

Workshop Manual Audi A3 1997 ➤

5-speed manual gearbox 02J

Edition 10.2007



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List of Workshop Manual Repair Groups

Repair Group

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



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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00 – Technical data

1 Gearbox identification

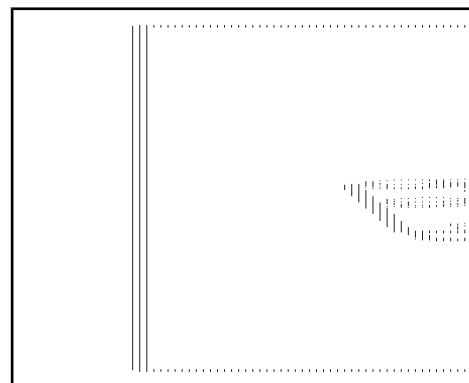
5-speed manual gearbox 02J is fitted in conjunction with 4-cylinder engines in the Audi A3 1997 ▶.

Allocation ⇒ [page 1](#).

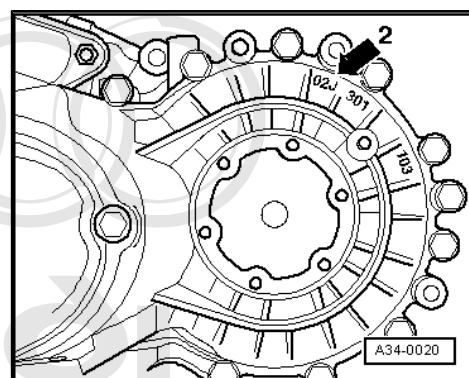
1.1 Location on gearbox

Code letters and date of manufacture -arrow 1-

Manual gearbox 02J -arrow 2-



Manual gearbox 02J -arrow 2-



Code letters and date of manufacture of gearbox

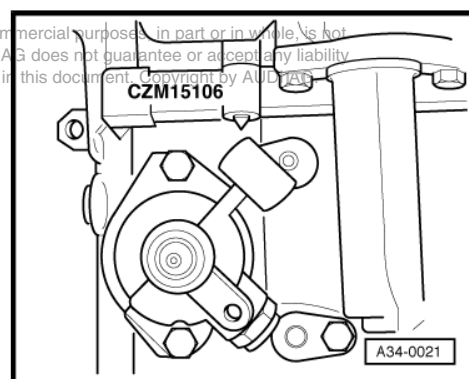
Example:	CZM	15	10	6
	Code letters	Day	Month	Year -1996- of manufacture

Additional data are production-related.



Note

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



1.2 Code letters, allocation, transmission ratios, capacities

Manual gearbox		5-speed 02J		
Code letters		CZL	CZM	DBZ
Manufactured	from	05.96	05.96	05.96
	to	07.97	09.98	09.98
Allocation	Model	Audi A3 1997 ▶	Audi A3 1997 ▶	Audi A3 1997 ▶
	Engine	1.9 ltr. - 66 kW turbo diesel	1.8 ltr. - 92 kW	1.8 ltr. - 110 kW



Manual gearbox		5-speed 02J		
Ratios: Z ₂ : Z ₁	Final drive	62 : 17 = 3.647	72 : 17 = 4.235	70 : 19 = 3.684
	1st gear	33 : 10 = 3.300	33 : 10 = 3.300	33 : 10 = 3.300
	2nd gear	35 : 18 = 1.944	35 : 18 = 1.944	35 : 18 = 1.944
	3rd gear	34 : 26 = 1.308	34 : 26 = 1.308	34 : 26 = 1.308
	4th gear	33 : 36 = 0.917	35 : 34 = 1.029	35 : 34 = 1.029
	5th gear	33 : 46 = 0.717	36 : 43 = 0.837	36 : 43 = 0.837
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{OV} in top gear		2.615	3.546	3.084
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		100 mm		
• The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate				

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Manual gearbox		5-speed 02J		
Code letters		DEA	DQY	DUE
Manufactured	from	02.97	06.97	09.98
	to	09.98	09.98	09.00
Allocation	Model Engine	Audi A3 1997 ▶ 1.9 ltr. - 81 kW turbo diesel	Audi A3 1997 ▶ 1.9 ltr. - 66 kW turbo diesel	Audi A3 1997 ▶ 1.8 ltr. - 132 kW
Ratios: Z ₂ : Z ₁	Final drive	61 : 18 = 3.389	61 : 18 = 3.389	62 : 17 = 3.647
	1st gear	34 : 9 = 3.778	34 : 9 = 3.778	33 : 10 = 3.300
	2nd gear	33 : 16 = 2.063	36 : 17 = 2.118	35 : 18 = 1.944
	3rd gear	31 : 23 = 1.348	34 : 25 = 1.360	34 : 26 = 1.308
	4th gear	29 : 30 = 0.964	34 : 35 = 0.971	30 : 29 = 1.034
	5th gear	30 : 39 = 0.769	34 : 45 = 0.756	31 : 37 = 0.838
	6th gear	-	-	-
	Reverse gear	18 : 9 x 36 : 20 = 3.600	18 : 9 x 36 : 20 = 3.600	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{OV} in top gear		2.607	2.560	3.056
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		100 mm	100 mm	108 mm ¹⁾
¹⁾ for drive shafts with triple roller joint - The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate				

Manual gearbox		5-speed 02J		
Code letters		DYN	DYP	DZK
Manufactured	from	05.97	05.97	05.97
	to	09.98	09.98	09.98
Allocation	Model	Audi A3 1997 ▶	Audi A3 1997 ▶	Audi A3 1997 ▶
	Engine	1.8 ltr. - 92 kW	1.8 ltr. - 110 kW	1.8 ltr. - 132 kW
Ratios: Z ₂ : Z ₁	Final drive	72 : 17 = 4.235	70 : 19 = 3.684	62 : 17 = 3.647
	1st gear	33 : 10 = 3.300	33 : 10 = 3.300	33 : 10 = 3.300
	2nd gear	35 : 18 = 1.944	35 : 18 = 1.944	35 : 18 = 1.944
	3rd gear	34 : 26 = 1.308	34 : 26 = 1.308	34 : 26 = 1.308
	4th gear	35 : 34 = 1.029	35 : 34 = 1.029	30 : 29 = 1.034
	5th gear	36 : 43 = 0.837	36 : 43 = 0.837	31 : 37 = 0.838
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{ov} in top gear		3.546	3.084	3.056
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		100 mm	100 mm	108 mm ¹⁾
¹⁾ for drive shafts with triple roller joint • The following data can be found in the ⇒ Electronic parts catalogue . ♦ Gear oil specification ♦ Correct type of clutch plate and pressure plate				

Manual gearbox		5-speed 02J		
Code letters		EBD	EBF	EBJ
Manufactured	from	09.98	09.98	09.98
	to	09.00	09.00	09.00
Allocation	Model	Audi A3 1997 ▶	Audi A3 1997 ▶	Audi A3 1997 ▶
	Engine	1.8 ltr. - 92 kW	1.9 ltr. - 81 kW turbo diesel	1.9 ltr. - 66 kW turbo diesel
Ratios: Z ₂ : Z ₁	Final drive	72 : 17 = 4.235	61 : 18 = 3.389	61 : 18 = 3.389
	1st gear	33 : 10 = 3.300	34 : 9 = 3.778	34 : 9 = 3.778
	2nd gear	35 : 18 = 1.944	33 : 16 = 2.063	36 : 17 = 2.118
	3rd gear	34 : 26 = 1.308	31 : 23 = 1.348	34 : 25 = 1.360
	4th gear	35 : 34 = 1.029	29 : 30 = 0.967	34 : 35 = 0.971
	5th gear	36 : 43 = 0.837	30 : 39 = 0.769	34 : 45 = 0.756
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{ov} in top gear		3.546	2.607	2.560
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		100 mm		



Manual gearbox	5-speed 02J
- The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate	

Manual gearbox	5-speed 02J		
Code letters	EBM	EBN	ECW
Manufactured from to	09.98 09.00	09.98 09.00	06.98 10.98
Allocation Model Engine	Audi A3 1997 ► 1.8 ltr. - 92 kW	Audi A3 1997 ► 1.8 ltr. - 110 kW	Audi A3 1997 ► 1.8 ltr. - 110 kW
Ratios: Z ₂ : Z ₁	Final drive	72 : 17 = 4.235	70 : 19 = 3.684
	1st gear	33 : 10 = 3.300	33 : 10 = 3.300
	2nd gear	35 : 18 = 1.944	35 : 18 = 1.944
	3rd gear	34 : 26 = 1.308	34 : 26 = 1.308
	4th gear	35 : 34 = 1.029	35 : 34 = 1.029
	5th gear	36 : 43 = 0.837	36 : 43 = 0.837
	6th gear	-	-
	Reverse gear	18 : 9 x 36 : 20 = 3.600	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{OV} in top gear	3.546	3.084	3.084
Capacity	2.0 litres		
Clutch actuation	Hydraulic		
Drive shaft flange Ø	100 mm	108 mm ¹⁾	108 mm ¹⁾
¹⁾ for drive shafts with triple roller joint - The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate			

Manual gearbox	5-speed 02J		
Code letters	EGR ¹⁾	EGS ¹⁾	EGV ¹⁾
Manufactured from to	09.00	09.00	09.00
Allocation Model Engine	Audi A3 1997 ► 1.9 ltr. - 66 kW turbo diesel	Audi A3 1997 ► 1.9 ltr. - 81 kW turbo diesel	Audi A3 1997 ► 1.8 ltr. - 92 kW
Ratios: Z ₂ : Z ₁	Final drive	61 : 18 = 3.389	72 : 17 = 4.235
	1st gear	34 : 9 = 3.778	33 : 10 = 3.300
	2nd gear	36 : 17 = 2.118	33 : 16 = 2.063
	3rd gear	34 : 25 = 1.360	31 : 23 = 1.348
	4th gear	34 : 35 = 0.971	29 : 30 = 0.967
	5th gear	34 : 45 = 0.756	30 : 39 = 0.769
	6th gear	-	-

Manual gearbox	5-speed 02J		
Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i_{OV} in top gear	2.560	2.607	3.546
Capacity	2.0 litres		
Clutch actuation	Hydraulic		
Drive shaft flange Ø	100 mm		
1) As of 09.00, modified 1st gear synchromesh and modified selector mechanism on gearbox			
• The following data can be found in the ⇒ Electronic parts catalogue .			
◆ Gear oil specification			
◆ Correct type of clutch plate and pressure plate			

Manual gearbox	5-speed 02J		
Code letters	EGW ¹⁾	EGY ¹⁾	EHA ²⁾
Manufactured from to	09.00	09.00	05.00
Allocation Model Engine	Audi A3 1997 ▶ 1.8 ltr. - 92 kW	Audi A3 1997 ▶ 1.8 ltr. - 110 kW	Audi A3 1997 ▶ 1.8 ltr. - 132 kW
Ratios: Z ₂ : Z ₁	Final drive	72 : 17 = 4.235	70 : 19 = 3.684
	1st gear	33 : 10 = 3.300	33 : 10 = 3.300
	2nd gear	35 : 18 = 1.944	35 : 18 = 1.944
	3rd gear	34 : 26 = 1.308	34 : 26 = 1.308
	4th gear	35 : 34 = 1.029	30 : 29 = 1.034
	5th gear	36 : 43 = 0.837	31 : 37 = 0.838
	6th gear	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio $i_{ov.}$ in top gear	3.546	3.084	3.056
Capacity	2.0 litres		
Clutch actuation	Hydraulic		
Drive shaft flange Ø	100 mm	108 mm ³⁾	108 mm ³⁾
1) from 09.00 modified 1st gear synchromesh and modified selector mechanism on gearbox 2) from 05.00 modified 1st gear synchromesh 3) for drive shafts with triple roller joint The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate			

Manual gearbox	5-speed 02J		
Code letters	EHN	ENJ	ESV
Manufactured from to	02.99 09.00	12.98 09.00	10.98 09.00
Allocation Model Engine	Audi A3 1997 ▶ 1.8 ltr. - 92 kW	Audi A3 1997 ▶ 1.8 ltr. - 110 kW	Audi A3 1997 ▶ 1.8 ltr. - 132 kW



Manual gearbox		5-speed 02J		
Ratios: Z ₂ : Z ₁	Final drive	72 : 17 = 4.235	70 : 19 = 3.684	62 : 17 = 3.647
	1st gear	34 : 9 = 3.778	33 : 10 = 3.300	33 : 10 = 3.300
	2nd gear	36 : 17 = 2.118	35 : 18 = 1.944	35 : 18 = 1.944
	3rd gear	34 : 25 = 1.360	34 : 26 = 1.308	34 : 26 = 1.308
	4th gear	35 : 34 = 1.029	35 : 34 = 1.029	30 : 29 = 1.034
	5th gear	36 : 43 = 0.837	36 : 43 = 0.837	31 : 37 = 0.838
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{ov.} in top gear		3.546	3.084	3.056
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		100 mm	108 mm ¹⁾	108 mm ¹⁾
¹⁾ for drive shafts with triple roller joint • The following data can be found in the → Electronic parts catalogue . ♦ Gear oil specification ♦ Correct type of clutch plate and pressure plate				

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Manual gearbox		5-speed 02J		
Code letters		EUH ¹⁾	EVQ ¹⁾	EVS ¹⁾
Manufactured from to		09.00	09.00	09.00
Allocation	Model Engine	Audi A3 1997 ▶ 1.9 ltr. - 74 kW turbo diesel	Audi A3 1997 ▶ 1.8 ltr. - 92 kW	Audi A3 1997 ▶ 1.8 ltr. - 110 kW
Ratios: Z ₂ : Z ₁	Final drive	61 : 18 = 3.389	72 : 17 = 4.235	70 : 19 = 3.684
	1st gear	34 : 9 = 3.778	34 : 9 = 3.778	33 : 10 = 3.300
	2nd gear	33 : 16 = 2.063	36 : 17 = 2.118	35 : 18 = 1.944
	3rd gear	31 : 23 = 1.348	34 : 25 = 1.360	34 : 26 = 1.308
	4th gear	29 : 30 = 0.967	35 : 34 = 1.029	35 : 34 = 1.029
	5th gear	29 : 39 = 0.744	36 : 43 = 0.837	36 : 43 = 0.837
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{ov.} in top gear		2.520	3.546	3.084
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		108 mm ²⁾	100 mm	100 mm

Manual gearbox	5-speed 02J
1) from 09.00, modified 1st gear synchromesh and modified selector mechanism on gearbox 2) for drive shafts with triple roller joint • The following data can be found in the ⇒ Electronic parts catalogue . ♦ Gear oil specification ♦ Correct type of clutch plate and pressure plate	

Manual gearbox		5-speed 02J		
Code letters		EWU ¹⁾	EWX	EXD ¹⁾
Manufactured	from	05.00	02.00	05.00
	to		05.00	09.00
Allocation	Model Engine	Audi A3 1997 ▶ 1.8 ltr. - 132 kW	Audi A3 1997 ▶ 1.9 ltr. - 74 kW turbo diesel	Audi A3 1997 ▶ 1.8 ltr. - 132 kW
Ratios: Z ₂ : Z ₁	Final drive	62 : 17 = 3.647	61 : 18 = 3.389	62 : 17 = 3.647
	1st gear	33 : 10 = 3.300	34 : 9 = 3.778	33 : 10 = 3.300
	2nd gear	35 : 18 = 1.944	33 : 16 = 2.063	35 : 18 = 1.944
	3rd gear	34 : 26 = 1.308	31 : 23 = 1.348	34 : 26 = 1.308
	4th gear	30 : 29 = 1.034	29 : 30 = 0.967	30 : 29 = 1.034
	5th gear	31 : 37 = 0.838	29 : 39 = 0.744	31 : 37 = 0.838
	6th gear	-	-	-
	Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060
	Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	13 : 22 = 0.591
Overall ratio i _{OV} in top gear		3.056	2.520	3.056
Capacity		2.0 litres		
Clutch actuation		Hydraulic		
Drive shaft flange Ø		108 mm ²⁾		
1) from 09.00, modified 1st gear synchromesh 2) for drive shafts with triple roller joint • The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate				

Manual gearbox		5-speed 02J		
Code letters		EXE ¹⁾	FBX ²⁾	
Manufactured	from	09.00	05.00	
	to			
Allocation	Model Engine	Audi A3 1997 ▶ 1.8 ltr. - 132 kW	Audi A3 1997 ▶ 1.8 ltr. - 110 kW	
Ratios: Z ₂ : Z ₁	Final drive	62 : 17 = 3.647	70 : 19 = 3.684	
	1st gear	33 : 10 = 3.300	33 : 10 = 3.300	
	2nd gear	35 : 18 = 1.944	35 : 18 = 1.944	
	3rd gear	34 : 26 = 1.308	34 : 26 = 1.308	



Manual gearbox	5-speed 02J		
4th gear	30 : 29 = 1.034	35 : 34 = 1.029	
5th gear	31 : 37 = 0.838	36 : 43 = 0.837	
6th gear	-	-	
Reverse gear	17 : 10 x 36 : 20 = 3.060	17 : 10 x 36 : 20 = 3.060	
Speedometer	13 : 22 = 0.591	13 : 22 = 0.591	
Overall ratio i_{OV} in top gear	3.056	3.084	
Capacity	2.0 litres		
Clutch actuation	Hydraulic		
Drive shaft flange Ø	108 mm ³⁾		
1) from 09.00 modified 1st gear synchromesh and modified selector mechanism on gearbox 2) from 05.00 modified 1st gear synchromesh 3) for drive shafts with triple roller joint • The following data can be found in the ⇒ Electronic parts catalogue . ◆ Gear oil specification ◆ Correct type of clutch plate and pressure plate			



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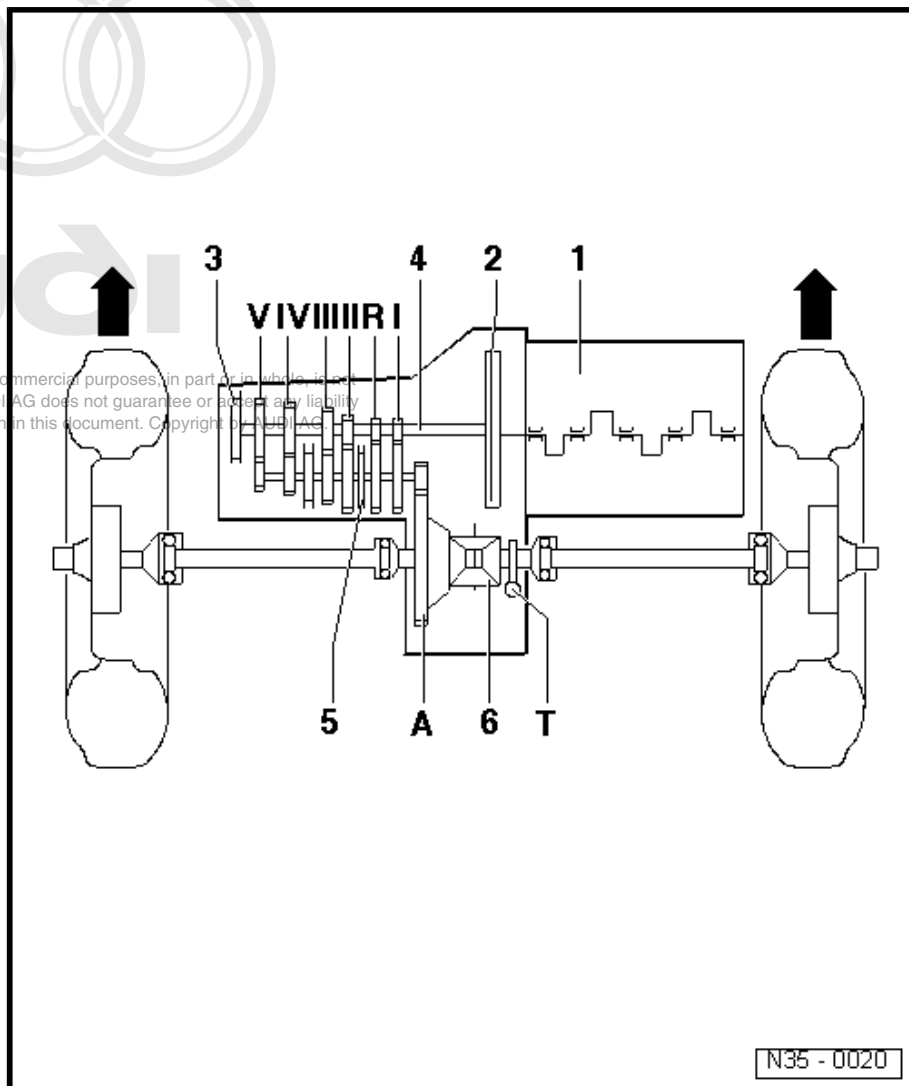
2 Transmission layout

Identification

-Arrows- point in direction of travel

- 1 - Engine
- 2 - Clutch
- 3 - Manual gearbox
- 4 - Input shaft
- 5 - Output shaft / pinion shaft
- 6 - Differential

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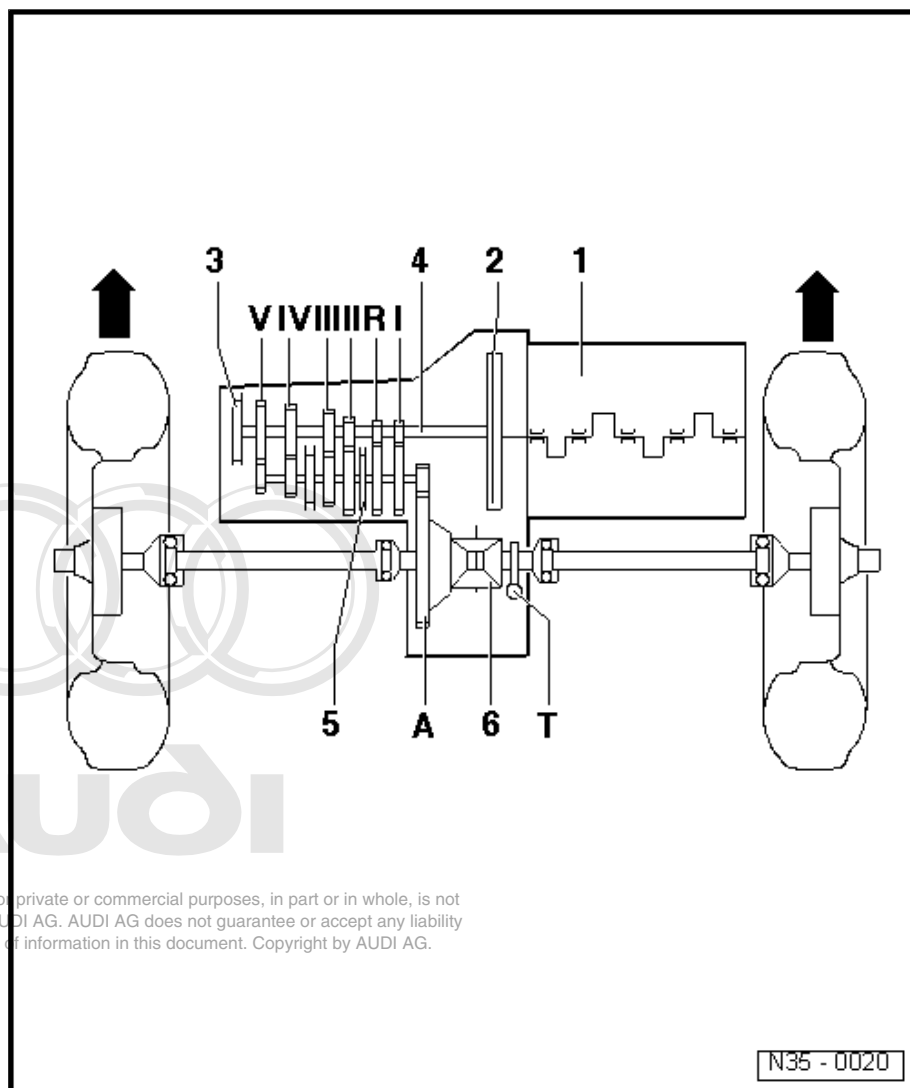


Ratio

-Arrows- point in direction of travel



- I - 1st gear
- II - 2nd gear
- III - 3rd gear
- IV - 4th gear
- V - 5th gear
- R - Reverse gear
- A - Final drive
- T - Speedometer drive



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3 Calculating ratio "i"

Example:

	5th gear	Final drive
Drive gear	$ZG_1 = 43$	$ZA_1 = 17$
Driven gear	$ZG_2 = 36$	$ZA_2 = 72$

$$i = Z_2 : Z_1^{1)}$$

$$i_G = \text{gear ratio} = ZG_2 : ZG_1 = 36 : 43 = 0.837$$

$$i_A = \text{axle ratio} = ZA_2 : ZA_1 = 72 : 17 = 4.235$$

i_{ov} = overall ratio

$$i_{ov} = i_G \times i_A = 0.837 \times 4.235 = 3.545$$

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

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4 General repair instructions

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

A number of generally applicable instructions for the various repair procedures - which were previously repeated at numerous places in the Workshop Manual - are summarised here. They apply to the work described in this Manual.

Special tools

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

Gearbox

- ◆ When installing, ensure that the dowel sleeves between the engine and gearbox are correctly located.
- ◆ When installing a new gearbox, check the oil level and fill up with oil if necessary ⇒ [page 95](#) .
- ◆ Capacity ⇒ [page 1](#) .



Note

- ◆ *If the oil level is topped up with the gearbox installed, check oil level as follows:*
- ◆ *Fill with oil to bottom lip of filler hole and refit screw plug. Start engine, engage a gear and allow gearbox to turn for approx. 2 minutes. Switch off engine and again top up oil to bottom lip of filler hole.*

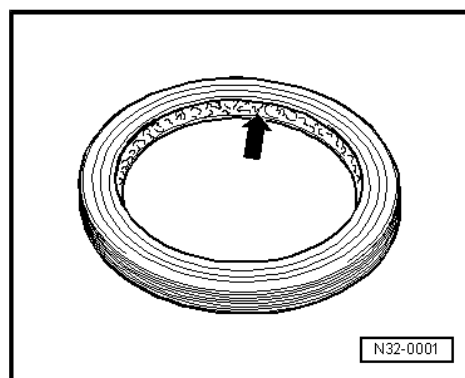
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Sealants

- ◆ Thoroughly clean joint surfaces on gearbox housing etc. before applying sealant .
- ◆ Apply sealant -AMV 188 200 03- evenly and not too thickly.

O-rings, oil seals and gaskets

- ◆ Always renew O-rings, oil seals and gaskets.
- ◆ After removing gaskets and seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- ◆ Thoroughly clean housing joint surfaces before assembling.
- ◆ Before installing oil seals, lightly oil the outer circumference of the seal and fill the space between the sealing lips -arrow- about half full with grease -G 052 128 A1- .
- ◆ The open side of the oil seals faces toward the side with fluid filling.
- ◆ When installing a new oil seal, position the seal in the housing so that the sealing lip does not contact the shaft in the same place as the old seal (make use of insertion depth tolerances).
- ◆ Lightly lubricate O-rings before installation to prevent them from being trapped and damaged during assembly.
- ◆ After renewing seals and gaskets, check and, if necessary, top up oil level in gearbox ⇒ [page 95](#) .

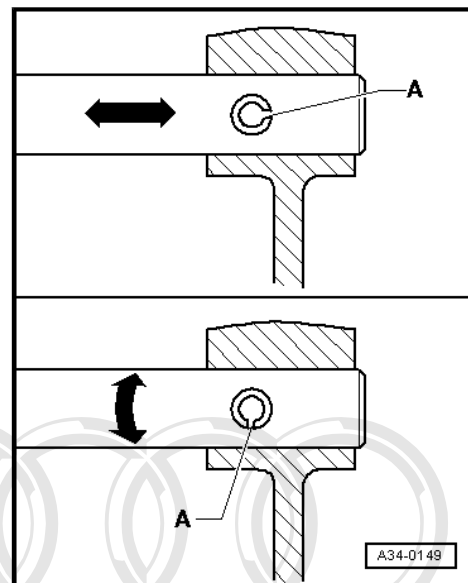


Locking elements

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

Nuts, bolts

- ◆ Loosen the nuts and bolts in reverse sequence to the specified tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- ◆ Especially delicate parts, such as clutch pressure plates, must not be distorted. Loosen and tighten bolts and nuts in stages in diagonal sequence.
- ◆ The tightening torques stated apply to non-oiled nuts and bolts.
- ◆ Always renew self-locking bolts and nuts.
- ◆ Use a wire brush to clean the threads of bolts which are secured with locking fluid. Then apply locking fluid - AMV 185 101 A1- to bolt threads before installing.
- ◆ Threaded holes which take self-locking bolts or bolts coated with locking fluid must be cleaned (using a tap or similar). Otherwise there is a danger of the bolts shearing off the next time they are removed.



Bearings

- ◆ Install needle bearings so the lettering (side with thicker metal) faces towards the installing tool.
- ◆ Install new tapered roller bearings as supplied; do not lubricate additionally with oil.
- ◆ Lubricate all bearings (except new tapered roller bearings) with gear oil before installing in gearbox.
- ◆ Always renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Use inductive heater -VAS 6414- to heat inner races to approx. 100°C before installing. Press in onto stop when installing so there is no axial clearance.
- ◆ Do not interchange the outer or inner races of bearings of the same size (the bearings are paired).

Shims

- ◆ Measure shims at several points with a micrometer. Tolerance variations make it possible to obtain the exact shim thickness required.
- ◆ Check for burrs and damage.
- ◆ Install only shims which are in perfect condition.

Synchro-rings

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

Gear wheels

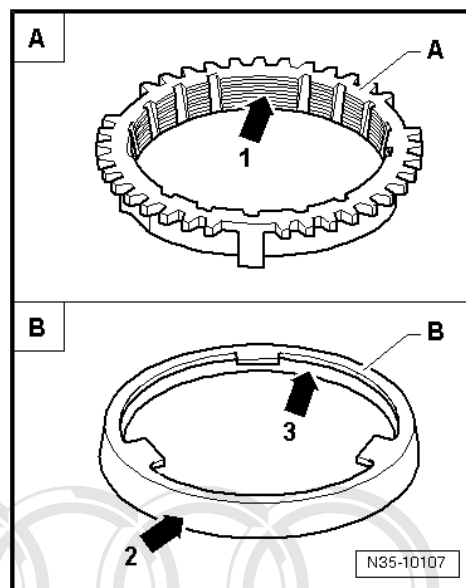
- ◆ Note correct installation position.
- ◆ Before installing, clean and heat to 100°C (maximum) using inductive heater -VAS 6414- .

Selector gears

- ◆ After installing, check 1st to 5th selector gears for minimal axial play and freedom of movement.

Clutch actuation

- ◆ When removing gearbox, remove clutch slave cylinder without disconnecting pipes.
- ◆ Do not depress the clutch pedal after removing the slave cylinder if the hydraulic pipe is still connected. Otherwise the piston will be pressed out of the slave cylinder.
- ◆ Ensure that the pressure plate is kept straight: loosen and tighten bolts in a diagonal sequence and in several gradual stages.
- ◆ If the clutch pedal does not return to its initial position after releasing it (clutch pedal in rest position), you must bleed the clutch system (further measures ⇒ ["1.1 Checking hydraulic clutch mechanism", page 16](#)).
- ◆ If the clutch has burnt out, thoroughly clean the bell housing, flywheel and parts of the engine facing the gearbox in order to prevent odours.



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30 – Clutch

1 Servicing clutch mechanism

I - Exploded view - pedal cluster

⇒ [“1.1 Checking hydraulic clutch mechanism”, page 16](#)

⇒ [“1.2 Exploded view - pedal cluster”, page 17](#)

⇒ [“1.3 Removing and installing clutch pedal switch F36 \(square housing\)”, page 18](#)

⇒ [“1.4 Removing and installing clutch pedal switch F36 \(round housing\)”, page 19](#)

⇒ [“1.5 Removing and installing over-centre spring \(LHD vehicles\)”, page 19](#)

⇒ [“1.6 Removing and installing over-centre spring \(RHD vehicles\)”, page 20](#)

⇒ [“1.7 Removing and installing clutch pedal \(LHD vehicles\)”, page 21](#)

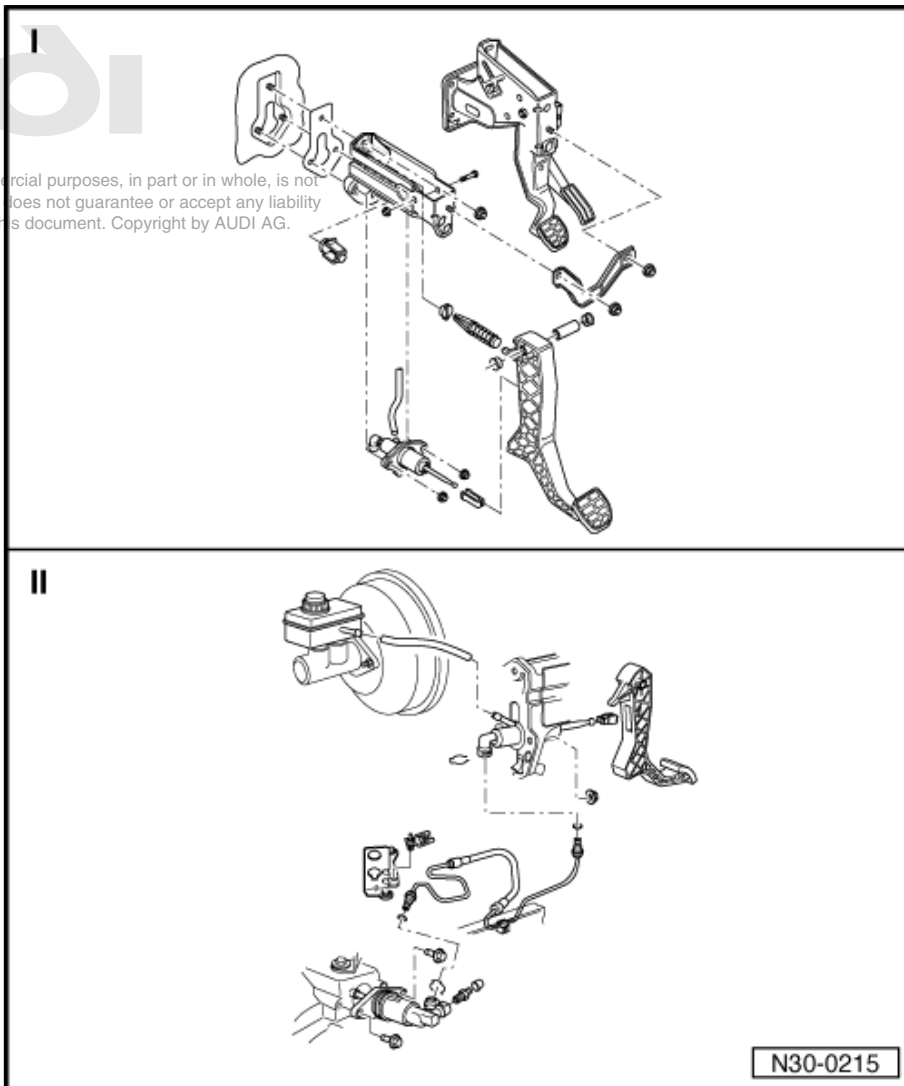
II - Exploded view - hydraulic system

⇒ [“1.8 Exploded view - hydraulic system”, page 22](#)

⇒ [“1.9 Removing and installing master cylinder”, page 23](#)

⇒ [“1.10 Removing and installing slave cylinder”, page 27](#)

⇒ [“1.11 Bleeding clutch system”, page 29](#)



Note

- ◆ Before renewing the master or slave cylinder on the assumption that it is defective you must first check the clutch mechanism ⇒ [page 16](#).
- ◆ Disconnect battery earth strap.
- ◆ Note radio coding for vehicles with coded radio.
- ◆ Apply polycarbamide grease -G 052 142 A2- to all bearings and contact surfaces.

- ◆ *Make sure that no brake fluid escapes into the footwell, the plenum chamber or onto the gearbox below. If this does happen, clean the affected area thoroughly.*
- ◆ *When performing work in the footwell, put cloths on the carpet to protect it from possible brake fluid spills.*
- ◆ *Before working on pedal cluster, remove driver's storage compartment ⇒ Rep. Gr. 68 .*

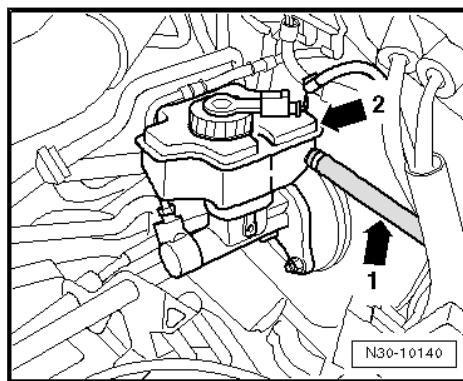
1.1 Checking hydraulic clutch mechanism

- Make sure the pedal returns to its initial position and is not obstructed by additional floor mats or mats that have slipped out of position.
- Bleed the clutch system if necessary.
- First check brake fluid level in brake fluid reservoir.



Note

- ◆ *The clutch hydraulics are connected to one of the chambers -arrow 2- of the brake fluid reservoir via the supply hose -arrow 1-.*
- ◆ *If this chamber is empty or contains too little brake fluid, the system may be leaking.*
- Then check the following components of the hydraulic clutch mechanism for external leaks:
 - ◆ Supply hose between brake fluid reservoir and master cylinder
 - ◆ Master cylinder
 - ◆ Pipe/hose assembly between master cylinder and slave cylinder
 - ◆ Connections (plug-in connectors and threaded connections), including hidden connections
 - ◆ Slave cylinder

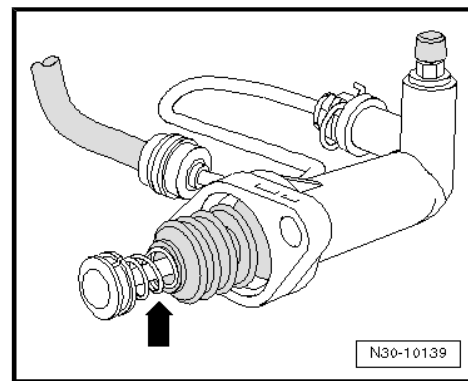


Note

- ◆ *External leaks can be detected, for instance, by traces of brake fluid on or below the gearbox as well as on the noise insulation panel below the gearbox.*
- ◆ *Check correct routing of pipe/hose assembly between master cylinder and slave cylinder. The pipe/hose assembly must not be kinked or become trapped.*
- Then depress clutch pedal carefully; hold pedal in five different positions for approx. 20 seconds at each position over its full travel. Have a second person check the components of the hydraulic clutch mechanism ⇒ [page 16](#) for visible leaks. At the same time the first person should check whether the clutch pedal yields under the foot at any of the held positions.

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- Finally, detach slave cylinder from gearbox (do not open pipe connections) and check sleeve for traces of escaped brake fluid.
- Detach sleeve from plunger -arrow- to check for leaks.



1.2 Exploded view - pedal cluster

1 - Bulkhead

- ☐ With mounting for mounting bracket and master cylinder

2 - Gasket

- ☐ Always renew

3 - Mounting bracket

- ☐ For mounting clutch pedal

4 - Bolt

5 - Mounting bracket

- ☐ For mounting accelerator pedal and brake pedal

6 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Always renew

7 - Connecting plate

8 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Always renew

9 - Spacer bushes

10 - Bearing bush

11 - Clutch pedal

- ☐ Removing and installing
⇒ [page 21](#)

12 - Retaining clip

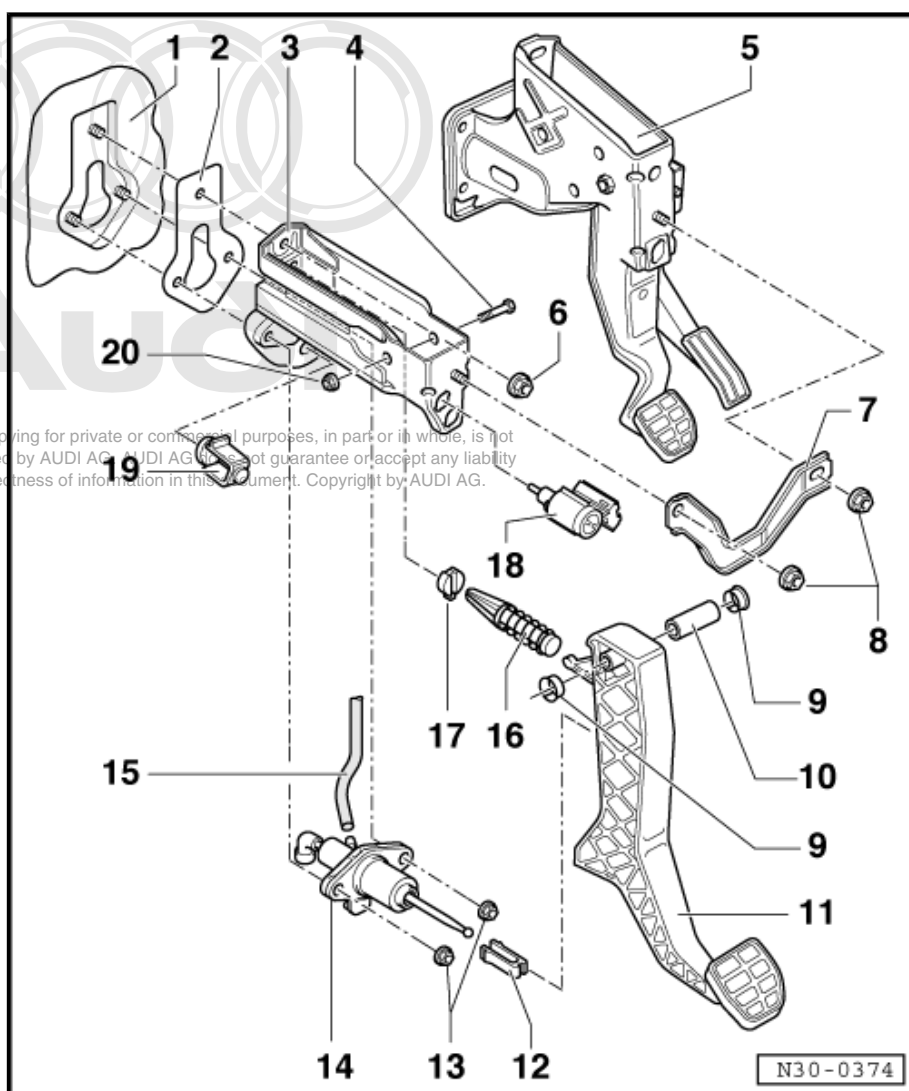
- ☐ Removing and installing ⇒ [Item 4 \(page 22\)](#)

13 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Always renew

14 - Master cylinder

- ☐ Removing and installing ⇒ [page 23](#)



15 - Supply hose

16 - Over-centre spring

- ☐ Removing and installing (LHD vehicles) ⇒ [page 19](#)
- ☐ Removing and installing (RHD vehicles) ⇒ [page 20](#)

17 - Over-centre spring mounting

- ☐ Install in mounting bracket
- ☐ When renewing, remove and install master cylinder ⇒ [page 23](#)

18 - Clutch pedal switch -F36-

- ☐ ⇒ ["1.3 Removing and installing clutch pedal switch F36 \(square housing\)", page 18](#)
- ☐ ⇒ ["1.4 Removing and installing clutch pedal switch F36 \(round housing\)", page 19](#)

19 - Stop

- ☐ For clutch pedal
- ☐ Installation position ⇒ [page 26](#)

20 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Always renew

1.3 Removing and installing clutch pedal switch -F36- (square housing)

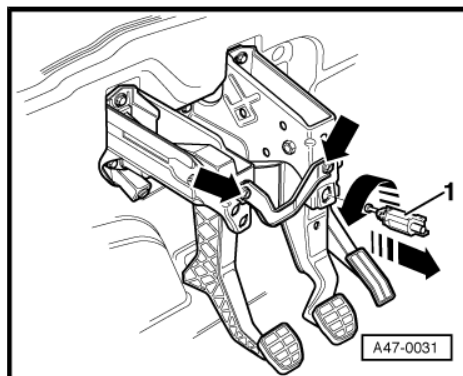


Note

To ensure a secure fit, the switch may only be fitted once.

Removing

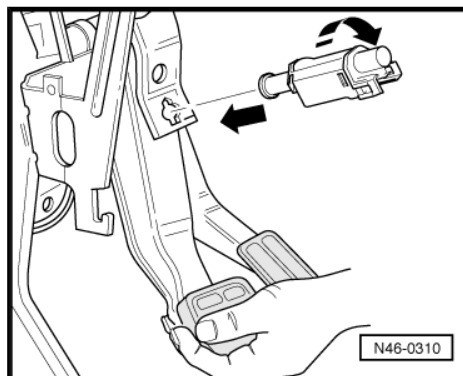
- Remove storage compartment on driver's side ⇒ General body repairs, interior; Rep. Gr. 68 .
- Unplug electrical connector from clutch pedal switch.
- Remove clutch pedal switch -1- by turning 90° anti-clockwise.



Installing

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

- Pull operating rod of clutch pedal switch all the way out.
- Push clutch pedal down by hand.
- Insert switch in mounting hole and secure by turning clockwise through 90° -arrows-.
- Release clutch pedal
- Attach electrical connector to clutch pedal switch.
- Install storage compartment on driver's side ⇒ General body repairs, interior; Rep. Gr. 68 .



1.4 Removing and installing clutch pedal switch -F36- (round housing)



Note

Clutch pedal switch may only be fitted once so as to ensure a firm fit.

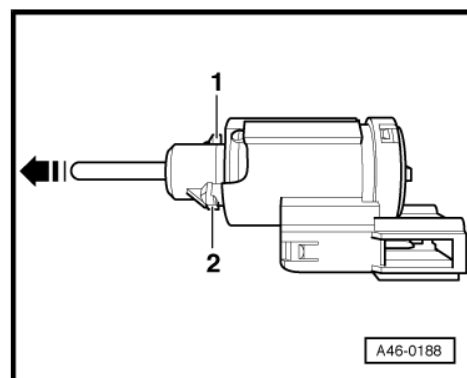
Removing

- Remove storage compartment on driver's side ⇒ General body repairs, interior; Rep. Gr. 68.
- Unplug electrical connector from clutch pedal switch.
- Remove clutch pedal switch by turning anti-clockwise through 45°.

Installing

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

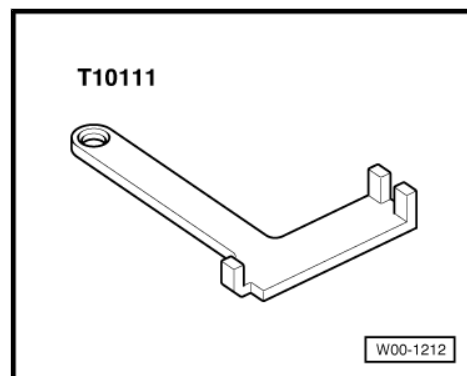
- Pull out operating rod -arrow- all the way before installing clutch pedal switch.
- Insert retainer tabs -1- and -2- of switch in recesses provided in mounting hole and secure by turning clockwise through 45°.
- The clutch pedal should be in the normal position (i.e. not pressed down).
- Do not press clutch pedal when installing.
- Plunger is adjusted automatically when clutch pedal switch is installed.
- Attach electrical connector to clutch pedal switch.
- Install storage compartment on driver's side ⇒ General body repairs, interior; Rep. Gr. 68 .



1.5 Removing and installing over-centre spring (LHD vehicles)

Special tools and workshop equipment required

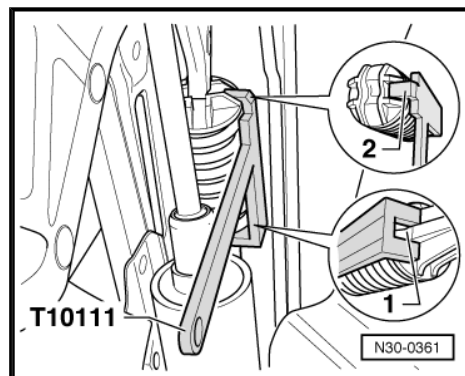
- ◆ Assembly clip -T10111-



Removing

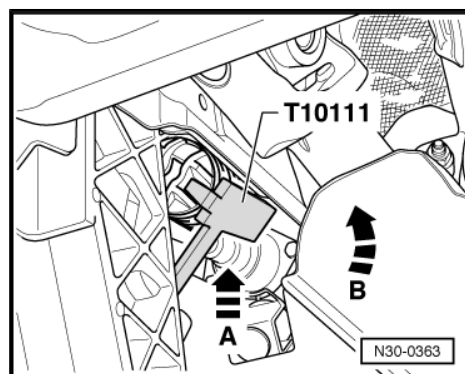
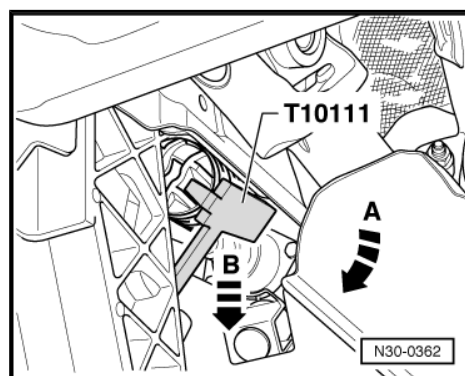
- Remove driver's storage compartment (bottom) ⇒ Rep. Gr. 68 .

- Fit assembly clip -T10111- from the right onto over-centre spring.
 - Ensure that the assembly clip is correctly seated:
- 1 - The rear part of assembly clip must be positioned on the over-centre spring so that the claws fit exactly over the rib -1-.
 - 2 - Lightly depress clutch pedal towards bulkhead.
- Engage the lug -2- of the assembly clip into the cut-out on the over-centre spring.
 - Now depress the clutch pedal towards the bulkhead until the over-centre spring can be removed from below from the mountings on the mounting bracket and clutch pedal.
 - Return clutch pedal to normal position.
 - Turn over-centre spring together with assembly clip -T10111- in direction of -arrow A- and take out downwards in direction of -arrow B-.

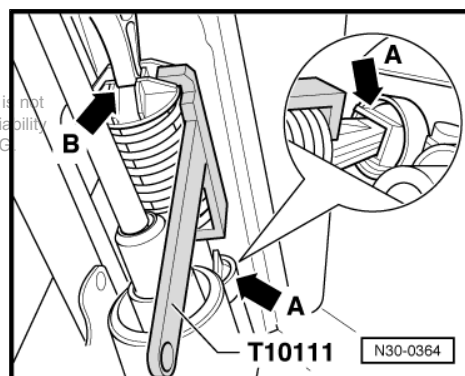


Installing

- Pull clutch pedal into the passenger compartment.
- Insert over-centre spring together with assembly clip -T10111- upwards (in direction of -arrow A-) into mounting bracket and then turn in direction of -arrow B-.



- Insert over-centre spring into rear mounting first -arrow A-.
- Operate clutch pedal until over-centre spring seats on mounting lug -arrow B- on clutch pedal.
- Return clutch pedal to normal position and remove assembly clip.
- Install driver's storage compartment (bottom) ⇒ Rep. Gr. 68 .



1.6 Removing and installing over-centre spring (RHD vehicles)

Removing

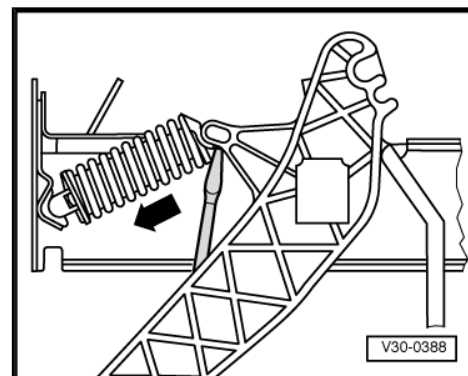
- Remove driver's storage compartment (bottom) ⇒ Rep. Gr. 68 .

- Insert a screwdriver between clutch pedal and over-centre spring.
- Operate clutch pedal and pry over-centre spring off pedal in direction of arrow.

Installing

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

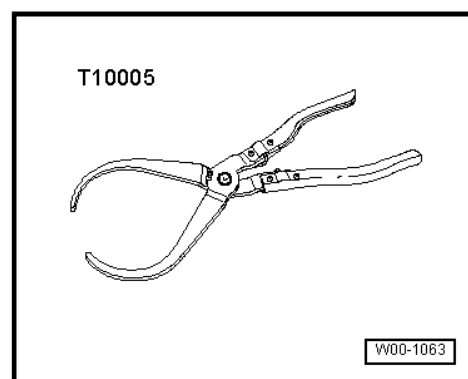
- Operate clutch pedal.
- Insert over-centre spring in over-centre spring mounting and press into position on locating lug on clutch pedal.



1.7 Removing and installing clutch pedal (LHD vehicles)

Special tools and workshop equipment required

- ◆ Pliers -T10005-

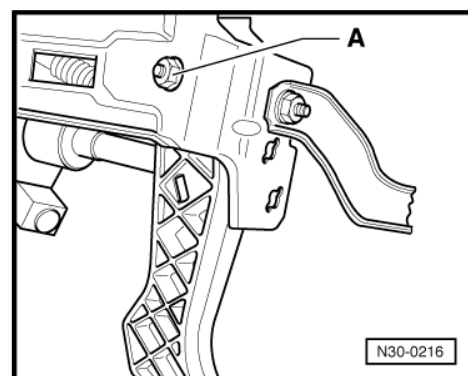


Removing

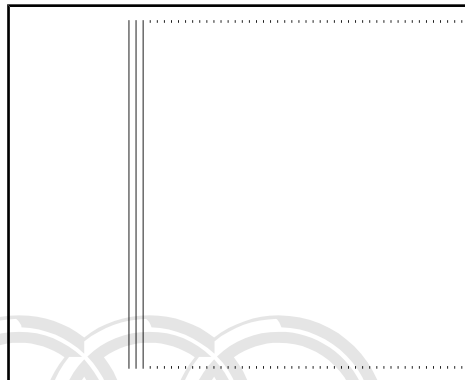
- If fitted, turn clutch pedal switch -F36- 45° anti-clockwise and pull out of mounting.
- Remove over-centre spring ⇒ [page 19](#) or ⇒ [page 20](#) .
- Separate clutch pedal from master cylinder ⇒ [page 26](#) and push operating rod towards engine compartment as far as stop.
- Remove nut -A-.
- Pull out bolt until clutch pedal can be removed.

Installing

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



- The retaining clip -A- must be fitted to the master cylinder operating rod -B-.
- Press clutch pedal in -direction of arrow- until it engages. Ensure that it is properly locked.
- Install over-centre spring ➔ [page 19](#) or ➔ [page 20](#) .
- If fitted, insert clutch pedal switch -F36- in mounting hole and secure by turning 45° clockwise. Clutch pedal must be pressed down.



1.8 Exploded view - hydraulic system

1 - Brake fluid reservoir

2 - Supply hose

3 - Master cylinder

- ☐ Removing and installing
➔ [page 23](#)

4 - Retaining clip

- ☐ Renew only when master cylinder has been removed
- ☐ Removing ➔ [page 23](#)
- ☐ Pressing on
➔ [page 23](#)

5 - Clutch pedal

- ☐ Removing and installing on LHD vehicles
➔ [page 21](#)

6 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Always renew

7 - Bracket

- ☐ Secure to support bracket
➔ [Item 9 \(page 22\)](#)

8 - Pipe/hose assembly

- ☐ Allocation for LHD and RHD vehicles ➔ Electronic parts catalogue

9 - Support bracket

10 - Dust cap

11 - Bleeder valve

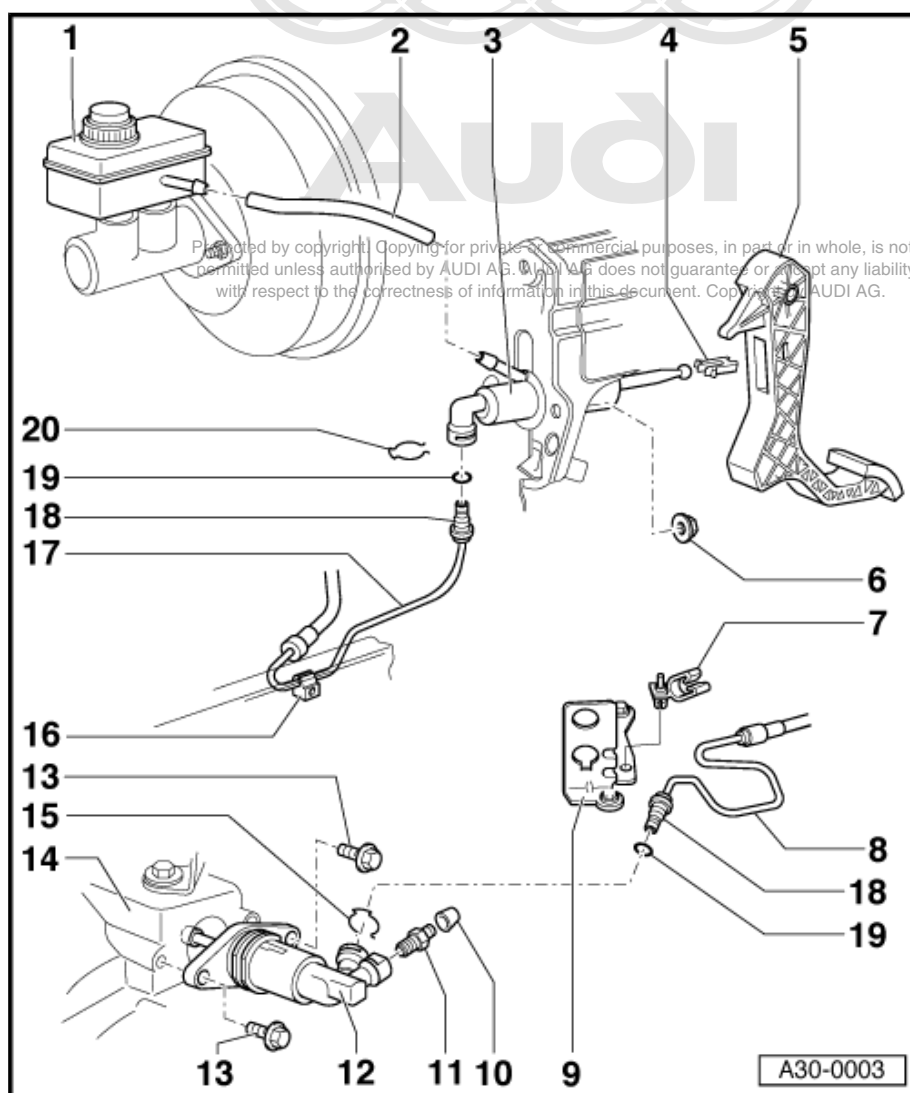
- ☐ Bleeding clutch system ➔ [page 29](#)

12 - Slave cylinder

- ☐ Removing and installing ➔ [page 27](#)

13 - Bolt

- ☐ 23 Nm



14 - Gearbox

15 - Retaining clip

- ☐ Pull out retaining clip to disconnect pipe → [page 25](#)

16 - Clip

- ☐ Secured on body

17 - Pipe/hose assembly

- ☐ Allocation for LHD and RHD vehicles → Electronic parts catalogue

18 - Pipe connection (plug-in type)

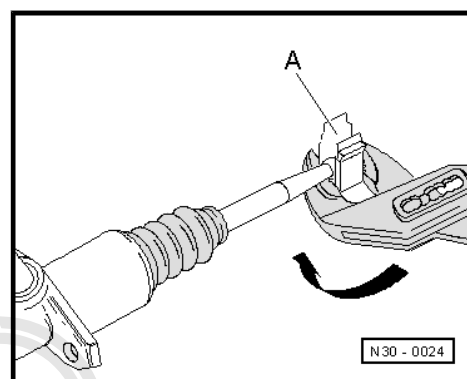
19 - O-rings

- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

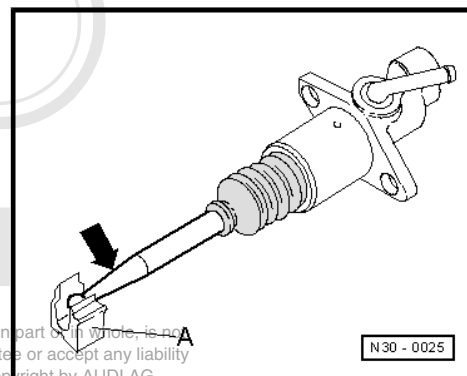
20 - Retaining clip

- ☐ Pull out retaining clip to disconnect pipe → [page 25](#)

Levering retaining clip -A- off in direction of arrow



Pressing master cylinder operating rod into retaining clip -A- (in direction of arrow).

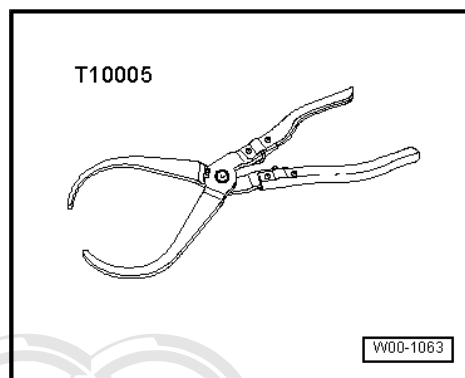


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1.9 Removing and installing master cylinder

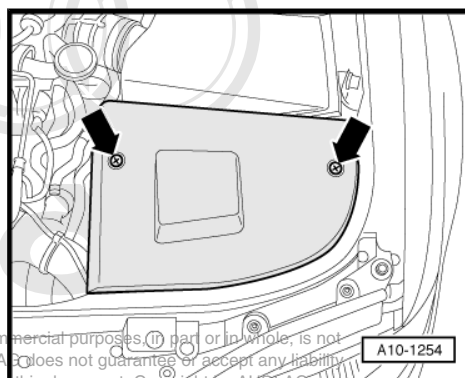
Special tools and workshop equipment required

◆ Pliers -T10005-

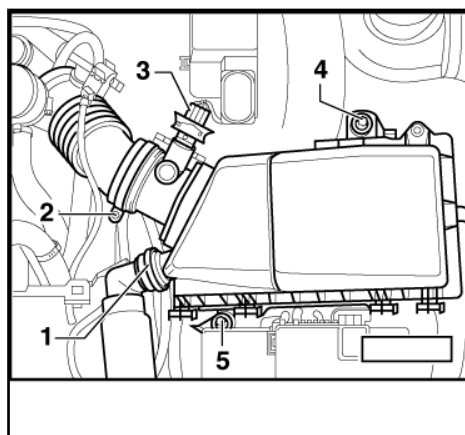


Removing

- If fitted, remove cover panel (front left) -arrows-.



- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .



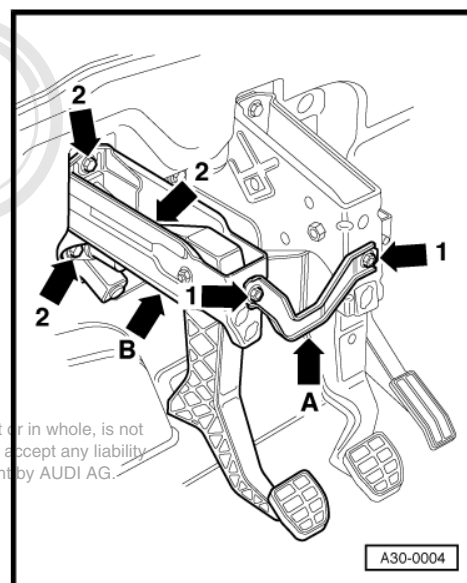
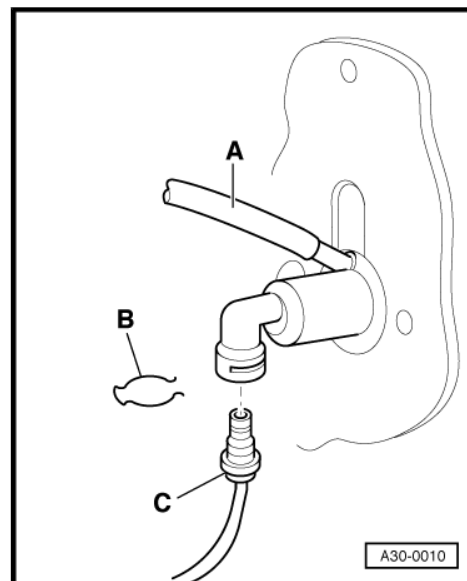
- Clamp off supply hose -A- coming from brake fluid reservoir using hose clamp -3094- .
- Disconnect supply hose -A- at master cylinder.
- Remove retaining clip -B- from master cylinder.
- Pull pipe/hose assembly -C- out of master cylinder and seal end of pipe.



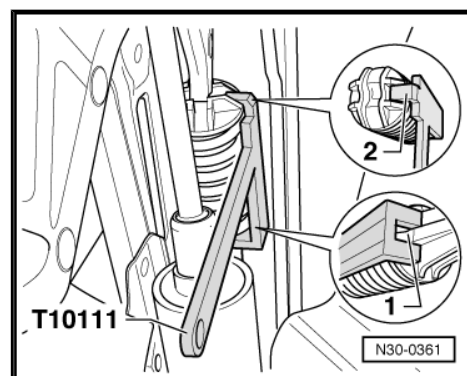
Note

In order to take out the master cylinder the entire clutch pedal assembly must be removed.

- Remove driver's storage compartment (bottom) ⇒ Rep. Gr. 68 .
- If fitted, remove clutch pedal switch -F36-
⇒ ["1.3 Removing and installing clutch pedal switch F36 \(square housing\)", page 18](#) or
⇒ ["1.4 Removing and installing clutch pedal switch F36 \(round housing\)", page 19](#) .
- Now remove complete clutch pedal mounting bracket as follows:
- First remove connecting plate -arrow A- -arrows 1-.
- Then remove securing nuts -arrows 2- for mounting bracket -arrow B-.
- Take off mounting bracket.

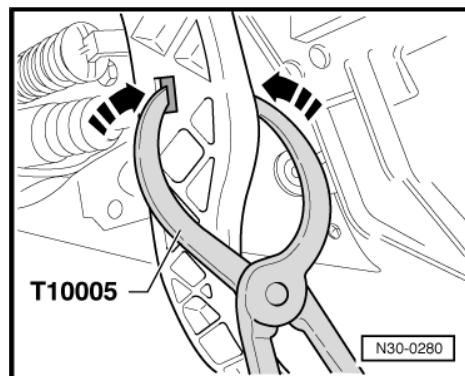


- Remove over-centre spring using assembly clip -T10111- as follows:
- 1 - The rear part of assembly clip must be positioned on the over-centre spring so that the claws fit exactly over the rib -1-.
- 2 - Lightly depress clutch pedal towards clutch pedal stop.
- Engage the lug -2- of the assembly clip into the cut-out on the over-centre spring.

