

Audi

Workshop Manual

Audi A3 1997 ➤

Automatic gearbox 01M

Edition 11.2007

List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 32 - Torque converter
- 37 - Controls, housing
- 38 - Gears, control
- 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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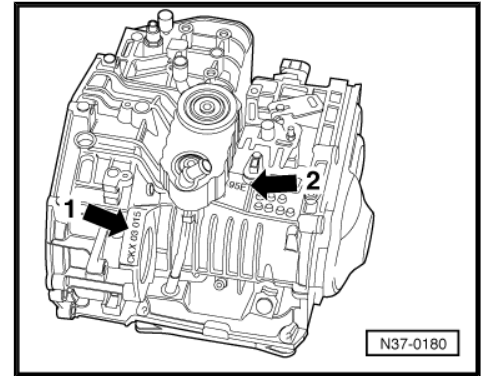
00 – Technical data

1 Gearbox identification

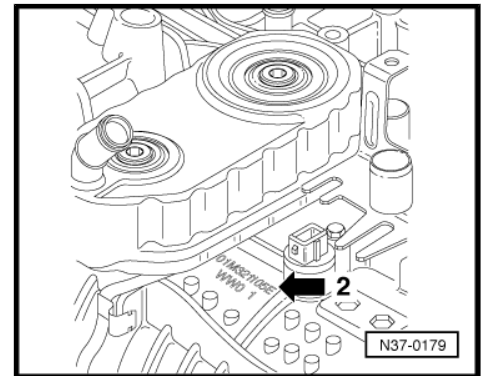
The “4-speed automatic gearbox 01M” is installed in the Audi A3 1997 ▶ in combination with various engine versions. Allocation ⇒ [page 3](#) .

Location on gearbox

- ◆ Code letters -arrow 1-
- ◆ Automatic gearbox 01M -arrow 2-



Automatic gearbox 01M -arrow 2-



Code letters and date of manufacture of gearbox

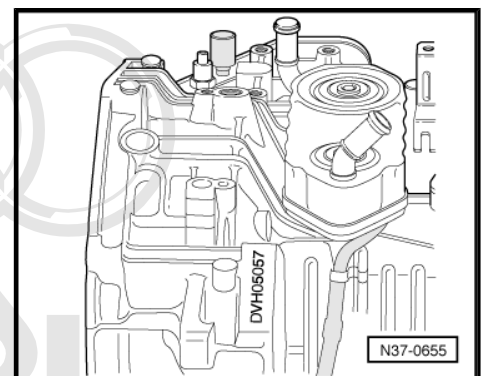
Example:

DVH	05	05	7
Code letters	Day	Month	Year (1997) of manufacture

Note

- ◆ Additional data are production-related.
- ◆ The code letters for the gearbox are also given on the vehicle data stickers.

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2 Information on “Automatic gearbox 01M”

Operating principle

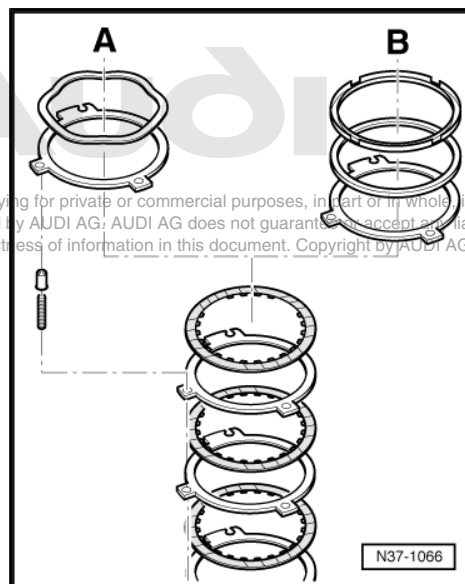
⇒ Self-study programme No. 172 ; Automatic gearbox model year '95 provides extensive information on the operating principle of the automatic 4-speed gearbox.

Two gearbox generations

A distinction is made between two types of gearbox:

A - Gearboxes in which a corrugated washer is fitted on the last outer plate in brake “B2” (code letters ⇒ [page 3](#))

B - Gearboxes in which a shim and a retaining ring are fitted in brake “B2” (code letters ⇒ [page 3](#))



3 Code letters, gearbox allocation, ratios, equipment

Automatic gearbox				01M				
Gearbox	Code letters		DLR ¹⁾		DLS ¹⁾		DMN ²⁾	
	Manufactured	from to	05.96 12.96		05.96 12.96		01.97 07.98	
Allocation	Model		Audi A3 1997 ▶		Audi A3 1997 ▶		Audi A3 1997 ▶	
	Engine		1.8 ltr. MPI - 92 kW		1.9 ltr. TDI - 66 kW		1.8 ltr. MPI - 92 kW	
Torque converter	Code letters	For sleeve bearing ³⁾	QADC		QCDC		QADC	
		With needle bearing ⁴⁾	QADD		QCDD		QADD	
Valve body	Code letters		QDB		QDB		QEB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		5	5	5	5	4	4
	Clutch "K3"		5	4	6	5	5	4
	Brake "B1"		5	5	5	5	5	5
	Brake "B2"		6	7	6	7	4	5
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	16		20		16	
		Final drive gear	78		74		78	
	Ratio		4.875		3.700		4.875	

- 1) Brake "B2" with corrugated washer on last outer plate.
- 2) Brake -B2- with shim and retaining ring.
- 3) For gearbox with sleeve bearing in turbine shaft ⇒ [page 26](#) .
- 4) With integrated needle bearing ⇒ [page 26](#) .

Automatic gearbox			01M		
Gearbox	Code letters		DMP ²⁾	DQD ¹⁾	DQE ²⁾
	Manufactured	from to	01.97 07.98	09.96 12.96	01.97 07.98
Allocation	Model		Audi A3 1997 ▶	Audi A3 1997 ▶	Audi A3 1997 ▶



Automatic gearbox			01M					
Engine			1.9 ltr. TDI - 66 kW		1.8 ltr. MPI - 92 kW		1.8 ltr. MPI - 92 kW	
Torque converter	Code letters	For sleeve bearing 3)	QCDC		QADC		QADC	
		With needle bearing 4)	QCDD		QADD		QADD	
Valve body	Code letters		QEB		QDB		QEB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		5	5	5	5	4	4
	Clutch "K3"		6	5	5	4	5	4
	Brake "B1"		5	5	5	5	5	5
	Brake "B2"		5	6	6	7	4	5
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	20		16		16	
		Final drive gear	74		78		78	
	Ratio		3.700		4.875		4.875	
• 1) Brake "B2" with corrugated washer on last outer plate. • 2) Brake -B2- with shim and retaining ring. • 3) For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . • 4) With integrated needle bearing ⇒ page 26 .								

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Automatic gearbox			01M		
Gearbox	Code letters		DTB 2)	DVH 2)	DVK 2)
	Manufactured from to		01.97 07.98	05.97 07.98	05.97 07.98
Allocation	Model		Audi A3 1997 ►	Audi A3 1997 ►	Audi A3 1997 ►
	Engine		1.6 ltr. MPI - 74 kW	1.8 ltr. MPI - 110 kW	1.9 ltr. TDI - 81 kW
Torque converter	Code letters	For sleeve bearing 3)	QADC	QCDC	QCDC

Automatic gearbox			01M					
With needle bearing 4)			QADD		QCDD		QCDD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		4	4	5	5	5	5
	Clutch "K2"		3	3	5	5	5	5
	Clutch "K3"		5	4	6	5	6	5
	Brake "B1"		4	4	6	6	6	6
	Brake "B2"		4	5	5	6	5	6
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	61		45		45	
		Output gear	63		44		44	
	Ratio		1.033		0.978		0.978	
Final drive	No. of teeth	Output shaft	16		15		15	
		Final drive gear	78		68		68	
	Ratio		4.875		4.533		4.533	
• 2) Brake -B2- with shim and retaining ring. • 3) For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . • 4) With integrated needle bearing ⇒ page 26 .								

Automatic gearbox			01M					
Gearbox	Code letters		ECK 2)		ECL		ECN 2)	
	Manufactured	from to	08.98 05.99		08.98 05.99		08.98 05.99	
Allocation	Model	Engine	Audi A3 1997 ► 1.8 ltr. MPI - 92 kW		Audi A3 1997 ► 1.8 ltr. MPI - 92 kW		Audi A3 1997 ► 1.9 ltr. TDI - 66 kW	
Torque converter	Code letters	For sleeve bearing 3)	QADC		QADC		QCDC	
		With needle bearing 4)	QADD		QADD		QCDD	
Valve body	Code letters		QFB		QEB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		4	4	4	4	5	5



Automatic gearbox			01M					
	Clutch "K3"		5	4	5	4	6	5
	Brake "B1"		5	5	5	5	5	5
	Brake "B2"		4	5	4	5	5	6
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	16		16		20	
		Final drive gear	78		78		74	
	Ratio		4.875		4.875		3.700	
1) Brake "B2" with corrugated washer on last outer plate. 2) Brake -B2- with shim and retaining ring. 3) For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . 4) With integrated needle bearing ⇒ page 26 . Audi Protected by copyright. Copying for private or commercial purposes, in part or permitted unless authorised by AUDI AG. AUDI AG does not guarantee or ac with respect to the correctness of information in this document. Copyright t								

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Automatic gearbox			01M					
Gearbox	Code letters		ECP ²⁾		ECR ²⁾		ECT ²⁾	
	Manufactured	from to	08.98 05.99		08.98 05.99		08.98 05.99	
Allocation	Model		Audi A3 1997 ►		Audi A3 1997 ►		Audi A3 1997 ►	
	Engine		1.8 ltr. MPI - 110 kW		1.9 ltr. TDI - 81 kW		1.6 ltr. MPI - 74 kW	
Torque converter	Code letters	For sleeve bearing ³⁾	QCDC		QCDC		QADC	
		With needle bearing ⁴⁾	QCDD		QCDD		QADD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	4	4
	Clutch "K2"		5	5	5	5	3	3
	Clutch "K3"		6	5	6	5	5	4
	Brake "B1"		6	6	6	6	4	4
	Brake "B2"		5	6	5	6	4	5
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	

Automatic gearbox			01M		
	3rd gear		1.000	1.000	1.000
	4th gear		0.742	0.742	0.742
	Reverse gear		2.884	2.884	2.884
Intermediate drive	No. of teeth	Input gear	45	45	61
		Output gear	44	44	63
	Ratio		0.978	0.978	1.033
	Final drive	No. of teeth	Output shaft	16	20
Final drive gear			78	74	78
Ratio		4.875	3.700	4.875	
• 2) Brake -B2- with shim and retaining ring. • 3) For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . • 4) With integrated needle bearing ⇒ page 26					

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Automatic gearbox			01M					
Gearbox	Code letters		ELS ²⁾		ELT ²⁾		ELU ²⁾	
	Manufactured	from to	05.99 11.99		05.99 11.99		05.99 11.99	
Allocation	Model		Audi A3 1997 ➤		Audi A3 1997 ➤		Audi A3 1997 ➤	
	Engine		1.8 ltr. MPI - 92 kW		1.9 ltr. TDI - 66 kW		1.8 ltr. MPI - 110 kW	
Torque converter	Code letters	For sleeve bearing ³⁾	QADC		QCDC		QCDC	
		With needle bearing ⁴⁾	QADD		QCDD		QCDD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		4	4	5	5	5	5
	Clutch "K3"		5	4	6	5	6	5
	Brake "B1"		5	5	5	5	6	6
	Brake "B2"		4	5	5	6	5	6
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	



Automatic gearbox			01M		
	Ratio		0.978	0.978	0.978
Final drive	No. of teeth	Output shaft	16	20	15
		Final drive gear	78	74	68
	Ratio		4.875	3.700	4.533
• 2) Brake -B2- with shim and retaining ring. • 3) For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . • 4) With integrated needle bearing ⇒ page 26 .					

Automatic gearbox				01M				
Gearbox	Code letters		EPA 2)		EPB 2)		EPC 2)	
	Manufactured	from to	12.99 01.00		12.99 01.00		12.99 01.00	
Allocation	Model		Audi A3 1997 ▶		Audi A3 1997 ▶		Audi A3 1997 ▶	
	Engine		1.8 ltr. MPI - 92 kW		1.9 ltr. TDI - 66 kW		1.8 ltr. MPI - 110 kW	
Torque converter	Code letters	With needle bearing 4)	QADD		QCDD		QCDD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		4	4	5	5	5	5
	Clutch "K3"		5	4	6	5	6	5
	Brake "B1"		5	5	5	5	6	6
	Brake "B2"		4	5	5	6	5	6
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	16		20		15	
		Final drive gear	78		74		68	
	Ratio		4.875		3.700		4.533	

• 2) Brake -B2- with shim and retaining ring.

