop equipment, testers, measuring instruments and other items required

- Mandrel VW 295
- Measuring device VW 382
- Universal measuring tool VW 385
- Universal dial gauge holder VW 387
- Test lever VW 388
- Thrust plate VW 402

This text 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.

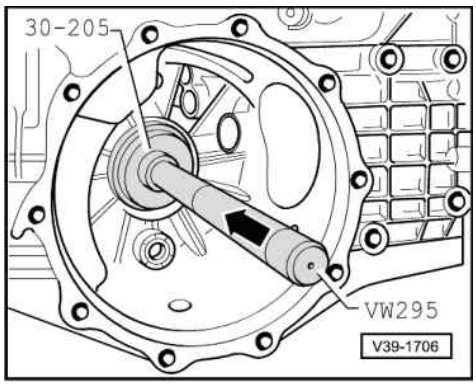


- Pressing-out and pressing-in tool VW 459
- Adjustment tool for crown wheel VW 521
- Thrust plate 30-205
- Fitting mandrel 30-505
- Thrust pad 3062
- Torque gauge 0 ... 600 Ncm
- Dial gauge
- Dial gauge extension

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 thickness "Stot" for shims "S1" + "S2"

(adjustment of pre-load of taper roller bearings for differential)

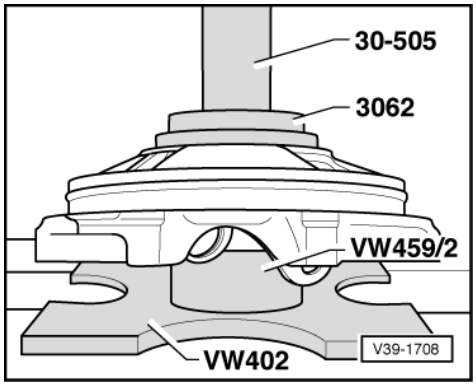


- Drive pinion removed

- Remove oil seal and outer races of both differential taper roller bearings.
- Take out shims => Page 299 .
- -> Drive outer race for taper roller bearing with shim "S2" into gearbox housing. Use is made for measurement of a shim "S2*" of thickness 1.20 mm (2 x 0.60 mm thick shims).

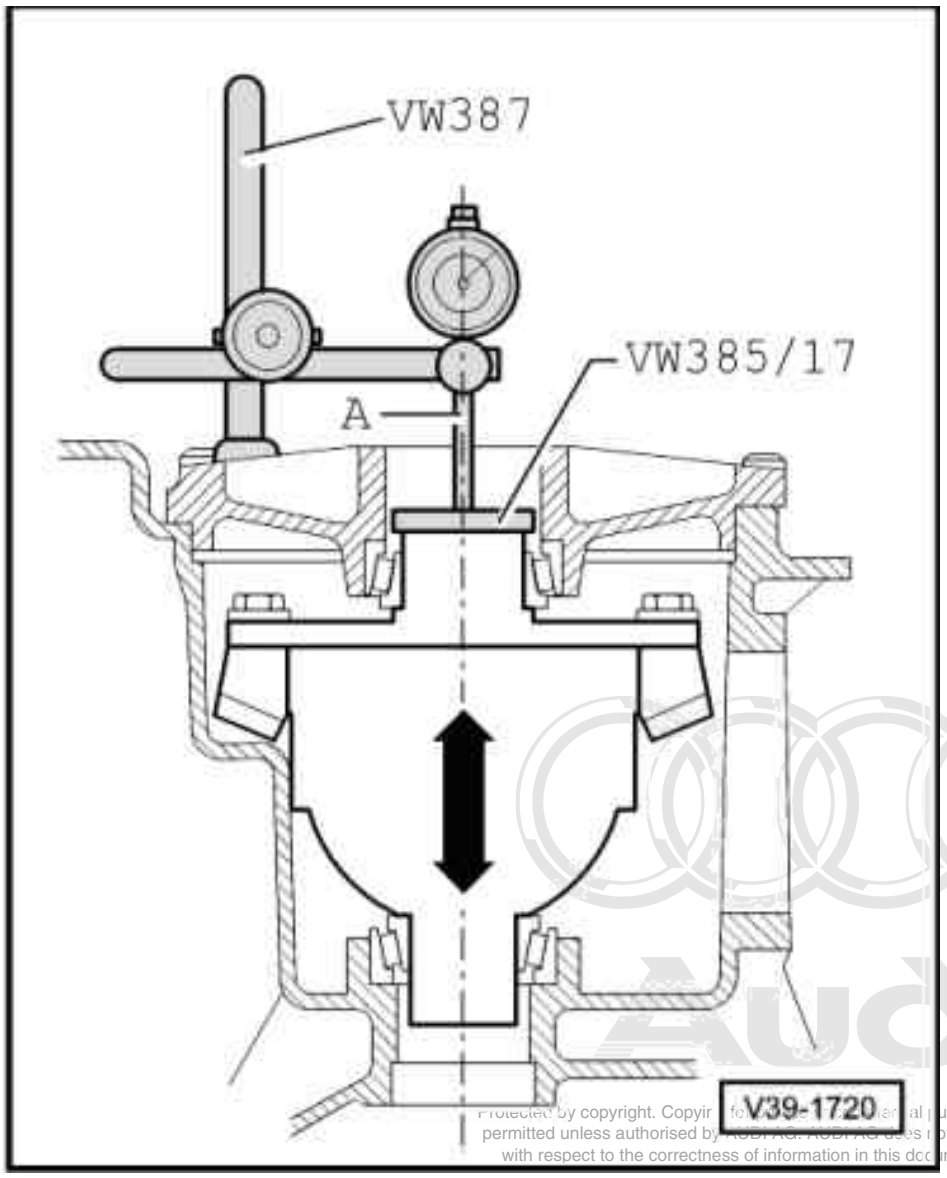
Note:

A 1.20 mm thick shim "S2" is provisionally inserted as standard measure. This is referred to in the following as "S2". "S2*" is replaced with final "S2" after determining backlash.*



- -> Press outer race for taper roller bearing without shim "S1" into cover for differential.
- Insert differential without drive wheel for speedometer sender -G22 in gearbox housing. Crown wheel is located on left side in front of cover for differential.
- Fit differential cover with 4 bolts (25 Nm).
- Position gearbox such that differential cover faces upwards.

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

- Give differential 5 turns in each direction so that taper roller bearing settles.
- -> Attach measuring tool, making use of 30 mm dial gauge extension.
- Set dial gauge (3 mm measuring range) -A- to "0" with 2 mm pre-load.

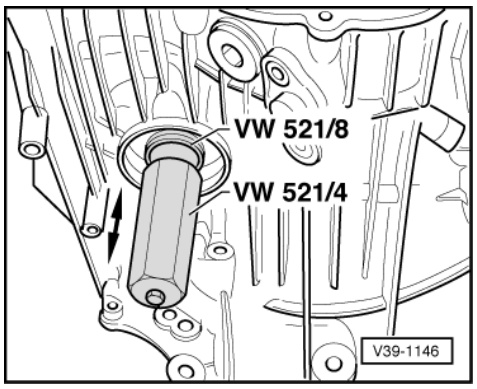
Note:

Tip of dial gauge must be located at centre of differential.

- Raise differential without turning, read clearance off dial gauge and note down.

• Measured value in the following example: 0.62 mm

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.

- -> To lift differential, attach special tools VW 521/4 and VW 521/8 to right of differential (housing end).
- If measurement is to be repeated, differential must first be turned again5 times in each direction to allow taper roller bearing to settle.

Formula:
"Stot" = "S2*" + Measured value + Bearing preload

Example:	
Shim(s) "S2*" fitted	1.20 mm
+ Measured value	0.62 mm
+ Bearing pre-load (constant value)	0.25 mm
= Total shim thickness "Stot" for "S1" + "S2"	2.07 mm

Determining thickness of shim "S1*"

Notes:

- Provisional shim "S1*" is replaced by ultimate shim "S1" after determining backlash.
- The total shim thickness "Stot" remains unchanged.

Formula:
"S1*" = "Stot" - "S2*"

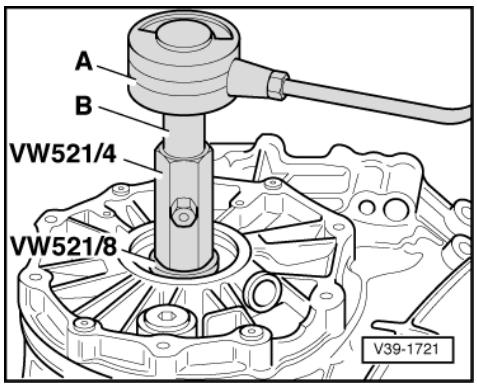
Example:	
Total shim thickness "Stot" for "S1" + "S2"	2.07 mm
- Shim(s) "S2*" fitted	1.20 mm
= Thickness of shim "S1*"	0.87 mm

Measuring friction torque (check)

Notes:

- Taper roller bearings for differential are of low-friction design. Friction torque can therefore only be used to a limited extent for check purposes. Correct setting is only possible by means of determining total shim thickness "Stot"
- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.

- Drive pinion removed



- -> Apply torque gauge 0 ... 600 Ncm -A- at differential.

  B - Socket attachment

- Take friction torque reading.

Friction torque specifications:

New bearings	Used bearings
200 ... 350 Ncm	30 ... 50 Ncm

Note:

In the event of re-adjustment of pinion set, drive pinion is now to be adjusted and checked =>Page 328 .

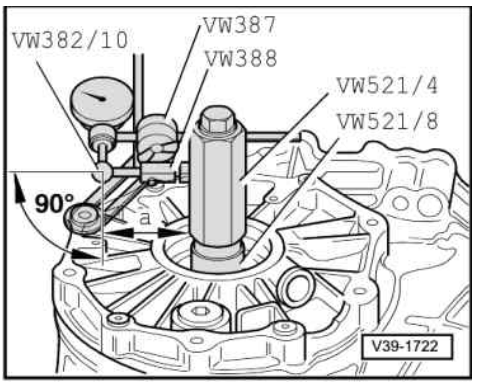
Measuring backlash

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

(position of crown wheel in gearbox housing)

- Drive pinion with shims "S3" and "S4" fitted

- Install differential.



- Give differential 5 turns in both directions so that taper roller bearings settle.
- -> Attach dial gauge holder VW 387 to housing.
- Insert adjustment tool for crown wheel VW 521/4 and VW 521/8.
- Insert dial gauge with extension VW 382/10 (6 mm flat).
- Set test lever VW 388 to dimension "a" = 79 mm.
- Determine backlash between tooth flanks as follows:
  - Turn crown wheel until it makes contact with tooth flank (backlash end).
  - Set dial gauge to "0" with 2 mm pre-load.
  - Turn back crown wheel until it makes contact with opposite tooth flank (backlash).

  - Take backlash reading and note down measured value.

- Turn crown wheel by a further 90° in each case and repeat measurement 3 times.

Note:

If the individual values determined in this measurement differ by more than 0.06 mm, there is a problem either with the installation of the crown wheel or with the actual pinion set. Check assembly operations and replace pinion set if necessary.

Determining average backlash

- Add the 4 measured values together and divide the total by 4.

Example:	
1st measured value	0.49 mm
+ 2nd measured value	0.48 mm
+ 3rd measured value	0.50 mm
+ 4th measured value	0.49 mm
= Sum total of measured values	1.96 mm

• Result: Average backlash = 1.96 mm : 4 = 0.49 mm

Determining thickness of shim "S2"

Formula:
"S2" = "S2*" - Backlash + Lift

Example:	
Shim "S2*" fitted	1.20 mm
- Average backlash	0.49 mm
+ Lift (constant value)	0.15 mm
= Thickness of shim "S2"	0.86 mm

- Determine shim(s) as per table. Part numbers

=> Parts List

Shims available for "S2"

Shim thickness (mm) 1)		
0.45	0.65	0.85
0.10	0.70	0.90
0.55	0.75	
0.60	0.80	

1) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

Determining thickness of shim "S1"

Formula:
"S1" = "Stot" - "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 "Stot" for "S1" + "S2"	2.07 mm
- Thickness of shim "S2"	0.86 mm

=	Thickness of shim "S1"	1.21 mm

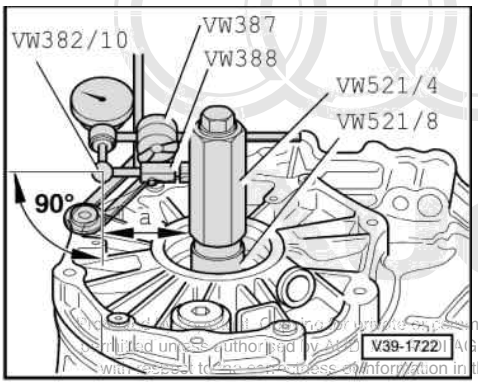
- Determine shim(s) as per table. Part numbers

=> Parts List

Shims 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) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary



Copyright by AUDI AG. Distribution or reproduction for 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.

-> Check measurement

- After fitting shims "S1" and "S2", give differential 5 turns in both directions so that taper roller bearings settle.
- Measure backlash 4 times on periphery.
  - Specification: 0.12 ... 0.22 mm

Notes:

- Adjustment must be repeated if backlash is outside tolerance. The total shim thickness "Stot" must not be changed.
- Deviation between individual measured values must not exceed 0.06 mm.

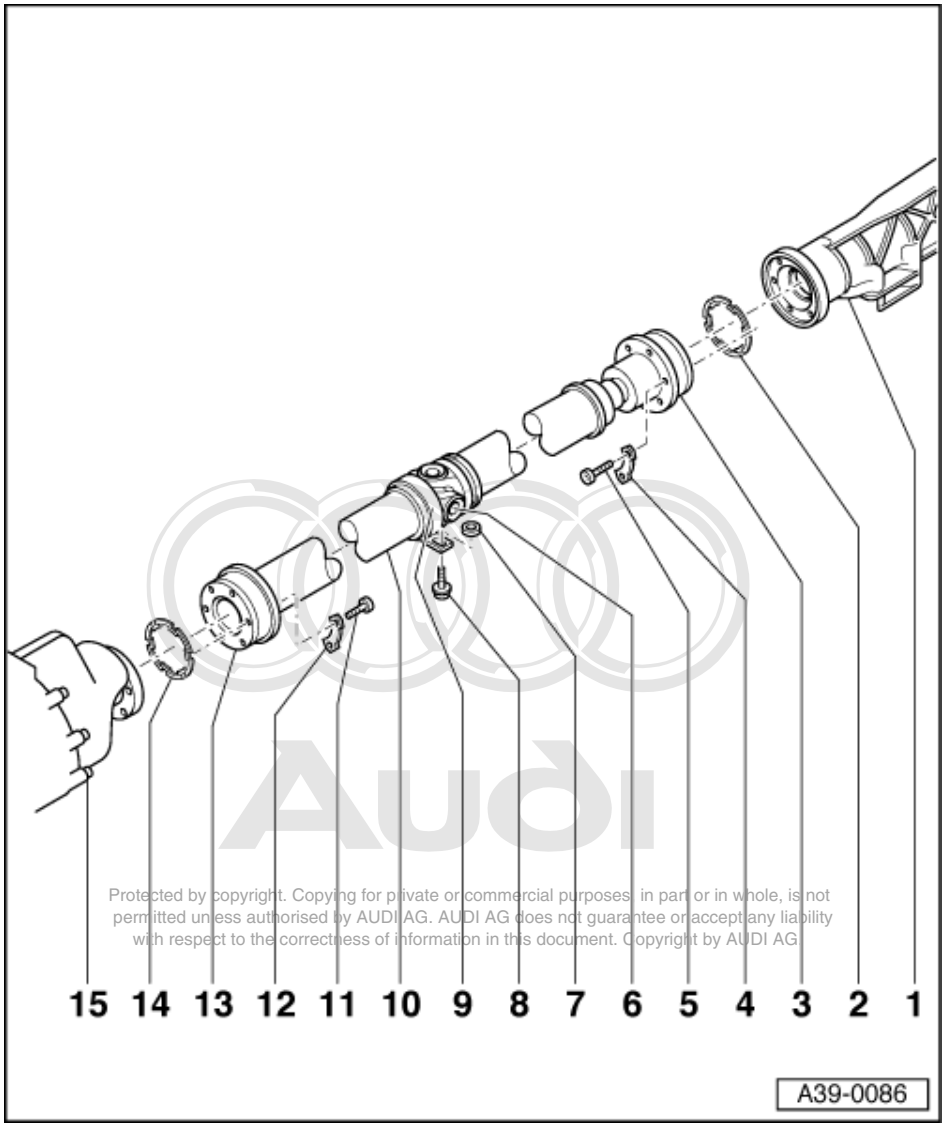
10 - Servicing propshaft

10.1 - Servicing propshaft

Notes:

- General repair instructions => Page 10
- Take care not to kink propshaft (max. perm. bending angle 25 °), as otherwise universal joint could be damaged.
- Ensure flat storage and transportation of propshaft.
- With the exception of removal, installation and adjustment, no other propshaft repair operations can be performed.
- If propshaft is only separated from gearbox or rear final drive, it must be tied to constant velocity joints or supported.
- Prior to removal, mark position of joint with respect to flange. Re-install in same position to avoid excessive imbalance, bearing damage and humming noise.
- In the event of complaints (noise, vibration), always check whether precise adjustment cures the problem before replacing propshaft.

- After detaching propshaft from rear final drive, do not re-install additional balancing plate (thicker packing plate) which may have been fitted between washer and bolt head.



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

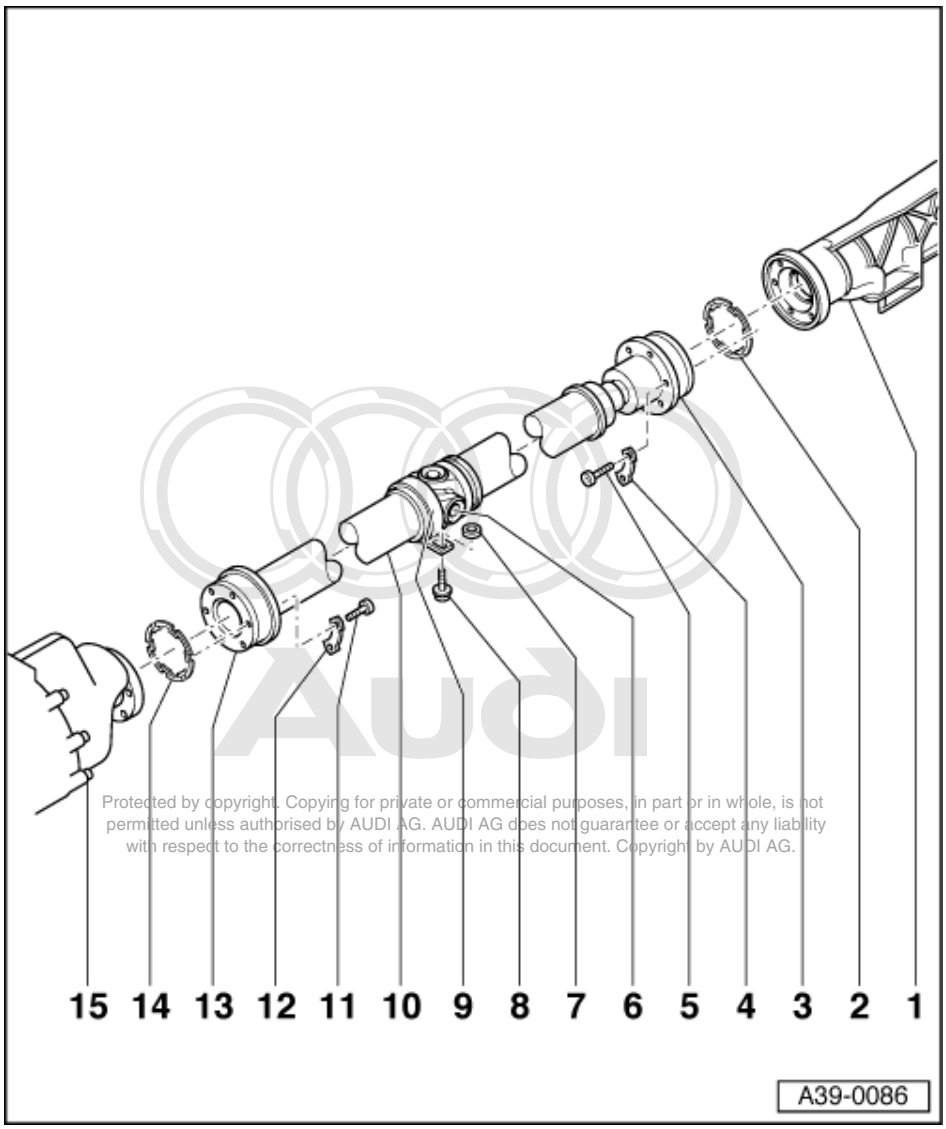
1 Rear final drive

2 Gasket
- Replace
- Pull off backing and bond self-adhesive side of gasket to flange shaft
- Degrease flange shaft

3 Constant velocity joint
- Max. perm. bending angle 8°

4 Packing plate

5 Hexagon socket-head bolt - 55Nm
- Self-locking
- Replace
- Tapped holes for bolts in flange shafts are always to be cleaned (e.g. with a thread cutter)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Universal joint
- Max. perm. bending angle 25°

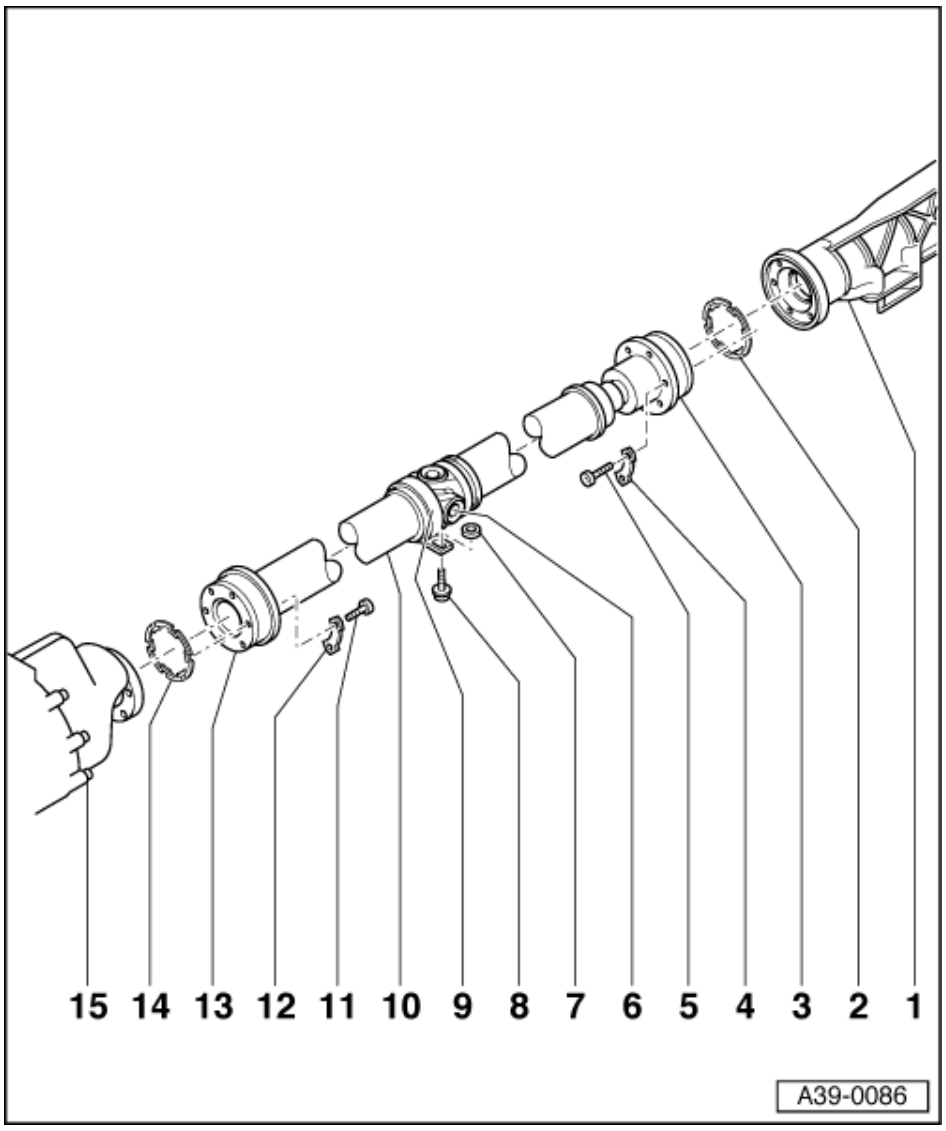
7 Shim
- Determining thickness=>Page 352

8 Hexagon bolt, 23 Nm

9 Centre propshaft bearing

10 Propshaft
- Adjusting => Page 351

11 Hexagon socket-head bolt - 55Nm
- Self-locking
- Replace
- Tapped holes for bolts in flange shafts are always to be cleaned (e.g. with a thread cutter)



12 Packing plate

13 Constant velocity joint

- Max. perm. bending angle 8°

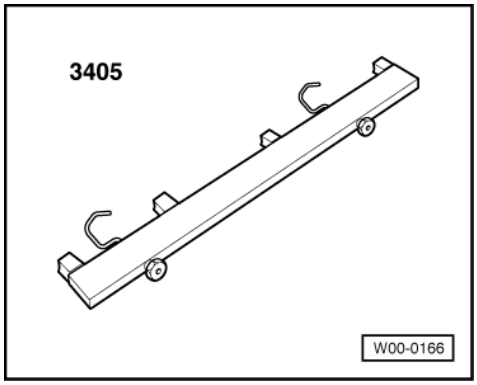
14 Gasket

- Replace
- Pull off backing and bond self-adhesive side of gasket to flange shaft
- Degrease flange shaft

15 Manual 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.

10.2 - Removing and installing propshaft



Special tools, testers and other items required

- Assembly device 3405

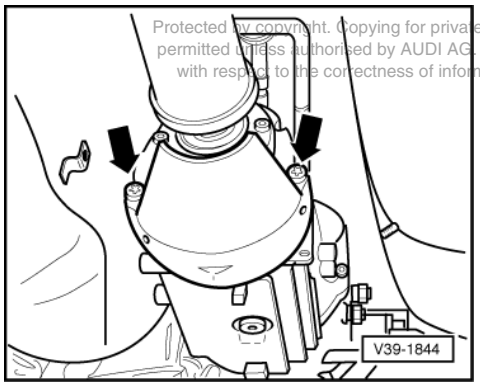
Removing

- Heed notes => Page 344 .
- If fitted, detach cross member beneath exhaust system.
- Remove rear section of exhaust system as of clamp(s).