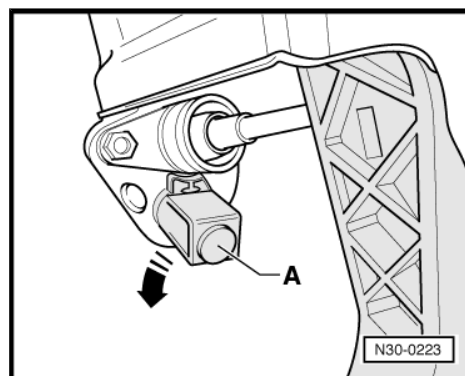


Release master cylinder operating rod from clutch pedal as follows:

- Carefully pull clutch pedal towards you. At the same time, press both sides of retaining clip inwards using pliers -T10005- -arrows-



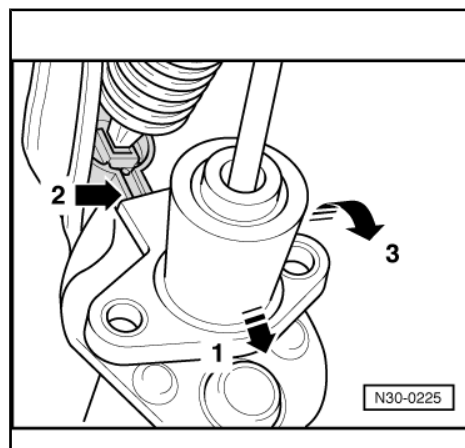
- Turn stop -A- for clutch pedal in direction of arrow and remove.



- Then push master cylinder in the direction of -arrow 1- onto stop.

It must not be covered in upper area by over-centre spring mounting -arrow 2-.

- Then swing master cylinder in direction of -arrow 3- out of mounting bracket.



Installing

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

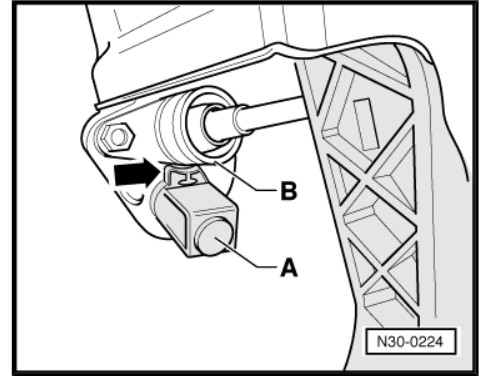
- Retaining clip -A- must be fitted on operating rod -B- of master cylinder.
- Press clutch pedal in -direction of arrow- until it engages. Ensure that it is properly locked.
- Install over-centre spring ⇒ [page 19](#) or ⇒ [page 20](#) .

- Fit stop -A- for clutch pedal again.

Installation position:

The arm -arrow- points towards master cylinder -B-.

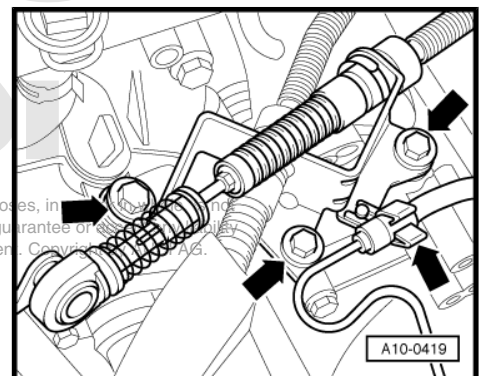
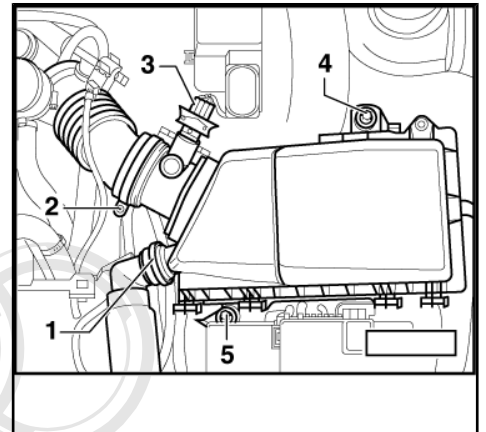
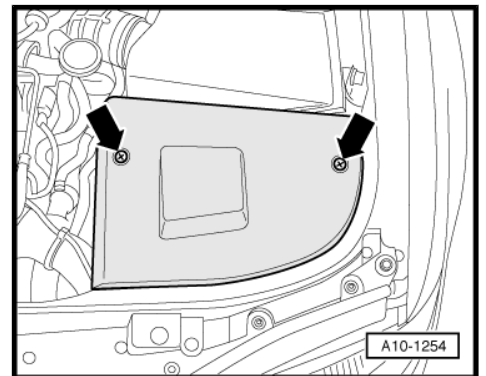
- Bleed clutch system after installing master cylinder
⇒ [page 29](#) .
- If fitted, install clutch pedal switch -F36- in mounting hole
⇒ [“1.3 Removing and installing clutch pedal switch F36 \(square housing\)”, page 18](#) or
⇒ [“1.4 Removing and installing clutch pedal switch F36 \(round housing\)”, page 19](#) .
- Install complete air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .



1.10 Removing and installing slave cylinder

Removing

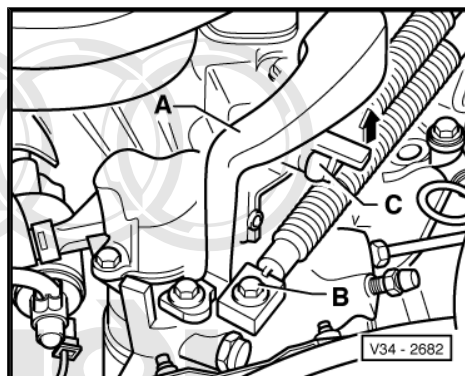
- If fitted, remove cover panel (front left) -arrows-.
- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .
- Detach cable support bracket from gearbox, if necessary unclip pipe/hose assembly -arrows-.



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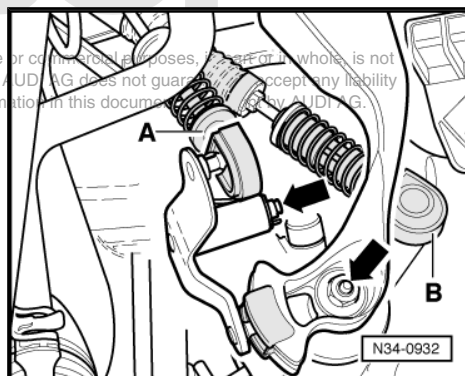
Detaching selector mechanism on vehicles up to 09.98

- Detach damper weight -A- and gear selector cable -B- from gearbox selector lever.
- Unscrew gear selector cable and take off washer and square nut (self-locking).
- Pull gate selector cable off actuating arm/relay lever -C-, to do this lift lug in direction of arrow.



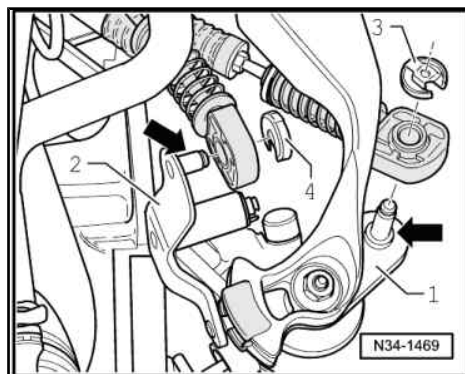
Detaching selector mechanism on vehicles from 09.98 to 06.01

- Remove securing clip -arrow- and pull off gate selector cable -A- with relay lever.
- Remove nut -arrow- and detach gear selector cable -B- with gearbox selector lever.
- Tie up gear selector cable with gearbox selector lever and gate selector cable with relay lever.



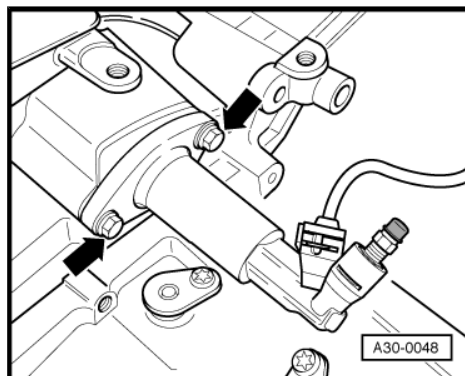
Detaching selector mechanism on vehicles from 07.01

- Detach securing clip -3- for gear selector cable from gearbox selector lever -1-.
- Detach securing clip -4- for gate selector cable from relay lever -2-.
- Pull gate selector cable and gear selector cable off joint pins -arrows-.



Continued for all vehicles

- Remove bolts -arrows- for slave cylinder.
- Remove slave cylinder.



- Pull clip -A- and then pipe/hose assembly -C- out of slave cylinder and seal end of pipe.

Installing

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

- Press retaining clip -A- in as far as it will go.
- Position recess on hose/pipe assembly so that it faces lug on clutch slave cylinder -arrow B-.
- Insert hose/pipe assembly -C- in slave cylinder, making sure you hear it engage.
- Lubricate end of operating rod with MoS₂ grease.
- Install slave cylinder.
- Attach selector mechanism to gearbox on vehicles up to 09.98
⇒ [page 44](#) .
- Attach selector mechanism to gearbox on vehicles from 09.98
⇒ [page 61](#) .
- After installing slave cylinder, bleed clutch system
⇒ [page 29](#) .
- Install complete air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

Tightening torques

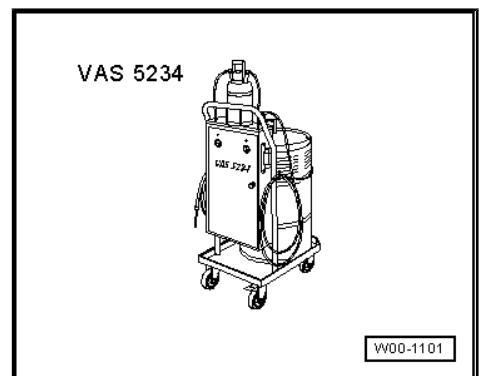
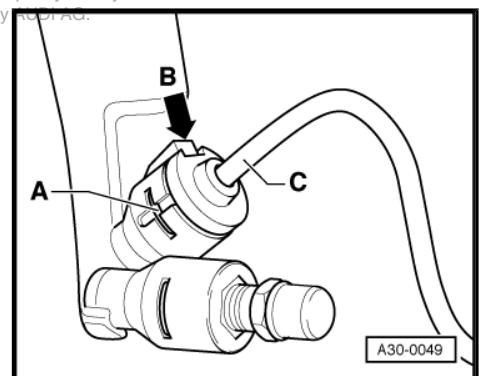
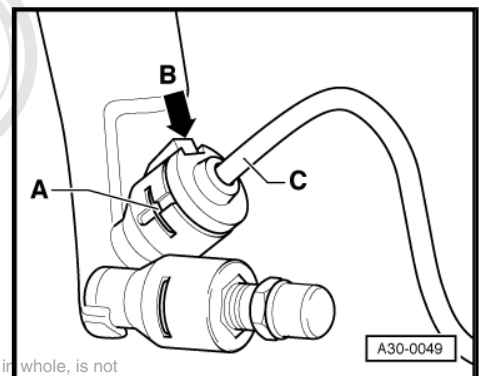
Clutch slave cylinder to gearbox	23 Nm
Selector cable support bracket to gearbox	25 Nm

1.11 Bleeding clutch system

Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment -VAS 5234- or brake filling and bleeding equipment -V.A.G 1869-

- ◆ Brake fluid specification ⇒ Rep. Gr. 47 .

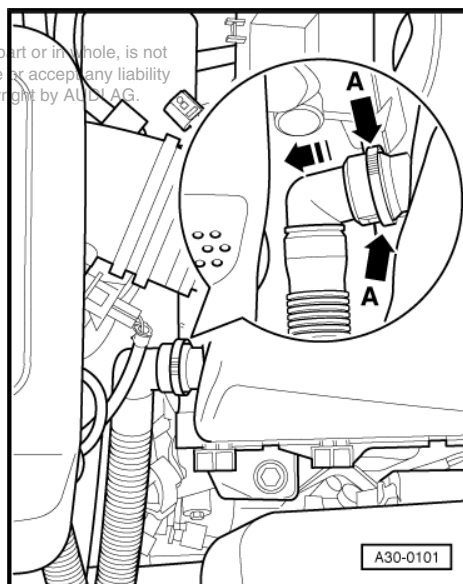


Procedure

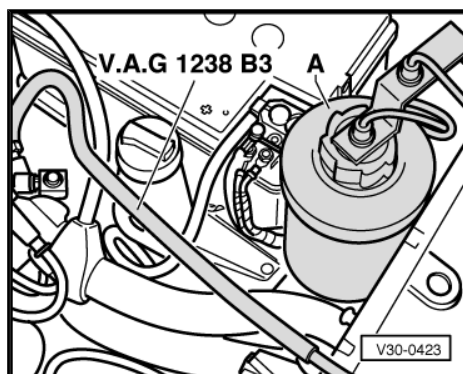


Note

- ◆ *Open the bleeder valve before switching on the bleeding appliance.*
- ◆ *When performing the following steps, make sure that no brake fluid escapes onto the gearbox.*
- ◆ *The clutch system must be bled after performing work on the hydraulic clutch mechanism.*
- ◆ *Before bleeding the clutch system, pull back the clutch pedal to the normal position and top up brake fluid to "Max" marking on brake fluid reservoir.*
- ◆ *The clutch system should be bled at the same intervals as the brake system.*
- If fitted, detach secondary air pipe from air cleaner housing. Compress catch -arrows A- and detach in direction of -arrow-. Move secondary air pipe clear (upwards).
- Connect brake filling and bleeding equipment -V.A.G 1869- or -VAS 5234- , but do not switch on at this stage.



- To bleed system, use 670 mm bleeder hose -V.A.G 1238/B3- if necessary.
- Then connect bleeder hose to collector bottle -A- of brake bleeding equipment.



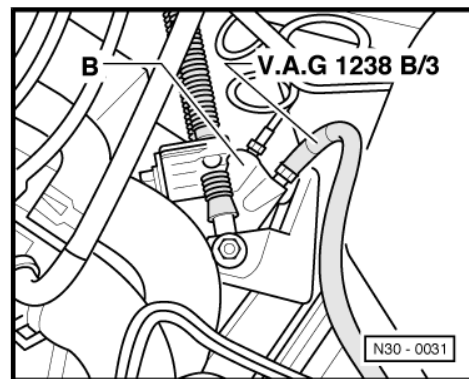
- Connect bleeder hose to slave cylinder -B- and open bleeder valve.
- Switch on bleeder appliance and allow about 100 cm³ of brake fluid to drain out.
- Operating pressure 2.5 bar



Note

Ensure bleeder hose is correctly fitted during bleeding operation.

- Close bleeder valve.
- Depress clutch pedal several times after bleeding process is completed.
- Repeat bleeding procedure if necessary.



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2 Servicing clutch release mechanism

1 - Gearbox

2 - Ball head stud

- ☐ 25 Nm
- ☐ Lubricate with MoS₂ grease

3 - Input shaft oil seal

- ☐ Renewing
⇒ [Item 13 \(page 114\)](#)

4 - Guide sleeve with O-ring

- ☐ O-ring secured to guide sleeve
- ☐ Renew guide sleeve if O-ring is damaged
- ☐ Lubricate guide sleeve in area of release bearing with MoS₂ grease

5 - Retaining spring

- ☐ Secure to clutch release lever

6 - Bolt

- ☐ 20 Nm

7 - Clutch release lever

- ☐ Remove and install together with release bearing ⇒ [page 33](#) and ⇒ [page 33](#)

8 - Release bearing

- ☐ Do not wash out bearing; wipe clean only
- ☐ Renew bearing if noisy
- ☐ Lubricate surfaces which contact release lever with MoS₂ grease

9 - Bolt

- ☐ 23 Nm

10 - Slave cylinder

- ☐ Removing and installing ⇒ [page 27](#)

11 - Operating rod

- ☐ Lubricate end of operating rod with MoS₂ grease

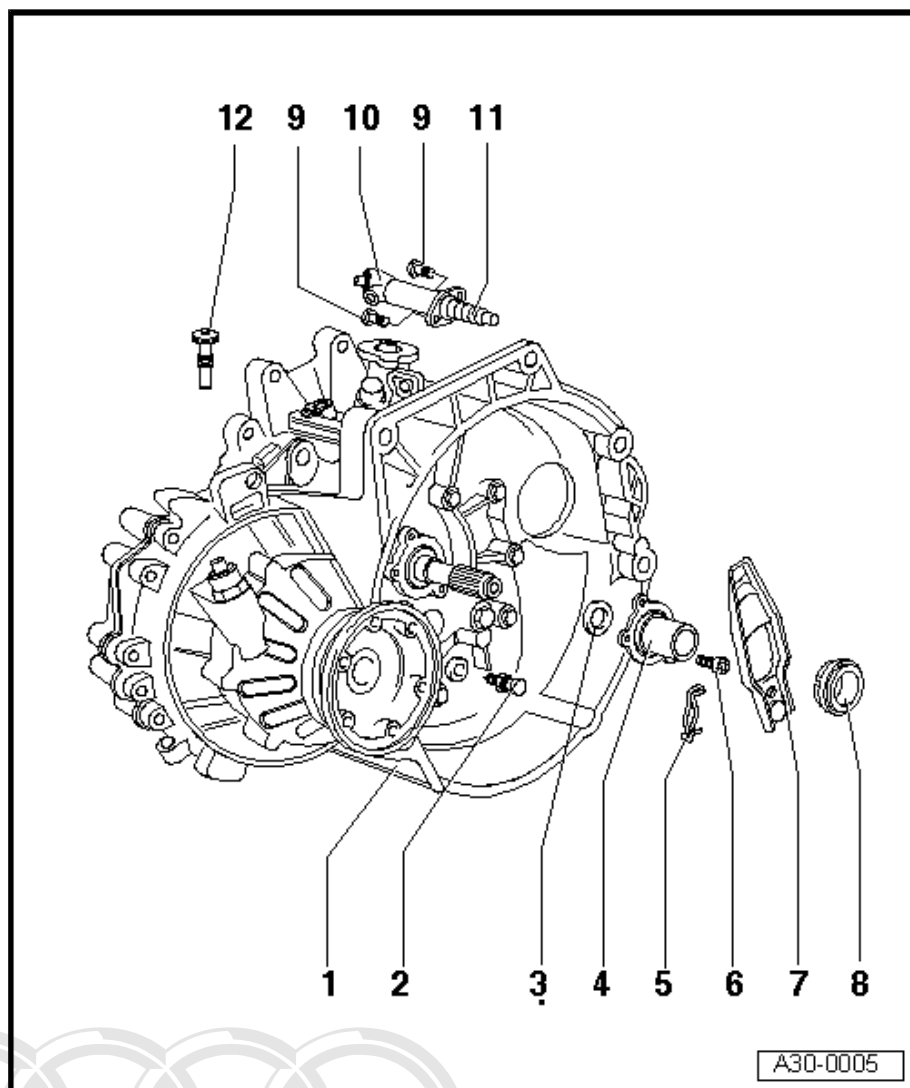
12 - Assembly bolt

- ☐ Secures clutch release lever while installing gearbox ⇒ [page 81](#)
- ☐ Unscrew after gearbox has been installed



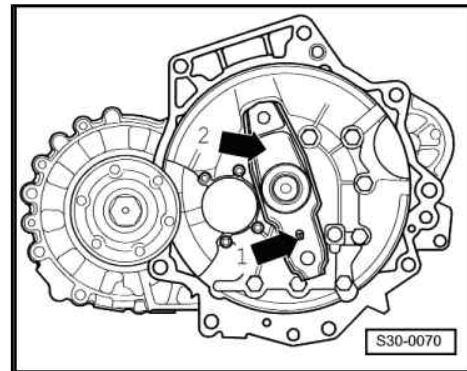
Note

If the assembly bolt
⇒ [Item 12 \(page 32\)](#) is not available,
an M 8 x 35 bolt can be used instead.



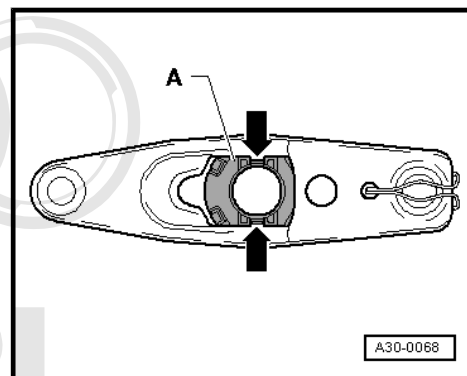
Removing and installing clutch release lever together with release bearing

- Unhook spring -arrow 1-.
- Pull off clutch release lever -arrow 2- and clutch release bearing.
- Perform installation in reverse sequence of removal.



Removing and installing release bearing

- Press locking lugs -arrows- together on reverse side of clutch release lever and remove release bearing -A- from clutch release lever.
- To install, press release bearing -A- into clutch release lever until locking lugs -arrows- engage.



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3 Servicing clutch

⇒ "3.1 Fault-finding on power transmission - complaints regarding defects on the clutch and clutch mechanism", page 34

⇒ "3.2 Servicing clutch - exploded view", page 39

⇒ "3.3 Removing and installing clutch", page 40

3.1 Fault-finding on power transmission - complaints regarding defects on the clutch and clutch mechanism



Note

Checking hydraulic clutch mechanism ⇒ [page 16](#).

Before carrying out any clutch repairs, always check out the customer complaint and the trace the cause of the fault. Investigate in each case whether the fault is caused by a defective clutch mechanism or by incorrect adjustment of the selector mechanism.

Complaint	Fault description	Fault rectification
Clutch pedal does not return to original position by itself	♦ Air in hoses/pipes.	– Bleed pipes/hoses; top up with brake fluid.
	♦ Leak in pipes/hoses, master cylinder or slave cylinder.	– Renew defective component, bleed pipes/hoses; top up with brake fluid.
	♦ Clutch release bearing seized or sticking on guide sleeve.	– Renew guide sleeve and clutch release bearing.
	♦ Diaphragm spring of pressure plate is broken.	– Renew pressure plate.

Complaint	Fault description	Fault rectification
Excessive force is necessary to operate clutch pedal.	♦ Over-centre spring defective.	– Renew over-centre spring.
	♦ Increased clutch release pressure due to wear of clutch linings.	– Inform customer that clutch release force normally increases due to wear of clutch linings. – Renew clutch plate if the distance between clutch plate and rivets is less than 0.1 mm.
	♦ Clutch release bearing seized or sticking on guide sleeve.	– Renew defective components.
	♦ Pressure plate with incorrect type of spring	– Allocate pressure plate according to ⇒ Electronic parts catalogue
	♦ Mechanically defective pressure plate/clutch plate.	– Renew defective components.

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Complaint	Fault description	Fault rectification
	◆ Clutch plate does not move freely or is stuck on splines.	– Check hub splines for damage (burrs). Renew clutch plate if necessary. – Clean hub splines and input shaft to remove corrosion and remnants of grease and coat with grease for clutch plate splines -G 000 100-. Move clutch plate backwards and forwards and remove excess grease.

Complaint	Fault description	Fault rectification
Noises when operating the clutch	◆ Release bearing defective, release bearing not guided correctly, contact surface worn	– Always renew release bearing if noisy. – Renew guide sleeve if damaged.
	◆ Contact surface (tips of diaphragm springs) of pressure plate defective (bent, broken). Contact point of release bearing off-centre.	– Renew pressure plate. – Check release bearing and guide sleeve, renew if necessary. – Check position of release lever. – Check dowel sleeves.
	◆ Engine/gearbox off-centre.	– Check dowel sleeves.
	◆ Clutch plate installed wrong way around.	– Install correctly.
	◆ Wrong clutch plate installed.	– Allocate clutch plate according to → Electronic parts catalogue.

Complaint	Fault description	Fault rectification
Grinding noises when engaging one of the forward gears or reverse gear; gear lever sticking, does not move freely; gears cannot be selected or clutch mechanism is without function	◆ Air in system, clutch does not disengage fully.	– Bleed system; check system, top up with brake fluid.
	◆ Leak in pipes/hoses, master cylinder or slave cylinder.	– Renew defective component, top up with brake fluid, bleed system.
	◆ Travel of clutch pedal is restricted (carpet, floor mat under pedal) it is not possible to floor clutch pedal	– Inform customer of the source of the fault.
	◆ Pressure plate is distorted due to incorrect installation, clutch plate deformed due to incorrect handling.	– Check components and renew if necessary, note position of centring pins. – If there is still a grinding noise, check clutch plate splines on input shaft for freedom of movement, repair gearbox if necessary.

Complaint	Fault description	Fault rectification
	◆ Tips of diaphragm springs broken or bent (incorrect installation, release bearing off-centre).	– Renew pressure plate. – Check release bearing and guide sleeve, renew if necessary. – Check dowel sleeves.
	◆ Clutch plate too thick.	– Allocate clutch plate according to ⇒ Electronic parts catalogue .
	◆ Clutch lining sticking to flywheel (stored for a lengthy period of time, high humidity).	– Lightly grind off friction surfaces for clutch linings or renew components if corrosion is excessive.
	◆ Clutch plate does not move freely or is stuck on splines. Hub corroded, damaged during installation. Hub splines worn on one side.	– Check hub splines for damage. Renew clutch plate if necessary. – Remove traces of corrosion and grease from hub and shaft. Lightly coat shaft with grease for clutch plate splines - G 000 100- . – Move clutch plate backwards and forwards and remove excess grease. – Check position of dowel sleeves if hub splines are worn. – Check release bearing, guide sleeve and pressure plate, renew if necessary.
	◆ Pressure plate does not move away from flywheel far enough (wrong pressure plate installed).	– Allocate pressure plate according to ⇒ Electronic parts catalogue
	◆ Offset of engine/gearbox assembly above tolerance (dowel sleeves not fitted), support plate of clutch plate deformed.	– Insert dowel sleeves before fitting gearbox. – Check clutch plate and pressure plate for damage. Renew if necessary.
	◆ Clutch linings have become loose due to excessive speed (shifting into lower gear at high speed). ◆ Clutch linings have come loose due to excessive clutch slip when driving off.	– Renew clutch plate. Inform customer of the source of the fault.

Complaint	Fault description	Fault rectification
Load change shocks when accelerator is pressed briefly and when engine speed is reduced suddenly.	◆ Engine/gearbox mountings too soft.	– Inform customer of the source of the fault. Allocate mountings according to ⇒ Electronic parts catalogue , renew if necessary.
	◆ Uneven engine running.	– Check engine adjustments and rectify if necessary.
	◆ Clutch plate is fitted with damper to prevent loose gear rattling noises.	– Inform customer of the source of the fault.

Complaint	Fault description	Fault rectification
	♦ Engine/gearbox off-centre.	– Check dowel sleeves and renew if necessary.

Complaint	Fault description	Fault rectification
Clutch slips, ineffective power transmission or vehicle does not move.	♦ Wrong clutch plate or wrong pressure plate installed.	– Allocate clutch plate and pressure plate according to ⇒ Electronic parts catalogue .
	♦ Clutch plate worn, burnt; pressure plate overheated, scores; pressure plate deformed due to incorrect installation; contact pressure of pressure plate insufficient; poor driving habits; normal wear.	– Renew clutch plate. – Renew pressure plate. – Inform customer of the source of the fault.
	♦ Oil on clutch plate, pressure plate, flywheel. Oil seal of engine or gearbox defective. Grease on contact surfaces due to excessive grease on hub.	– Renew clutch plate. – Clean contact surfaces of pressure plate and flywheel. – Renew oil seal, remove excessive grease from input shaft.
	♦ Clutch plate installed wrong way around.	– Install correctly, check clutch plate and renew if necessary.
	♦ Flywheel recessed too far or excessive wear on clutch contact surface.	– Allocate flywheel according to ⇒ Electronic parts catalogue . – Check clutch plate and pressure plate. Renew if necessary.
	♦ Leak in clutch slave cylinder.	– Renew clutch slave cylinder.

Complaint	Fault description	Fault rectification
Grabbing clutch, engine jolts	♦ Air in system.	– Bleed system, check brake fluid level, check system for leaks. – Renew defective component.
	♦ Uneven engine running.	– Check engine adjustments and rectify if necessary.
	♦ Poor driving habits, rpm too low when driving off.	– Inform customer of the source of the fault.
	♦ Wrong clutch plate installed.	– Allocate clutch plate according to ⇒ Electronic parts catalogue .
	♦ Engine/gearbox mountings too soft, worn.	– Check engine/gearbox mountings, if necessary allocate according to ⇒ Electronic parts catalogue .
	♦ Oil on clutch lining, contact surface of pressure plate and flywheel (oil escapes from clutch housing).	– Check oil seal for gearbox input shaft or crankshaft, renew if necessary. – Renew clutch plate, clean pressure plate and flywheel.

Complaint	Fault description	Fault rectification
	◆ Clutch release bearing seized or sticking on guide sleeve (bearing applies pressure only on one side of diaphragm spring of pressure plate).	– Renew clutch release bearing and guide sleeve. – Check actuating components and mountings of actuating components.
	◆ Contact surface of pressure plate moves away only on one side due to seized release bearing.	– Check contact surface of clutch lining on flywheel, pressure plate and diaphragm spring, renew pressure plate if necessary.
	◆ Pressure plate housing deformed during installation. Contact surface of pressure plate moves away only on one side.	– Renew clutch release bearing and guide sleeve.
	◆ Excessive amount of grease applied to input shaft (traces of grease on clutch plate, pressure plate and flywheel).	– Remove grease on pressure plate and flywheel, renew components if damaged (marks caused by clutch judder, traces of overheating, scores). – Remove traces of grease from hub and shaft, apply a thin coat of grease for clutch plate splines -G 000 100- to shaft. – Move clutch plate backwards and forwards and remove excess grease.

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Complaint	Fault description	Fault rectification
Clacking sound can be heard when releasing clutch pedal	◆ Mass of input shaft is accelerated due to sudden release of clutch pedal. Splines of meshing gears knock, the noise is increased on clutch plates with damper due to the damper moving to stop.	– Inform customer of the source of the fault.

Complaint	Fault description	Fault rectification
Noises can be heard when engine is idling	◆ Damper spring broken.	– Renew clutch plate.
	◆ Clutch plate installed without damper (rattling noises occur when engine is idling).	– Allocate clutch plate according to ⇒ Electronic parts catalogue.
	◆ Pressure plate deformed, broken, imbalance.	– Renew pressure plate.
	◆ Uneven engine running.	– Check adjustment of engine and rectify if necessary.
	◆ Offset of engine/gearbox assembly above tolerance (dowel sleeves not fitted).	– Insert dowel sleeves before fitting gearbox.
	◆ Intermediate plate contacts flywheel.	– Engage intermediate plate at sealing flange and push onto dowel sleeves.

3.2 Servicing clutch - exploded view



Note

- ◆ Before renewing the clutch plate and pressure plate refer to *Fault finding on power transmission - Complaints regarding clutch and clutch mechanism* ⇒ [page 34](#).
- ◆ Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.
- ◆ If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).
- ◆ Renew clutch plate and pressure plate if riveted fastening is damaged or loose.
- ◆ Allocate clutch plate and pressure plate according to ⇒ *Electronic parts catalogue*.

1 - Flywheel

- ☐ Ensure that dowel pins fit tightly
- ☐ Contact surface for clutch lining must be free of scoring, oil and grease
- ☐ Removing and installing ⇒ Rep. Gr. 13

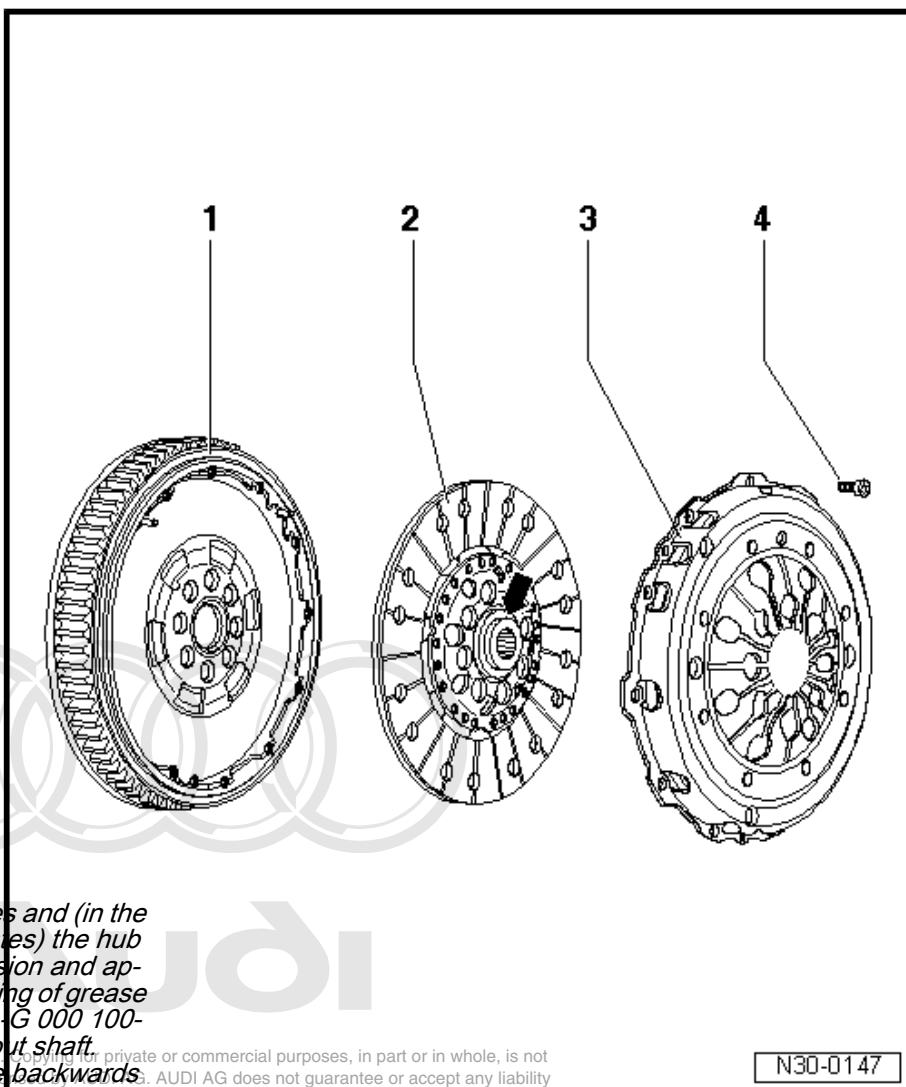
2 - Clutch plate

- ☐ Allocate diameter according to ⇒ *Electronic parts catalogue* and engine code.
- ☐ Installation position with dual-mass flywheel: Shorter end of hub -arrow- faces towards pressure plate.
- ☐ Installation position with one-piece flywheel: spring cage faces towards pressure plate
- ☐ Centralising ⇒ [page 40](#)
- ☐ Lightly grease splines



Note

Clean input shaft splines and (in the case of used clutch plates) the hub splines. Remove corrosion and apply only a very thin coating of grease for clutch plate splines. G 000 100- to the splines of the input shaft. Then move clutch plate backwards and forwards on input shaft until hub moves freely on shaft. It is important to remove excess grease.



N30-0147

3 - Pressure plate

- ☐ Removing and installing ⇒ [page 40](#)
- ☐ Checking ends of diaphragm spring ⇒ [page 40](#)

- ☐ Checking spring connections and rivets ➔ [page 40](#)



Note

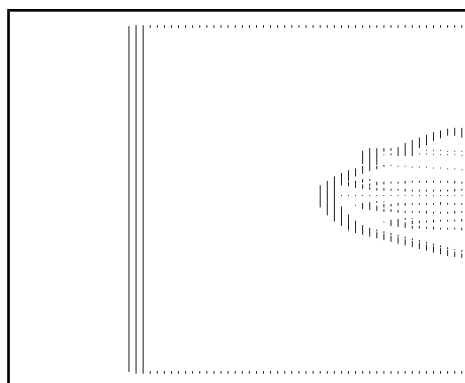
Pressure plates have an anti-corrosion coating and are greased. Only the contact surface may be cleaned, otherwise the service life of the clutch will be considerably reduced.

4 - Bolt

- ☐ Allocate according to ➔ Electronic parts catalogue
- ☐ M6 = 13 Nm
- ☐ M7 = 20 Nm
- ☐ Loosen and tighten gradually in diagonal sequence

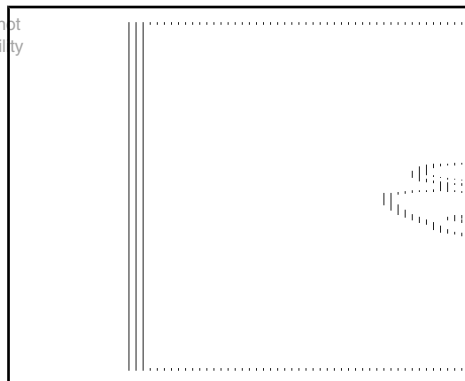
Checking ends of diaphragm spring

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



Checking spring connections and rivets

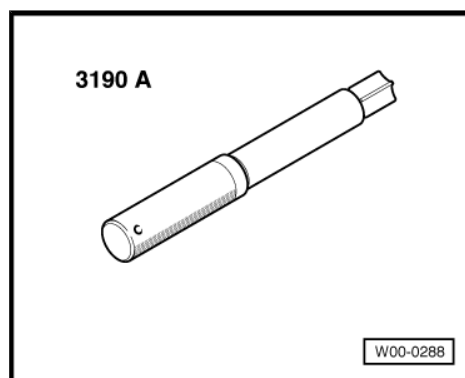
- Check spring connections between pressure plate and cover for cracks and make sure rivets are seated tightly.
- Renew pressure plate if spring connections are damaged or rivets are loose -arrows-.



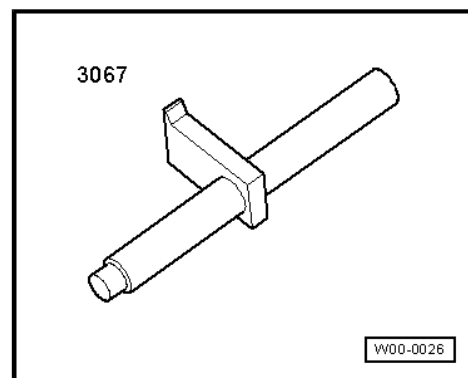
3.3 Removing and installing clutch

Special tools and workshop equipment required

- ◆ Centring mandrel -3190 A-



◆ Counterhold tool -3067-



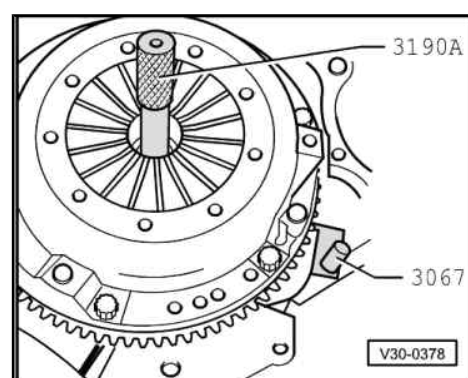
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Removing

- Remove gearbox ➔ [page 72](#) .
- Attach counterhold tool -3067- before loosening or tightening bolts.
- Loosen bolts in small steps and in diagonal sequence.
- Take off pressure plate and clutch plate.

Installing

- Fit pressure plate onto centring pins.
- Screw in all bolts evenly by hand until bolt heads make contact with pressure plate.
- Tighten bolts in small steps and in diagonal sequence to avoid damaging centring holes in pressure plate and dowel pins on flywheel.
- Install gearbox ➔ [page 81](#) .



34 – Controls, housing

1 Servicing selector mechanism up to 09.98

⇒ [“1.1 Installation position of selector mechanism up to 09.98”, page 42](#)

⇒ [“1.2 Removing and installing selector cables up to 09.98”, page 44](#)

⇒ [“1.3 Servicing selector housing up to 09.98”, page 46](#)

⇒ [“1.4 Removing and installing selector mechanism up to 09.98”, page 48](#)

⇒ [“1.5 Servicing gear lever up to 09.98”, page 50](#)

⇒ [“1.6 Adjusting selector mechanism up to 09.98”, page 52](#)

1.1 Installation position of selector mechanism up to 09.98

-Arrow A- gear selection movement

-Arrow B- gate selection movement

A - Gear selector cable (gear selection movement)

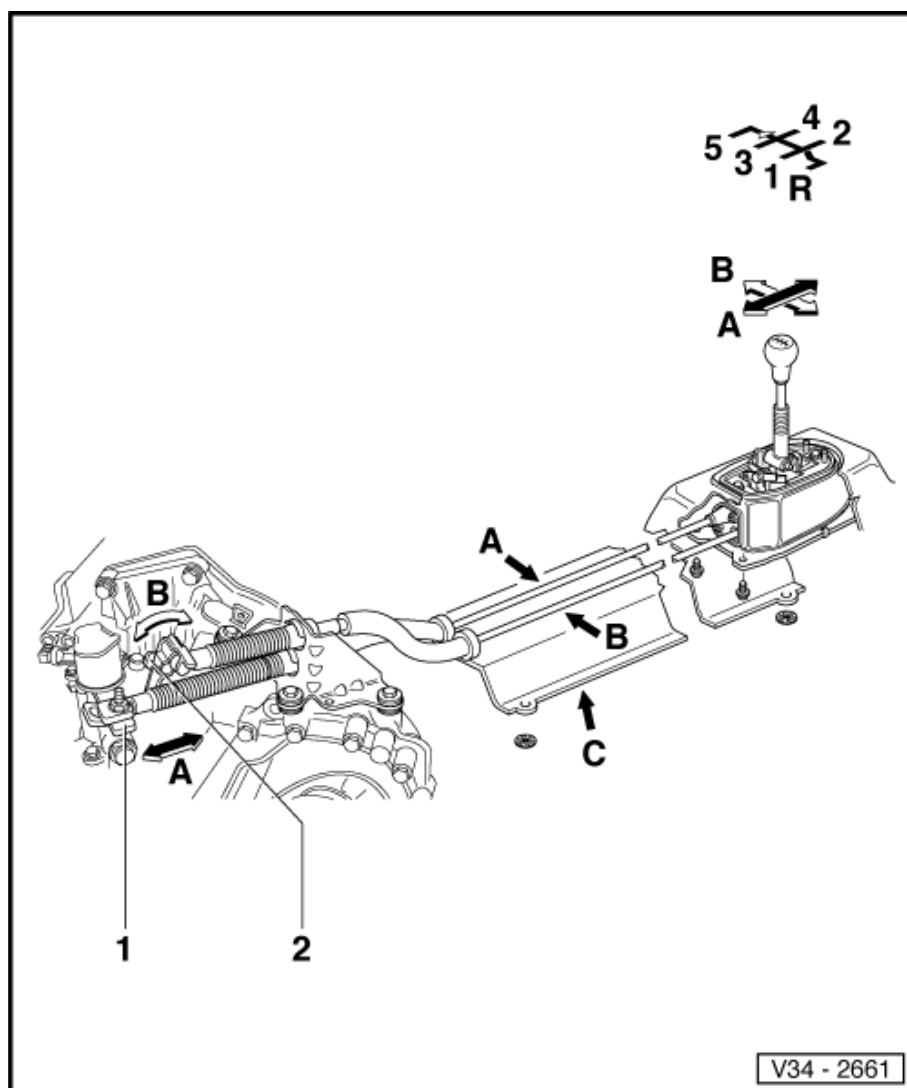
B - Gate selector cable (gate selection movement)

C - Heat shield

- ☐ Detach before removing selector mechanism.

1 - Gearbox selector lever

2 - Relay lever with actuating arm/gate selector cable



 Note

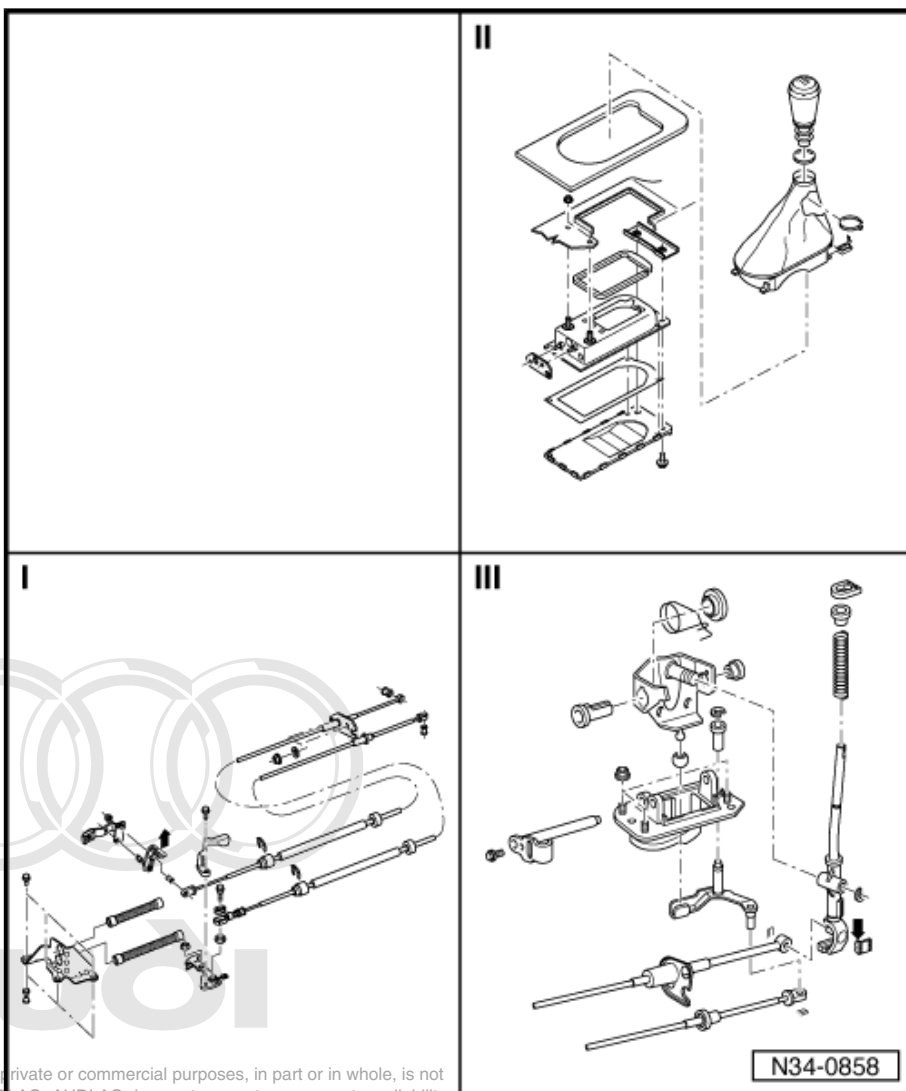
- ◆ *Note radio coding for vehicles with coded radio.*
- ◆ *Before working on selector mechanism in engine compartment, disconnect earth strap from battery ⇒ Rep. Gr. 27.*
- ◆ *Follow the steps required when re-connecting the battery ⇒ Rep. Gr. 27.*
- ◆ *Do not kink selector cables.*
- ◆ *Apply polycarbamide grease -G 052 142 A2- to all bearings and contact surfaces.*

I - Removing and installing selector cables - exploded view
⇒ [page 44](#)

II - Servicing selector housing
⇒ [page 46](#)

Removing and installing selector mechanism ⇒ [page 48](#)

III - Servicing gear lever
⇒ [page 50](#)
⇒ "1.6 Adjusting selector mechanism up to 09.98", [page 52](#)



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1.2 Removing and installing selector cables up to 09.98



Note

Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2-.

1 - Gear selector cable

- ☐ Installation position
⇒ [page 42](#)

2 - Gate selector cable

- ☐ Pull cable off actuating arm
⇒ [Item 18 \(page 45\)](#),
to do this lift lug in direction of -arrow-
- ☐ Installation position
⇒ [page 42](#)
- ☐ Install before installing gear selector cable

3 - Securing clip

- ☐ When removing do not damage bellows

4 - Bolt

- ☐ 25 Nm
- ☐ With shank
- ☐ Gear selector cable to gearbox selector lever

5 - Insulation piece

- ☐ Between gear selector cable and gearbox selector lever

6 - Washer

- ☐ Install between gear selector cable and gearbox selector lever

7 - Gearbox selector lever

- ☐ Install so that gap in splines aligns with selector shaft
- ☐ After installing, adjust selector mechanism ⇒ [page 52](#)
- ☐ Installation position ⇒ [page 46](#)

8 - Square nut

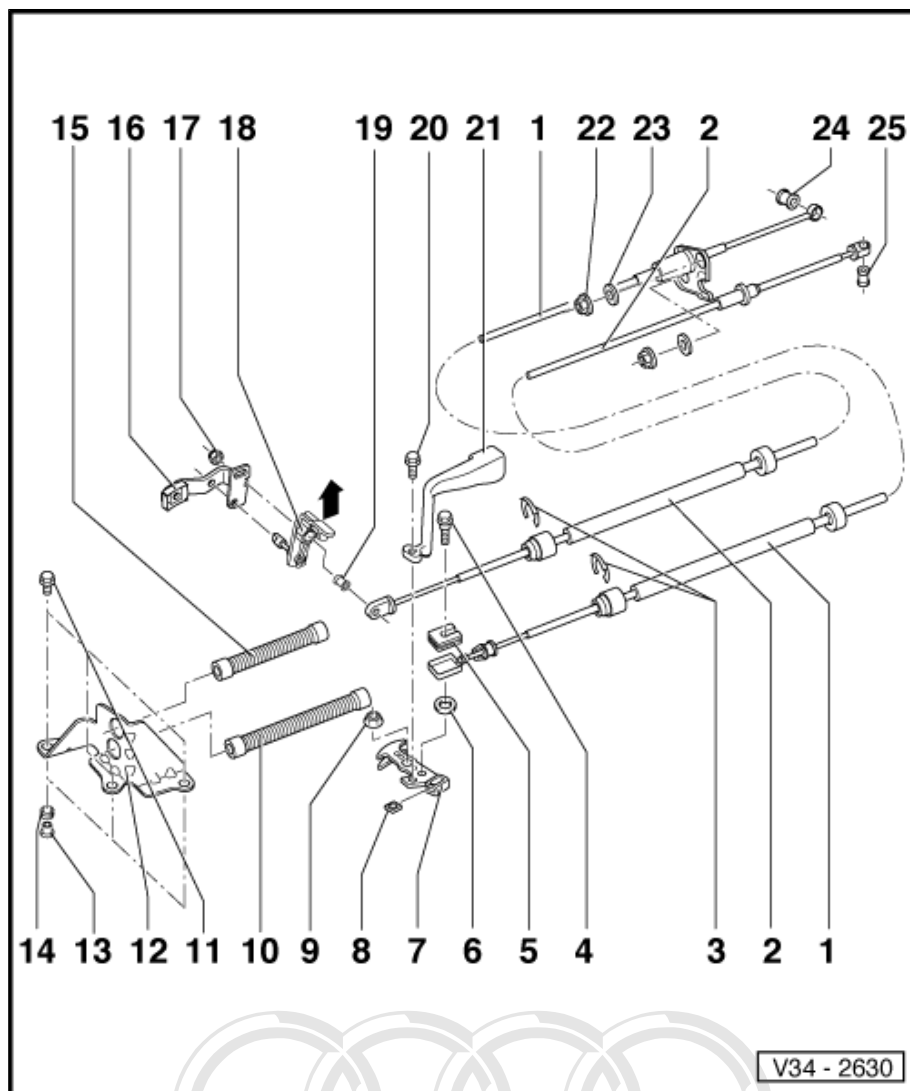
- ☐ Self-locking
- ☐ Always renew
- ☐ Insert in gearbox selector lever

9 - Nut

- ☐ 20 Nm
- ☐ Self-locking
- ☐ For gearbox selector lever

10 - Bellows

- ☐ Carefully pull over gear selector cable/end piece



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- ☐ Lubricate with MoS₂ grease

11 - Bolt

- ☐ 25 Nm
- ☐ For support bracket

12 - Support bracket

13 - Distance piece

14 - Grommet

- ☐ For support bracket mounting on gearbox

15 - Bellows

- ☐ Carefully pull over gate selector cable/end piece
- ☐ Lubricate with MoS₂ grease

16 - Relay lever

- ☐ Remove before removing clutch mechanism
- ☐ Installation position ⇒ [page 46](#)
- ☐ Servicing ⇒ [page 119](#)

17 - Nut

- ☐ 15 Nm
- ☐ Self-locking
- ☐ For relay lever/actuating arm
- ☐ Loosen only when adjusting selector mechanism

18 - Actuating arm

- ☐ With pivot shaft for relay lever
- ☐ Installation position ⇒ [page 46](#)
- ☐ Servicing ⇒ [page 119](#)

19 - Insulation piece

- ☐ For gate selector cable/actuating arm
- ☐ Press out and in with drift

20 - Bolt

- ☐ 25 Nm
- ☐ For damper weight

21 - Damper weight

- ☐ Remove to adjust selector mechanism

22 - Nut

- ☐ 15 Nm
- ☐ Self-locking
- ☐ Secures selector cables to selector housing

23 - Rubber washer

24 - Insulation piece

- ☐ For gear selector cable/gear lever
- ☐ Press out and in with drift

25 - Insulation piece

- ☐ For gate selector cable/gate selector lever
- ☐ Press out and in with drift

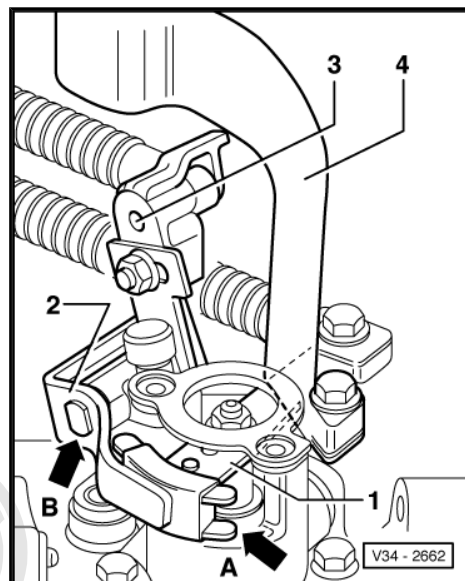
Installation position: gearbox selector lever / relay lever / actuating arm / damper weight

- 1- - Gearbox selector lever
- 2- - Relay lever
- ◆ Engages in guide rail of gearbox selector lever via slide block -arrow A-.
- ◆ Lubricate with MoS₂ grease
- 3- - Actuating arm
- ◆ Flats -arrow B- on pivot shaft for relay lever only fit in one position
- 4- - Damper weight
- ◆ Bolt on to gearbox selector lever



Note

For purposes of clarity, the mechanism and switch for reversing light -F4- are not shown in the illustration.



1.3 Servicing selector housing up to 09.98

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1 - Gear knob

- ☐ When removing, also take off boot
⇒ [Item 3 \(page 47\)](#)
- ☐ Removing ⇒ [page 48](#)

2 - Trim ring

3 - Boot with mounting frame

- ☐ When removing, also take off gear knob
⇒ [Item 1 \(page 47\)](#)
- ☐ Removing ⇒ [page 48](#)
- ☐ Separating boot from gear knob ⇒ [page 50](#)

4 - Retaining clips

5 - Connecting piece

- ☐ Connects boot with gear knob
- ☐ Removing ⇒ [page 50](#)

6 - Clip

- ☐ Secures gear knob to gear lever

7 - Noise insulation

8 - Nut

- ☐ 25 Nm
- ☐ Self-locking
- ☐ Secures selector housing to body

9 - Body

10 - Retainer for selector housing

11 - Gasket

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

12 - Gasket

- ☐ Between selector cables and selector housing

13 - Selector housing

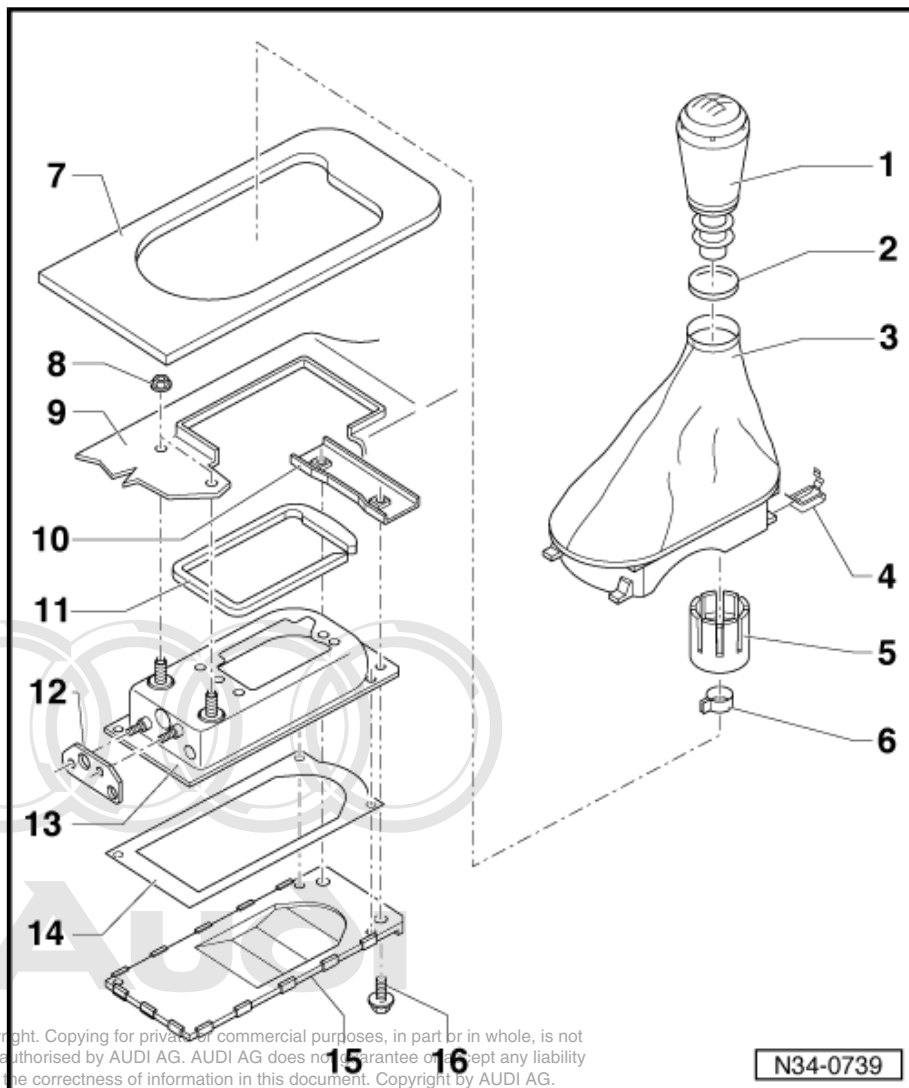
14 - Gasket

- ☐ Self-adhesive
- ☐ Glue onto cover

15 - Cover

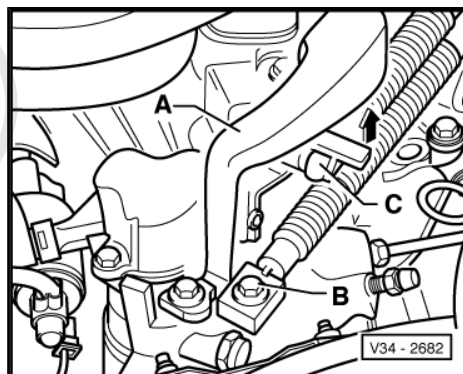
16 - Bolt

- ☐ 25 Nm
- ☐ Secures selector housing to body

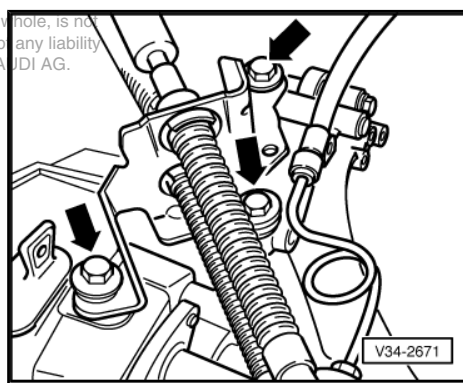


1.4 Removing and installing selector mechanism up to 09.98

- Detach gear selector cable -B- from gearbox selector lever.
- Take off gear selector cable with washer and square nut (self-locking).
- Pull gate selector cable off actuating arm/relay lever -C-, to do this lift lug in direction of arrow.

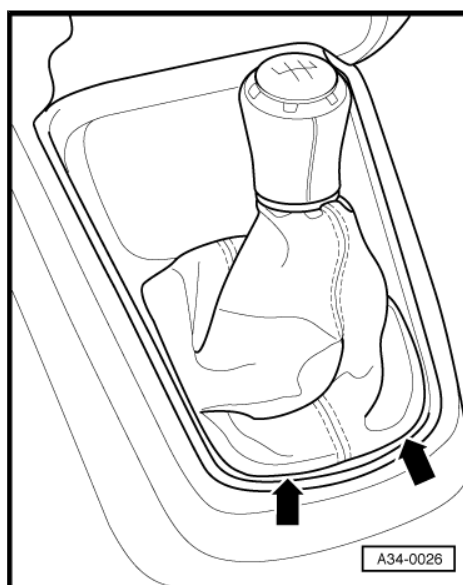


- Remove cable support bracket from gearbox -arrows-, if necessary unclip pipe/hose assembly at cable support bracket first.

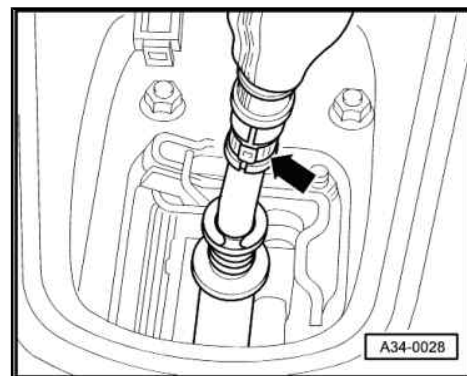


Removing gear knob and gear lever boot

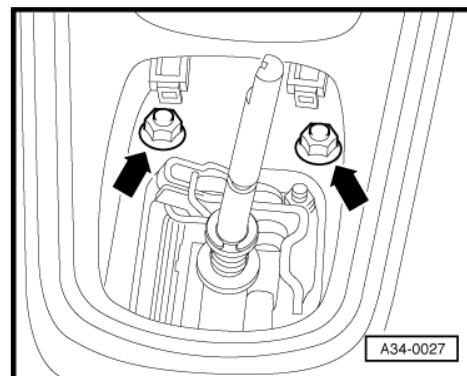
- Lift boot in direction of -arrows- and remove from behind.
- Pull boot up and over gear knob.



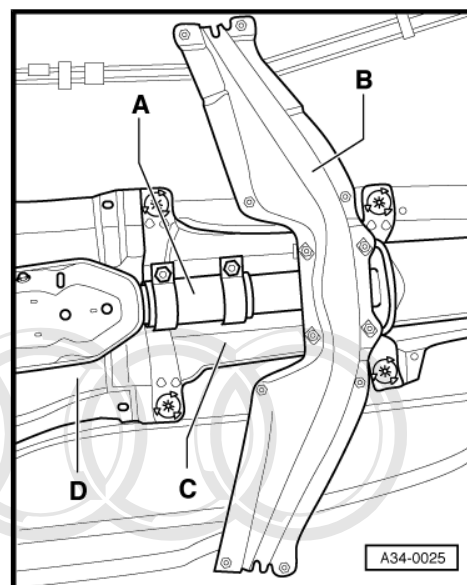
- Open clip -arrow- and pull off gear knob together with boot.
- Remove noise insulation ⇒ [Item 7 \(page 47\)](#) .



- Remove securing nuts -arrows-.



- Unfasten clamp -arrow A- and disconnect exhaust system.
- Remove cross member -arrow B-.
- Remove heat shields -C- and -D- below selector cables.
- Remove securing bolts ⇒ [Item 16 \(page 47\)](#) .
- Pull selector housing down and remove from behind together with selector cables.



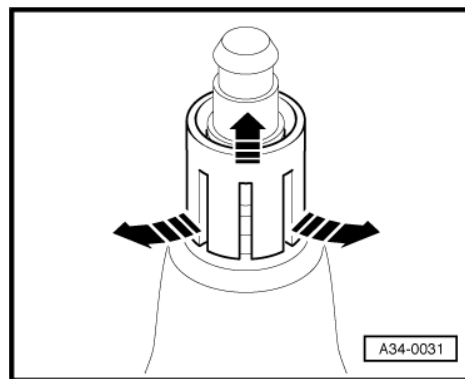
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Separating gear knob from boot

- Turn boot inside out.
- Using a screwdriver, lever the prongs -arrows- on the connecting piece outwards.
- Pull connecting piece off gear lever.
- Turn gear knob outwards and pull free of boot.

Installing gear knob in boot

- Turn boot inside out.
- Insert gear knob in boot.
- Press connecting piece onto gear knob and boot. The connecting piece must clip onto the gear knob.



Installing selector housing

Perform installation in reverse sequence of removal.