• 4) With integrated needle bearing ⇒ [page 26](#) .

Automatic gearbox			01M					
Gearbox	Code letters		ERQ ²⁾		ERX ²⁾		ESE ²⁾	
	Manufactured	from to	03.99 04.99		05.99 11.99		05.99 11.99	
Allocation	Model		Audi A3 1997 ▶		Audi A3 1997 ▶		Audi A3 1997 ▶	
	Engine		1.6 ltr. MPI - 74 kW		1.9 ltr. TDI - 81 kW		1.6 ltr. MPI - 74 kW	
Torque converter	Code letters	For sleeve bearing ³⁾	QADC		QCDC		QADC	
		With needle bearing ⁴⁾	QADD		QCDD		QADD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		4	4	5	5	4	4
	Clutch "K2"		3	3	5	5	3	3
	Clutch "K3"		5	4	6	5	5	4
	Brake "B1"		4	4	6	6	4	4
	Brake "B2"		4	5	5	6	4	5
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	16		18		16	
		Final drive gear	78		61		78	
	Ratio		4.875		3.389		4.875	
• ²⁾ Brake -B2- with shim and retaining ring. • ³⁾ For gearbox with sleeve bearing in turbine shaft ⇒ page 26 . • ⁴⁾ With integrated needle bearing ⇒ page 26 .								

Automatic gearbox			01M		
Gearbox	Code letters		ESF ²⁾	FDA ²⁾	FDC ²⁾
	Manufactured	from to	12.99 01.00	02.00	02.00
Allocation	Model		Audi A3 1997 ▶	Audi A3 1997 ▶	Audi A3 1997 ▶
	Engine		1.9 ltr. TDI - 81 kW	1.8 ltr. MPI - 92 kW	1.8 ltr. MPI - 110 kW



Automatic gearbox			01M					
Torque converter	Code letters	With needle bearing 4)	QCDD		QADD		QCDD	
Valve body	Code letters		QFB		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer	Inner	Outer
	Clutch "K1"		5	5	5	5	5	5
	Clutch "K2"		5	5	4	4	5	5
	Clutch "K3"		6	5	5	4	6	5
	Brake "B1"		6	6	5	5	6	6
	Brake "B2"		5	6	4	5	5	6
Ratios	1st gear		2.714		2.714		2.714	
	2nd gear		1.441		1.441		1.441	
	3rd gear		1.000		1.000		1.000	
	4th gear		0.742		0.742		0.742	
	Reverse gear		2.884		2.884		2.884	
Intermediate drive	No. of teeth	Input gear	45		45		45	
		Output gear	44		44		44	
	Ratio		0.978		0.978		0.978	
Final drive	No. of teeth	Output shaft	18		16		15	
		Final drive gear	61		78		68	
	Ratio		3.389		4.875		4.533	
• 2) Brake -B2- with shim and retaining ring. • 4) With integrated needle bearing <u>⇒ page 26</u> .								

Automatic gearbox			01M			
Gearbox	Code letters		FDH ²⁾		FDH ²⁾	
	Manufactured	from to	02.00		02.00	
Allocation	Model		Audi A3 1997 ►		Audi A3 1997 ►	
	Engine		1.6 ltr. MPI - 74 kW		1.6 ltr. MPI - 75 kW	
Torque converter	Code letters	With needle bearing ⁴⁾	QADD		QADD	
Valve body	Code letters		QFB		QFB	
Number of plates			Inner	Outer	Inner	Outer
	Clutch "K1"		4	4	4	4
	Clutch "K2"		3	3	3	3
	Clutch "K3"		5	4	5	4
	Brake "B1"		4	4	4	4
	Brake "B2"		4	5	4	5
Ratios	1st gear		2.714		2.714	
	2nd gear		1.441		1.441	

Automatic gearbox			01M	
	3rd gear		1.000	1.000
	4th gear		0.742	0.742
	Reverse gear		2.884	2.884
Intermediate drive	No. of teeth	Input gear	63	63
		Output gear	61	61
	Ratio		1.033	1.033
Final drive	No. of teeth	Output shaft	16	16
		Final drive gear	78	78
	Ratio		4.875	4.875
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness or translation in this document. Copyright by AUDI AG. • 2) Brake -B2- with shim and retaining ring. • 4) With integrated needle bearing ⇒ page 26 .				

4 Capacities

Planetary gearbox

Capacities	Planetary gearbox	Automatic gearbox
Initial filling	5.3 ltr.	01M
Oil change	Approx. 3.0 ltr. Change interval for ATF ⇒ Maintenance tables	
Lubricant	ATF ⇒ Electronic parts catalogue	



Caution

Risk of malfunction or gearbox failure.

- ◆ *Use only the ATF available as a replacement part for automatic gearbox 01M ⇒ Electronic parts catalogue .*

- Checking ATF level ⇒ [page 62](#) and changing ATF ⇒ [page 67](#) .

Final drive

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Capacities	Final drive	Automatic gearbox
Initial filling	0.75 ltr.	01M
Oil change	Filled for life, no change	
Lubricant	Gear oil SAE 75 W90 (synthetic oil) ⇒ Electronic parts catalogue	

- Checking oil level in final drive ⇒ [page 149](#) .

5 Safety precautions

Observe the following precautions to avoid possible injury and/or damage to the vehicle:



WARNING

Accidents and injury can be caused if a gear is inadvertently engaged while the engine is running.

- ◆ *Before working on the vehicle while the engine is running, shift the selector lever into position "P" and apply the handbrake.*

Danger from toxic exhaust gases when engine is running.

- ◆ *When the engine is running, the exhaust system must always be connected to an exhaust gas extractor unit.*

Observe the following precautions to avoid possible injury and/or irreparable damage to electrical and electronic components:

- ◆ Switch off ignition before disconnecting and connecting test equipment.



Caution

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

- ◆ *Observe the correct procedure for disconnecting the battery.*
- ◆ *Always switch off the ignition before disconnecting the battery.*

– Disconnecting battery ⇒ Rep. Gr. 27 .

Observe the following precautions if test equipment has to be used when road-testing the vehicle.



WARNING

Accidents can be caused if the driver is distracted by test equipment or if test equipment is not secured.

Injuries can also be caused if the passenger's airbag is triggered in a collision.

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Always secure testing equipment to the rear seat with a strap and have them operated from there by a second person.*

6 Notes on tow-starting and towing



Caution

Risk of irreparable damage to gearbox.

- ◆ *When the vehicle is towed, the selector lever must be set to position "N" and the vehicle must not be towed for a distance of more than 50 km or at a speed in excess of 50 km/h.*



Note

It is not possible to start the engine by means of tow-starting, for instance in the case of insufficient battery charge or if the starter is not working.



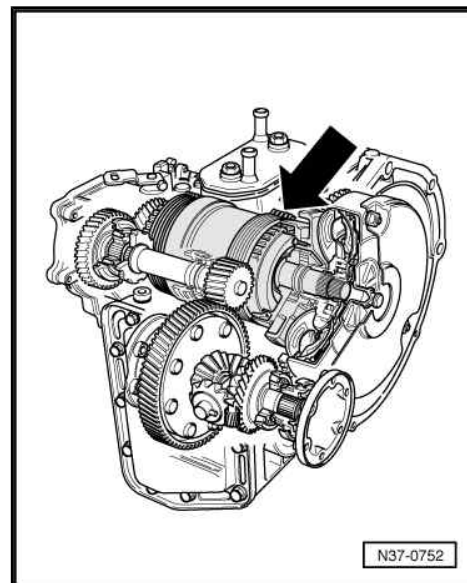
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7 Exchange component

- ◆ The exchange component -arrow- is a low-cost replacement part. It contains all clutches, all brakes, the ATF pump, the planetary gearbox and the valve body for the respective gearbox.
- ◆ The exchange component is assigned to the gearbox code ⇒ [page 3](#) .
- ◆ The items contained in the exchange component are listed on ⇒ [page 15](#) .

The following items are not included:

- ◆ O-rings for ATF cooler, ATF filler pipe, multifunction switch - F125- , vehicle speed sender -G68- and gearbox speed sender -G38-
- ◆ Gasket for ATF oil pan, gasket for intermediate drive cover
- ◆ Conductor strip for valve body
- Removing exchange component ⇒ [page 73](#) .
- Installing exchange component ⇒ [page 80](#) .



Note

When installing an exchange component, use all new parts supplied with the exchange component; do not reuse old parts.

7.1 Items supplied with exchange component



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1 - ATF pump with piston "B2"

2 - Components of brake "B2"

☐ ⇒ [page 17](#)

3 - Reverse gear clutch "K2"

4 - Shims for clutch clearance

☐ Shims are colour-coded to indicate different thicknesses

5 - 1st to 3rd gear clutch "K1"

☐ Clutches "K1" and "K3" may be pressed together

6 - 3rd and 4th gear clutch "K3" with turbine shaft

☐ Clutches "K1" and "K3" may be pressed together

7 - Axial needle bearing with washer

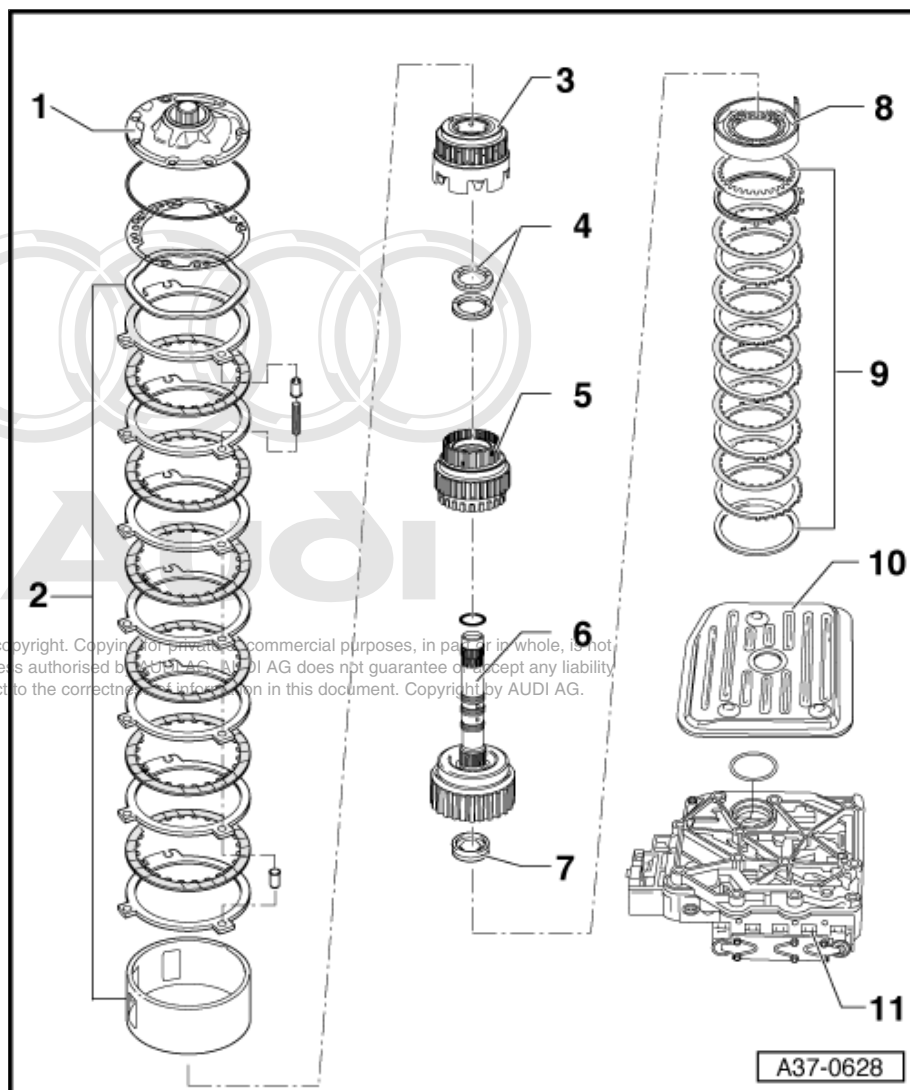
8 - Freewheel with piston "B1"