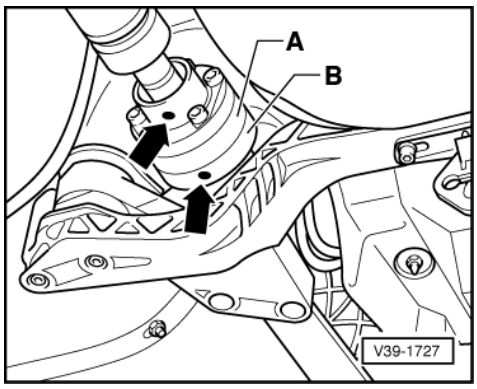
=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Remove heat shields over propshaft.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 heat shield for propshaft from cover for Torsen differential -arrows-.

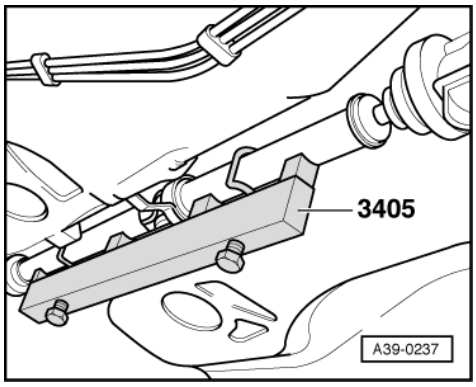


- -> Check for factory mark (coloured dot -arrows-) at propshaft and at flange/propshaft at rear final drive. If there is no coloured dot, make coloured mark to identify position of propshaft flange -A- with respect to rear final drive -B-.

Note:

Only mark if same propshaft is to be re-used.

- Slacken off bolts of both propshaft flanges.
- Screw out three upper bolts at each constant velocity joint of propshaft.
- Slacken off centre bearing bolts slightly.



- -> Engage assembly device 3405 and tighten plastic nuts.

Note:

Never position assembly device on balancing plates.

- Screw out bolts attaching flanges to manual gearbox and rear final drive as well as centre bearing bolts.
- Retract propshaft to rear final drive. Constant velocity joints are axially adjustable.
- Move out propshaft with assembly device at gearbox flange.

Note:

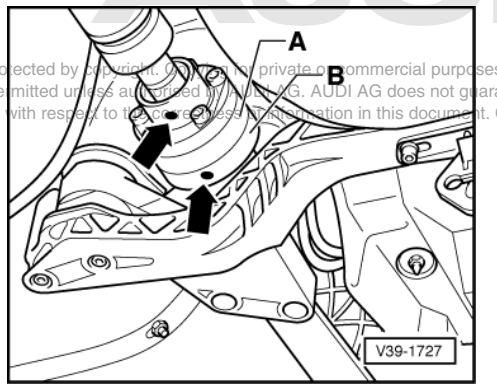
Ensure flat transportation and storage of propshaft.

Installing

Install in reverse order, paying attention to the following:

Notes:

- After taking out propshaft, always remove residual locking fluid from tapped holes in flange shafts of gearbox and rear final drive. Otherwise there would be a danger of the new bolts seizing when screwed in and shearing off on renewed disassembly.
- Cleaning can be performed using a thread tap.
- Replace seals at flange shafts (pull off backing and bond seal to flange shafts). Bonding surface must be free from grease.



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

- -> To prevent imbalance, flanges of propshaft -A- and rear final drive -B- must be fitted such that factory coloured marks/service identification marks are aligned -arrows-.

- If a new propshaft is fitted and factory coloured mark is no longer visible on flange of rear final drive, radial run-out must be measured at flange/propshaft => Page 350 and coloured mark at propshaft aligned with new mark at flange.
- After detaching propshaft from rear final drive, do not re-install additional balancing plate (thicker packing plate) which may have been fitted between washer and bolt head.
- Replace propshaft bolts (self-locking).

- Following installation, adjust propshaft => Page 351 .
- Perform stress-free alignment of exhaust system.

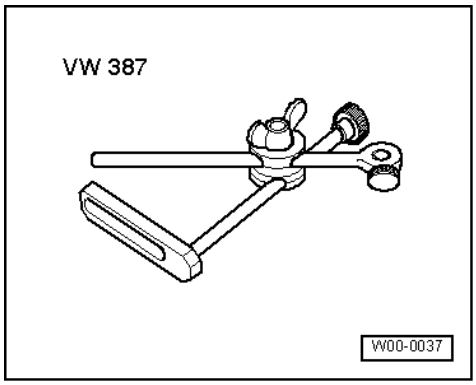
=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

Tightening torques

Component	Nm
Propshaft to gearbox (output flange)	55
Propshaft to final drive (input flange)	55
Centre propshaft bearing to body	23
Heat shield for propshaft to gearbox	23
Cross member to body	25
Nuts for clamp	40

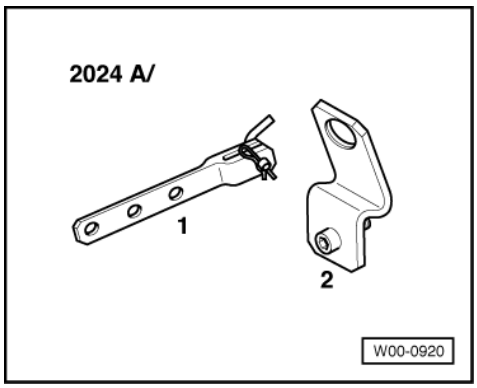
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

10.3 - Measuring and marking radial run-out at flange/propshaft



Special tools, testers and other items required

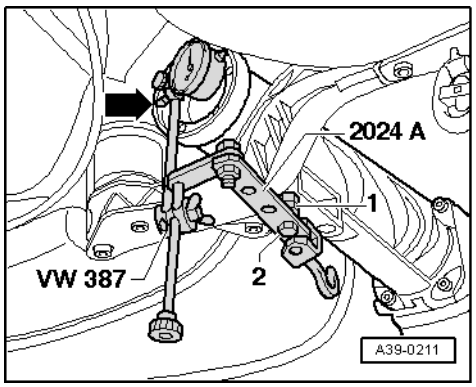
- Universal dial gauge holder VW 387



- Lifting tackle 2024 A
- Dial gauge
- Bolt M10 x 85

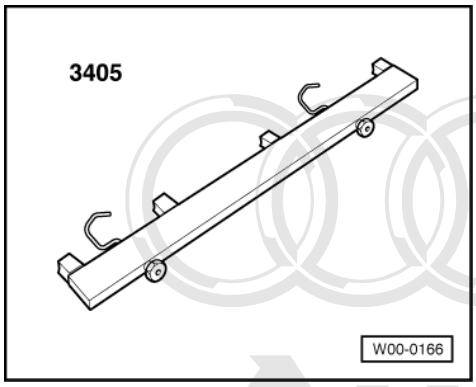
Notes:

- Radial run-out is always to be measured following removal of thrust tube. Make new coloured dot and remove old coloured mark.
- If a new propshaft is fitted and mark on flange shaft of rear final drive is no longer visible, maximum radial run-out point must be determined and marked with a coloured dot.
- This coloured dot is aligned with coloured dot on propshaft => Page 349 .
- Radial run-out can also be measured with rear final drive in position. This involves disconnecting propshaft at rear final drive. Heed notes => Page 344 .



- Screw out front left bolt at gearbox support for rear final drive.
- -> Remove link plate from lifting tackle 2024 A and screw on at free hole with bolt M10 x 85 mm -2-. Place approx. 5 nuts M12 -1- beneath link plate.
- Screw dial gauge holder VW 387 to link plate fitted as indicated above.
- Position dial gauge on machined diameter in propshaft flange -arrow- and set to "0" with 1 mm pre-load.
- Simultaneously turn differential by way of both rear wheels (right and left flange shafts) in one direction until flange/propshaft has completed one revolution.
- Mark maximum radial run-out with coloured dot on outside of flange (corresponding to maximum distance from axis of rotation).
- Remove old mark at flange/propshaft.
- Install propshaft => Page 349 .

10.4 - Adjusting propshaft



Special tools, testers and other items required

- Assembly device 3405

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

- Heed notes => Page 344 .

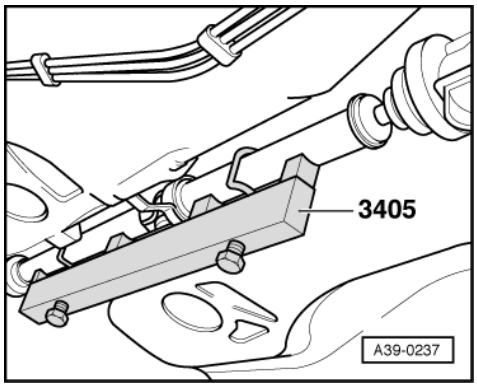
Adjustment work is to be performed with extreme care as a poorly adjusted propshaft is often the cause of vibration and humming noise.

- If fitted, detach cross member beneath exhaust system.
- Remove rear section of exhaust system as of clamp(s).

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Remove heat shields over propshaft.

- Slacken off centre bearing bolts slightly.

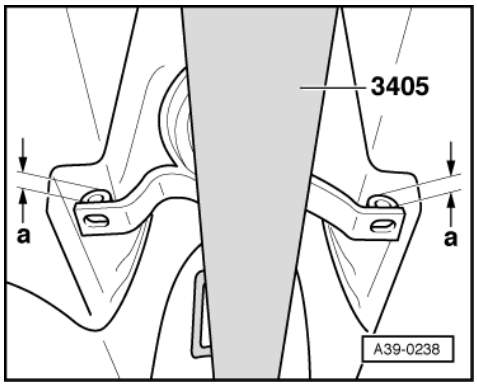


- -> Engage assembly device 3405 and tighten plastic nuts.

Note:

Never position assembly device on balancing plates.

- Take out bolts and shims of centre 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.

- -> Align centre propshaft bearing such that gap -a- on left is equal to gap -a- on right.
- Measure gaps -a-.
- Determine shims as per table. Part numbers

=> Parts List

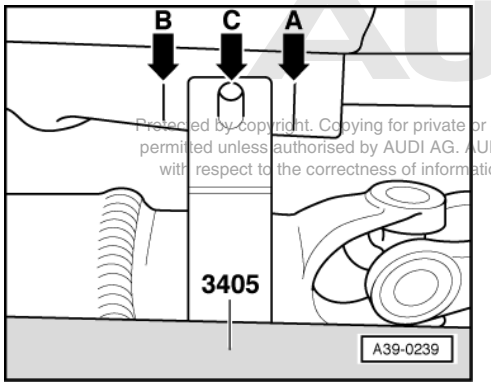
Shims available

Gap -a- (mm)	Shim thickness (mm)
0 ... 3.0	-
3.1 ... 5.0	2
5.1 ... 7.0	4
7.1 ... 9.0	6

Gap -a- (mm)	Shim thickness (mm)
9.1 ... 11.0	8
11.1 ... 13.0	10

- Fit shims determined on left and right.

Propshaft axial alignment



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 propshaft with assembly device to rear as far as it will go.
- Mark position of centre bearing on body -arrow A-.
- Then slide propshaft with assembly device forwards as far as it will go.
- Mark position of centre bearing on body -arrow B-.
- Align propshaft -arrow C-:
  - Centre bearing must be centred between marks -A- and -B-
- Fit bolts of centre propshaft bearing and previously determined shims and tighten.
- Detach assembly device.
- Fit heat shield over propshaft.

Perform further installation in reverse order, paying attention to the following:

- Perform stress-free alignment of exhaust system.

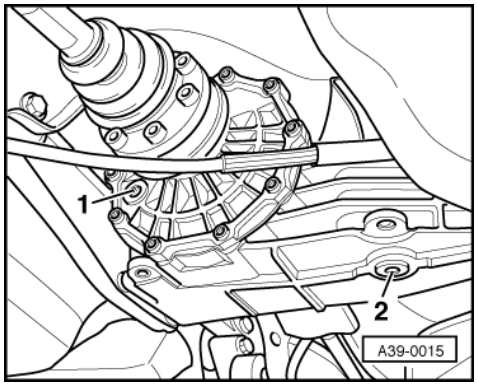
=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

Tightening torques

Component	Nm
Centre propshaft bearing to body	23
Cross member to body	25
Nuts for clamp	40

11 - Checking gear oil level in rear final drive

11.1 - Checking gear oil level in 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.

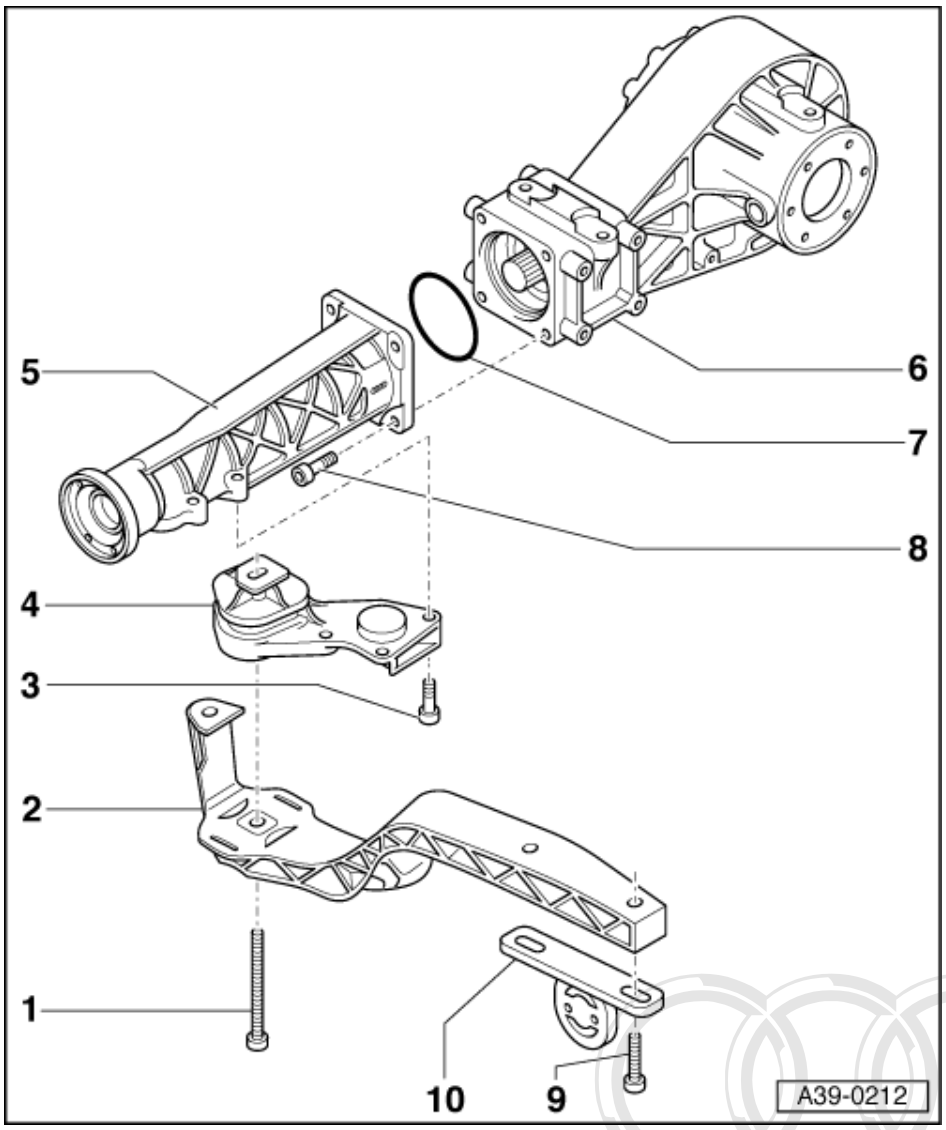
- -> Screw out oil filler plug -1- to check gear oil.
  - Specification: Oil level up to lower edge of filler hole
- Top up gear oil if necessary. Specification => Page 6
- Screw in oil filler plug.

Tightening torque

Component	Nm
Oil filler plug	35

12 - Removing and installing thrust tube

12.1 - Removing and installing thrust tube



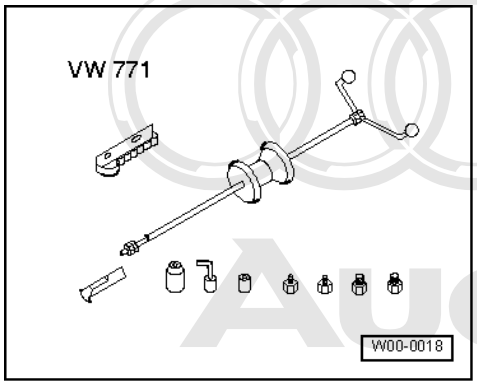
12.2 - Exploded view

1 Bolt, 40 Nm
2 Front cross-member
3 Bolt, 40 Nm
4 Gearbox support
5 Thrust tube
6 Rear final drive housing
7 O-ring
8 Bolt, 35 Nm
9 Bolt, 23 Nm
10 Bracket
- For 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.

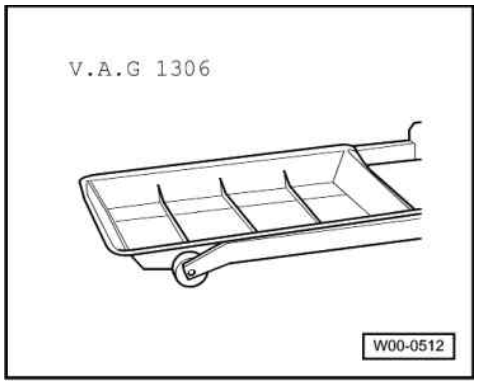
12.3 - Removing

Special tools, testers and other items required

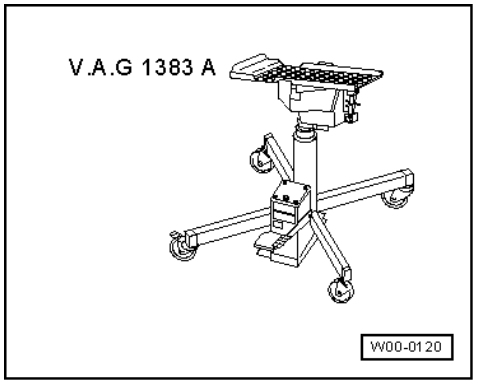


- Multi-purpose tool VW 771 with 771/15

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



- Drip tray V.A.G 1306



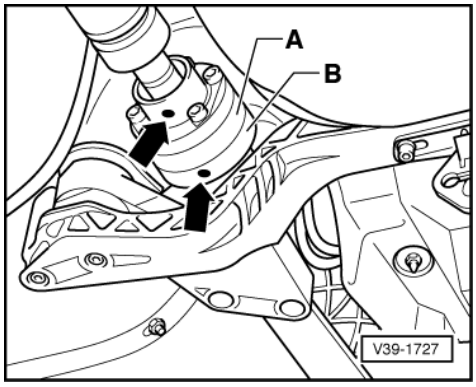
- Engine/gearbox lifter V.A.G 1383 A
- Universal holder V.A.G 1359/2

- Rear final drive fitted

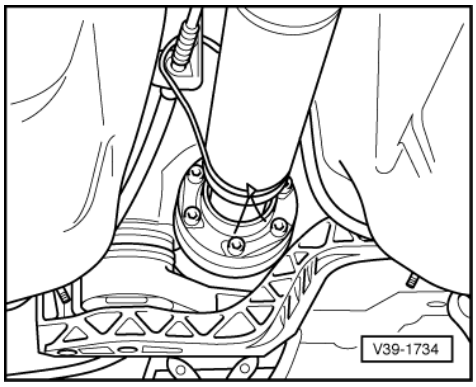
- Place drip tray V.A.G 1306 in position and drain off gear oil.
- Remove rear section of exhaust system as of clamp(s).

=> Engine mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Remove heat shield over propshaft.



- Remove heat shield next to rear final drive.
- -> Check for factory mark (coloured dot) at propshaft. If there is no coloured dot, make coloured mark to identify position of propshaft flange -A- with respect to rear final drive -B-.
- Screw out bolts of propshaft flange.

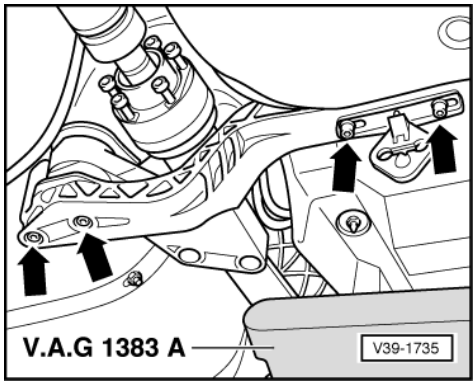


- -> Use wire to tie up propshaft at holder for handbrake cable.

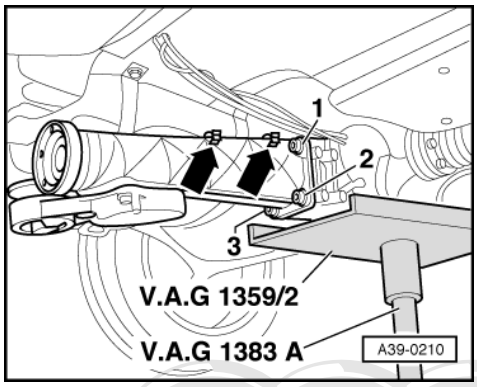
Note:

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.

If propshaft cannot be pressed upwards past flange, lower final drive and then tie up propshaft. When lowering, secure propshaft to stop it falling and pay attention to permissible propshaft bending angle => Notes, Page 344 .



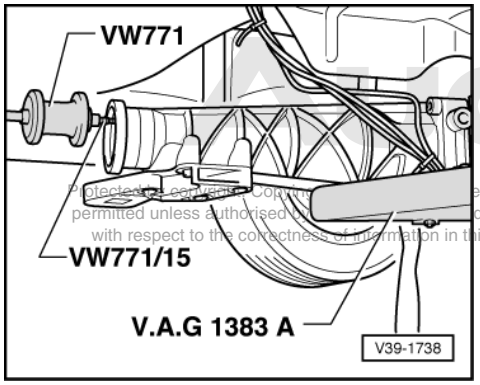
- Support final drive with gearbox lifter V.A.G 1383 A.
- -> Screw out bolts -arrows- at front cross member for rear final drive.
- Detach front cross member.



- Lower final drive by approx. 10 cm.
- -> Screw out 4 bolts for thrust tube -1 ... 3-.

Note:

4th bolt is not shown in Fig.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 flange shaft with thrust tube.

12.4 - Installing

Install in reverse order, paying attention to the following:

Notes:

- After taking out propshaft, always remove residual locking fluid from tapped holes in flange shafts of gearbox and rear final drive. Otherwise there would be a danger of the new bolts seizing when screwed in and shearing off on renewed disassembly.
- Cleaning can be performed using a thread tap.
- Replace seal between propshaft and input flange (remove backing and bond seal to flange shaft). Bonding surface must be free from grease.
- Replace propshaft bolts (self-locking).

- If there is a factory mark on propshaft, establish radial run-out at flange/propshaft=>Page 350 and align coloured mark at propshaft with new mark at flange.

- Perform stress-free alignment of exhaust system.

=> Engine mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

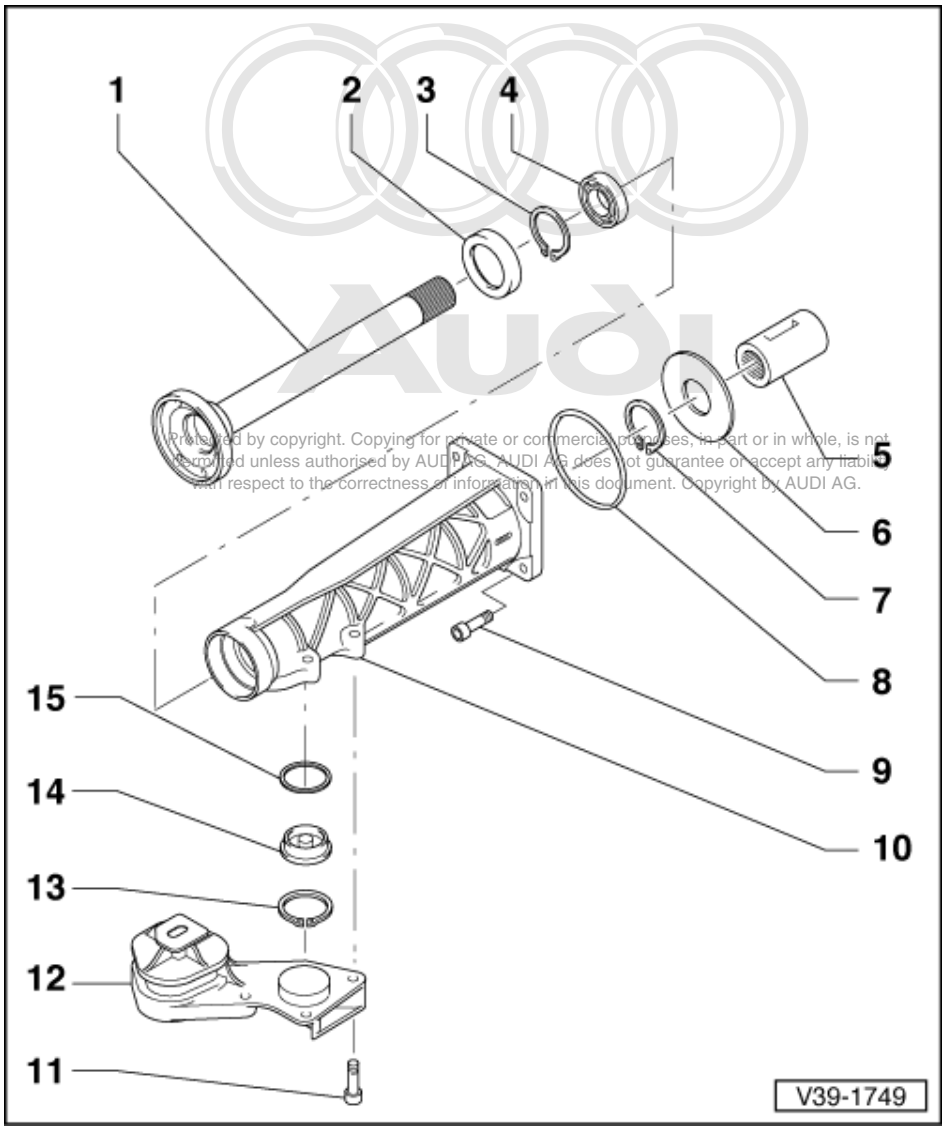
- Top up gear oil in rear final drive and check oil level => Page 354 .