Note

- ◆ *Renew the gasket between the selector housing and the floor if it is damaged.*
- ◆ *Adjust selector mechanism ⇒ [page 52](#) .*
- ◆ *Align exhaust system ⇒ Rep. Gr. 26 .*

Tightening torques

Selector housing to body Bolt M8	25 Nm
Selector housing to body Nut M8	25 Nm
Cross member to body	25 Nm
Selector cable support bracket to gearbox	25 Nm
Bolt securing gear selector cable to gear- box selector lever	25 Nm

1.5 Servicing gear lever up to 09.98

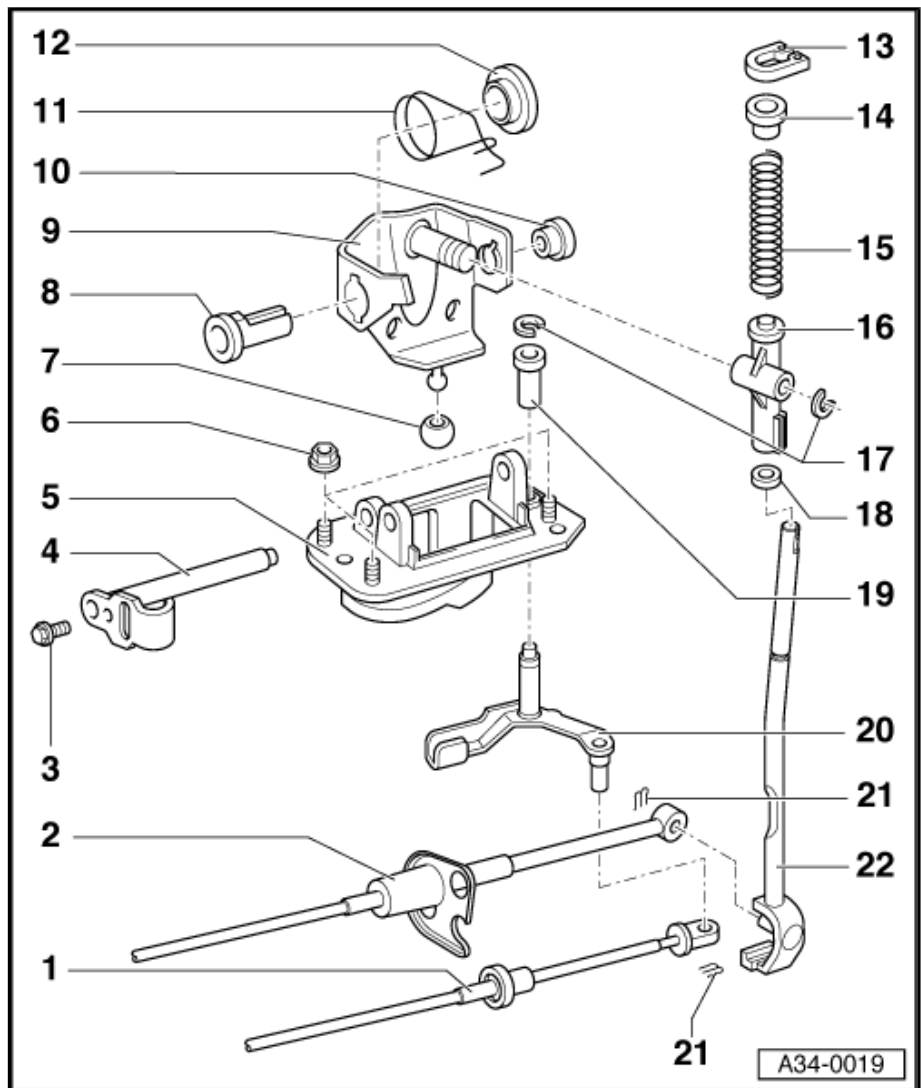


Note

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Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2- .

- 1 - Gate selector cable**
 - ☐ On gate selector lever
- 2 - Gear selector cable**
 - ☐ On gear lever
- 3 - Bolt**
 - ☐ 15 Nm
 - ☐ For pivot pin on base plate
- 4 - Pivot pin**
- 5 - Base plate**
- 6 - Nut**
 - ☐ 20 Nm
 - ☐ Secures base plate to selector housing
 - ☐ Self-locking
 - ☐ Always renew
- 7 - Cap**
 - ☐ Assembly ⇒ [page 52](#)
- 8 - Bearing bush**
 - ☐ Only fits in one position
- 9 - Gate selector housing**
 - ☐ Fit into base plate after fitting the complete gear lever
- 10 - Bush**
- 11 - Long-arm spring**
- 12 - Guide bush**
 - ☐ Locate on bearing bush
- 13 - Securing clip**
 - ☐ Removing and installing ⇒ [page 52](#)
- 14 - Spacer sleeve**
- 15 - Spring**
- 16 - Gear lever guide**
- 17 - Securing clip**
 - ☐ Removing ⇒ [page 52](#)
- 18 - Damping washer**
- 19 - Bearing bush**
 - ☐ Only fits in one position
- 20 - Gate selector lever**
- 21 - Split pin**
- 22 - Gear lever**



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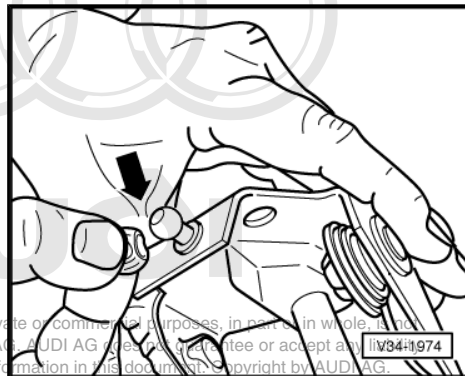
Installing cap

- Press on from side -arrow-.
- Press opening together to form a slot.



Note

If necessary, heat cap (e.g. hot water).



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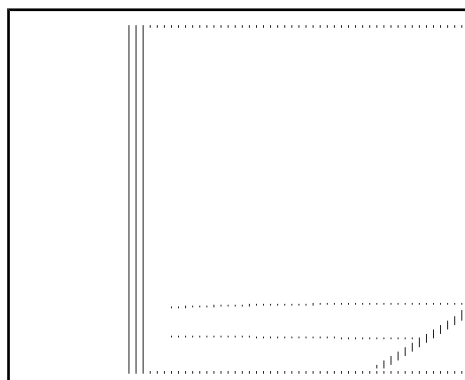
Removing and installing securing clip

- To remove and install securing clip -A-, pull gear lever in direction of -arrow A- and at the same time push down spacer bush onto stop with a screwdriver in direction of -arrow B-.



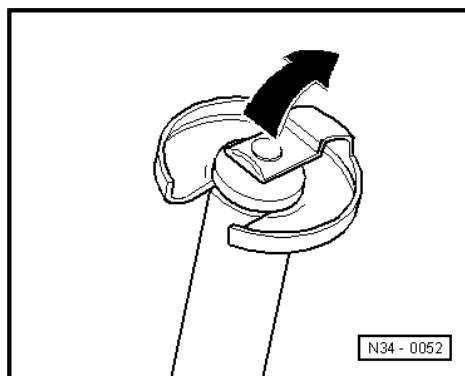
Note

Do not tilt spacer bush when pushing down. Carefully release pressure at groove in gear lever for securing clip.



Removing securing clip for gate selector lever and gear lever guide/gate selector housing

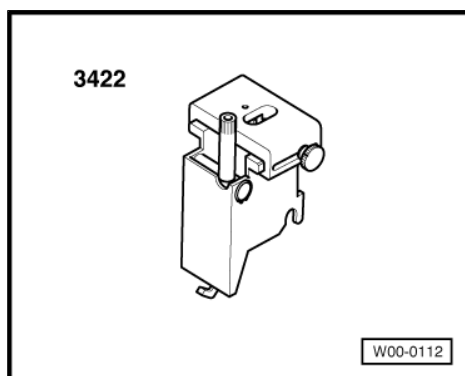
- Lift tab in direction of arrow.



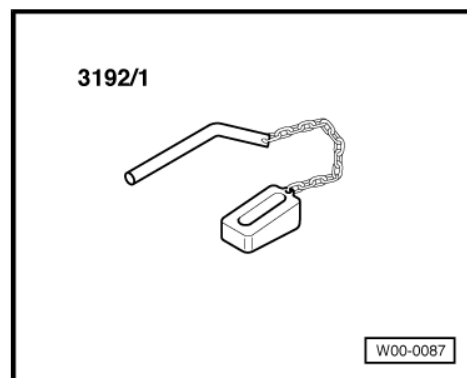
1.6 Adjusting selector mechanism up to 09.98

Special tools and workshop equipment required

- ♦ Selector lever gauge -3422-



◆ Wedge -3192/1-



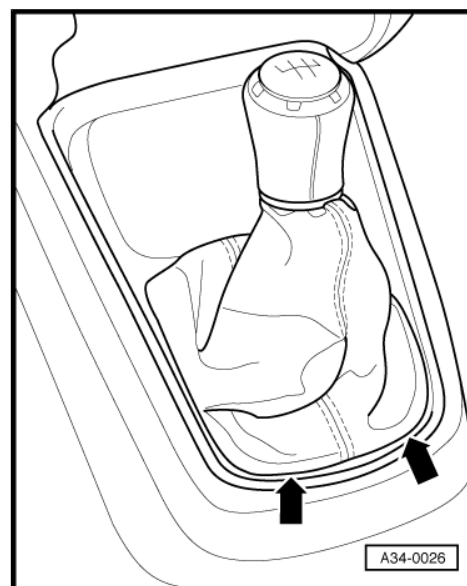
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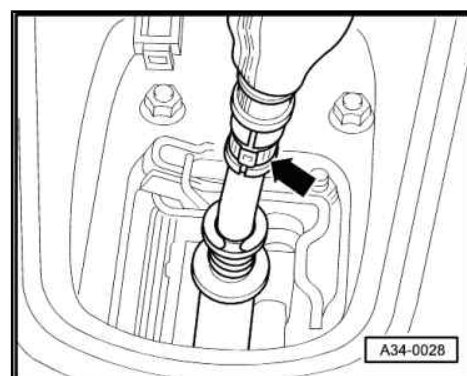
Note

- ◆ *The following are prerequisites for correct gear lever alignment:*
- ◆ *Gear selector linkage must be in proper condition and undamaged.*
- ◆ *Selector mechanism must move freely.*
- ◆ *The gearbox, clutch and clutch mechanism must also be in proper condition.*

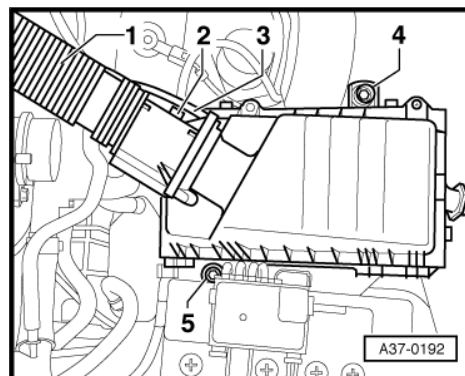
- Gearbox in neutral.
- Carefully pry gear lever boot off centre console -arrows-.
- Pull gear lever boot off centre console towards rear.
- Pull boot up and over gear knob.



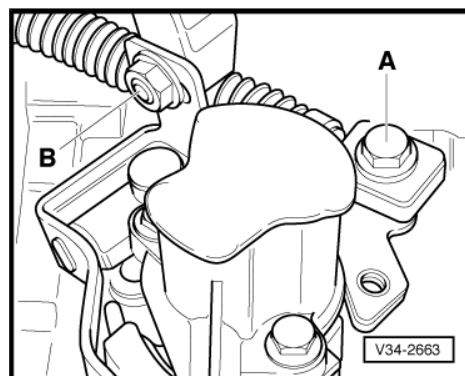
- Open clip -arrow- and pull off gear knob together with boot.
- Remove rubber boot, if fitted.



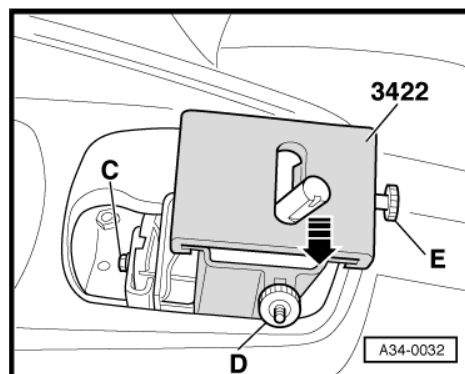
- Remove intake hose -1-, connector -2- and hose -3- from air mass meter.
- If fitted, detach secondary air pipe from air cleaner housing.
- Remove bolts -4- and -5- and detach complete air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .
- Detach damper weight ⇒ [Item 21 \(page 45\)](#) .



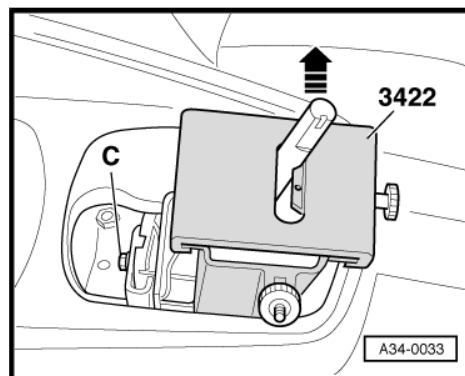
- Loosen bolt -A- and nut -B-, until the gear selector cable and actuating arm/gate selector cable are free to move in the elongated holes.



- Loosen bolt -C-.
- Attach selector lever gauge -3422- .
- Swing gauge securing hook under base plate and tighten nut -D-.
- Press gear lever into left detent of sliding piece.
- Press gear lever together with sliding piece to left up to stop in direction of -arrow- and secure sliding piece with bolt -E-.



- Press gear lever into right detent in direction of -arrow-.
- Tighten bolt -C-.



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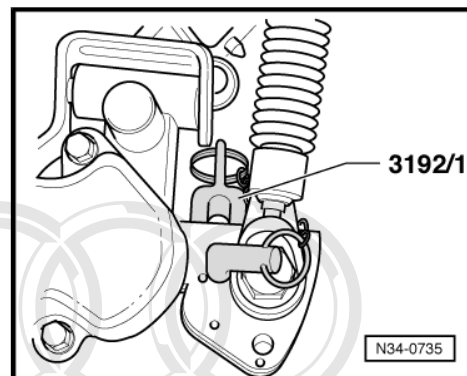
- Insert wedge -3192/1- and locking pin.
- Slide wedge -3192/1- between gearbox selector lever and selector mechanism cover, ensuring no play.



Note

Wedge -3192/1- must not lift gearbox selector lever.

- In this position, secure gear selector cable and actuating arm/gate selector cable. When doing this, check position of wedge -3192/1- .
- Remove selector lever gauge -3422- .
- Fit boot and gear knob.
- Detach wedge -3192/1- and locking pin.
- Tighten damper weight to torque ⇒ [Item 20 \(page 45\)](#) .

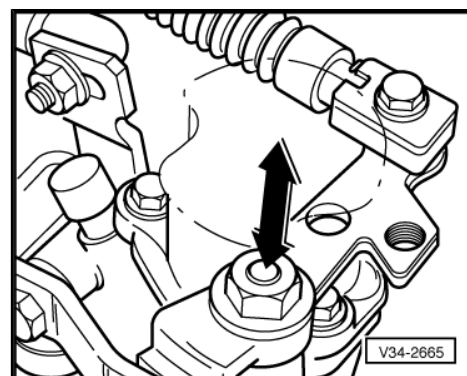


Function

- With the gearbox in neutral, the gear lever should rest in the gate for 3rd and 4th gear.
- Depress clutch.
- Select all gears several times. Pay particular attention to the operation of the reverse gear locking mechanism.

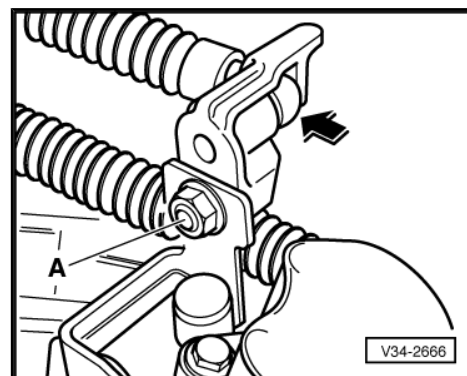
Should a gear fail to engage smoothly after repeated selection, check the play (lift movement) of the selector shaft as follows:

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



Should this not be the case, disengage first gear and again loosen nut -A- for the actuating arm/gate selector cable mounting. (The gate selector cable has a certain amount of play at the mounting - due to the linkage movement).

- Take up play in gate selector cable by lightly pressing cable mounting towards bulkhead in direction of -arrow-.
- Hold in this position and re-tighten nut -A- to specified torque ⇒ [Item 17 \(page 45\)](#) .



2 Servicing selector mechanism from 09.98

⇒ [“2.1 Installation position of selector mechanism from 09.98”, page 56](#)

⇒ [“2.2 Removing and installing gear knob and boot from 09.98”, page 58](#)

⇒ [“2.3 Servicing gear lever and selector housing from 09.98”, page 59](#)

⇒ [“2.4 Removing and installing selector cables - exploded view from 09.98”, page 61](#)

⇒ [“2.5 Removing and installing selector mechanism from 09.98”, page 64](#)

⇒ [“2.6 Adjusting selector mechanism from 09.98”, page 68](#)

2.1 Installation position of selector mechanism from 09.98

-Arrow A- gear selection movement

-Arrow B- gate selection movement

A - Gear selector cable (gear selection movement)

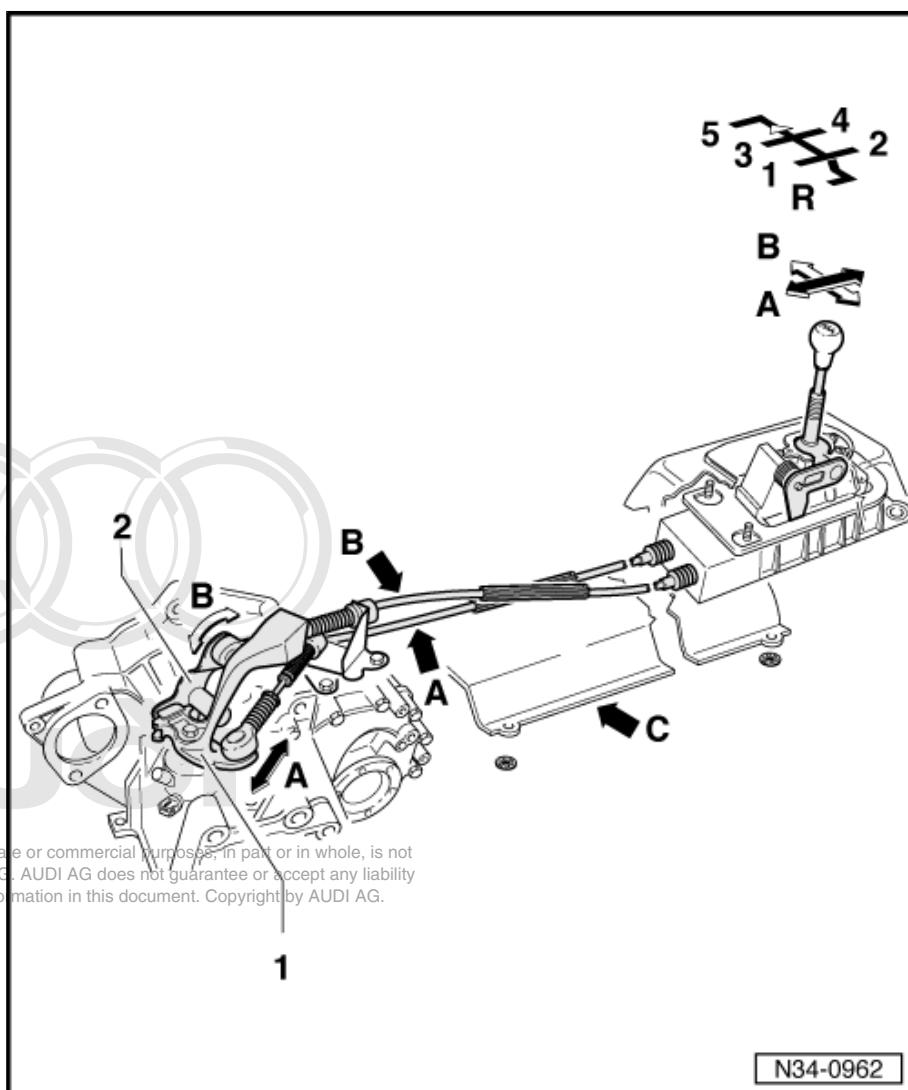
B - Gate selector cable (gate selection movement)

C - Heat shield

- ☐ Detach before removing selector mechanism.

1 - Gearbox selector lever

2 - Relay lever



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N34-0962

 Note

- ◆ *Note radio coding for vehicles with coded radio.*
- ◆ *Before working on selector mechanism in engine compartment, disconnect earth strap from battery ⇒ Rep. Gr. 27.*
- ◆ *Follow the steps required when re-connecting the battery ⇒ Rep. Gr. 27.*
- ◆ *Do not kink selector cables.*
- ◆ *Apply polycarbamide grease -G 052 142 A2- to all bearings and contact surfaces.*

I - Removing and installing gear knob and boot
⇒ [page 58](#)

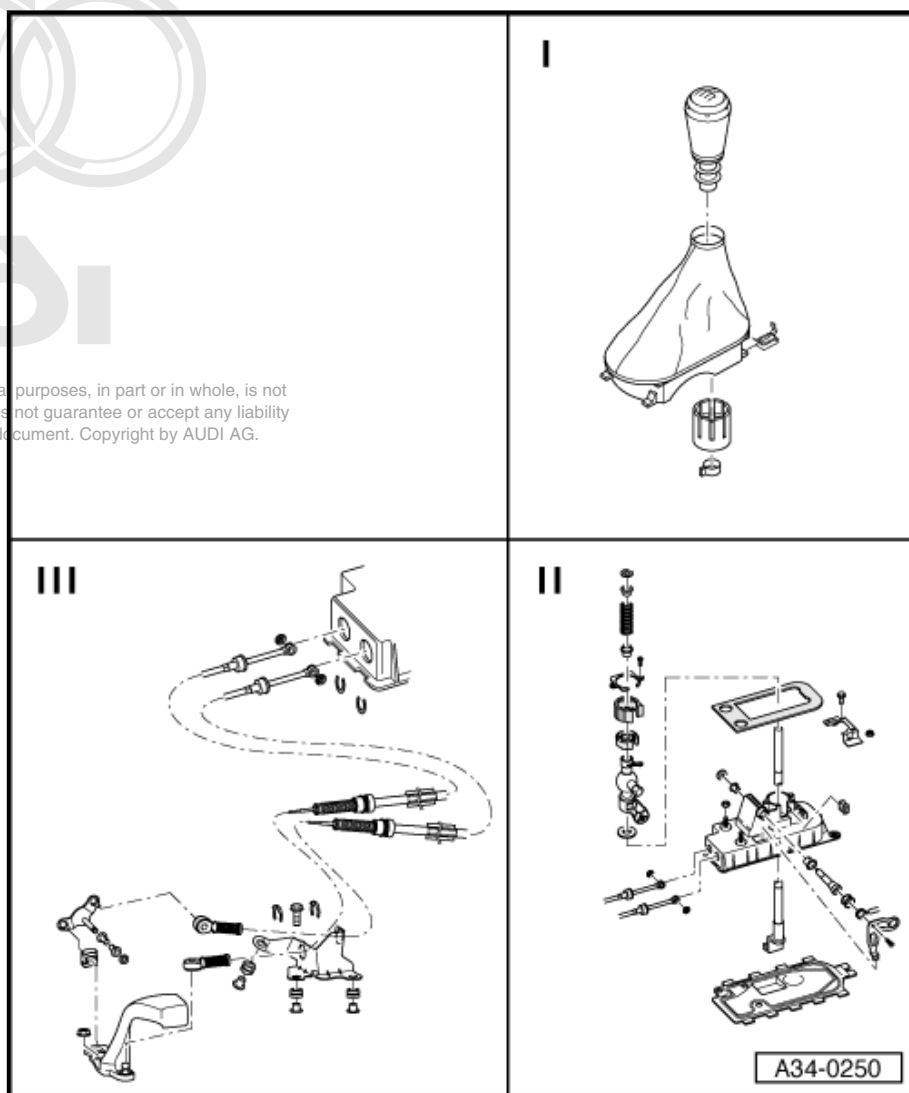
II - Servicing gear lever and selector housing ⇒ [page 59](#)

III - Removing and installing selector cables - exploded view ⇒ [page 61](#)

Removing and installing selector mechanism ⇒ [page 64](#)

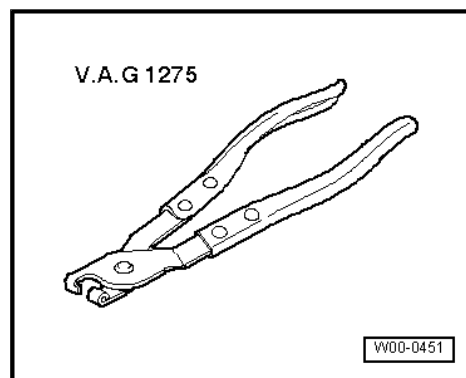
Adjusting selector mechanism from 09.98 ⇒ [page 68](#)

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Special tools and workshop equipment required

◆ Pliers -V.A.G 1275-



2.2 Removing and installing gear knob and boot from 09.98

1 - Gear knob

- ☐ Remove and install together with boot
- ☐ Removing ⇒ [page 66](#)

2 - Boot with mounting frame

- ☐ Remove and install together with gear knob
- ☐ Removing ⇒ [page 66](#)
- ☐ Separating from gear knob ⇒ [page 59](#)
- ☐ Connect to gear knob before installing ⇒ [page 59](#)

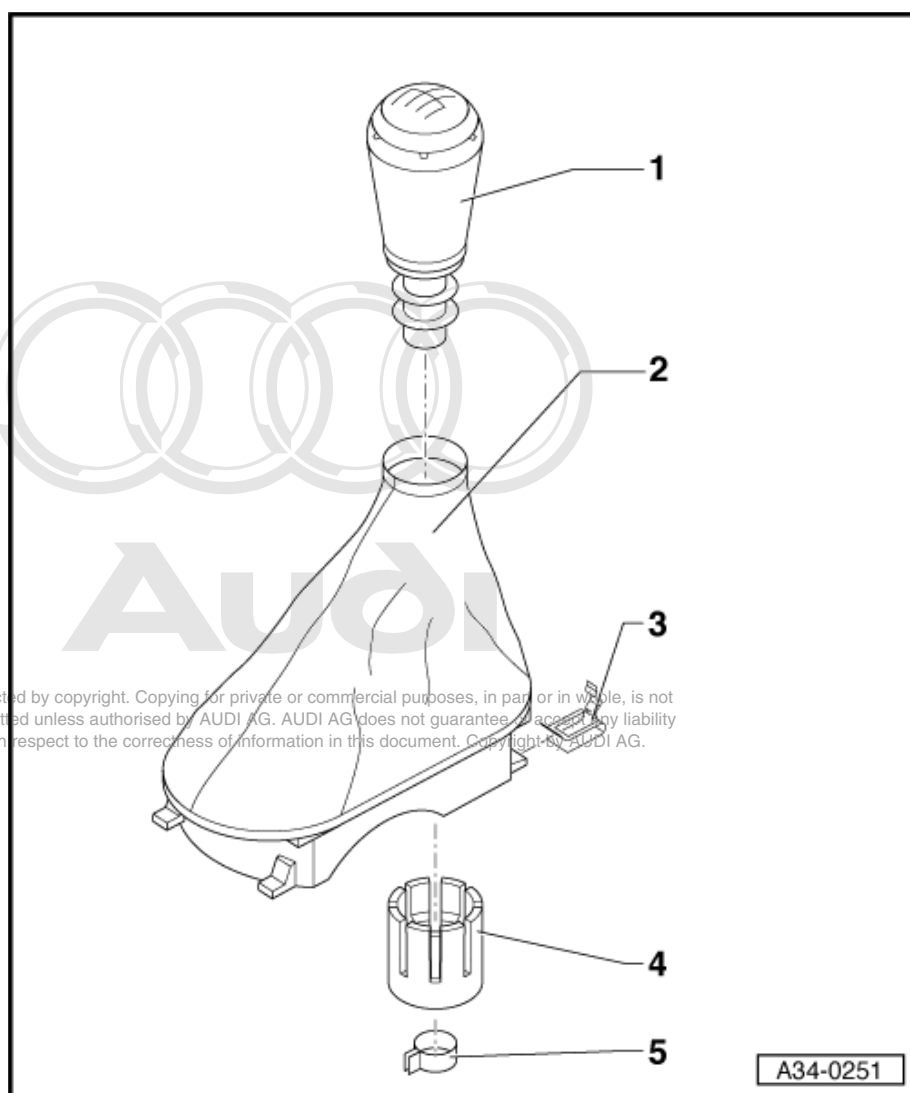
3 - Retaining clips

4 - Connecting piece

- ☐ Connects boot with gear knob
- ☐ Removing ⇒ [page 59](#)

5 - Clip

- ☐ Secures gear knob to gear lever

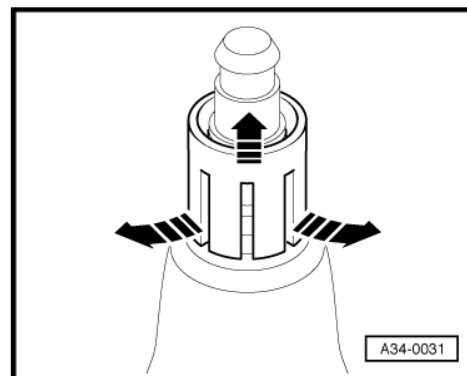


Detaching boot from gear knob and assembling

- Turn boot inside out.
- Using a screwdriver, lever the prongs -arrows- on the connecting piece outwards.
- Pull connecting piece off gear lever.
- Turn gear knob outwards and pull free of boot.

Assembly is carried out in the reverse order to removal; note the following:

- Turn boot inside out.
- Insert gear knob in boot.
- Press connecting piece onto gear knob and boot. The connecting piece must clip onto the gear knob.



2.3 Servicing gear lever and selector housing from 09.98



Note

Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2-.

1 - Securing clip

- ☐ Removing and installing
⇒ [page 60](#)

2 - Bush

3 - Spring

4 - Bush

5 - Bolt

- ☐ 6 Nm

6 - Cover

7 - Damper

8 - Bearing shell

- ☐ Insert in damper
⇒ [Item 7 \(page 59\)](#)

9 - Gear lever guide

10 - Damping washer

11 - Gasket

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

12 - Gear lever

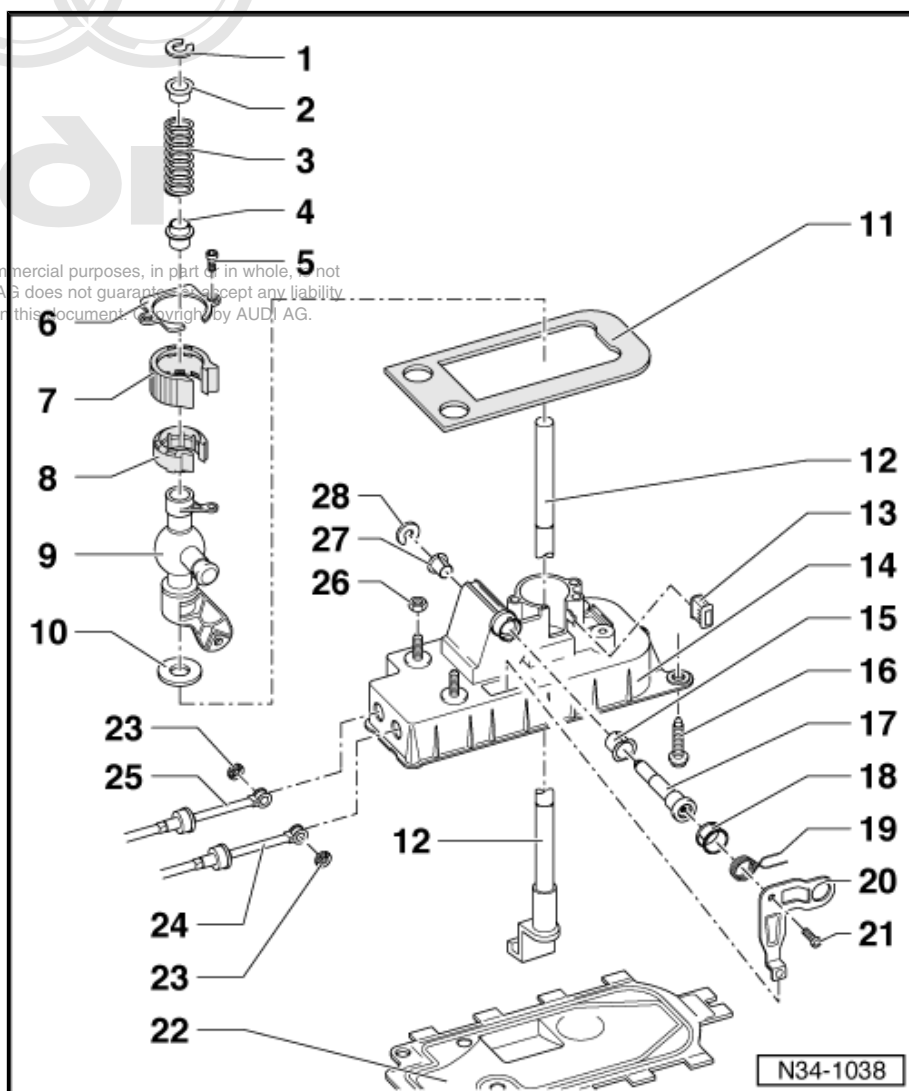
13 - Damper

- ☐ Press onto selector housing

14 - Selector housing

15 - Bearing bush

- ☐ Only fits in one position



16 - Bolt

- ☐ 25 Nm

17 - Pivot pin**18 - Guide bush**

- ☐ Press onto selector housing

19 - Spring

- ☐ Installing ⇒ [page 61](#)

20 - Gate selector lever**21 - Bolt**

- ☐ 6 Nm

22 - Floor plate

- ☐ With gasket
- ☐ Bend tabs open to remove
- ☐ Renew

23 - Securing clip**24 - Gate selector cable**

- ☐ On gate selector lever
- ☐ Installation position ⇒ [page 56](#)

25 - Gear selector cable

- ☐ Press onto gear lever guide
- ☐ Installation position ⇒ [page 56](#)

26 - Nut

- ☐ 25 Nm

27 - Bearing bush

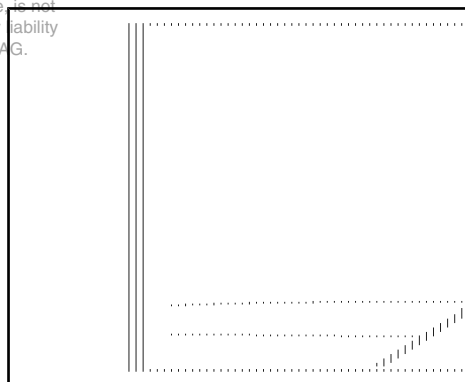
- ☐ Only fits in one position

28 - Securing clip**Removing and installing securing clip**

- To remove and install securing clip -A-, pull gear lever in direction of -arrow A- and at the same time push down spacer bush onto stop with a screwdriver in direction of -arrow B-.

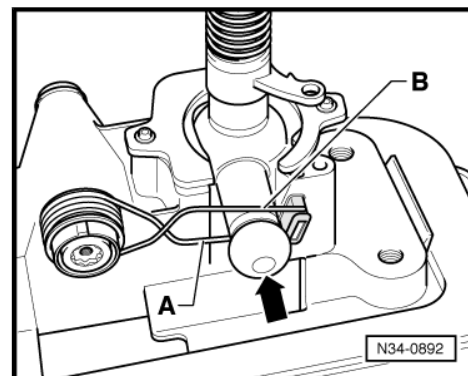
**Note**

Do not tilt spacer bush when pushing down. Carefully release pressure at groove in gear lever for securing clip.



Installing spring

- Insert spring so that the spring extension -A- is under the pin -arrow-.
- Then pull spring extension -B- up towards gear lever until it lies on upper section of pin -arrow-.



2.4 Removing and installing selector cables - exploded view from 09.98



Note

Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2- .

1 - Gear selector cable

- ☐ Press onto gear lever guide
- ☐ Installation position
⇒ [page 56](#)

2 - Gate selector cable

- ☐ On gate selector lever
- ☐ Installation position
⇒ [page 56](#)

3 - Securing clip

- ☐ Removing ⇒ [page 64](#)

4 - Retaining clip

- ☐ Take care not to damage bellows of selector cables when removing.

5 - Selector housing

6 - Support bracket

7 - Grommet

- ☐ For support bracket mounting on gearbox

8 - Distance piece

9 - Bolt

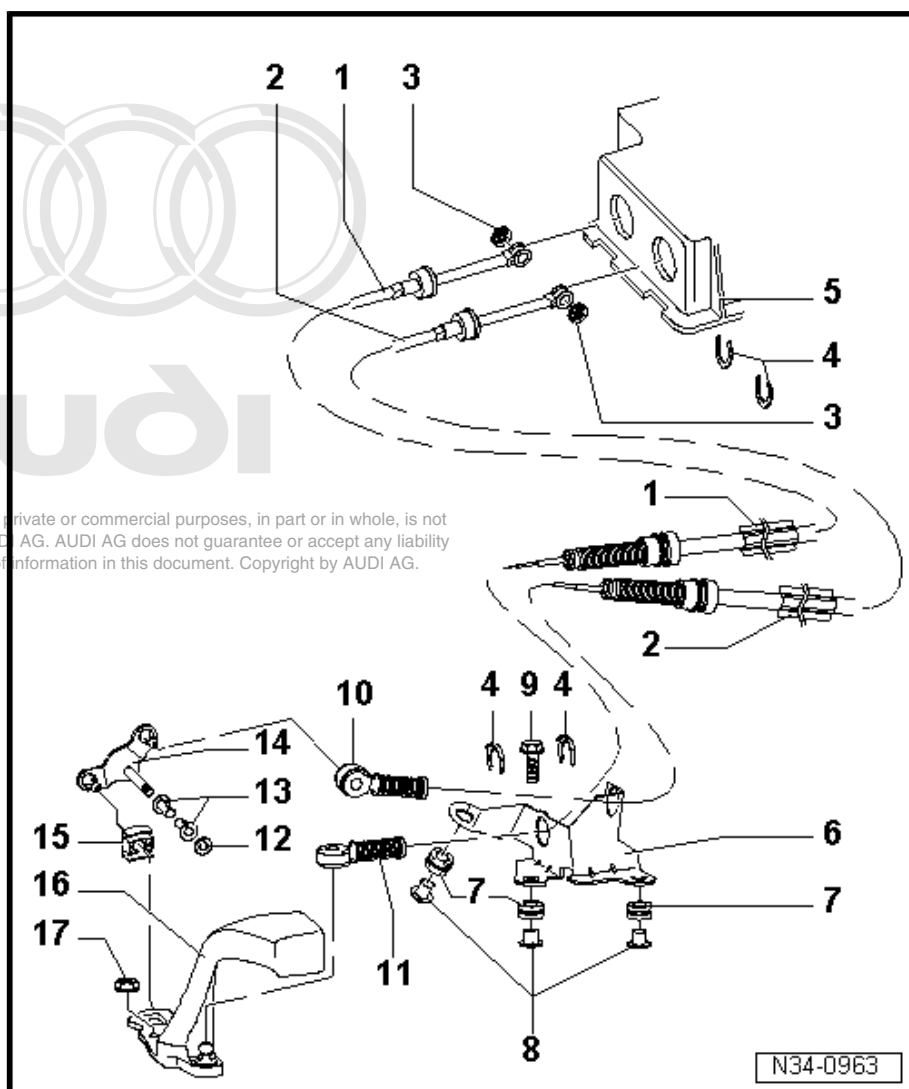
- ☐ 25 Nm
- ☐ For support bracket

10 - Cable end-piece

- ☐ Secures gate selector cable to relay lever
- ☐ Release to adjust selector mechanism
⇒ [page 69](#)

- ☐ Renewing on vehicles up to 06.2001 ⇒ [page 63](#)

- ☐ Installing on vehicles up to 06.2001 ⇒ [page 64](#)



- ☐ On vehicles up to 06.2001: must be renewed if it has been detached from relay lever
⇒ [Item 14 \(page 62\)](#)
- ☐ As of 07.01 with open drilling
- ☐ On vehicles from 07.2001: different version, do not interchange ⇒ [page 64](#)
- ☐ Secured with securing clip
- ☐ Removing and installing ⇒ [page 64](#)

11 - Cable end-piece

- ☐ Secures gear selector cable to gearbox selector lever
- ☐ Release to adjust selector mechanism ⇒ [page 69](#)
- ☐ Renewing on vehicles up to 06.2001 ⇒ [page 63](#)
- ☐ Installing on vehicles up to 06.2001 ⇒ [page 64](#)
- ☐ On vehicles up to 06.2001: must be renewed if it has been detached from gearbox selector lever
⇒ [Item 16 \(page 62\)](#)
- ☐ As of 07.01 with open drilling
- ☐ On vehicles from 07.2001: different version, do not interchange ⇒ [page 64](#)
- ☐ Secured with securing clip
- ☐ Removing and installing ⇒ [page 64](#)

12 - Securing clip

- ☐ Removing ⇒ [page 64](#)

13 - Bearing bush

14 - Relay lever

- ☐ Installation position ⇒ [page 63](#)
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15 - Slide block

16 - Gearbox selector lever

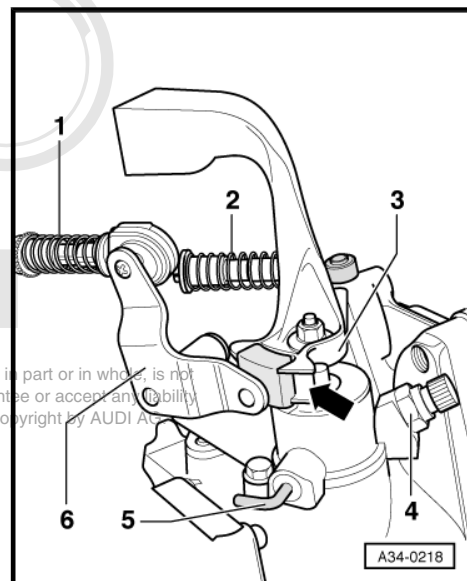
- ☐ With damper weight
- ☐ Install so that gap in splines aligns with selector shaft ⇒ [page 63](#)
- ☐ Installation position ⇒ [page 63](#)
- ☐ After installing, adjust selector mechanism ⇒ [page 68](#)

17 - Nut

- ☐ 20 Nm
- ☐ For gearbox selector lever
- ☐ Always renew

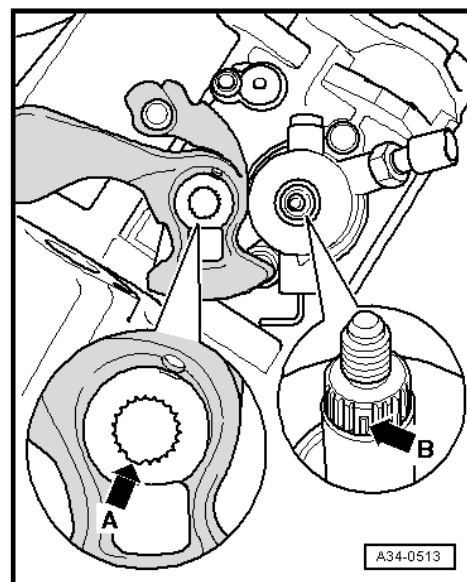
Installation position of gearbox selector lever, relay lever and locking pin

- 1- - End piece (locking mechanism) for gate selector cable
- 2- - End piece (locking mechanism) for gear selector cable
- 3- - Gearbox selector lever with damper weight
- 4- - Reversing light switch -F4-
- 5- - Locking pin
- ◆ Turn vertically upwards to adjust selector mechanism.
- 6- - Relay lever
- ◆ Locates in guide rail of gearbox selector lever via slide block -arrow-.
- ◆ Lubricate with MoS₂ grease.



Installing gearbox selector lever

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



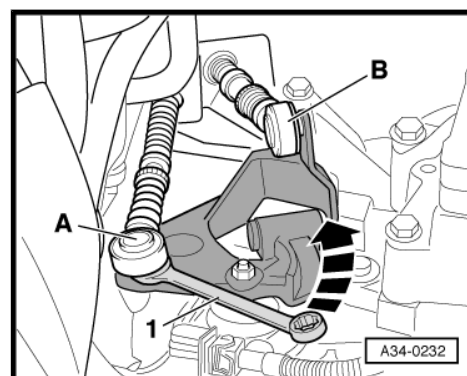
Renewing cable end-pieces - vehicles up to 06.2001



Note

Cable end-pieces must be renewed after being removed. Cable end-pieces are damaged upon removal.

- Lever off gear selector cable -A- and gate selector cable -B- using an open-ended spanner (13 mm) -1-.



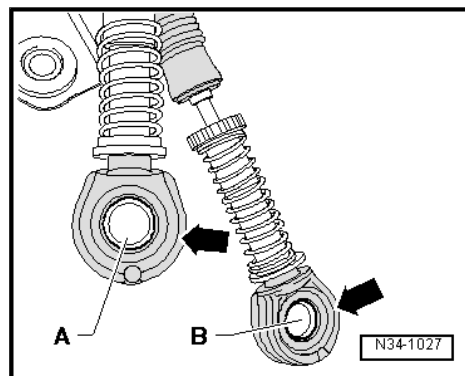
Fitting new cable end-pieces - vehicles up to 06.2001

- Apply a small amount of polycarbamide grease -G 052 142 A2- in ball sockets of end pieces on gear selector cable -A- and gate selector cable -B-.



Note

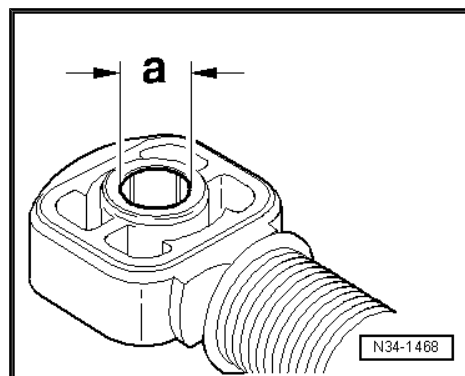
The seals -arrows- outside the ball socket must be grease-free.



Allocation of cable end-pieces - vehicles from 07.2001

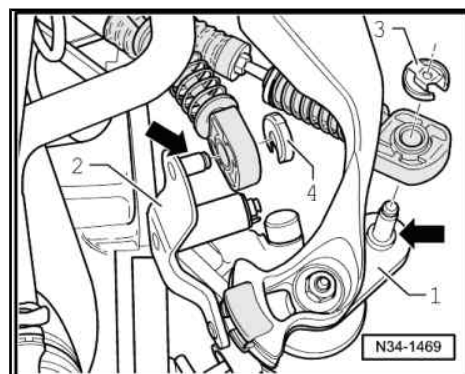
The holes in the cable end-pieces have different diameters:

- ◆ Cable end-piece securing gear selector cable to selector shaft lever: diameter -a- = 10 mm.
- ◆ Cable end-piece for gate selector cable to relay lever: diameter -a- = 8 mm.



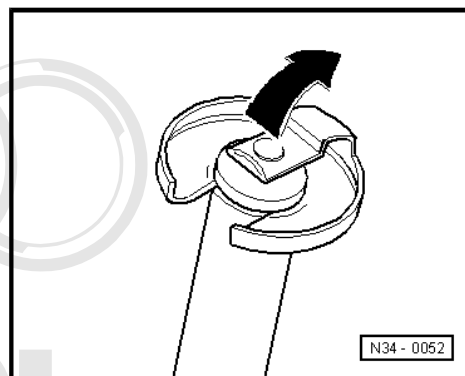
Fitting new cable end-pieces - vehicles from 07.2001

- Spread a small amount of polycarbamide grease -G 052 142 A2- onto studs -arrows- of selector shaft lever -1- and relay lever -2-.
- Always renew securing clips -3- for gear selector cable and -4- for gate selector cable after removing.



Removing securing clip for gate selector lever, relay lever and gear lever guide/gate selector housing

- Lift tab in direction of -arrow-.



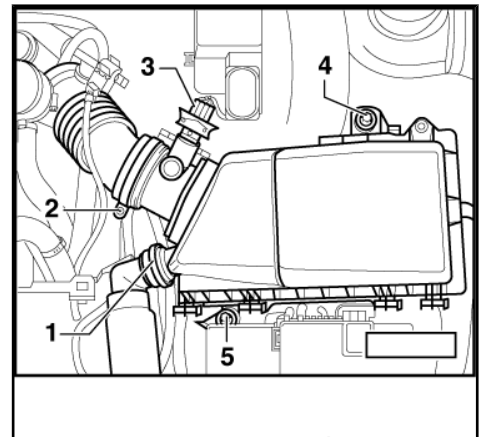
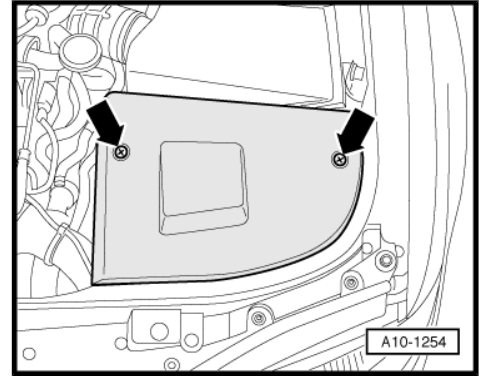
2.5 Removing and installing selector mechanism from 09.98

Special tools and workshop equipment required

- ◆ Polycarbamide grease -G 052 142 A2-

Removing

- If fitted, remove cover panel (front left) -arrows-.
- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing → Rep. Gr. 23 or → Rep. Gr. 24 .



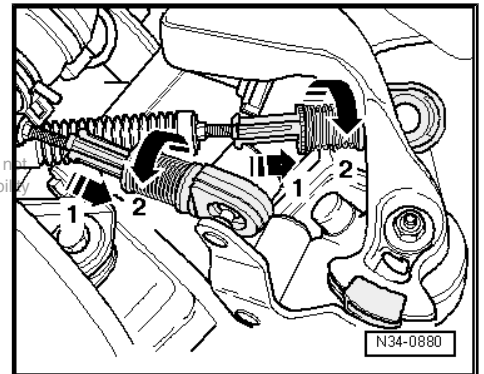
Selector mechanism up to 06.01



Caution

Do not remove cable end-pieces from selector shaft lever or relay lever on vehicles up to 06.2001. Cable end-pieces must be renewed after removal.

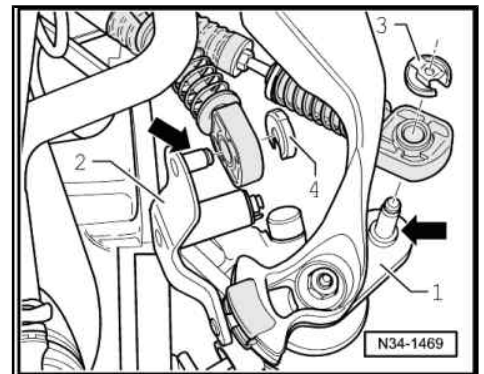
- Release cable end-pieces for gate selector cable and gear selector cable; push back locking sleeve as far as it will go in direction of -arrow 1-, then turn anti-clockwise in direction of -arrow 2- so that it engages.
- Pull selector cables out of cable end-pieces.



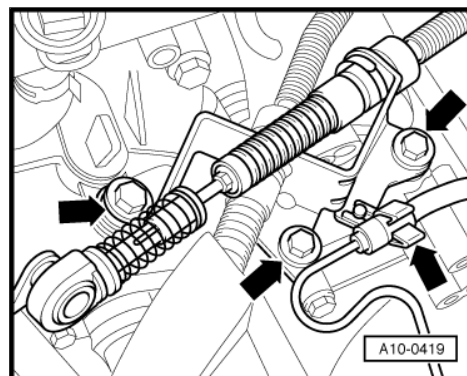
Selector mechanism from 07.01

- Detach securing clip -3- for gear selector cable from gearbox selector lever -1-.
- Detach securing clip -4- for gate selector cable from relay lever -2-.
- Pull gate selector cable and gear selector cable off joint pins -arrows-.

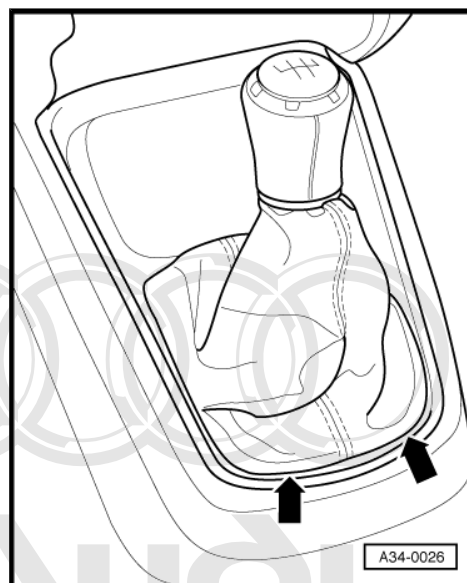
Continued for all selector mechanisms:



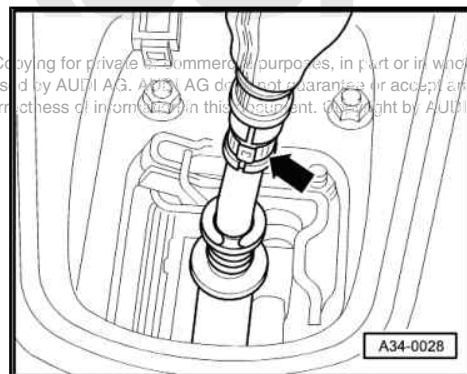
- Detach cable support bracket from gearbox, if necessary unclip pipe/hose assembly -arrows-.



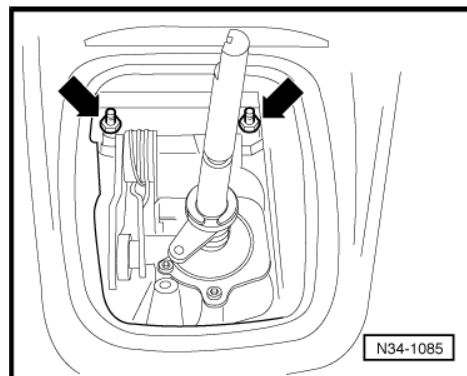
- Carefully pry gear lever boot off centre console -arrows-.
- Pull gear lever boot off centre console towards rear.
- Pull boot up and over gear knob.



- Open clip -arrow- and pull off gear knob together with boot.
- Remove bottom centre console ⇒ Rep. Gr. 68 .
- Remove cover of selector mechanism.



- Remove securing nuts for selector housing -arrows-.



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- Unfasten clamp -A- and disconnect exhaust system.
- Remove cross member -B-
- Remove heat shields -C- and -D- below selector cables.
- Remove both bottom securing bolts for selector housing.
- Pull selector housing down and remove from behind together with selector cables.

Installing

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

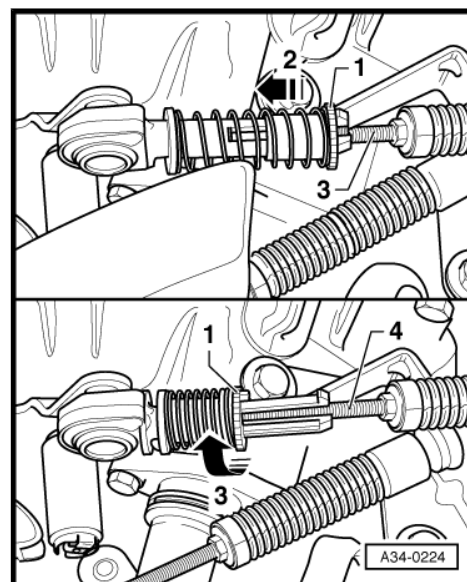
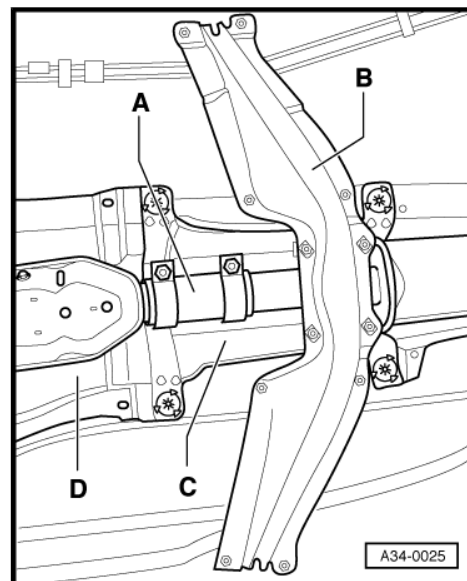
Selector mechanism up to 06.01

- Press locking sleeve -1- in direction of -arrow 2- up to stop.
- Turn locking sleeve -1- as far as it will go in direction of arrow 3 and allow it to engage.
- Insert Bowden cables -3- and -4- in unlocked cable end-pieces.

Selector mechanism from 07.01

Cable end-pieces securing cables to gearbox selector lever and relay lever have open drillings.

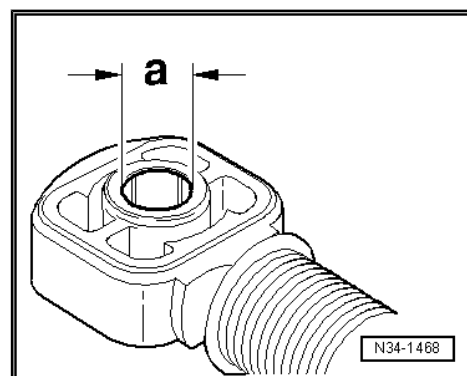
The holes in the cable end-pieces have different diameters.



Allocation

Cable end-piece for:	Distance "a"
Gear selector cable to gearbox selector lever	10 mm
Gate selector cable to relay lever	8 mm

The cable end-pieces do not have to be renewed after removal.



- Spread small amount of polycarbamide grease -G 052 142 A2- onto pins -arrows- of gearbox selector lever -1- and relay lever -2-.
- Always renew securing clips -3- and -4- after removing.
- Secure gear selector cable with securing clip -3- and gate selector cable with securing clip -4-.

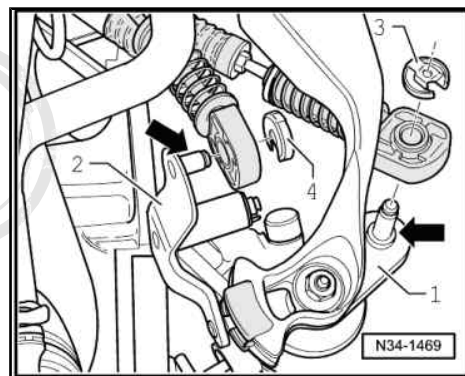
Continued for all selector mechanisms:

- Align selector housing parallel to body.
 - Distance to body must then be the same on both sides.
- Install bottom centre console ⇒ Rep. Gr. 68 .

Adjust selector mechanism ⇒ [page 68](#) .

- Install complete air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24 .

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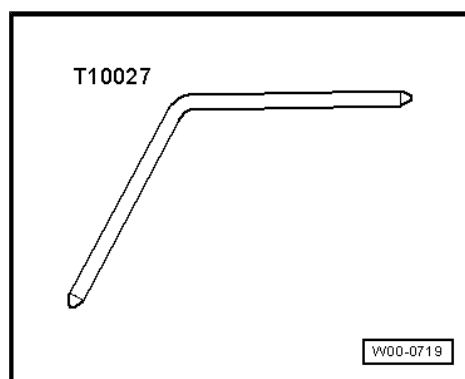
Tightening torques

Selector housing to body	25 Nm
Cross member to body	25 Nm
Selector cable support bracket to gearbox	25 Nm
Clamp for exhaust pipe	40 Nm

2.6 Adjusting selector mechanism from 09.98

Special tools and workshop equipment required

- ◆ Locking pin -T10027- or locking pin -T10027 A-



Note

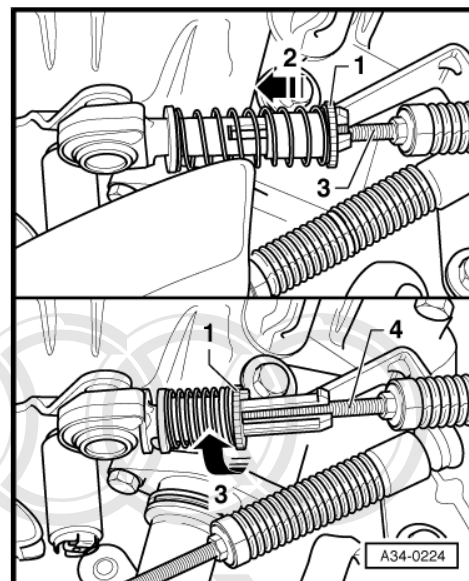
- ◆ *The following are prerequisites for correct gear lever alignment:*
- ◆ *Gear selector linkage must be in proper condition and undamaged.*
- ◆ *Selector mechanism must move freely.*
- ◆ *The gearbox, clutch and clutch mechanism must also be in proper condition.*
- Gearbox in neutral.

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

- Press locking sleeve -1- in direction of -arrow 2- up to stop.
- Turn locking sleeve -1- as far as it will go in direction of -arrow 3- and allow it to engage.

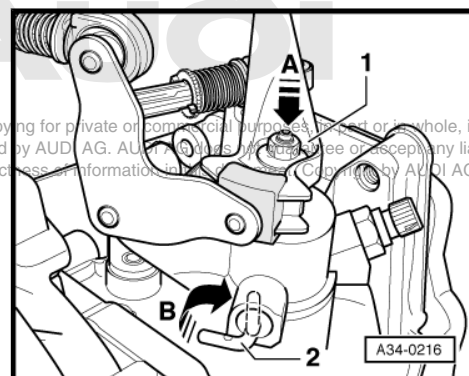
 Note

- ◆ *It should be possible to move selector cable -4- in the cable end-piece.*
- ◆ *The illustration shows the gate selector cable. The gear selector cable is released in the same way.*

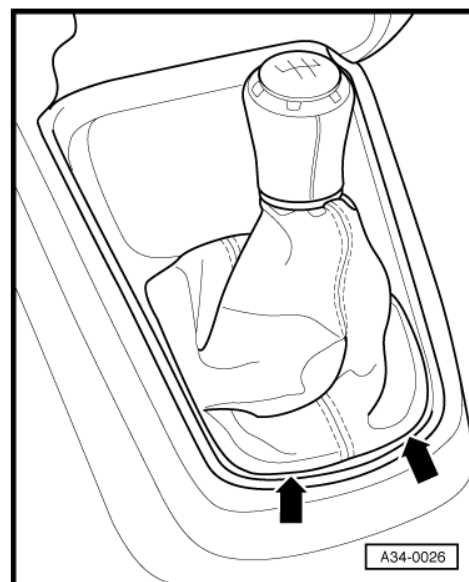


- Press gearbox selector lever -1- down -arrow A- into 1st/2nd gear gate, and at the same time turn locking pin -2- upwards -arrow B- until it locks.

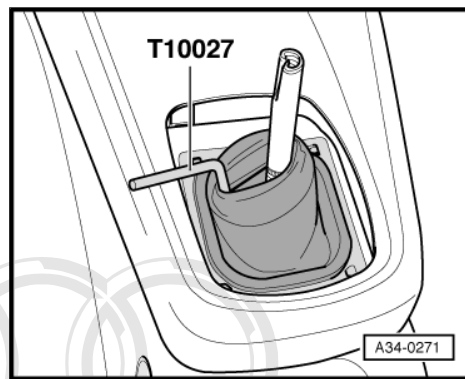
- ◆ The locking pin -2- should point vertically upwards.



- Pull the gear lever boot off the centre console -arrows-.
- Pull boot up and over gear knob.

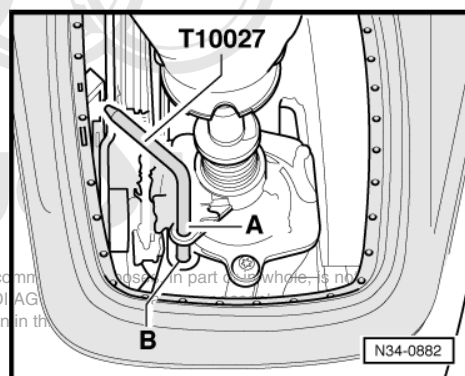


- If fitted, pull rubber cover far enough away from gear lever to allow you to insert locking pin -T10027- or locking pin -T10027 A- into hole -A- ⇒ [page 70](#) .

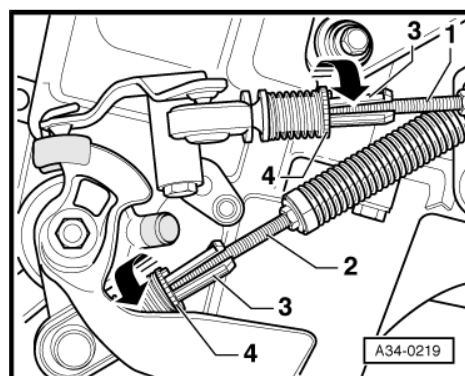


Now lock the gear lever as follows:

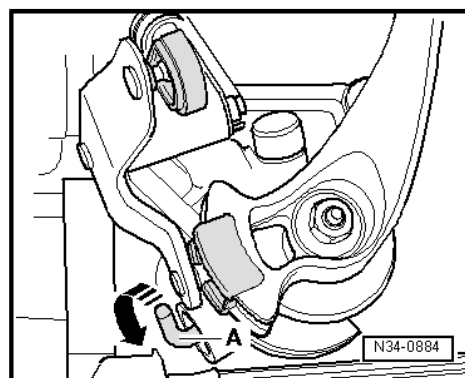
- Select neutral with gear lever.
- Press gear lever into 1st/2nd gear gate.
- Then guide locking pin -T10027- or locking pin -T10027 A- through hole -A- and into hole -B-.



- Make sure that gate selector cable -1- and gear selector cable -2- are located free of tension in the cable end-pieces -3-.
- Turn locking sleeves -4- as far as they will go in direction of -arrow- and release.



- Now turn angled rod -A- back to original position -direction of arrow-.
- ◆ The locking pin -A- should be horizontal.



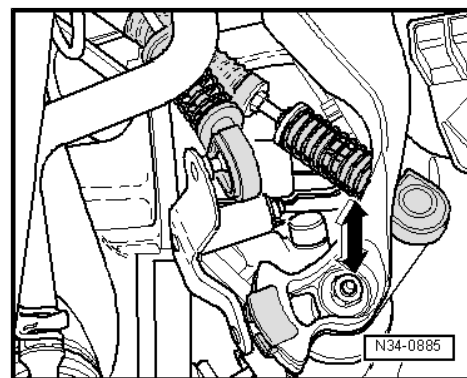
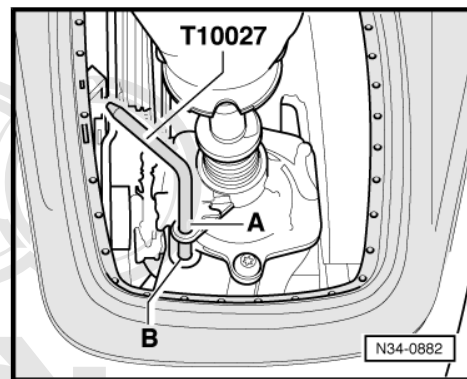
- Pull locking pin -T10027- or locking pin -T10027 A- out of holes -A- and -B-.
- Install gear lever boot.

Function

- With the gearbox in neutral, the gear lever should rest in the gate for 3rd and 4th gear.
- Depress clutch.
- Select all gears several times. Pay particular attention to the operation of the reverse gear locking mechanism.