9 - Components of brake "B1"

☐ ⇒ [page 16](#)

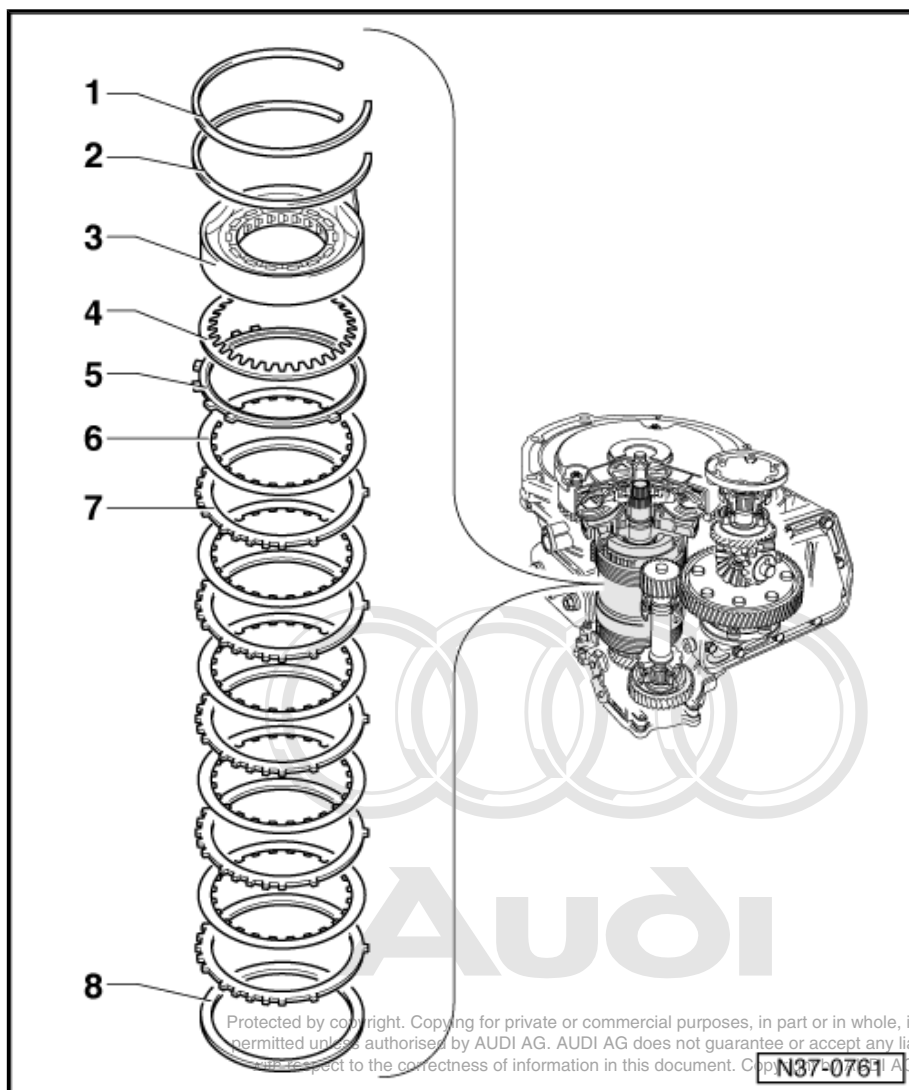
10 - ATF strainer

11 - Valve body



Components of brake "B1"

- 1 - Circlip
 - For supporting tube "B2"
- 2 - Circlip
 - For freewheel
- 3 - Freewheel
 - With piston "B1"
- 4 - Dished spring
- 5 - Pressure plate "B1"
- 6 - Inner plate "B1"
- 7 - Outer plate "B1"
- 8 - Shim



Components of brake "B2"



Note

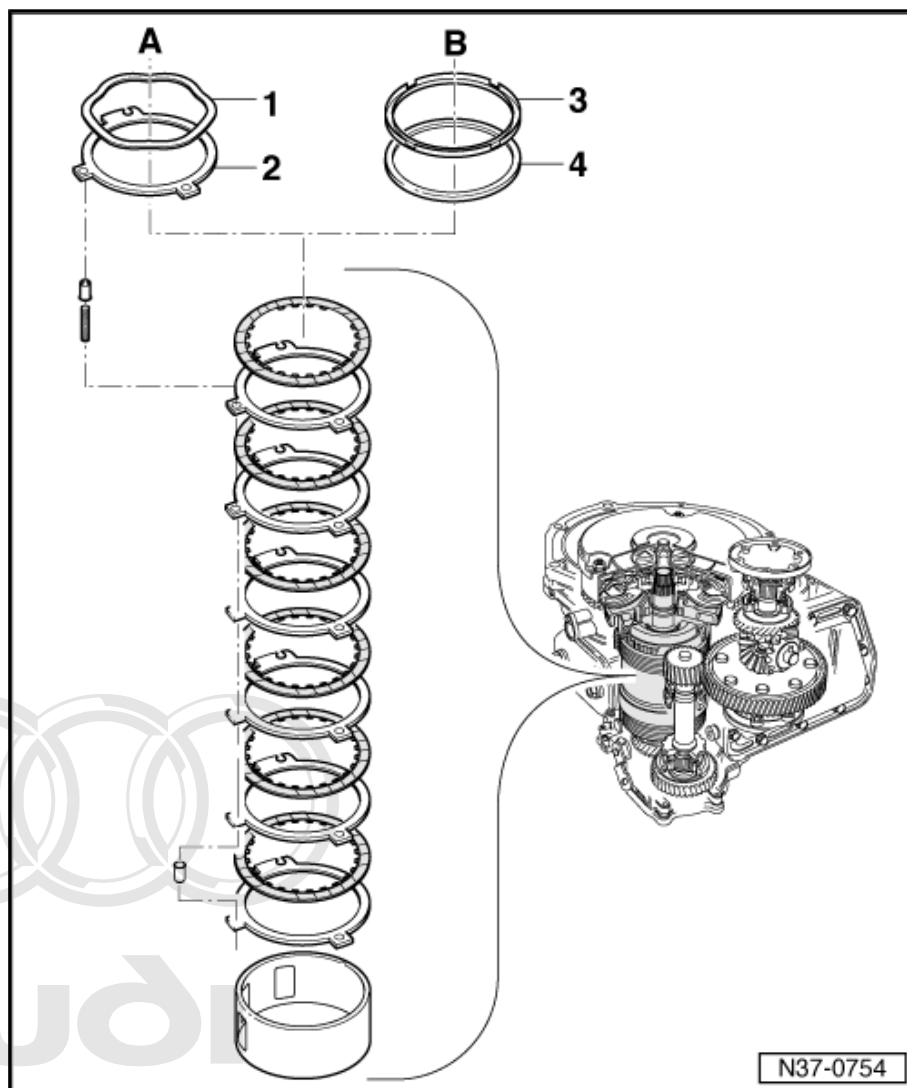
Brake "B2" is supplied in two versions.

A - Brake "B2"

- ☐ Version with corrugated washer
- ☐ Code letters ➔ [page 3](#)

1 - Corrugated washer**2 - Outer plate "B2"****B - Brake "B2"**

- ☐ Version with retaining ring
- ☐ Code letters ➔ [page 3](#)

3 - Retaining ring**4 - Shim**

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Clutches**Note**

Clutches "K1" and "K3" exist in two versions.

A - Clutches -items 3, 4, 5- are pressed together

B - Clutches can be loosely fitted together

1 - Reverse gear clutch "K2"

2 - Shims for clutch clearance

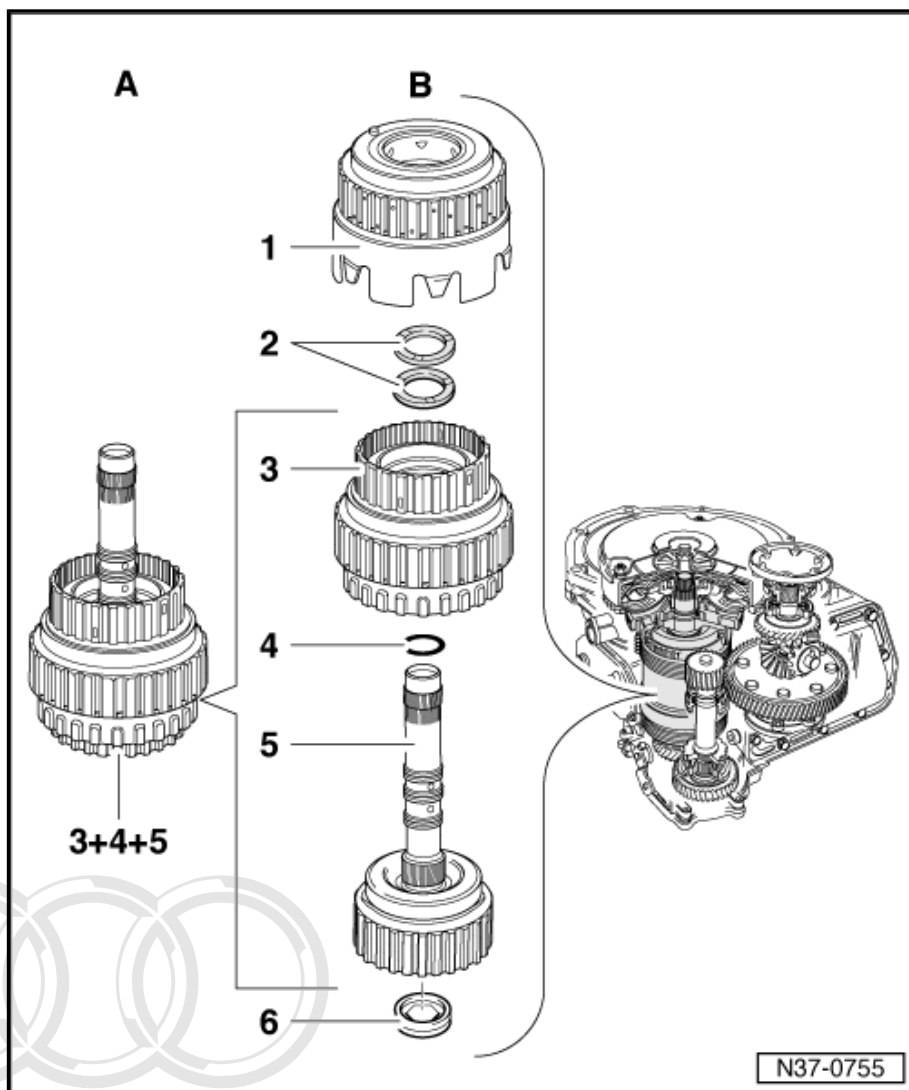
- ☐ Up to 3 shims may be fitted

3 - 1st to 3rd gear clutch "K1"

4 - O-ring

5 - 3rd and 4th gear clutch "K3" with turbine shaft

6 - Axial needle bearing with washer



Valve body with ATF strainer

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1 - Steel spring and bolt

- ☐ For operating rod for manual selector valve

2 - Sealing plug for freewheel

- ☐ Must be ordered separately if required

3 - Valve body

- ☐ Supplied without conductor strip
- ☐ Conductor strip must be ordered separately if required