Tightening torques

Component	Nm
Thrust tube to rear final drive	35
Propshaft to final drive (input flange)	55
Front cross member for rear final drive to body	40
Front cross member for rear final drive with exhaust system bracket to body	23
Oil filler plug	35
Nuts for clamp	40

13 - Dismantling and assembling thrust tube (exploded view)

13.1 - Dismantling and assembling thrust tube (exploded view)



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 thrust tube
=>Page 355 .

1 Flange shaft

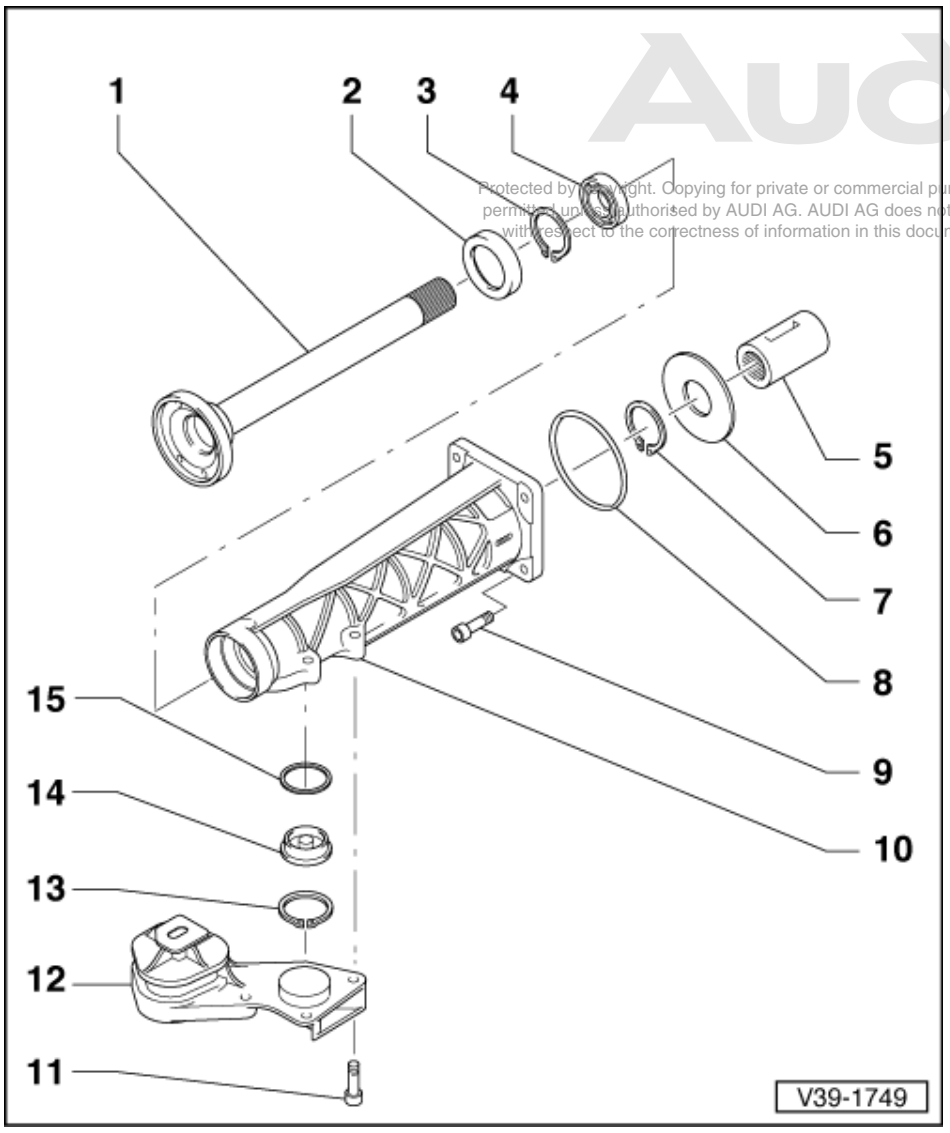
- Removing => Page 363
- On installation, simultaneously insert circlip -Item 365

2 Oil seal

- Prising out => Page 363
- Driving in => Page 365

3 Circlip

- Removing => Page 364



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Grooved ball bearing for flange shaft

- Extracting => Page 364
- Pressing in =>Page 364

5 Collar

- Removing => Page 362
- Pressing on => Page 365

6 Baffle plate

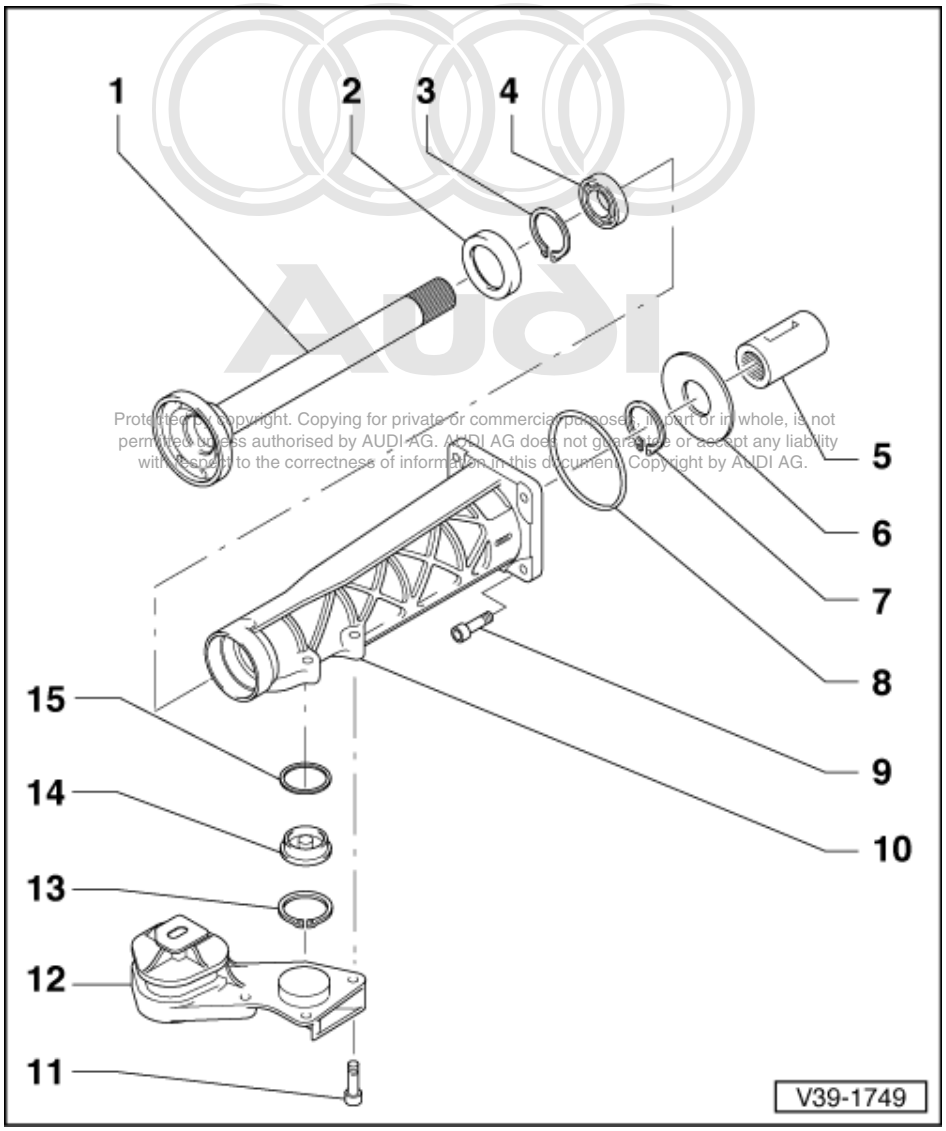
- Only press out if damaged
- Installing => Page 364

7 Circlip

- Splaying circuit to remove flange shaft => Page 363

8 O-ring
- Replace

9 Bolt, 35 Nm
- For attaching thrust tube to housing of 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.

10 Thrust tube

11 Bolt, 40 Nm
- For attaching gearbox support to thrust tube

12 Gearbox support

13 Circlip
- Removing => Page 362

14 Cap
- Removing => Page 362

15 O-ring
- Replace

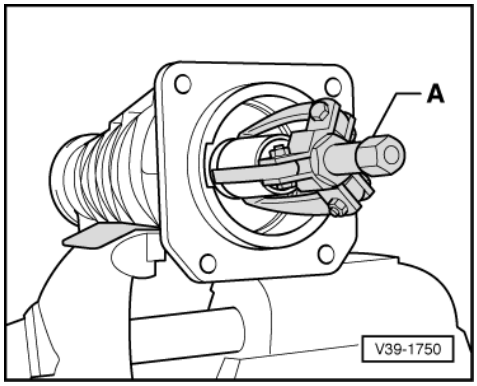
13.2 - Dismantling and assembling thrust tube

Special tools, testers and other items required

- Thrust plate VW 402
- Press tool VW 409
- Press tool VW 412
- Thrust pad VW 433
- Multi-purpose tool VW 771 with 771/15
- Fitting mandrel 2051
- Fitting mandrel 2062
- Bucket tappet hold-down 2078
- Internal puller Kukko 21/5

Note:

Removing and installing thrust tube => Page 355



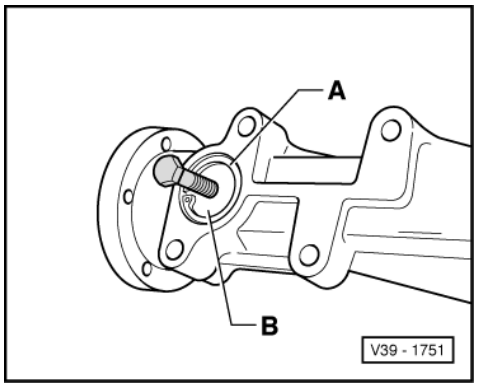
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Dismantling

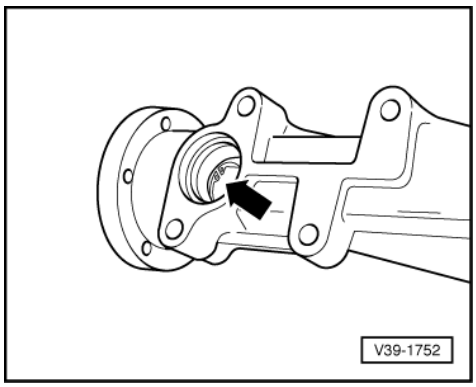
- Clamp thrust tube in vice with soft jaws.
- -> Detach collar.

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

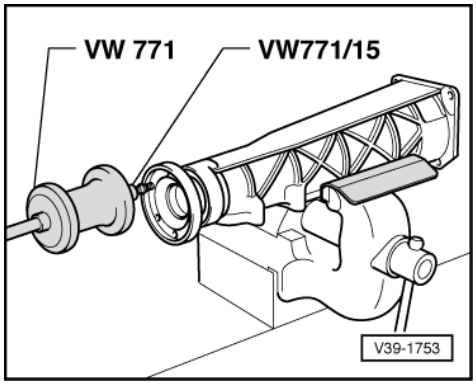
- Detach gearbox support.



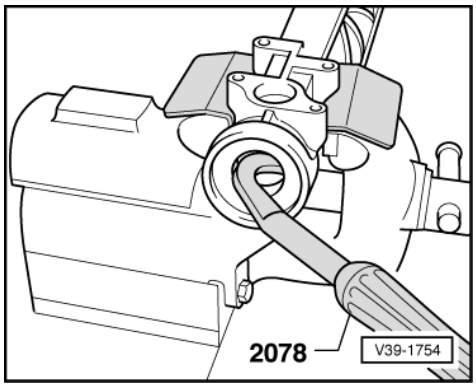
- -> Remove circlip -A-.
- Screw M8 bolt into tapped hole of cap -B- and pull out cap.



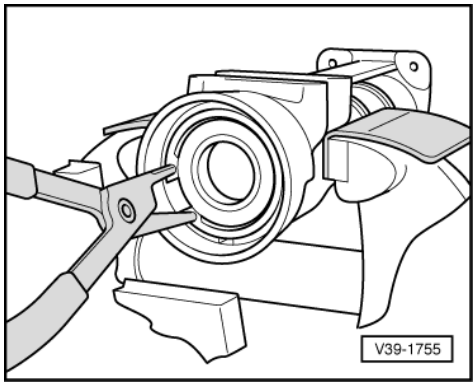
- -> Splay circlip -arrow- on flange shaft and slide in direction of splines.



- -> Remove flange shaft.
- Take circlip out of thrust tube.

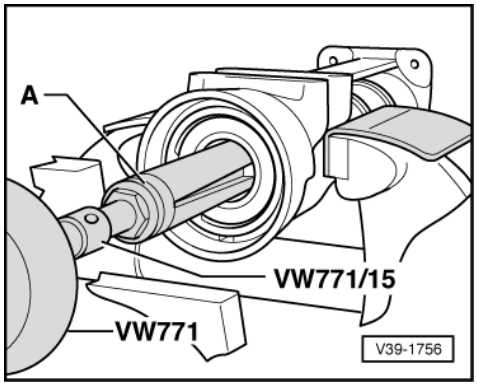


- -> Prise out oil seal.



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.

- -> Take out circlip.



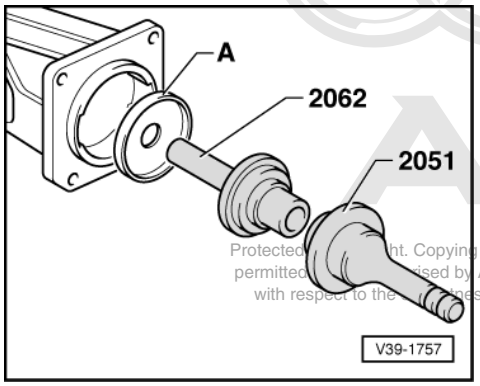
- -> Extract grooved ball bearing for flange shaft.

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

Note:

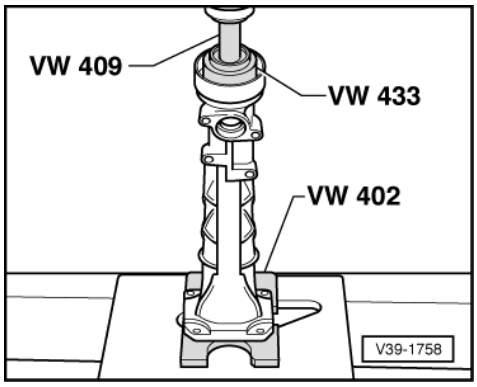
Bearing is damaged on removal.

In the event of baffle plate damage only:



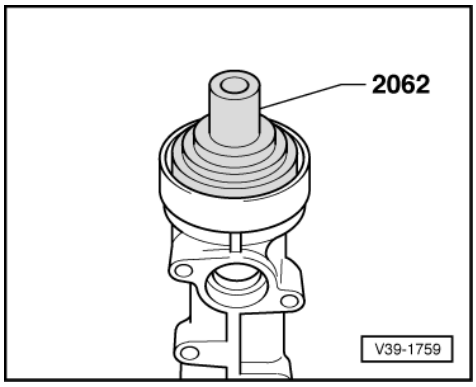
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- If baffle plate is damaged, press it out with flange shaft.
- -> Drive home baffle plate -A- on installation.

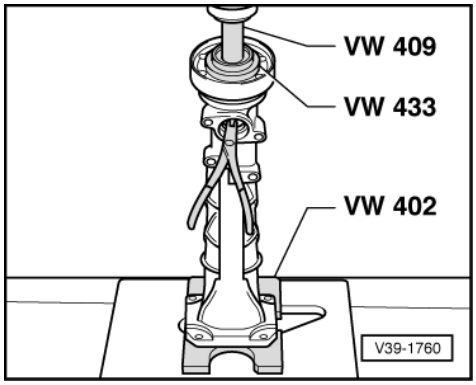


Assembling

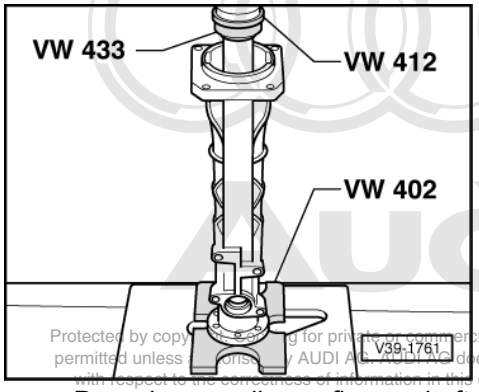
- -> Press grooved ball bearing into thrust tube.
- Fit outer circlip.



- Fill space between sealing and dust lip of oil seal with multi-purpose grease.
- -> Drive home oil seal.



- -> Insert inner circlip in thrust tube, hold with pliers and press in flange shaft.
- Insert circlip in groove.



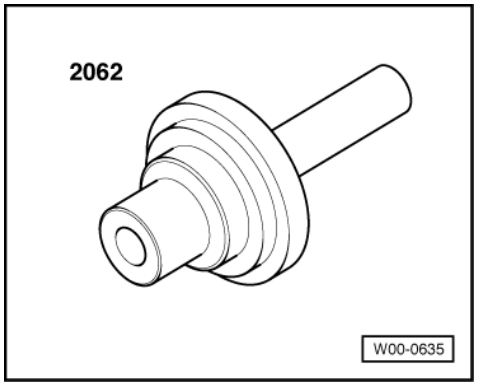
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Press home collar on flange shaft.
- Fit cap with oil seal.
- Fit circlip.
- Fit gearbox support.
- Attach O-ring to thrust tube.

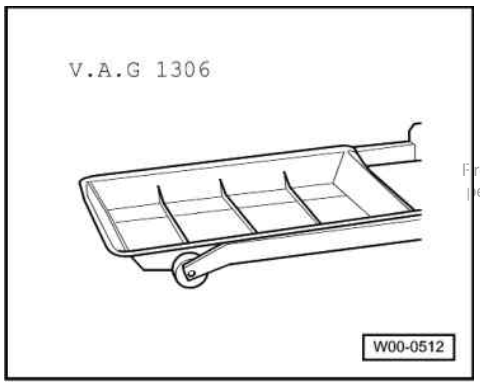
14 - Replacing oil seals for flange shafts

14.1 - Replacing oil seals for flange shafts

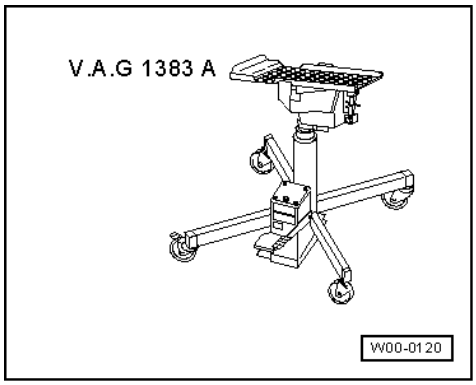
Special tools, testers and other items required



- Fitting mandrel 2062



- Drip tray V.A.G 1306



- Engine/gearbox lifter V.A.G 1383 A
- Universal holder V.A.G 1359/2

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.

Removing

- Rear final drive fitted

- Pay attention to general repair instructions=> Page 10 .

Note:

Exhaust system only has to be removed for replacing left oil seal.

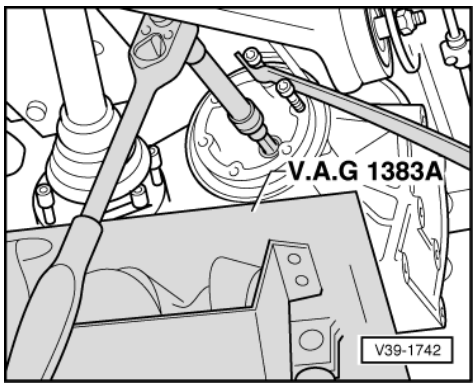
- Remove rear section of exhaust system as of clamp(s).

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

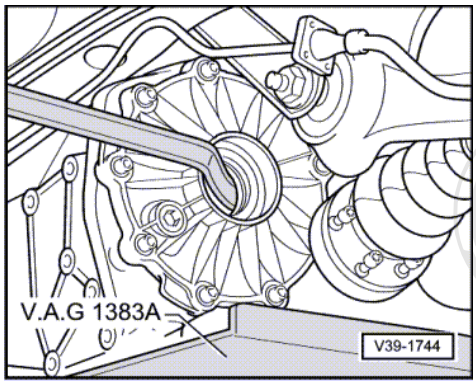
- Detach left/right drive shafts from rear final drive and lay aside.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42; Removing and installing drive shaft Removing and installing drive shaft

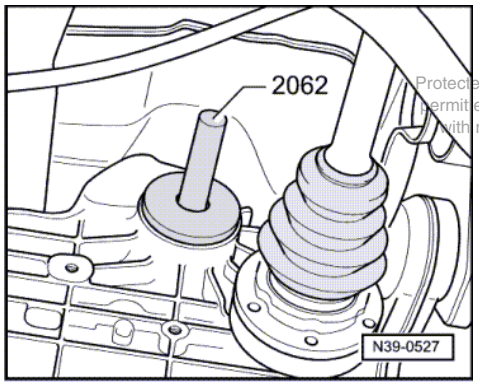
Removing



- -> Remove flange shaft. To slacken off securing bolt, screw two bolts into flange shaft and provide support with suitable tool.
- Place drip tray V.A.G 1306 in position and drain off gear oil.
- Pull on bolts screwed in to remove flange shaft.



- -> Use suitable tool to prise out flange shaft oil seal.

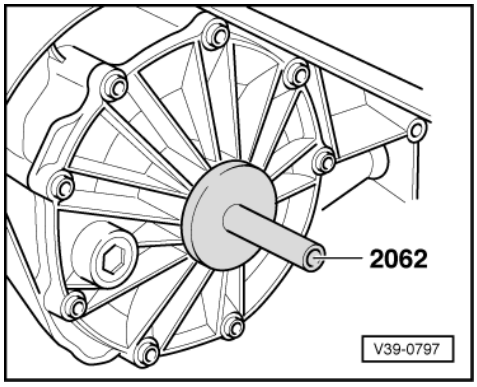


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Installing

Install in reverse order, paying attention to the following:

- Clean seat for oil seal.
- Moisten outer circumference of oil seal with gear oil.
- Fill space between sealing and dust lip with multi-purpose grease.
- -> Drive home left flange shaft oil seal with fitting mandrel 2062, taking care not to tilt oil seal.



- -> Drive home right flange shaft oil seal with fitting mandrel 2062, taking care not to tilt oil seal.
- Screw on drive shaft.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42; Removing and installing drive shaft Removing and installing drive shaft

- Perform stress-free alignment of exhaust system.

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

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Top up gear oil in rear final drive and check oil level => Page 354 .

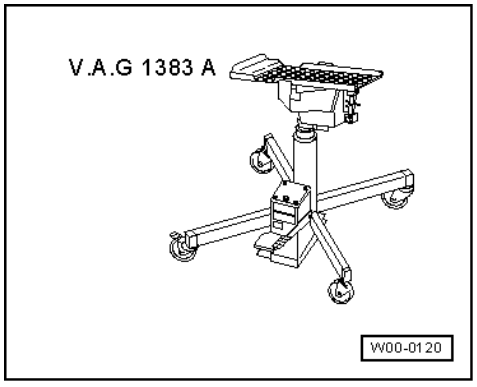
Tightening torque

Component	Nm
Flange shaft to final drive	25

15 - Removing and installing rear final drive

15.1 - Removing and installing rear final drive

Special tools, testers and other items required



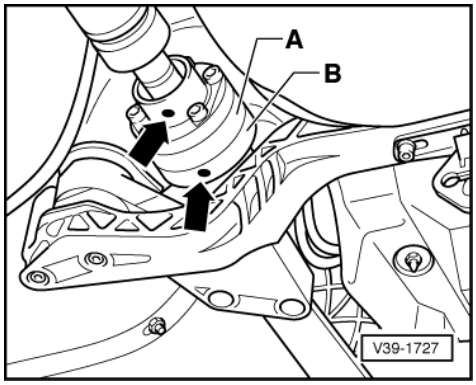
- Engine/gearbox lifter V.A.G 1383 A
- Universal holder V.A.G 1359/2

Removing

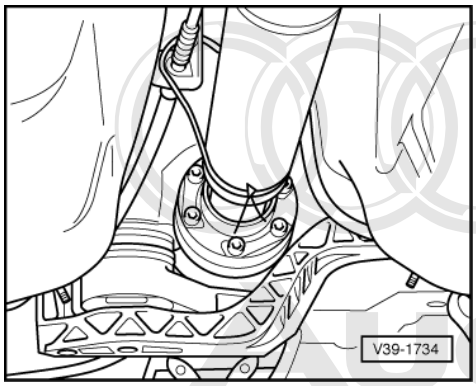
- Remove rear section of exhaust system as of clamp(s).

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

- Remove heat shield over propshaft.



- -> Check for factory mark (coloured dot) at propshaft. If there is no coloured dot, make coloured mark to identify position of propshaft flange -A- with respect to rear final drive -B-.
- Screw out bolts of propshaft flange.



- -> Use wire to tie up propshaft at holder for handbrake cable.

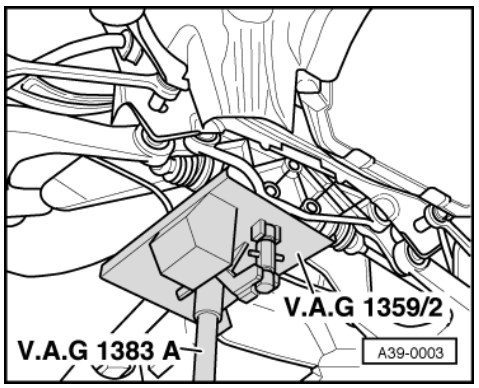
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

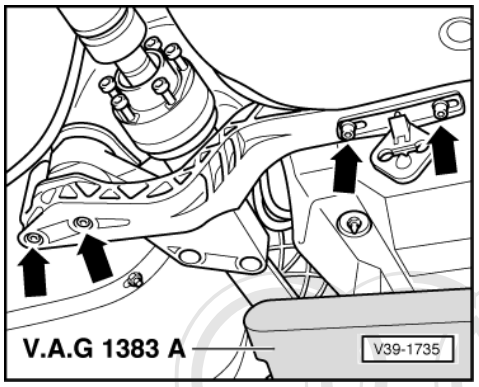
If propshaft cannot be pressed upwards past flange, lower final drive and then tie up propshaft. When lowering, secure propshaft to stop it falling and pay attention to permissible propshaft bending angle => Notes, Page 344 .

- Detach left/right drive shafts from rear final drive.