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

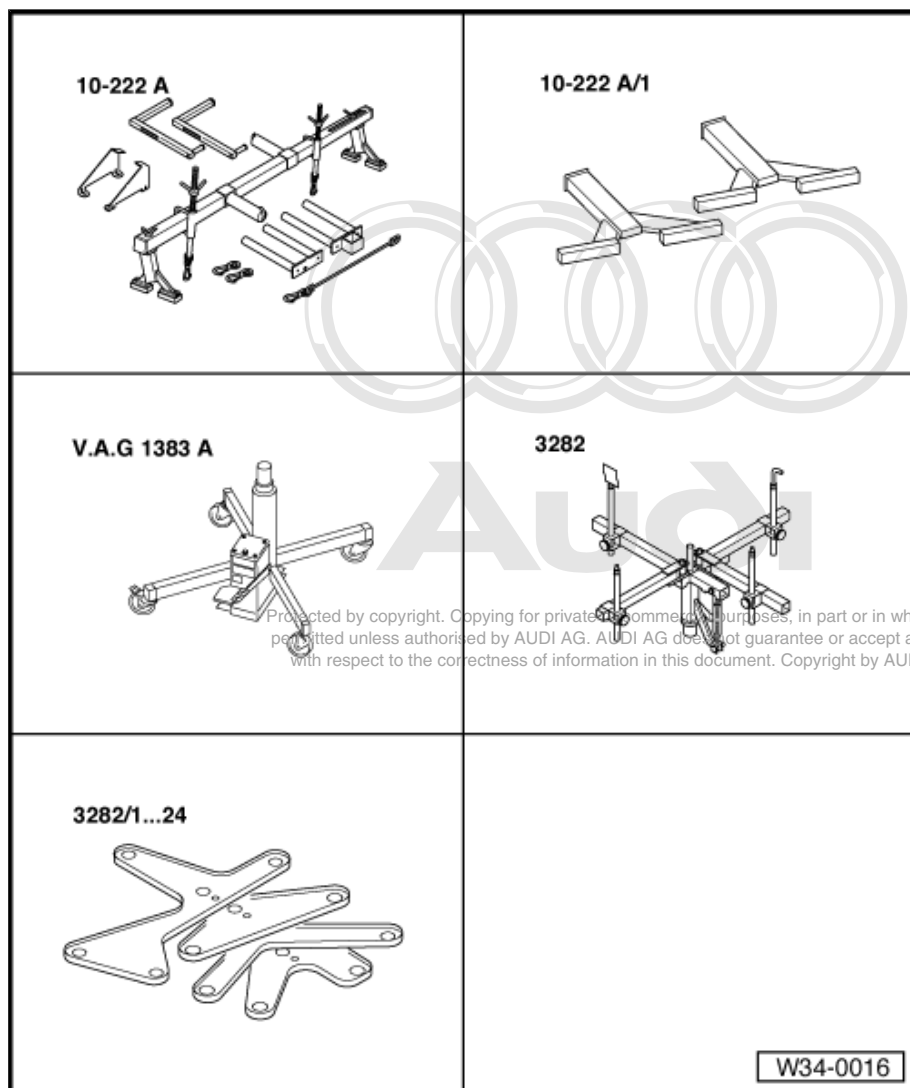
- Engage 1st gear.
- Push gear lever as far as it will go to the left and release.
- At the same time observe selector shaft on gearbox (2nd mechanic).
- The selector shaft should move up and down approx. 1 mm (in direction of -arrow-) when the gear lever is moved.
- If this is not the case, adjust selector mechanism again
⇒ [page 68](#) .



3 Removing and installing gearbox

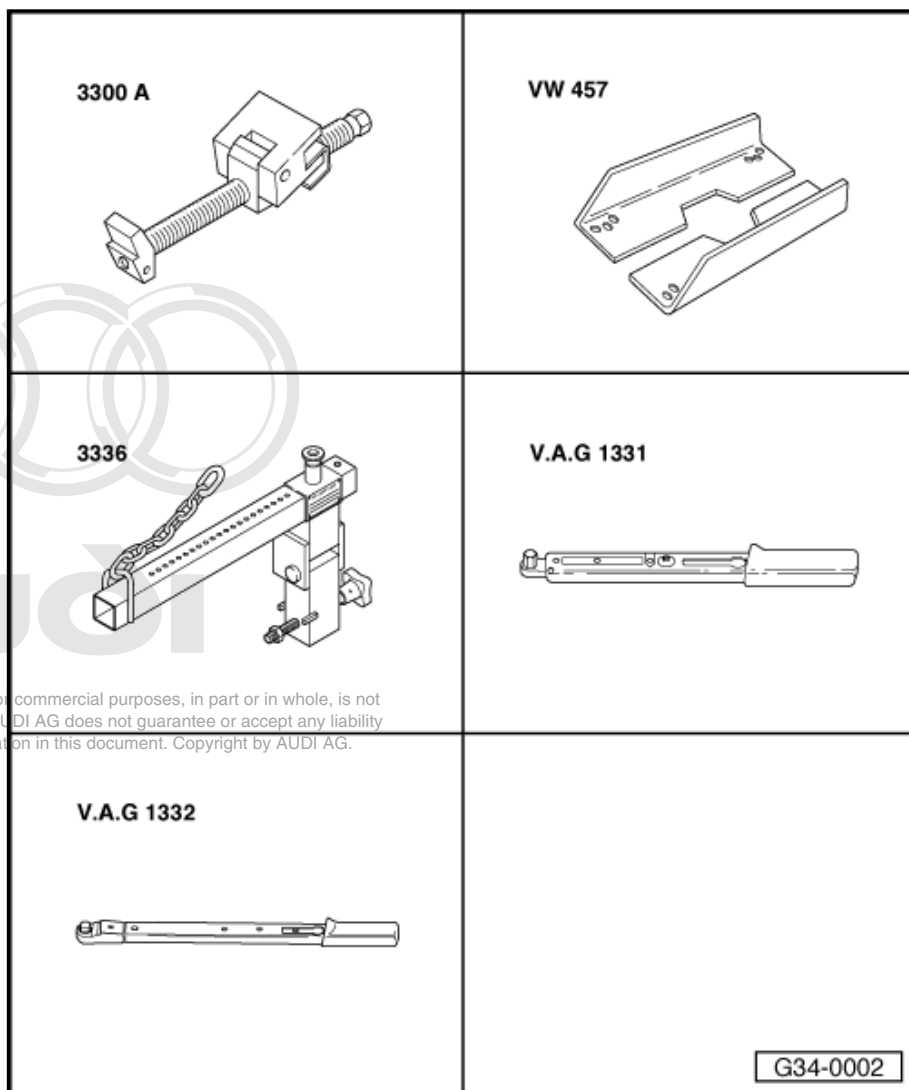
Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-
- ◆ Rack -10 - 222 A /1-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Gearbox support -3282-
- ◆ Adjustment plate -3282/8-



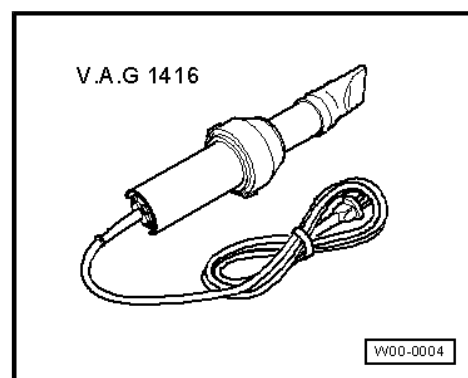
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- ◆ Engine support -3300 A-
- ◆ Support rails -VW 457/1-
(modifying ⇒ [page 73](#))
- ◆ Gearbox lifting tackle
-3336-
- ◆ Torque wrench -V.A.G
1331-
- ◆ Torque wrench -V.A.G
1332-



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- ◆ Hot air blower -V.A.G 1416-



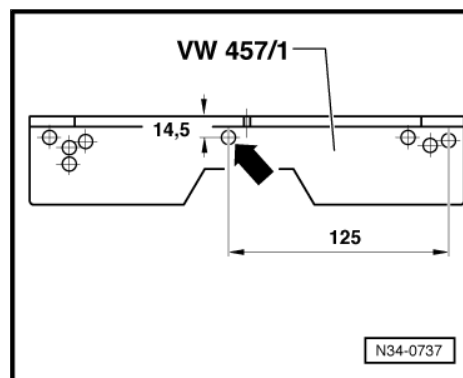
Modifying support rail -VW 457/1-

- Support rail -VW 457/1- is required to remove and install the gearbox.

To secure support rail -VW 457/1- to the subframe a new hole -arrow- is required.

Dimensions are given in mm.

- If the hole is not present, drill a hole of 8.5 mm Ø -arrow- in support rail -VW 457/1- .



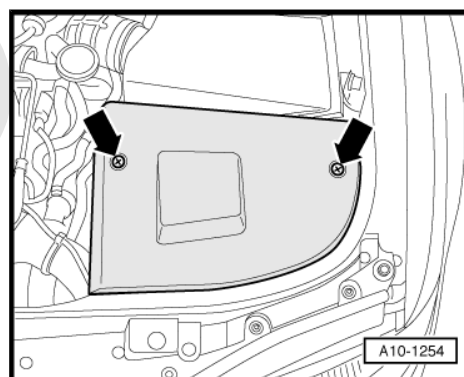
3.1 Removing gearbox



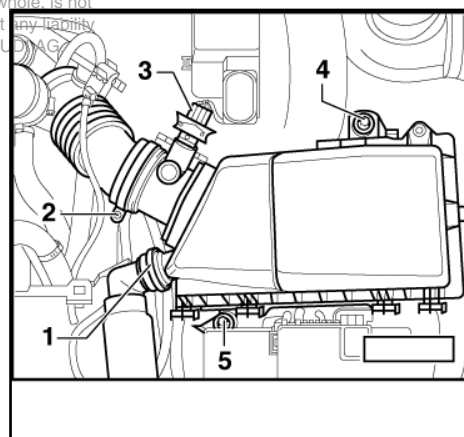
Note

All cable ties which are released or cut open when removing the gearbox must be refitted in the same position when installing the gearbox.

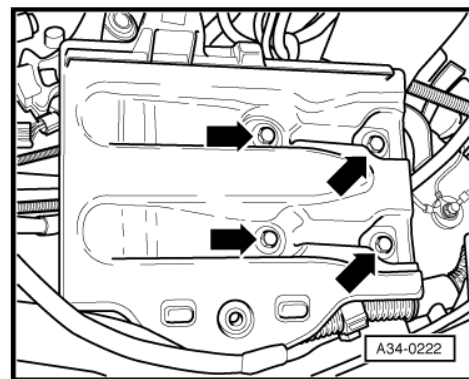
- Remove engine cover panel.
- Obtain radio code on vehicles with coded radio.
- With the ignition switched off, disconnect battery earth strap.
- If fitted, remove cover panel (front left) -arrows-.



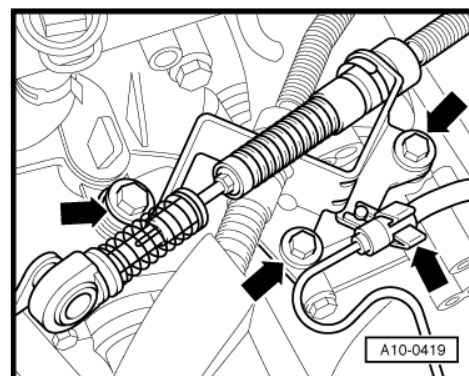
- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .



- Remove battery and battery tray -arrows- ⇒ Rep. Gr. 27 .



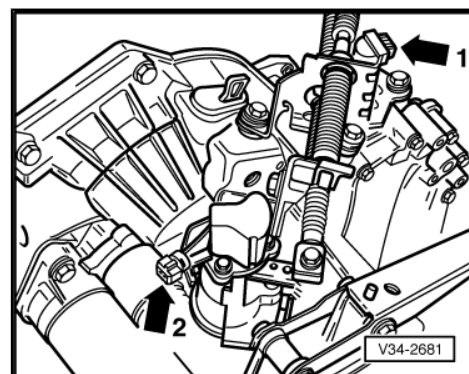
- Detach cable support bracket from gearbox, if necessary unclip pipe/hose assembly -arrows-.



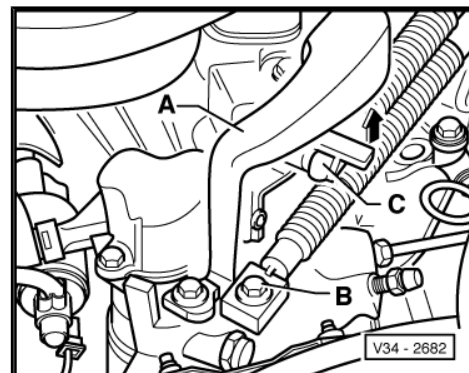
Vehicles up to 09.98

- Unplug connector from speedometer sender -G22- -arrow 1-.
- Unplug connector from reversing light switch -F4- -arrow 2-.

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- Detach damper weight -A- and gear selector cable -B- from gearbox selector lever.
- Unscrew gear selector cable and take off washer and square nut (self-locking).
- Pull gate selector cable off actuating arm/relay lever -C-, to do this lift lug in direction of -arrow-.

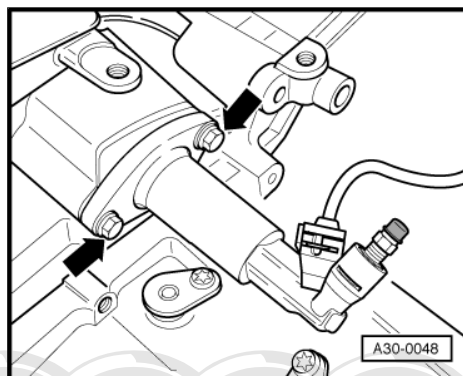


- Remove slave cylinder -arrows-, move to one side and secure with wire. Do not disconnect pipes.

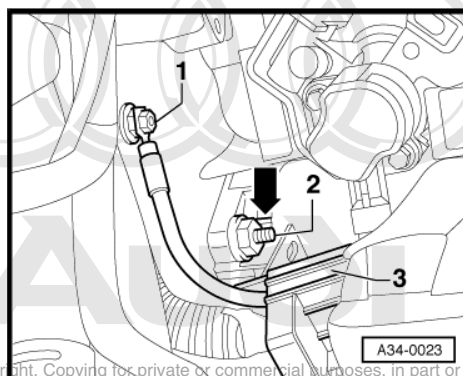


Caution

Do not depress clutch pedal after removing slave cylinder.



- Detach earth strap at upper engine/gearbox connecting bolt -1-.
- Remove upper engine/gearbox connecting bolts -1-.
- Unbolt cable retainer -3- at top of starter -arrow- and place to one side.
- Remove upper securing bolt on starter -2-.
- Remove all engine/gearbox securing bolts which are accessible from above.



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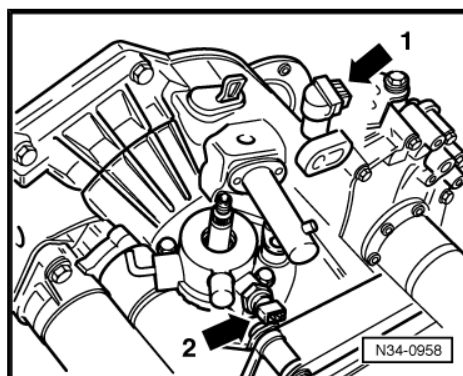
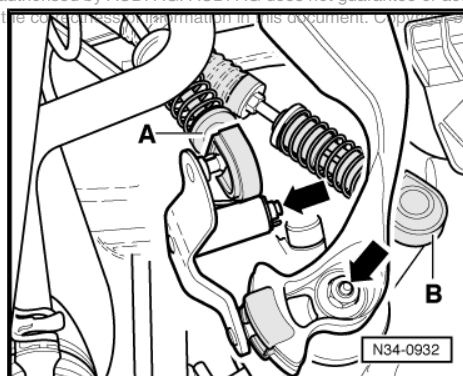
Vehicles from 09.98



Caution

Do not remove cable end-pieces from selector shaft lever or relay lever on vehicles up to 06.2001. Cable end-pieces must be renewed after removal.

- Remove securing clip -arrow- and pull off gate selector cable -A- with relay lever.
- Remove nut -arrow- and detach gear selector cable -B- with gearbox selector lever.
- Tie up gear selector cable with gearbox selector lever and gate selector cable with relay lever.
- Unplug connector from speedometer sender -G22- -arrow 1-.
- Unplug connector from reversing light switch -F4- -arrow 2-.

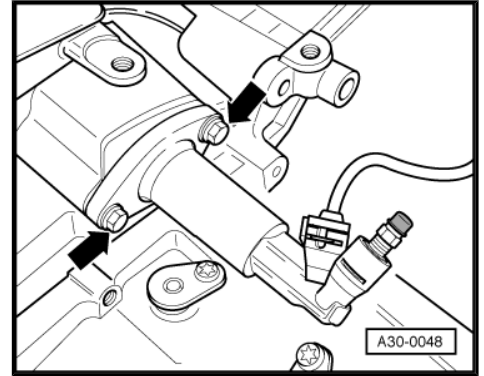


- Remove slave cylinder -arrows-, move to one side and secure with wire. Do not disconnect pipes.



Caution

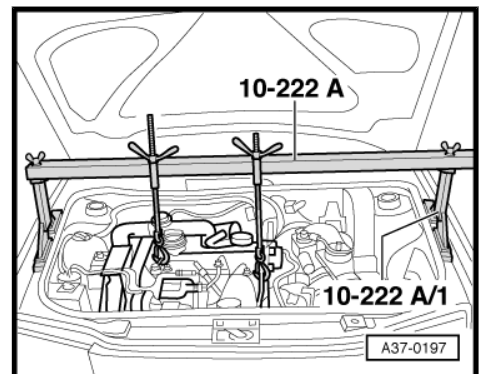
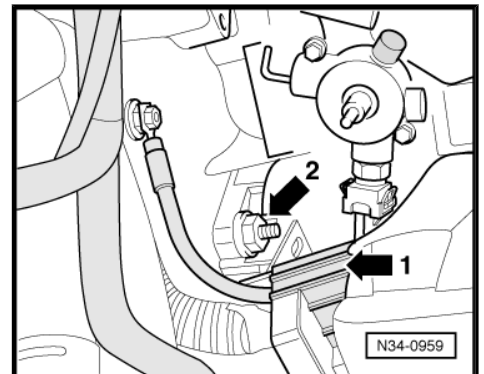
Do not depress clutch pedal after removing slave cylinder.



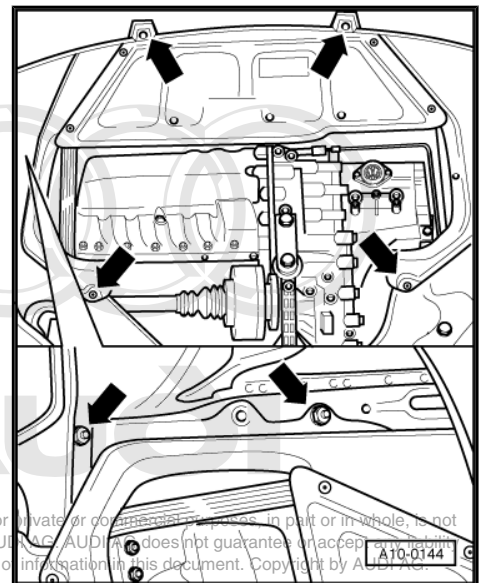
- Remove cable retainer -arrow 1- on starter.
- Remove wiring and cable from starter.
- Detach earth strap at upper engine/gearbox connecting bolt.
- Then remove upper securing bolt -arrow 2- on starter.
- Remove upper engine/gearbox securing bolts.

Continued for all vehicles

- If there are hoses and cable connections in area of engine lifting eyes for support bracket -10 - 222 A- , remove these now.
- Assemble support bracket -10 - 222 A- together with racks -10 - 222 A /1- .
- Take up weight of engine/gearbox assembly with the spindles.

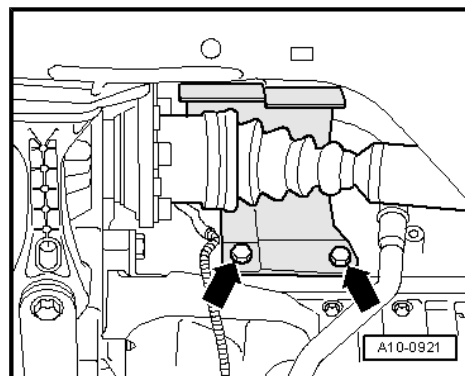


- Unscrew bolts -arrows- and remove noise insulation completely.
- Remove starter ⇒ Rep. Gr. 27 .
- Remove retainer for power assisted steering pipe from gearbox.



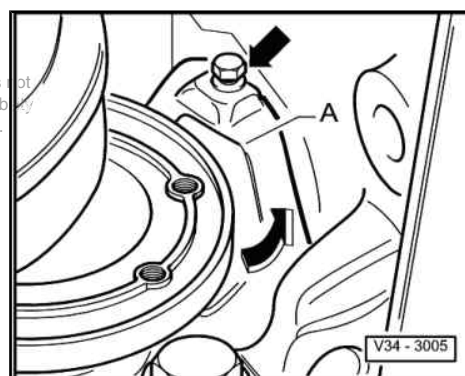
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- If fitted, remove protective cover for right inner constant velocity joint from engine -arrows-.



- Remove small cover plate -A- for flywheel behind right-hand flange shaft -arrows-.

- Disconnect drive shafts from flange shafts, turn steering to full left lock and tie up drive shafts as high as possible. Take care not to damage surface coating.



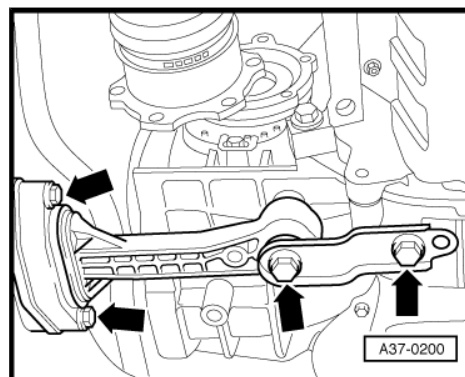
- Separate exhaust system behind catalytic converter ⇒ Rep. Gr. 26 .



Note

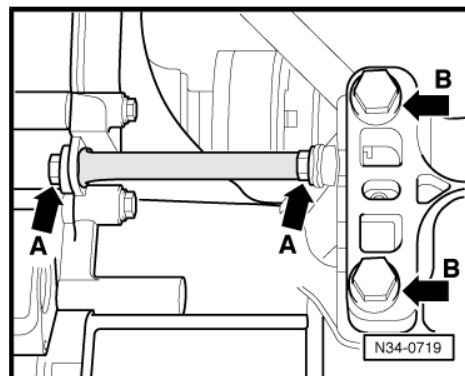
- ♦ On vehicles with TDI engines, the exhaust pipe bracket must be detached from the subframe.
- ♦ On vehicles with 5V turbo engines, the front exhaust pipe must be removed.

- Unbolt pendulum support -arrows-.



- Remove gearbox support from gearbox and gearbox bracket -arrows A-.

- Remove bolts -arrows B- at left mounting from gearbox mounting/gearbox bracket.



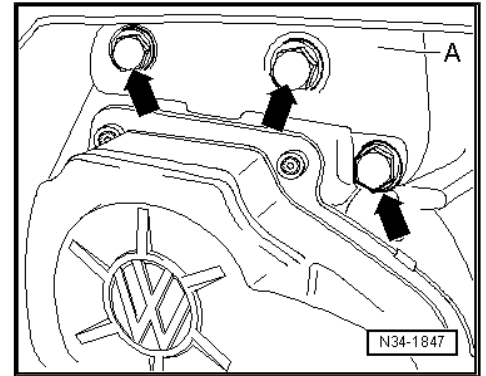
Note

Do not damage power steering pipe when moving engine/gearbox assembly.

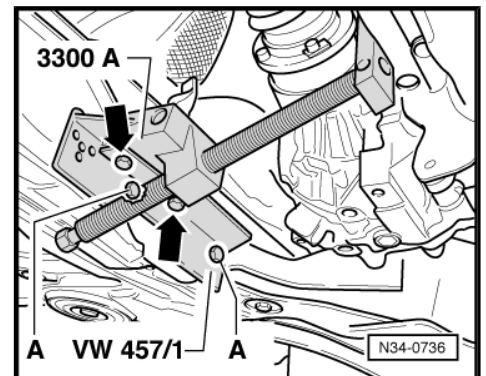
- Lower engine/gearbox assembly via the two spindles until securing bolts for gearbox bracket -A- are accessible from left wheel housing.

Separate gearbox bracket -A- from gearbox as follows:

- Using hot-air blower -V.A.G 1416- , heat self-locking bolts -arrows- slightly, otherwise the bolts -arrows- can shear off when they are loosened.
- Remove bolts -arrows- and release gearbox bracket -A- from gearbox.

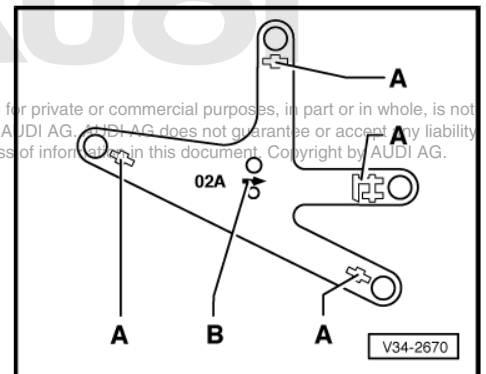


- Bolt support rail -VW 457/1- to both threaded holes for pendulum support securing holes on subframe.
- Spacers totalling 6 mm must be inserted between subframe and support rail -VW 457/1- .
- A- 2 hexagon bolts M8 x 25
- Fit engine support -3300 A- and secure -arrows-.
- Carefully press engine/gearbox unit forwards.



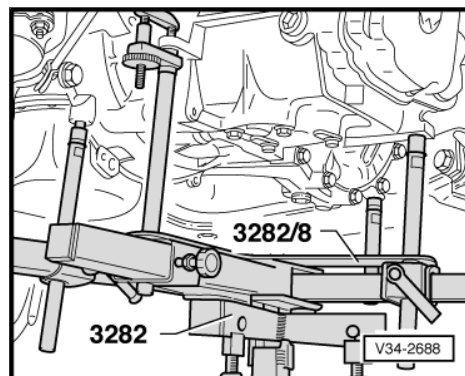
Do not damage power steering pipe.

- Assemble gearbox jack with gearbox support -3282- , adjustment plate -3282/8- for "02A" gearbox and support elements as follows:
- Place adjustment plate -3282/8- on gearbox support -3282- (adjustment plate only fits in one position).
- Align arms of gearbox support according to holes in adjustment plate.
- Bolt on support elements -A-, as illustrated on adjustment plate.

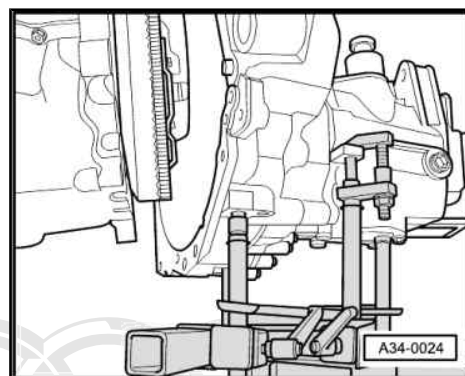


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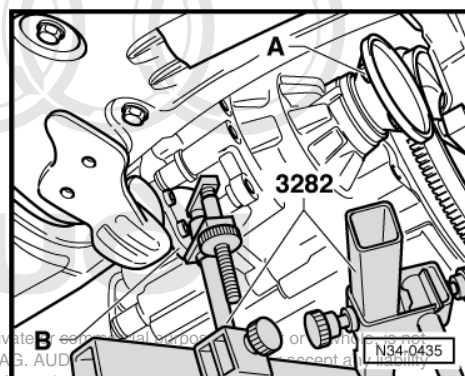
- Place gearbox jack under vehicle; arrow symbol -B- (⇒ [page 79](#)) on adjustment plate points to front of vehicle.
- Align adjustment plate parallel to gearbox and lock safety support on gearbox.
- Remove bottom engine/gearbox securing bolts.



- Push the gearbox off the dowel sleeves and swing carefully towards the subframe.
- Slightly lower gearbox and tilt to left via spindles of gearbox support -3282-.



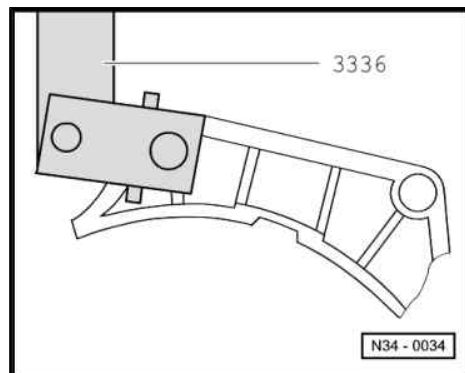
- Then lower gearbox carefully, guiding right-hand flange shaft -A- past flywheel as illustrated and left-hand flange shaft -B- past subframe.
- When lowering the gearbox, change position of gearbox using the spindles on gearbox support -3282-.


Note

Do not damage power steering pipe when lowering gearbox.

Transporting gearbox

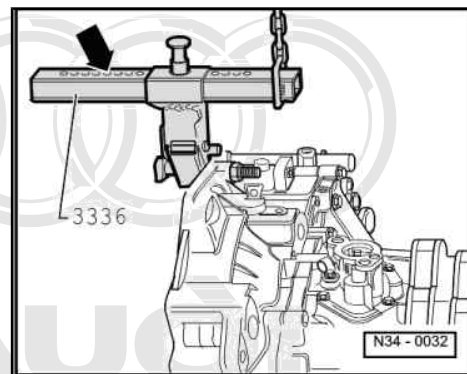
- Bolt gearbox lifting tackle -3336- to clutch housing.



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

Number of holes visible = 5

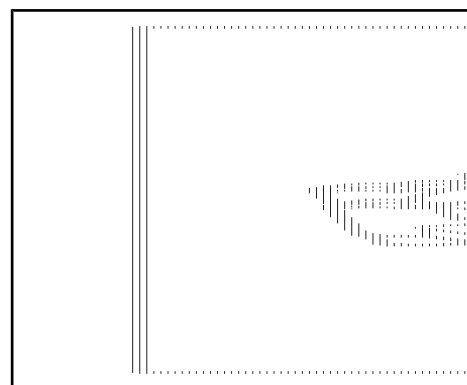
- Take up gearbox with workshop hoist and gearbox lifting tackle -3336- .
- Set down gearbox as required (for example in transport container).



3.2 Installing gearbox

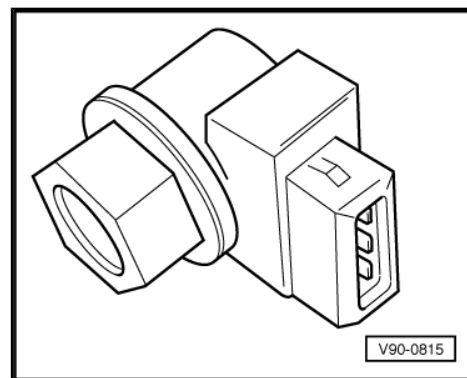
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Installation of gearbox is carried out in reverse order of removal.
When installing gearbox, ensure that engine/gearbox mountings are free of stress ⇒ Rep. Gr. 10 .



Note

- ◆ Before installing gearbox, press clutch release lever towards gearbox housing and secure with assembly bolt or M8 x 35 bolt. Remove after gearbox has been installed. The hole will then be sealed by the 3rd securing bolt for the cable support bracket.
- ◆ Clean splines of input shaft and apply a thin coat of grease for clutch plate splines -G 000 100- .
- ◆ It should be possible to push the clutch plate back and forth slightly on the input shaft.
- ◆ When renewing gearbox, speedometer sender -G22- (illustration), selector shaft lever and relay lever must be transferred to new unit.
- ◆ When renewing gearbox, ensure that intermediate plate is correctly positioned.
- ◆ Check that dowel sleeves for centralising engine/gearbox are in the cylinder block, install if necessary.



- Bolt support rail -VW 457/1- to both threaded holes for pendulum support securing holes on subframe.
- Spacers totalling 6 mm must be inserted between subframe and support rail -VW 457/1- .

-A- 2 hexagon bolts M8 x 25

- Fit engine support -3300 A- and secure -arrows-.
- Press engine forward carefully.



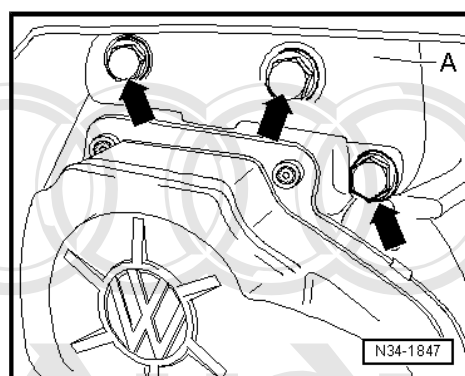
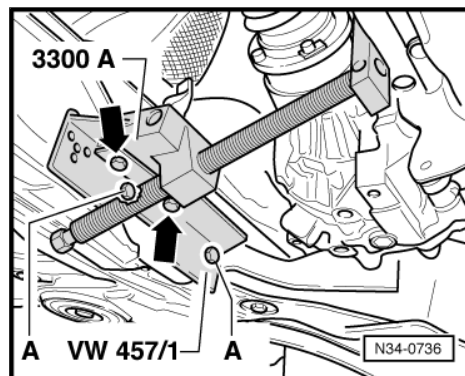
Note

Do not damage power steering pipe.

- Assemble gearbox jack ➔ [page 79](#) .
- Place gearbox on gearbox jack ➔ [page 80](#) .
- Incline gearbox to left via spindles of gearbox support -3282- .
- Bring gearbox into position.

Do not damage power steering pipe.

- Install bottom engine/gearbox securing bolts.
- Detach engine support -3300 A- and support rail -VW 457/1- .
- Fit gearbox bracket -A- with new bolts -arrows-.
- Install upper engine/gearbox securing bolts.
- Lift engine/gearbox assembly slightly via the spindles of support bracket -10 - 222 A- .
- Align engine/gearbox in installation position.



- Fit new bolts -arrows B- for left-hand assembly mounting in gearbox mounting and tighten to torque.



WARNING

Do not remove support bracket -10 - 222 A- until all bolts securing the engine/gearbox mountings (left and right) have been tightened to the specified torque.

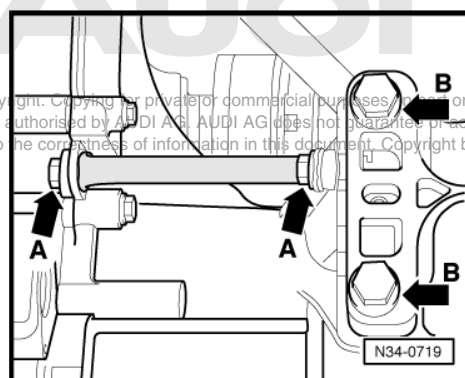
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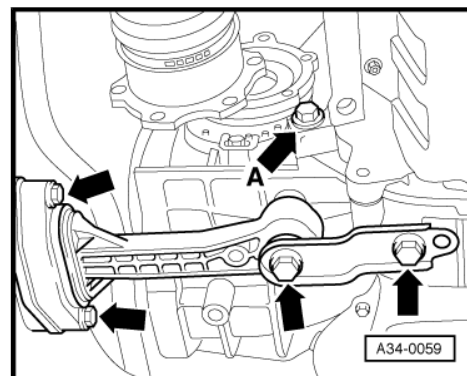
Note

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

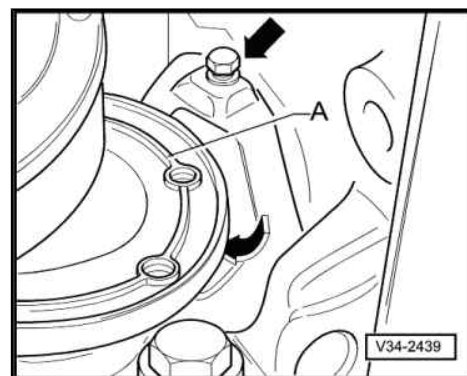
- Then fit gearbox support to gearbox and gearbox bracket -arrows A-.



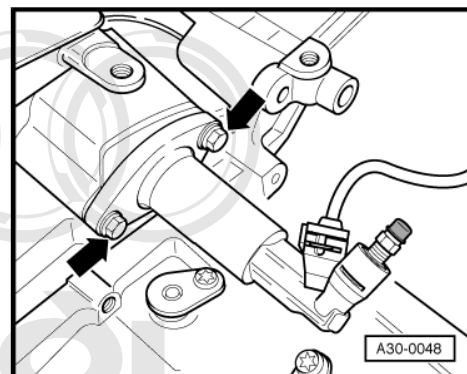
- Fit bolt -arrow A- securing engine to gearbox and tighten to specified torque.
- Install pendulum support -arrows-.
- Use new bolts.



- If fitted, install small cover plate -A- at rear of flange shaft (right-side) -arrows-.
- Assemble exhaust system ⇒ Rep. Gr. 26 .
- Fit retainer for power steering pipe to gearbox.
- Secure drive shafts to gearbox, renew gasket ⇒ Rep. Gr. 40 .
- Fit protective cover for right inner constant velocity joint to engine.
- Install starter ⇒ Rep. Gr. 27 .



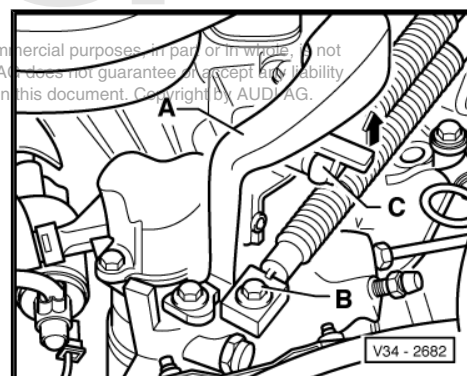
- Install slave cylinder -arrows-.



Vehicles up to 09.98

- Attach gear selector cable -B- and damper weight -A- to gearbox selector lever.
- Attach gate selector cable to actuating arm/relay lever -C-, to do this lift lug in direction of -arrow-.

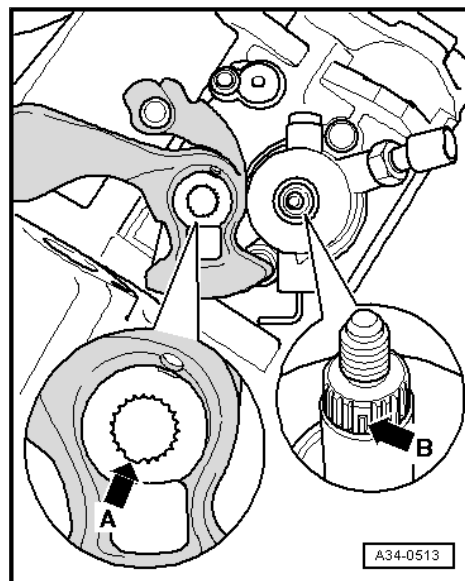
Vehicles from 09.98



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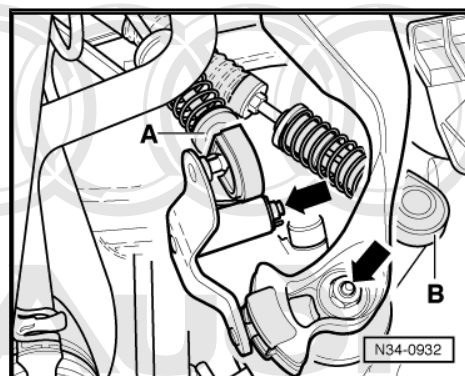
Fit gearbox selector lever as follows:

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

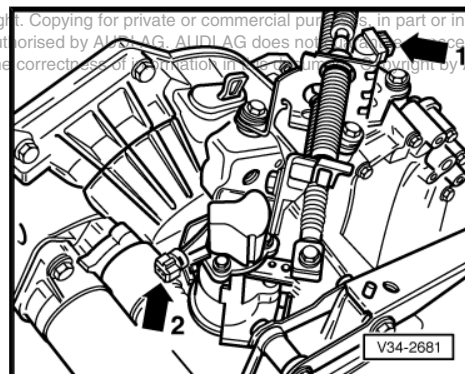


- Fit gear selector cable -B- with gearbox selector lever -arrow-.
- Fit gate selector cable -A- with relay lever and secure -arrow-.
- Install cable support bracket on gearbox, if necessary clip pipe/hose assembly onto cable support bracket.

Continued for all vehicles



- Attach connector for reversing light switch -F4- -arrow 2-.
- Attach connector to speedometer sender -G22- -arrow 1-. Attach all other electrical connections and earth wires to gearbox and to engine/gearbox securing bolts.
- Adjust selector mechanism on vehicles up to 09.98 ⇒ [page 52](#).
- Adjust selector mechanism on vehicles from 09.98 ⇒ [page 68](#).
- Install engine cover panel.
- Install complete air cleaner housing ⇒ Rep. Gr. 23 or ⇒ Rep. Gr. 24.
- Check gearbox oil ⇒ [page 95](#).
- Install insulation tray below engine/gearbox, if fitted ⇒ Rep. Gr. 50.
- Connect earth strap to battery.



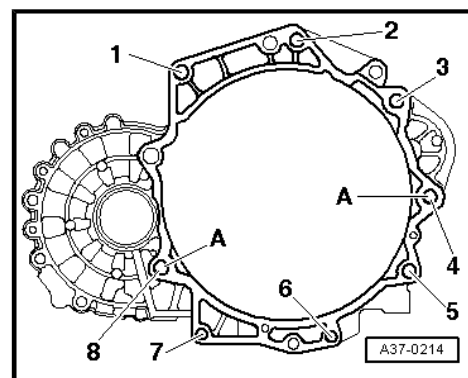
Note

When the battery is reconnected, please remember to check and activate the vehicle equipment (radio, clock, convenience electrical systems etc.).

Tightening torques

Gearbox to engine

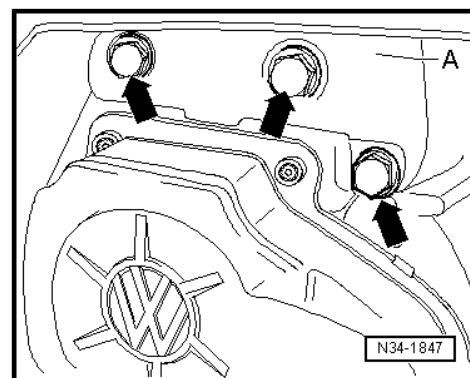
Item	Bolt	Qty.	Nm
1	M 12 x 55	1	80
2 ¹⁾	M 12 x 55	1	80
3 ¹⁾	M 12 x 150	1	80
4	M 12 x 150	1	80
5	M 10 x 50	1	45
6	M 10 x 70	1	45
7	M 10 x 50	1	45
8	M 12 x 55	1	80
A	Dowel sleeves for centralising		
• ¹⁾ Bolt with stud M8			



Gearbox bracket -A- to gearbox.

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

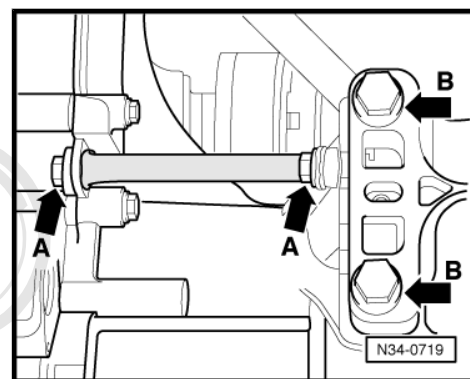
Bolts -arrows-	50 Nm + 90° ¹⁾
• ¹⁾ 90° is equivalent to a quarter turn	



Gearbox to body

- Renew bolts -arrows B-.

Bolts -arrows A-	25 Nm
Bolts -arrows B-	60 Nm + 90° ¹⁾
• ¹⁾ 90° is equivalent to a quarter turn	



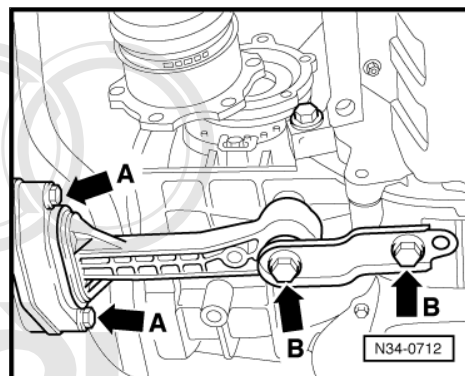
Rear gearbox mounting

- Renew bolts -arrows A- and -arrows B-.

Bolts -arrows A-	20 Nm + 90° ¹⁾
Bolts -arrows B-	40 Nm + 90° ¹⁾
• ¹⁾ 90° is equivalent to a quarter turn	

Cover plate for flywheel	10 Nm
Protective cover for right inner constant velocity joint to engine	M8 = 20 Nm M10 = 35 Nm
Slave cylinder to gearbox	23 Nm
Selector cable support bracket to gearbox	25 Nm
Bolt securing gear selector cable to gearbox selector lever ¹⁾	25 Nm
Damper weight to gearbox selector lever ¹⁾	25 Nm
Gearbox selector lever to gearbox ^{2) 3)}	20 Nm

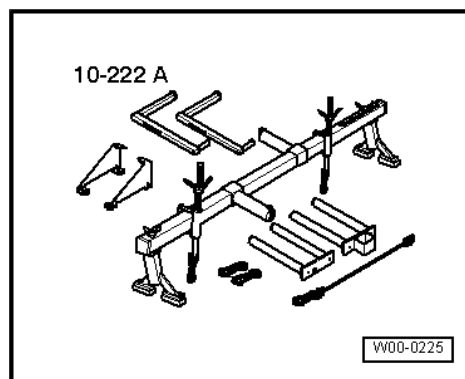
- ¹⁾ Vehicles up to 09.98
- ²⁾ Vehicles from 09.98
- ³⁾ Renew nut



3.3 Removing and installing gearbox mounting

Special tools and workshop equipment required

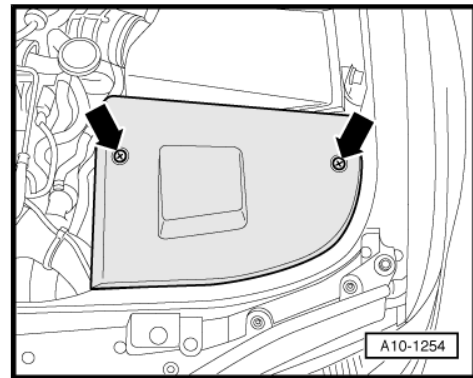
- ◆ Support bracket -10-222 A-



Removing gearbox mounting

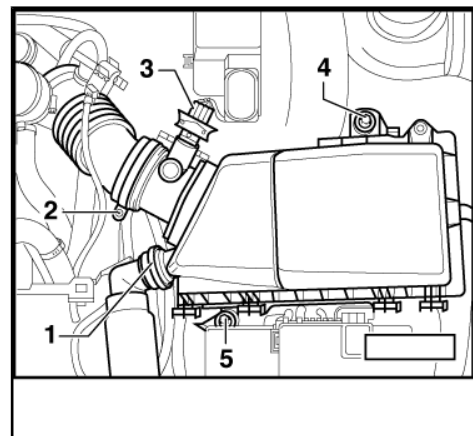
- Remove engine cover panel.
- Obtain radio code on vehicles with coded radio.
- With the ignition switched off, disconnect battery earth strap.

- If fitted, remove cover panel (front left) -arrows-.

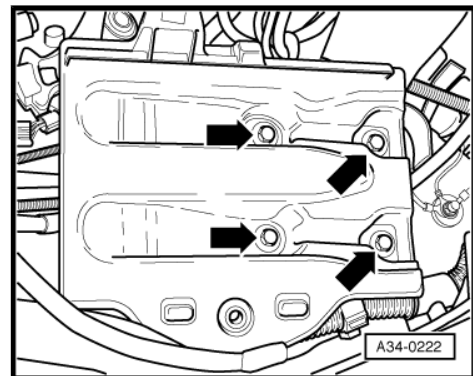


- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing => Repair group 23 or => Repair group 24 .

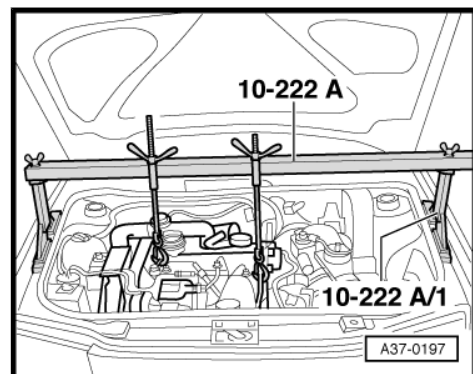
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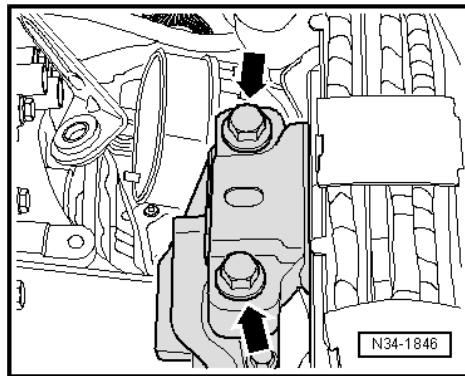
- Remove battery and battery tray -arrows- => Rep. Gr. 27 .
- If there are hoses and cable connections in area of engine lifting eyes for support bracket -10 - 222 A- , remove these now.



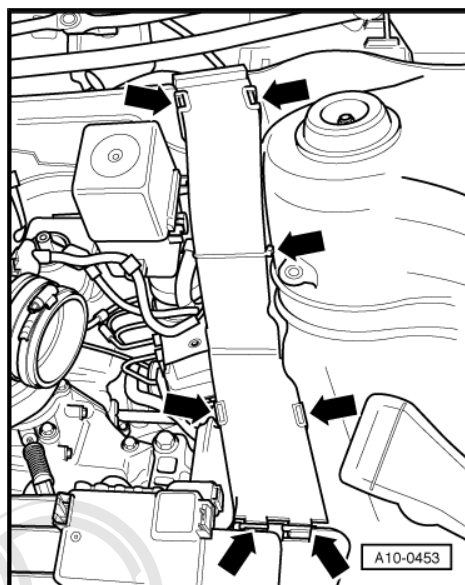
- Assemble support bracket -10 - 222 A- together with racks -10 - 222 A /1- .
- Attach spindles of support bracket to engine lifting eyes.
- Take up weight of engine/gearbox assembly via the spindles, but do not raise.



- Unscrew bolts -arrows- approx. 2 turns to release gearbox bracket from gearbox mounting.



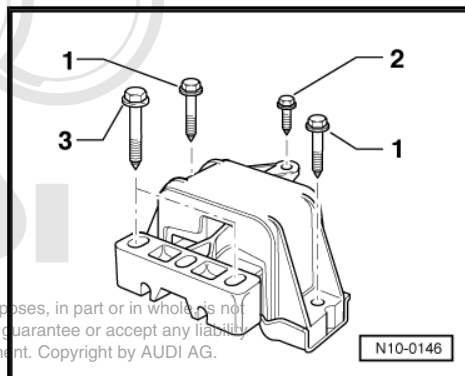
- Open wiring duct on left in engine compartment -arrows-.
- Move wiring in wiring duct and wiring duct clear far enough to be able to remove securing bolts for gearbox mounting.



- Unscrew bolts -1...3- and remove gearbox mounting.

Installing gearbox mounting

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



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- Secure gearbox mounting to body with bolt -2- and new bolts -1-.

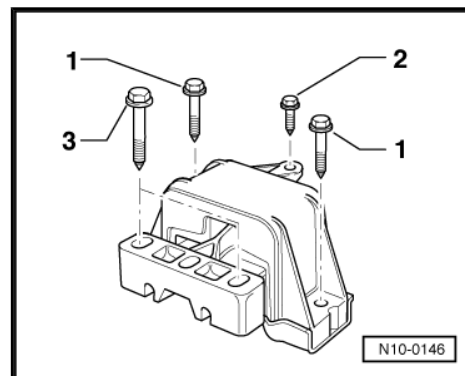
Bolts -1-	40 Nm + 90° 1) 2)
Bolt -2-	25 Nm
• 1) Renew bolts • 2) 90° is equivalent to a quarter turn	

- Pull gearbox up to gearbox mounting with spindle on support bracket -10-222 A- to fit new bolts -3- to gearbox bracket.



Caution

Before tightening bolts -3- between gearbox mounting and gearbox bracket, the mounting and bracket must be aligned in an absolutely parallel position, otherwise the threads will be damaged. If necessary, push gearbox up at rear with trolley jack.



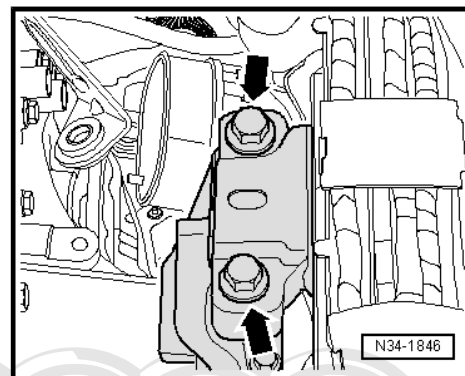
- Bolt gearbox bracket onto support arm of gearbox mounting using new bolts -arrows-.

Bolts -arrows-	60 Nm + 90° 1) 2)
• 1) Renew bolts • 2) 90° is equivalent to a quarter turn	



Note

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



WARNING

Do not remove support bracket -10 - 222 A- until all bolts securing the engine/gearbox mountings (left and right) have been tightened to the specified torque.

- Install battery tray and battery ⇒ Rep. Gr. 27 .
- Install complete air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .
- Install engine cover panel.
- Connect the battery.



Note

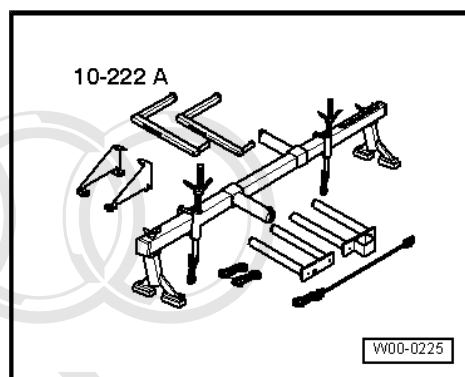
When the battery is reconnected, please remember to check and activate the vehicle equipment (radio, clock, convenience electrical systems etc.).

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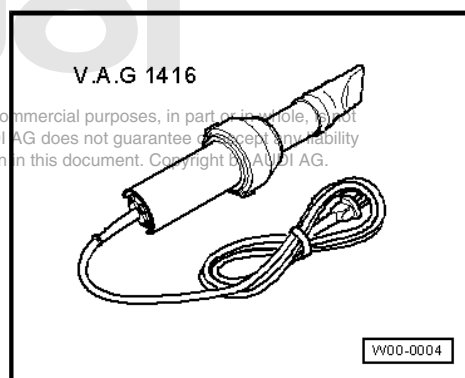
3.4 Removing and installing gearbox bracket

Special tools and workshop equipment required

- ◆ Support bracket -10-222 A-



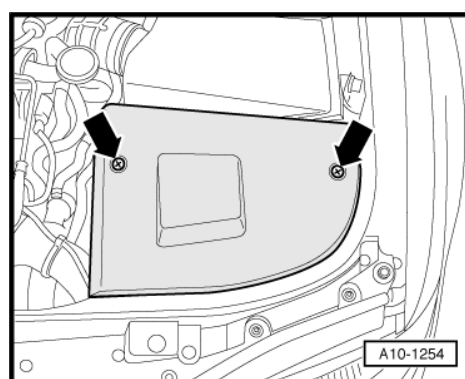
- ◆ Hot air blower -V.A.G 1416-



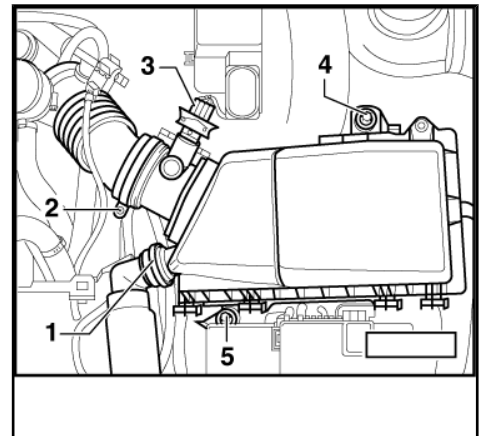
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Removing gearbox bracket

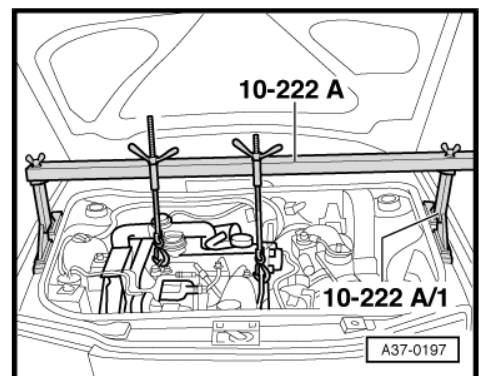
- Remove engine cover panel.
- Obtain radio code on vehicles with coded radio.
- With the ignition switched off, disconnect battery earth strap.
- If fitted, remove cover panel (front left) -arrows-.



- If fitted, detach hose -1- for secondary air pump.
- Detach air intake hose at air mass meter -G70- (slacken hose clip -2-).
- Unplug electrical connector for air mass meter -G70- -3-.
- Remove bolts -4- and -5- and detach air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .
- If there are hoses and cable connections in area of engine lifting eyes for support bracket -10 - 222 A- , remove these now.



- Assemble support bracket -10 - 222 A- together with racks -10 - 222 A /1- .
- Attach spindles of support bracket to engine lifting eyes.
- Take up weight of engine/gearbox assembly via the spindles, but do not raise.
- Remove centre noise insulation (below engine/gearbox) and left noise insulation ⇒ Rep. Gr. 50 .



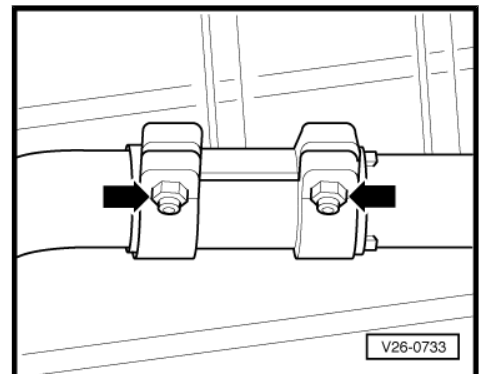
- Disconnect exhaust system at clamp -arrows-.



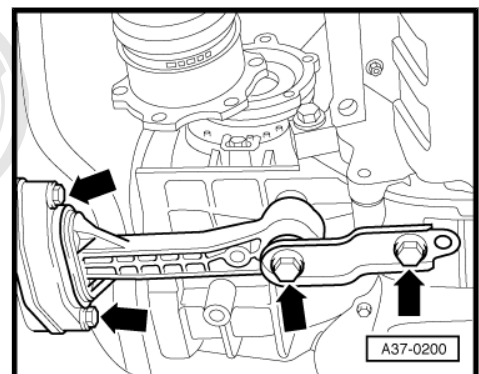
Note

The flexible pipe connection (de-coupling element) in the front exhaust pipe must not be bent more than 10 ° - otherwise it can be damaged.

- Tie up the front exhaust pipe.



- Unbolt pendulum support -arrows-.



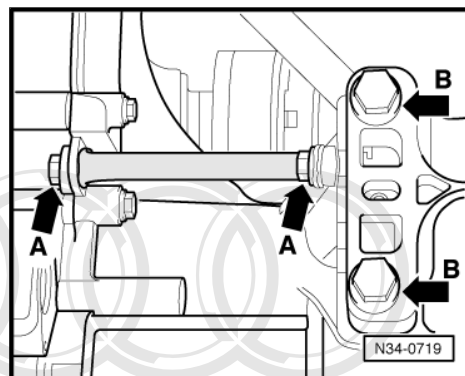
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- Remove gearbox support from gearbox and gearbox bracket -arrows A-.
- Remove bolts -arrows B- at left mounting from gearbox mounting/gearbox bracket.


Note

Take care not to damage power steering pipe when lowering engine/gearbox assembly.

- Lower engine/gearbox assembly via the two spindles until securing bolts for gearbox bracket -A- are accessible from left wheel housing.



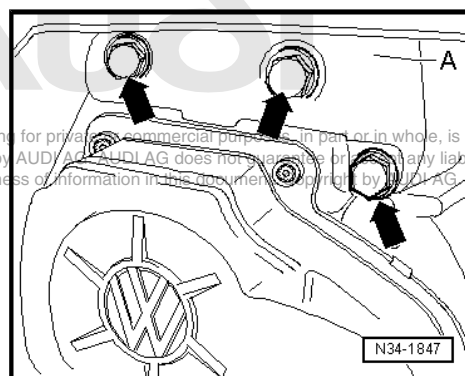
Separate gearbox bracket -A- from gearbox as follows:

- Using hot-air blower -V.A.G 1416- , heat self-locking bolts -arrows- slightly, otherwise the bolts -arrows- can shear off when they are loosened.
- Remove bolts -arrows- and release gearbox bracket -A- from gearbox.

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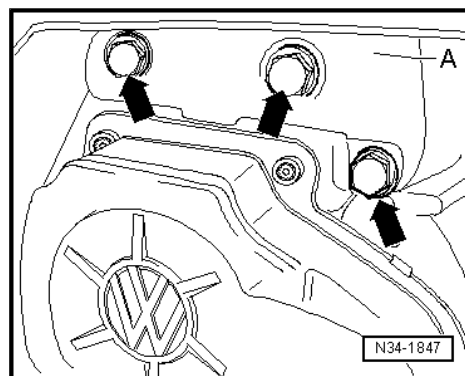
Installing gearbox bracket

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



Attach gearbox bracket -A- to gearbox as follows:

- Before installing, it is important to clean any residue from threaded holes for securing bolts -arrows- in gearbox housing using a tap.
- Renew bolts -arrows-
- Tighten all bolts hand-tight.
- Tighten bolts to specified torque.



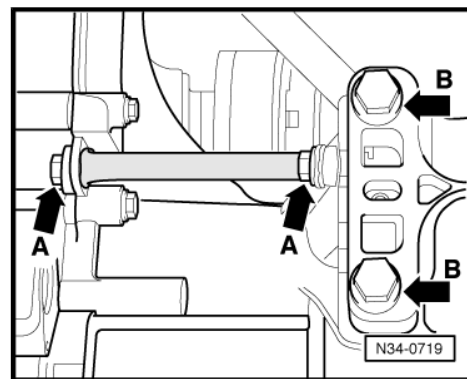
Bolts -arrows-	50 Nm + 90° ¹⁾ ²⁾
• ¹⁾ Renew bolts • ²⁾ 90° is equivalent to a quarter turn	

- Pull gearbox up to gearbox mounting with spindle on support bracket -10-222 A- to fit new bolts -arrows B- to gearbox bracket.



Caution

Before tightening bolts between gearbox mounting and gearbox bracket, the mounting and bracket must be aligned in an absolutely parallel position, otherwise the threads will be damaged. If necessary, push gearbox up at rear with trolley jack.



- Bolt gearbox bracket onto support arm of gearbox mounting using new bolts -arrows B-.
- Then fit gearbox support to gearbox and gearbox bracket -arrows A-.

Bolts -arrows A-	25 Nm
Bolts -arrows B-	60 Nm + 90° ¹⁾ 2)
• ¹⁾ Renew bolts • ²⁾ 90° is equivalent to a quarter turn	



Note

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



WARNING

Do not remove support bracket -10 - 222 A- until all bolts securing the engine/gearbox mountings (left and right) have been tightened to the specified torque.

- Install pendulum support ⇒ [page 94](#) .
- Assemble exhaust system and align so it is free of stress ⇒ Rep. Gr. 26 .
- Install complete air cleaner housing ⇒ Repair group 23 or ⇒ Repair group 24 .
- Install engine cover panel.
- Connect the battery.



Note

When the battery is reconnected, please remember to check and activate the vehicle equipment (radio, clock, convenience electrical systems etc.).

- Install centre noise insulation (below engine/gearbox) and left noise insulation ⇒ Rep. Gr. 50
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3.5 Removing and installing pendulum support

Removing pendulum support

- Remove centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .
- Unscrew bolts -arrows- and detach pendulum support.

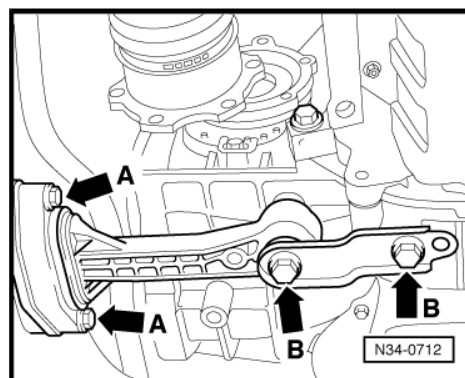
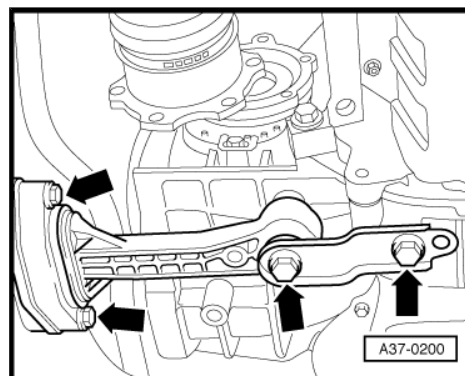
Installing pendulum support

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

- Secure pendulum support to subframe with new bolts -arrows A- and to gearbox -arrows B-.

Bolts -arrows A-	20 Nm + 90° 1) 2)
Bolts -arrows B-	40 Nm + 90° 1) 2)
• 1) Renew bolts • 2) 90° is equivalent to a quarter turn	

- Install centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .



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4 Checking gearbox oil

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

- Remove centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .
- Remove gear oil inspection plug -arrow-.

Oil level is correct when gearbox oil is up to bottom lip of filler hole.

- Screw in plug -arrow-.