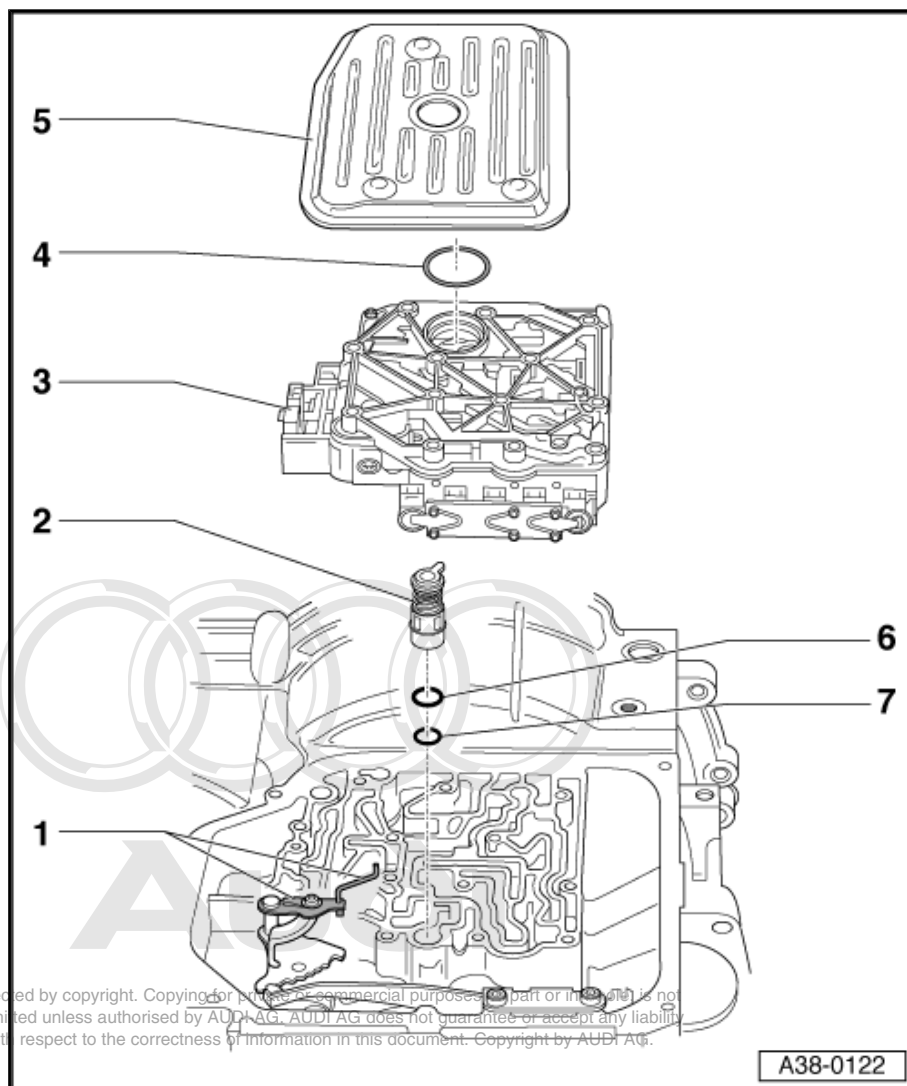
4 - Seal

- ☐ Press onto suction collar on ATF strainer

5 - ATF strainer

6 - O-ring

7 - O-ring



8 Repair instructions

8.1 Contact corrosion!

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

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

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

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

Please note:

- ◆ Use only genuine spare parts: these have been fully tested and are compatible with aluminium.
- ◆ We recommend the use of accessories approved by Audi.
- ◆ Damage resulting from contact corrosion is not covered by the warranty.

8.2 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.

To avoid repetition, a number of generally applicable instructions for the various repair procedures are summarised here. They apply to the work described in this Manual.

Vehicle self-diagnosis

Before servicing the gearbox, the exact cause of the fault must be determined as precisely as possible. Self-diagnosis is described in a separate manual ⇒ Automatic gearbox 01M, self-diagnosis; Rep. Gr. 01 .

Environmental and waste disposal regulations for oil

- ◆ ATF, gear oil and any other type of oil must be handled with care.
- ◆ Dispose of drained oil properly.
- ◆ Always adhere to statutory environmental and waste disposal regulations.
- ◆ Observe the information shown on the packaging of the oil.

Special tools

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

Gearbox

- ◆ Rules for cleanliness when working on the automatic gearbox ⇒ [page 24](#) .
- ◆ Do not run engine or tow vehicle with ATF oil pan removed or when there is no ATF in the gearbox.
- ◆ If gearbox has been removed from vehicle, secure torque converter to prevent it from falling out.
- ◆ Before installing torque converter, refer to notes regarding sleeve bearing in turbine shaft ⇒ [page 26](#) .

- ◆ Check position of torque converter before installing gearbox
⇒ [page 31](#) .
- ◆ When installing gearbox ensure dowel sleeves are correctly seated.
- ◆ After installing, the following fluid levels must be checked and topped up if necessary: ATF in planetary gearbox
⇒ [page 62](#) and gear oil in final drive ⇒ [page 149](#) . Capacities and specifications ⇒ [page 12](#)

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.
- ◆ The open side of the oil seal should face the side containing the fluid.
- ◆ Before installing, lightly lubricate outer circumference and sealing lips of oil seals with ATF or gear oil, depending on fitting location.
- ◆ Lightly lubricate O-rings with ATF before installation to prevent them getting crushed during assembly.
- ◆ Use only ATF for parts running in ATF. Other lubricants will cause malfunction of the gearbox hydraulics.
- ◆ When installing a new oil seal, position the seal such that the sealing lip does not contact the shaft in the same place as the old seal (make use of installation depth tolerances).
- ◆ After installing, the following fluid levels must be checked and topped up if necessary: ATF in planetary gearbox
⇒ [page 62](#) and gear oil in final drive ⇒ [page 149](#) . Capacities and specifications ⇒ [page 12](#)

Nuts, bolts

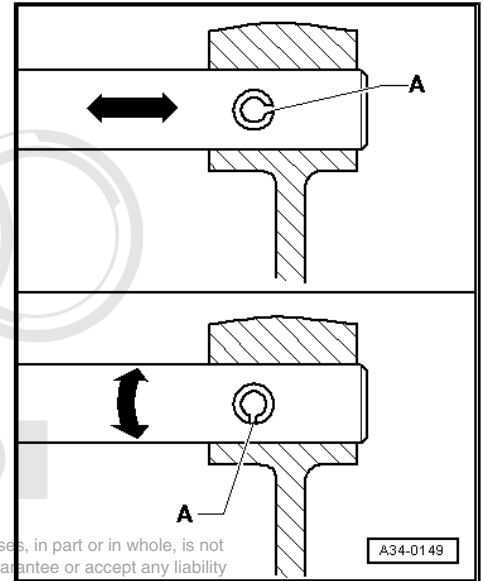
- ◆ Loosen bolts in reverse sequence to the specified tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- ◆ Parts which are particularly sensitive to distortion (e.g. valve body) must be kept straight when removing and installing; loosen or tighten diagonally in stages.
- ◆ The tightening torques stated apply to non-oiled nuts and bolts.
- ◆ Renew self-locking nuts and bolts.
- ◆ 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 bolts again before fitting.
- ◆ 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.
- ◆ Renew bolts which are tightened by turning through a specified angle.

Circlips, snap rings

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

Bearings

- ◆ Install needle bearings so the lettering (side with thicker metal) faces towards the installing tool.
- ◆ Lubricate bearings with gear oil or ATF, depending on fitting location.
- ◆ Do not interchange inner or outer races of bearings of the same size.
- ◆ If required, renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Heat tapered roller bearing inner races to approx. 100 °C before installing. Press in onto stop when installing so there is no axial clearance.



Shims

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

Inner plates

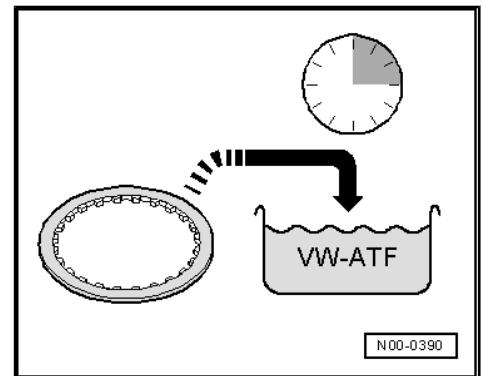
- ◆ Soak new inner plates in ATF for 15 minutes before installing.

Valve body

- ◆ Renew valve body if any of the shift elements are scorched.

Clutches

- ◆ Clutches "K1", "K2" and "K3" should be dismantled for cleaning only; renew clutches if any components are defective. Clutches are assigned by way of gearbox code.



9 Rules for cleanliness when working on the automatic gearbox

- ◆ Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- ◆ Use cleaning fluid -D 009 401 04- to clean the gearbox and its components.
- ◆ Use lint-free cloths for cleaning; Audi recommends the "WY-PALL X70 / WORKHORSE" cloth from Kimberly-Clark Professional.
- ◆ Seal off open lines and connections with clean plugs or sealing caps immediately.
- ◆ Place removed parts on a clean surface and cover them over. Use sheeting and paper. Use lint-free cloths.
- ◆ Carefully cover or seal open components if repairs cannot be completed immediately.
- ◆ Only install clean components: do not remove replacement parts from packaging until just before installation.
- ◆ Protect unplugged electrical connectors against dirt and moisture and make sure connections are dry when attaching.



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32 – Torque converter

1 Exploded view - torque converter



Note

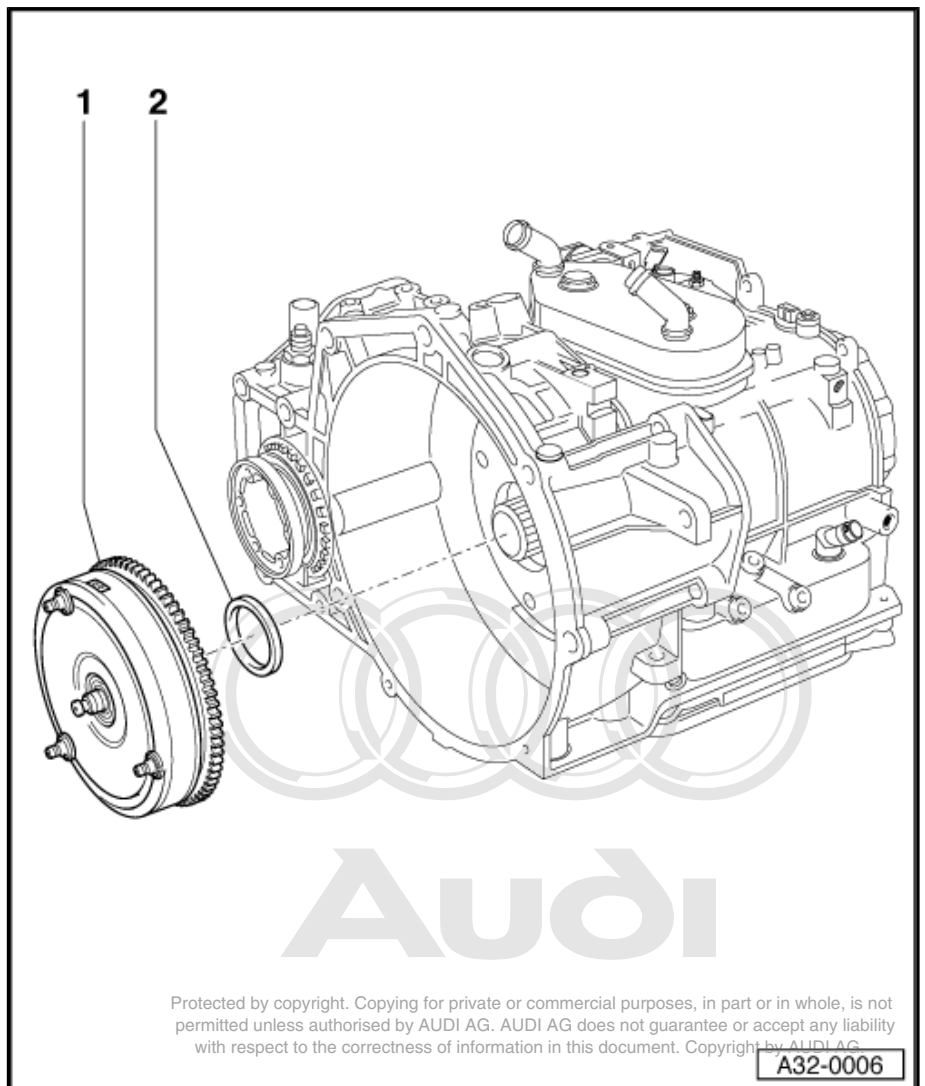
- ◆ *Rules for cleanliness when working on the automatic gearbox*
⇒ [page 24](#).
- ◆ *General repair instructions* ⇒ [page 21](#).