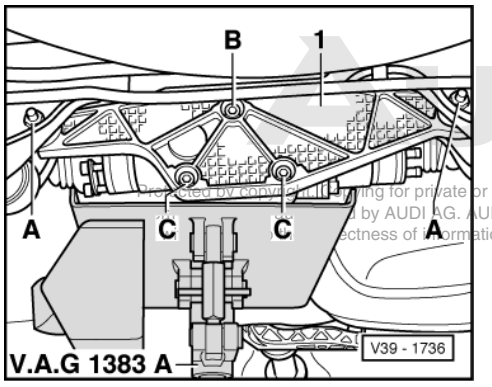
=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42; Removing and installing drive shaft Removing and installing drive shaft



- -> Support final drive with gearbox lifter V.A.G 1383 A and universal holder V.A.G 1359/2.
- Secure final drive with strap.



- -> Screw out bolts -arrows- at front cross member for rear final drive.
- Detach front cross member.



- -> Screw out bolts -B- and -C- of rear cross member at rear final drive.
- Lower final drive with gearbox lifter.

Note:

Cross member -1- does not have to be removed.

Installing

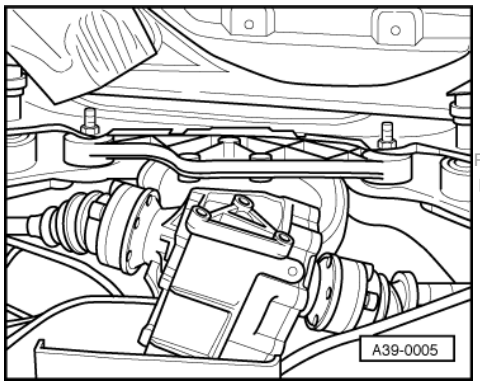
Install in reverse order, paying attention to the following:

Notes:

- Always 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.

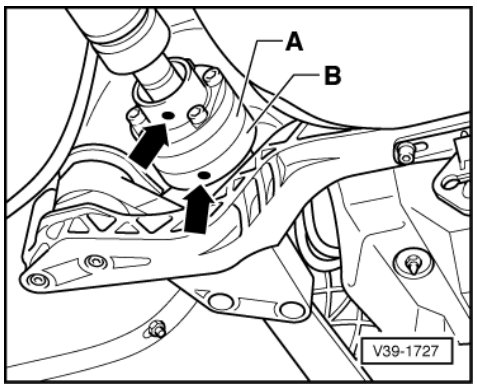
- After removing propshaft, always remove residual locking fluid from flange shaft threads at rear final drive. Otherwise there would be a danger of the bolts seizing when screwed in and shearing off on renewed disassembly.
- Cleaning can be performed using a thread tap.
- Replace seal between propshaft and input flange (remove backing and bond seal to flange shaft). Bonding surface must be free from grease.
- Replace propshaft bolts (self-locking).



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

- -> Raise final drive with gearbox lifter until both drive shafts can be connected.
- Slightly tighten drive shaft bolts.
- Raise final drive and bolt to cross member and gearbox support.
- Bolt on propshaft => Page 349 .

Notes:



- -> To prevent imbalance, flanges of propshaft -A- and rear final drive -B- must be fitted such that coloured marks are aligned -arrows-.
- After detaching propshaft from rear final drive, do not re-install additional balancing plate (thicker packing plate) which may have been fitted between washer and bolt head.
- Replace propshaft bolts (self-locking).

- Bolt on drive shafts.

=> Running Gear, Front-wheel Drive and Four-wheel Drive; Repair Group 42; Removing and installing drive shaft Removing and installing drive shaft

- Check gear oil in rear final drive=> Page 354 .
- Perform stress-free alignment of exhaust system.

=> Engine, Mechanics; Repair Group 26; Removing and installing exhaust system components Removing and installing exhaust system components

Tightening torques

Component		Nm
Propshaft to final drive		55

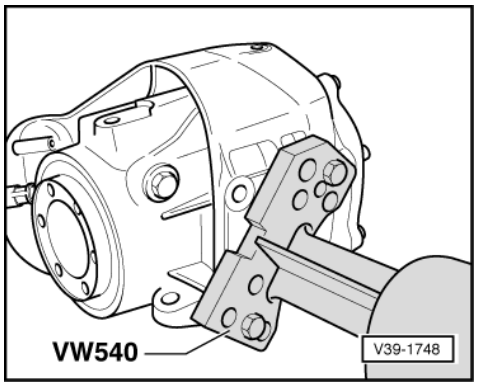
Gearbox support to thrust tube	40
Front cross-member to body - M10	40
Front cross-member with exhaust system bracket to body - M8	23
Rear cross-member to final drive	55
Rear cross-member to subframe	50
Heat shields to final drive	25

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.

15.2 - Attaching rear final drive to repair stand

Special tools, testers and other items required

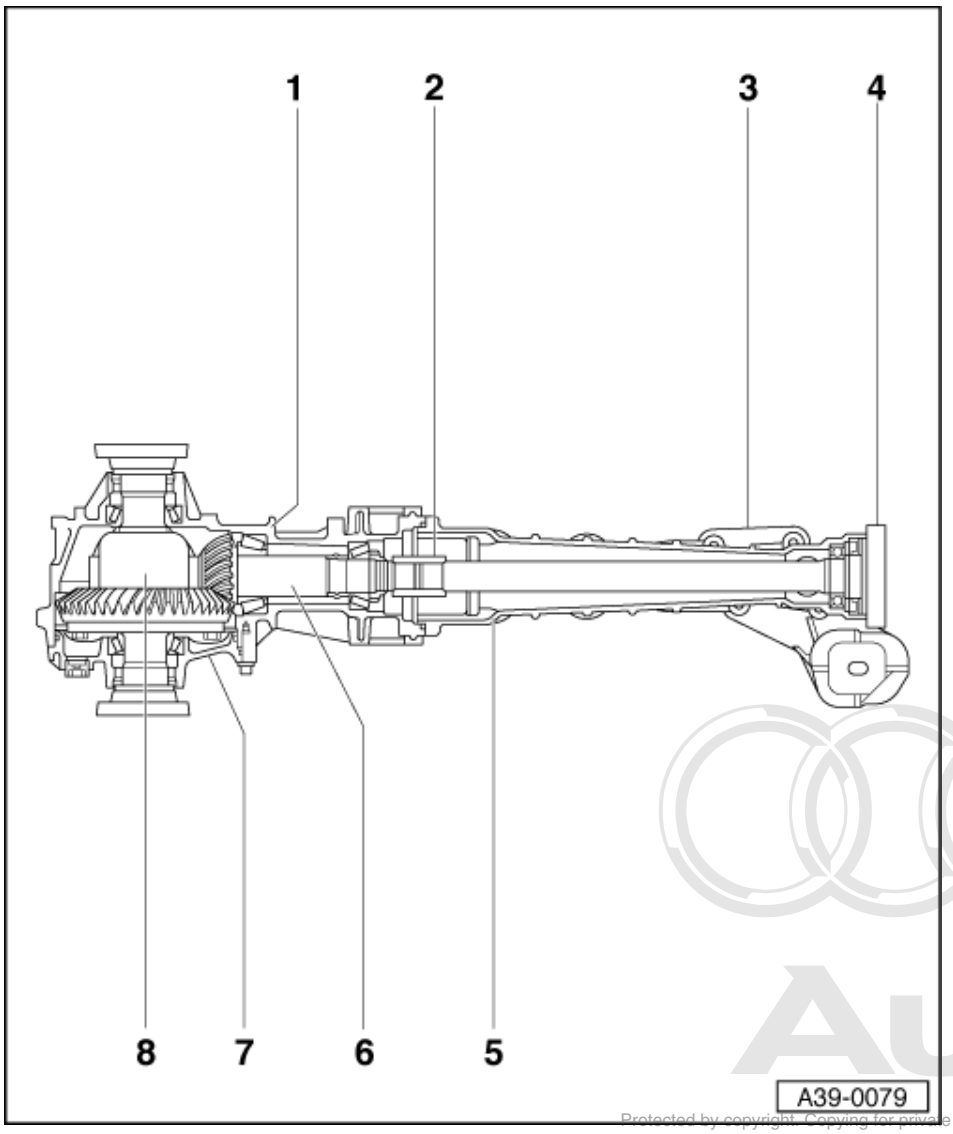
- Engine and gearbox holder VW 540



- -> Attach rear final drive assembly with engine and gearbox holder VW 540 to repair stand.

16 - Dismantling and assembling rear final drive

16.1 - Dismantling and assembling rear final drive



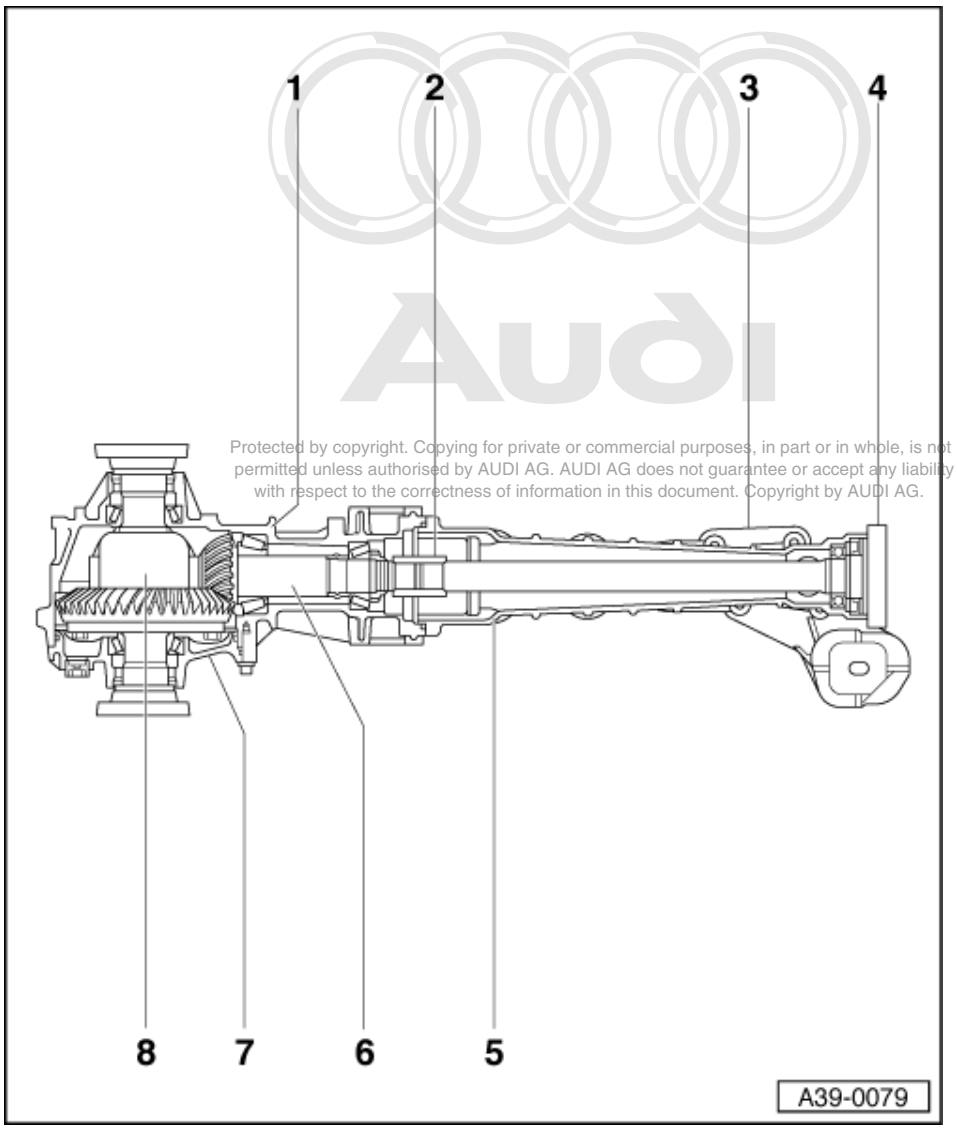
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

16.2 - Exploded view of gearbox

Notes:

- Separating thrust tube from rear final drive with final drive in position => Page 355
- Separating thrust tube from rear final drive with final drive removed => Page 374

1 Housing for final drive
2 Collar
3 Gearbox support
4 Flange for propshaft
- Removing => Page 363



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Thrust tube

- Removing and installing
  => Page 355

6 Drive pinion

- Paired with crown wheel
- Removing and installing drive pinion => Page 394

7 Final drive cover

8 Differential

- Must be removed before taking out drive pinion
- Removing and installing
  => Page 376
- Dismantling and assembling
  => Page 382

Separating thrust tube from rear final drive

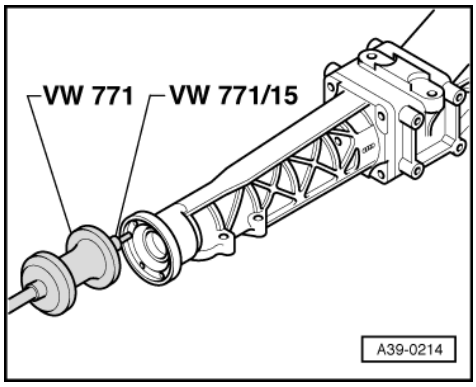
- Rear final drive removed

Special tools, testers and other items required

- Multi-purpose tool VW 771 with 771/15

- Drip tray V.A.G 1306

- Attach rear final drive to repair stand => Page 372 .
- Place drip tray V.A.G 1306 in position and drain off gear oil.
- Screw out thrust tube/final drive housing bolts.

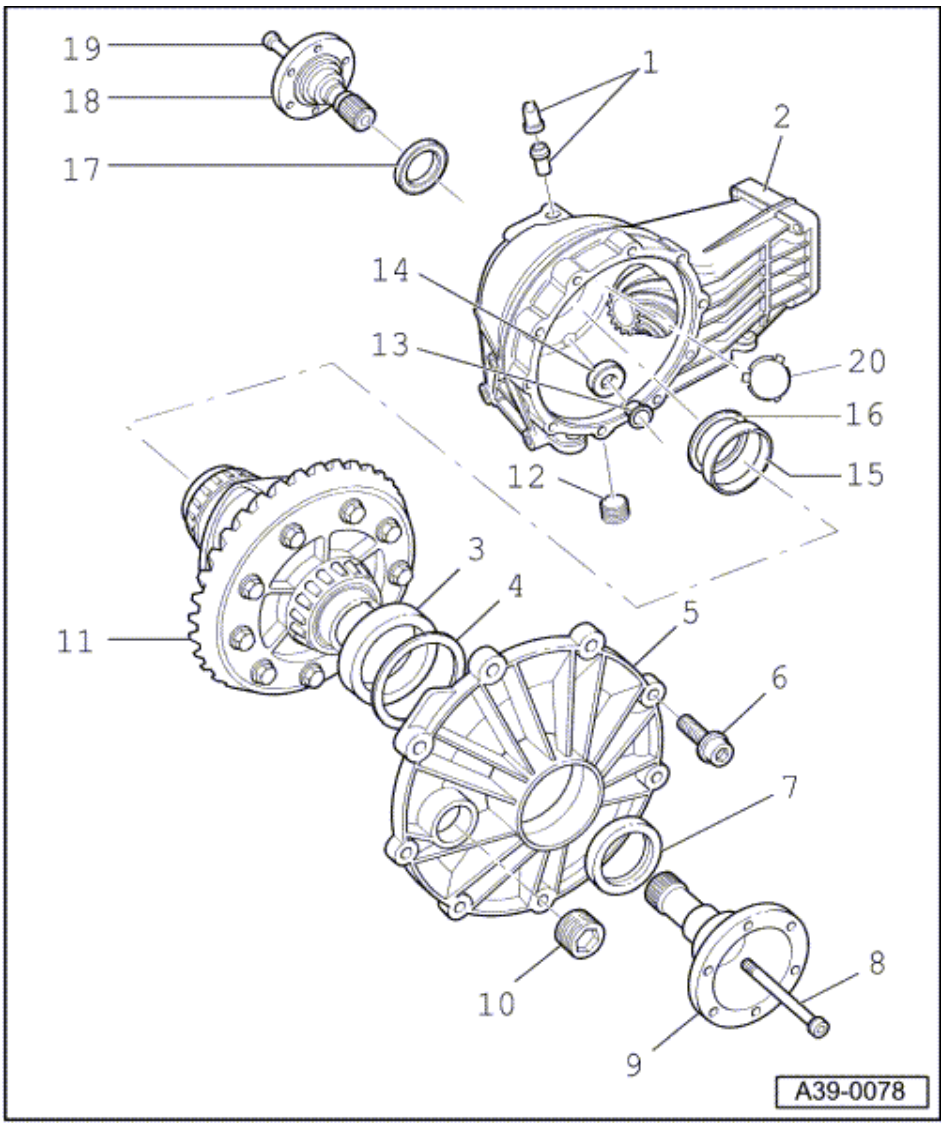


- -> Provide support for thrust tube and detach it at flange shaft.

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.

17 - Removing and installing differential

17.1 - Removing and installing differential



Notes:

- General repair instructions =>Page 10 .
- Attaching final drive to repair stand
  => Page 39-132.
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 404 .

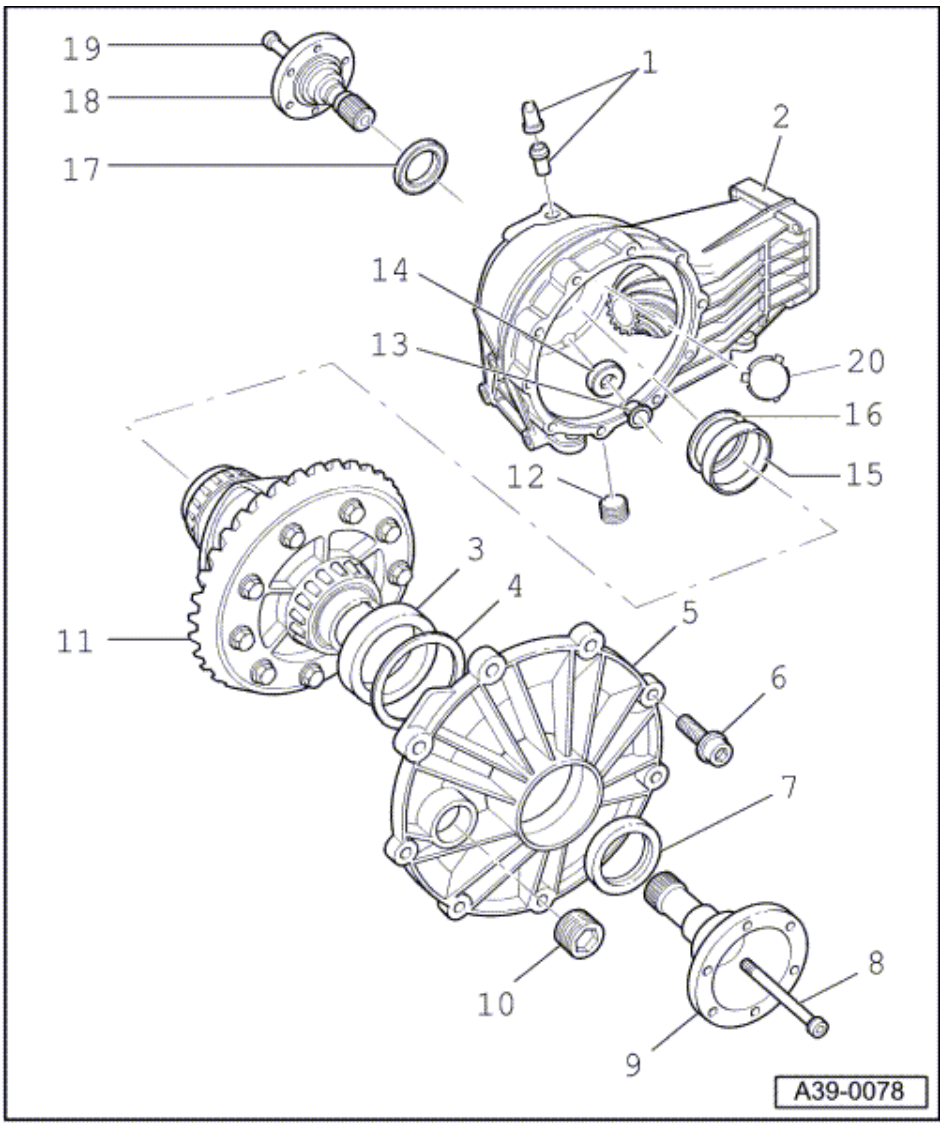
1 Breather sleeve

- With rubber valve
- Installation position => Fig. 3

2 Final drive housing 1)

- With drive pinion
- Removing and installing drive pinion
  => Page 394

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 taper roller bearing, large 1)

- Driving out => Fig. 391
- Pressing in => Fig. 392

4 Shim "S1"

- Note thickness
- Adjustment table => Page 404

5 Cover for final drive 1)

- With O-ring
- Replace O-ring
- Apply oil to O-ring when fitting

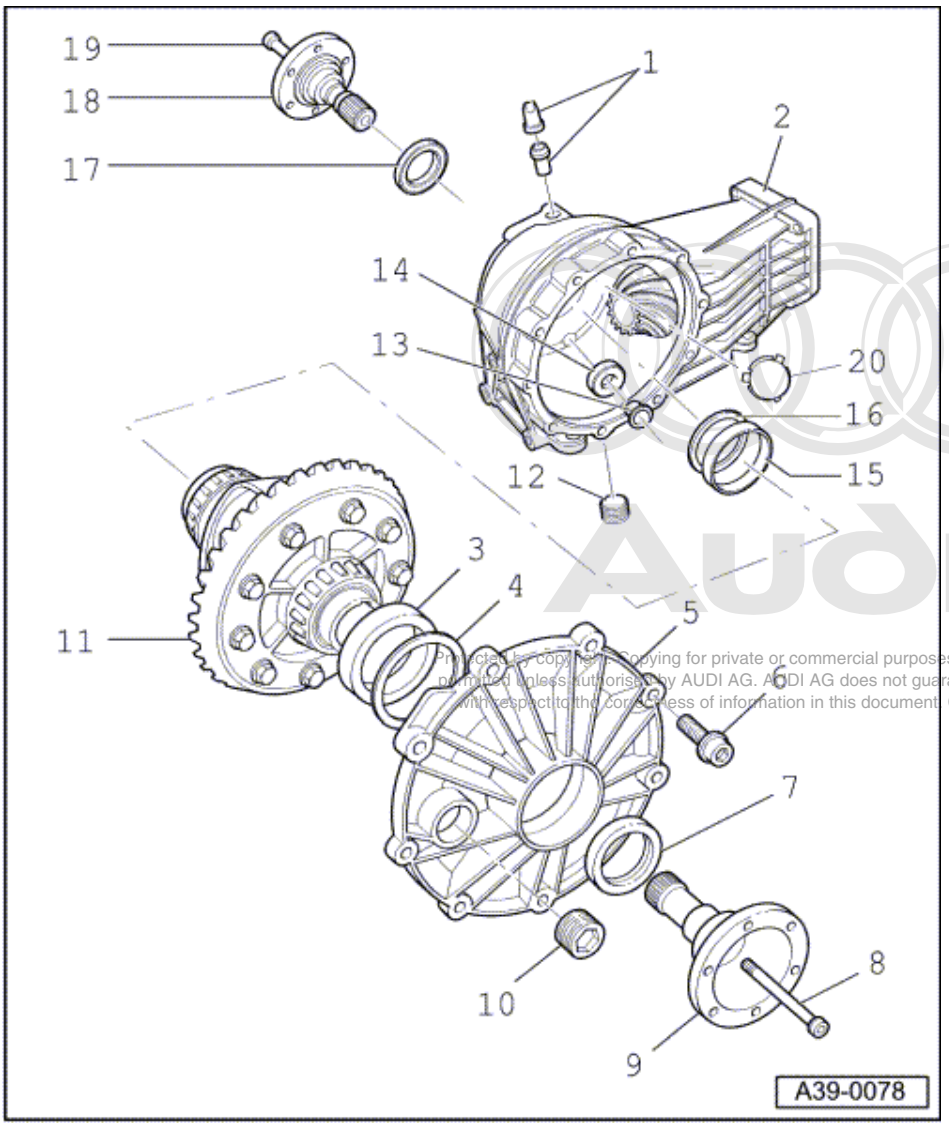
6 TORX bolt, 25 Nm

7 Right oil seal

- Replacing => Page 366

8 Hexagon socket-head 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.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Right flange shaft

- Removing and installing => Fig. 1

10 Oil filler plug, 35 Nm

11 Differential with crown wheel 1)

- Dismantling and assembling
  => Page 382

12 Oil drain plug, 35 Nm

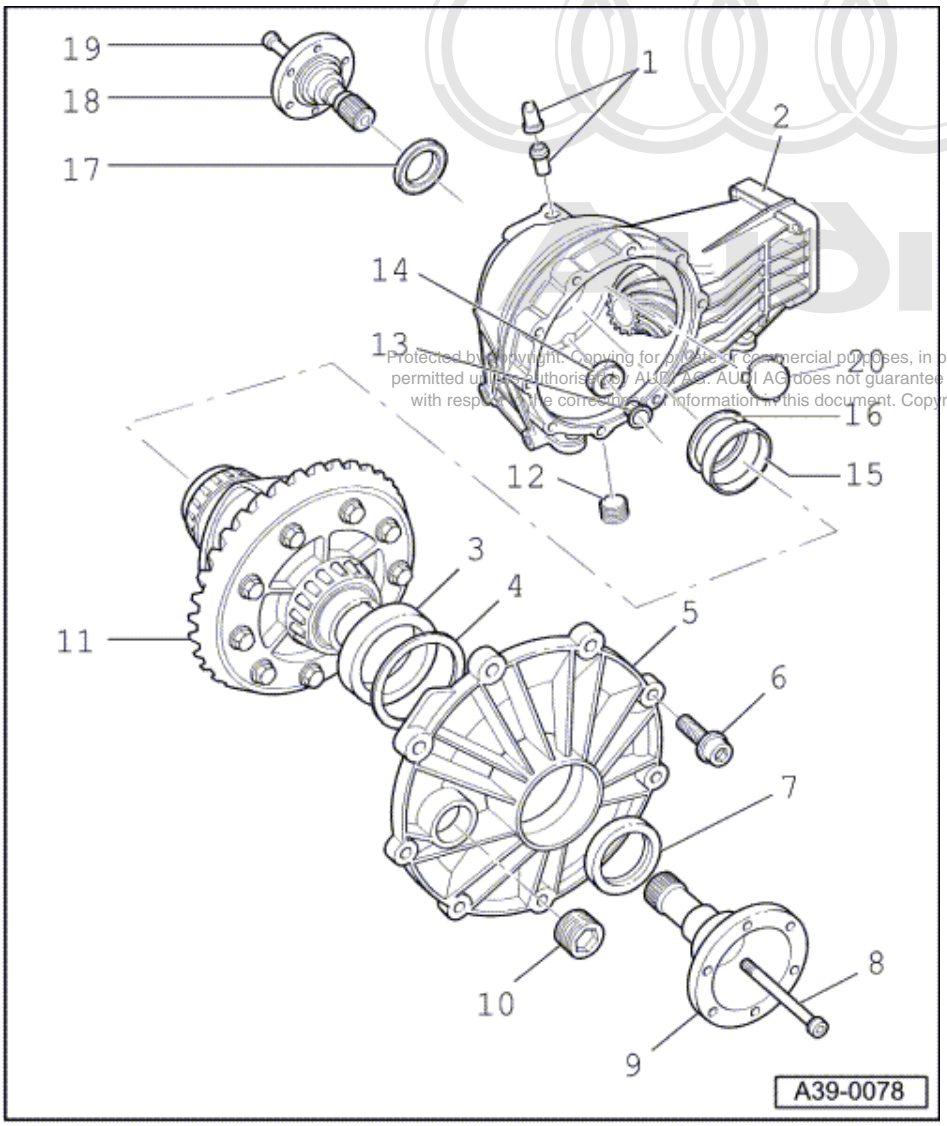
13 Bushing

- Holds magnet in position
- Drive home

14 Magnet

15 Outer race for taper roller bearing, small 1)

- Driving out => Fig. 389
- Pressing in => Fig. 389



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Shim "S2"

- Note thickness
- Adjustment table=>Page 404

17 Left oil seal

- Replacing => Page 366

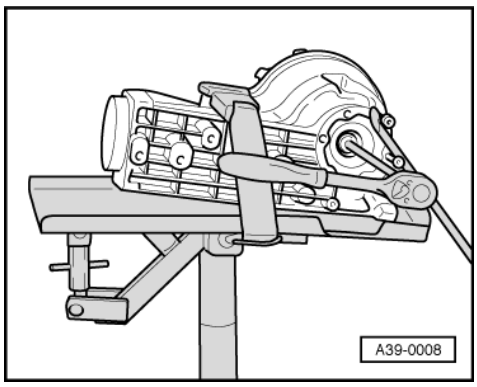
18 Left flange shaft

- Removing and installing => Fig. 1

19 Hexagon socket-head bolt - 25 Nm

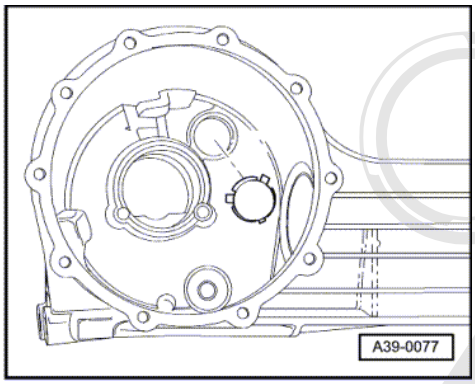
20 Cover

- Installing => Fig. 2



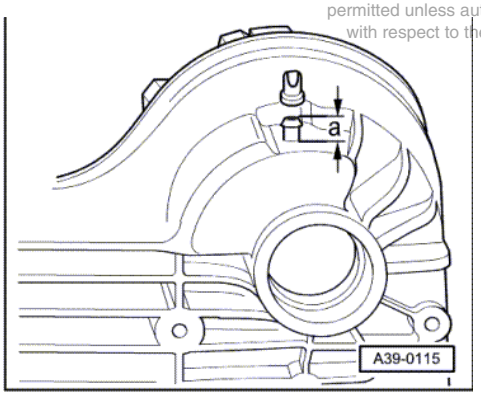
-> Fig.1 Removing and installing flange shaft

- To slacken off securing bolt, screw 2 bolts into flange shaft and provide support with suitable tool.
- Pull on bolts screwed in to remove flange shaft.