Tightening torque

Oil filler plug	30 Nm
-----------------	-------

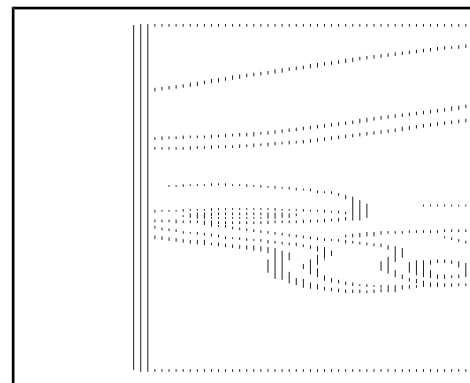
Note the following when filling with new oil:

- Remove plug -arrow-.
- Fill up gear oil to bottom lip of filler hole.
- Screw in plug -arrow-.
- Start engine, engage a gear and allow gearbox to turn for approx. 2 minutes.
- Switch off engine and remove plug -arrow-.
- Top up gear oil again to bottom lip of filler hole.
- Screw in plug -arrow-.

Tightening torque

Oil filler plug	30 Nm
-----------------	-------

- Install centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .



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5 Dismantling and assembling gearbox

5.1 General layout of gearbox

1 - 1st gear

2 - 2nd gear

3 - 3rd gear

4 - 4th gear

5 - 5th gear

6 - Gearbox housing

❑ Servicing ⇒ [page 112](#)

7 - Selector mechanism

❑ Selector forks

❑ Dismantling and assembling ⇒ [page 126](#)

8 - Input gear for 1st speed selector gear and reverse gear

9 - Input shaft

❑ Dismantling and assembling ⇒ [page 131](#)

10 - Output shaft

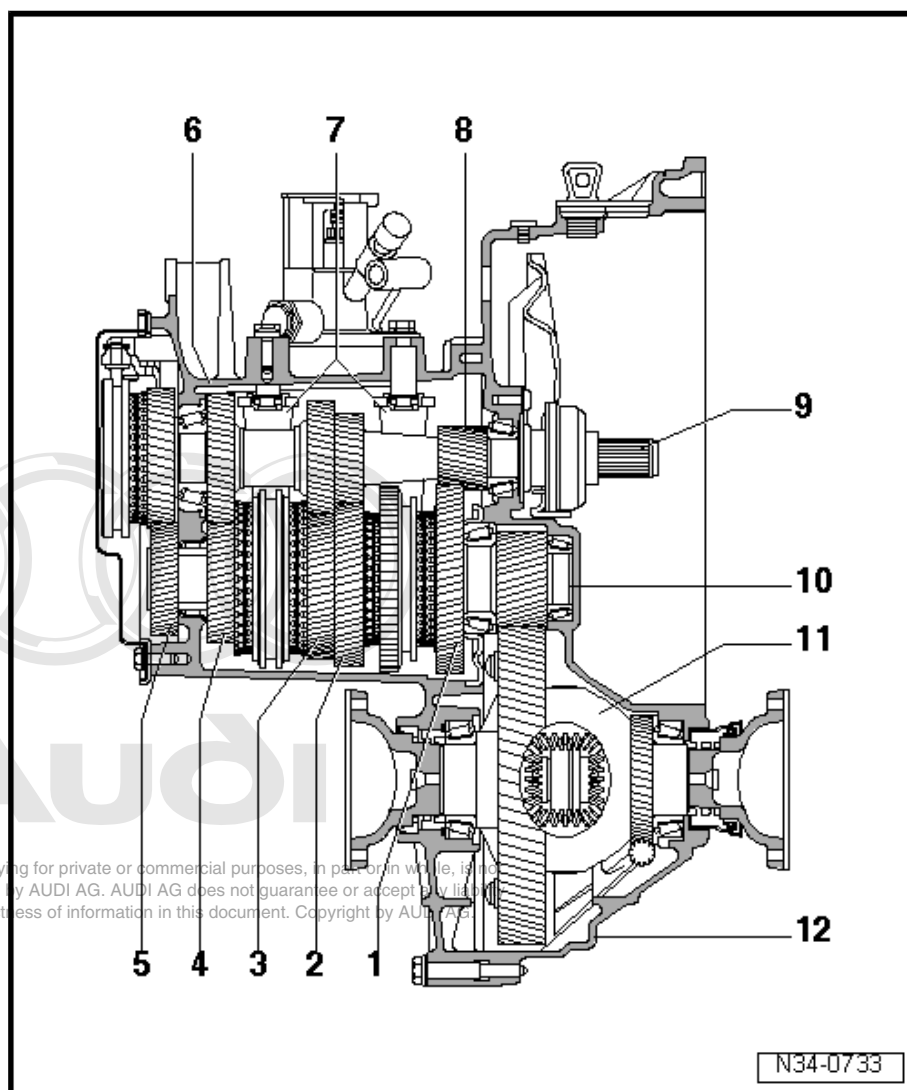
❑ Dismantling and assembling ⇒ [page 143](#)

11 - Differential

❑ Dismantling and assembling ⇒ [page 172](#)

12 - Clutch housing

❑ Servicing ⇒ [page 112](#)



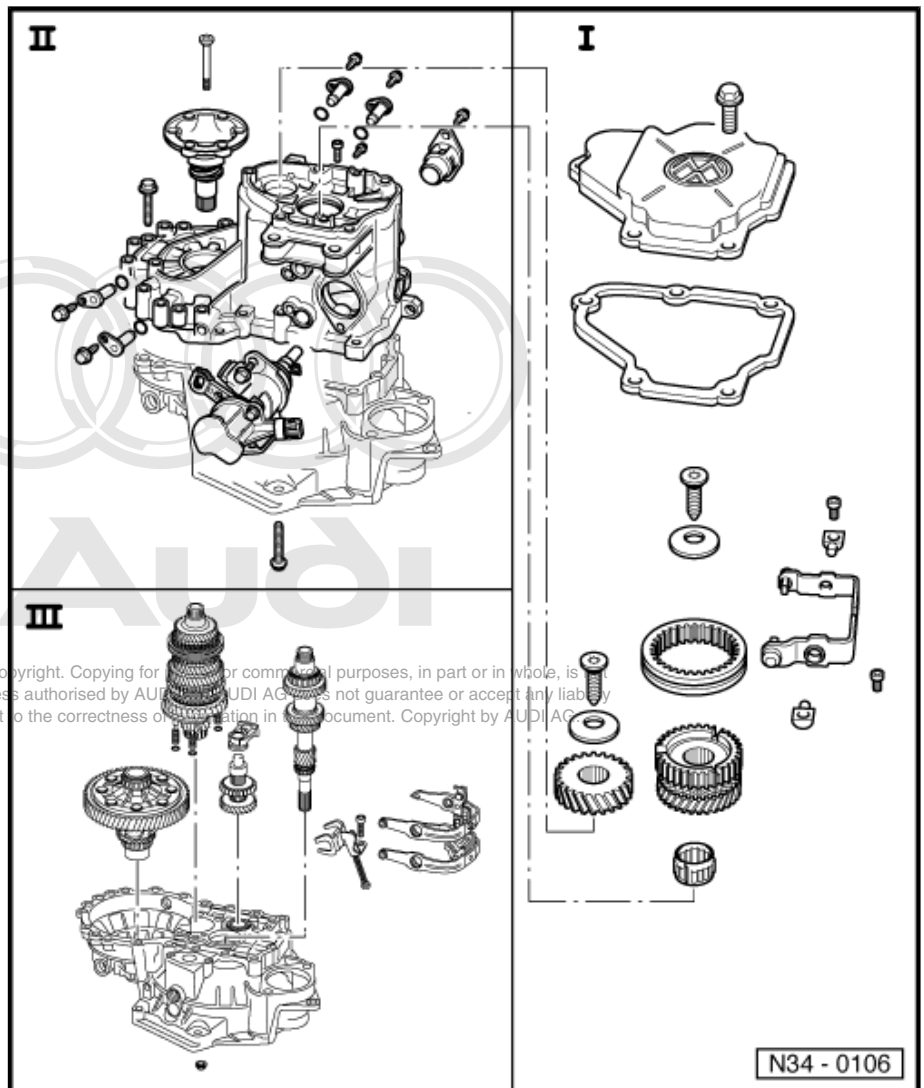
5.2 Exploded view

Sequence for dismantling and assembling ⇒ [page 100](#)

I - Removing and installing gearbox housing cover and 5th gear ⇒ [page 98](#)

II - Dismantling and assembling gearbox housing and selector mechanism ⇒ [page 99](#)

III - Removing and installing input shaft, output shaft, differential and selector forks ⇒ [page 100](#)



5.3 Removing and installing gearbox housing cover and 5th gear

1 - Bolt

- ☐ 14 Nm
- ☐ For gearbox housing cover

2 - Gearbox housing cover



Note

- ◆ If the gearbox cover is fitted with gearbox installed, check oil level as follows:
- ◆ Fill with oil to bottom lip of filler hole and refit screw plug.
- ◆ Start engine, engage a gear and allow gearbox to turn for approx. 2 minutes.
- ◆ Switch off engine and again top up oil to bottom lip of filler hole.

3 - Gasket

4 - Bolt

- ☐ M10 x 1
- ☐ 80 Nm and turn 90° further
- ☐ Always renew
- ☐ Fitted piece on bolt head holds dished spring in position

5 - Dished spring

- ☐ Installing ⇒ [page 110](#)
- ☐ Always renew dished spring if broken

6 - Bolt

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

7 - Pivot pin

8 - 5th gear selector fork

- ☐ Dismantling and assembling ⇒ [page 126](#)
- ☐ Adjusting ⇒ [page 111](#)

9 - 5th gear locking collar

- ☐ Installation position ⇒ [page 109](#)
- ☐ Adjusting ⇒ [page 111](#)

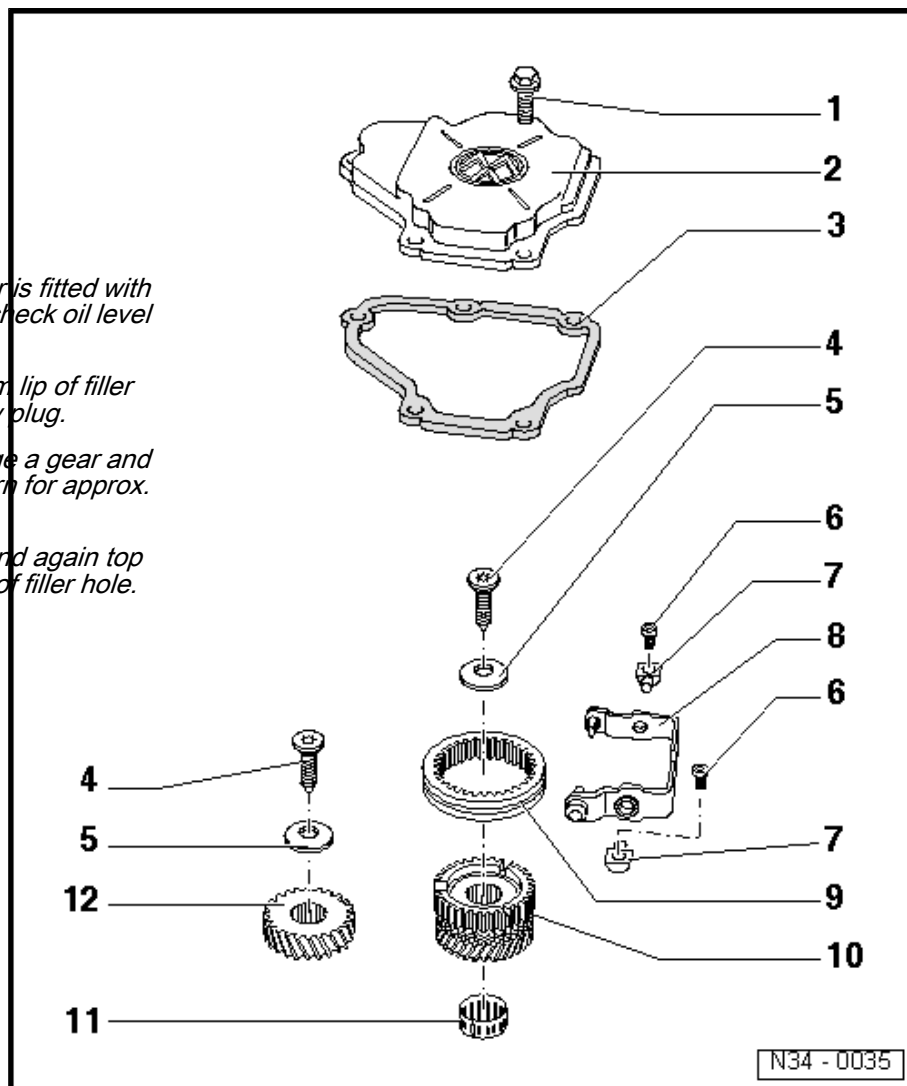
10 - Synchronising hub with 5th speed selector gear and synchronising ring

- ☐ Dismantling and assembling ⇒ [page 137](#)

11 - Needle bearing

12 - 5th gear wheel

- ☐ Installation position ⇒ [page 108](#)



5.4 Dismantling and assembling gearbox housing and selector mechanism

1 - Countersunk bolt

- ☐ 25 Nm

2 - Flange shaft with spring

- ☐ Removing and installing
⇒ [page 100](#)
- ☐ Assembling
⇒ [page 172](#)

3 - Bolt

- ☐ Tightening sequence and torque ⇒ [page 107](#)
- ☐ For reverse shaft support
- ☐ Self-locking
- ☐ Always renew

4 - O-ring

- ☐ Always renew

5 - Pivot pin

6 - Bolt

- ☐ 25 Nm

7 - Bolt

- ☐ 25 Nm

8 - Cover plate

9 - Gearbox housing

- ☐ Servicing ⇒ [page 112](#)

10 - Clutch housing

- ☐ Servicing ⇒ [page 112](#)

11 - Bolt

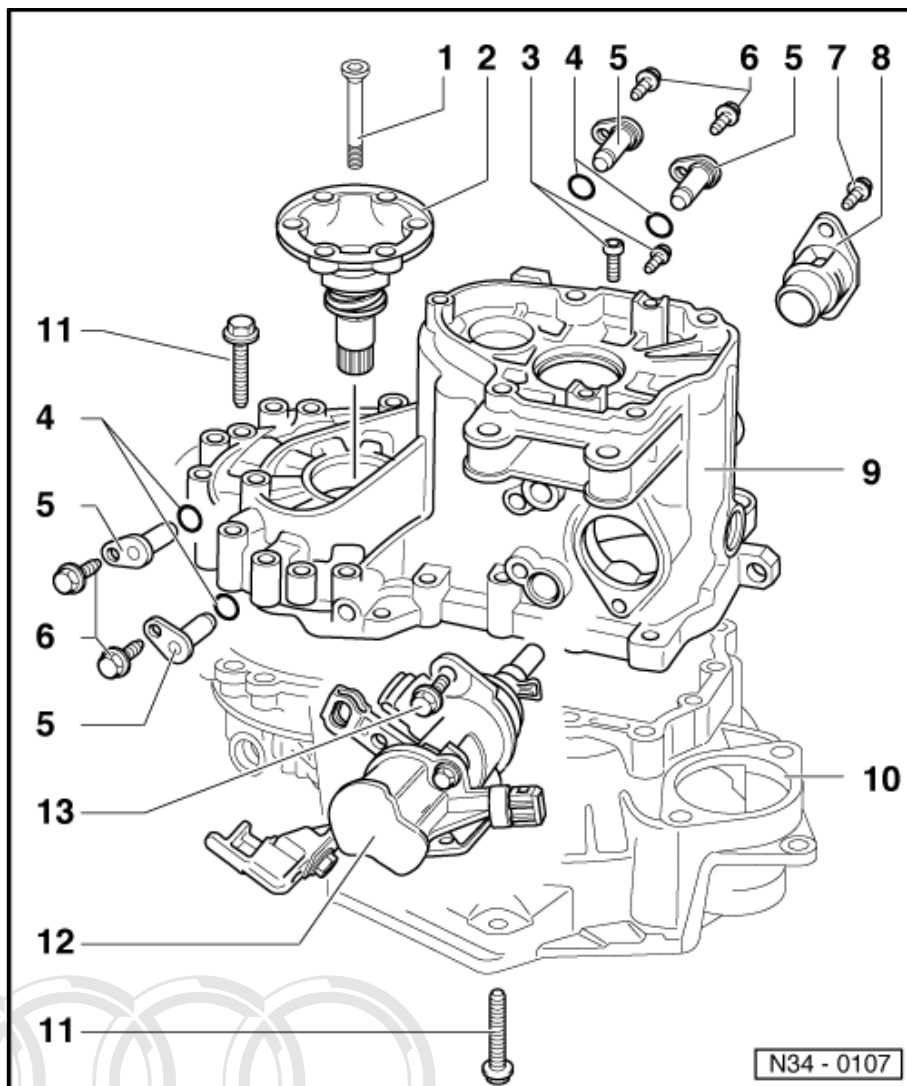
- ☐ 25 Nm and turn 90° further
- ☐ Always renew

12 - Selector mechanism

- ☐ Dismantling and assembling up to 09.98 ⇒ [page 119](#)
- ☐ From 09.98, a modified selector mechanism has been used
- ☐ Dismantling and assembling from 09.98 ⇒ [page 122](#)

13 - Bolt

- ☐ 25 Nm



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5.5 Removing and installing input shaft, output shaft (pinion shaft), differential and selector forks

1 - Differential

- ☐ Dismantling and assembling ⇒ [page 172](#)

2 - Seal

- ☐ 4x
- ☐ Always renew

3 - Output shaft

- ☐ Dismantling and assembling ⇒ [page 143](#)

4 - Reverse shaft support

- ☐ Dismantling and assembling ⇒ [page 161](#)

5 - Reverse shaft

- ☐ Dismantling and assembling ⇒ [page 161](#)

6 - Input shaft

- ☐ Dismantling and assembling ⇒ [page 131](#)

7 - Reverse gear selector fork

- ☐ Dismantling and assembling ⇒ [page 126](#)
- ☐ Installation position ⇒ [page 106](#)

8 - Bolt

- ☐ 25 Nm

9 - Selector mechanism

- ☐ (Selector forks)
- ☐ Dismantling and assembling ⇒ [page 126](#)

10 - Clutch housing

- ☐ Servicing ⇒ [page 112](#)

11 - Nut

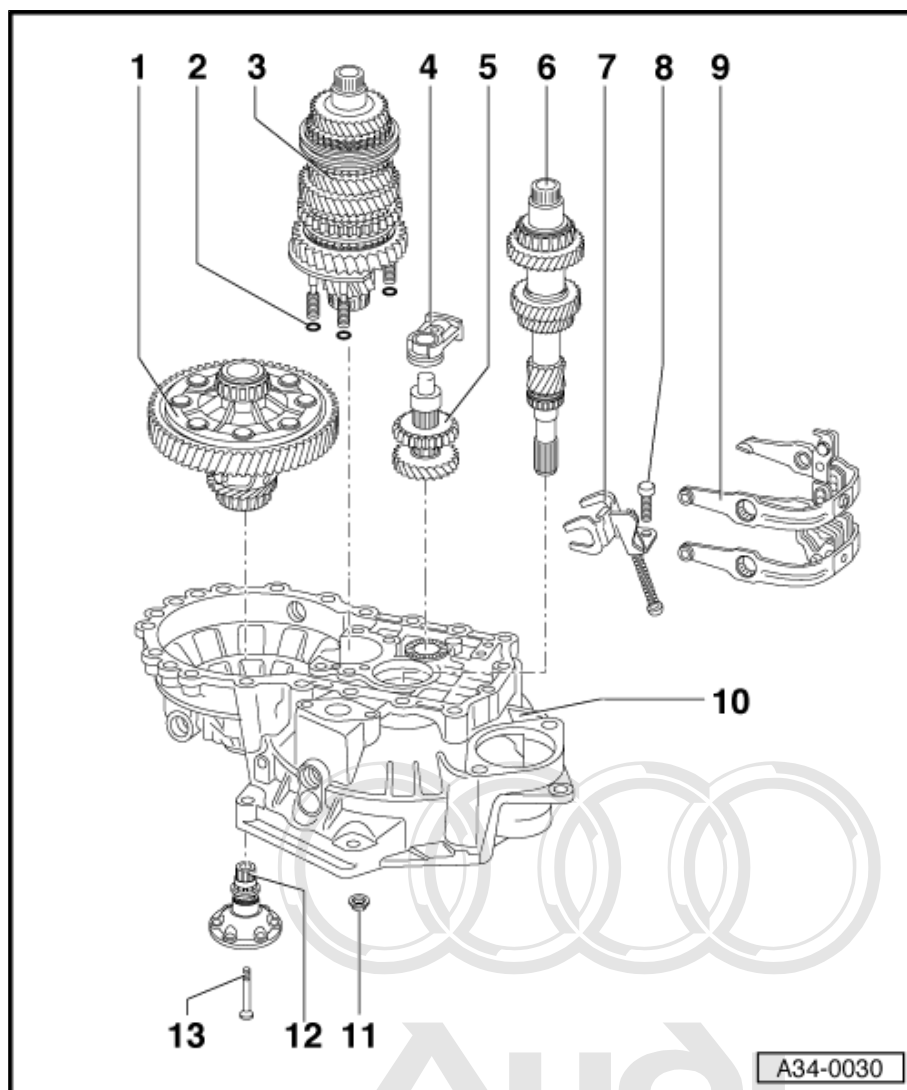
- ☐ 25 Nm and turn 90° further
- ☐ Always renew
- ☐ 4 nuts for bearing mounting

12 - Flange shaft with spring

- ☐ Removing and installing ⇒ [page 100](#)
- ☐ Assembling ⇒ [page 172](#)

13 - Countersunk bolt

- ☐ 25 Nm



A34-0030

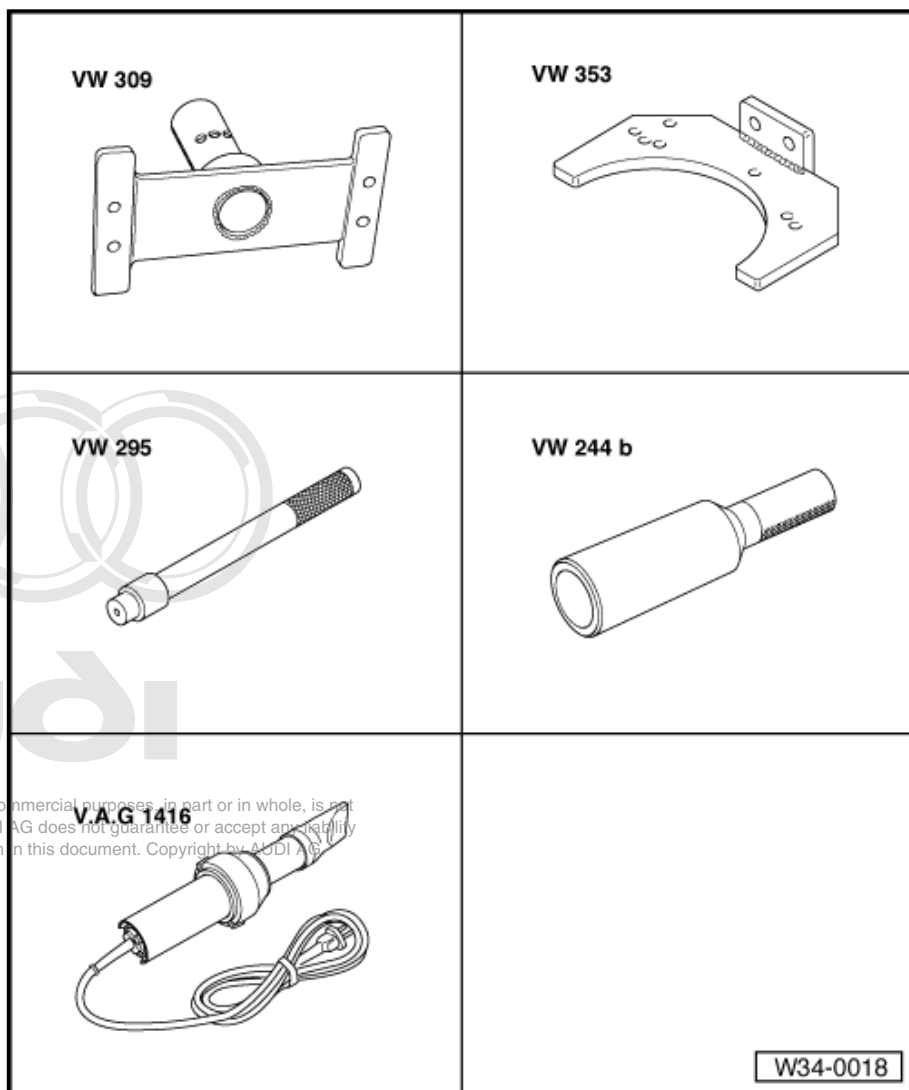
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5.6 Dismantling and assembling sequence

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

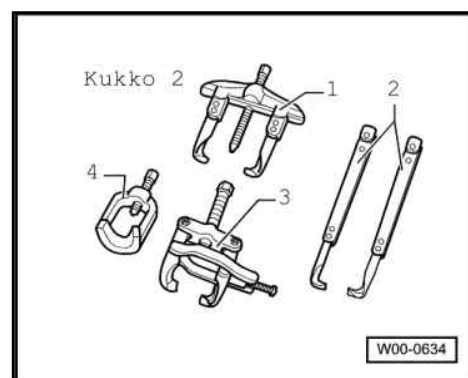
Special tools and workshop equipment required

- ◆ Support plate -VW 309-
- ◆ Gearbox support -VW 353-
- ◆ Drift -VW 295-
- ◆ Drift sleeve -VW 244 B-
- ◆ Hot air blower -V.A.G 1416-
- ◆ Sealing grease -G 052 128 A1-
- ◆ Sealants -AMV 188 200 03-
- ◆ Studs M8 x 100 mm
- ◆ Bolt M10 x 20 mm

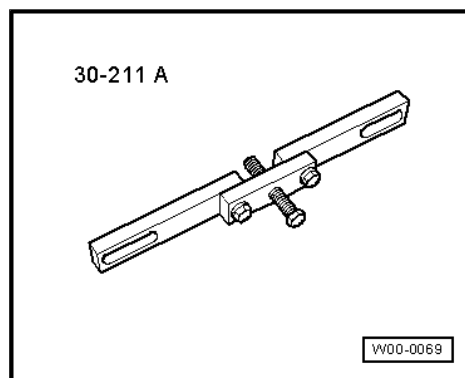


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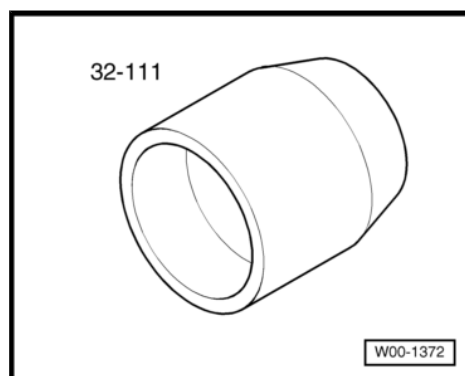
- ◆ -1- Two-arm puller -Kukko 20/10- with puller hooks Matra V/170



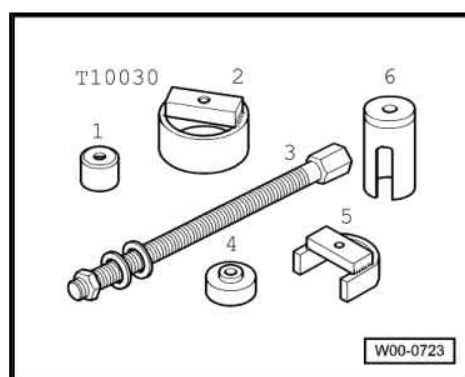
◆ Support bridge -30-211A-



◆ Thrust piece -32 - 111-



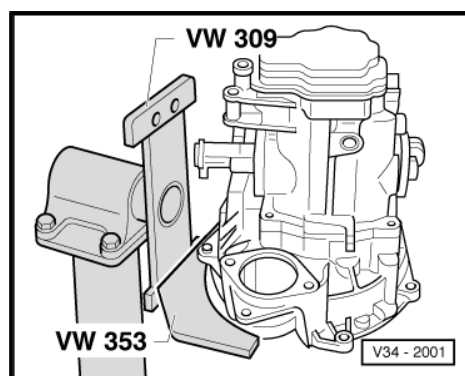
◆ Thrust piece -T10030/4- of assembly tool -T10030-



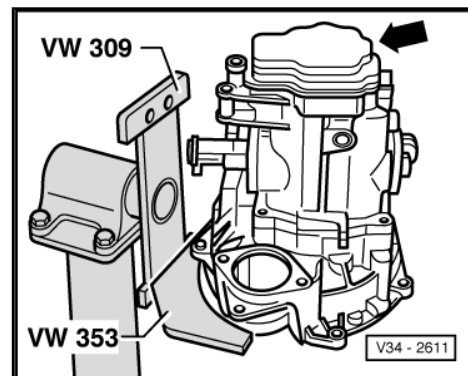
Dismantling

- Mount gearbox on assembly stand.
- Drain off gear oil.
- Remove clutch release lever and release bearing ⇒ [page 32](#) .
- Remove guide sleeve ⇒ [page 32](#) .

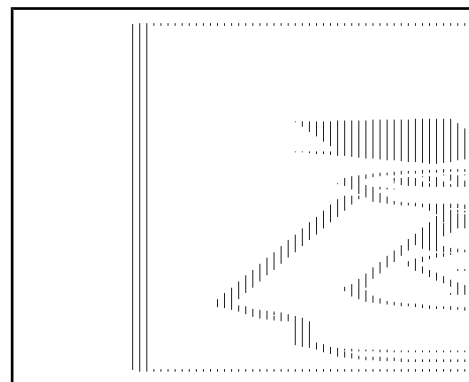
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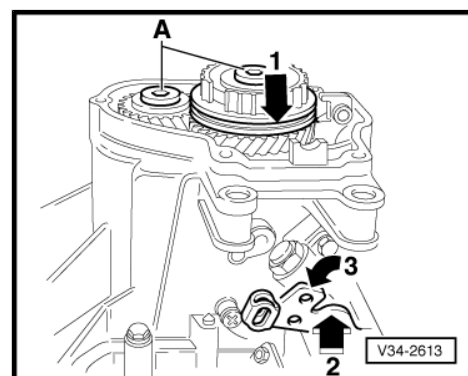
- Unbolt gearbox housing cover -arrow-.



- Then remove both bolts -arrows- for pivot pins.
- Pull pivot pins out of 5th gear selector fork.
- Remove spring for locking pieces out of locking collar/5th gear synchronising hub.
- Detach 5th gear selector fork with 5th gear locking collar and at the same time remove locking pieces.
- Then fit 5th gear locking collar (without selector fork) back onto synchronising hub.



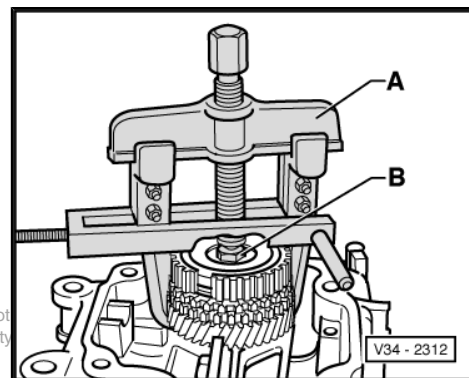
- Remove bolts -A- for synchronising hub and 5th gear wheel, to do this select 5th gear -arrow 1- and 1st gear -arrows 2- and -3-.
- After engaging both gears the input shaft and output shaft are locked; the synchronising hub and gear wheel cannot turn. The two bolts can now be loosened.
- Remove 5th gear locking collar.



- Pull off synchronising hub and 5th speed selector gear, and remove together with needle roller bearing.

A - Two-arm puller , e.g. -Kukko 20/10- with hook -Matra V/170-

B - Hexagon bolt M10 x 20 mm



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- Pull off 5th gear wheel.

A - Two-arm puller , e.g. -Kukko 20/10- with hook -Matra V/170-

B - Hexagon bolt M10 x 20 mm

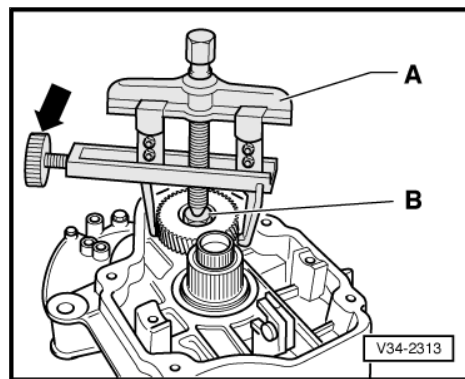
Dismantling sequence:

- Apply two-arm puller and centralize by turning screw -arrow-.
- Pull gear wheel off with two-arm puller ; first heat with hot air blower -V.A.G 1416- if necessary.

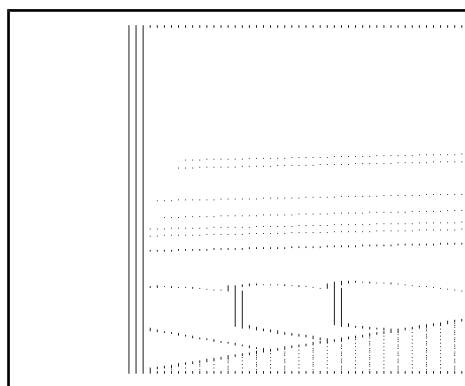


Note

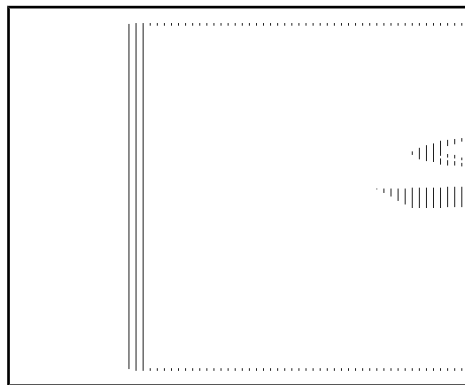
When pulling off the gear ensure that the claws do not bend outwards, if necessary tighten screw -arrow-. Check 5th gear wheel for damage after removal.



- Remove both flange shafts.
- Take out flange shafts together with springs, thrust washers and tapered rings.

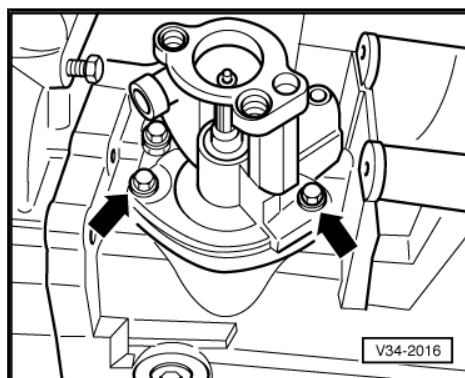


- Remove both bolts -arrows- for reverse shaft support.



Gearboxes up to 05.99

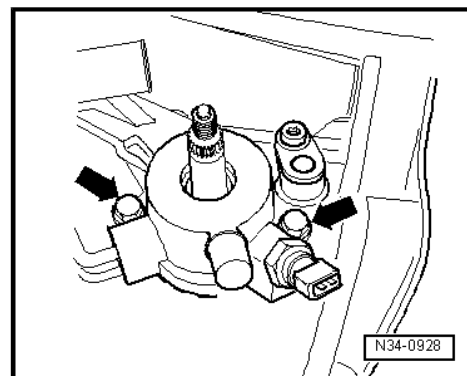
- Remove selector shaft with selector mechanism cover. To do this, set selector shaft in neutral position. Then remove bolts -arrows- and pull selector shaft out of gearbox housing.



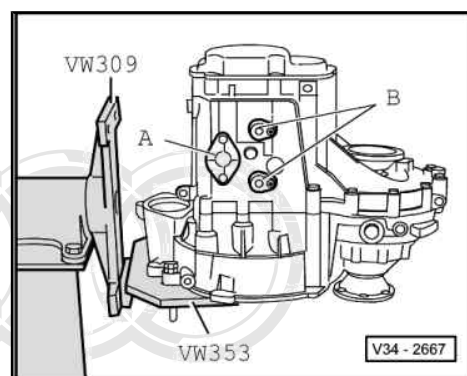
Gearboxes from 05.99

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

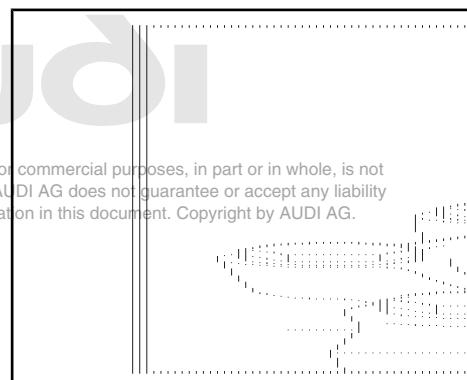
Continued for all vehicles



- Remove cover plate -A- and pivot pins -B- from underside of gearbox.



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



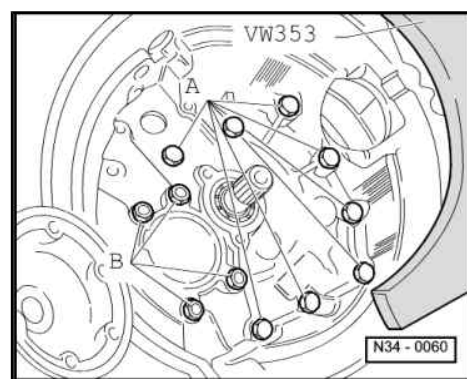
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- Remove bolts -A- securing gearbox housing from inside clutch housing.

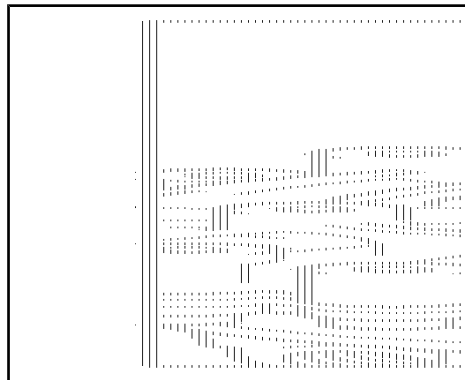


Note

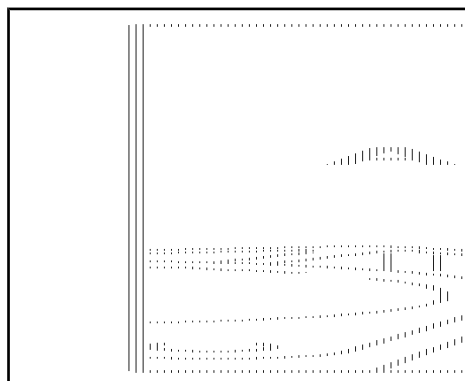
Do not remove nuts -B- for output shaft bearing mounting.



- Take off gearbox housing: carefully lever up all round protruding housing flanges -arrows- on alternate sides, taking care not to damage sealing surfaces.



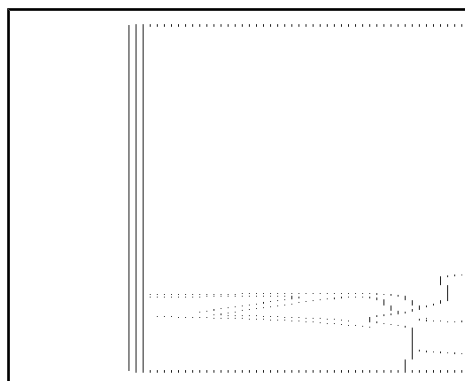
- Remove selector forks -A- together with selector plates.
- Unscrew bolt for reverse gear selector mechanism -B-.
- Remove nuts -B- for output shaft bearing mounting
⇒ [page 105](#) .



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

Assembly

- Insert differential.



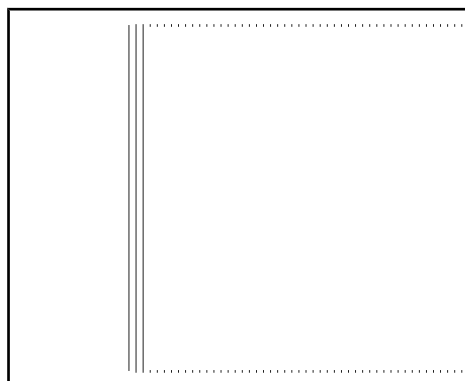
- Always renew seals -arrows- for output shaft bearing mounting.



Note

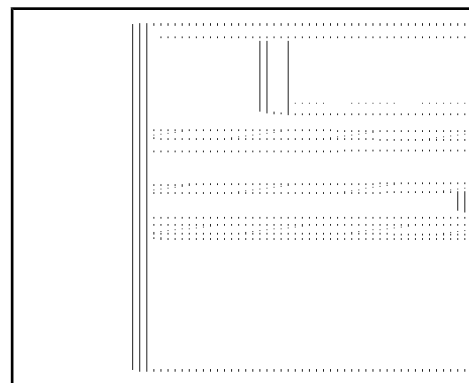
The illustration only shows 3 of the 4 seals.

- Install input shaft, output shaft and reverse shaft together.
- Tighten nuts for output shaft bearing mounting.



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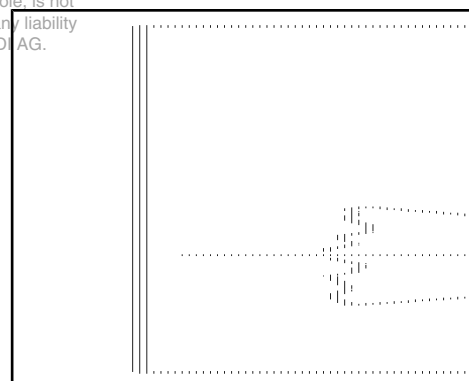
- Clean locking fluid residue from threads for bolts -a- and -b- in reverse shaft support -arrow-. The residue can be removed using a tap.
- Install reverse shaft support.
- Install reverse gear selector mechanism.



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Installation position: reverse gear

- Install selector forks together with selector plates.



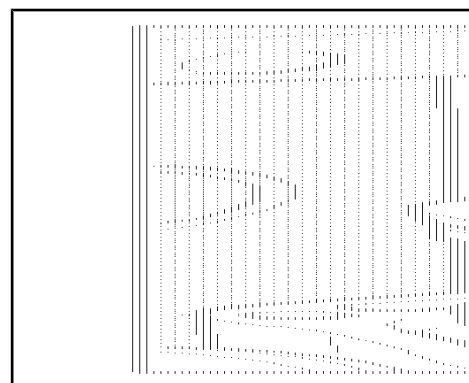
- Screw M8 x 100 mm stud -A- into reverse shaft support so that the shaft is aligned after fitting gearbox housing.
- Align selector plates.



Note

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

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

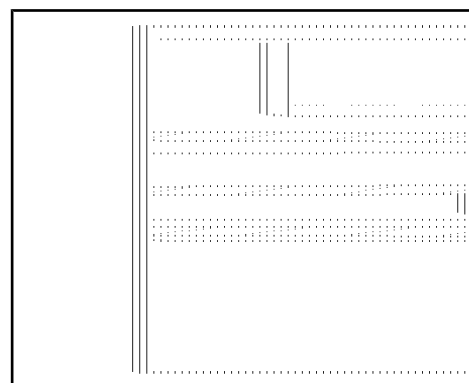


Install bolts for reverse shaft support -arrow- as follows:

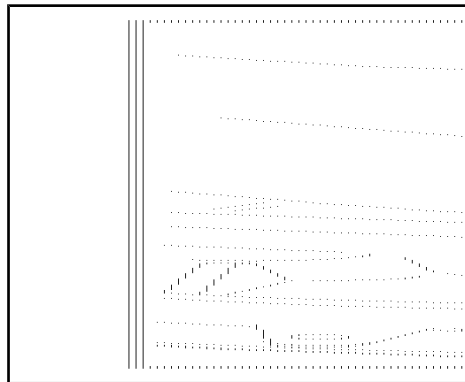
- Install bolt -a- (M8 x 32 mm), remove stud (⇒ [page 107](#)), fit bolt -b- (M8 x 26 mm) and tighten hand-tight.

Tightening sequence and torque:

- 1 - Bolt -a- 30 Nm
- 2 - Bolt -b- 25 Nm

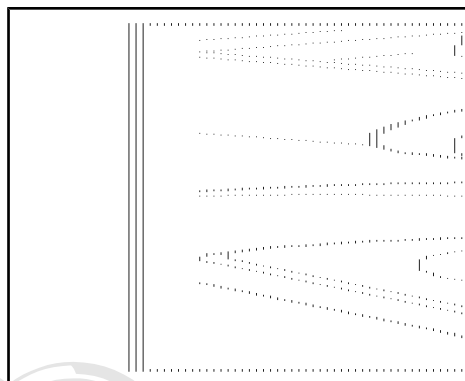


- Install pivot pins -arrow- for selector forks. To do this align selector mechanism using a screwdriver so that the relevant pivot pin can be inserted.
- Apply sealant -AMV 188 200 03- evenly to sealing surface of cover plate.
- Fit cover plate for selector shaft.



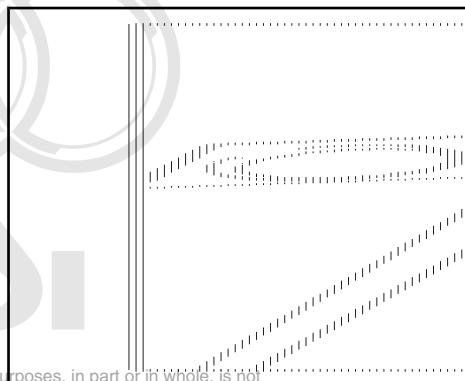
Install selector shaft as follows:

- Set selector plates in neutral position.
- Apply sealant -AMV 188 200 03- evenly to sealing surface of selector mechanism cover.
- Locate lug -arrow 1- in recess in gearbox housing. Position selector shaft so that selector finger -arrow 2- is engaged in selector plates.
- Install and secure selector shaft cover.



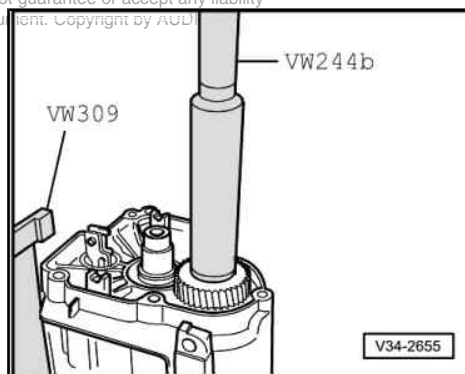
Installation position of 5th gear wheel

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

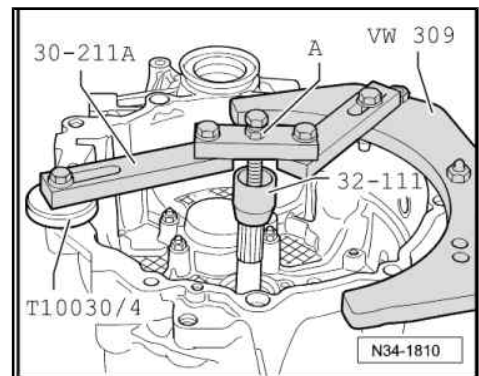


- Drive on 5th gear wheel.

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- Fit support bridge -30-211A- .
- Bring thrust piece -32 - 111- into contact with input shaft by turning bolt, and tighten lock nut -A-.

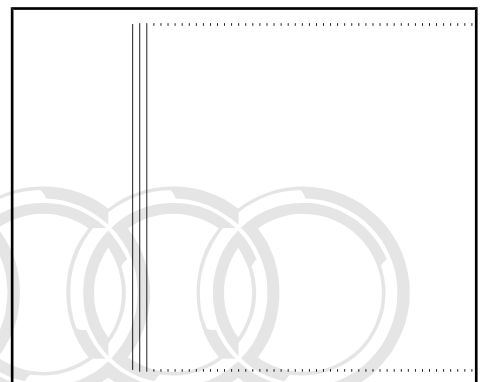


Checking 5th gear synchro-ring

- Before re-installing selector gear and synchro-ring for 5th gear, press the synchro-ring onto the tapered seat of the selector gear and measure gap -a- with a feeler gauge.

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

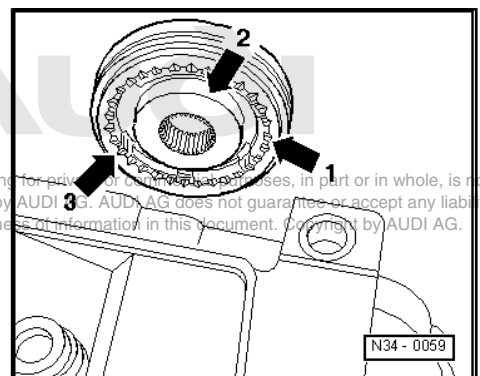
- Install 5th speed selector gear with needle bearing.
- Fit 5th gear synchro-ring on selector gear.
- Assemble 5th gear synchronising hub/locking collar before installing ⇒ [page 137](#) .



Installation position of 5th gear synchronising hub/locking collar

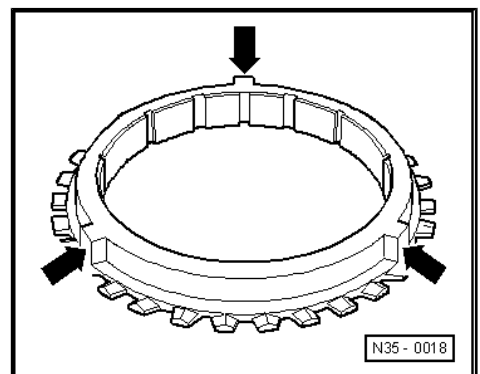
The pointed teeth of the locking collar -arrow 1- and the high shoulder of the synchronising hub -arrow 2- face the gearbox housing.

Retainers in synchronising hub -arrow 3- align with cast locking pieces on synchro-ring ⇒ [page 109](#) .



5th gear synchro-ring with cast locking pieces -arrows-

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



- Drive on 5th gear synchronising hub/locking collar.


Note

When driving on, ensure clearance for synchro-ring.

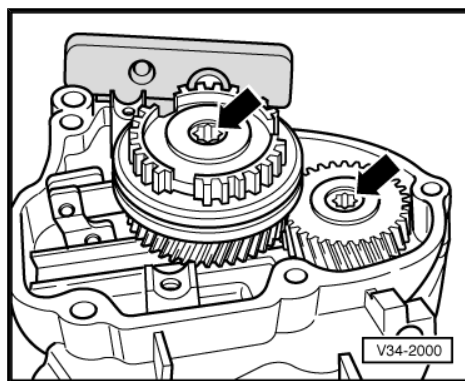
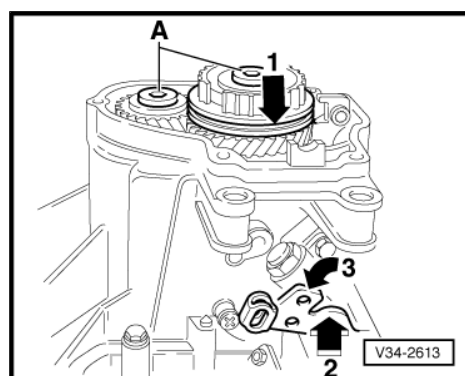
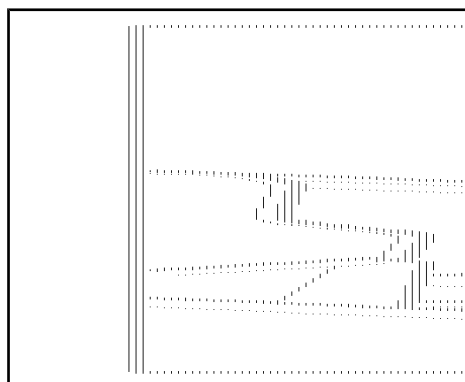
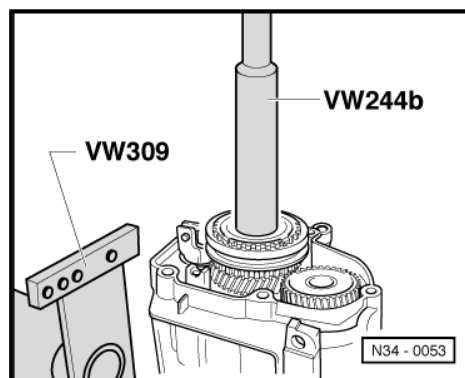
- Detach support bridge -30-211A- .
- Screw in securing bolts for synchronising hub and 5th gear wheel.

Installation position of dished springs for securing bolts for 5th gear wheel and synchronising hub

The outer diameter (concave side -arrows-) faces 5th gear.

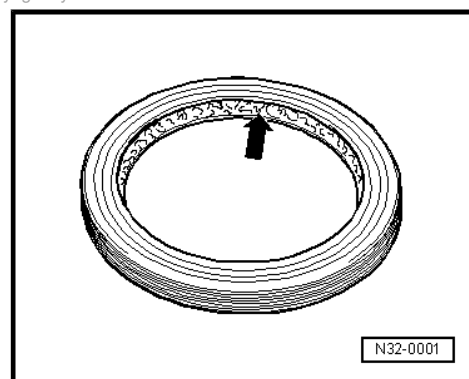
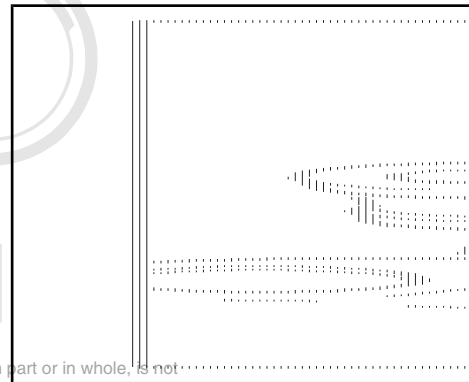
- Secure bolts -A- for 5th gear synchronising hub and gear wheel, to do this select 5th gear -arrow 1- and 1st gear -arrows 2- and -3-.

- After engaging both gears the input shaft and output shaft are locked; the synchronising hub and gear wheel cannot turn. The two bolts -arrows- can now be tightened.
- Install 5th gear selector fork.

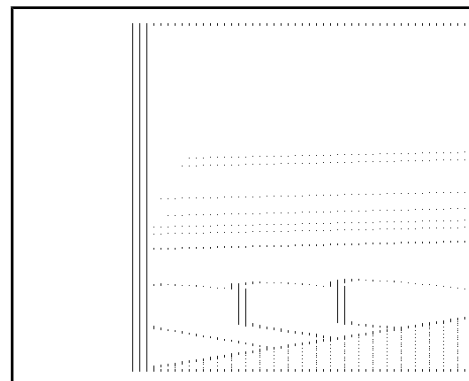


Adjusting 5th gear

- Engage 5th gear. Loosen bolt -1-. Press locking collar and selector jaws in direction of -arrow-, then tighten bolt -1- to 25 Nm.
- Check adjustment: It should not be possible to slide a 0.2 mm feeler gauge between locking collar and selector gear. Repeat adjustment if necessary.
- Disengage 5th gear. Locking collar should now be in the neutral position. Synchro-ring should move freely.
- Select all gears.
- Install gearbox housing cover.
- Pack space between sealing lip and dust lip of oil seals for flange shafts half-full with sealing grease -G 052 128 A1- -arrow-.



- Install both flange shafts with springs, thrust washers and tapered rings.
- Install release bearing guide sleeve ⇒ [page 32](#) .
- Install clutch release lever and release bearing ⇒ [page 32](#) .

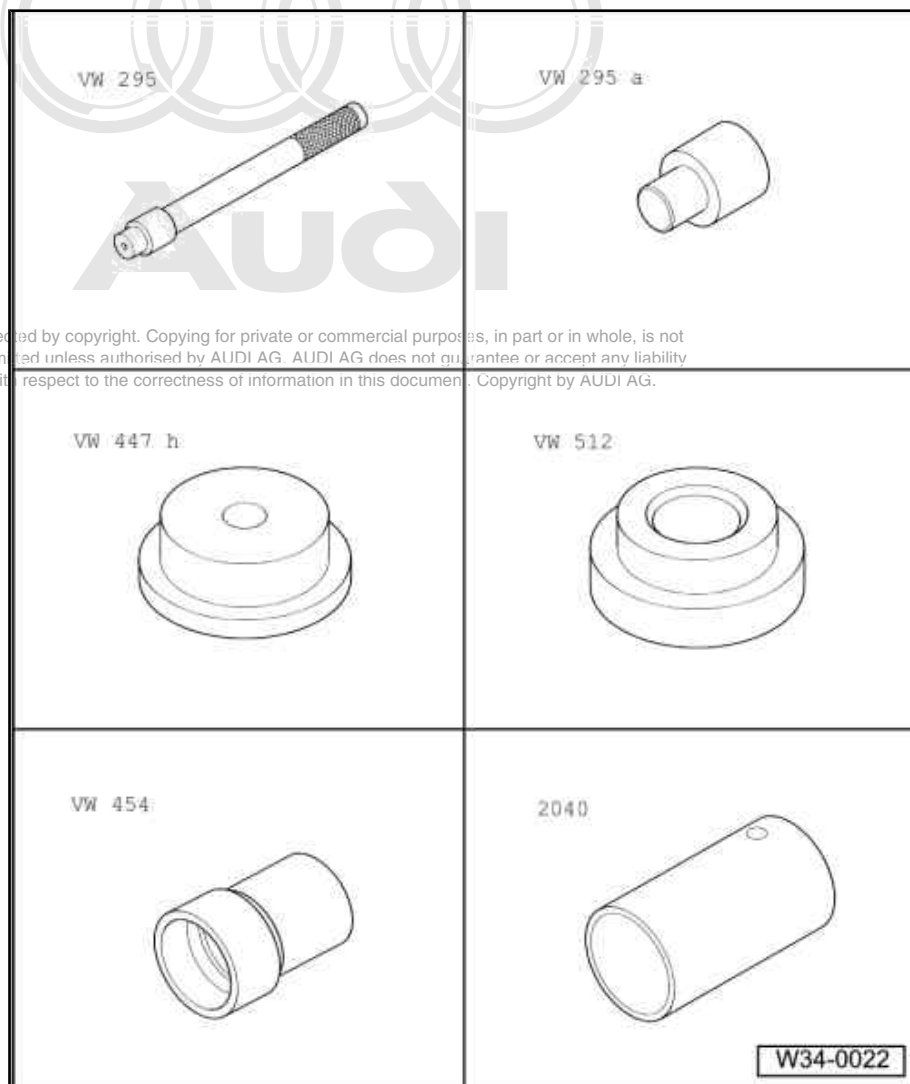


6 Servicing gearbox housing and clutch housing

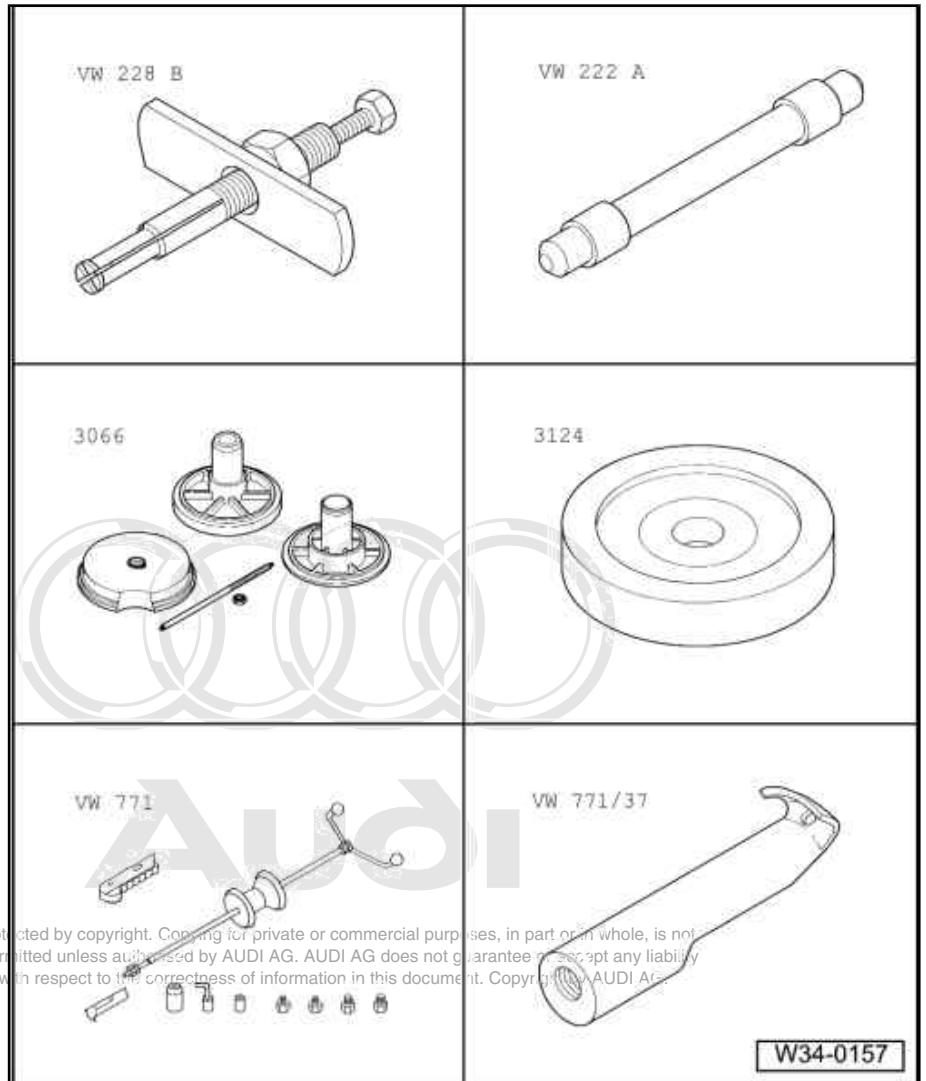
Special tools and workshop equipment required

- ◆ Drift -VW 295-
- ◆ Adapter -VW 295 A-
- ◆ Thrust plate -VW 447 H-
- ◆ Thrust pad -VW 512-
- ◆ Press tool -VW 454-
- ◆ Tube -2040-

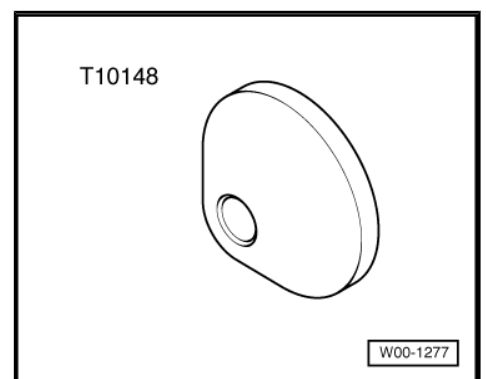
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- ◆ Extractor -VW 228 B-
- ◆ Drift -VW 222 A-
- ◆ Spindle from assembly device -3066-
- ◆ Thrust piece -3124- (for two-piece oil seal and sleeve)
- ◆ Multi-purpose tool - VW 771- (for one-piece oil seal and sleeve)
- ◆ Puller hook -VW 771/37- (for one-piece oil seal and sleeve)



- ◆ Thrust piece -T10148- (for one-piece oil seal and sleeve)



1 - Gearbox housing

- ☐ If renewed: Adjust input shaft and differential
⇒ [page 171](#)

2 - Needle bearing

- ☐ For output shaft
- ☐ Removing ⇒ [page 115](#)
- ☐ Installing and securing
⇒ [page 116](#)

3 - Oil filler plug

- ☐ 30 Nm

4 - Tapered roller bearing outer race

- ☐ For output shaft
- ☐ Removing and installing
⇒ [Item 4 \(page 146\)](#)
- ☐ If renewed: Adjust output shaft
⇒ [page 157](#)

5 - Shim

- ☐ For output shaft
- ☐ Table of adjustments
⇒ [page 171](#)

6 - Shim

- ☐ For input shaft
- ☐ Table of adjustments
⇒ [page 171](#)

7 - Tapered roller bearing outer race

- ☐ For input shaft
- ☐ Removing and installing
⇒ [Item 10 \(page 133\)](#)
- ☐ If renewed: Adjust input shaft ⇒ [page 138](#)

8 - Tapered roller bearing outer race

- ☐ For input shaft
- ☐ Removing and installing ⇒ [Item 2 \(page 133\)](#)
- ☐ If renewed: Adjust input shaft ⇒ [page 138](#)

9 - Needle bearing

- ☐ Removing and installing ⇒ [Item 2 \(page 162\)](#)

10 - Dowel sleeve

- ☐ 2x

11 - Starter bush

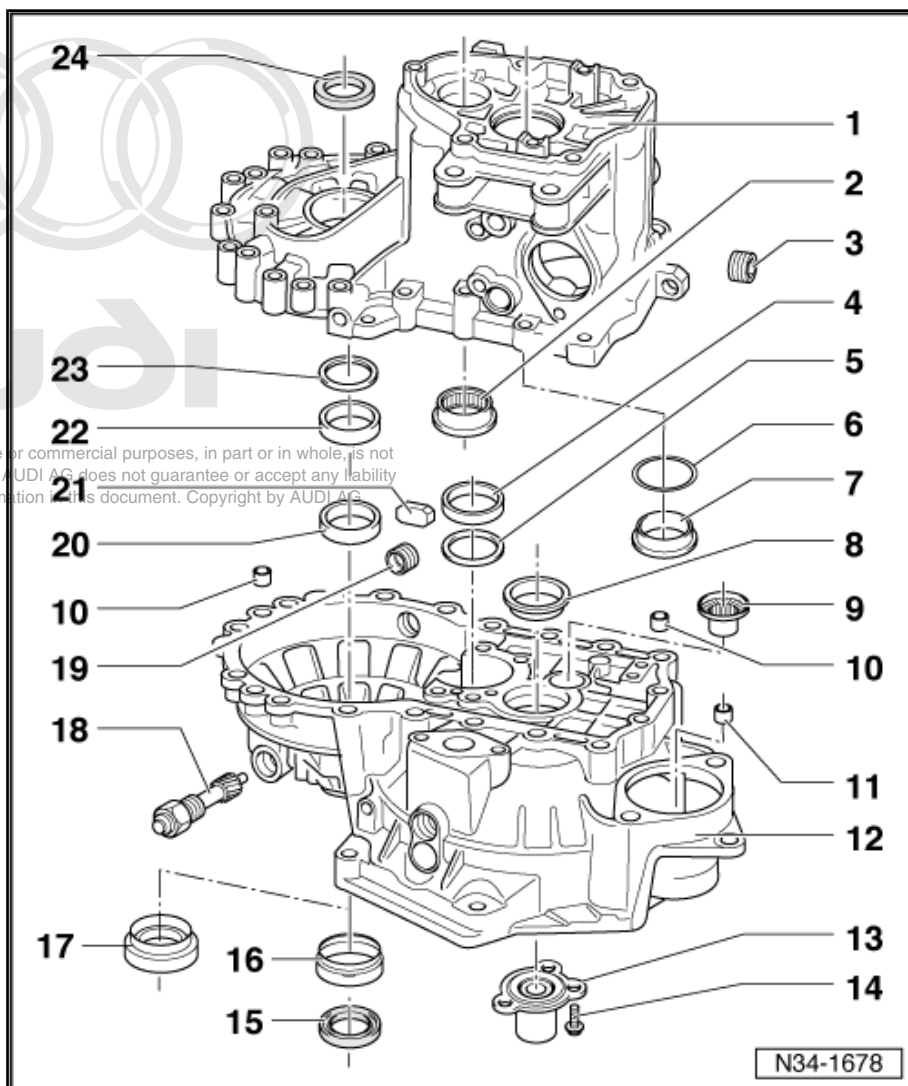
- ☐ Pulling out ⇒ [page 116](#)
- ☐ Driving in ⇒ [page 117](#)
- ☐ Can be renewed with gearbox in vehicle

12 - Clutch housing

- ☐ If replaced: ⇒ [“2 Table of adjustments”, page 171](#)

13 - Guide sleeve

- ☐ With input shaft oil seal and vulcanised O-ring
- ☐ Knocking out oil seal ⇒ [page 116](#)
- ☐ Driving in oil seal ⇒ [page 116](#)



- ☐ Remove guide sleeve in order to renew oil seal
- ☐ If O-ring is damaged, renew both guide sleeve and O-ring

14 - Bolt

- ☐ 20 Nm

15 - Oil seal

- ☐ For flange shaft (right-side)
- ☐ Renewing ➔ [page 165](#)

16 - Sleeve

- ☐ For oil seal (right-side) ➔ [Item 15 \(page 115\)](#)
- ☐ Removing ➔ [page 117](#)
- ☐ Installing ➔ [page 117](#)

17 - One-piece oil seal and sleeve

- ☐ If oil seal is damaged, renew both sleeve and oil seal
- ☐ Removing ➔ [page 117](#)
- ☐ Installing ➔ [page 118](#)

18 - Speedometer drive

- ☐ Tighten aluminium version to 30 Nm
- ☐ Tighten plastic version to 10 Nm

19 - Oil drain plug

- ☐ 30 Nm

20 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ➔ [Item 13 \(page 175\)](#)
- ☐ If renewed: adjust differential ➔ [page 179](#)

21 - Magnet

- ☐ Held in place by joint surface of housing

22 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ➔ [Item 8 \(page 174\)](#)
- ☐ If renewed: adjust differential ➔ [page 179](#)

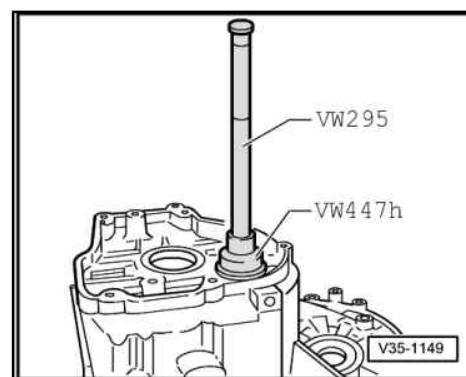
23 - Shim

- ☐ For differential
- ☐ Table of adjustments ➔ [page 171](#)

24 - Oil seal

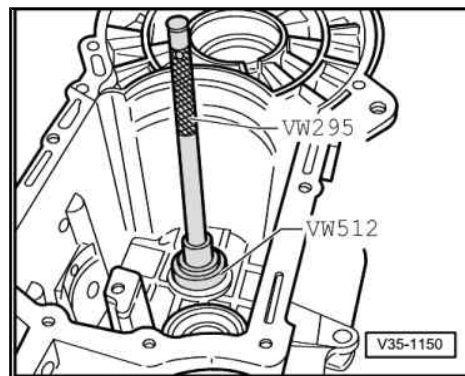
- ☐ For flange shaft (left-side)
- ☐ Renewing ➔ [page 164](#)

Driving out needle bearing

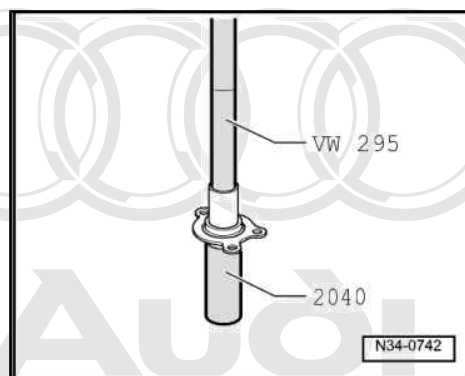


Driving in needle bearing onto stop

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

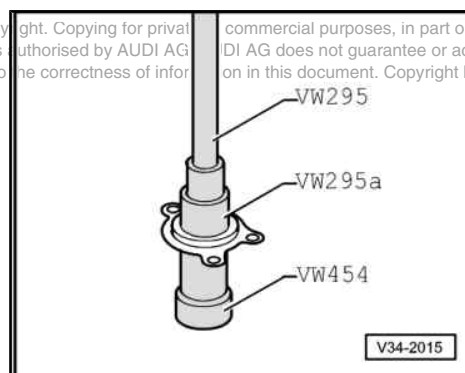


Driving oil seal out of guide sleeve

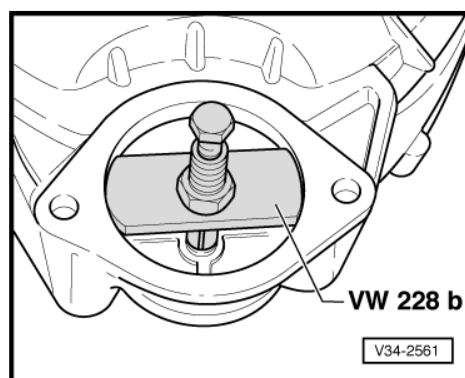


Driving oil seal into guide sleeve (drive in onto stop)

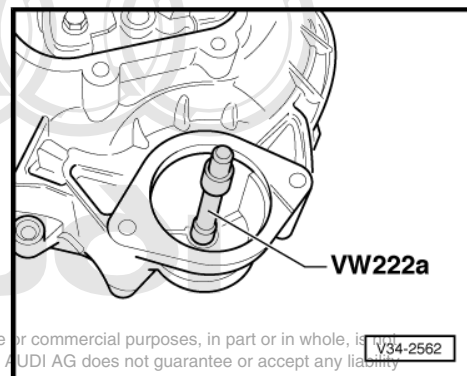
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Pulling out starter bush

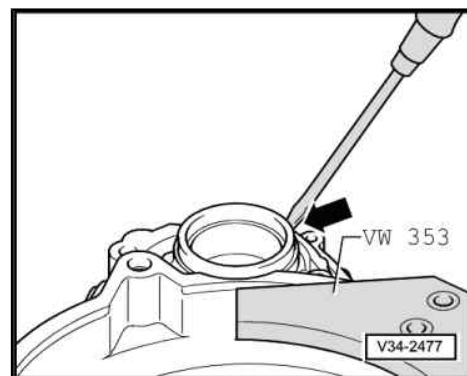


Driving in starter bush



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Levering out sleeve with screwdriver



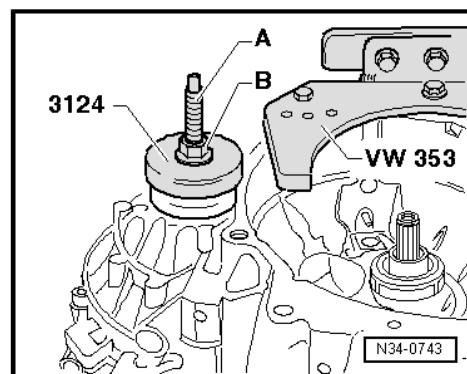
Installing sleeve

- Screw spindle -A- of assembly device -3066- into threaded piece in differential.
- Turn nut -B- and pull sleeve in onto stop with thrust piece -3124-.