1 - Torque converter

- ☐ Secure to prevent it falling out when gearbox is removed ⇒ [page 26](#)
- ☐ Code letters ⇒ [page 3](#)
- ☐ Allocation ⇒ [page 26](#)
- ☐ Identification ⇒ [page 26](#)
- ☐ Installing ⇒ [page 30](#)
- ☐ Installation depth ⇒ [page 31](#)

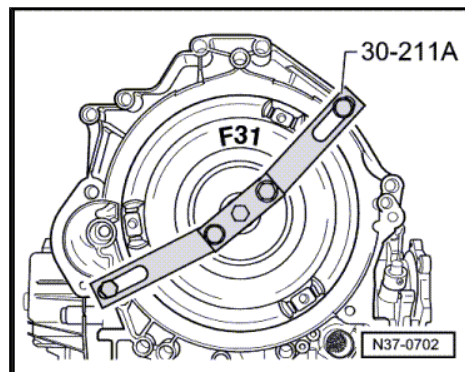
2 - Oil seal

- ☐ Renewing ⇒ [page 28](#)



Secure the torque converter to prevent it from falling out

- Secure torque converter using support bridge -30 - 211 A- to prevent it from falling out, as shown in illustration.



1.1 Allocation of torque converter

There are two versions which are allocated according to the gearbox code ➔ [page 3](#) .

Torque converter (old type):

- With sleeve bearing -arrow- in turbine shaft of gearbox.

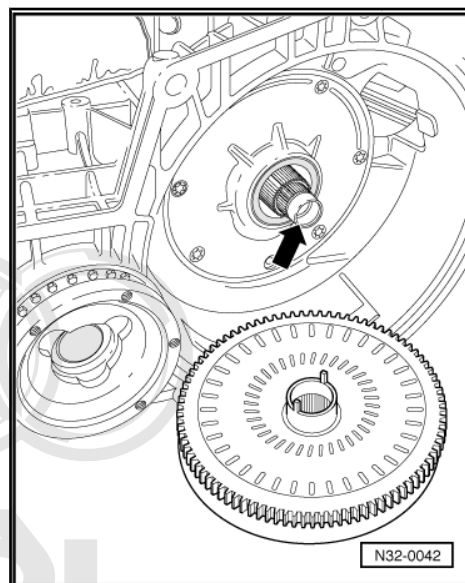
Torque converter (new type):

- With integrated needle bearing. If this version is installed, a sleeve bearing -arrow- must not be fitted in the turbine shaft of the gearbox.



Note

If a new torque converter with integrated needle bearing is installed in a gearbox with a sleeve bearing in the turbine shaft, the sleeve bearing must be removed ➔ [page 27](#) .



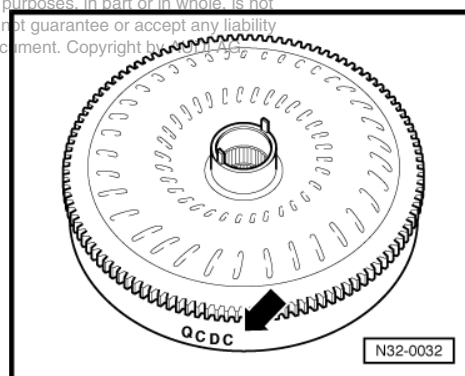
1.2 Identification of torque converter

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

Torque converter (old type):

A torque converter of the old type must only be installed in gearboxes with a sleeve bearing in the turbine shaft.

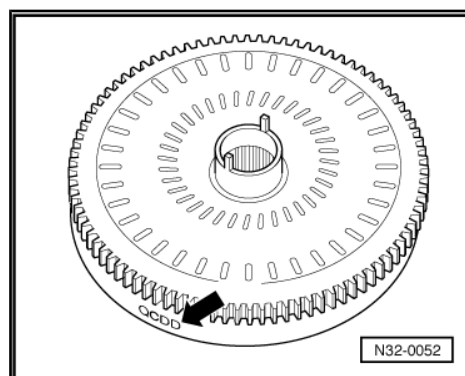
- Identification: The fourth letter in the identification code is a "C" -arrow-.



Torque converter (new type):

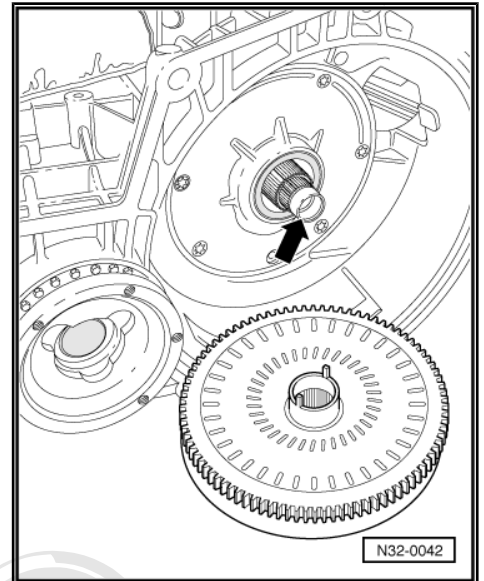
A torque converter of the new type must only be installed in gearboxes with no sleeve bearing in the turbine shaft.

- Identification: The fourth letter in the identification code is a "D" -arrow-.



i Note

If a new torque converter with integrated needle bearing is installed in a gearbox with a sleeve bearing in the turbine shaft, the sleeve bearing must be removed -arrow- [⇒ page 27](#).



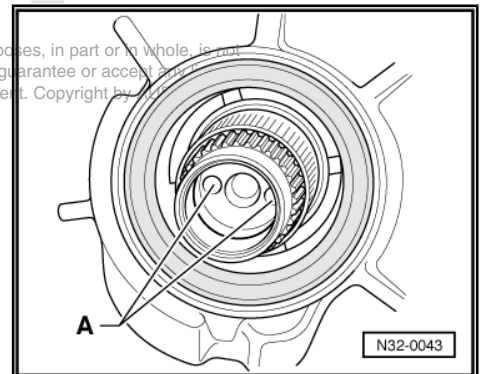
1.3 Removing sleeve bearing from turbine shaft

i Note

If a new torque converter with integrated needle bearing is installed in a gearbox with a sleeve bearing in the turbine shaft, the sleeve bearing must be removed.

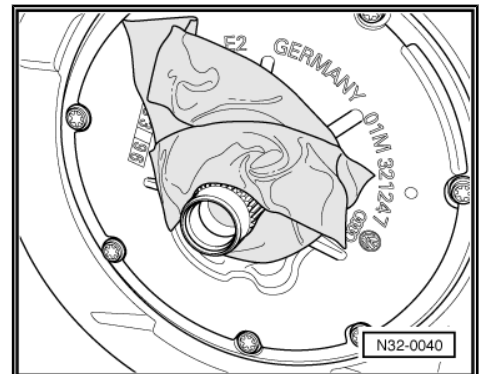
Procedure

- Gearbox removed [⇒ page 46](#)
- Position gearbox in installation position on the ATF oil pan.
- Take out torque converter.
- Position holes -A- in turbine shaft so that they are horizontal.

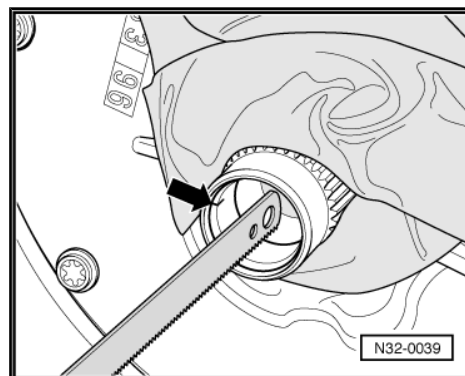


i Note

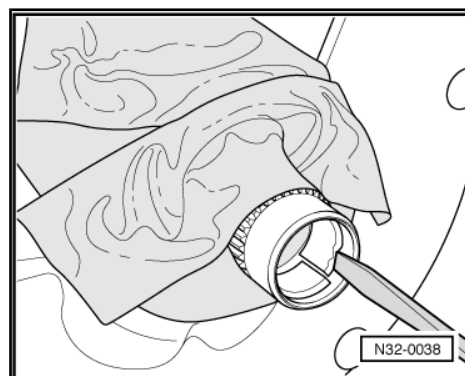
Protect gearbox from metal particles by carefully masking off turbine shaft and holes with adhesive tape.



- Saw open sleeve bearing with saw blade. When doing so, do not place saw blade on sleeve bearing joint -arrow-.
- Make sure that no metal particles enter gearbox.



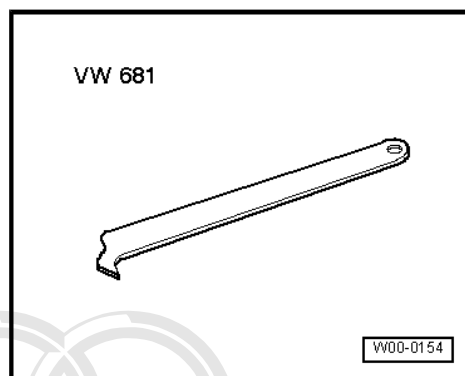
- Carefully prise off sawn-open sleeve bearing using screwdriver, without damaging turbine shaft.
- Remove metal particles and adhesive tape.
- Renew oil seal for torque converter ⇒ [page 28](#) .



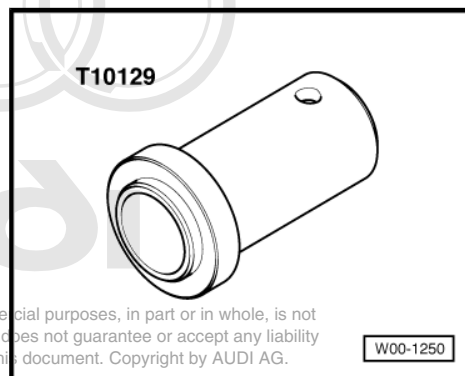
1.4 Renewing oil seal for torque converter

Special tools and workshop equipment required

- ◆ Oil seal extractor lever -VW 681-



- ◆ Thrust piece -T10129-



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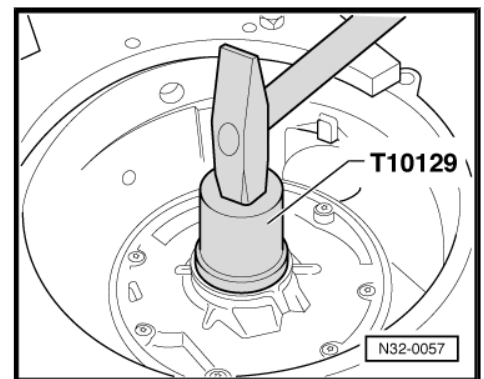
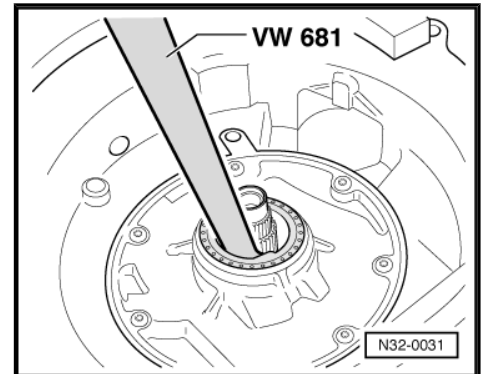
Procedure

- Gearbox removed ⇒ [page 46](#) .
- Remove torque converter.

- Secure gearbox to engine and gearbox support ➔ [page 56](#) or position gearbox in installation position on the ATF oil pan.
- Remove oil seal for torque converter using oil seal extractor lever -VW 681- .
- Lightly lubricate outer circumference and sealing lips of new oil seal with ATF.
- Installation position: open side of oil seal points towards gearbox.

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- Drive in torque converter oil seal with thrust piece -T10129- until thrust piece reaches stop.