-> Fig.2 Pressing home 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.



-> Fig.3 Installation position of breather sleeve

After pressing in, breather sleeve must protrude 13 mm (dimension -a-) out of housing.

Slot in rubber valve is in parallel with direction of travel.

Removing and installing differential

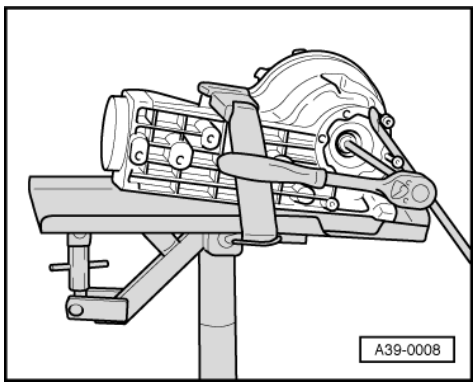
- Rear final drive removed

Special tools, testers and other items required

- Drip tray V.A.G 1306

Removing

- Attach rear final drive assembly to repair stand => Page 372 .
- Place drip tray V.A.G 1306 in position and drain off gear oil.

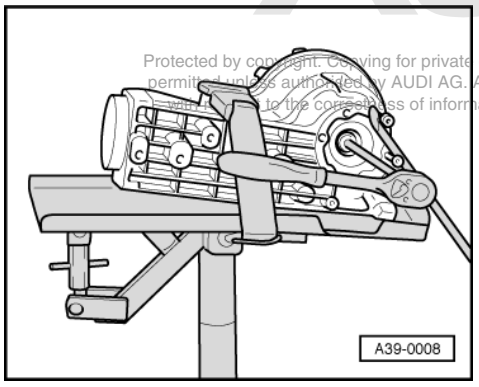


- -> Remove left and right flange shafts.
- To slacken off securing bolt, screw 2 bolts into flange shaft and provide support with suitable tool.
- Mark flange shafts (left and right).
- Pull on bolts screwed in to remove flange shaft.
- Screw out bolts of cover for final drive.
- Detach cover for final drive from axle housing and take out differential.

Installing

Install in reverse order, paying attention to the following:

- Insert differential.
- Replace O-ring for final drive cover and lubricate when fitting.
- Position cover for final drive on housing for final drive and tighten diagonally to 25 Nm.
- Fill space between sealing and dust lip with sealing grease G 052 128 A1.



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

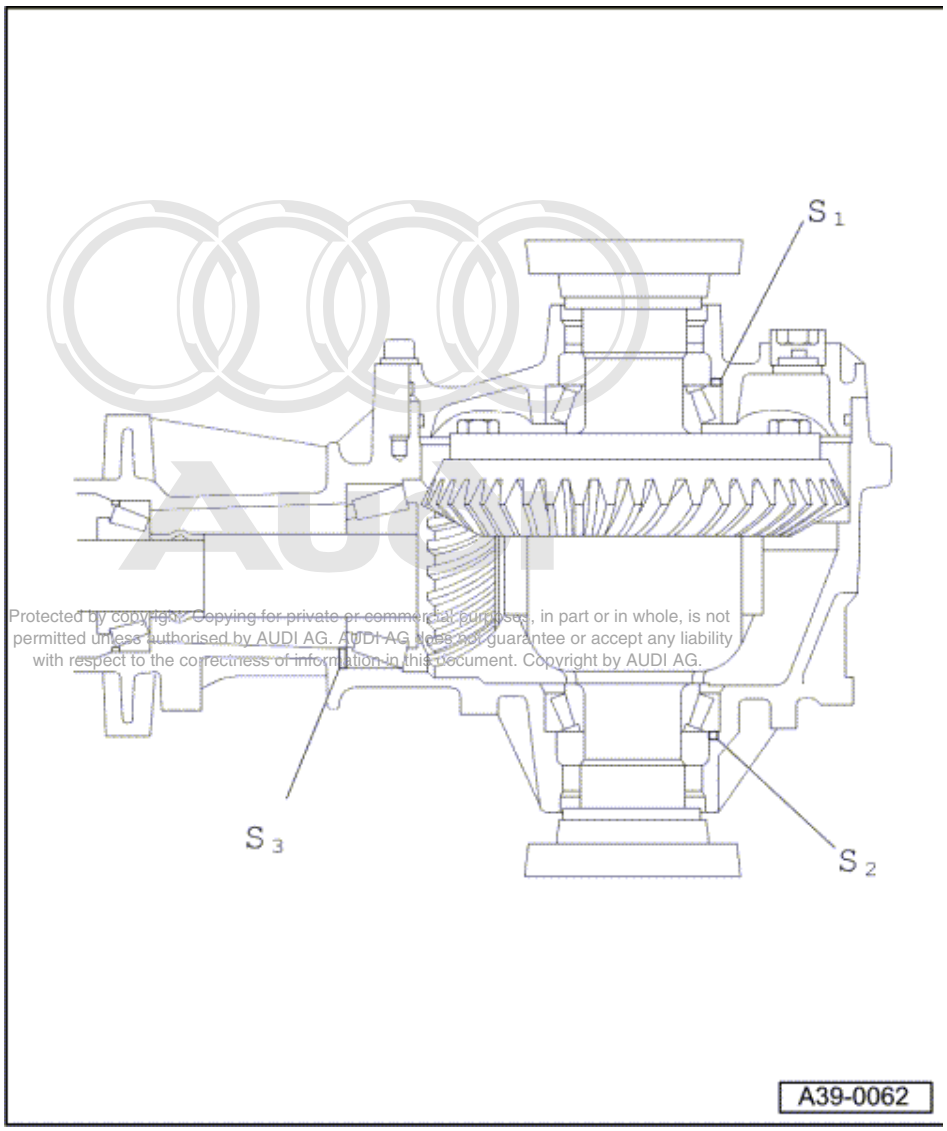
- -> Install and secure flange shafts.
- Top up gear oil in rear final drive and check oil level => Page 354 .

Tightening torques

Component	Nm
Cover for final drive to axle housing	25
Flange shaft to final drive	25

18 - Dismantling and assembling differential

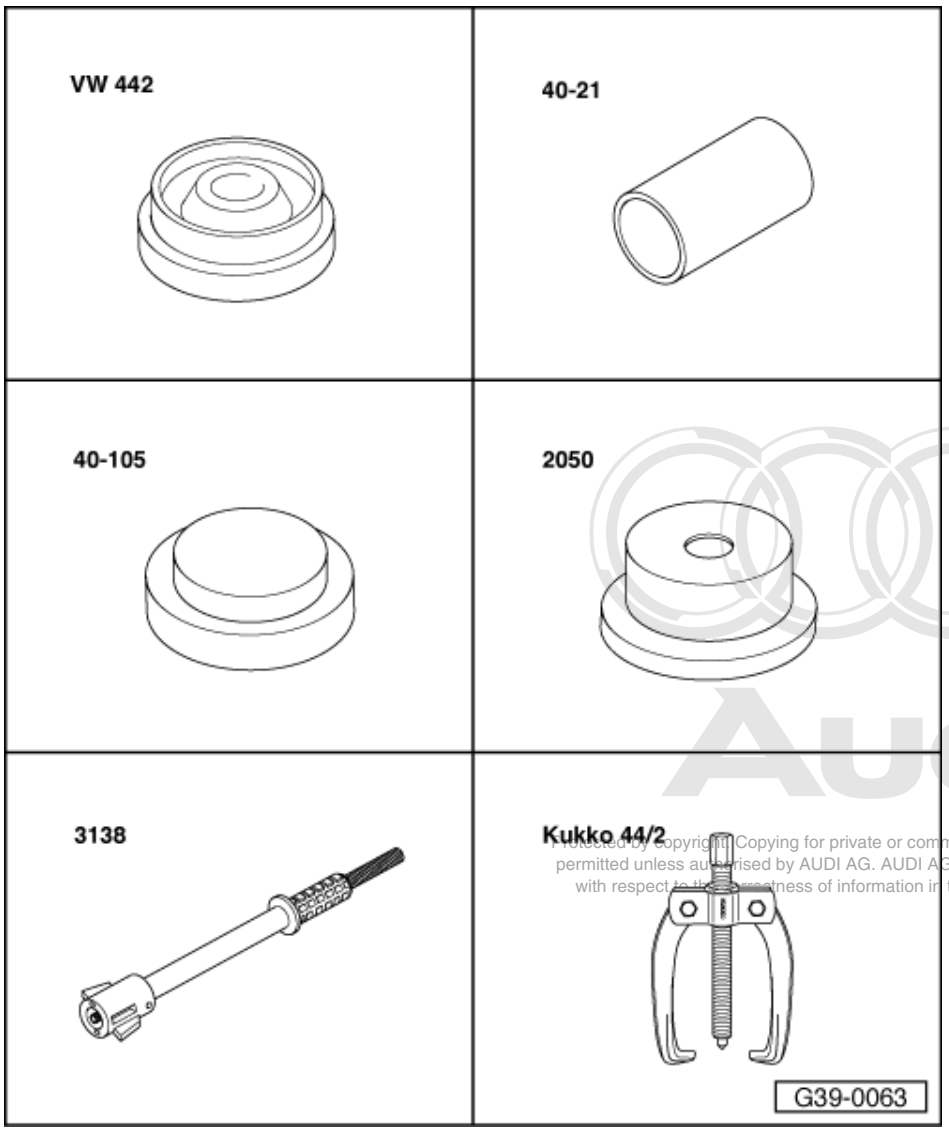
18.1 - Dismantling and assembling differential



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.

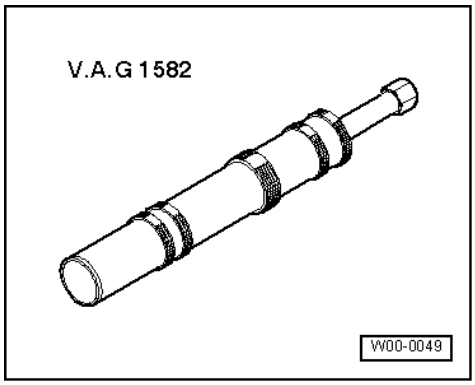
Special tools, testers and other items required

- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 412
- Mandrel VW 295
- Press tool VW 408 A

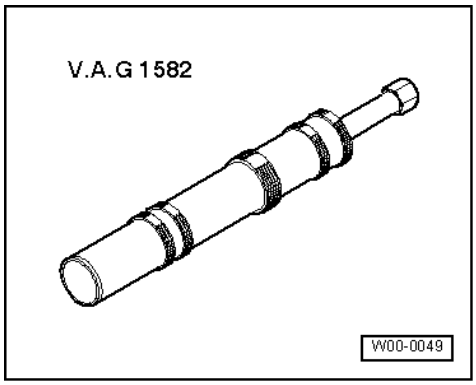


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

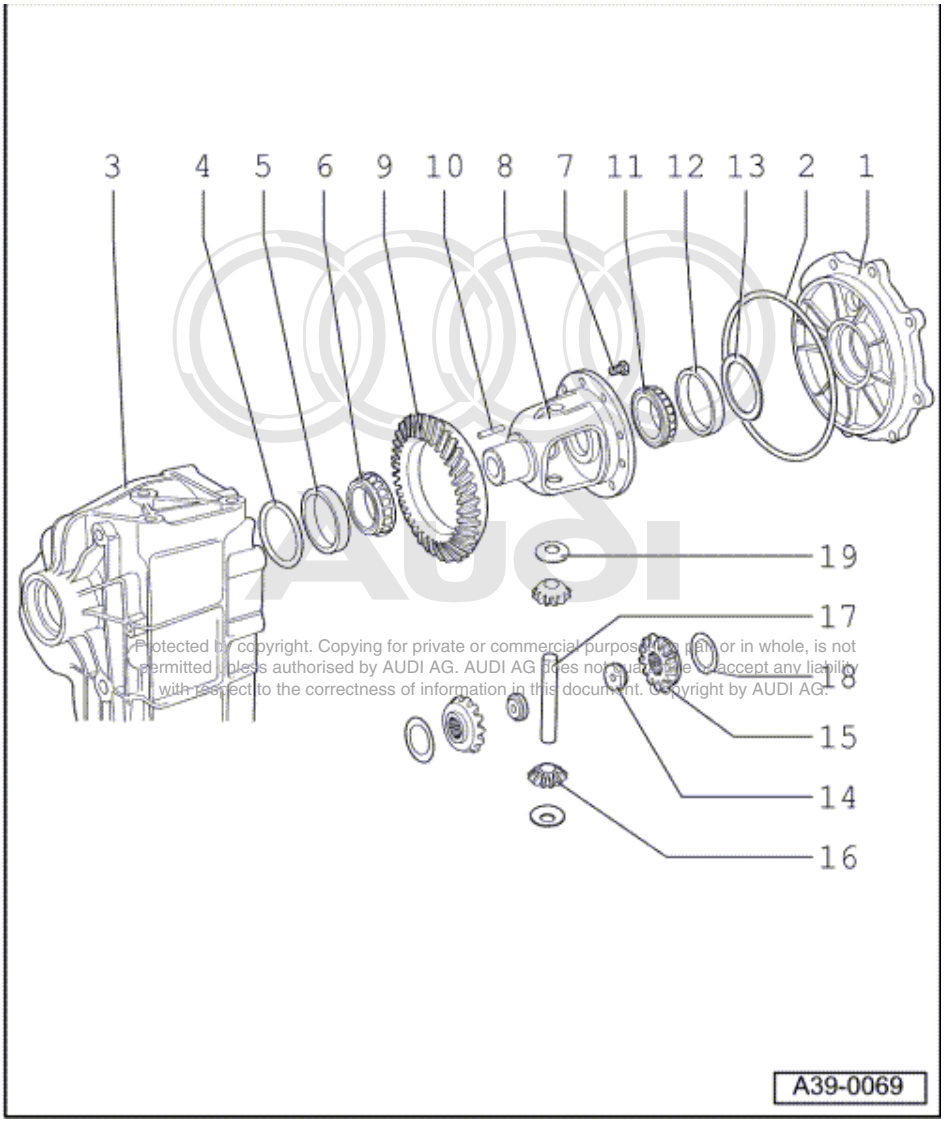
- Thrust pad VW 442
- Fitting sleeve 40-21
- Thrust plate 40-105
- Thrust pad 2050
- Driving-out tool 3138
- Two-arm puller, Kukko 44/2



◆ Taper roller bearing puller V.A.G 1582



- Gripper V.A.G 1582/6



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.

Notes:

- General repair instructions =>Page 10 .
- Always replace both differential taper roller bearings jointly. Use same makes wherever possible.

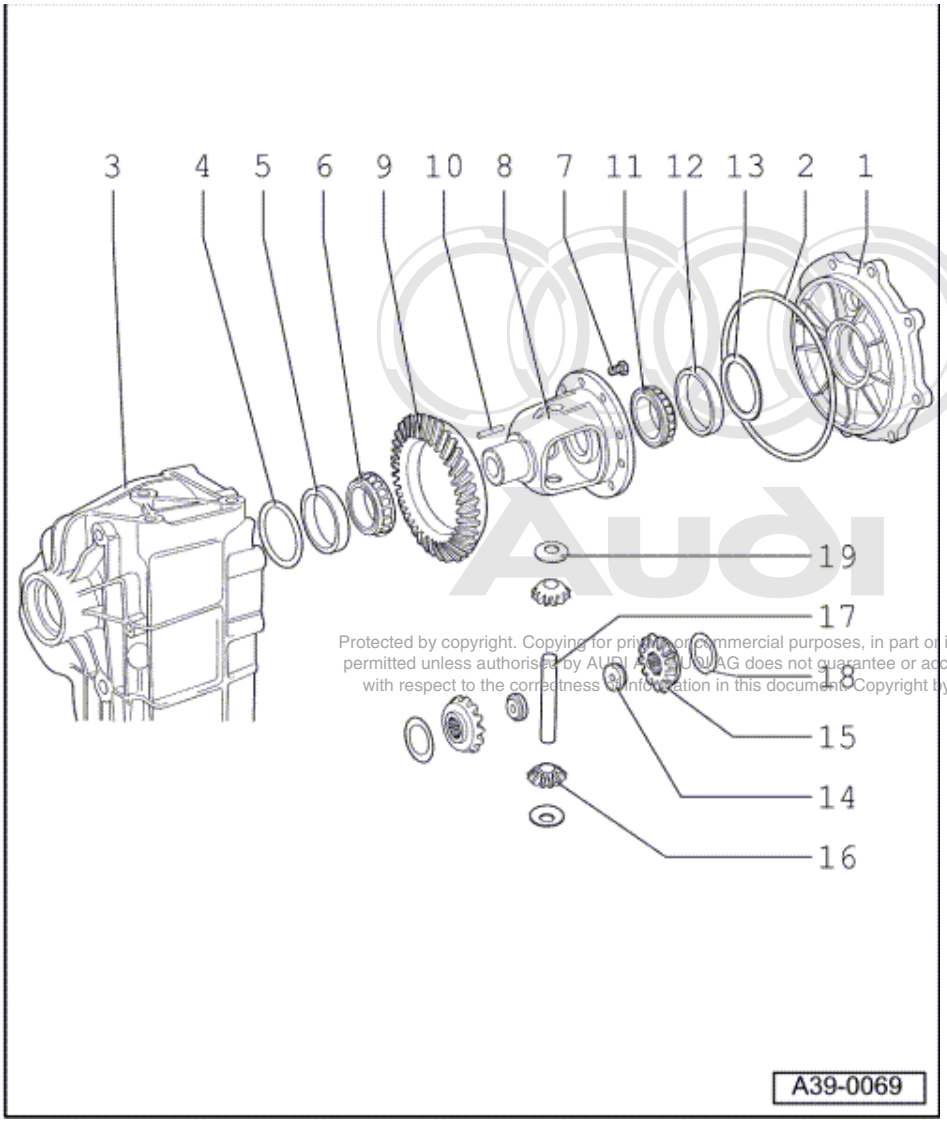
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 404 .

1 Cover for final drive 1)

2 O-ring

- Replace
- Oil on insertion

3 Final drive 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.

4 Shim "S2"

- Note thickness
- Adjustment table => Page 404

5 Outer race for taper roller bearing, small 1)

- Driving out => Fig. 1
- Pressing in => Fig. 2

6 Inner race for taper roller bearing, small 1)

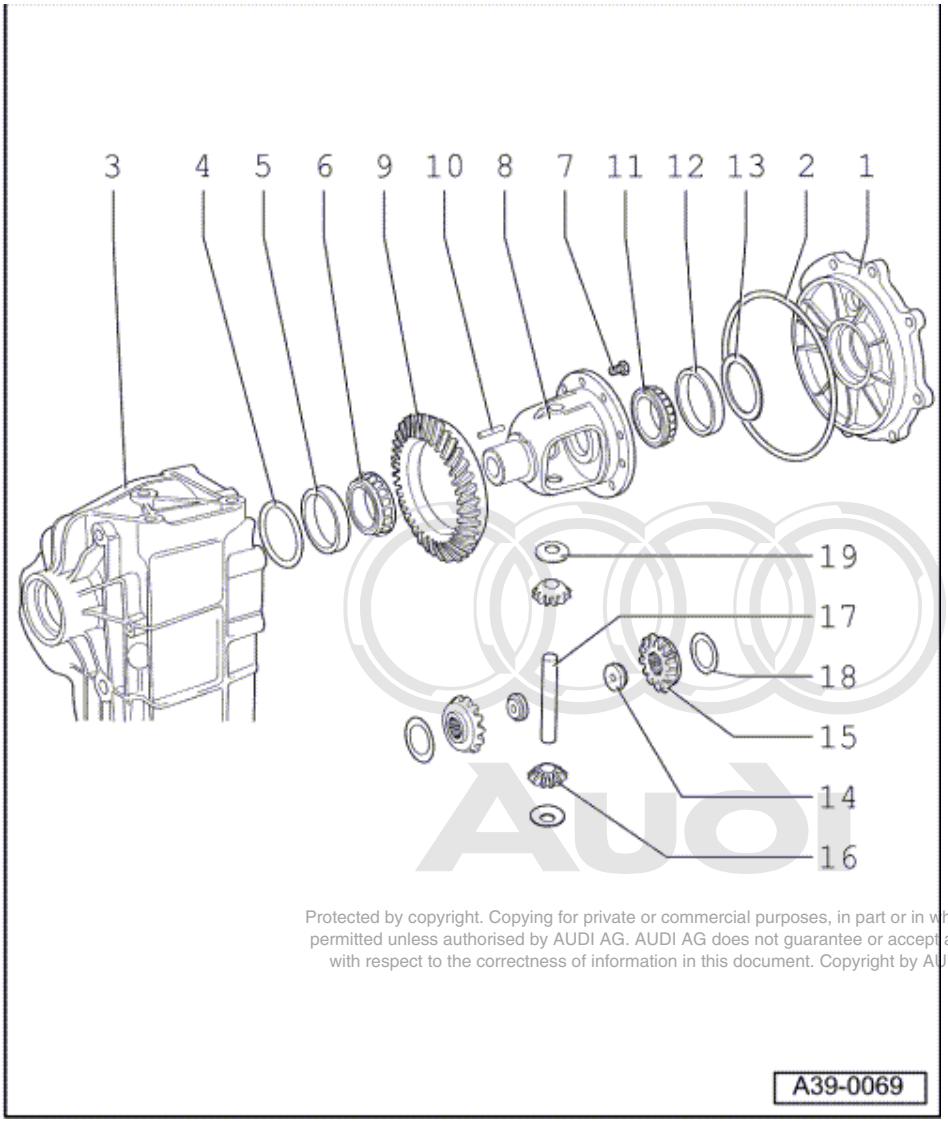
- Pulling off => Fig. 3
- Pressing on => Fig. 4

7 Bolt, 60 Nm + further 45°turn

- Replace
- Assignment

=> Parts List

- Tighten bolts alternately and then diagonally to 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.