Note

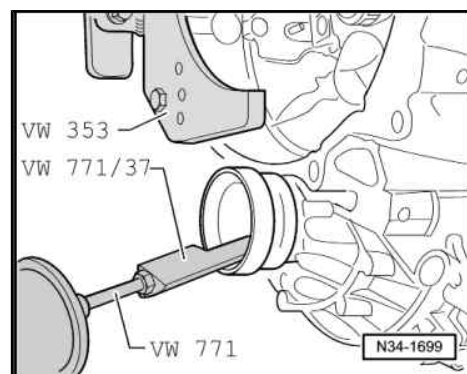
If gearbox has been dismantled, press in sleeve onto stop using thrust piece -3124-.



Pulling out sleeve and oil seal

A shoulder is located on inside diameter of sleeve.

- To pull out oil seal and sleeve, apply puller hook -VW 771/37- behind shoulder inside sleeve.
- During this operation, press puller hook -VW 771/37- firmly in against sleeve.

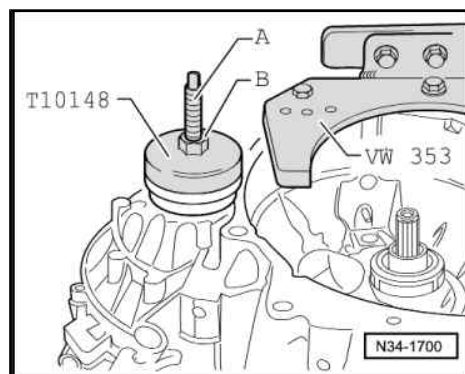


Drawing in sleeve and oil seal

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

**Note**

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

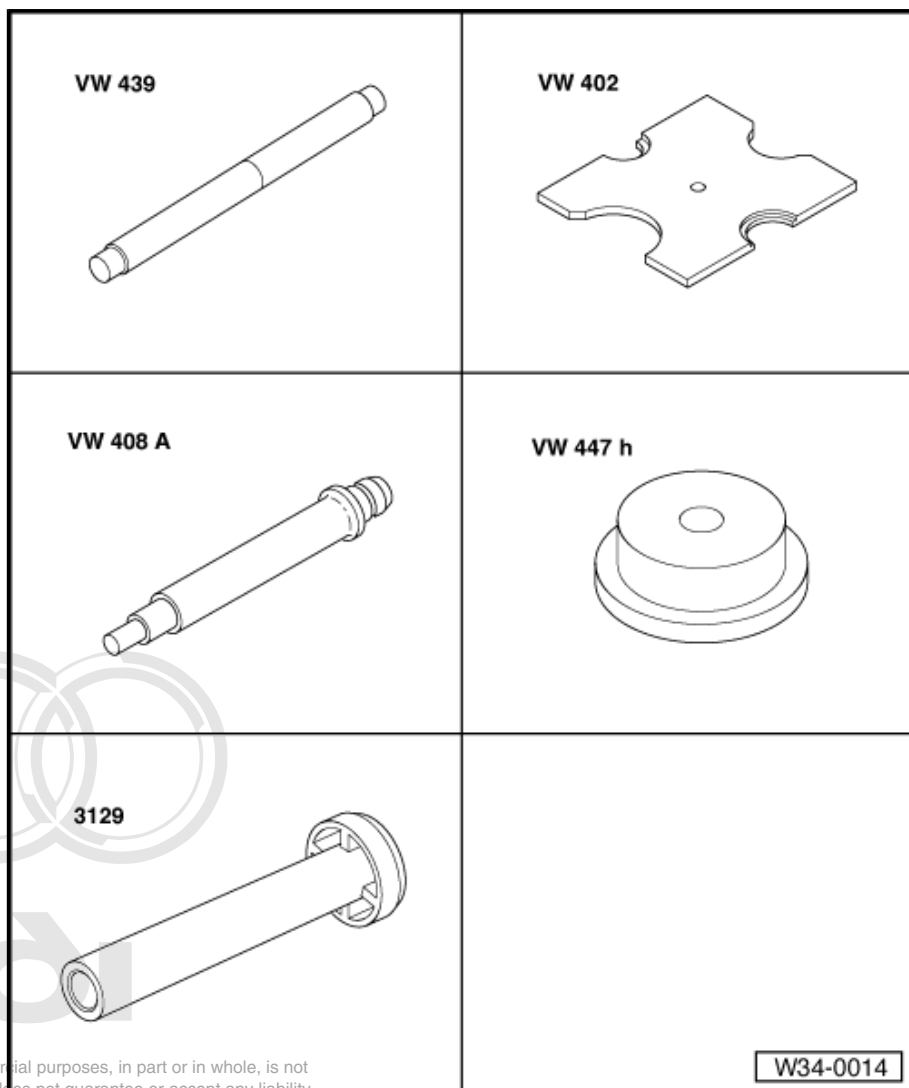


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7 Dismantling and assembling selector mechanism on gearbox up to 09.98

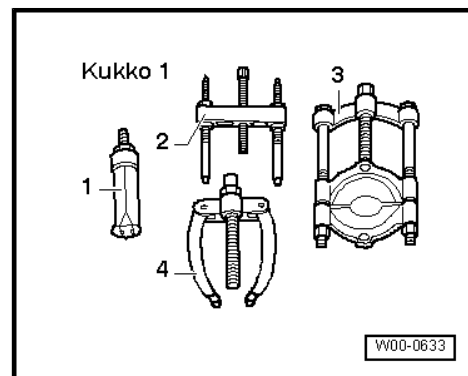
Special tools and workshop equipment required

- ◆ Guide pin -VW 439 -
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Thrust plate -VW 447 H-
- ◆ Thrust piece -3129-



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- ◆ -1- Internal puller -Kukko 21/3-



1 - Selector shaft
2 - Check ring
3 - Ball sleeve

- ☐ Removing ⇒ [page 121](#)
- ☐ Pressing in ⇒ [page 121](#)

4 - Seal

- ☐ Lever out with screw-driver
- ☐ Installing ⇒ [page 121](#)

5 - Selector mechanism cover
6 - Sleeve

- ☐ The lug points to reverse light switch -F4-
- ☐ Lightly coat lug with MoS₂ grease

7 - Nut

- ☐ 20 Nm
- ☐ Self-locking
- ☐ Always renew

8 - Retainer

- ☐ With reversing light switch -F4-

9 - Bolt
10 - Cap

- ☐ For gearbox breather

11 - Sleeve

- ☐ If fitted as a separate part, drive in to stop

12 - Gearbox selector lever

- ☐ Install so that gap in splines aligns with selector shaft
- ☐ Can be renewed with selector mechanism installed
- ☐ Installation position ⇒ [page 46](#)

13 - Relay lever

- ☐ Installation position ⇒ [page 46](#)

14 - Nut

- ☐ 15 Nm
- ☐ Self-locking

15 - Actuating arm

- ☐ With pivot shaft for relay lever
- ☐ Installation position ⇒ [page 46](#)

16 - Bolt

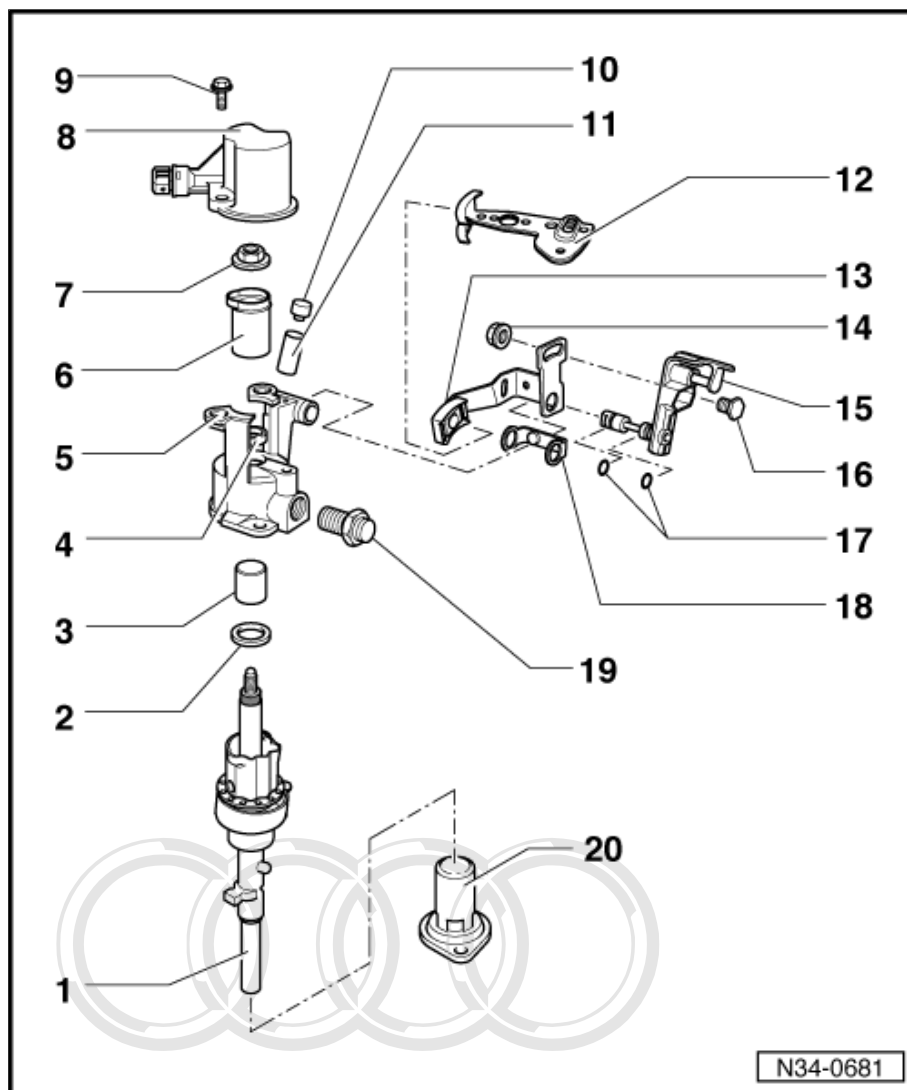
- ☐ Press into actuating arm

17 - O-rings

- ☐ Pull onto pin of actuating arm

18 - Distance piece

- ☐ Press into relay lever ⇒ [Item 13 \(page 120\)](#)



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19 - Locking bolt

- 40 Nm

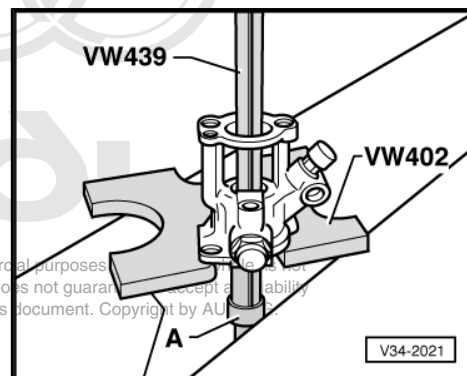
20 - Cover plate

Removing ball sleeve from selector mechanism cover

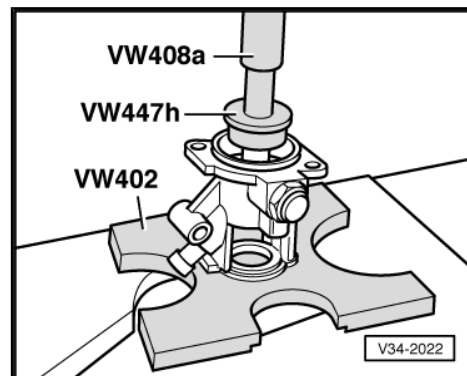
- Before pressing out ball sleeve, destroy plastic cage and remove balls.

A - Internal puller 18.5 ... 23.5 mm , e.g. -Kukko 21/3-

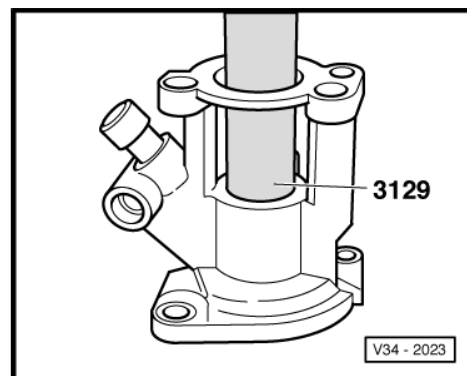
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Pressing ball sleeve into selector mechanism cover



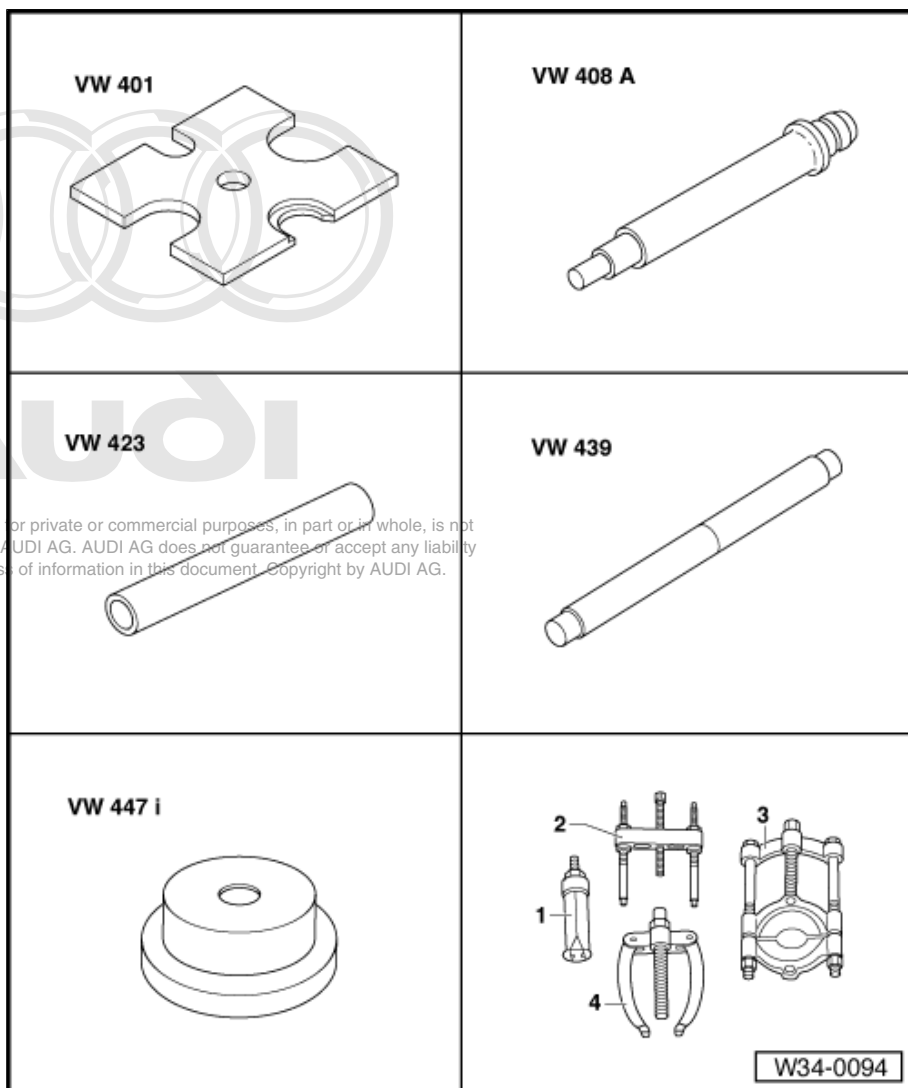
Installing oil seal (insert onto stop)



8 Dismantling and assembling selector mechanism on gearbox from 09.98

Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Press tool -VW 408 A-
- ◆ Tube -VW 423-
- ◆ Guide pin -VW 439 -
- ◆ Thrust plate -VW 447 i-
- ◆ -1- Internal puller -Kukko 21/3-



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1 - Selector shaft

- ☐ From gearbox build date 04 09 0, detent sleeve modified so that when shifting down from 5th gear to 4th gear the selector shaft is guided into the 4th gear selector gate ⇒ [page 125](#)
- ☐ From gearbox build date 06 08 01: additional detent spring in cover plate ⇒ [page 125](#)

2 - Check ring

3 - Ball sleeve

- ☐ Removing ⇒ [page 124](#)
- ☐ Pressing in ⇒ [page 124](#)

4 - Selector mechanism cover

- ☐ Additional bolt fitted from gearbox build date 04 09 0 so that when shifting down from 5th gear to 4th gear the selector shaft is guided into the 4th gear selector gate ⇒ [page 125](#)

5 - Reversing light switch -F4-

- ☐ 20 Nm
- ☐ Lightly coat lug with MoS₂ grease

6 - Cap

- ☐ For gearbox breather

7 - Relay lever

- ☐ Installation position ⇒ [page 63](#)

8 - Bearing bush

9 - Seal

- ☐ Lever out with screwdriver
- ☐ Installing ⇒ [page 124](#)

10 - Securing clip

11 - Nut

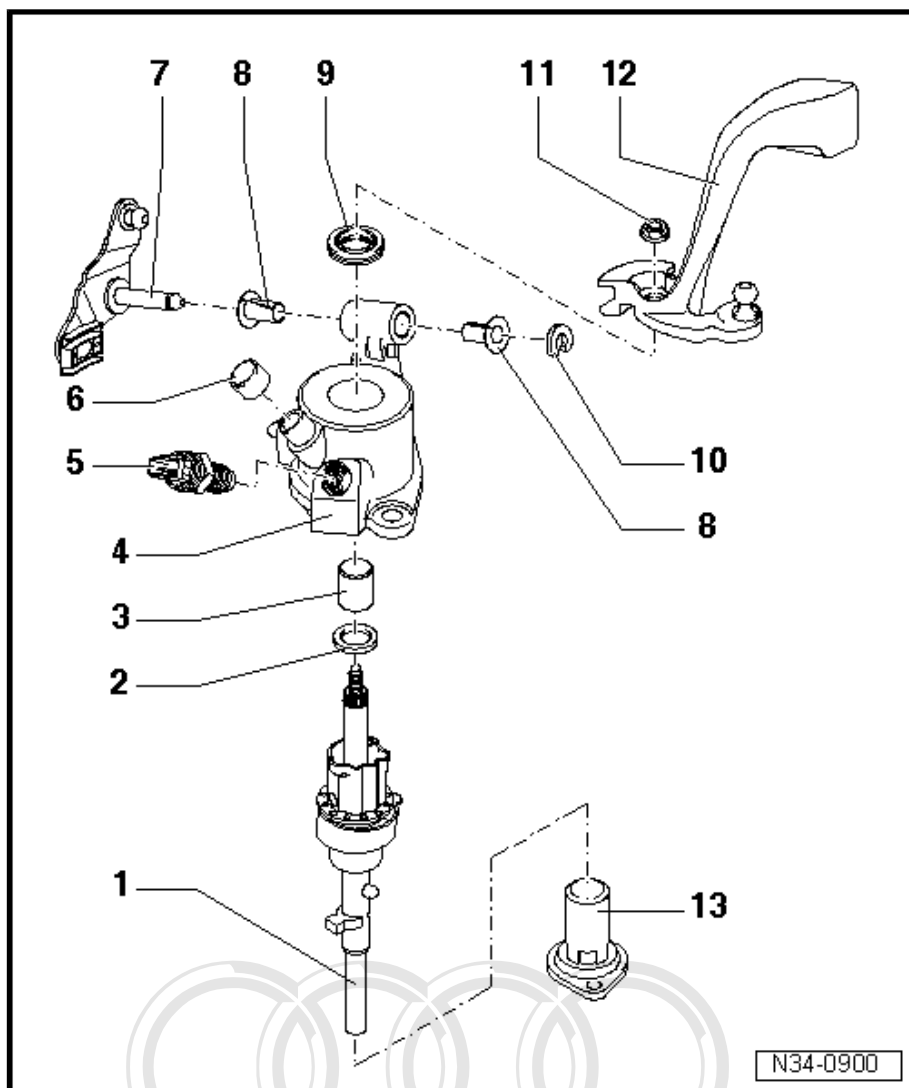
- ☐ 20 Nm
- ☐ Self-locking
- ☐ Always renew

12 - Gearbox selector lever

- ☐ Install so that gap in splines aligns with selector shaft ⇒ [page 124](#)
- ☐ Can be renewed with selector mechanism installed
- ☐ Installation position ⇒ [page 63](#)

13 - Cover plate

- ☐ From gearbox date 06 08 01 with detent spring for selector shaft ⇒ [page 125](#)

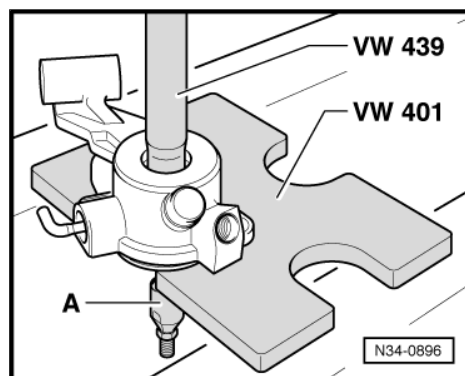


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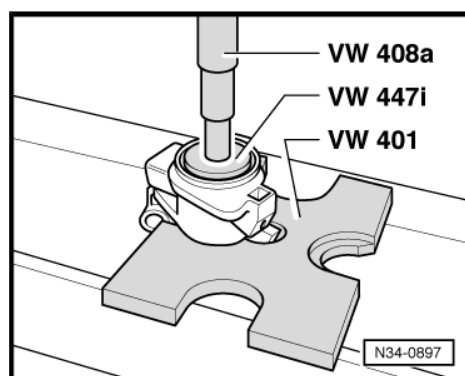
Removing ball sleeve from selector mechanism cover

- Before pressing out ball sleeve, destroy plastic cage and remove balls.

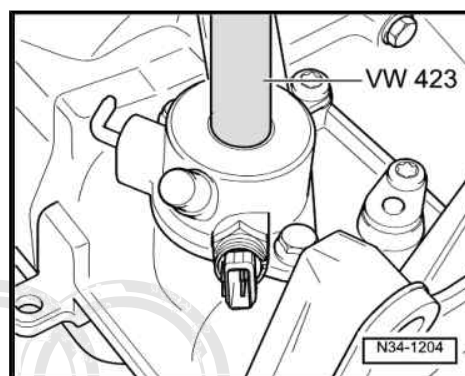
A - Internal puller 18.5 ... 23.5 mm , e.g. -Kukko 21/3-



Pressing ball sleeve into selector mechanism cover

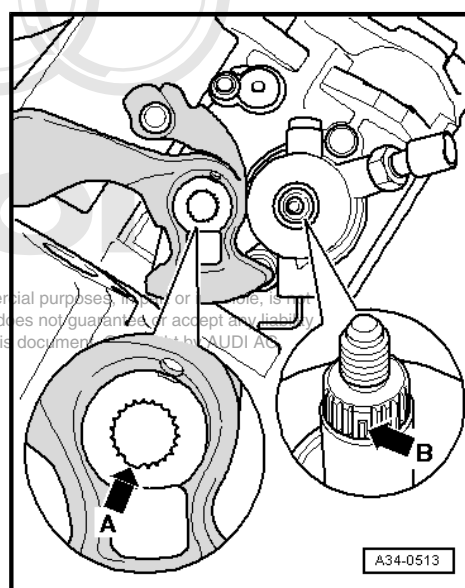


Installing oil seal (insert onto stop)



Installing gearbox selector lever

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



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Modified selector mechanism cover and selector shaft

From gearbox build date 04 09 0, bolt -2- is fitted in selector mechanism cover -1-.

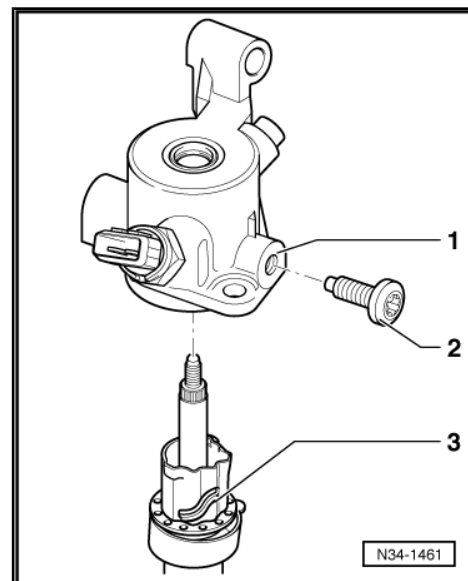
Tightening torque

15 Nm

The detent sleeve on the selector shaft has been fitted with a ramp -3- for this purpose.

Function

When shifting down from 5th gear to 4th gear, bolt -2- guides the selector shaft by means of ramp -3- into 4th gear selector gate.



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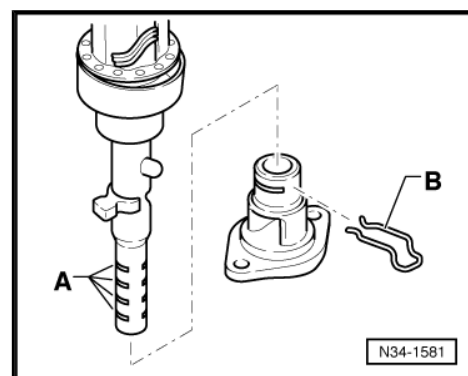
Selector shaft and cover plate modified

From gearbox build date 06 08 01 with recesses on selector shaft -A-.

Cover plate is fitted with spring -B-.

Function

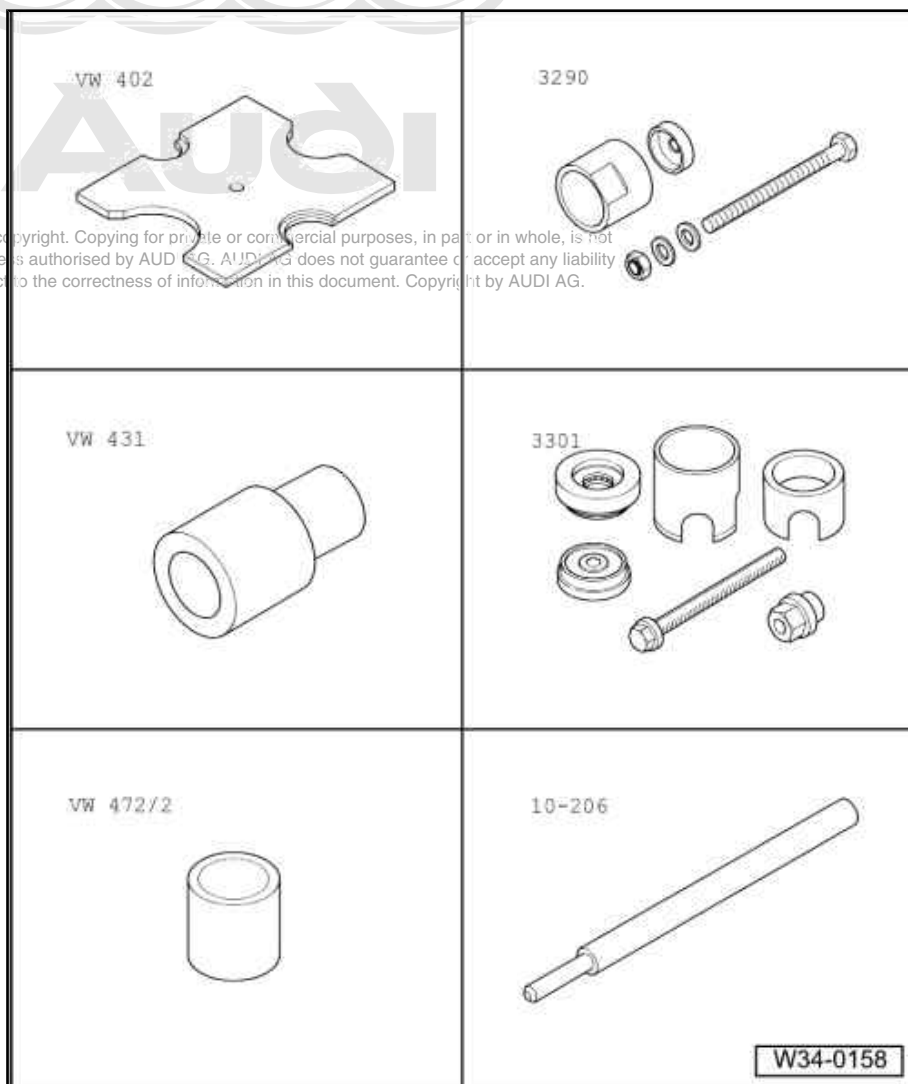
The spring -B- in the cover plate engages into one of the recesses in the selector shaft -A- when a forward gear is engaged.



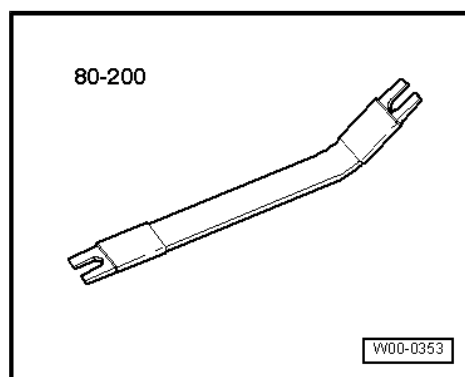
9 Dismantling and assembling selector forks

Special tools and workshop equipment required

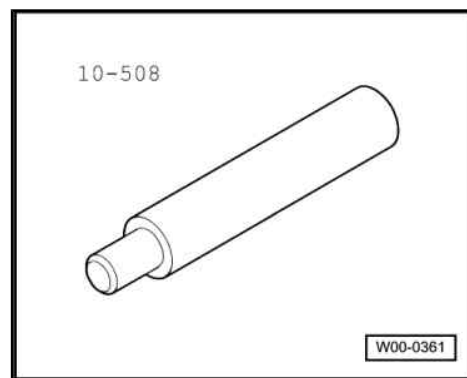
- ◆ Thrust plate -VW 402-
- ◆ Thrust piece -3290/1- of assembly tool -3290-
- ◆ Assembly tool -3301-
- ◆ Press tool -VW 431-
- ◆ Spacer sleeve -VW 472/2-
- ◆ Drift -10 - 206-



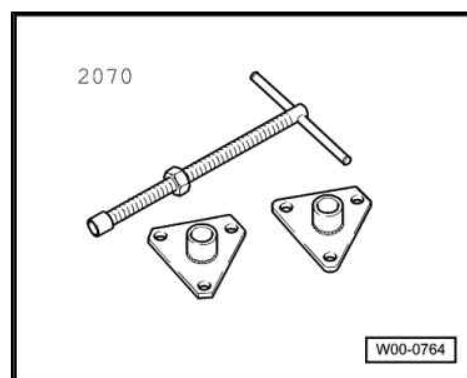
- ◆ Removal lever -80-200-



◆ Assembly mandrel -10 - 508-



◆ Tensioning device -2070-



Note

The selector fork cluster (⇒ [Item 7 \(page 128\)](#)) does not have to be dismantled in order to remove and install detent segments, lock washers and angular contact ball bearings.

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1 - 5th gear detent segment

- ☐ Identification
⇒ [page 129](#)
- ☐ Detent segment should turn freely after lock washer is installed

2 - Lock washer

- ☐ Always renew
- ☐ Removing ⇒ [page 129](#)
- ☐ Installing ⇒ [page 129](#)

3 - 5th gear selector fork

- ☐ Adjusting ⇒ [page 111](#)

4 - Bolt

- ☐ 25 Nm

5 - 5th gear selector jaw

6 - Angular contact ball bearing

- ☐ 4x
- ☐ Removing ⇒ [page 129](#)
- ☐ Pressing inner race into outer race ⇒ [page 130](#)
- ☐ Installing ⇒ [page 130](#)

7 - Selector fork cluster with selector plates

- ☐ Check selector fork with detent segments installed ⇒ [page 130](#)

8 - 1st/2nd gear detent segment

- ☐ Identification
⇒ [page 129](#)
- ☐ Detent segment should turn freely after lock washer is installed

9 - 3rd/4th gear detent segment

- ☐ Identification ⇒ [page 129](#)
- ☐ Detent segment should turn freely after lock washer is installed

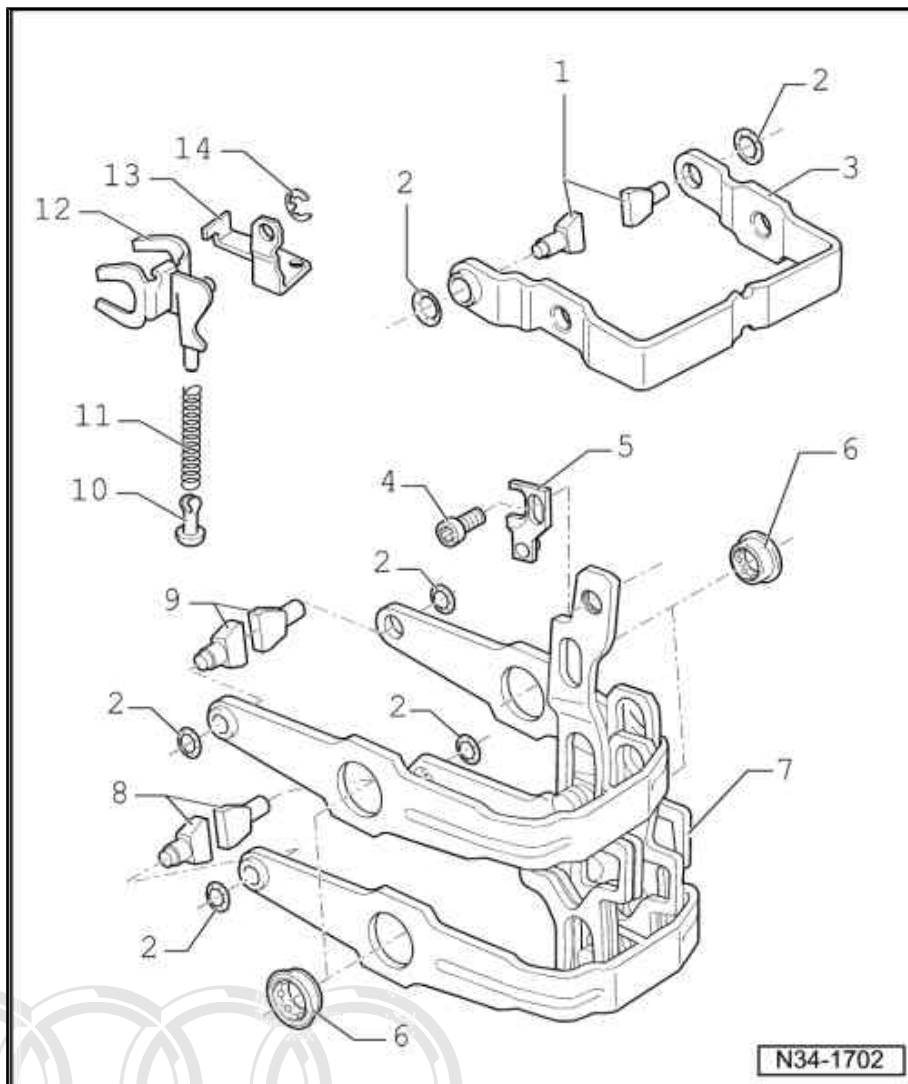
10 - Sliding piece

11 - Spring

12 - Reverse gear selector fork

13 - Support for reverse gear selector fork

14 - Circlip



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Identification of detent segments

Distance -a-

-1- 1st and 2nd gear detent segments = 12.1 mm

Detent segments, 1st/2nd gear in combination with modified synchromesh (⇒ [page 155](#)) = 11.4 mm.

The shorter detent segments can also be installed on gearboxes of the earlier type.

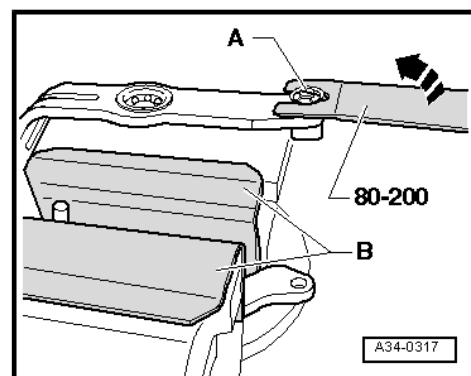
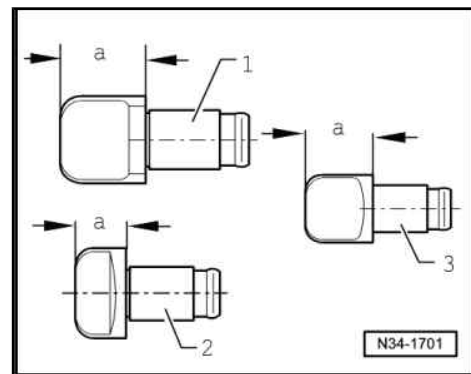
-2- 3rd and 4th gear detent segments = 7.7 mm

-3- 5th gear detent segments = 12.1 mm

Removing lock washer

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

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Installing lock washer

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

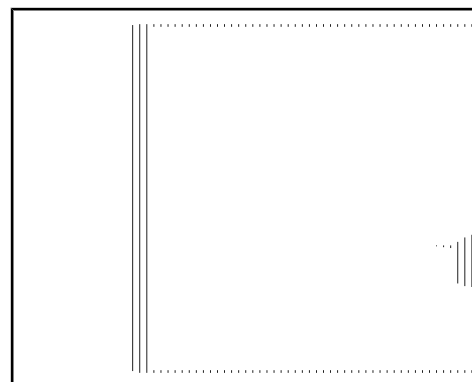


Note

Detent segment should turn freely after lock washer is installed.

A - Socket driver, 10 mm

B - Jaw protectors

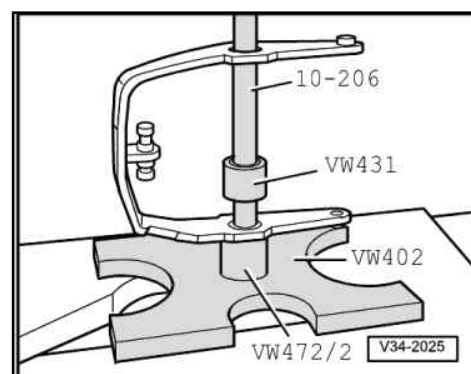


Removing angular contact ball bearing



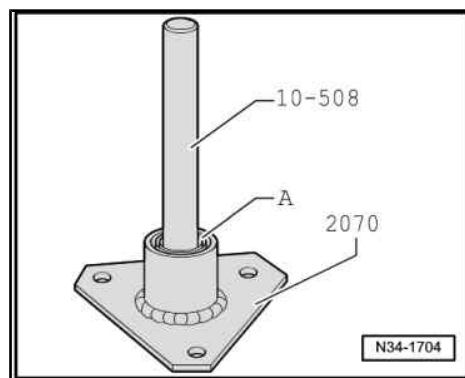
Note

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



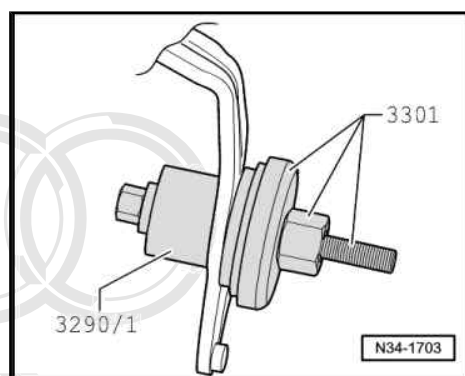
Pressing inner race -A- of angular contact ball bearing into outer race

Inner race must engage positively in outer race.



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

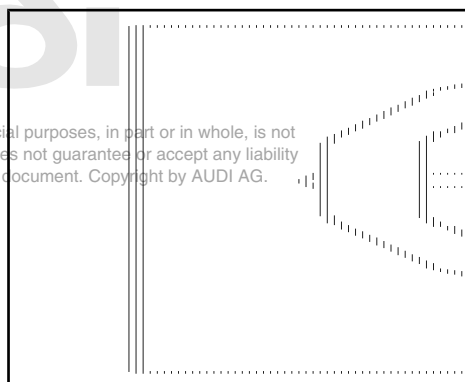
Recess in thrust piece -3290/1- points towards ball bearing.



Selector forks with detent segments installed

	Dimension -a- (mm)
1st/2nd gear selector fork	87.2...87.9
1st/2nd gear selector fork in combination with modified synchromesh (⇒ page 155)	88.4...89.1
3rd/4th gear selector fork	96.0...96.7

For identification of detent segments ⇒ [page 129](#)



35 – Gears, shafts

1 Input shaft

⇒ “1.1 Dismantling and assembling input shaft”, page 131

⇒ “1.2 Modified springs for 5th gear synchromesh from gearbox build date 05 11 1”, page 138

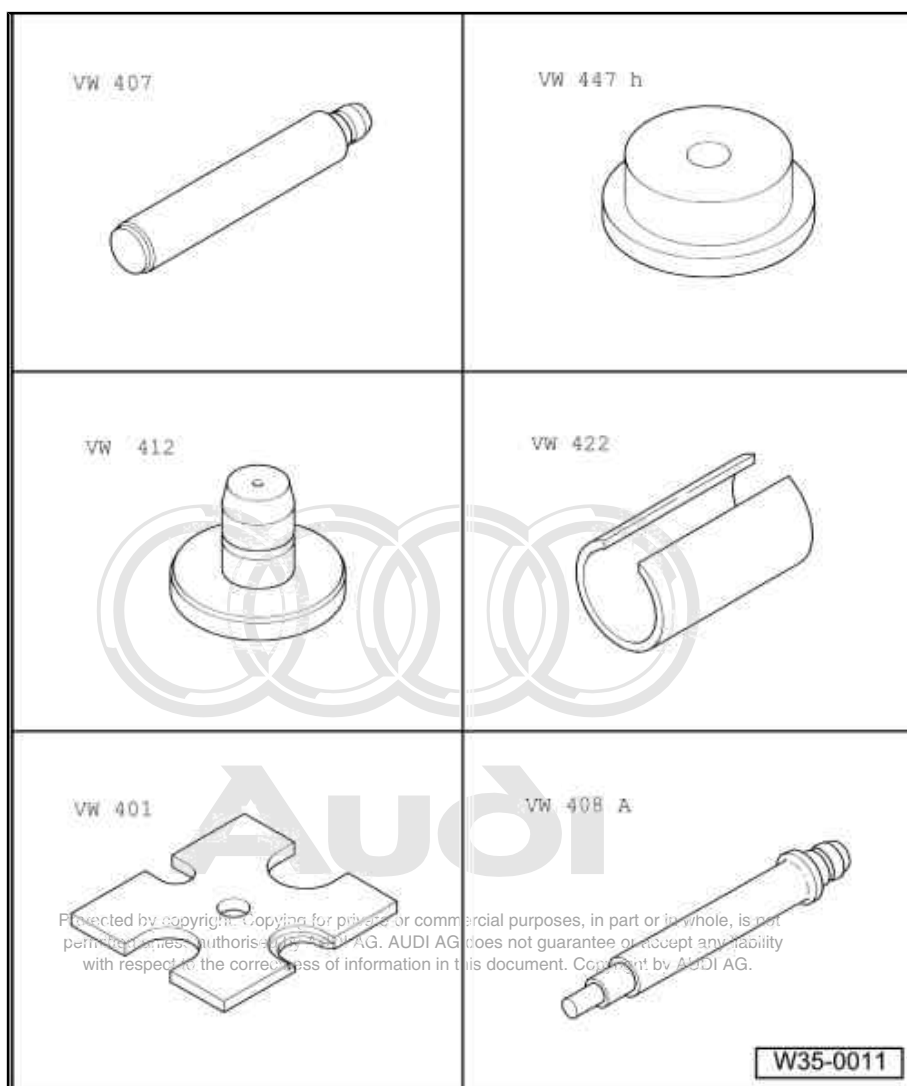
⇒ “1.3 Adjusting input shaft”, page 138

⇒ “1.4 Table of shims”, page 141

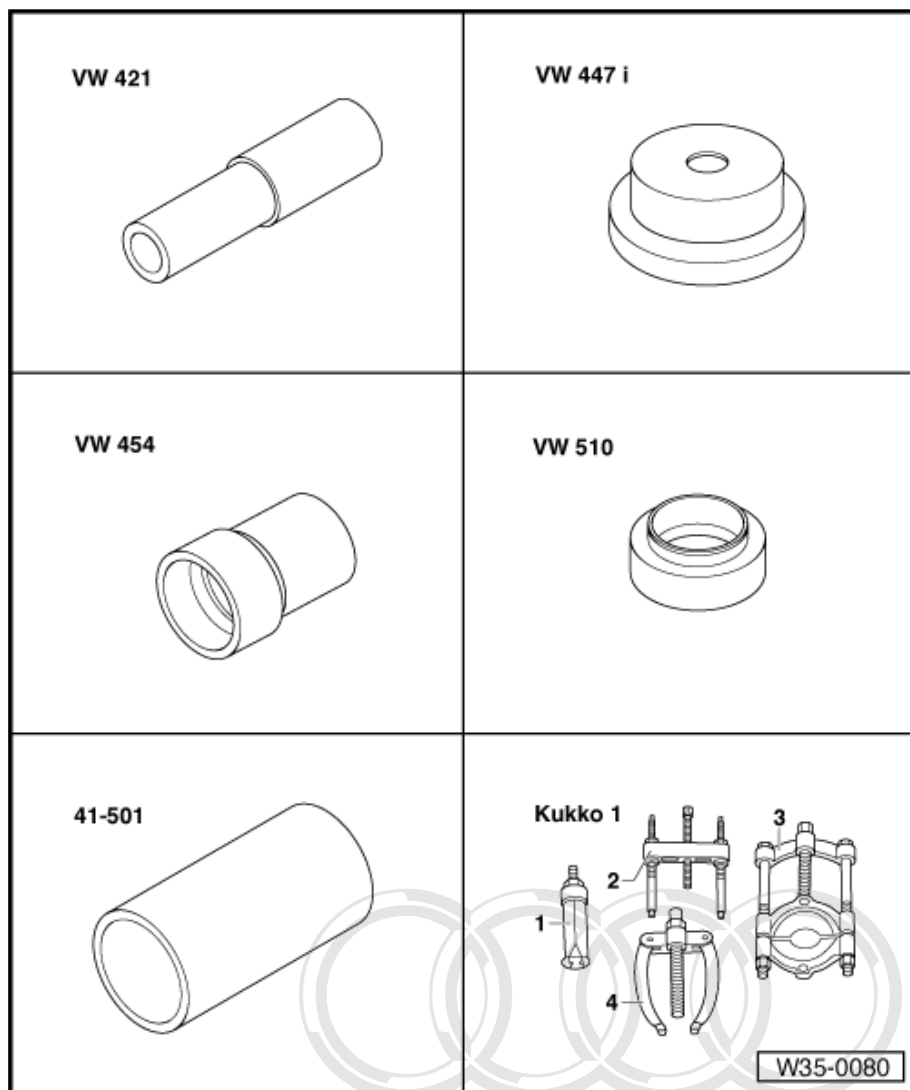
1.1 Dismantling and assembling input shaft

Special tools and workshop equipment required

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



- ◆ Tube -VW 421-
- ◆ Thrust plate -VW 447 i-
- ◆ Press tool -VW 454-
- ◆ Thrust pad -VW 510-
- ◆ Drift sleeve -41-501-
- ◆ -3- Splitter -Kukko 17/1-



Note

- ◆ Refer to technical data when installing new gears ⇒ [page 1](#) .
- ◆ The input shaft must be re-adjusted if the position of tapered roller bearings is affected when renewing parts. Refer to table of adjustments ⇒ [page 171](#) .
- ◆ Do not over-stretch circlip ⇒ [Item 6 \(page 133\)](#) . Always renew circlips which have been damaged or over-stretched.

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1 - Clutch housing

2 - Tapered roller bearing outer race

- ☐ Removing ⇒ [page 134](#)
- ☐ Pressing in ⇒ [page 134](#)

3 - Tapered roller bearing inner race

- ☐ Pressing off ⇒ [page 135](#)
- ☐ Pressing on ⇒ [page 135](#)

4 - Input shaft

- ☐ Adjusting ⇒ [page 138](#)

5 - 3rd gear wheel

- ☐ Shoulder faces towards 4th gear
- ☐ Pressing off ⇒ [page 135](#)
- ☐ Pressing on ⇒ [page 136](#)

6 - Circlip

7 - 4th gear wheel

- ☐ Pressing off with tapered roller bearing inner race and sleeve ⇒ [page 135](#)
- ☐ Pressing on ⇒ [page 136](#)
- ☐ Shoulder faces towards 3rd gear

8 - Tapered roller bearing inner race

- ☐ Pressing off with 4th gear wheel and sleeve ⇒ [page 135](#)
- ☐ Pressing on ⇒ [page 136](#)

9 - Thrust washer

10 - Tapered roller bearing outer race

- ☐ Pressing out ⇒ [page 137](#)
- ☐ Pressing in ⇒ [page 137](#)

11 - Shim

- ☐ Determining thickness ⇒ ["1.3 Adjusting input shaft", page 138](#)

12 - Gearbox housing

13 - Sleeve

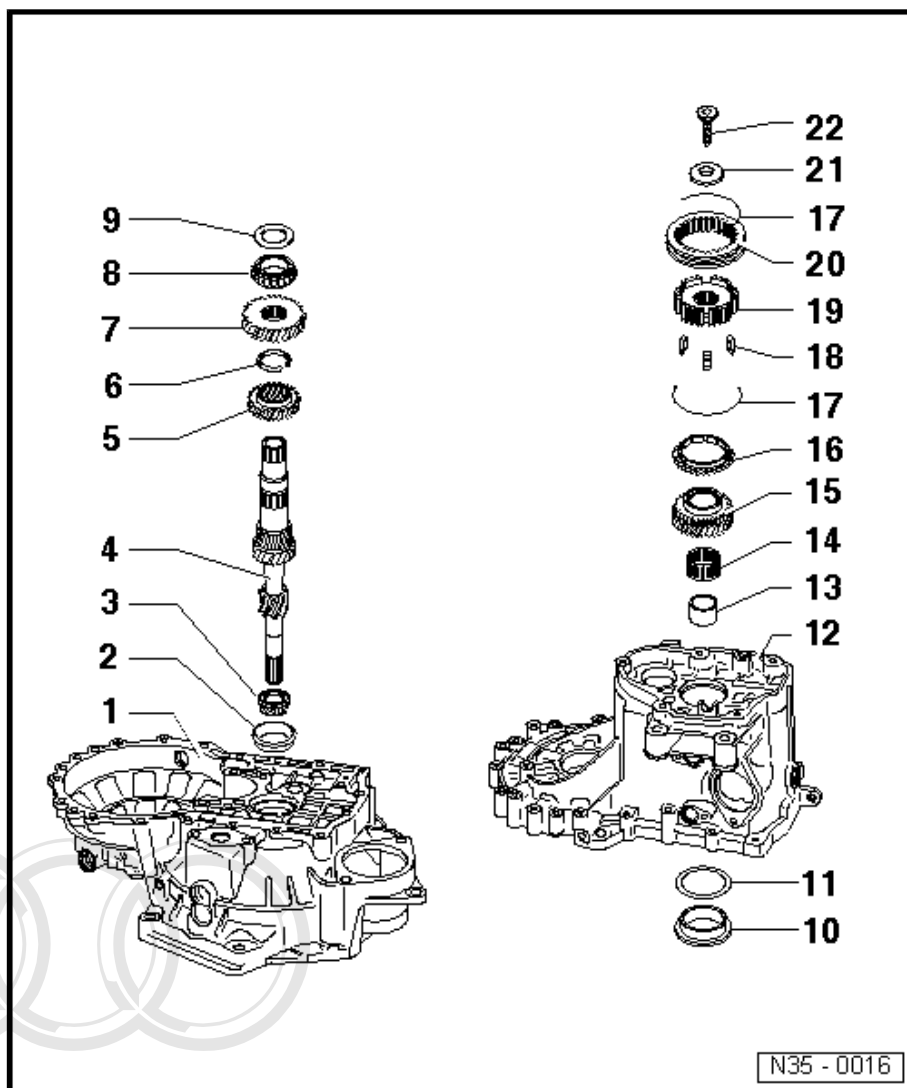
- ☐ For 5th gear needle bearing
- ☐ Press off with 4th gear wheel and tapered roller bearing inner race ⇒ [page 135](#)
- ☐ Pressing on ⇒ [page 136](#)
- ☐ Fit thrust washer ⇒ [Item 9 \(page 133\)](#) before installing

14 - Needle bearing

- ☐ For 5th gear

15 - 5th speed selector gear

- ☐ Pull off together with 5th gear synchronising hub ⇒ [page 100](#)



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16 - 5th gear synchro-ring

- ☐ With cast locking pieces ⇒ [page 109](#)
- ☐ Checking for wear ⇒ [page 109](#)

17 - Spring

- ☐ Installation position ⇒ [page 137](#)
- ☐ Modified spring from gearbox build date 05 11 1 ⇒ [page 138](#)

18 - Locking pieces (3x)

- ☐ Installation position ⇒ [page 137](#)
- ☐ From gearbox build date 05 03 1, hollow locking pieces with internal recess are fitted.

19 - 5th gear synchronising hub

- ☐ Removing and installing ⇒ [page 100](#)

20 - 5th gear locking collar

- ☐ Removing and installing ⇒ [page 100](#)

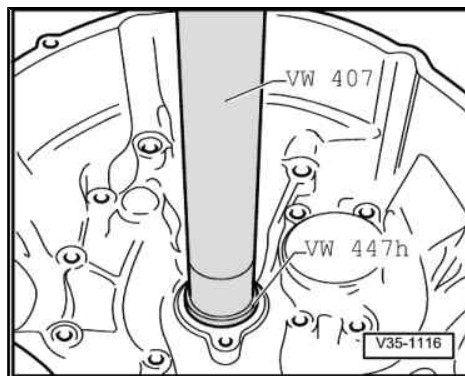
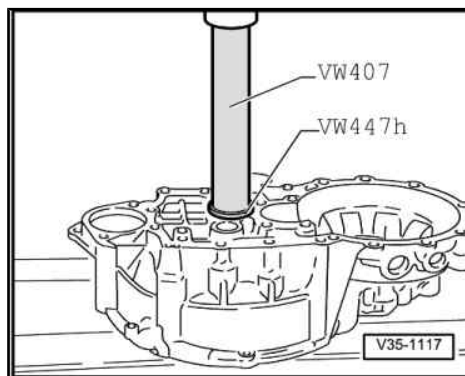
21 - Dished spring

- ☐ Installation position ⇒ [page 110](#)

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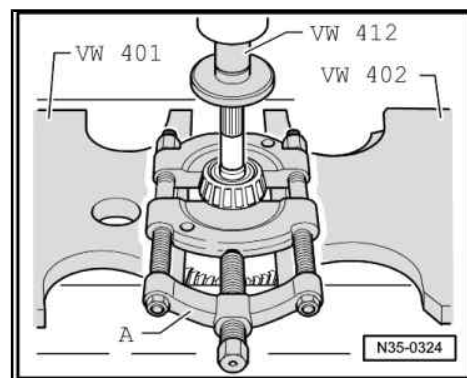
22 - Bolt

- ☐ M10 x 1
- ☐ Tightening torque ⇒ [Item 4 \(page 98\)](#)
- ☐ Always renew
- ☐ Fitted piece on bolt head holds dished spring in position

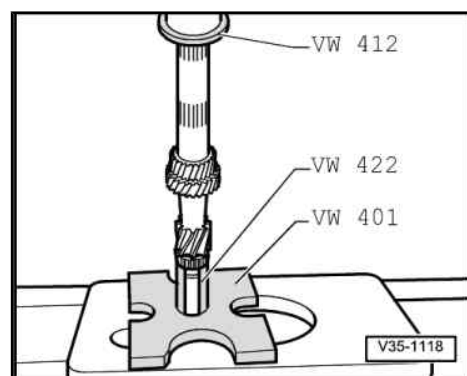
Pressing out tapered roller bearing outer race**Pressing in tapered roller bearing outer race**

Pressing off tapered roller bearing inner race

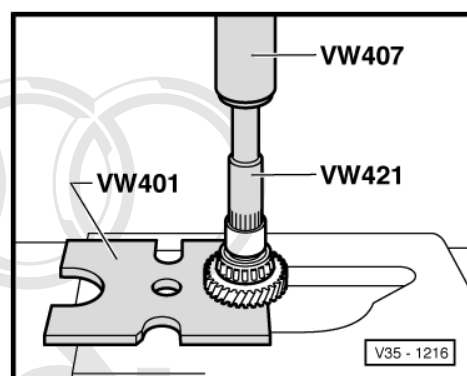
A - Splitter -Kukko 17/1-



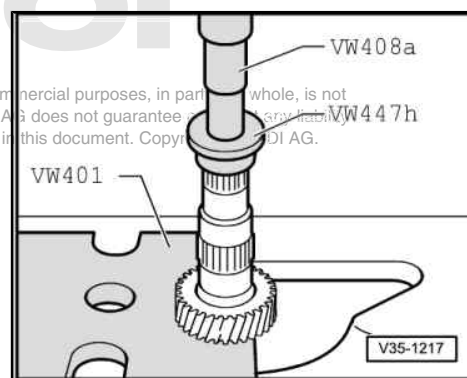
Pressing on tapered roller bearing inner race



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

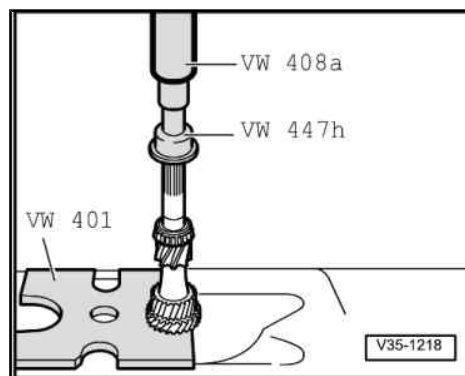


Pressing off 3rd gear wheel



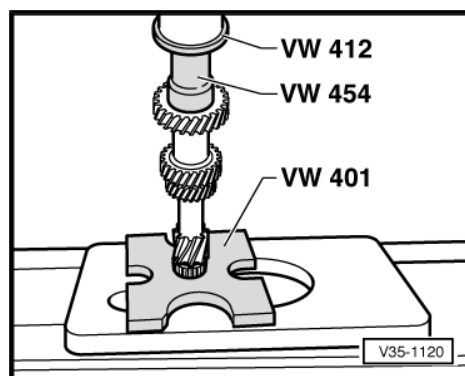
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Pressing on 3rd gear wheel

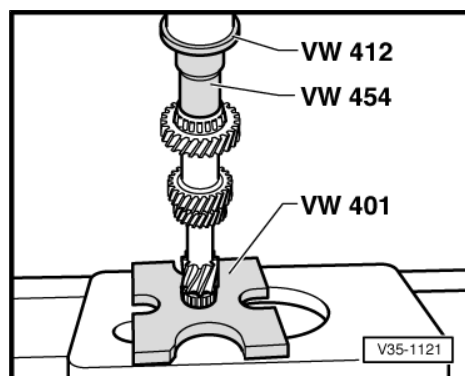


Pressing on 4th gear wheel

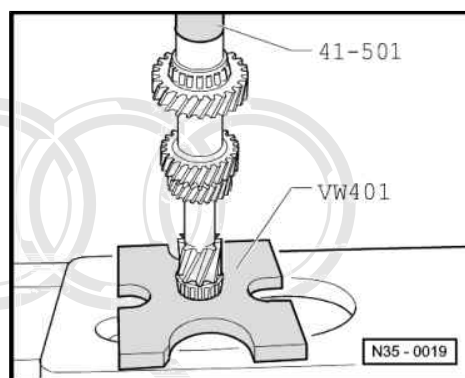
Shoulder faces towards 3rd gear.