1.5 Draining torque converter

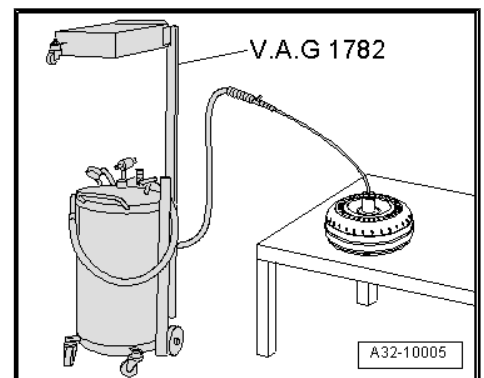
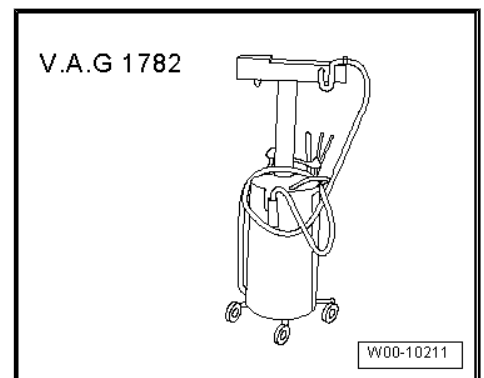
Special tools and workshop equipment required

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

Procedure

Drain the torque converter as follows if it has become obstructed by abrasion, or when performing a major overhaul of the gearbox:

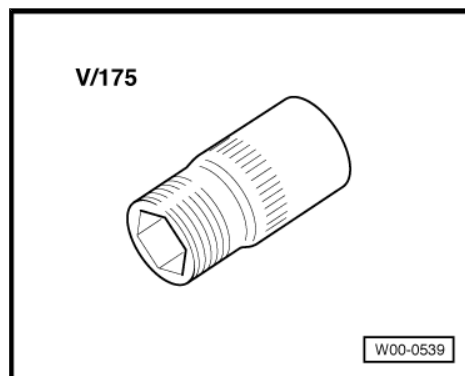
- Extract ATF from torque converter with used oil collection and extraction unit -V.A.G 1782- and oil extractor probe.



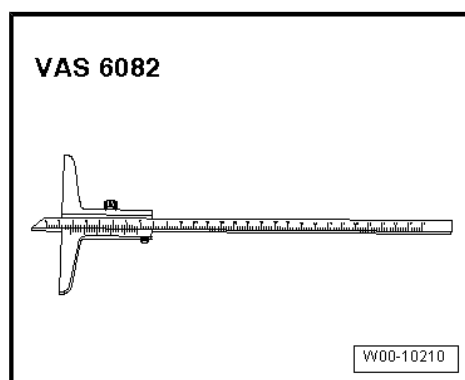
1.6 Installing torque converter

Special tools and workshop equipment required

- ◆ 15 mm socket attachment Matra V/175



- ◆ Depth gauge -VAS 6082-



Procedure

- Press torque converter hub through oil seal as far as first stop.
- Turn the torque converter, at the same time pressing it inwards lightly until the slots on the torque converter hub engage in the drive lugs on the ATF pump gear and the torque converter slides in a noticeable distance.

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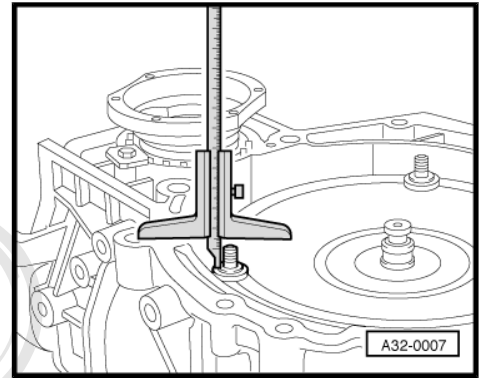
Installation depth



Caution

If the torque converter is not fitted correctly, the drive lugs on the torque converter or the ATF pump will be seriously damaged when the gearbox is joined to the engine.

- If the torque converter is correctly installed, the depth between the contact faces at the bottom of the studs on the torque converter and the contact surface of the torque converter bell-housing is about 22 mm.



Note

If the torque converter has not been fully inserted, the distance will be only approx. 10 mm.

- Use genuine nuts for attaching torque converter to drive plate
⇒ Electronic parts catalogue
- Use 15 mm socket (Matra V175) to tighten nuts of torque converter.

37 – Controls, housing

1 Exploded view - selector mechanism



WARNING

Accidents and injury can be caused if a gear is inadvertently engaged while the engine is running.

- ◆ *Before working on the vehicle while the engine is running, shift the selector lever into position "P" and apply the handbrake.*

1 - Bolt

- 8 Nm

2 - Locking segment

3 - Contact spring

- For selector lever position indicator

4 - Bolt

- 4 Nm
- Shift selector lever into position "P" to loosen and tighten.

5 - Bolt

- 2x
- 1.5 Nm

6 - Selector lever lock solenoid -N110-

- Function test
⇒ [page 34](#)
- Removing and installing
⇒ [page 38](#)

7 - Nut

- Renew
- 13 Nm

8 - Washer

9 - Nut

- With shoulder
- 25 Nm

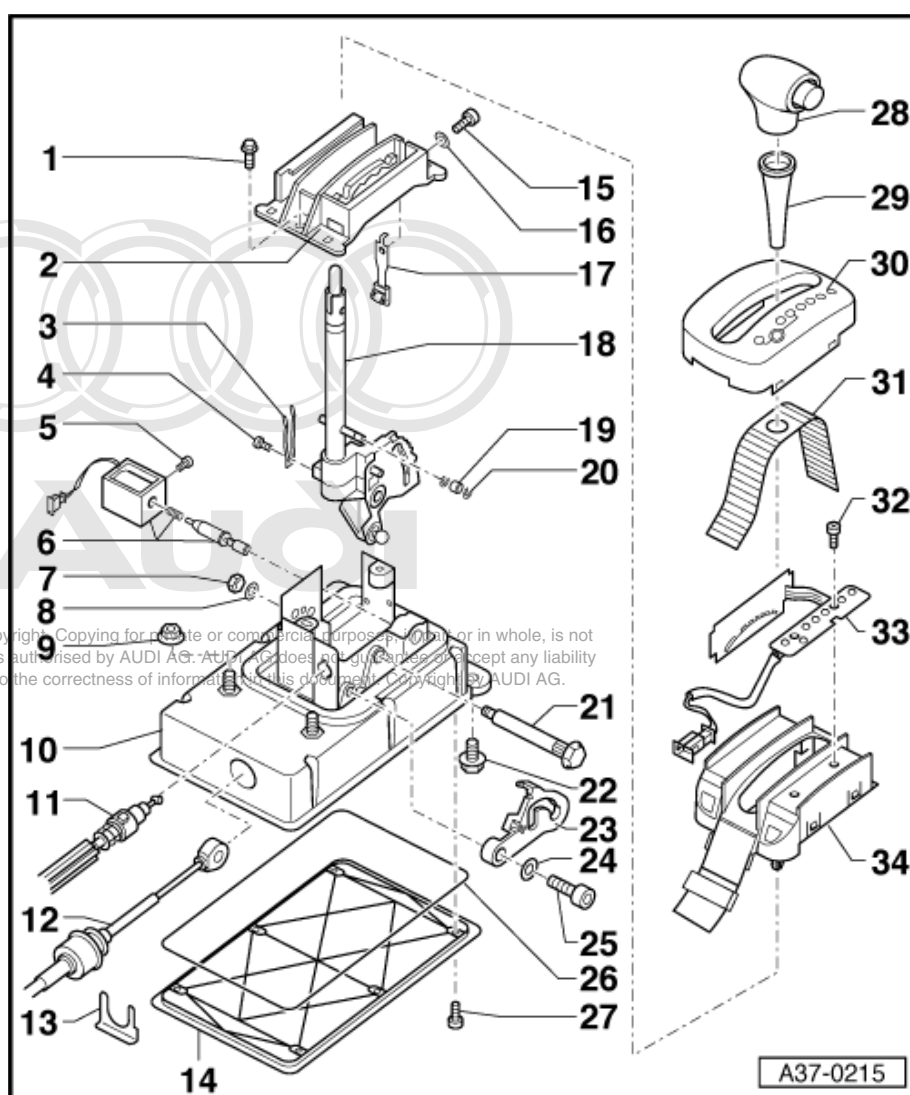
10 - Shift unit

11 - Locking cable

- Do not bend or kink
- Removing and installing ⇒ [page 40](#)
- Adjusting ⇒ [page 42](#)

12 - Selector lever cable

- Do not bend or kink
- Renew selector lever cable if rubber sleeve is damaged
- Removing and installing ⇒ [page 36](#)



- ☐ Before installing, lightly lubricate ball socket with polycarbamide grease -G 052 142 A2- .
- ☐ Adjusting ⇒ [page 37](#)

13 - Retaining clip

- ☐ For selector lever cable sleeve

14 - Bottom cover

- ☐ For shift unit

15 - Bolt

- ☐ 7 Nm

16 - Washer

17 - Detent spring

- ☐ With roller

18 - Selector lever

- ☐ With release
- ☐ Removing and installing ⇒ [page 39](#)

19 - Roller

20 - Circlip

21 - Bolt

- ☐ Splined
- ☐ Only counterhold at bolt head, do not turn!
- ☐ Apply grease to shank

22 - Bolt

- ☐ 25 Nm

23 - Locking lever

- ☐ For locking cable
- ☐ Locks selector lever in position "P"

24 - Washer

25 - Bolt

- ☐ Standard bolt 0.5 Nm
- ☐ Bolt with shoulder, tightening torque according to bolt diameter

26 - Seal

27 - Bolt

28 - Selector lever handle

- ☐ To remove, push sleeve for selector lever -item 29- downwards and remove handle by pulling it upwards
- ☐ To install, press handle onto selector lever and pull sleeve upwards to secure

29 - Sleeve for selector lever

30 - Selector gate

- ☐ Clipped onto frame -item 34-
- ☐ To remove, carefully release securing lugs

31 - Cover strip

- ☐ Clipped onto frame -item 34-

32 - Bolt

33 - Selector lever position display

- ☐ With contact plate and connector

34 - Frame

- ☐ Attached onto shift unit

- ❑ To remove, carefully compress retaining lugs at 4 securing points

1.1 Checking selector mechanism

Overview:

- ◆ 1. Checking operation of selector mechanism ➔ [page 34](#)
- ◆ 2. Checking ignition key removal lock ➔ [page 34](#)
- ◆ 3. Checking interlock button on selector lever handle ➔ [page 35](#).

1. Checking operation of selector mechanism

- It should not be possible to operate the starter while the selector lever is in position "R", "D", "3" and "2".
- When travelling at speeds above 5 km/h and shifting into selector lever position "N", the solenoid for the selector lever lock must not engage and block the selector lever. The selector lever can be shifted into a driving gear.
- When travelling at speeds below 2 km/h (almost stationary) and shifting into selector lever position "N", the solenoid for the selector lever lock should only engage after about 1 second. Selector lever cannot be shifted out of "N" position until brake pedal is depressed.

Selector lever in "P" position and ignition switched on:

- Do not depress brake pedal.
- The selector lever is locked and cannot be shifted out of "P" position, even when the interlock button on the handle is pressed in. Solenoid for selector lever lock -N110- blocks selector lever.
- Press and hold brake pedal.
- Solenoid for selector lever lock -N110- releases selector lever. It is possible to shift into a driving gear. With interlock button on selector lever handle pressed, shift selector lever slowly from "P" position through "R, N, D, 3 and 2" and check whether the selector lever position display -Y6- in the instrument cluster shows the correct selector lever position in each case.

Selector lever in "N" position and ignition switched on:

- Do not depress brake pedal.
- After a short delay: Selector lever is locked and cannot be shifted out of "N" position even when pressing the interlock button on the selector lever handle. Solenoid for selector lever lock -N110- blocks selector lever.
- Depress brake pedal.
- Solenoid for selector lever lock -N110- releases selector lever. Shifting into position "D" is possible.
- If the specified results are not obtained, perform self-diagnosis ➔ Rep. Gr. 01
- Adjust selector lever cable ➔ [page 37](#).
- Check interlock button on selector lever handle ➔ [page 35](#).
- Check ignition key removal lock.

2. Checking ignition key removal lock

- Switch on ignition:
- Press and hold brake pedal.

- When interlock button in selector lever handle is pressed, it should be possible to move selector lever out of position "P" without "catching".
- Switch off ignition.
- It should not be possible to remove the ignition key when the selector lever is in any position other than "P".
- Shift selector lever into position "P".
- Pull out ignition key.
- It should only be possible to remove ignition key in selector lever position "P".
- Selector lever can then not be shifted out of "P" position with interlock button pressed and brake pedal depressed.

If the ignition key removal lock does not function as described, perform self-diagnosis ⇒ Rep. Gr. 01 .

3. Checking interlock button on selector lever handle

Check that interlock button moves freely:

- Interlock button should move easily when pressed without force.
- Interlock button should spring back fully on its own when released.
- If specified results are not obtained, check that selector lever handle is correctly installed ⇒ [page 39](#) .
- Check whether selector rod or selector lever is bent.

Function test:

- Ignition switched on

Press the interlock button on the selector lever handle to move the handle into the positions listed below; it should not be possible to move the selector lever into these positions unless the interlock button is pressed.