8 Differential housing 1)

9 Crown wheel 1)

- Paired with drive pinion (pinion set)
- Assignment in line with gearbox code letters

=> Parts List

- Driving off housing with mandrel
  => Fig. 9
- Fitting on differential housing
  => Fig. 10

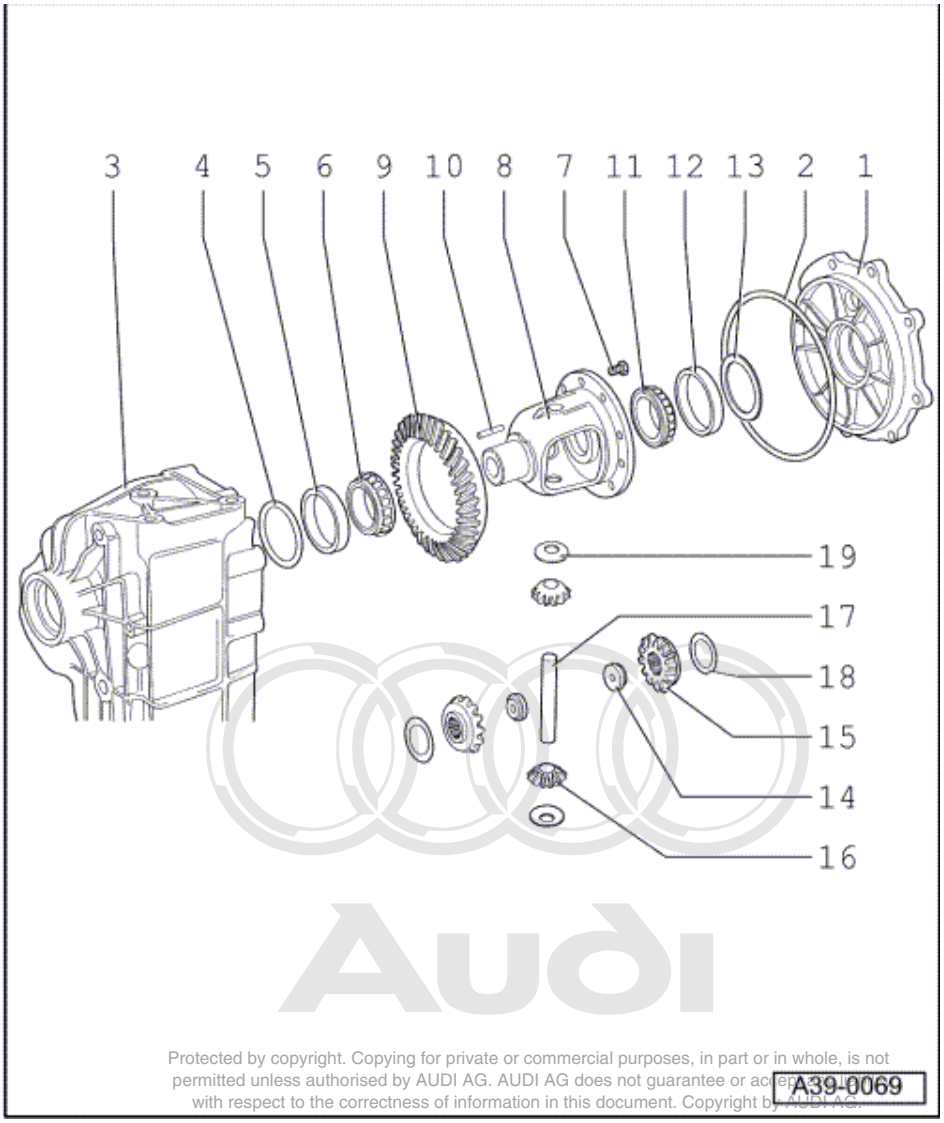
10 Spring pin

- For securing bevel gear shaft
- Drive in flush

11 Inner race for taper roller bearing, large 1)

- Pulling off => Fig. 5

- Pressing on => 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.

12 Outer race for taper roller bearing, large 1)

- Driving out => Fig. 7
- Pressing in => Fig. 8

13 Shim "S1"

- Note thickness
- Adjustment table=> Page 404

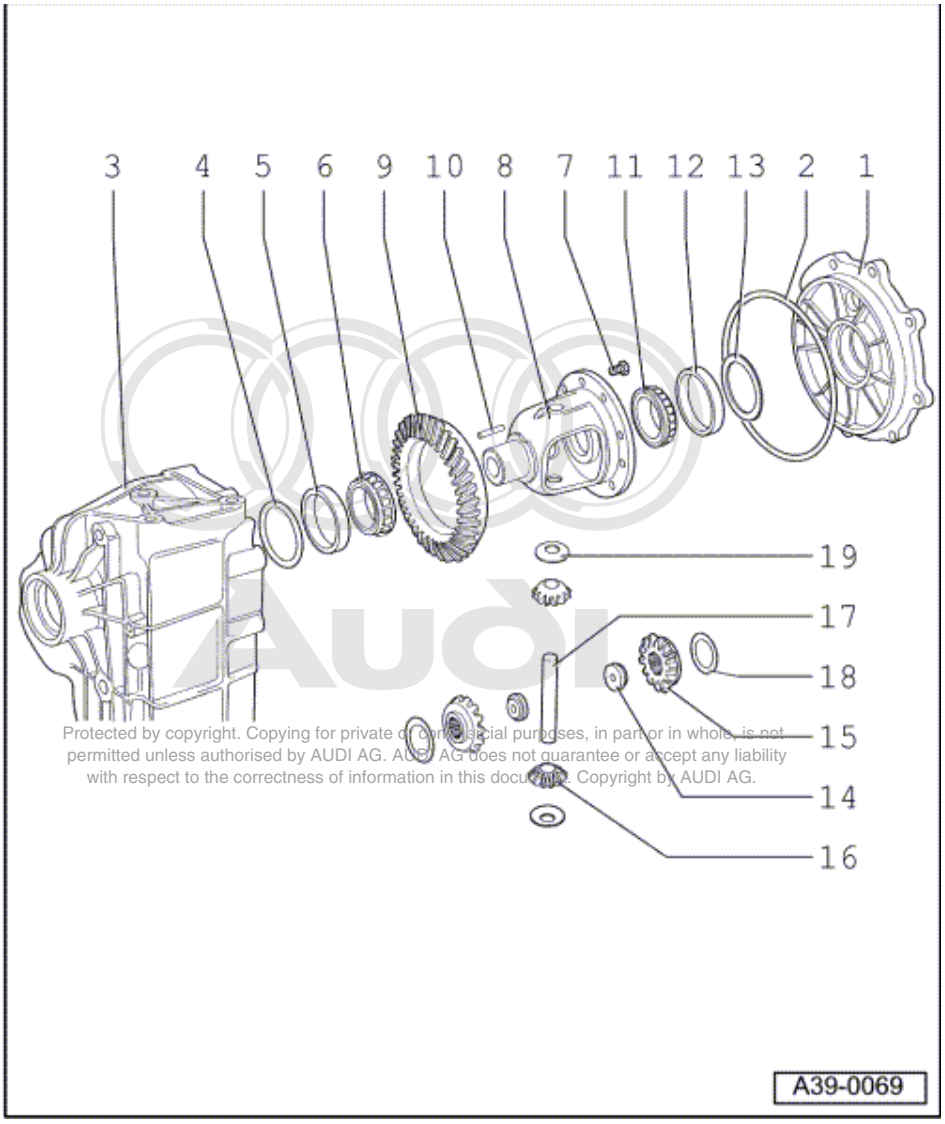
14 Threaded piece

15 Sun wheel

- Installing => Fig. 11
- Adjusting => Fig. 12

16 Planet pinion

- Installing => 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.

17 Shaft for bevel gears

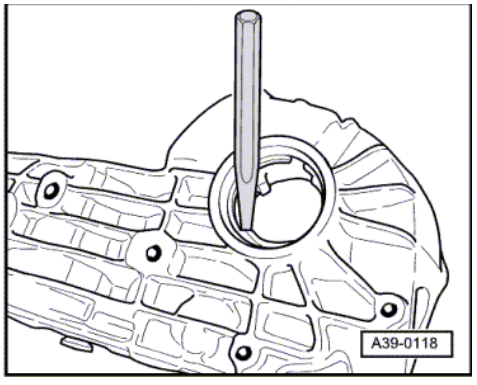
- Drive out with mandrel
- Drive in carefully, so as not to damage thrust washers
- Secure with spring pin -Item 10 -

18 Shim

- Re-determining thickness => Fig. 12

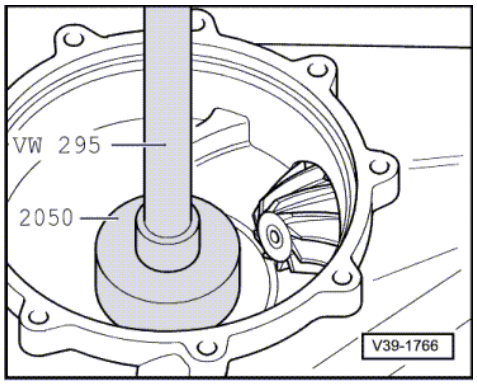
19 Thrust washer

- Check for cracks



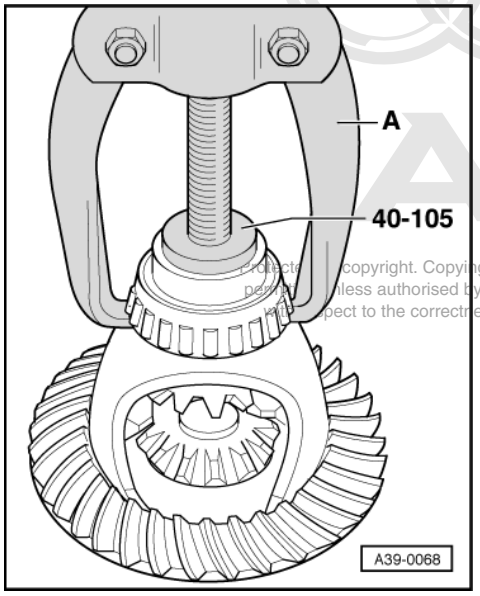
-> Fig.1 Driving outer race for taper roller bearing, small out of housing

- Check shims for damage following removal.



-> Fig.2 Pressing home outer race for taper roller bearing, small in housing

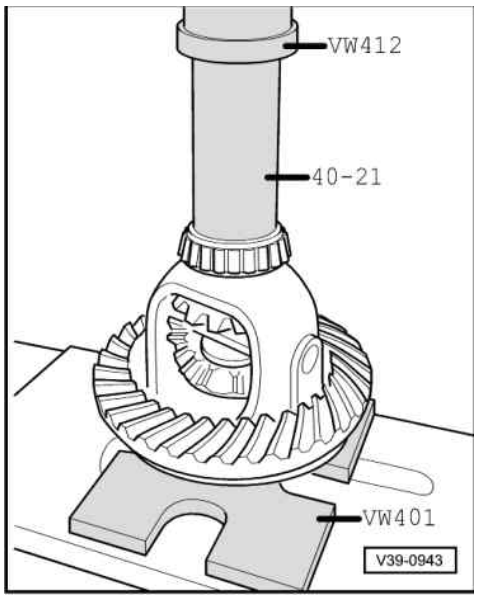
- Fit outer race evenly in position with VW 295 by tapping gently with hammer.
- Then drive home as shown.



Audi
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.

-> Fig.3 Pulling off inner race for taper roller bearing, small

A - Two-arm puller, e.g. Kukko 44/2

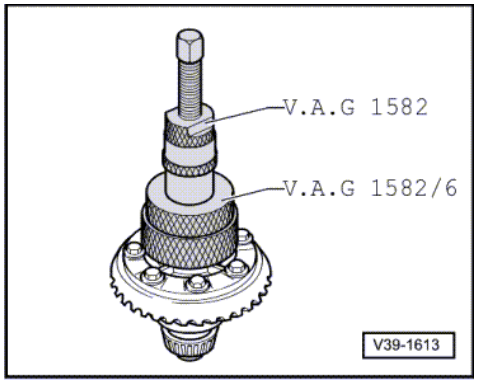


-> Fig.4 Pressing on inner race for taper roller bearing, small

Attention:
Wear protective gloves.

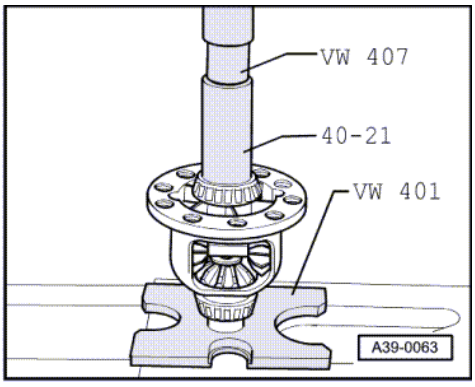
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

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



-> Fig.5 Pulling off inner race for taper roller bearing, large

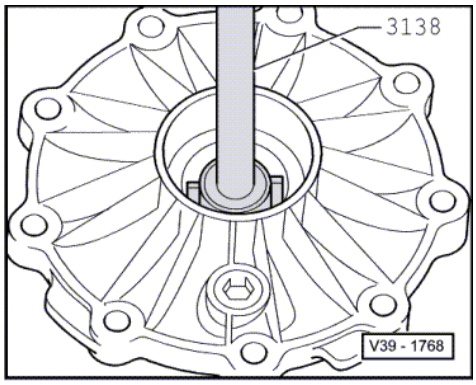
- Position thrust plate 40-105 on differential housing before setting up puller.



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

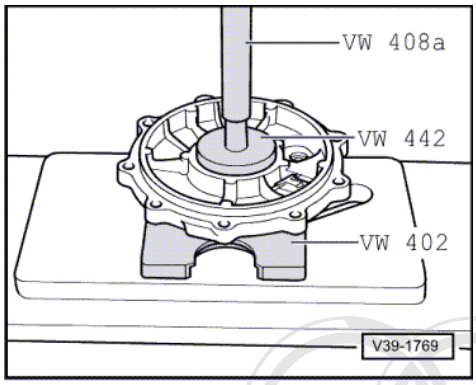
Attention: Wear protective gloves.

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



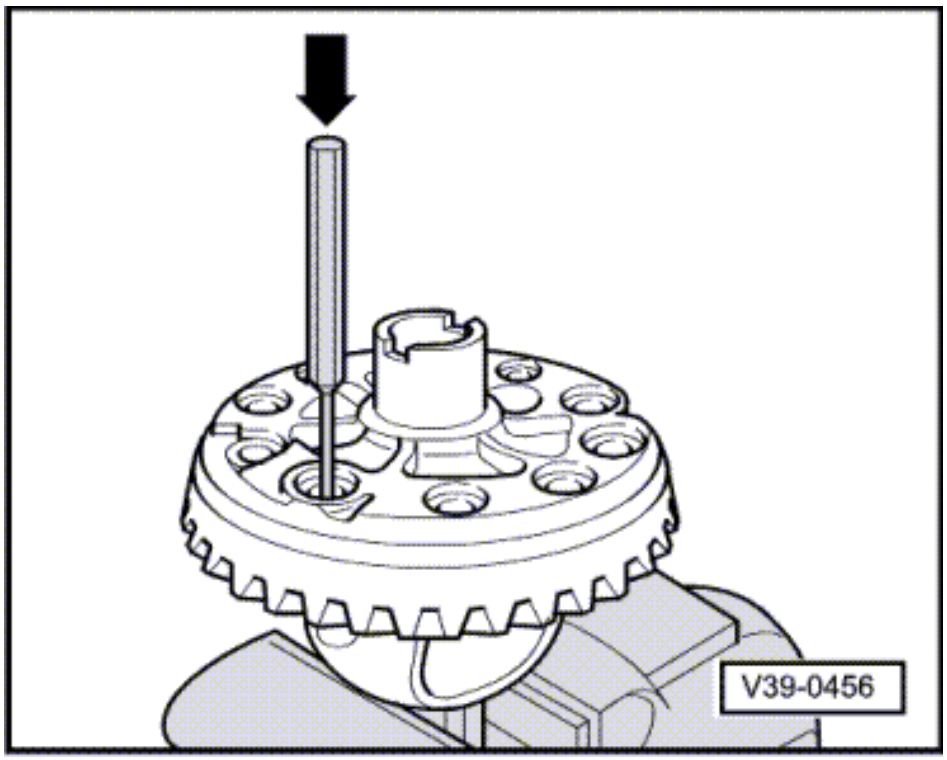
-> Fig.7 Driving outer race for taper roller bearing, large out of cover

- Check shims for damage following removal.

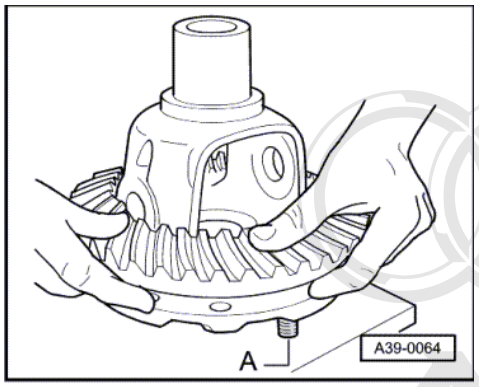


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.8 Pressing outer race for taper roller bearing, large into cover



-> Fig.9 Driving crown wheel off housing

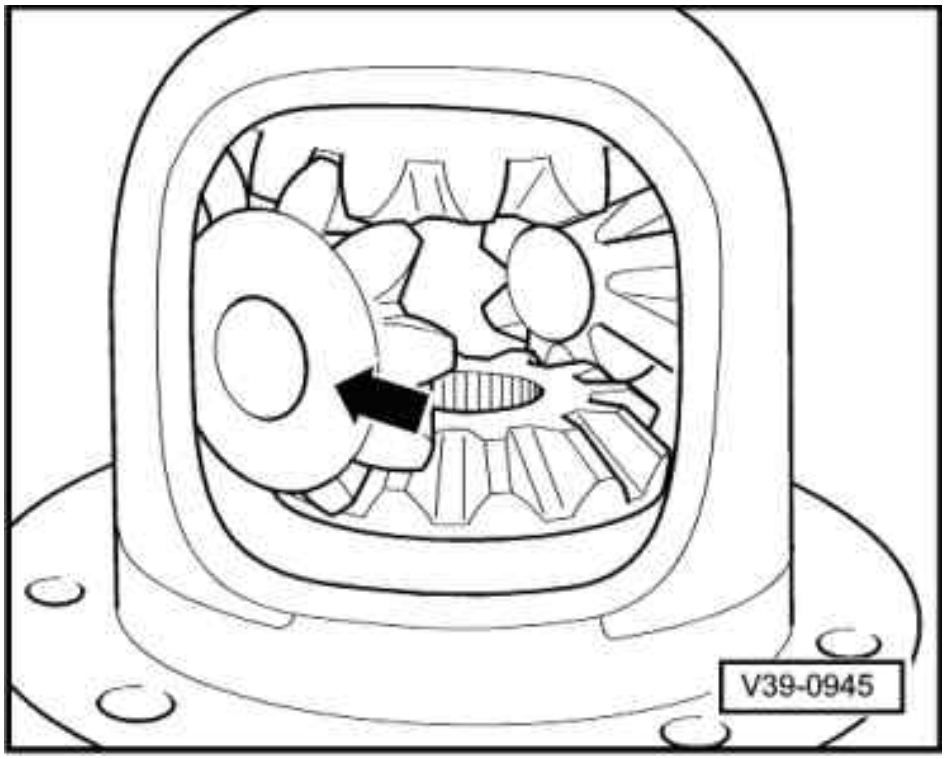


-> Fig.10 Fitting crown wheel

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.

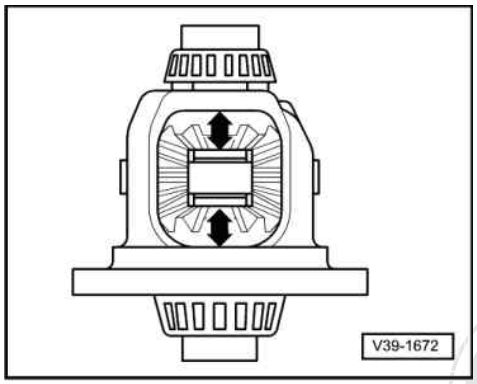
Attention:
Wear protective gloves.

- When fitting, guide crown wheel with improvised centring pins -A-.
- Heat crown wheel to approx. 100 °C and fit in position.



-> Fig.11 Installing bevel gears

- If sun wheels are replaced, shims must be re-determined => Fig. 12 .
- Fit sun wheels with shims determined.
- Insert planet pinions with 180° offset and swivel in -arrow-.
- Insert and align thrust washers.
- Insert threaded pieces.
- Drive bevel gear shaft into final position and secure.



-> Fig.12 Adjusting bevel gears

- Insert sun wheels with thinnest shims (0.5 mm).
- Insert planet pinions with 180° offset with thrust washers.

Note:

From now on bevel gears and thrust washers are not to be interchanged.

- Drive in shaft for bevel gears.
- Press planet pinions outwards.
- Press sun wheels in direction of arrow and check clearance.
- Determine thickest shim which can still just be fitted for sun wheels on either side.

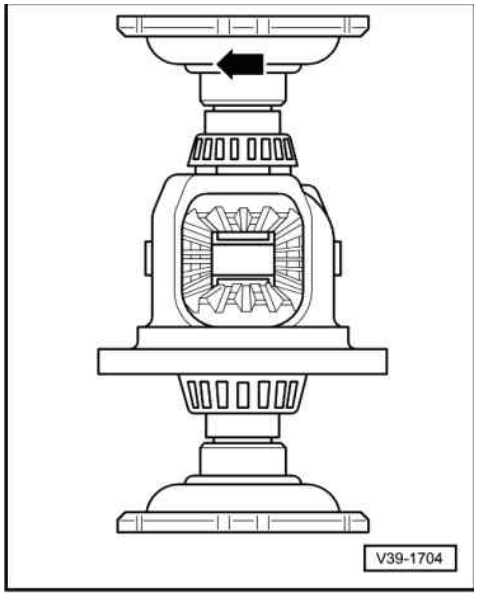
Audi
Printing this electronic repair manual or parts of it for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. Audi AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Shims for both sides should be of same thickness
- Determine shims as per table. Part numbers

=> Parts List

Shims available:

Shim thickness (mm)		
0.50	0.70	0.90
0.60	0.80	1.00



Note:

-> Correct setting has also been made if there is no perceptible clearance, but bevel gears can still just be turned -arrow-.

19 - Removing, installing, dismantling and assembling drive pinion

19.1 - Removing, installing, dismantling and assembling drive pinion

Special tools, testers and other items required

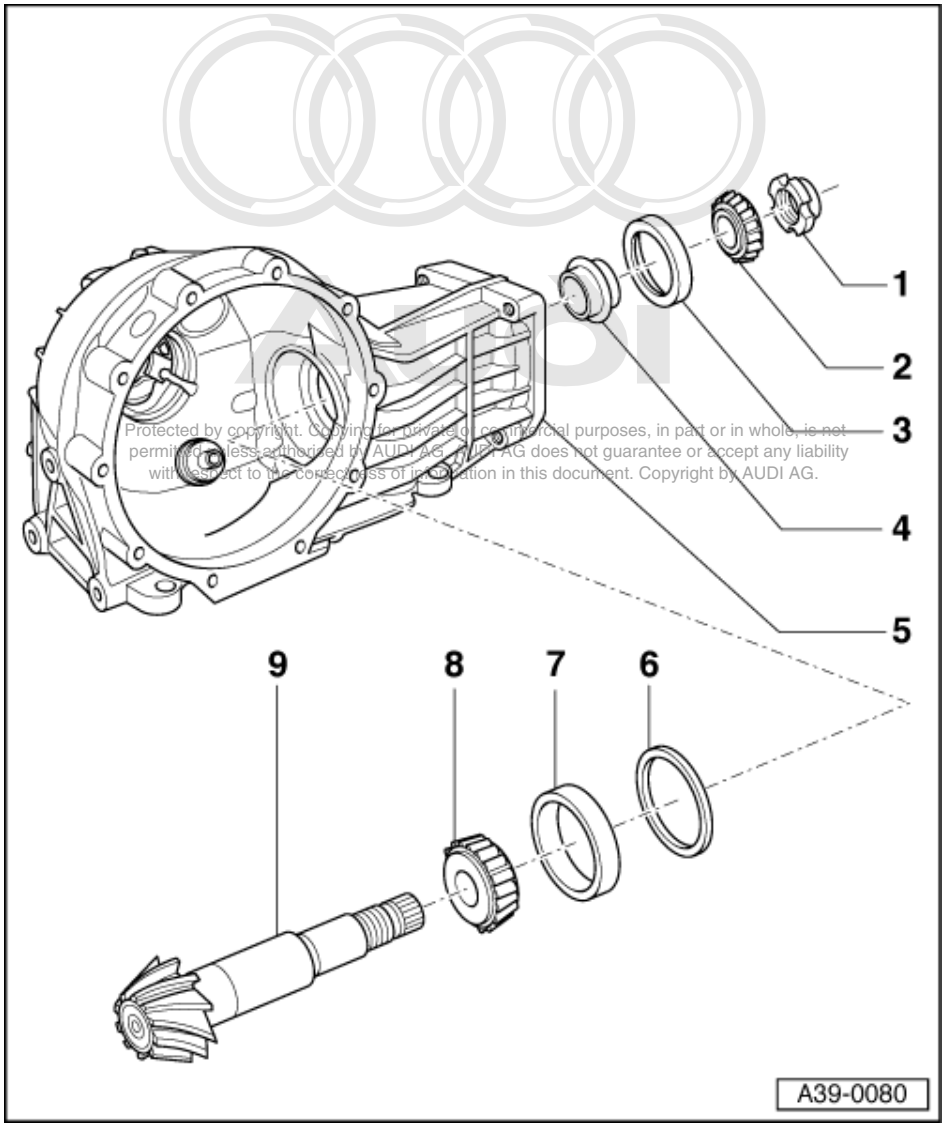
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 408 A
- Press tool VW 412
- Support rails VW 457
- Mandrel VW 460/2
- Tubular section VW 519
- Engine and gearbox holder VW 540
- Thrust plate 30-205
- Fitting ring 2003/3
- Assembly device for drive pinion 2052/2
- Thrust plate 3005

- Thrust pad 3062
- Driving-out tool 3138
- Assembly device 3253 with 3253/3 and 3253/4
- Counterhold 3304

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

- Engine/gearbox lifter V.A.G 1383 A
- Universal holder V.A.G 1359/2
- Parting tool Kukko 17/2
- Internal puller Kukko 21/7
- Counter-support Kukko 22/2
- Torque gauge 0 ... 600 Ncm
- Socket attachment, long, 32 mm

Notes:
- General repair instructions =>Page 10
- Separating thrust tube from rear final drive with final drive in position => Page 356
- Separating thrust tube from rear final drive with final drive removed => Page 374
- Always replace both taper roller bearings jointly. Use same makes wherever possible.
- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.
- Removing differential => Page 376
- Replacement of components marked 1) necessitates adjustment work => Adjustment table, Page 404 .