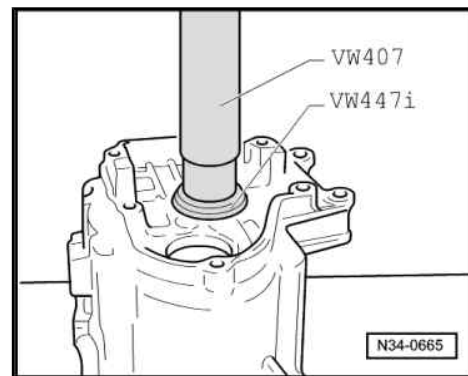
Pressing on tapered roller bearing inner race



Fitting thrust washer and pressing on needle roller bearing sleeve for 5th gear.

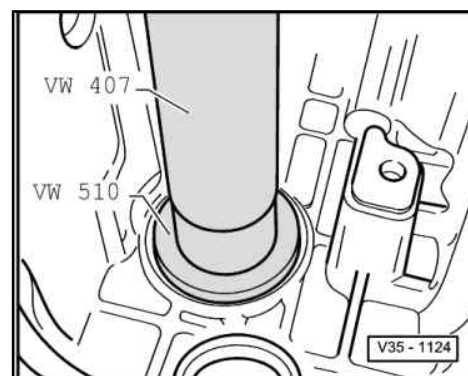


Pressing out tapered roller bearing outer race



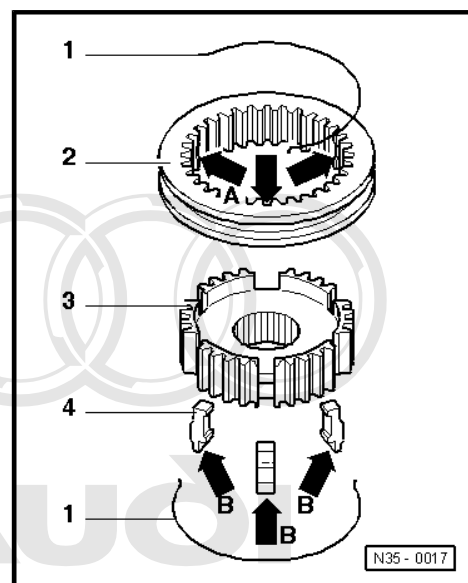
Pressing in tapered roller bearing outer race

- Press in with shim after adjusting input shaft.



5th gear synchromesh

- 1 - Springs for locking pieces
- 2 - Locking collar with 3 recesses -arrows A- for locking pieces -4-
- 3 - Synchronising hub
- 4 - Locking pieces - Installation position: The thin extension -arrow B- faces the pointed teeth of the locking collar -2-

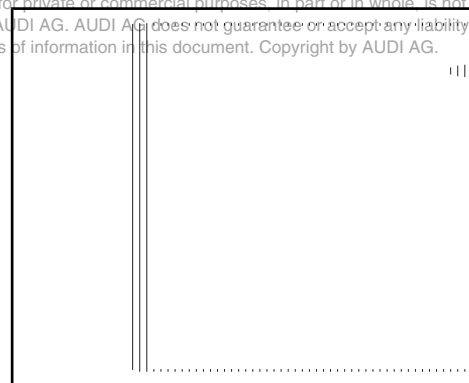


Assembling 5th gear locking collar/synchronising hub

- Push locking collar over synchronising hub.

Pointed teeth -A- of locking collar and shoulder -B- of synchronising hub face in same direction. The recesses for the locking pieces in the locking collar and synchronising hub must be aligned [⇒ page 137](#).

- Fitting locking pieces [⇒ page 137](#).
- Insert springs offset by 120° underneath lug -C-. Angled ends of spring must be in front of locking pieces -arrows-.



1.2 Modified springs for 5th gear synchro-mesh from gearbox build date 05 11 1

Springs with angled ends -A- were introduced from gearbox build date 05 11 1.

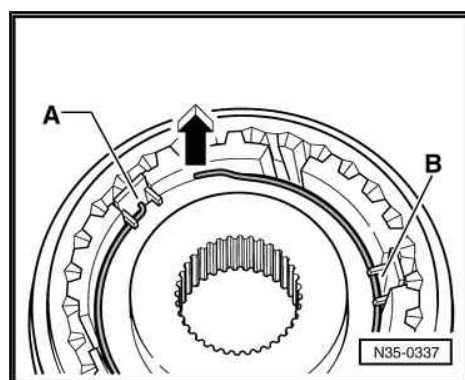
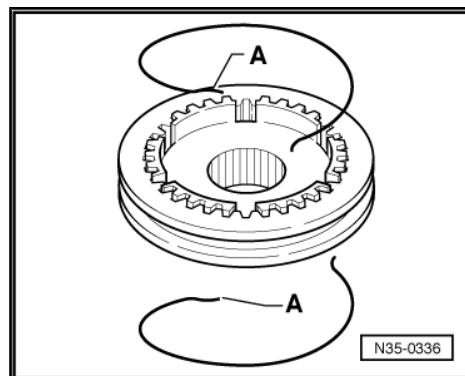
The modified springs are fitted on both sides.

- On gearboxes of the earlier type, the modified springs can only be installed in combination with hollow locking pieces.
- Fit locking pieces (installation position: ➔ [page 137](#)).

Installation position of springs:

- Insert springs offset by 120°.
 - Angled end -A- of spring must locate in hollow locking piece.
- Spring must be fitted under lug -B- of locking pieces.

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



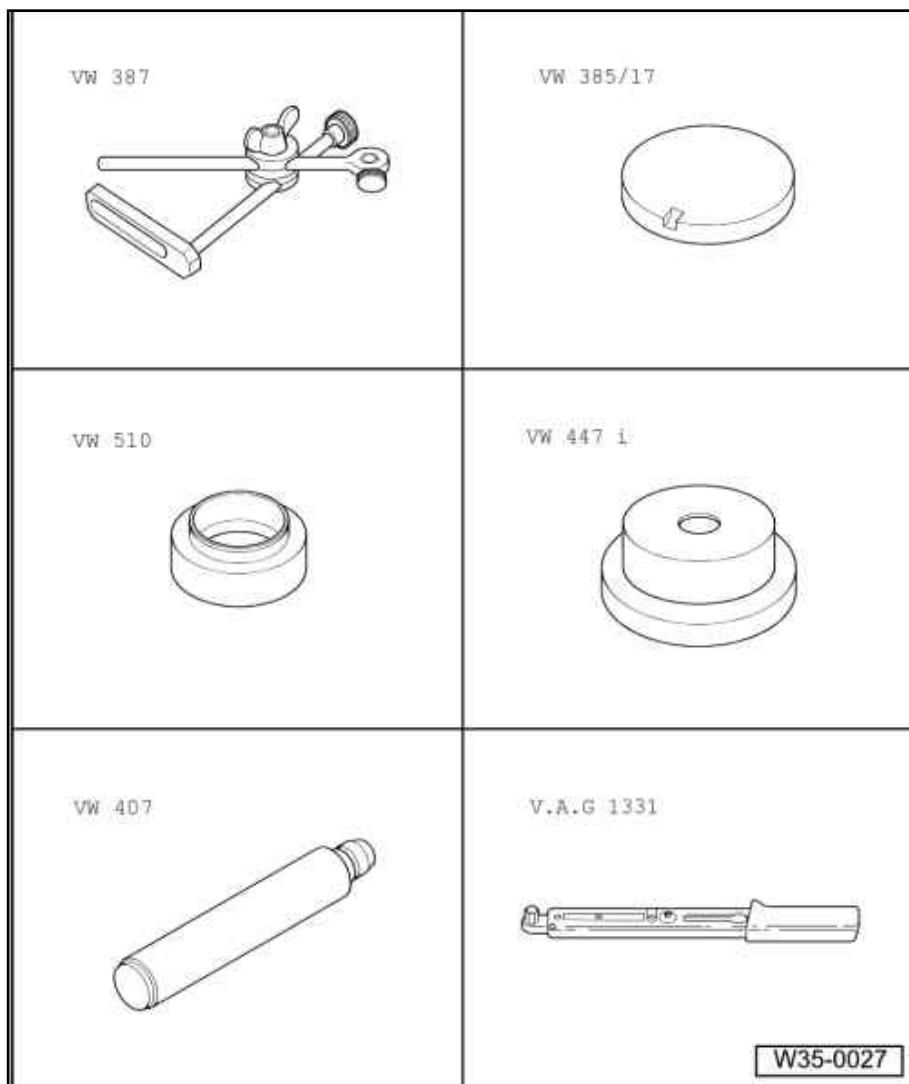
1.3 Adjusting input shaft

(Determining thickness of shim for input shaft)



Special tools and workshop equipment required

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



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

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

or the

- ◆ Tapered roller bearings

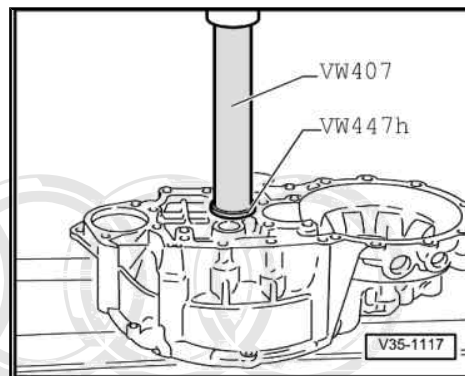
Table of adjustments ⇒ [page 171](#)

Requirement:

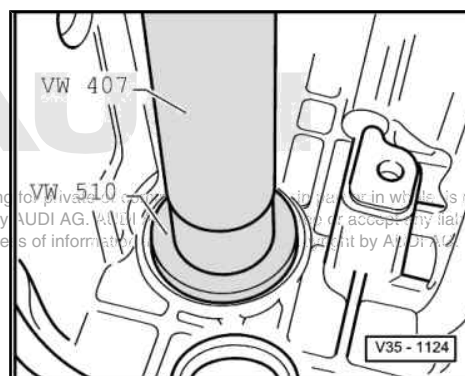
- Sealing surfaces of clutch and gearbox housings must be free of sealant.

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- Press tapered roller bearing outer race onto stop in clutch housing.



- Press tapered roller bearing outer race without shim onto stop in gearbox housing.
- Install input shaft in clutch housing and put on gearbox housing.
- Tighten bolts to 25 Nm.

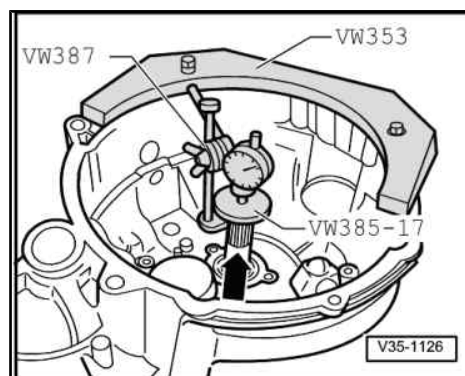


- Fit measuring appliance and dial gauge in clutch housing, as shown in illustration
- Before taking any measurements, rotate input shaft several times to allow taper roller bearings to settle. Preload dial gauge to 1 mm and set to "0".



Note

This procedure must be repeated for each measuring operation, since the dial gauge will not return to its original setting (zero) unless the bearings are turned again.



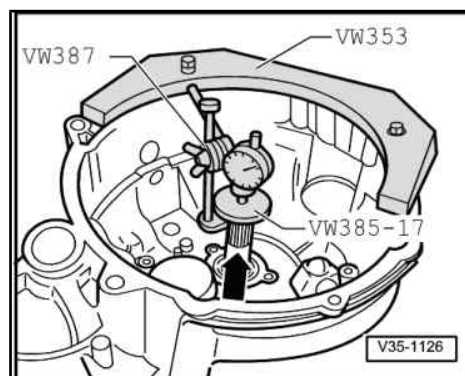
- Push input shaft towards dial gauge in direction of -arrow-.
- Read off and note play indicated on dial gauge (in this example: 1.21 mm).



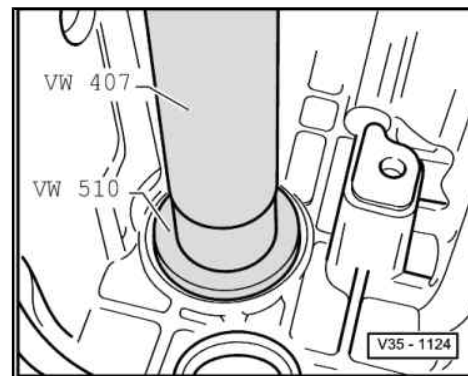
Note

Dial gauge does not return to original setting by itself.

- Select shim of required thickness according to table ⇒ [page 141](#) (in this example: 1.175 mm).
- Remove input shaft and press tapered roller bearing outer race out of gearbox housing using thrust plate -VW 447 i- .

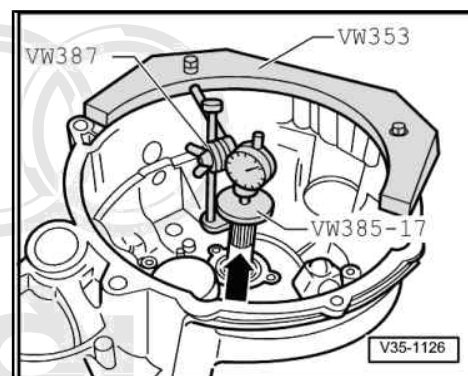


- Press tapered roller bearing outer race together with the 1.175 mm shim into gearbox housing.
- Fit gearbox housing and tighten hexagon bolt to 25 Nm.



Checking adjustment

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



Note

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

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1.4 Table of shims



Note

Select correct shims from ⇒ Electronic parts catalogue .

Bearing clearance	Shim
Measured value (mm)	Thickness (mm)
0.671...0.699	0.650
0.700...0.724	0.675
0.725...0.749	0.700
0.750...0.774	0.725
0.775...0.799	0.750
0.800...0.824	0.775
0.825...0.849	0.800
0.850...0.874	0.825
0.875...0.899	0.850
0.900...0.924	0.875
0.925...0.949	0.900
0.950...0.974	0.925
0.975...0.999	0.950
1.000...1.024	0.975
1.025...1.049	1.000
1.050...1.074	1.025
1.075...1.099	1.050
1.100...1.124	1.075
1.125...1.149	1.100
1.150...1.174	1.125
1.175...1.199	1.150



Bearing clearance	Shim
Measured value (mm)	Thickness (mm)
1.200...1.224	1.175
1.225...1.249	1.200
1.250...1.274	1.225
1.275...1.299	1.250
1.300...1.324	1.275
1.325...1.349	1.300
1.350...1.374	1.325
1.375...1.399	1.350
1.400...1.424	1.375
1.425...1.449	1.400
1.450...1.474	1.425
1.475...1.499	1.450
1.500...1.524	1.475
1.525...1.549	1.500
1.550...1.574	1.525
1.575...1.599	1.550
1.600...1.624	1.575
1.625...1.649	1.600
1.650...1.674	1.625
1.675...1.699	1.650
1.700...1.724	1.675
1.725...1.749	1.700
1.750...1.774	1.725
1.775...1.791	1.750



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2 Output shaft (pinion shaft)

⇒ [“2.1 Dismantling and assembling output shaft \(pinion shaft\)”, page 143](#)

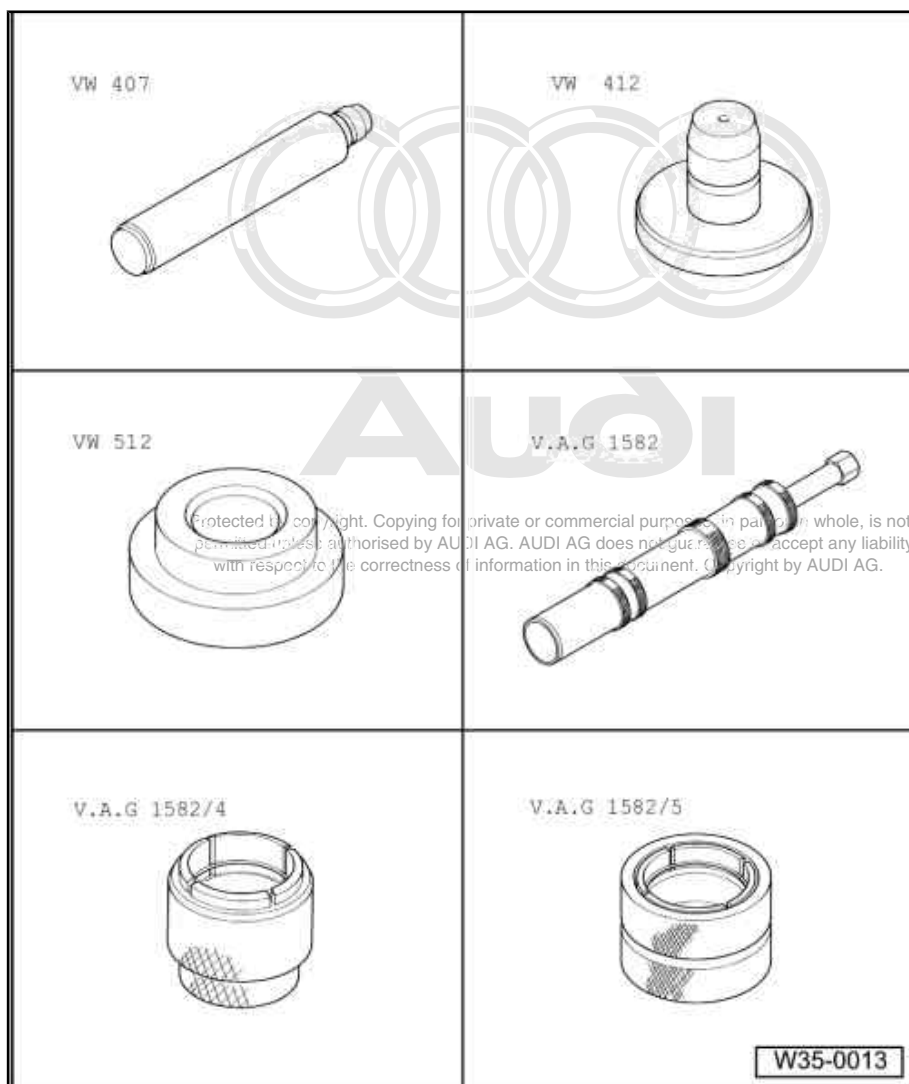
⇒ [“2.2 1st gear synchromesh modified as of gearbox build date 02 05 0”, page 155](#)

⇒ [“2.3 Adjusting output shaft”, page 157](#)

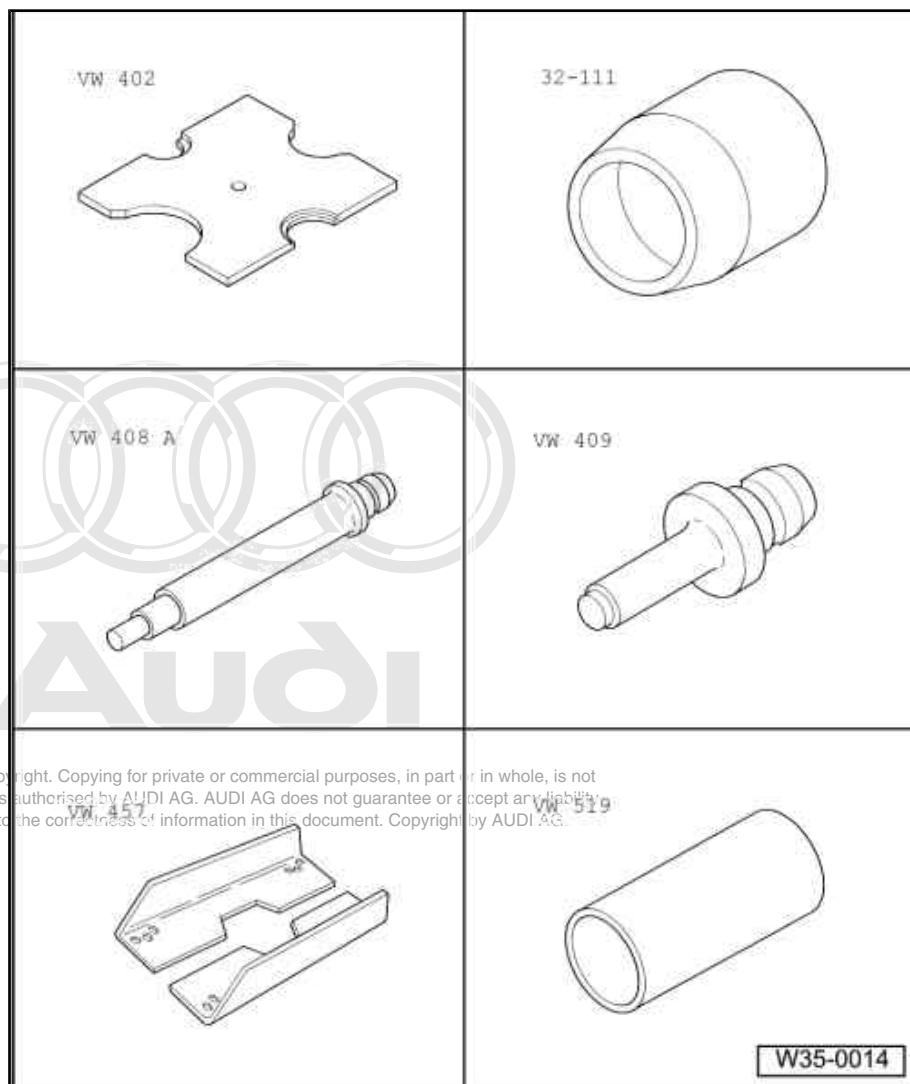
2.1 Dismantling and assembling output shaft (pinion shaft)

Special tools and workshop equipment required

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

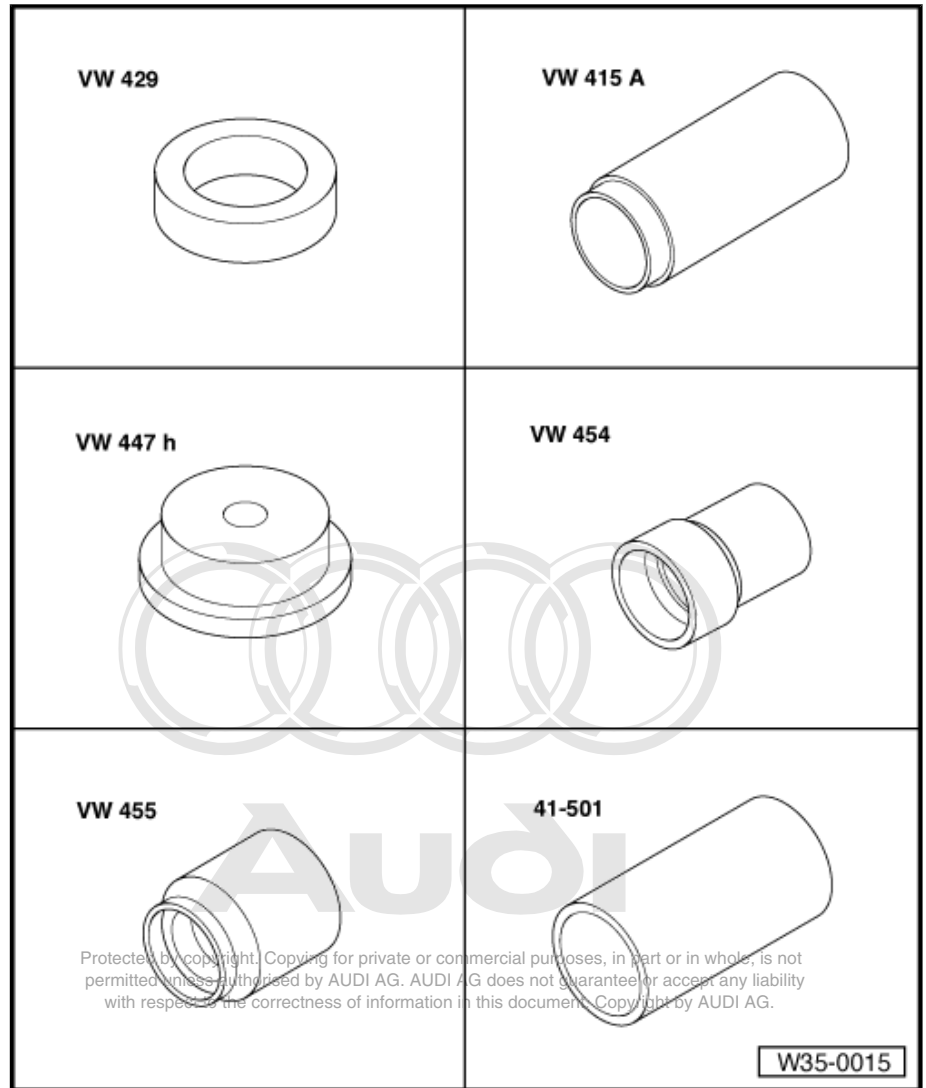


- ◆ Thrust plate -VW 402-
- ◆ Thrust piece -32 - 111-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 409-
- ◆ Support rails -VW 457-
- ◆ Tube -VW 519-

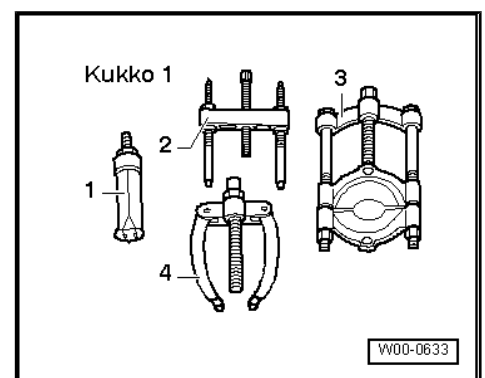


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- ◆ Thrust ring -VW 429-
- ◆ Tube -VW 415 A-
- ◆ Thrust plate -VW 447 H-
- ◆ Press tool -VW 454-
- ◆ Installing sleeve -VW 455-
- ◆ Drift sleeve -41 - 501-



- ◆ -1- Internal puller -Kukko 21/6-



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



Note

- ◆ The output shaft is dismantled as follows:- Position splitter under 2nd speed selector gear (⇒ [Item 19 \(page 147\)](#)) and press off as described in ⇒ [page 149](#). Remove circlip ⇒ [Item 15 \(page 147\)](#). Then press off locking collar and synchronising hub for 1st and 2nd gear as shown in ⇒ [page 150](#).
- ◆ Refer to technical data ⇒ [page 1](#) when installing new gears or a new output shaft.
- ◆ Always renew both tapered roller bearings together.
- ◆ Do not over-stretch circlip ⇒ [Item 15 \(page 147\)](#). Always renew circlips which have been damaged or over-stretched.

1 - Nut

- ☐ 25 Nm and turn 90° further
- ☐ Always renew
- ☐ 4 nuts for bearing mounting

2 - Clutch housing

3 - Shim

- ☐ For output shaft
- ☐ Determining thickness - Adjusting output shaft ⇒ [page 157](#)
- ☐ Table of adjustments ⇒ [page 171](#)

4 - Small tapered roller bearing outer race

- ☐ Removing ⇒ [page 148](#)
- ☐ Pressing in ⇒ [page 149](#)

5 - Small tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 149](#)
- ☐ Pressing on ⇒ [page 149](#)

6 - Output shaft

- ☐ Is paired with final drive gear, always renew together as a set
- ☐ Adjusting ⇒ [page 157](#)

7 - Large tapered roller bearing inner race

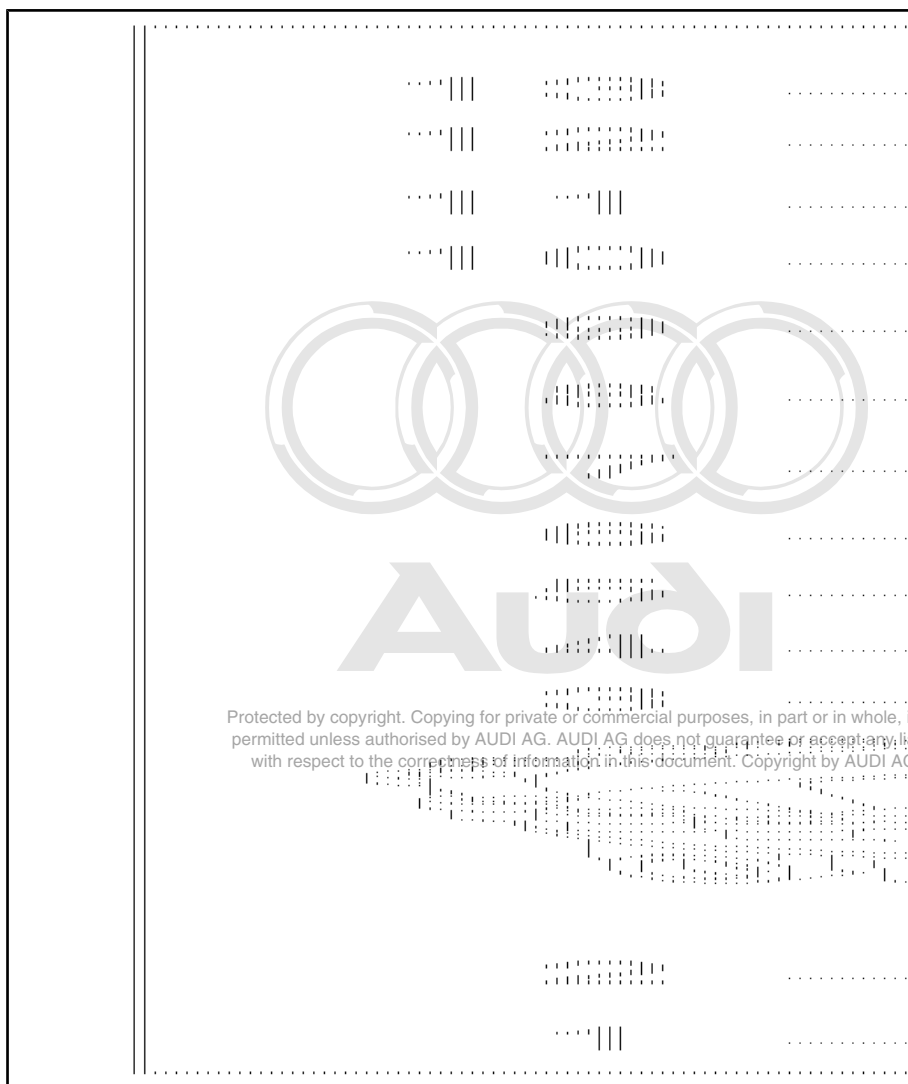
- ☐ Pulling off ⇒ [page 150](#)
- ☐ Pressing on ⇒ [page 150](#)

8 - Seal

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

9 - Bearing mounting

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



10 - Thrust washer

- ☐ Shoulder on thrust washer faces towards large tapered roller bearing inner race ⇒ [Item 7 \(page 146\)](#)

11 - 1st speed selector gear

- ☐ Modified 1st gear synchromesh from gearbox build date 02 05 0 ⇒ [page 155](#)

12 - Needle bearing

- ☐ For 1st gear

13 - 1st gear synchro-ring

- ☐ Checking for wear ⇒ [page 150](#)
- ☐ Identification ⇒ [page 152](#)
- ☐ Distinguishing 1st and 2nd gear synchro-rings ⇒ [page 152](#)
- ☐ Modified 1st gear synchromesh from gearbox build date 02 05 0 ⇒ [page 155](#)

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

- ☐ Press off together with bearing mounting ⇒ [Item 15 \(page 147\)](#) after removing circlip ⇒ [page 150](#)
- ☐ Dismantling ⇒ [page 151](#)
- ☐ Assembling locking collar/synchronising hub ⇒ [page 151](#) and ⇒ [page 151](#)
- ☐ Installation position ⇒ [page 151](#)
- ☐ Pressing on ⇒ [page 151](#)
- ☐ Modified 1st gear synchromesh from gearbox build date 02 05 0 ⇒ [page 155](#)

15 - Circlip

16 - 2nd gear synchro-ring

- ☐ Checking for wear ⇒ [page 152](#)
- ☐ Identification ⇒ [page 152](#)
- ☐ Distinguishing 1st and 2nd gear synchro-rings ⇒ [page 152](#)
- ☐ Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ [Item 14 \(page 147\)](#)

17 - Outer ring

- ☐ Insert in synchro-ring ⇒ [Item 16 \(page 147\)](#) ; installation position ⇒ [page 152](#)
- ☐ Renew if scored or if there are visible traces of wear

18 - Synchro-ring

- ☐ Inner ring
- ☐ Checking for wear ⇒ [page 153](#)
- ☐ Check lugs for scoring
- ☐ Installation position ⇒ [page 153](#)

19 - 2nd speed selector gear

- ☐ Installation position ⇒ [page 153](#)

20 - Needle bearing

- ☐ For 2nd gear

21 - Thrust washer

22 - Sleeve for 3rd gear needle bearing

- ☐ Pressing off with 2nd speed selector gear ⇒ [page 149](#)
- ☐ Pressing on ⇒ [page 153](#)

23 - Needle bearing

- ☐ For 3rd gear

24 - 3rd speed selector gear

25 - 3rd gear synchro-ring

- ☐ Checking for wear ⇒ [page 150](#)

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

- ☐ Pressing off with 2nd speed selector gear ⇒ [Item 19 \(page 147\)](#) and 3rd speed selector gear ⇒ [Item 24 \(page 147\)](#) ⇒ [page 149](#)
- ☐ Dismantling ⇒ [page 154](#)
- ☐ Installation position: Locking collar/synchronising hub ⇒ [page 154](#)
- ☐ Assembling locking collar/synchronising hub ⇒ [page 154](#) and ⇒ [page 154](#)
- ☐ Pressing on ⇒ [page 154](#)

27 - Sleeve

- ☐ For 4th gear needle bearing
- ☐ Pressing off with locking collar and synchronising hub for 3rd and 4th gear ⇒ [Item 26 \(page 148\)](#) ⇒ [page 149](#)
- ☐ Pressing on ⇒ [page 155](#)

28 - Needle bearing

- ☐ For 4th gear

29 - 4th gear synchro-ring

- ☐ Checking for wear ⇒ [page 150](#)

30 - 4th speed selector gear

31 - Thrust washer

32 - Needle bearing

- ☐ For output shaft
- ☐ Removing and installing ⇒ [page 115](#)

33 - Gearbox housing

34 - Sleeve

- ☐ For needle bearing ⇒ [Item 32 \(page 148\)](#)
- ☐ Pressing off ⇒ [page 149](#)
- ☐ Pressing on ⇒ [page 155](#)

35 - 5th gear wheel

- ☐ Removing and installing ⇒ [page 100](#)

36 - Dished spring

- ☐ Installation position ⇒ [page 110](#)

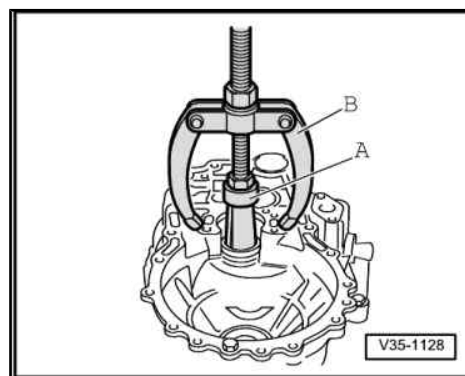
37 - Bolt

- ☐ M10 x 1
- ☐ Tightening torque ⇒ [Item 4 \(page 98\)](#)
- ☐ Always renew
- ☐ Fitted piece on bolt head holds dished spring in position

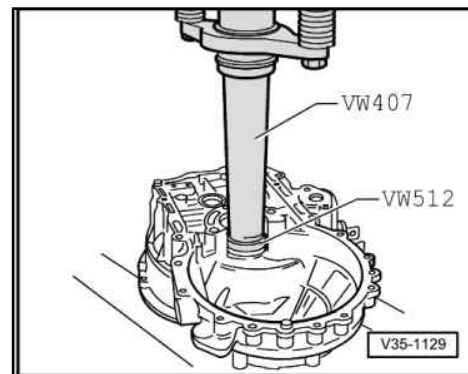
Pulling out small tapered roller bearing outer race

A - Internal puller 37 ... 46 mm , e.g. -Kukko 21/6-

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



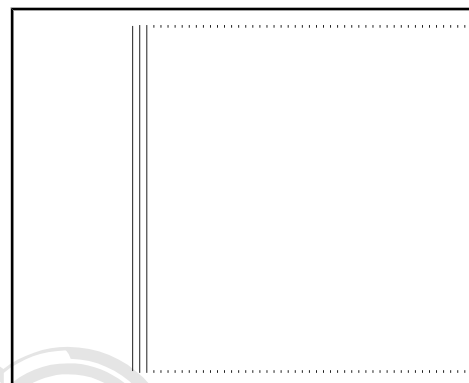
Pressing in small tapered roller bearing outer race



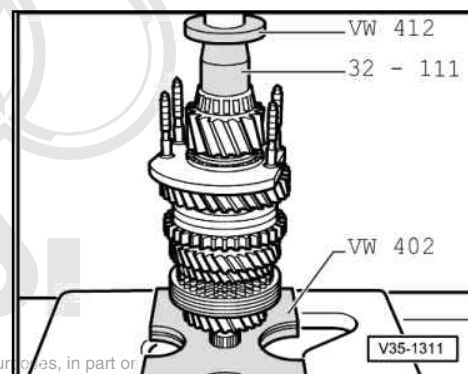
Pulling off small tapered roller bearing inner race

-A- Soft jaws/vice

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



Pressing on small tapered roller bearing inner race



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

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

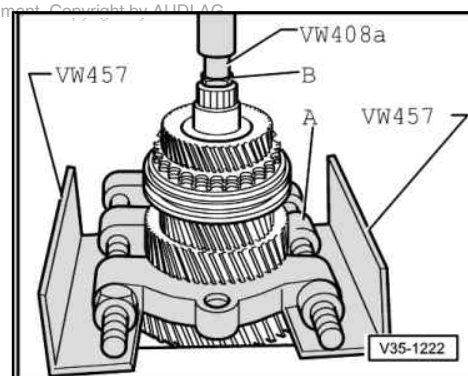
B - Hexagon bolt, 17 mm M10 x 20

- Position splitter under 2nd speed selector gear [⇒ Item 19 \(page 147\)](#) and press off.



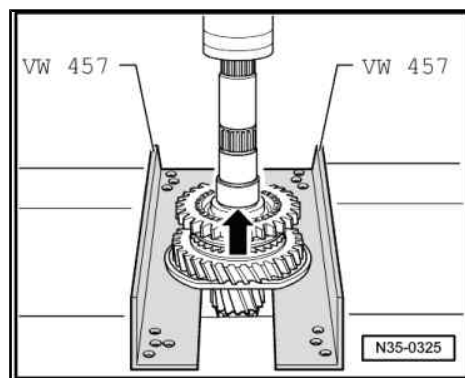
Note

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



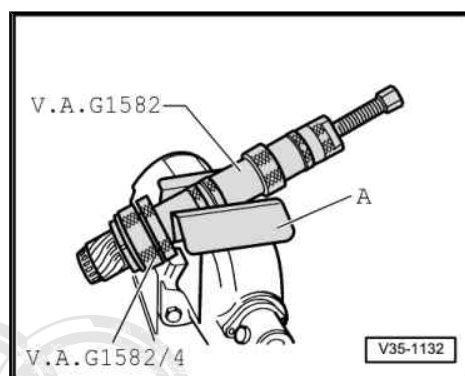
Pressing off locking collar with synchronising hub and bearing mounting

- First remove circlip -arrow-.



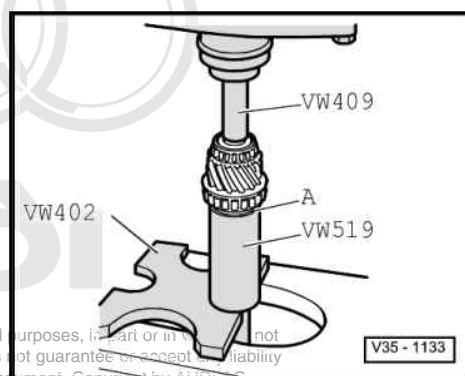
Pulling off large tapered roller bearing inner race

- A- Soft jaws
- Before applying puller, insert an M10 x 20 hexagon bolt in hole in output shaft.



Pressing on large tapered roller bearing inner race

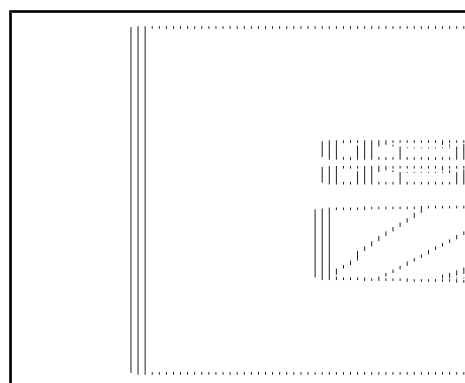
- A- Thrust washer
- Fit thrust washer before pressing on inner race. Shoulder faces towards inner race.



Checking synchro-ring for wear

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

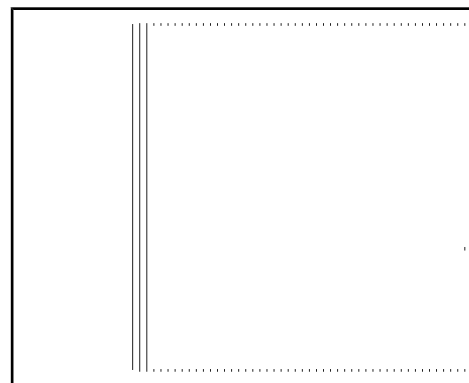
Gap -a-	Installation depth	Wear limit
1st gear ¹⁾	1.0...1.7 mm	0.5 mm
3rd gear	1.0...1.7 mm	
4th gear	1.0...1.7 mm	
• ¹⁾ For 1st gear synchromesh up to gearbox build date 01 05 00		



Dismantling and assembling 1st and 2nd gear locking collar and synchronising hub up to gearbox build date 01 05 00

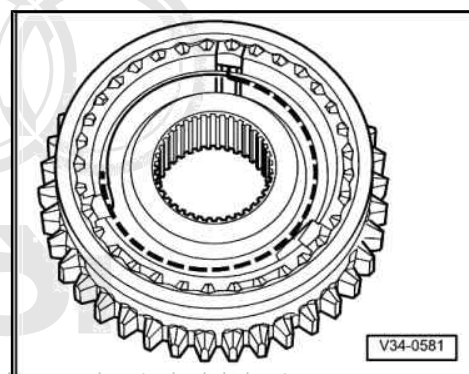
- 1 - Spring
 - 2 - Locking collar
 - 3 - Synchronising hub
 - 4 - Locking piece
- Push locking collar over synchronising hub.

The wider shoulder of the synchronising hub -arrow A- and the outer splines of the locking collar -arrow B- face in opposite directions after assembly. Recesses for locking pieces in synchronising hub and locking collar must align.



Assembling 1st and 2nd gear locking collar/synchronising hub

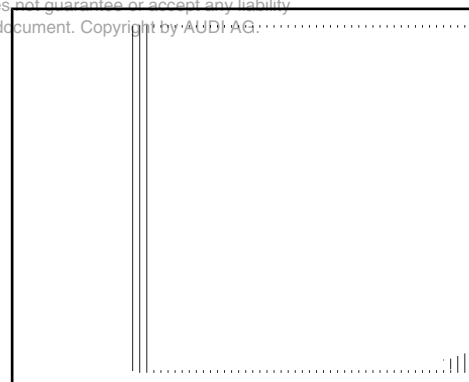
- Locking collar is pushed over synchronising hub.
- Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.



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

Splines on locking collar -arrow 1- point to splines for 3rd/4th gear synchronising hub -A-.

The wide shoulder of the synchronising hub -arrow 2- then faces towards 1st gear -B-.

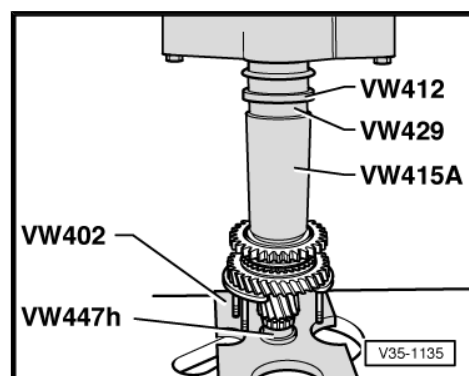


Pressing on 1st and 2nd gear locking collar/synchronising hub



Note

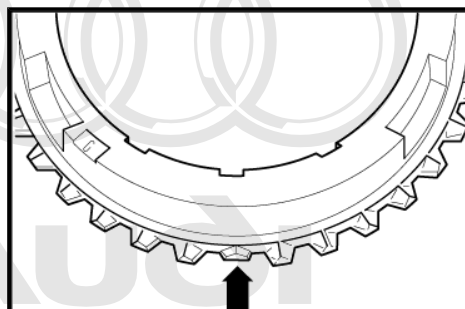
Before pressing on, place 1st gear synchro-ring on 1st speed selector gear.



Identification of 1st and 2nd gear synchro-rings

- ◆ 1st gear synchro-ring: 3 x ground-down $\frac{1}{2}$ teeth -arrow-.
- ◆ 2nd gear synchro-ring: 3 x ground-down $\frac{1}{2}$ teeth -arrow- or 2 x ground-down $\frac{1}{2}$ teeth.

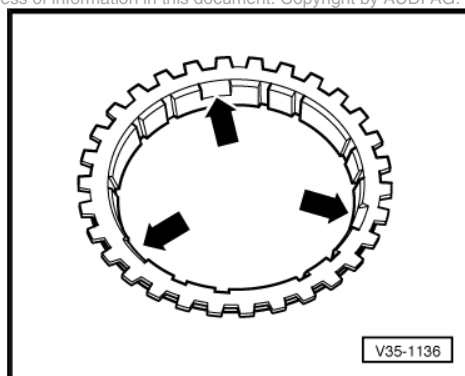
Only the version with “2 x ground-down $\frac{1}{2}$ teeth” is available as a spare part for the 2nd gear synchro-ring.



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Distinguishing 1st gear synchro-rings (up to gearbox build date 01 05 00) and 2nd gear synchro-rings

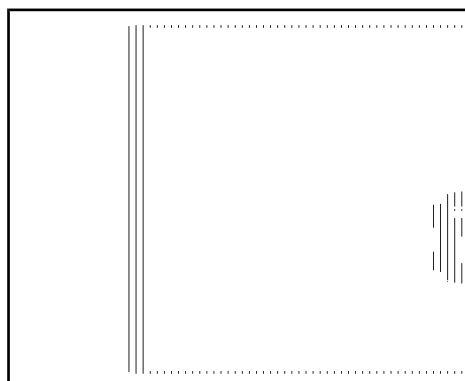
- ◆ 1st gear synchro-ring: no recesses
- ◆ 2nd gear synchro-ring: three recesses -arrows-



Checking 2nd gear synchro-rings for wear

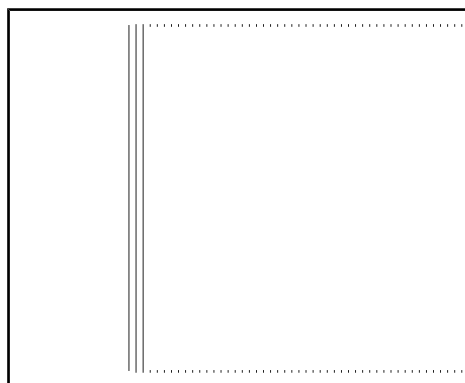
- Press synchro-ring, outer ring and inner ring onto tapered seat on selector gear and measure gap -a- using a feeler gauge.

Gap -a-	Installation depth	Wear limit
2nd gear	1.2 ... 1.8 mm	0.5 mm



Installation position of outer ring

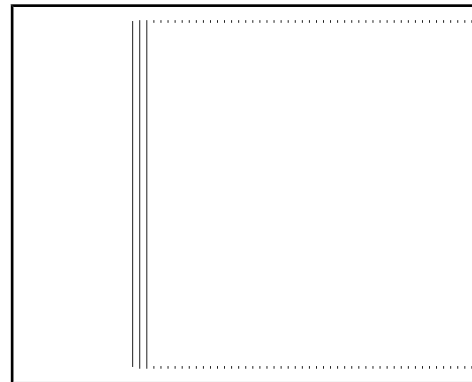
The lugs -arrows- face towards 1st gear -A-.



Checking inner ring for wear

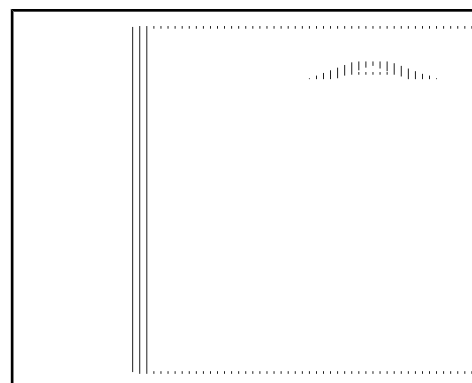
- Press inner ring onto tapered seat on 2nd speed selector gear and measure gap -a- using a feeler gauge.

Gap -a-	Installation depth	Wear limit
2nd gear	0.75 ... 1.25 mm	0.3 mm



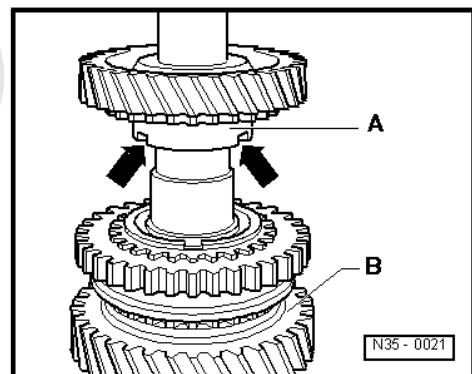
Installation position of synchro-ring (inner ring) -A-

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



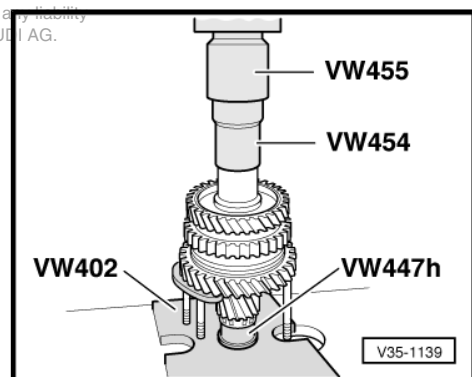
Installation position of 2nd speed selector gear

The higher shoulder -A- faces towards 1st gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring (arrow ⇒ [page 152](#)).



Fitting thrust washer and pressing on needle roller bearing sleeve for 3rd gear.

- Install needle roller bearing, selector gear and synchro-ring for 3rd gear.



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

- 1 - Spring
 - 2 - Locking piece
 - 3 - Locking collar
 - 4 - Synchronising hub
- Push locking collar over synchronising hub.

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

Assembling 3rd and 4th gear locking collar/synchronising hub

Locking collar is pushed over synchronising hub.

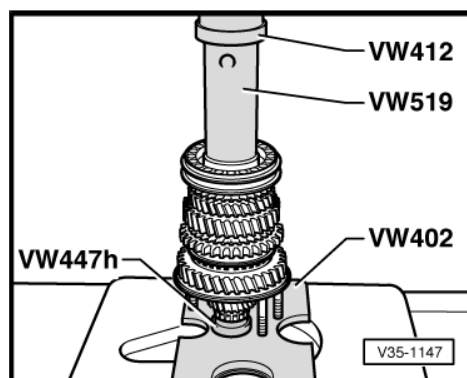
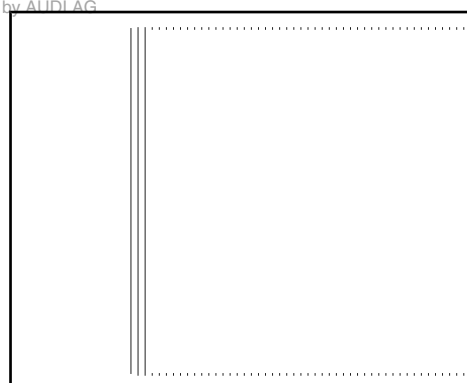
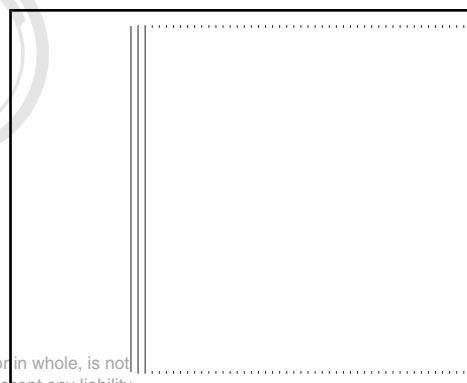
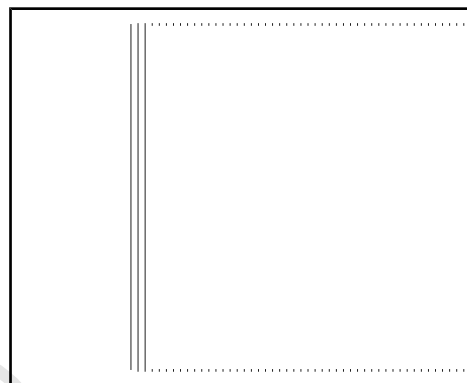
- Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.

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

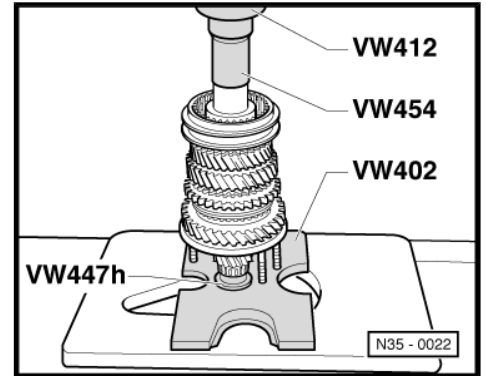
Chamfer -arrow- faces towards 4th gear.

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

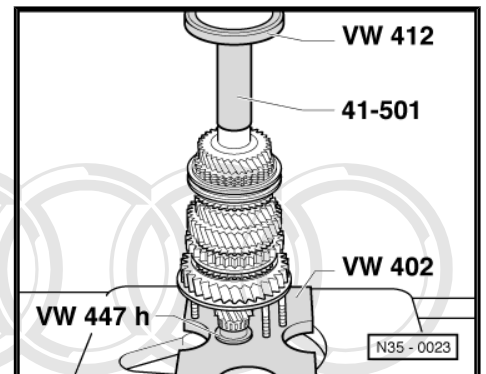


Pressing on sleeve for 4th gear needle bearing

- Install needle roller bearing, synchro-ring and 4th speed selector gear.
- Fit thrust washer over 4th speed selector gear.



Pressing on sleeve for needle bearing/output shaft



2.2 1st gear synchromesh modified as of gearbox build date 02 05 0

The following components are only fitted from this gearbox build date onwards, or were modified:

- ◆ -A- Inner ring
- ◆ -B- Outer ring
- ◆ -C- Synchro-ring

With additional slots -arrows 4- for lugs -arrows 1- on inner ring -A-.

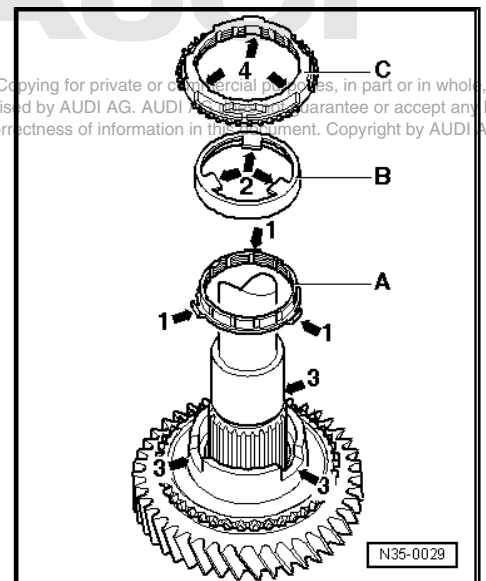
- ◆ 1st speed selector gear

With additional slots -arrows 3- for lugs -arrows 2- on outer ring -B-.



Note

- ◆ *The same inner ring, outer ring and synchro-ring are also installed on 2nd gear.*
- ◆ *If components are not being renewed, make sure they are re-installed on the same gear.*



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

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

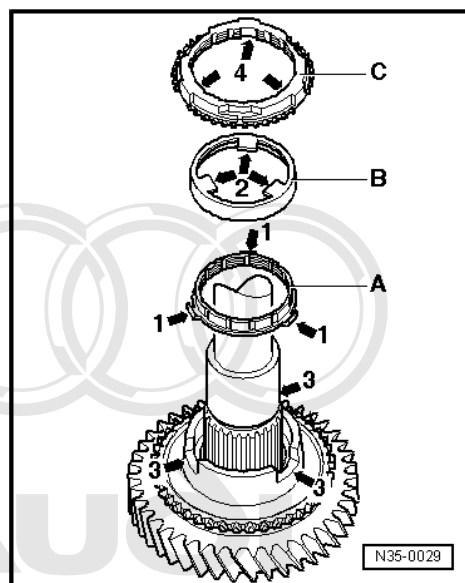
The angled lugs -arrows 1- point towards outer ring -B-.

- Fit outer ring -B-.

The lugs -arrows 2- lock in the slots -arrows 3- on the selector gear.

- Fit synchro-ring -C-.

The slots -arrows 4- locate on the lugs -arrows 1- of inner ring -A-.



Checking inner ring for 1st gear for wear

- Press inner ring onto tapered seat on selector gear and measure gap -a- using a feeler gauge.

Gap -a-	Installation depth	Wear limit
1st gear	0.75 ... 1.25 mm	0.3 mm

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Checking 1st gear synchro-ring and outer ring for wear

- Press synchro-ring, outer ring and inner ring onto tapered seat on selector gear and measure gap -a- using a feeler gauge.

Gap -a-	Installation depth	Wear limit
1st gear	1.2 ... 1.8 mm	0.5 mm

Assembling locking collar and locking pieces with synchronising hub for 1st and 2nd gear

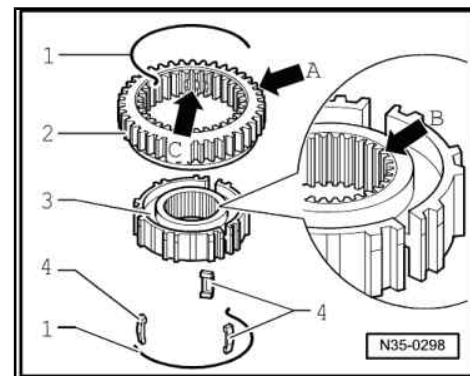
- 1 - Spring
- 2 - Locking collar
- 3 - Synchronising hub
- 4 - Locking piece

After introduction of the modified 1st gear synchromesh, the collar is the same width on both sides of the synchronising hub.

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

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

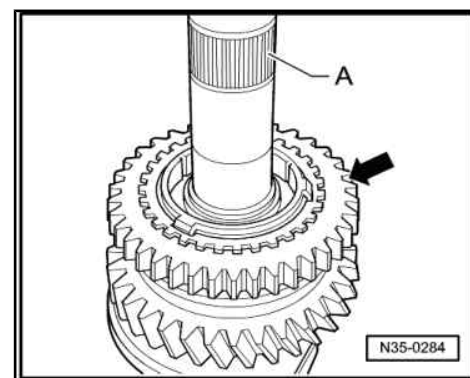
The recesses for the locking pieces on synchronising hub and locking collar -arrow C- must align.



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

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

- Remove and install 1st gear synchronising hub as described above.



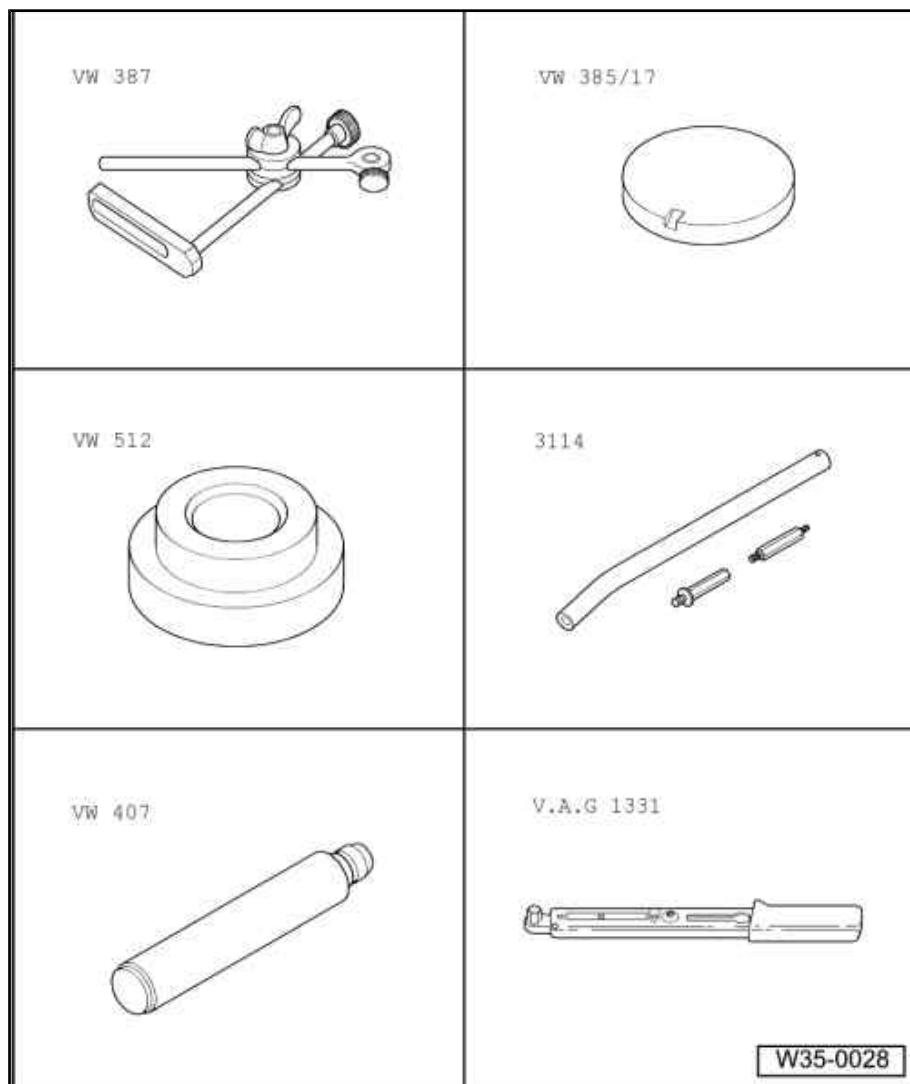
2.3 Adjusting output shaft

(Determining thickness of output shaft shim)

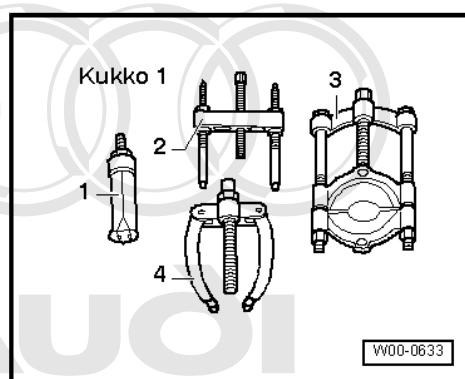
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Special tools and workshop equipment required

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



- ◆ -1- Internal puller -Kukko 21/6-



- ◆ -4- Counter-support -Kukko 22/2-

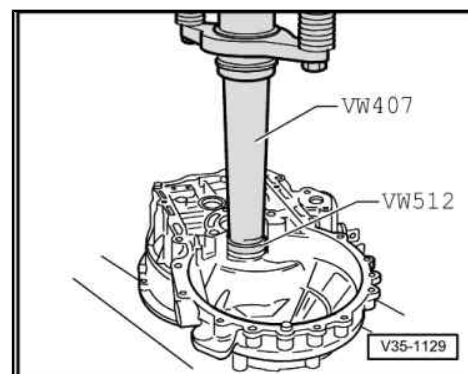
The output shaft must be re-adjusted when the following components are renewed:

- ◆ Final drive gear set
 - ◆ Clutch housing
- or
- ◆ Tapered roller bearings

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Table of adjustments ⇒ [page 171](#)

- Press small tapered roller bearing outer race together with a 0.65 mm thick shim fully into clutch housing.
- Insert output shaft and tighten nuts for bearing mounting to 25 Nm.



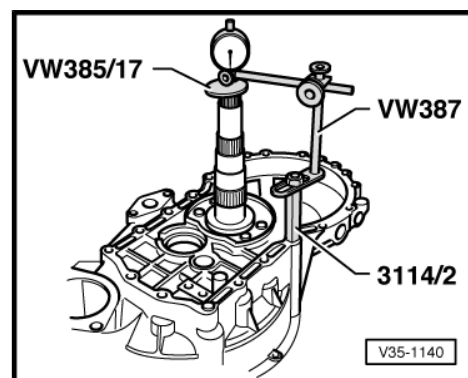
- Mount dial gauge (3 mm measuring range) and set to “0” with 1 mm preload.
- Move output shaft up and down; read off and note play indicated on dial gauge (in this example 0.35 mm).

Determining thickness of shim

The specified bearing preload is obtained by adding a constant preload figure (0.15 mm) to the measured value obtained (0.35 mm) and the thickness of the shim installed (0.65 mm).

Example:

Shim installed	0.65 mm
+ Measured value	0.35 mm
+ Preload (constant value)	0.15 mm
Thickness of shim	1.15 mm



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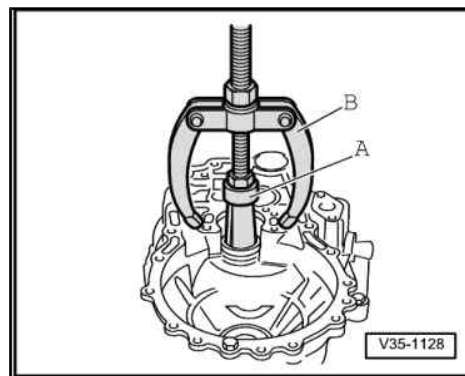
- Remove output shaft and pull out small taper roller bearing outer race.