- ◆ "P" to "R" (also depress brake pedal)
- ◆ "D" to "3" (according to version)
- ◆ "2" to "1" (according to version)
- ◆ "N" to "R" (vehicle stationary; brake pedal also has to be depressed)
- ◆ "R" to "P"

- If specified results are not obtained, check that selector lever handle is correctly installed ⇒ [page 39](#) .
- Perform self-diagnosis ⇒ Rep. Gr. 01 and check selector lever lock solenoid -N110- .
- Adjust selector lever cable ⇒ [page 37](#) .

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1.2 Removing and installing selector lever cable

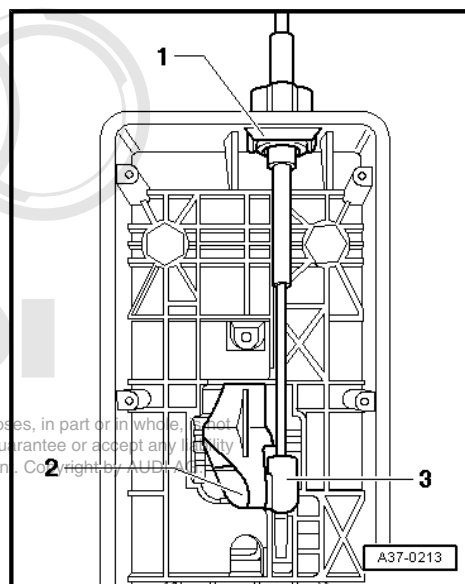
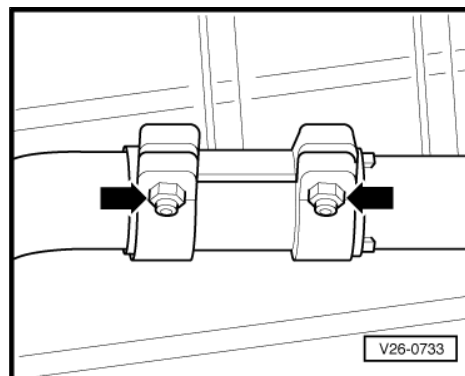
Removing



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.

- Disconnect exhaust system at clamp -arrows-.
- Remove heat shield for exhaust system below selector mechanism.
- Unscrew cover on bottom of selector mechanism.
- Pry selector lever cable -3- off selector lever -2- using a screwdriver.
- Pull off retaining clip -1- for sleeve of selector lever cable.



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- Use screwdriver to pry selector lever cable -1- off selector shaft lever -4- in engine compartment, detach retaining clip -3- from cable support bracket.



Note

Do not bend or kink the selector lever cable.

- Remove selector lever cable.

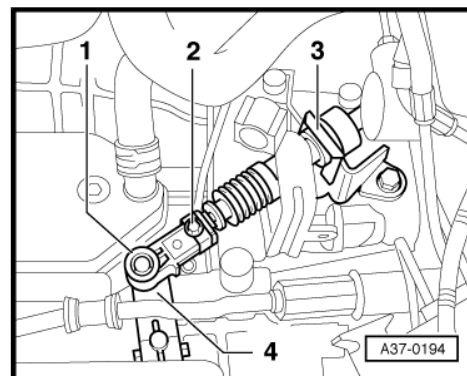
Installing

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



Note

- ◆ *Do not bend or kink the selector lever cable.*
- ◆ *Before installing, lightly lubricate ball socket with polycarbamide grease -G 052 142 A2- .*
- ◆ *Rubber sleeve for selector lever cable must be fitted correctly, otherwise water or dirt can enter selector cable assembly.*
- ◆ *Check rubber sleeve for damage; rubber sleeve can only be renewed together with selector lever cable.*
- Adjust selector lever cable ➔ [page 37](#) .
- Align exhaust system so it is free of stress ➔ Rep. Gr. 26 .



1.3 Adjusting selector lever cable

Adjusting

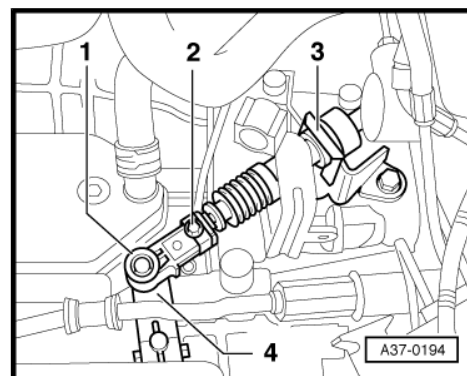
- Shift selector lever into position “P”.
- Loosen bolt -2- at front ball socket -1- of selector lever cable.
- Also move selector shaft lever -4- to position “P” (rear stop).

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- **The parking lock must be engaged.**
- **Make sure that the selector lever cable is not under tension.**
- Tighten bolt.
- Tightening torque: 8 Nm.
- Carry out check after installation and adjustment of selector lever cable.

Checking

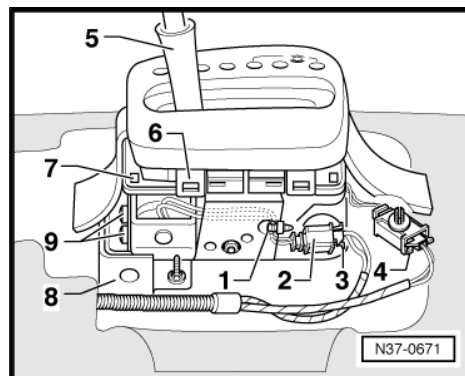
- With interlock button pressed and selector lever in position “P”, pull selector lever back approx. 5 mm and release.
- The lever should spring back into the previous position by itself.
- With interlock button pressed and selector lever in position “N”, push selector lever forward approx. 5 mm and release.
- The lever should spring back into the previous position by itself.
- If the lever does not spring back by itself, repeat the adjustment.



1.4 Removing and installing selector lever lock solenoid -N110-

Removing

- Push down sleeve -5- on selector lever handle with two screwdrivers.
- Pull selector lever handle off upwards.
- Remove centre console (bottom) ⇒ Rep. Gr. 68 .
- Disengage locking cable from selector mechanism
⇒ [page 41](#) .
- Cut open cable tie -1- on shift unit, taking care not to damage electrical wiring.
- Use screwdriver to carefully pry retainer -2- for connector out of shift unit.
- Unplug electrical connectors -3- for selector lever lock solenoid -N110- and -4- for selector lever position display.
- Release selector lever housing cover at four retaining lugs -6- by hand and lift off.
- Carefully lever off the four corners of the frame -7- and remove.



Note

Pay attention to contact spring for selector lever position display!

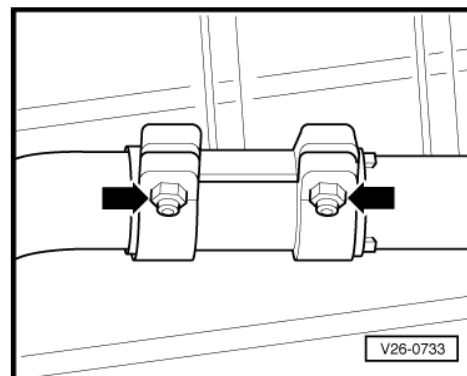
- Unfasten 2 bolts and remove locking segment.
- Shift selector lever into position "1".
- Remove 2 nuts and detach retaining bracket -8-.
- Remove 2 bolts -9- for selector lever lock solenoid -N110- .
- Remove 2 nuts on front of selector mechanism.

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i 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.

- Disconnect exhaust system at clamp -arrows-.
- Route wiring harness in such a way that it will not be damaged by selector lever or selector lever lock solenoid -N110- .
- Remove heat shield for exhaust system below selector mechanism.
- Remove bolts on rear of selector mechanism.
- Support selector mechanism from below.



i Note

Do not bend or kink the selector lever cable.

- With the selector lever in position "1" remove the selector lever lock solenoid -N110- with locking pin and spring from the shift unit, at the same time moving the selector lever to and fro slightly if necessary.

Installing

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

- Adjust locking cable ⇒ [page 42](#) .
- Check selector mechanism ⇒ [page 34](#) .
- Align exhaust system so it is free of stress ⇒ Rep. Gr. 26 .

1.5 Removing and installing selector lever

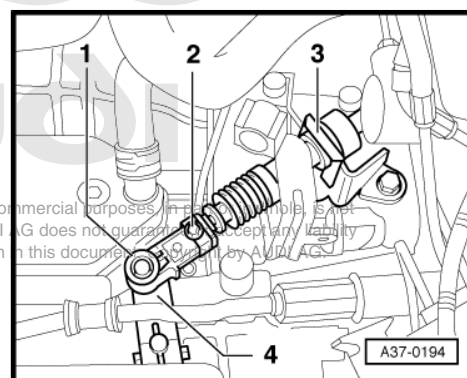
Removing

- Remove selector lever lock solenoid -N110- ⇒ [page 38](#) .
- Use screwdriver to pry selector lever cable -1- off selector shaft lever -4- in engine compartment, detach retaining clip -3- from cable support bracket.

i Note

Do not bend or kink the selector lever cable.

- Remove selector lever cable.
- Unscrew cover on bottom of selector mechanism.



- Pry selector lever cable -3- off selector lever -2- using a screw-driver.
- Pull off retaining clip -1- for sleeve of selector lever cable.
- Carefully pull selector lever cable out of shift unit.
- Loosen nut for selector lever pivot pin, counterholding at hexagon flats on pivot pin.



Note

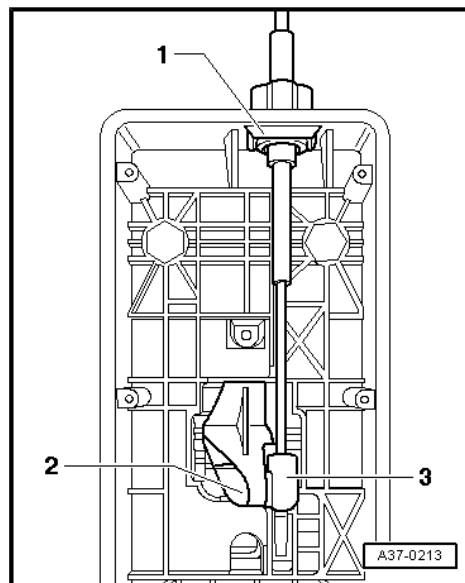
The pivot pin must not be turned.

- Carefully drive out pivot pin using drift.
- Remove selector lever.

Installing

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

- Install selector lever lock solenoid -N110- ➔ [page 38](#) .
- Adjust selector lever cable ➔ [page 37](#) .
- Adjust locking cable ➔ [page 42](#) .
- Check selector mechanism ➔ [page 34](#) .
- Align exhaust system so it is free of stress ➔ Rep. Gr. 26 .



1.6 Removing and installing locking cable

Removing

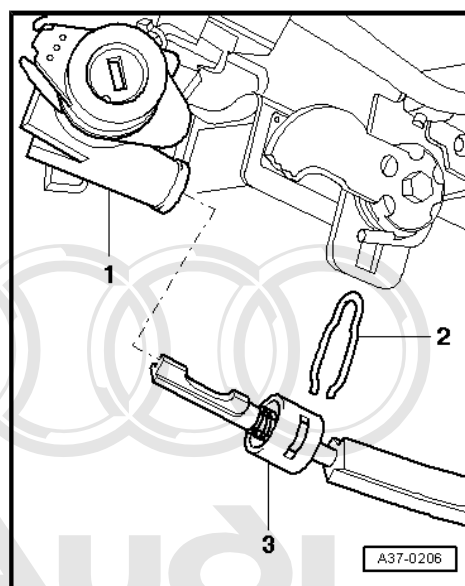
- Remove centre console (bottom) ➔ Rep. Gr. 68 .
- Press off retaining clip -2- for locking cable -3-.



Note

Remove steering wheel, trim on left below the dashboard, steering column trim, handle for steering column adjustment if necessary to gain access to components.

- Turn ignition key to "ignition on" position.
- Pull off locking cable from ignition starter switch -1-.
- Disengage locking cable from locking lever.