1 Nut
- Replace
- Unscrewing =>Fig. 1 and Fig. 2
- Screwing on =>Fig. 11
- Measuring friction torque =>Fig. 12
- Securing =>Fig. 13

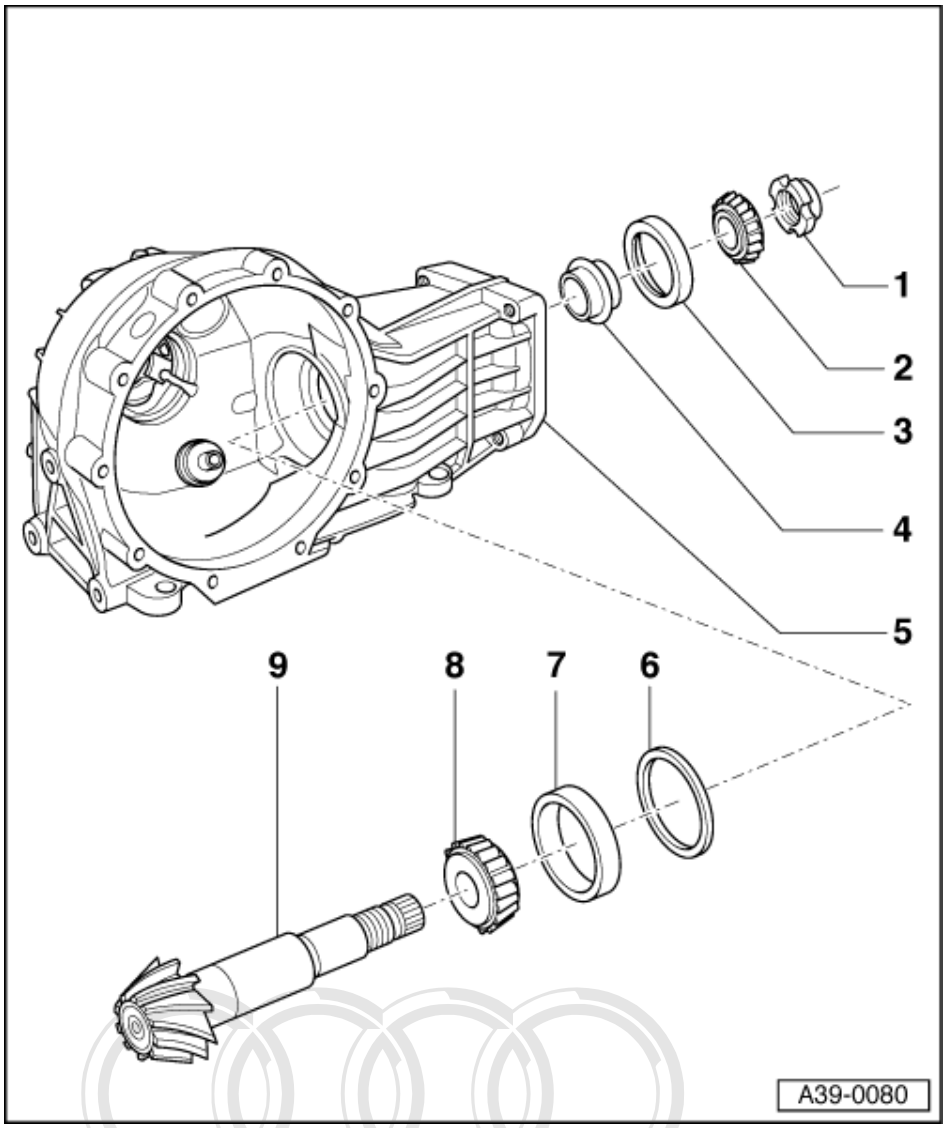
2 Inner race for taper roller bearing, small 1)

- Pressing out drive pinion => Fig. 3
- Pressing on => Fig. 10

3 Outer race for taper roller bearing, small 1)
- Extracting => Fig. 4
- Pressing in => Fig. 9

4 Spacer sleeve 1)
- Replace

5 Final drive housing 1)



6 Shim "S3"
- Note thickness
- Adjustment table => Page 404

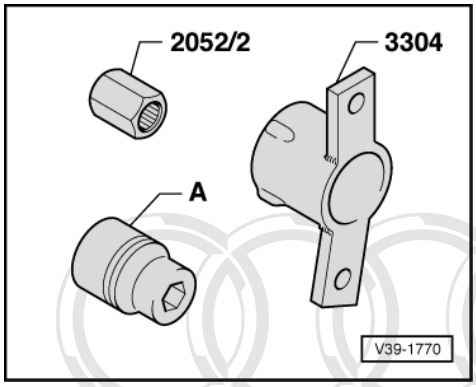
7 Outer race for taper roller bearing, large 1)
- Driving out => Fig. 5
- Fitting => Fig. 8

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

9 Drive pinion 1)

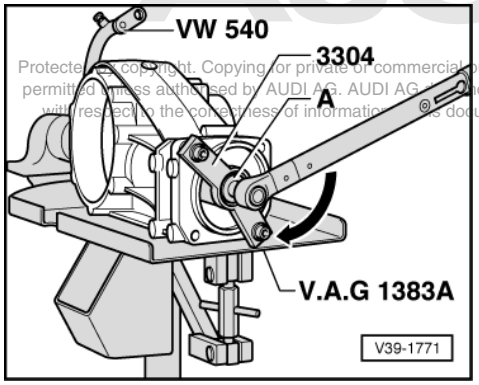
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not allowed unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Paired with crown wheel; replace jointly where necessary



-> Fig.1 Tool for unfastening and tightening drive pinion nut

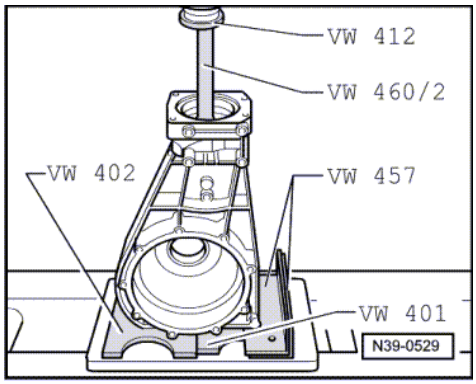
A - 32 mm socket wrench



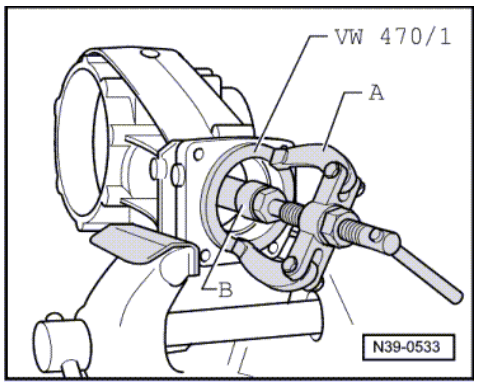
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.2 Unscrewing drive pinion nut

- Screw on counterhold 3304 with two hexagon bolts M8 x 30.
- Final drive must be supported when unfastening nut (e.g. universal holder V.A.G 1359/2 in conjunction with gearbox lifter V.A.G 1383 A).

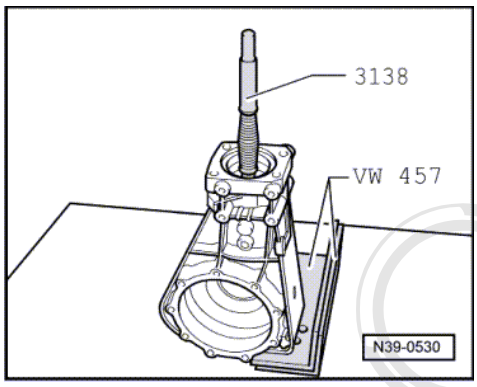


-> Fig.3 Pressing drive pinion out of inner race for taper roller bearing, small



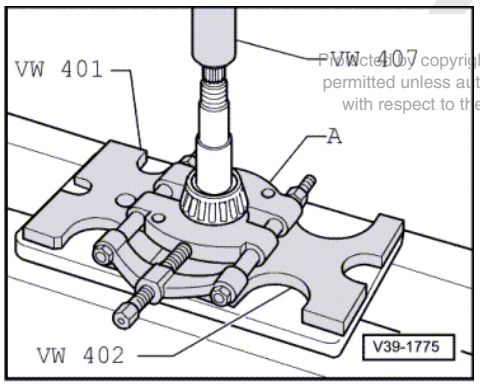
-> Fig.4 Extracting outer race for taper roller bearing, small

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



-> Fig.5 Driving out outer race for taper roller bearing, large

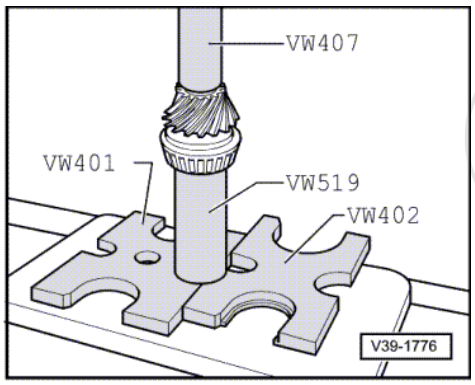
- Check shims for damage following removal.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 inner race for taper roller bearing, large, off drive pinion

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

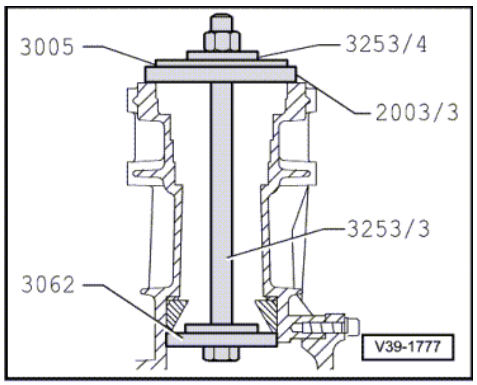


-> Fig.7 Pressing inner race for taper roller bearing, large, onto drive pinion

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.

Attention:
Wear protective gloves.

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

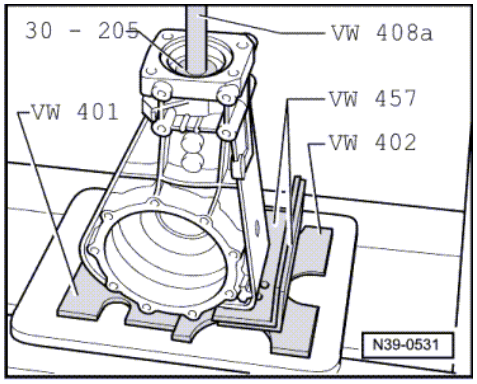


-> Fig.8 Fitting outer race for taper roller bearing, large

- Insert previously determined shim "S3" for drive pinion
  => Page 406 .

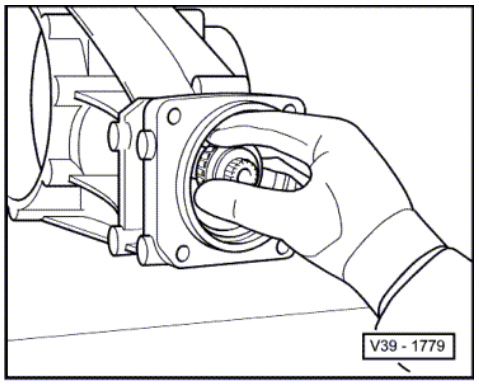
Note:

"Top" mark on thrust pad 3253/4 faces nut of fitting tool.



-> Fig.9 Pressing in outer race for taper roller bearing, small

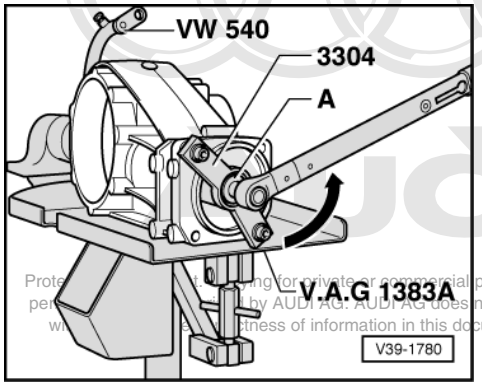
- Outer race is to be lubricated and fitted using press tool VW 408 A and thrust plate 30-205.



-> Fig.10 Pressing on inner race for taper roller bearing, small

Attention:
Wear protective gloves.

- Insert drive pinion with new spacer sleeve.
- Heat inner race for taper roller bearing, small to approx. 100 °C and position on drive pinion.
- Press up drive pinion and press home bearing with fitting sleeve 40-21.

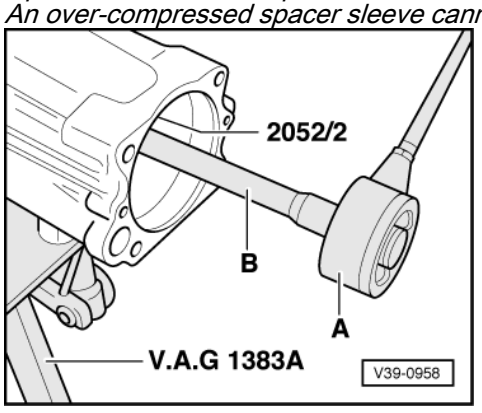


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

-> Fig.11 Tightening drive pinion nut and adjusting friction torque

- Screw on counterhold 3304 with two hexagon bolts M8 x 30.
- Final drive must be supported when tightening nut (e.g. universal holder V.A.G 1359/2 and gearbox lifter V.A.G 1383 A).
- Replace drive pinion nut.
- Tighten drive pinion nut until play can just no longer be felt at drive pinion.
- Further increase tightening torque until prescribed friction torque is attained; measure friction torque several times whilst doing so => Fig. 12 .

Note:
If prescribed friction torque is exceeded, spacer sleeve must be replaced and adjustment procedure repeated. An over-compressed spacer sleeve cannot be re-used.



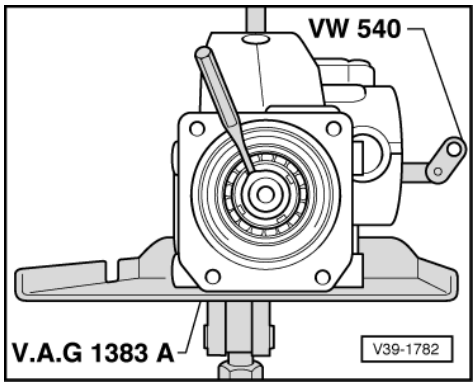
-> Fig.12 Measuring friction torque

A - Torque gauge, commercially available 0 ... 600 Ncm
B - Extension with 32 mm socket wrench

- Set the following friction torque:

New bearings	Old bearings1)
200 ... 250 Ncm	30 ... 60 Ncm

1) min. 50 km mileage



-> Fig.13 Securing drive pinion nut

- Use mandrel to peen drive pinion nut.

20 - Adjusting drive pinion and crown wheel

20.1 - Adjusting drive pinion and crown wheel

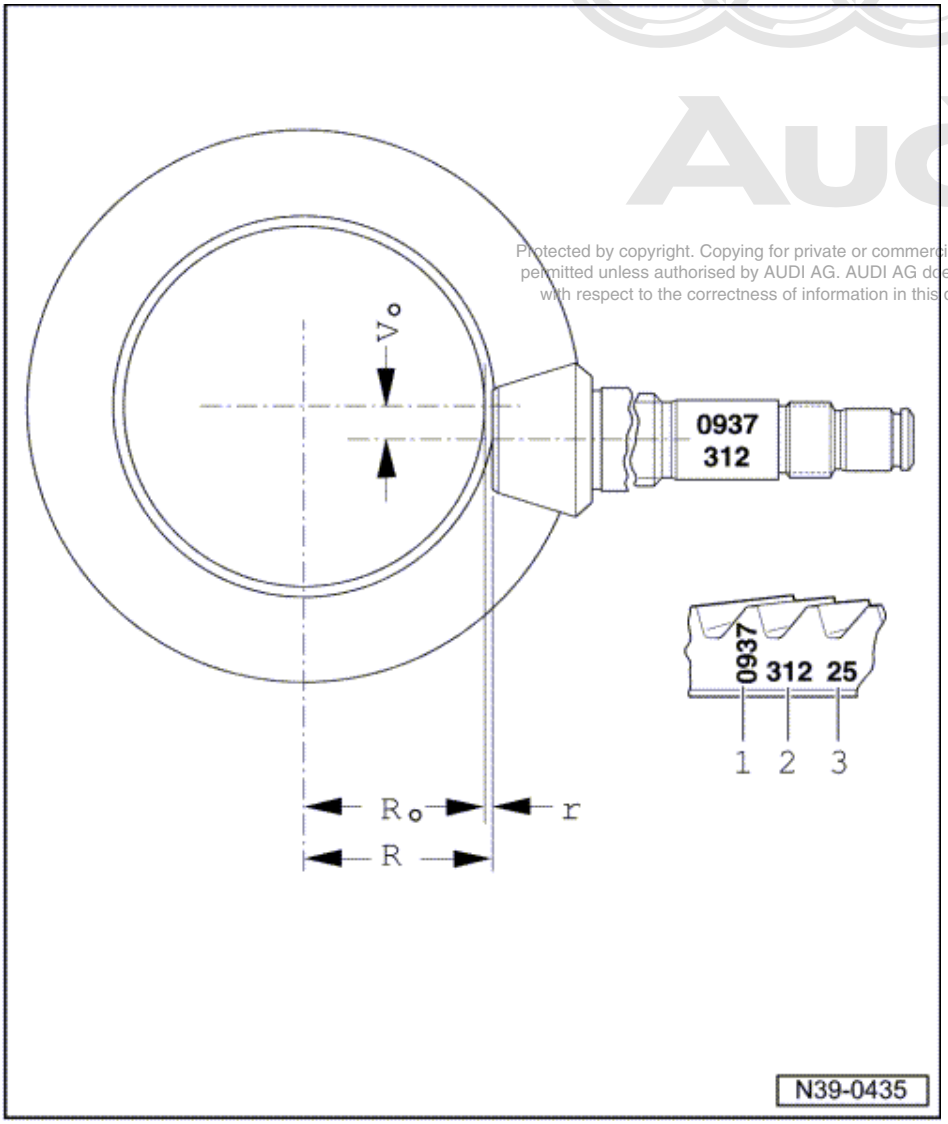
General notes:

- Careful setting of drive pinion and crown wheel is essential to long service life and smooth running of final drive. Drive pinion and crown wheel are checked at the production stage for proper contact pattern and low noise in both directions of rotation. The position providing the smoothest running is established by axially shifting the drive pinion, with the crown wheel being constantly kept out of no-play meshing to the extent required to ensure that the backlash is within the specified tolerance.
- The aim of the adjustment process is to re-attain the position providing the smoothest running as determined on the test machine in the production phase.
- The deviation "r" referenced to the master gauge "Ro" is measured for the replacement pinion sets and marked on the outer periphery of the crown wheel. Pinion sets (= drive pinion and crown wheel) are only to be replaced as a complete assembly.
- Pay attention to the general repair instructions for taper roller bearings and shims.
- The greatest possible care and absolute cleanliness when performing all assembly and measurement operations are essential to ensure desired results are obtained.

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

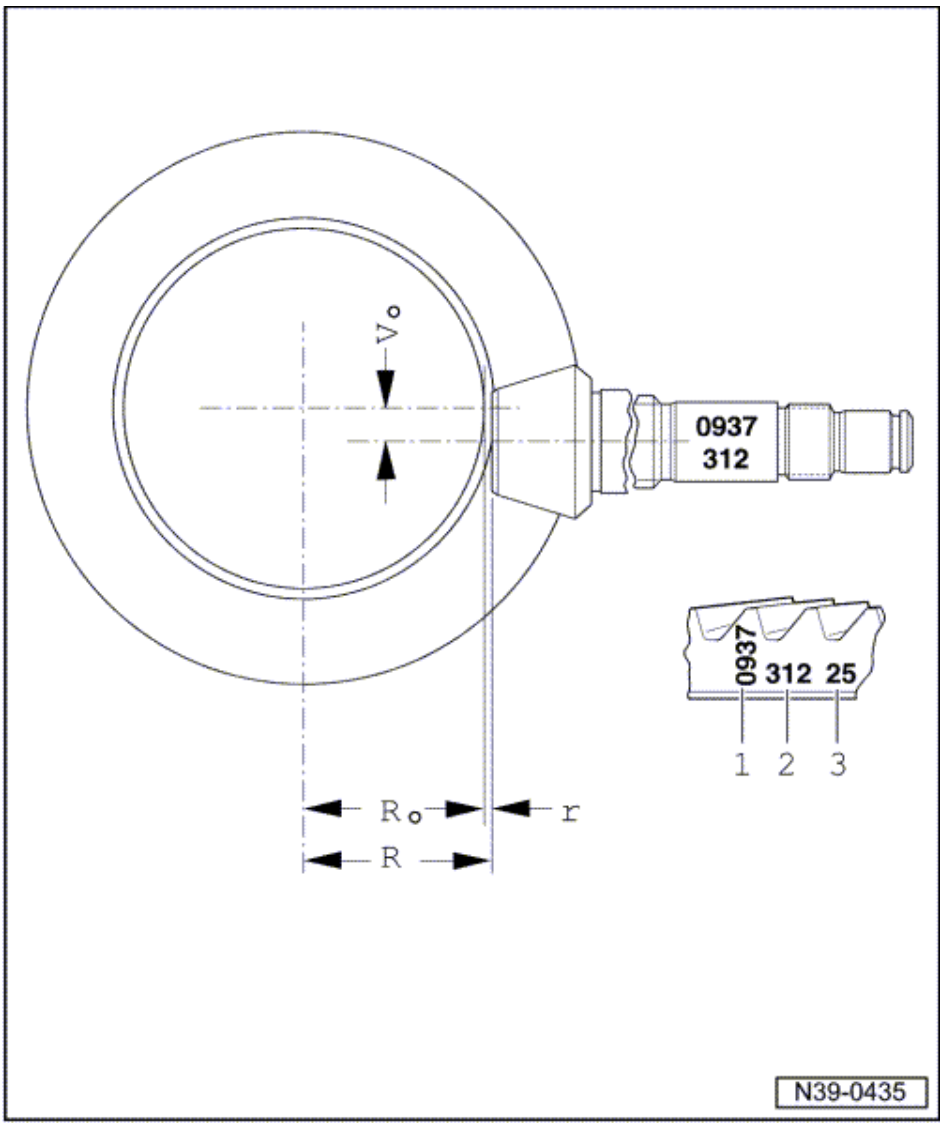
20.2 - Adjustment and labelling of pinion sets

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 Marking "0937" indicates Oerlikon pinion set with a ratio of 37 : 9.
2 Pairing number (312) of pinion set
3 Deviation "r" referenced to master gauge of test machine used in production; "r" is always given in 1/100 mm; Example: "25" signifies
r = 0.25 mm

Ro - Length of master gauge of test machine used "Ro".
Ro - Crown wheel = 57.50 mm



R - Actual dimension between crown wheel shaft and end face of drive pinion at smoothest running point for this pinion set
R = Ro + r

Vo - Hypoid offset

20.3 - Pinion set readjustment sequence

If drive pinion and crown wheel have to be adjusted, it is appropriate to adhere to the following sequence in the interests of rational working:

1.) Determine total shim thickness "Stot" for "S1" + "S2" for specified pre-load of taper roller bearings for differential.
2.) Determine total shim thickness "S3" to ensure that drive pinion installation position is as determined on test machine during production.
3.) Divide up total shim thickness "Stot" for "S1" + "S2" so as to produce the specified backlash between crown wheel and 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.

Note:

Table of components and shims => Page 405

20.4 - Adjustment table

Note:

When performing gearbox assembly work, re-adjustment of drive pinion or pinion set is only necessary if components directly affecting setting of final drive are replaced. Refer to the following table so as to avoid unnecessary adjustment.

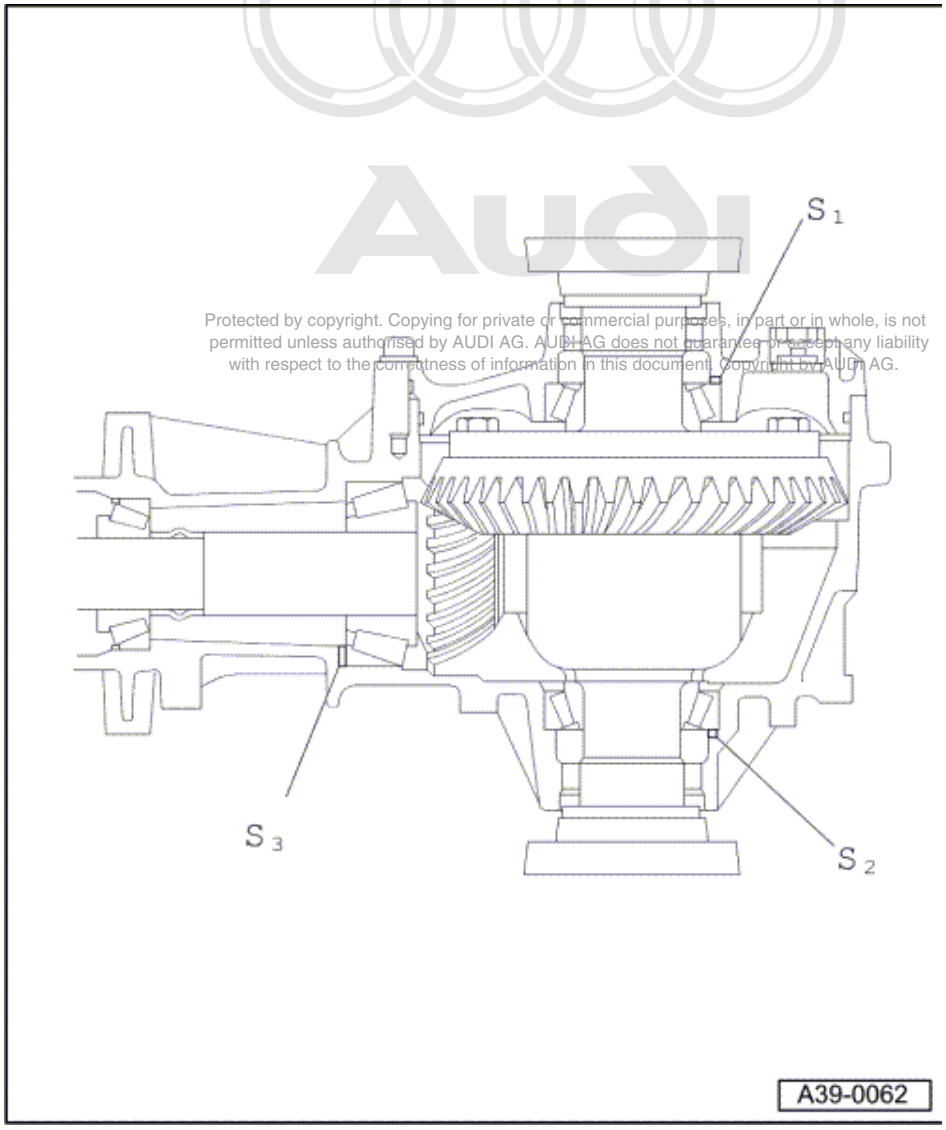
	To be adjusted:		
Component replaced: ▼	Crown wheel "S1"+"S2" 1) => Page 412	Drive pinion "S3" 1) via deviation "r" => Page 406	Backlash check => Page 414
Housingfor final drive	X	X	X
Differential housing	X		X
Taper roller bearing for drive pinion		X	X
Differential taper roller bearing	X		X
Pinion set 2)	X	X	X
Final drive cover	X		X

1) Shims; Installation position => Page 405

2) Drive pinion and crown wheel; always to be jointly replaced

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

20.5 - 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 table for replacement of individual gearbox components =>Page 404

S1 - Shim for crown wheel in final drive cover
S2 - Shim for crown wheel in final drive housing
S3 - Shim for drive pinion in final drive housing

Special tools, testers and other items required

- Dial gauge extension VW 382/10
- Universal mandrel VW 385/1
- Centring disc VW 385/2
- Centring disc VW 385/3
- Mandrel VW 385/14
- Dial gauge extension VW 385/15
- Gauge plate VW 385/17
- Master gauge VW 385/30
- Gauge block plate VW 385/33
- Universal dial gauge holder VW 387
- Test lever VW 388
- Thrust plate VW 401

- Thrust plate VW 402
- Press tool VW 408 A
- Support rails VW 457

- Adjustment tool for crown wheel VW 521/4
- Adjustment tool for crown wheel VW 521/8
- Engine and gearbox holder VW 540
- Thrust plate 30-205
- Fitting ring 2003/3
- Assembly device for drive pinion 2052/2
- Thrust plate 3005
- Counterhold 3028
- Thrust pad 3062
- Assembly device 3253 with 3253/3 and 3253/4
- Counterhold 3304
- Engine/gearbox lifter V.A.G 1383 A
- Universal holder V.A.G 1359/2
- Dial gauge extension 30 mm
- Dial gauge
- Torque gauge 0 ... 600 Ncm

20.6 - Adjusting drive pinion

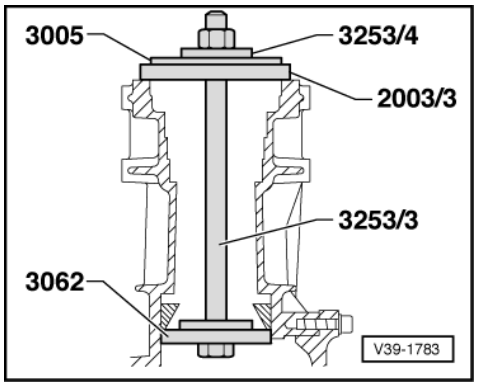
Notes:

- Before adjusting drive pinion, adjust crown wheel (determine total thickness "Stot" for shims "S1" + "S2") => Page 412 .
- Drive pinion only has to be readjusted following replacement of pinion set, drive pinion taper roller bearing or final drive housing. Adjustment table => Page 404
- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.