A - Internal puller 37 ... 46 mm , e.g. -Kukko 21/6-

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

The following shims are available:

Thickness (mm)	Part No.
0.65	020 311 391 P
0.70	020 311 391 Q
0.75	020 311 391
0.80	020 311 391 A
0.85	020 311 391 B
0.90	020 311 391 C
0.95	020 311 391 D
1.00	020 311 391 E
1.05	020 311 391 F
1.10	020 311 391 G
1.15	020 311 391 H
1.20	020 311 391 J
1.25	020 311 391 K
1.30	020 311 391 L
1.35	020 311 391 M
1.40	020 311 391 N



Tolerance variations make it possible to obtain the exact shim thickness required.

- Press in small tapered roller bearing outer race together with the correct shim (in example 1.15 mm) (⇒ [page 159](#)) and install output shaft. Tighten new nuts for bearing mounting in clutch housing to 25 Nm and then turn 90° further.

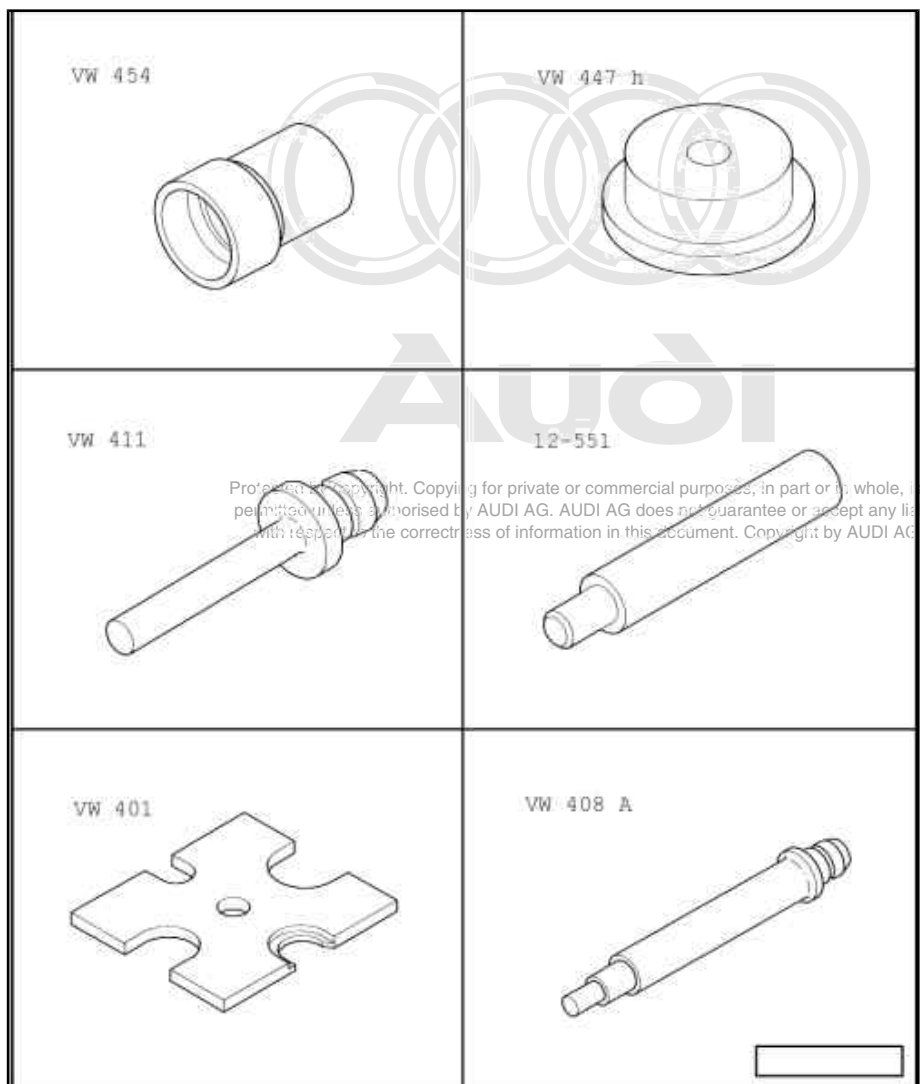


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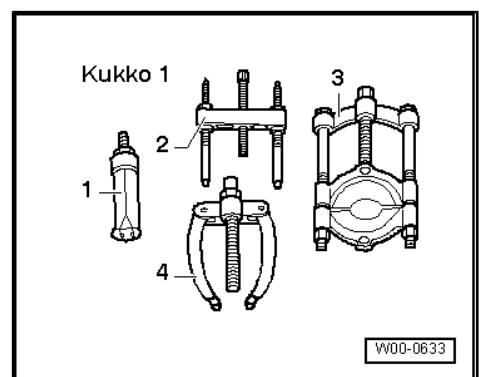
3 Dismantling and assembling reverse shaft

Special tools and workshop equipment required

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



- ◆ -1- Internal puller -Kukko 21/2-



- ◆ -4- Counter-support -Kukko 22/1-



Note

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

1 - Clutch housing

2 - Needle bearing

- ☐ Pulling out ⇒ [page 162](#)
- ☐ Pressing in
⇒ [page 163](#)

3 - Reverse gear wheel

4 - Circlip

- ☐ Always renew after removing

5 - Reverse selector gear

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

6 - Reverse shaft

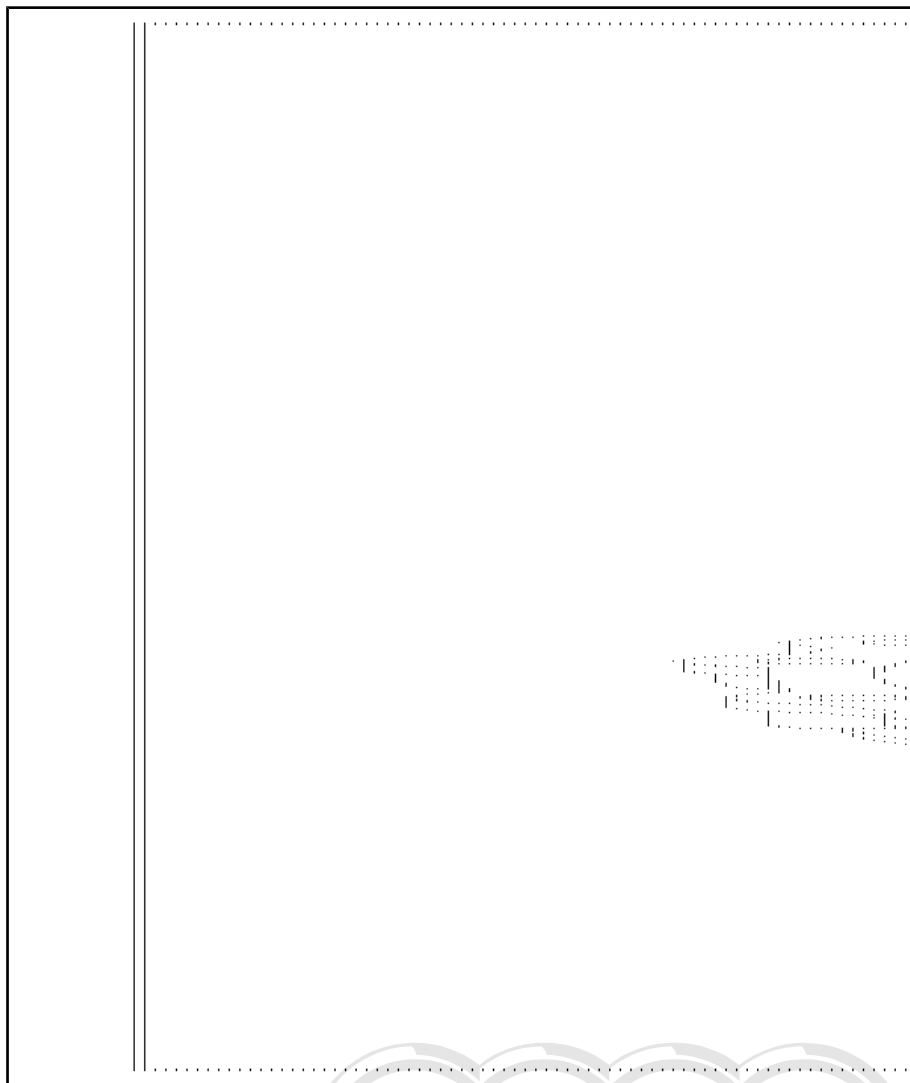
- ☐ Removing ⇒ [page 100](#)

7 - Needle bearing

- ☐ Pressing out
⇒ [page 163](#)
- ☐ Pressing in
⇒ [page 163](#)

8 - Reverse shaft support

- ☐ Removing and installing
⇒ [page 100](#)



Pulling needle bearing out of clutch housing

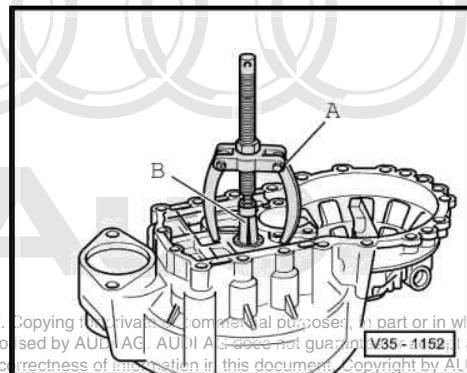
A - Counter-support , e.g. -Kukko 22/1-

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



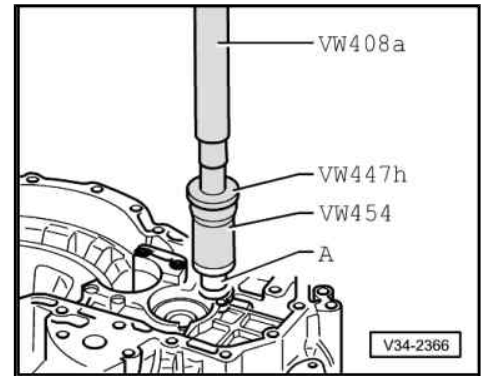
Note

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

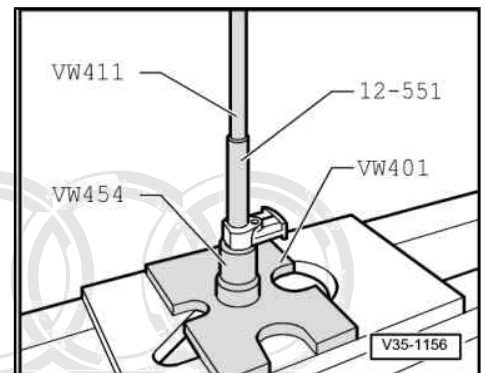


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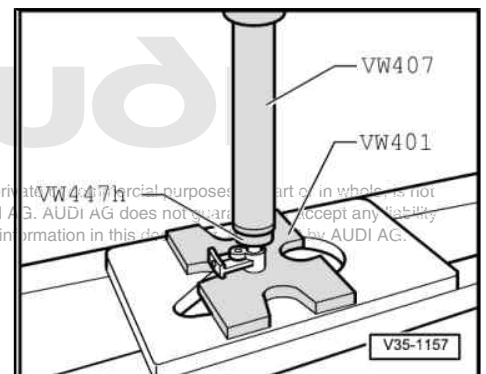
Pressing needle bearing -A- into clutch housing



Pressing needle bearing out of reverse shaft support



Pressing needle bearing into reverse shaft support



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39 – Final drive - differential

1 Renewing flange shaft oil seals (gearbox installed)

⇒ "1.1 Renewing flange shaft oil seal (left-side)", page 164 .

⇒ "1.2 Renewing flange shaft oil seal (right-side) - separate oil seal and sleeve", page 165 .

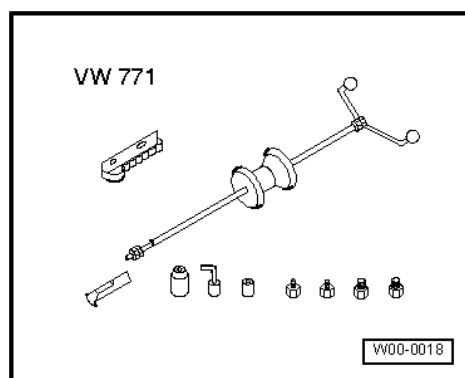
⇒ "1.3 Renewing flange shaft oil seal (right-side) - combined oil seal and sleeve", page 168 .

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1.1 Renewing flange shaft oil seal (left-side)

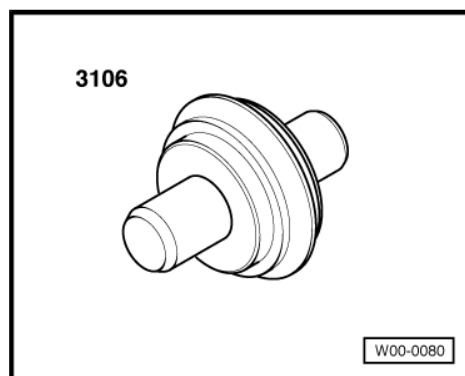
Special tools and workshop equipment required

◆ Multi-purpose tool -VW 771-

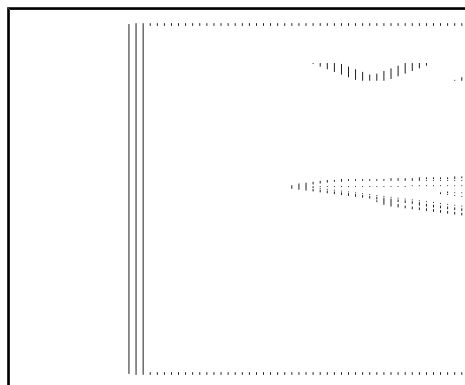


◆ Puller hook -VW 771/37-

◆ Drift -3106-



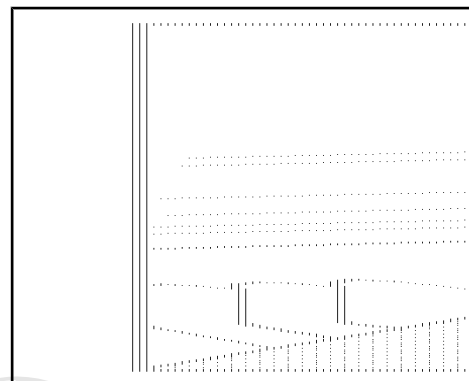
◆ Drip tray , e.g. -VAS 6208-



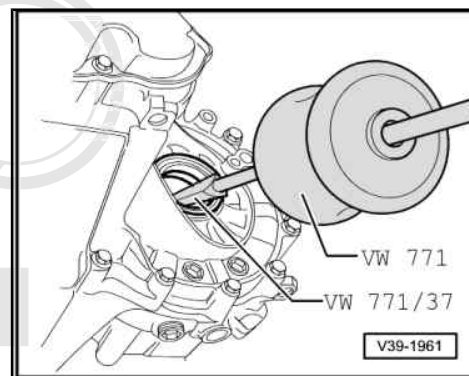
◆ Sealing grease -G 052 128 A1-

Removing

- Remove left wheel.
- Remove centre noise insulation (below engine/gearbox) and left noise insulation ⇒ Rep. Gr. 50 .
- Remove drive shaft ⇒ Rep. Gr. 40 .
- Place drip tray e.g. -VAS 6208- under the gearbox.
- Remove flange shaft securing bolt. To do this, screw two bolts into flange and counterhold flange shaft with tyre iron or other suitable lever.
- Pull out flange shaft and spring.

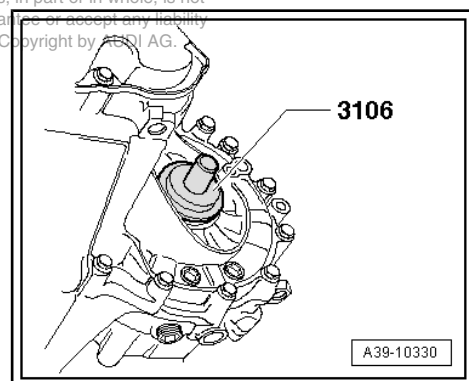


- Pull out flange shaft oil seal using multi-purpose tool -VW 771- and puller hook -VW 771/37- .



Installing

- Drive in new seal onto stop (take care to keep seal straight).
- Pack space between sealing lip and dust lip half full with sealing grease -G 052 128 A1- .
- Install flange shaft.
- Secure flange shaft with countersunk bolt.
- Install drive shaft ⇒ Rep. Gr. 40 .
- Check gearbox oil ⇒ [page 95](#) .
- Install centre noise insulation (below engine/gearbox) and left noise insulation ⇒ Rep. Gr. 50 .
- Fit wheel ⇒ Rep. Gr. 44 .



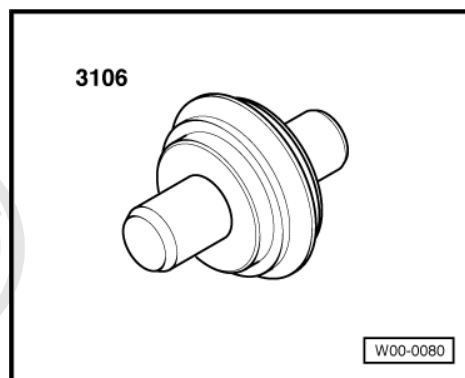
Tightening torque

Flange shaft to gearbox (countersunk bolt)	25 Nm
--	-------

1.2 Renewing flange shaft oil seal (right-side) - separate oil seal and sleeve

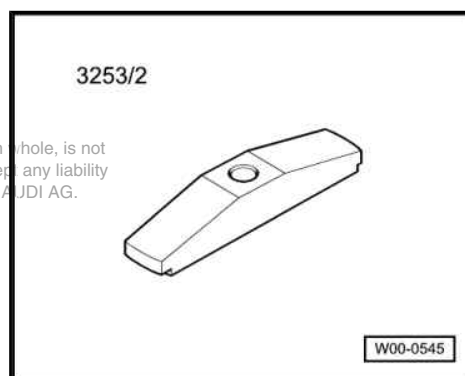
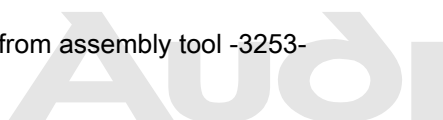
Special tools and workshop equipment required

◆ Drift -3106-

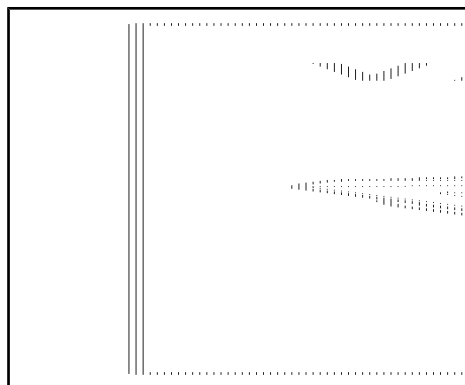


◆ Cross piece -3253/2- from assembly tool -3253-

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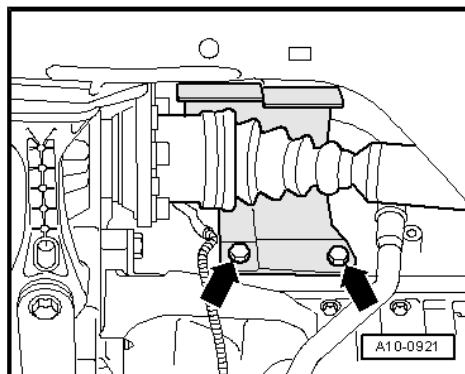
◆ Drip tray , e.g. -VAS 6208-



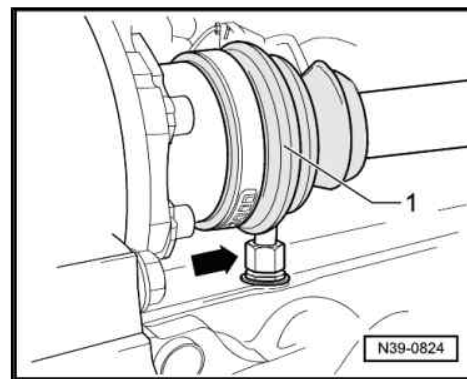
◆ Sealing grease -G 052 128 A1-

Removing

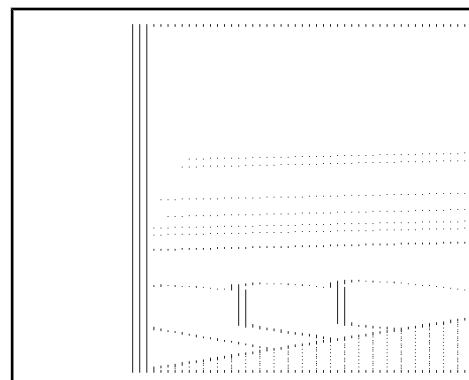
- Remove centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .
- Turn steering to full right lock.
- Remove protective cover for right inner constant velocity joint from engine -arrows-.



- Unbolt drive shaft -1- from flange shaft.
- Tie-up drive shaft as high as possible. Do not damage paint on drive shaft.
- Place drip tray e.g. -VAS 6208- under the gearbox and engine.
- On vehicles with diesel engine, disconnect turbocharger oil return line from engine -arrow- ⇒ Rep. Gr. 21 .



- Remove flange shaft securing bolt. To do this, screw two bolts into flange and counterhold flange shaft with tyre iron or other suitable lever.
- Pull out flange shaft and spring.

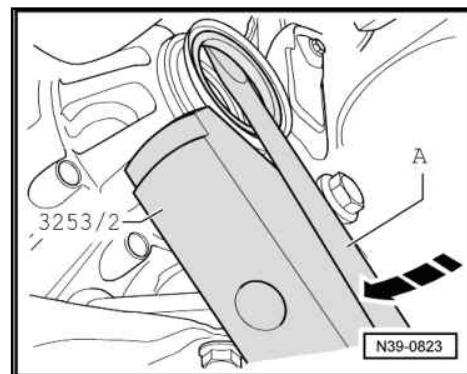


- Lever out oil seal using a screwdriver -A- (support screwdriver on cross piece -3253/2-).



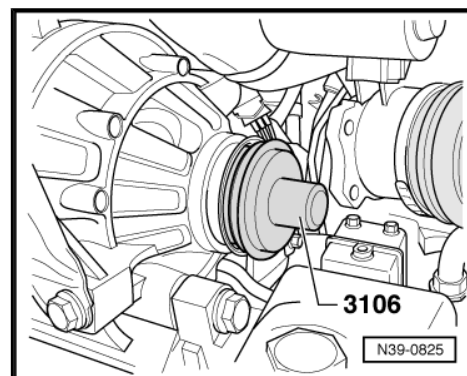
Note

- ◆ Do not damage sleeve, otherwise leaks will occur.
- ◆ Renew sleeve if damaged ⇒ [Item 16 \(page 115\)](#)



Installing

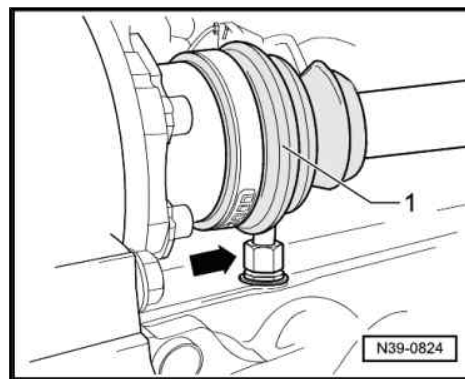
- Drive in new seal onto stop (take care to keep seal straight).
- Pack space between sealing lip and dust lip half full with sealing grease -G 052 128 A1- .
- Install flange shaft.
- Secure flange shaft with countersunk bolt.



- Re-connect turbocharger oil return line to engine if necessary
-arrow- ⇒ Rep. Gr. 21 .
- Bolt drive shaft -1- to flange shaft ⇒ Rep. Gr. 40 .
- Fit protective cover for right inner constant velocity joint to engine.
- Check gearbox oil ⇒ [page 95](#) .
- Install centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .

Tightening torques

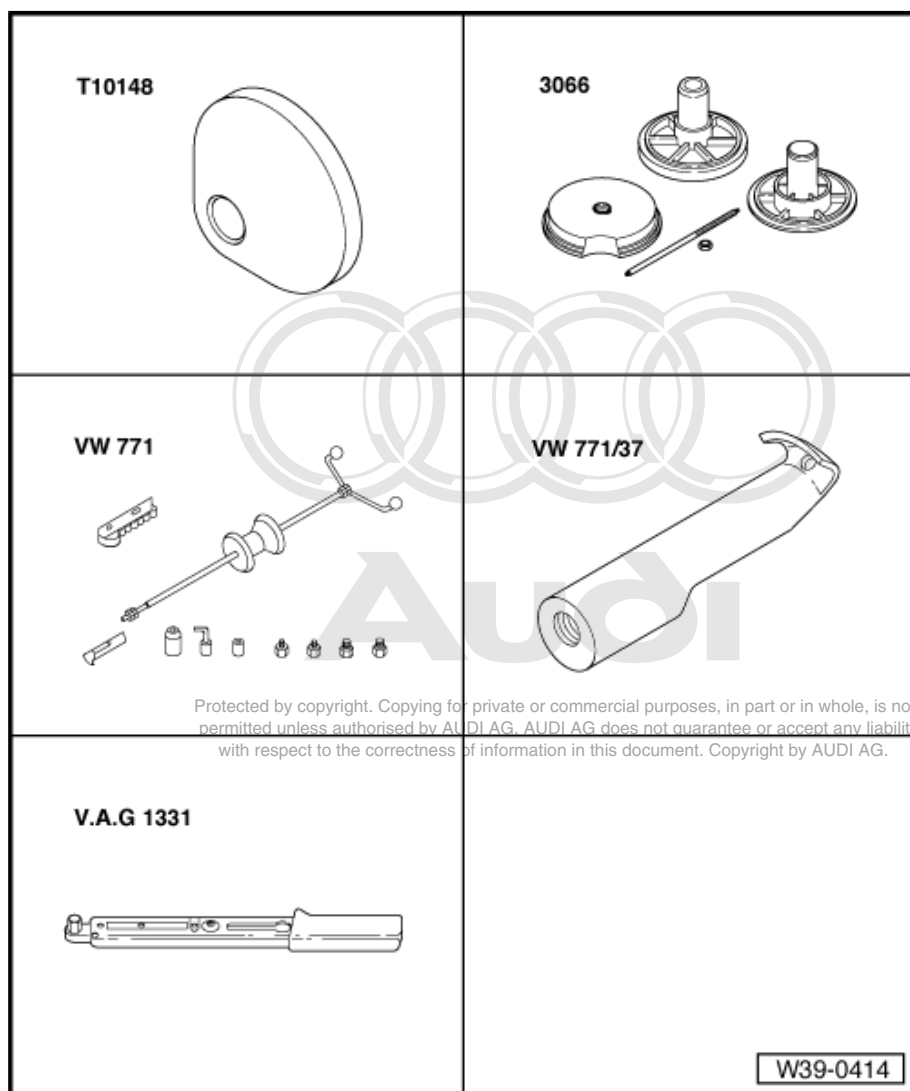
Flange shaft to gearbox (countersunk bolt)		25 Nm
Protective cover for right inner constant	M8	20 Nm
velocity joint to engine	M10	35 Nm



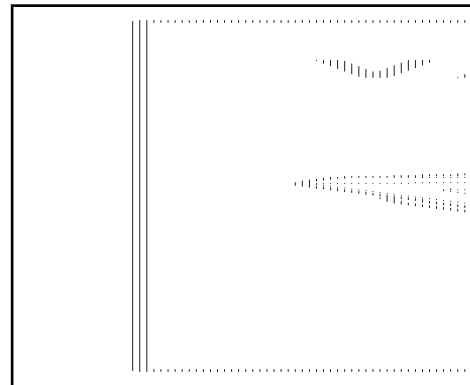
1.3 Renewing flange shaft oil seal (right-side) - combined oil seal and sleeve

Special tools and workshop equipment required

- ◆ Thrust piece -T10148-
- ◆ Spindle from assembly device -3066-
- ◆ Multi-purpose tool - VW 771-
- ◆ Puller hook -VW 771/37-
- ◆ Torque wrench - V.A.G 1331-



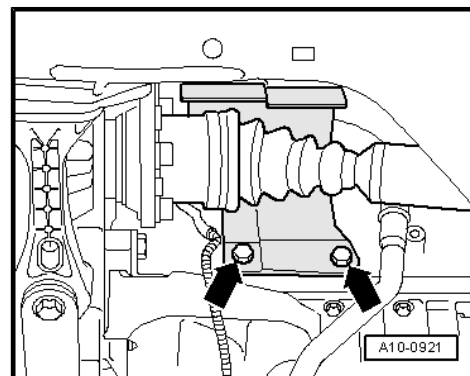
- ◆ Drip tray , e.g. -VAS 6208-



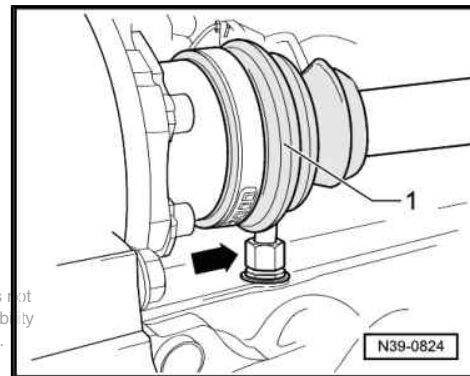
- ◆ Sealing grease -G 052 128 A1-

Removing

- Remove centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .
- Turn steering to full right lock.
- Remove protective cover for right inner constant velocity joint from engine -arrows-.

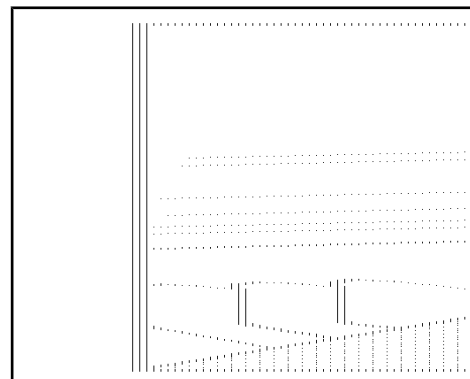


- Unbolt drive shaft -1- from flange shaft.
- Tie-up drive shaft as high as possible. Do not damage paint on drive shaft.
- Place drip tray e.g. -VAS 6208- under the gearbox and engine.
- On vehicles with diesel engine, disconnect turbocharger oil return line from engine -arrow- ⇒ Rep. Gr. 21 .



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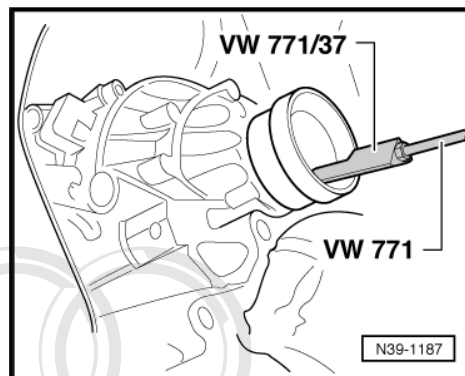
- Remove flange shaft securing bolt. To do this, screw two bolts into flange and counterhold flange shaft with tyre iron or other suitable lever.
- Pull out flange shaft and spring.



- Pull out oil seal with sleeve.

A projection is located on inside diameter of sleeve.

- Position puller hook -VW 771/37- directly behind projection in sleeve.
- During this operation, press puller hook -VW 771/37- firmly in against sleeve.



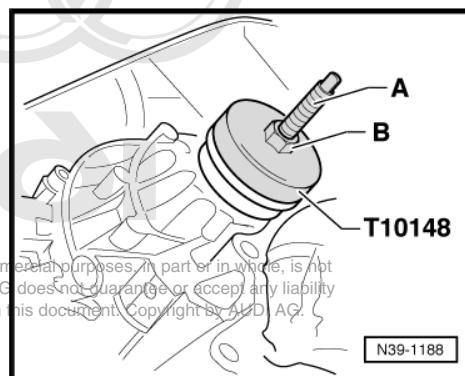
Installing

- Clean seat for oil seal in gearbox.
- Pull in oil seal together with sleeve.

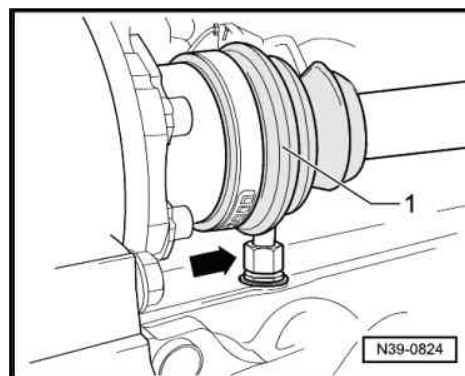
A - Spindle from assembly device -3066- screwed into threaded piece in differential.

B - M12 nut

- Turn nut -B- and pull oil seal with sleeve in onto stop with thrust piece -T10148- .
- Pack space between sealing lip and dust lip half-full with sealing grease -G 052 128 A1- .
- Install flange shaft.
- Secure flange shaft with countersunk bolt.



- Re-connect turbocharger oil return line to engine if necessary -arrow- ⇒ Rep. Gr. 21 .
- Bolt drive shaft -1- to flange shaft ⇒ Rep. Gr. 40 .
- Fit protective cover for right inner constant velocity joint to engine.
- Check gearbox oil ⇒ [page 95](#) .
- Install centre noise insulation (below engine/gearbox) ⇒ Rep. Gr. 50 .



Tightening torques

Flange shaft to gearbox (countersunk bolt)		25 Nm
Protective cover for right inner constant velocity joint to engine	M8	20 Nm
	M10	35 Nm

2 Table of adjustments



Note

When performing repairs on the gearbox it is only necessary to re-adjust the input shaft, output shaft or differential if components have been renewed which have a direct effect on the adjustment of the gearbox. Refer to the following table to avoid unnecessary adjustment work:

		Components requiring adjustment:		
		Input shaft ⇒ page 138	Output shaft ⇒ page 157	Differential ⇒ page 179
Components renewed:	Gearbox housing	x		x
	Clutch housing	x	x	x
	Input shaft	x		
	Output shaft (final drive set)		x	
	Differential cage			x
	Tapered roller bearing for input shaft	x		
	Tapered roller bearing for output shaft		x	
	Tapered roller bearing for differential			x
	4th gear wheel	x		



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3 Differential

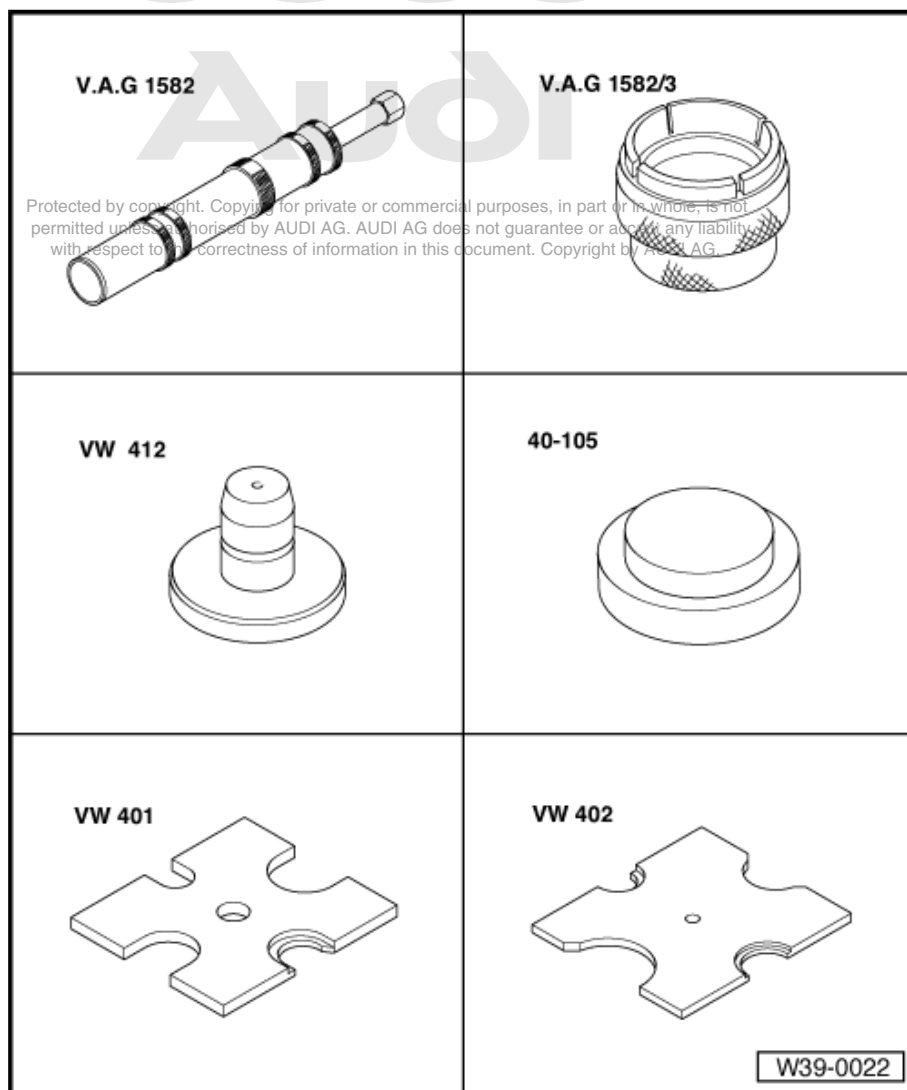
⇒ "3.1 Dismantling and assembling differential", page 172

⇒ "3.2 Adjusting differential", page 179

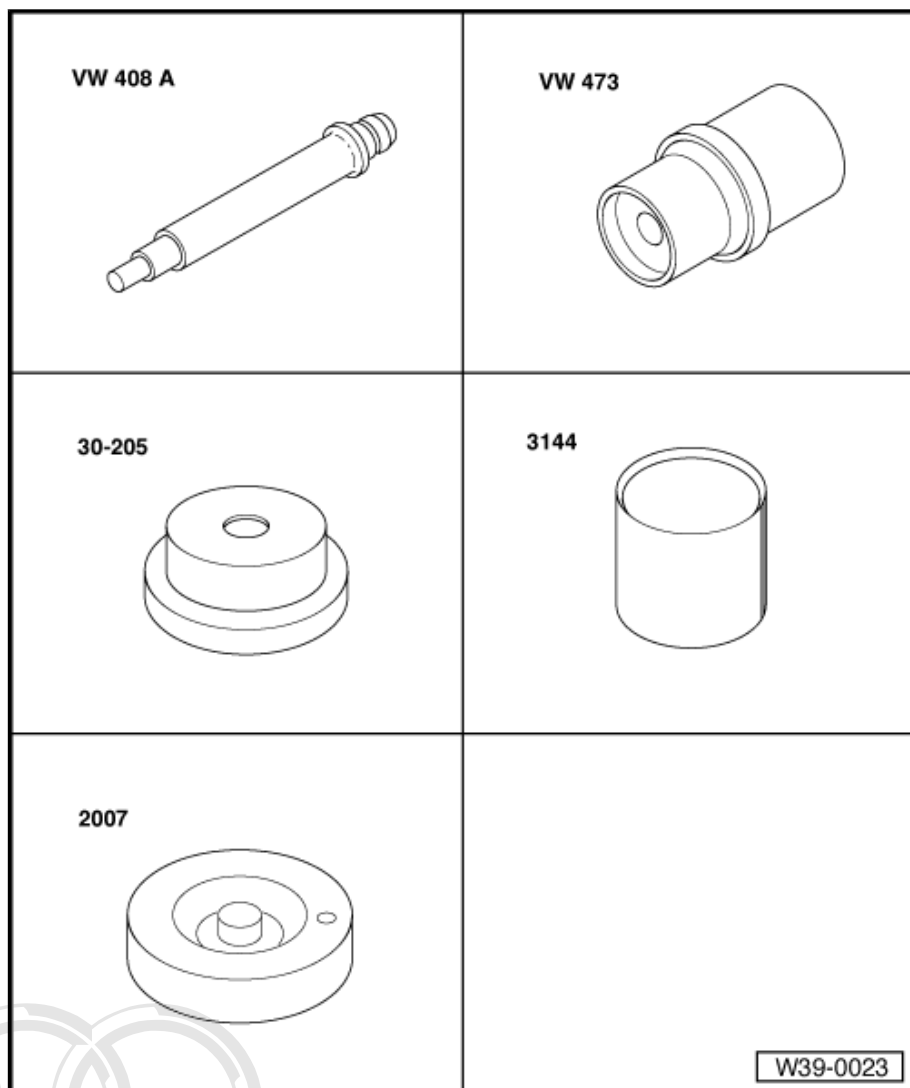
3.1 Dismantling and assembling differential

Special tools and workshop equipment required

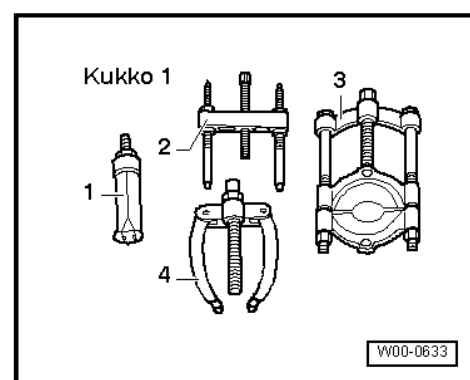
- ◆ Puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/3-
- ◆ Press tool -VW 412-
- ◆ Thrust plate -40 - 105-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-



- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 473-
- ◆ Thrust plate -30 - 205-
- ◆ Sleeve -3144-
- ◆ Press tool -2007-



- ◆ -1- Internal puller -Kukko 21/7-



- ◆ -4- Counter-support -Kukko 22/2-

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Note

- ◆ Heat tapered roller bearing inner race to 100° C before installing.
- ◆ Always renew both tapered roller bearings together.
- ◆ Adjust differential if tapered roller bearings, differential cage, gearbox housing or clutch housing are renewed
⇒ [page 179](#).

1 - Gearbox housing

2 - Bolt

3 - Differential cage

- ☐ Bolt to final drive gear
- ☐ Both sides chamfered
⇒ [page 177](#) to accept tapered rings
⇒ [Item 22 \(page 175\)](#)

4 - Final drive gear

- ☐ Riveted in production
- ☐ Is paired with output shaft, only renew as a set
- ☐ Pressing off
⇒ [page 178](#)
- ☐ Installation position
⇒ [page 178](#)
- ☐ Heat to 100° C before installing.
- ☐ Fit to differential cage
⇒ [page 178](#)
- ☐ Bolted ⇒ [page 178](#)

5 - Locking plate

6 - Nut

- ☐ 70 Nm

7 - Shim

- ☐ For differential
- ☐ Determining thickness
⇒ [page 179](#)

8 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 177](#)
- ☐ Pressing in ⇒ [page 177](#)

9 - Tapered roller bearing inner race

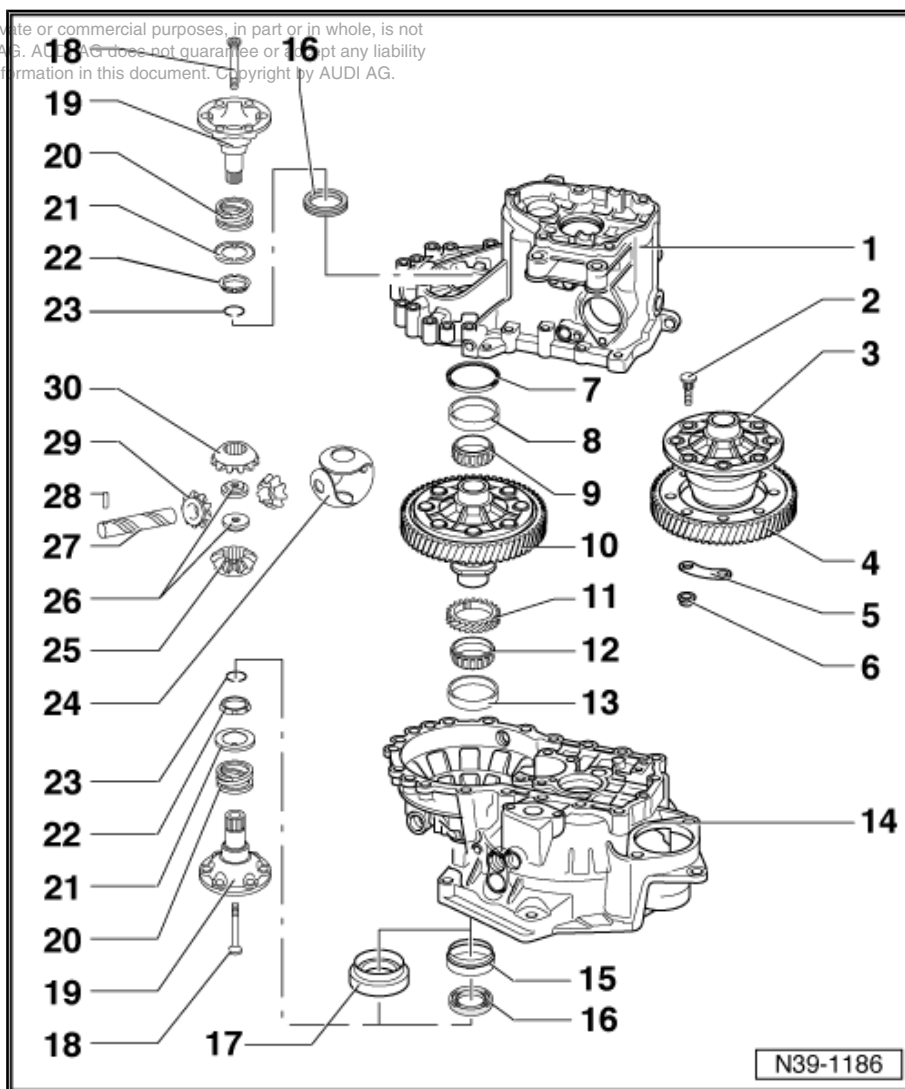
- ☐ Pulling off ⇒ [page 176](#)
- ☐ Pressing on ⇒ [page 176](#)

10 - Differential cage

- ☐ With riveted final drive gear
- ☐ Drill out rivet heads when renewing final drive gear ⇒ [page 177](#)
- ☐ Attaching final drive gear with bolts ⇒ [page 178](#)

11 - Speedometer drive wheel

- ☐ Fit onto differential cage as far as stop before pressing on inner race



12 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 176](#)
- ☐ Pressing on ⇒ [page 176](#)

13 - Tapered roller bearing outer race

- ☐ Pressing out ⇒ [page 176](#)
- ☐ Pressing in ⇒ [page 176](#)

14 - Clutch housing

15 - Sleeve

- ☐ For oil seal ⇒ [Item 16 \(page 175\)](#)
- ☐ Removing and installing ⇒ [Item 16 \(page 115\)](#)

16 - Oil seal

- ☐ Renewing ⇒ [page 164](#)

17 - One-piece oil seal and sleeve

- ☐ If oil seal is damaged, renew sleeve and oil seal together ⇒ [page 168](#)

18 - Countersunk bolt

- ☐ 25 Nm
- ☐ Screw into threaded piece to secure flange shaft ⇒ [Item 26 \(page 175\)](#)

19 - Flange shaft

- ☐ Removing and installing ⇒ [page 164](#)

20 - Spring for flange shaft

- ☐ Installed behind flange shafts

21 - Thrust washer

- ☐ Installation position ⇒ [page 179](#)

22 - Tapered ring

- ☐ With grooves to engage on thrust washer
- ☐ Installation position: Taper towards differential cage

23 - Circlip

- ☐ Holds tapered ring, thrust washer and spring in position when flange shaft is removed

24 - One-piece thrust washer

- ☐ Lubricate with gear oil before installing

25 - Sun wheel

- ☐ Installing ⇒ [page 179](#)

26 - Threaded piece

- ☐ Installing ⇒ [page 179](#)

27 - Differential pinion pin

- ☐ Drive out with drift
- ☐ Installing ⇒ [page 179](#)

28 - Spring pin

- ☐ For securing differential pinion pin
- ☐ Removing and installing ⇒ [page 179](#)

29 - Planet pinion

- ☐ Installing ⇒ [page 179](#)

30 - Sun wheel

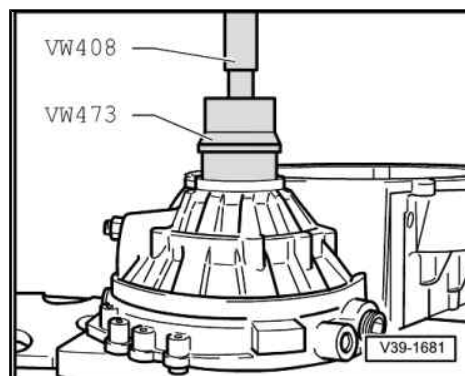
- ☐ Installing ⇒ [page 179](#)



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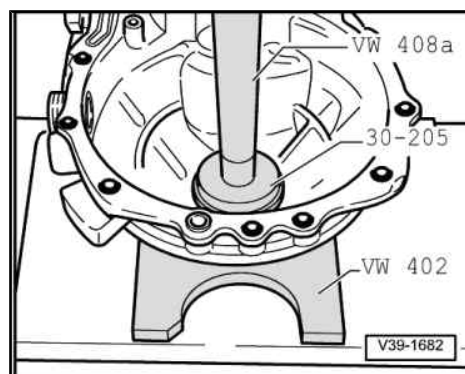
Pressing tapered roller bearing outer race out of clutch housing

- First remove flange shaft oil seal and mounting sleeve for seal.



Pressing tapered roller bearing outer race into clutch housing

No shim is installed on the clutch housing side.



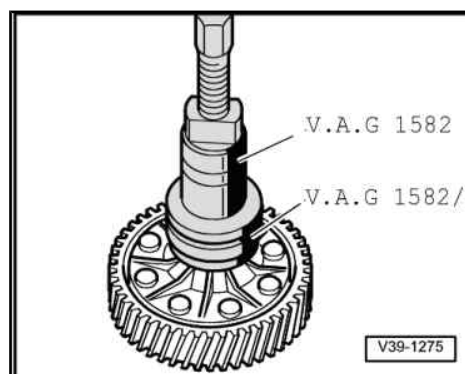
Pulling off tapered roller bearing inner races

- Before setting up the puller, place thrust plate -40-105- on differential cage.



Note

The procedure for pulling tapered roller bearing inner races off differential cage is the same for both bearings.



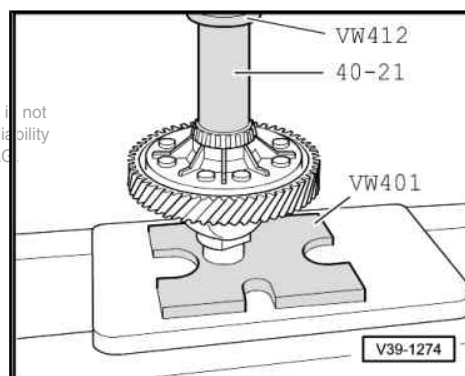
Pressing on tapered roller bearing inner races



Note

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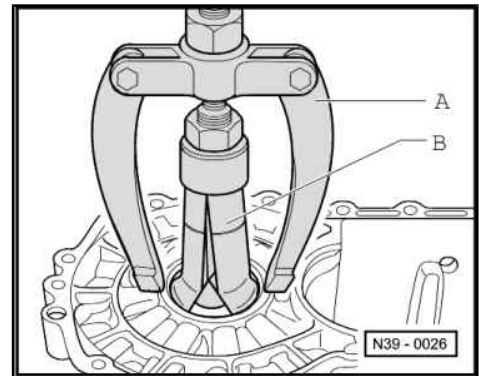
The same tools are used for pressing on tapered roller bearing inner races for gearbox housing and clutch housing.



Pulling tapered roller bearing outer race out of gearbox housing

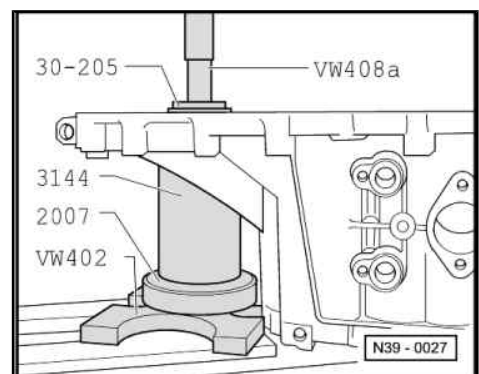
A - Counter-support , e.g. -Kukko 22/2-

B - Internal puller 46 ... 58 mm , e.g. -Kukko 21/7-

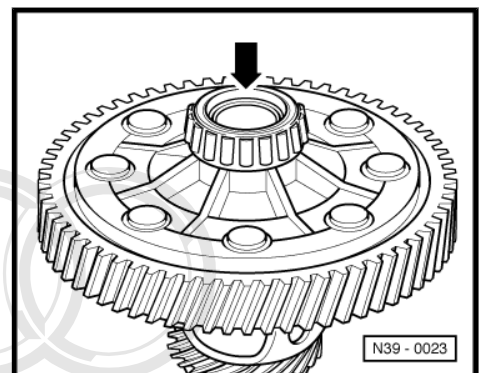


Pressing tapered roller bearing outer race into gearbox housing

- Fit shim below outer race.
- Support gearbox housing with sleeve -3144- directly below bearing mounting.



Both sides of differential cage are chamfered -arrow- to accept tapered rings/springs



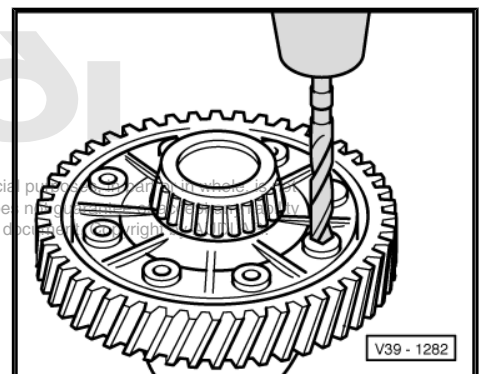
Drilling out rivet heads

- Drill out rivet heads from countersunk side with 12 mm drill and drive out rivets with a drift.



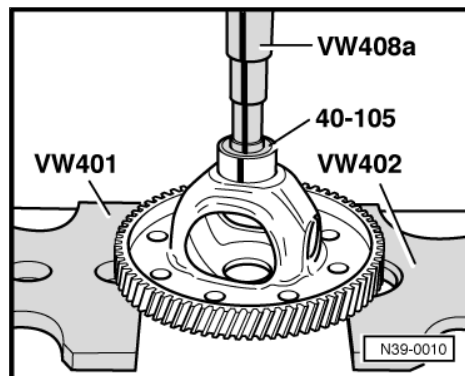
Note

Clean differential before and after drilling, protect taper roller bearings from swarf.



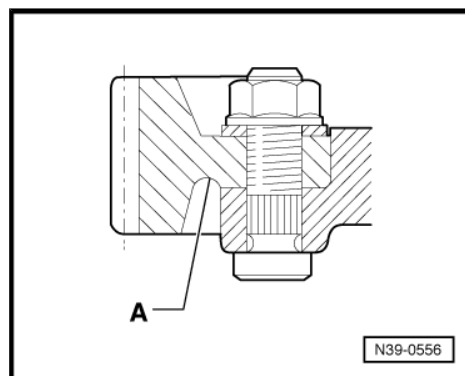
Pressing off final drive gear

- Fit thrust plate -40-105- onto differential cage.



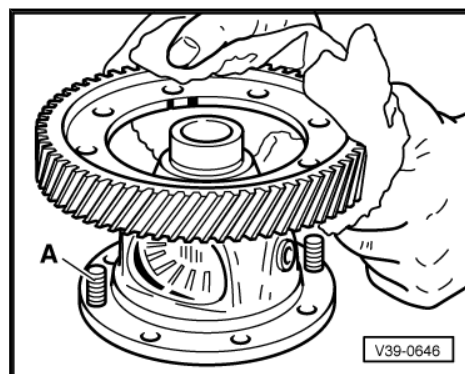
Installation position of final drive gear

Circular groove -A- faces joint surface on differential cage.



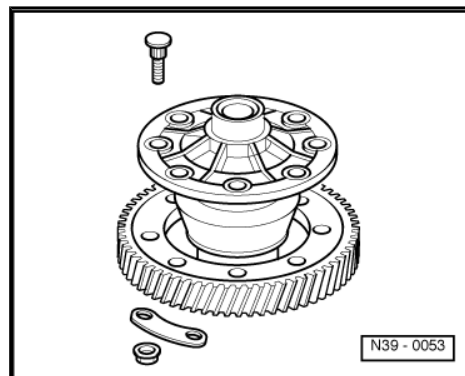
Heating final drive gear wheel to approx. 100 °C and installing

- Use bolts -A- from repair kit to guide final drive gear into position during installation.



Bolting final drive gear and differential cage together

Use special bolts with plates and nuts according to ⇒ Electronic parts catalogue .



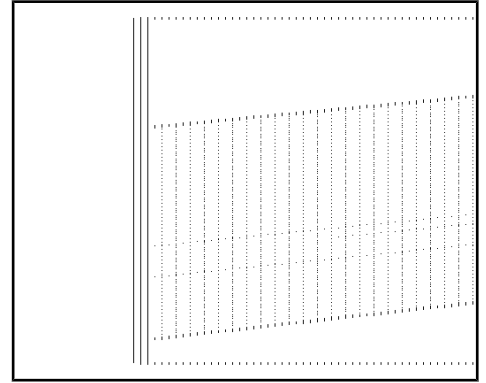
Removing and installing spring pin for differential pinion pin

Removing

- Cover up tapered roller bearing inner race and speedometer drive gear to keep out metal particles and to prevent damage.
- Drive out spring pin with chisel, inserting chisel into annular groove.

Installing

- Differential bevel gears and differential pinion pin are installed.
- Drive new spring pin onto stop in differential cage.

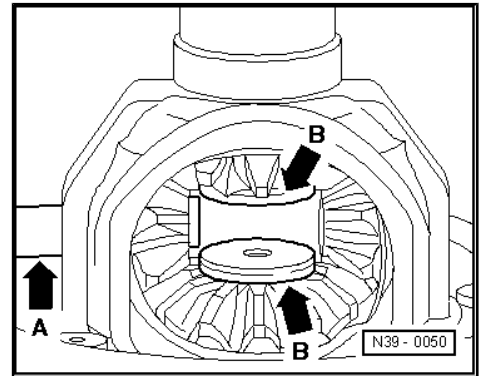


Installing differential bevel gears

- Lubricate one-piece thrust washer with gear oil and install.
- Install both sun wheels and secure (e.g. with flange shaft).
- Insert planet pinions (180° apart) and pivot into position.
- Push differential pinion pin -arrow A- in as far as first planet pinion.
- Fit threaded pieces -arrows B- in sun wheels.

Installation position: Stepped shoulder towards sun wheel

- Drive differential pinion pin into final position and secure with new spring pin.

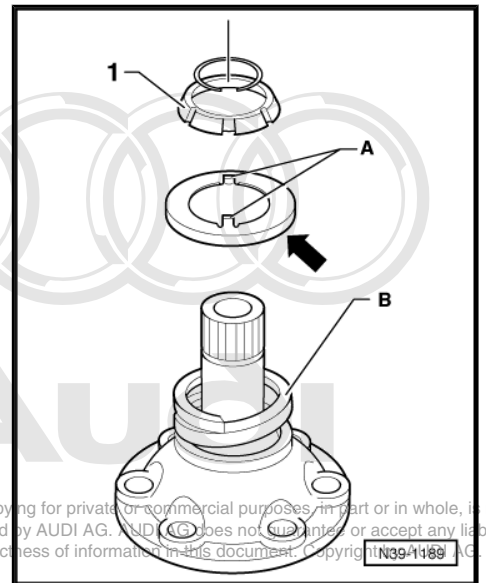


Installation position of thrust washer for tapered ring -1-

Collar -arrow- faces spring -B-.

Projections -A- are not present on some gearbox versions.

The projections -A- face towards tapered ring -1-.

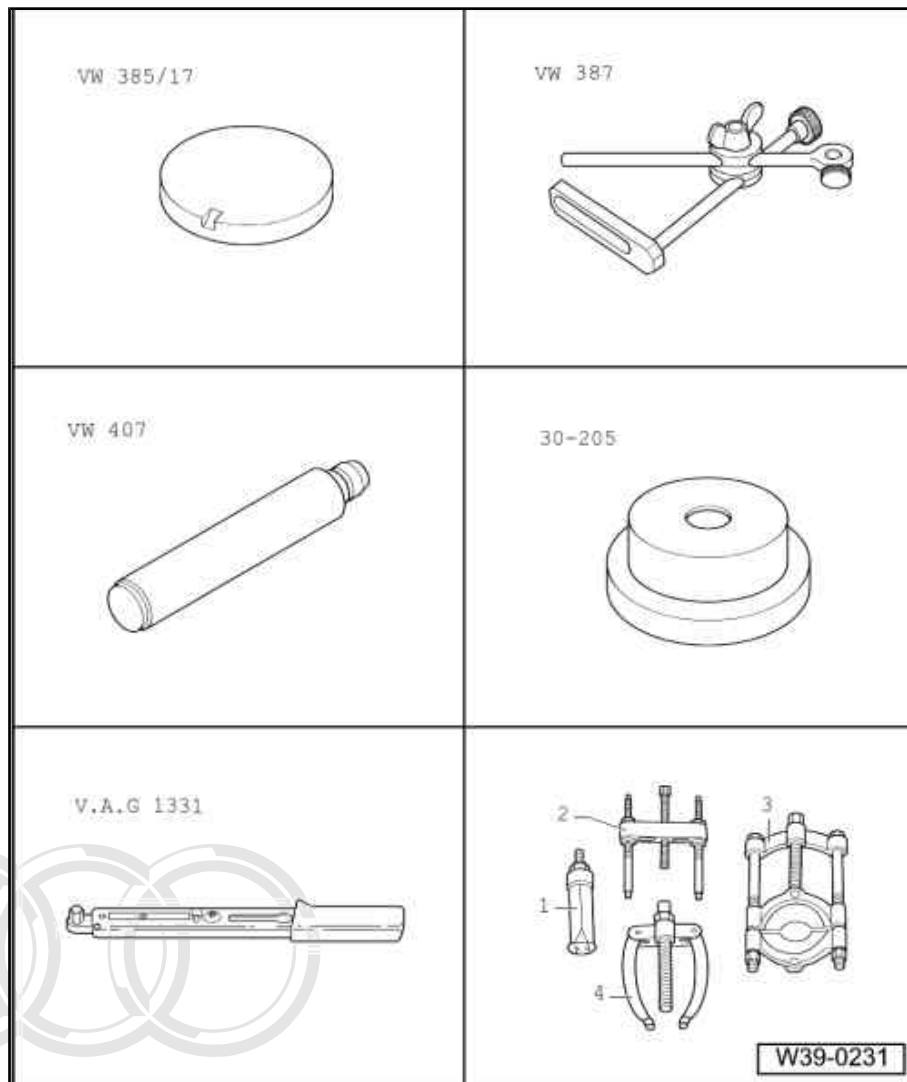


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3.2 Adjusting differential

Special tools and workshop equipment required

- ◆ End measuring plate - VW 385/17-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Press tool -VW 407-
- ◆ Thrust plate -30 - 205-
- ◆ Torque wrench - V.A.G 1331-
- ◆ -1- Internal puller -Kukko 21/7-
- ◆ -4- Counter-support -Kukko 22/2-
- ◆ Dial gauge



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

- ◆ Gearbox housing
- ◆ Clutch housing
- ◆ Differential cage

or the

- ◆ Differential tapered roller bearings

Table of adjustments ⇒ [page 171](#)



Note

The tapered roller bearing inner and outer races are paired. Do not interchange.

- Press tapered roller bearing outer race into clutch housing using thrust plate -30 - 205- ⇒ [page 176](#) .
- Press tapered roller bearing outer race without shim into gearbox housing using thrust plate -30 - 205- ⇒ [page 177](#) .
- Install differential in clutch housing.

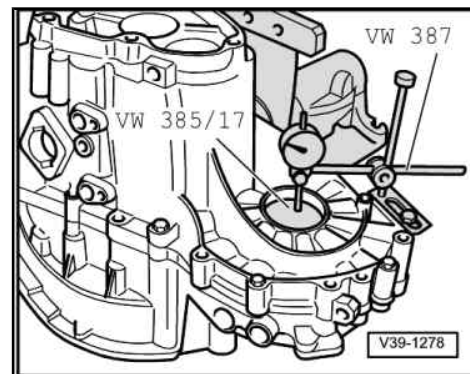
- Place gearbox housing in position and tighten 5 bolts to 25 Nm.
- Attach dial gauge and set to “0” with a preload of 1 mm.
- Move differential up and down and read off and note play indicated on dial gauge. (0.85 mm in this example.)

Determining thickness of shim

The specified bearing preload is obtained by adding a constant figure (0.25 mm) to the reading indicated.

Example:

Measured value	0.85 mm
+ Preload (constant value)	0.25 mm
Thickness of shim =	1.10 mm

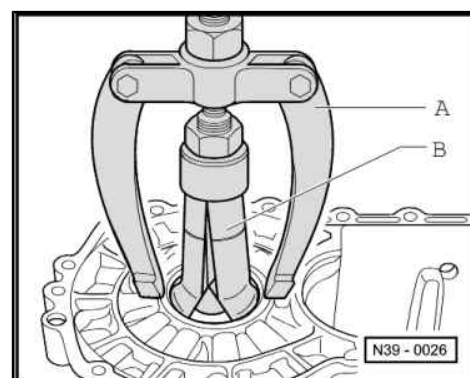


- Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing.

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

B - Internal puller 46 ... 58 mm , e.g. -Kukko 21/7-

- Install shims of the calculated thickness, thickest shim first.



Measured value (mm)	Shim
	Thickness (mm)
0.303...0.449	0.650
0.450...0.499	0.700
0.500...0.549	0.750
0.550...0.599	0.800
0.600...0.649	0.850
0.650...0.699	0.900
0.700...0.749	0.950
0.750...0.799	1.000
0.800...0.849	1.050
0.850...0.899	1.100
0.900...0.949	1.150
0.950...0.999	1.200
1.000...1.049	1.250
1.050...1.099	1.300
1.100...1.149	1.350
1.150...1.199	1.400

If the size of the shim required is larger than those listed in the table, install two shims amounting to the correct value.

Tolerance variations make it possible to obtain the exact shim thickness required.



Note

Select correct shims from ⇒ *Electronic parts catalogue*

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- Press in outer race of differential tapered roller bearing again and secure gearbox housing ⇒ [page 177](#) .