Audi
Reproduction or copyright copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 shim "S3"

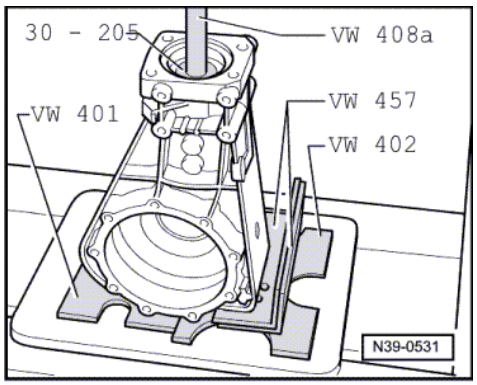
(adjustment of pre-load of taper roller bearings for drive pinion)



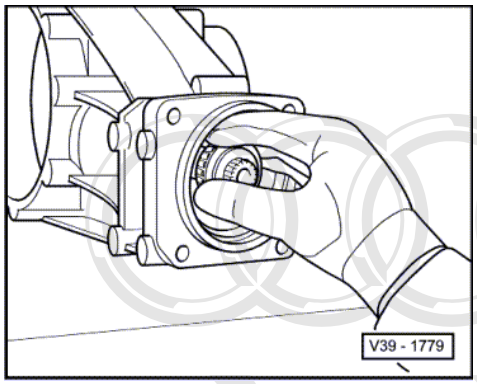
- Clamp final drive in engine and gearbox holder => Page 372 .
- -> Fit outer race for large taper roller bearing without shim in housing.

Note:

"Top" mark on thrust pad 3253/4 faces nut of fitting tool.



- -> Fit outer race for small taper roller bearing in housing.
- Outer race is to be lubricated and fitted using press tool VW 408 A and thrust plate 30-205.



- -> Insert drive pinion without spacer sleeve.

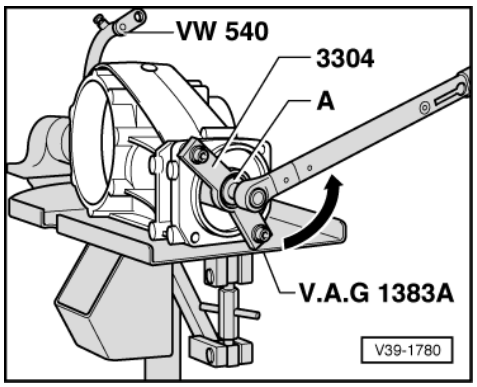
Attention:
Wear protective gloves.

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

- Heat inner race for taper roller bearing to 100 °C and position on drive pinion.

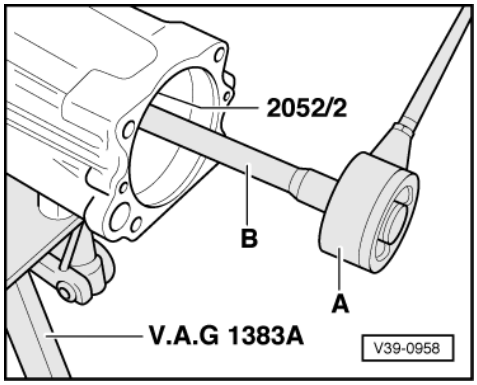
Notes:

- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.
- Spacer sleeve only has to be fitted if friction torque is to be adjusted as a final step (shim "S3" already determined).



- -> Screw on counterhold 3304 with two hexagon bolts M8 x 30.
- Final drive must be supported when tightening nut (e.g. universal holder V.A.G 1359/2 and gearbox lifter V.A.G 1383 A).
- Replace drive pinion nut.
- Tighten drive pinion nut until play can just no longer be felt at drive pinion.

- Further increase tightening torque until prescribed friction torque is attained; measure friction torque several times whilst doing so.

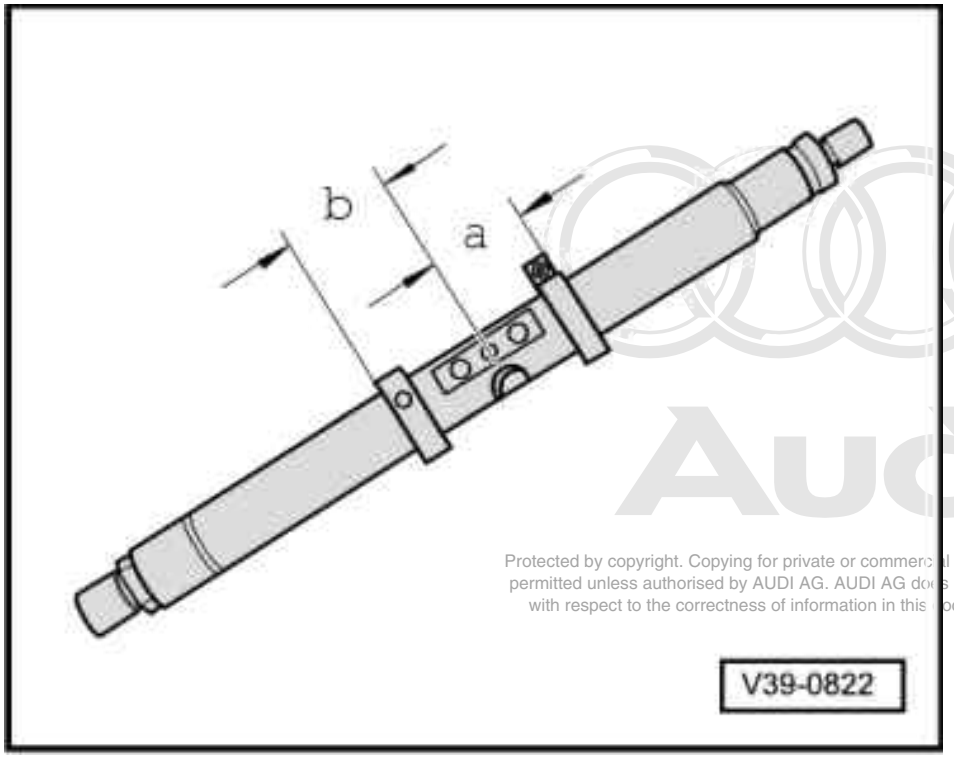


A - -> Torque gauge, commercially available 0 ... 600 Ncm
B - Extension with 32 mm socket wrench

- Set the following friction torque:

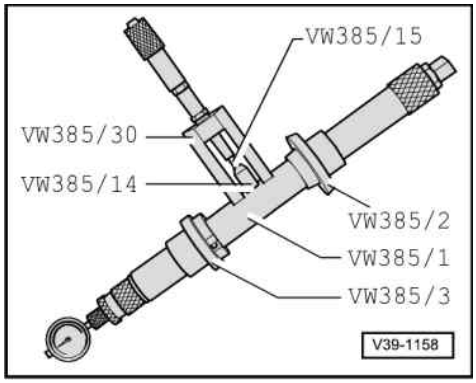
New bearings	Old bearings1)
200 ... 250 Ncm	30 ... 60 Ncm

1) min. 50 km mileage

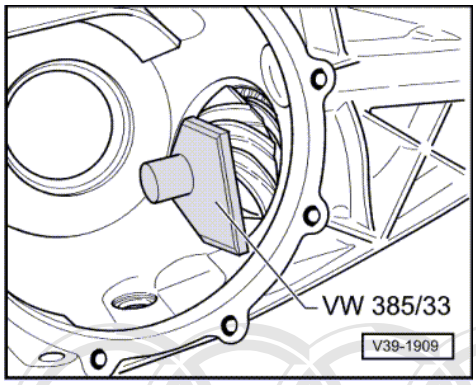


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- -> Set adjusting ring of universal mandrel VW 385/1.
  - Dimension a = 60 mm
- Set moveable adjusting ring.
  - Dimension b = 55 mm



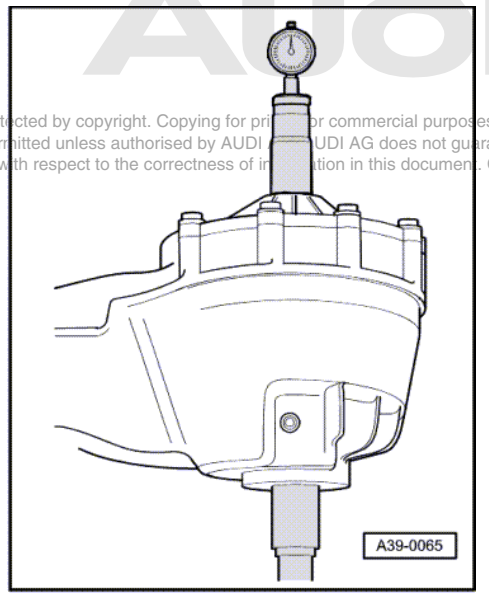
- -> Fully assemble universal mandrel as shown.
  - Dial gauge extension VW 385/15 = 9 mm long
- Set universal master gauge VW 385/30.
  - Ro = 57.50 mm
- Set dial gauge (3 mm measuring range) to "0" with 2 mm pre-load.



Note:

Prior to following measurement, give drive pinion at least 5 turns in each direction so that taper roller bearings settle. Otherwise measurement result will be biased.

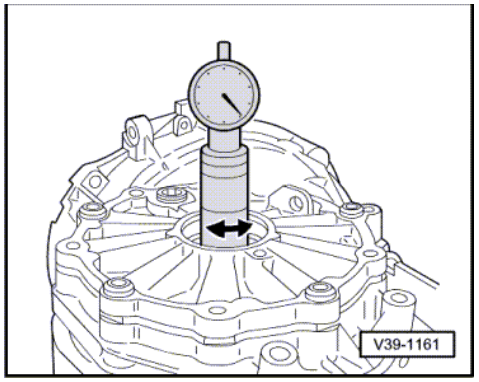
- -> Place gauge block plate VW 385/33 on end of drive pinion.



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.

- -> Detach master gauge and insert mandrel in housing.
  - Centring disc VW 385/3 faces final drive cover
- Fit cover for final drive and alternately tighten the 4 bolts.
- Pull 2nd centring disc outwards via moveable adjusting ring such that mandrel can still just be turned by hand.

Determining dimension "e"



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

- -> Turn mandrel until tip of dial gauge makes contact with gauge plate at end of drive pinion and indicates max. deflection (reversal point). Measured value is dimension "e" (red number band).
  - Measured value in the following example: "e" = 1.60 mm

Note:

Dimension "e" is required for determining thickness of shim "S3".

- As a final step - after removing universal mandrel - check again to establish whether dial gauge is set to "0" with 2 mm pre-load and master gauge VW 385/30 in position. If this is not the case, repeat measurement.

Determining thickness of shim "S3"

Formula: **"S3" = "e" - "r"** **e = Value determined** **r = Deviation (indicated on crown wheel in 1/100 mm)**

Example:		
	Value "e" determined	1.60 mm
-	Deviation "r"	0.42 mm
=	Thickness of shim "S3"	1.18 mm

- Determine shim(s) as accurately as possible in line with table. Part numbers

=> Parts List

Shims available for "S3"

Shim thickness (mm) 1)		
0.95	1.20	1.45
1.00	1.25	1.50
1.05	1.30	1.55
1.10	1.35	
1.15	1.40	

1) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

- Remove universal mandrel.

- Remove drive pinion and outer race for large taper roller bearing and fit with determined shims "S3" and spacer sleeve =>Page 397 onwards.
- Insert inner race for small taper roller bearing and tighten drive pinion nut until prescribed friction torque is attained => Fig. 400 .

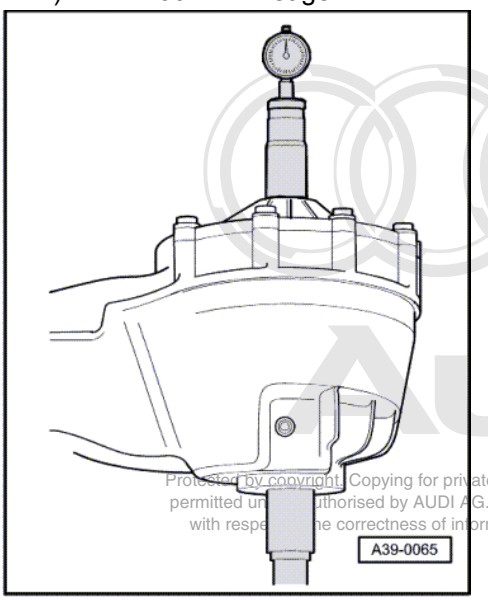
Notes:

- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.
- Only increase tightening torque slowly and in doing so take friction torque readings several times. If prescribed friction torque is exceeded, spacer sleeve must be replaced and adjustment procedure repeated. An over-compressed spacer sleeve cannot be re-used.

- Set the following friction torques:

New bearings	Old bearings1)
200 ... 250 Ncm	30 ... 60 Ncm

1) min. 50 km mileage

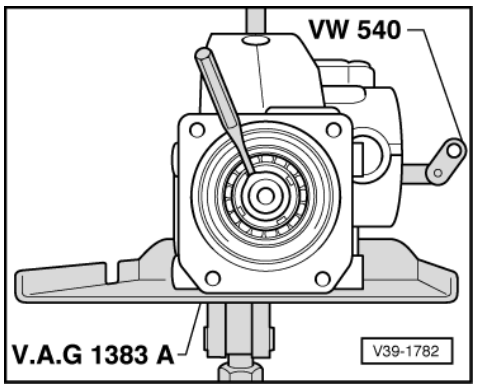


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Performing check measurement

Checking dimension "r"

- Give drive pinion at least 5 turns in both directions.
- -> Insert universal mandrel and perform check measurement.
  - If correct shims have been selected, dial gauge when read off in anti-clockwise direction (red number band) must indicate the value of the given deviation "r" with a tolerance of ± 0.04 mm.



- -> Use mandrel to peen drive pinion nut.

20.7 - Adjusting crown wheel

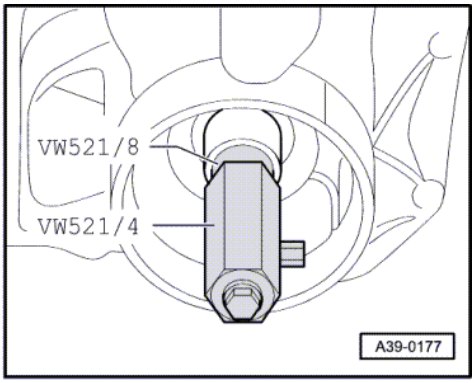
(differential adjustment)
Operations following which crown wheel has to be adjusted => Table, Page 404 .
Notes:
- Taper roller bearings for differential are of low-friction design. Friction torque can therefore only be used to a limited extent for check purposes. Correct setting is only possible by means of determining total shim thickness "Stot"
- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.

Determining total thickness "Stot" for shims "S1" + "S2"
(adjustment of pre-load of taper roller bearings for differential)
- Drive pinion removed or crown wheel detached from differential housing

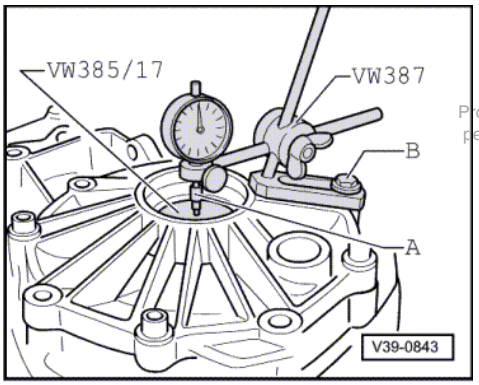
- Use appropriate tool to prise out flange shaft oil seal.
- Remove taper roller bearing outer races for differential and take out shims => Page 382 .

- Press outer race for taper roller bearing for differential, left (housing end) with shim "S2" into gearbox housing => Fig. 389 . Use is made for measurement of a shim "S2*" of thickness 1.00 mm (1 x 0.80 and 1 x 0.20 mm shims).

Note:
A 1.00 mm thick shim "S2" is provisionally inserted as standard measure. This is referred to in the following as "S2". "S2*" is replaced with final "S2" after determining backlash.*
- Press home outer race for taper roller bearing for differential, right (cover end) without shims => Fig. 382 .
- Insert differential in housing. Crown wheel is on right side (cover end).



- Fit cover and tighten bolts to 25 Nm.
- -> Fit special tool VW 521/4 and 521/8 on housing end in differential housing.
- Turn cover end of differential housing upwards.

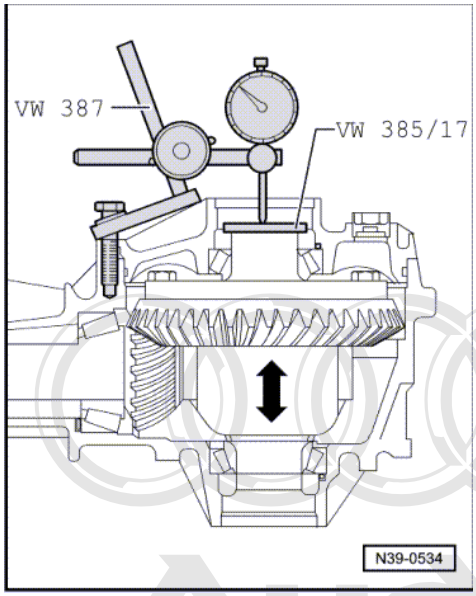


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- Give differential 5 turns in each direction so that taper roller bearing settles.
- Position gauge plate VW 385/17 on differential.
- -> Fit measuring tools.

A - Dial gauge extension, approx. 30 mm long
B - Hexagon bolt M8 x 45

- Position dial gauge extension on centre of gauge plate VW 385/17.



- Set dial gauge (3 mm measuring range) to "0" with 2 mm pre-load.
- -> Raise differential without turning, read clearance off dial gauge and note down.
  - Measured value in the following example: 0.50 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.

Note:

If measurement is to be repeated, differential must first be turned again5 times in each direction to allow taper roller bearing to settle.

Formula:
"Stot" = "S2*" + Measured value + Bearing preload

Example:	
Shim(s) "S2*" fitted	1.00 mm
+ Measured value	0.50 mm
+ Bearing pre-load (constant value)	0.30 mm
= Total shim thickness "Stot" for shims "S1" + "S2"	1.80 mm

Determining thickness of shim "S1*"

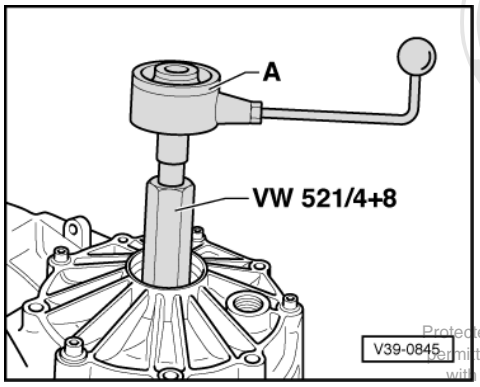
Notes:

- Provisional shim "S1*" is replaced by ultimate shim "S1" after determining backlash.
- The total shim thickness "Stot" remains unchanged.

Formula:		
"S1*"	=	"Stot" - "S2*"

Example:		
	Total shim thickness "Stot" for shims "S1" + "S2"	1.80 mm
-	Shim(s) "S2*" fitted	1.00 mm
=	Thickness of shim "S1*"	0.80 mm

- Determine shim(s) as accurately as possible in line with table => Page 416 .



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI 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 friction torque (check)

- Drive pinion removed
- Differential with shims "S1*" and "S2*" fitted

- -> Apply torque gauge 0 ... 600 Ncm -A- at differential.
- Take friction torque reading.

Friction torque specifications:

New bearings	Old bearings 1)
150 ... 300 Ncm	30 ... 60 Ncm

1) min. 50 km mileage

Notes:

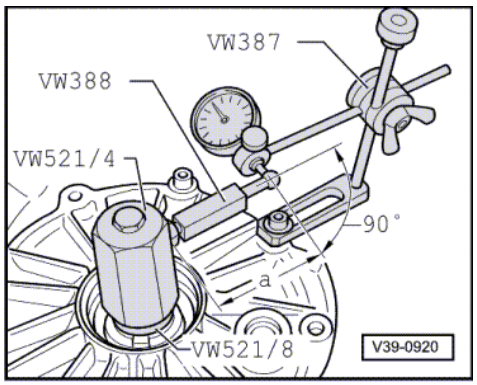
- Taper roller bearings for differential are of low-friction design. Friction torque can therefore only be used to a limited extent for check purposes. Correct setting is only possible by means of determining total shim thickness "Stot"
- Do not additionally lubricate new taper roller bearings for friction torque measurement. Bearings are treated at the factory with a special oil.
- In the event of re-adjustment of pinion set, drive pinion is now to be adjusted and checked => Page 406 .

Adjusting backlash

(position of crown wheel in gearbox housing)

- Drive pinion with shim "S3" fitted
- Differential with shims "S1*" + "S2*" fitted

- Insert differential in final drive housing, fit cover and tighten all bolts to 25 Nm.
- Give differential 5 turns in both directions so that taper roller bearings settle.



- -> Fit measuring tools.
- Use dial gauge extension VW 382/10 (6 mm flat).
- Set test lever VW 388 to dimension "a" = 60 mm.
- Determine backlash between tooth flanks as follows:
  - Turn crown wheel until it makes contact with tooth flank (backlash end).
  - Set dial gauge to "0" with 1 mm pre-load.

  - Turn back crown wheel until it makes contact with opposite tooth flank (backlash).
  - Take backlash reading and note down measured value.
  - Turn crown wheel by a further 90° in each case and repeat measurement 3 times.

Note:

If the individual values determined in this measurement differ by more than 0.06 mm, there is a problem either with the installation of the crown wheel or with the actual pinion set. Check assembly operations and replace pinion set if necessary.

Determining average backlash

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

- Result: Average backlash = 1.16 mm : 4 = 0.29 mm

Determining thickness of shim "S2"

Formula:
"S2" = "S2*" - Backlash + Lift

Example:	
Shim "S2*" fitted	1.00 mm
- Average backlash	0.29 mm
+ Lift (constant value)	0.15 mm
= Thickness of shim "S2"	0.86 mm

- Determine shim(s) as accurately as possible in line with table. Part numbers

=> Parts List

Shims available for "S2"

Shim thickness (mm) 1)		
0.15	0.50	1.50

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

Shim thickness (mm) 1)		
0.20	0.80	
0.25	1.00	

1) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary

Determining thickness of shim "S1"

Formula:
"S1" = "Stot" - "S2"

Example:		
	Total shim thickness "Stot" for "S1" + "S2"	1.80 mm
-	Thickness of shim "S2"	0.86 mm
=	Thickness of shim "S1"	0.94 mm

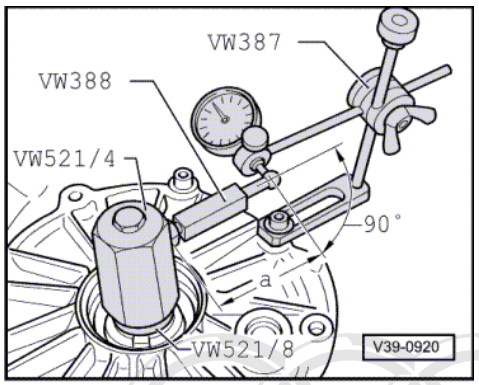
- Determine shim(s) as accurately as possible in line with table. Part numbers

=> Parts List

Shims available for "S1"

Thickness of shims in mm 1)		
0.15	0.50	0.90
0.20	0.60	1.00
0.30	0.70	1.20
0.40	0.80	

1) The tolerances of the shims permit determination of any thickness; fit 2 shims if necessary



-> Check measurement

- Drive pinion with shim "S3" fitted
- Differential with shims "S1" + "S2" fitted

- Give differential 5 turns in both directions so that taper roller bearings settle.
- Measure backlash 4 times on periphery.
  - Specification: 0.12 ... 0.22 mm

Notes:

- Adjustment must be repeated if backlash is outside tolerance. The total shim thickness "Stot" must not be changed.

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

- Deviation between individual measured values must not exceed 0.06 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.