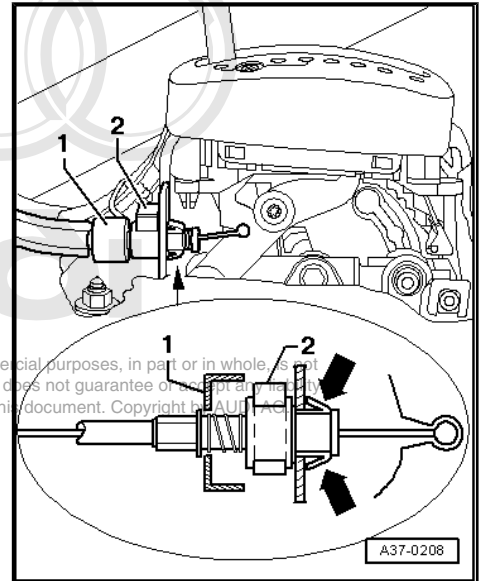
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- Compress lugs on retaining clip -arrows-.
- Pull locking cable out of selector mechanism.

i Note

Do not kink locking cable

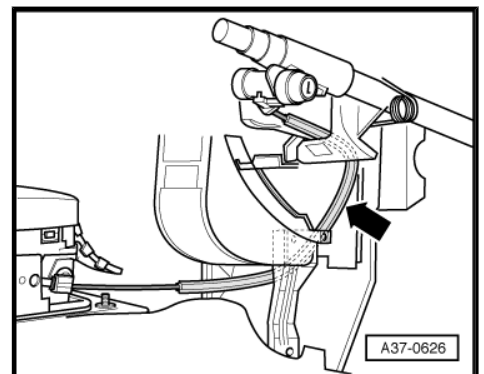
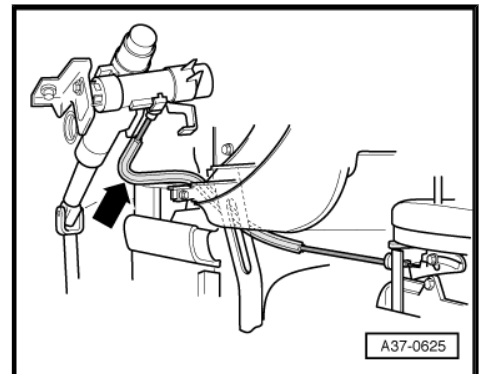
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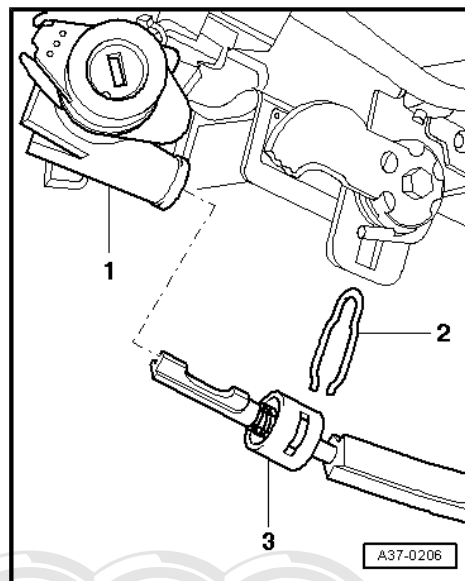
Installing

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

- Route locking cable correctly:
 - Routing -arrow- on left-hand drive vehicles.
- Routing -arrow- on right-hand drive vehicles.



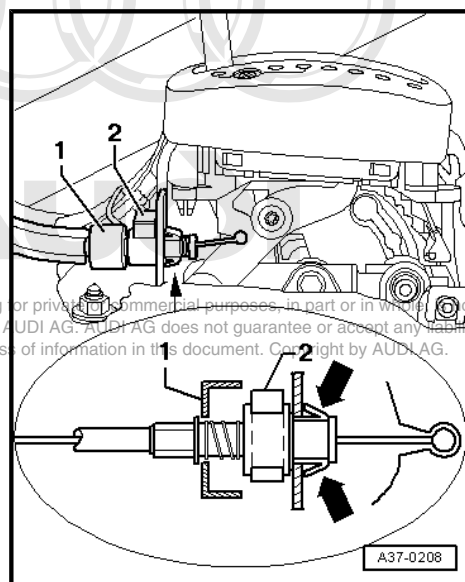
- Turn ignition key to “ignition on” position.
- Insert locking cable -3- in mounting hole on ignition/starter switch -1- as far as stop and lock with retaining clip -2-.
- Insert nipple of locking cable into selector mechanism and press on support bracket until retaining clips engage.
- Adjust locking cable ⇒ [page 42](#) .



1.7 Adjusting locking cable

Procedure

- Centre console removed.
- Locking cable must be in installation position.
- Selector lever is in position “P”
- Ignition key withdrawn.
- Slide sleeve -1- forwards.
- Release clip -2- by pressing upwards.
- The locking cable tensions itself under spring pressure and moves into the setting position.
- Press retaining clip -2- down until it engages.
- Slide sleeve -1- over the clip.



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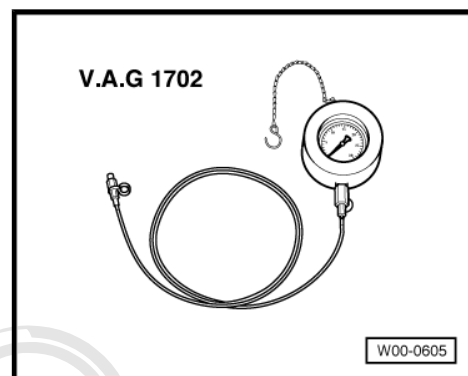
2 Measuring system pressure

Note

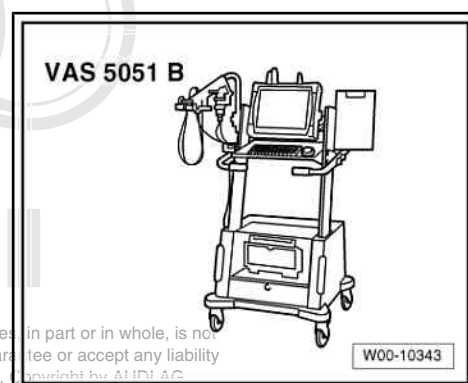
To identify the cause of the fault, always perform self-diagnosis as the first step ⇒ Rep. Gr. 01.

Special tools and workshop equipment required

- ♦ Automatic gearbox tester -V.A.G 1702-



- ♦ Vehicle diagnostic, testing and information system -VAS 5051B-



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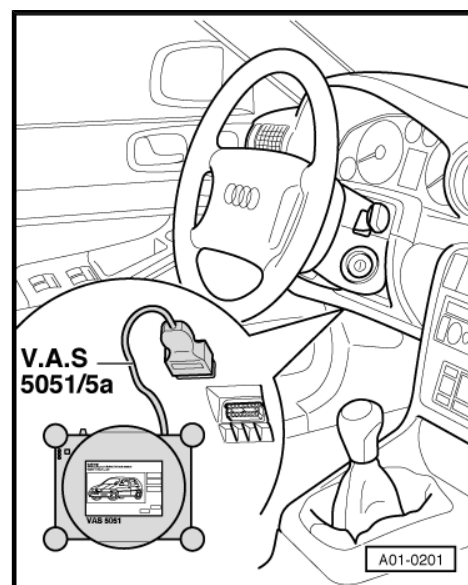
- ♦ Drip tray

Procedure

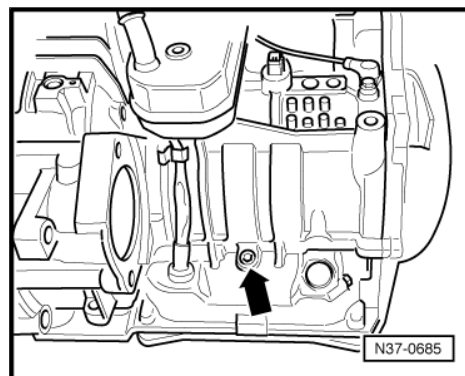
- Vehicle diagnostic, testing and information system -VAS 5051B- connected up; "Vehicle self-diagnosis" and vehicle system "02 - Gearbox electronics" selected ⇒ Rep. Gr. 01.
- No fault stored in fault memory ⇒ Rep. Gr. 01.
- Handbrake applied.

Note

System pressure should be tested on a roller dynamometer (if available).

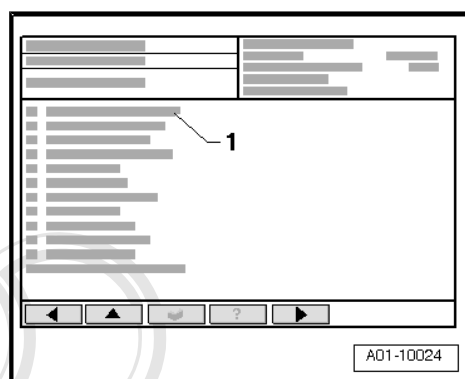


- Remove bolt -arrow- for system pressure hole.
- Connect automatic gearbox tester -V.A.G 1702- and tighten knurled screw.
- Start engine and run at idling speed.
- Bleed automatic gearbox tester -V.A.G 1702- (to do so, slacken off knurled screw and tighten again after bleeding).



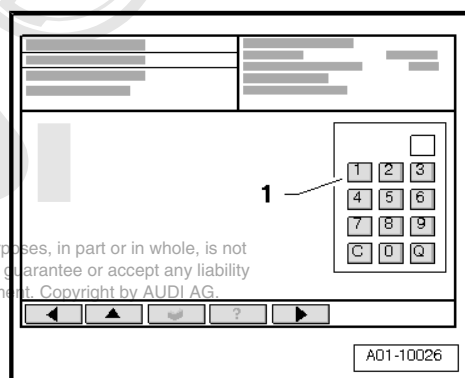
Display on -VAS 5051B- :

- From menu -1-, select function “Measured values” and advance by pressing button.



Display on -VAS 5051B- :

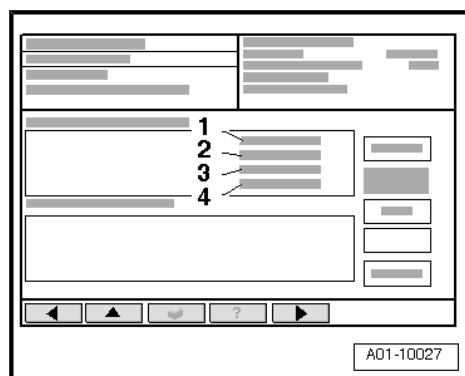
- Using keypad -1- press button for “Display group 005” and confirm entry by pressing .



Display on -VAS 5051B- :

- Read off ATF temperature in display zone -1-.
- Increase ATF temperature to 60 °C
- Exit from function “Measured values” by pressing button.

System pressure at idling speed		
Selector lever position	“D”	“R”
Engine speed	Idling	Idling
System pressure in bar	3.4 ... 3.8	5.0 ... 6.0



If reading is above or below specification:

- ◆ Idling speed above specification - eliminate engine fault.
- ◆ ATF pump defective - check ATF pump, renew if necessary.
- ◆ Valves sticking in valve body - renew valve body.
- Switch off ignition.

- Unplug electrical connector -arrow- for solenoid valves.
- Start engine and rev up to 2000 rpm.

System pressure at 2000 rpm		
Selector lever position	"D"	"R"
Engine speed	2000 rpm	2000 rpm
System pressure in bar	12.4 ... 13.2	23.0 ... 24.0

If reading is above or below specification:

- ◆ ATF pump defective - check ATF pump, renew if necessary.
- ◆ Valves sticking in valve body - renew valve body.
- Exit from function "Measured values" by pressing  button.
- Press "End output".
- Switch off ignition and unplug diagnostic connector.

Assembling

- Tightening torque:

Component	Nm
Bolt for system pressure hole	15

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

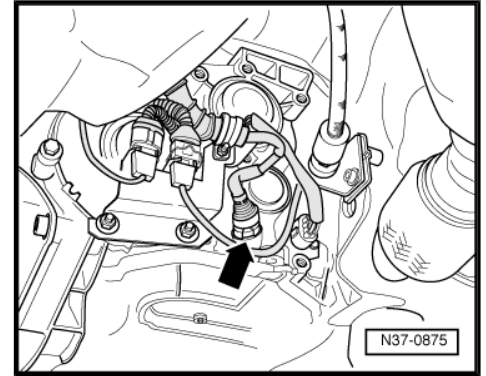
Note

Renew bolt for system pressure hole.

- Detach automatic gearbox tester -V.A.G 1702- .
- Interrogate fault memory and erase if necessary ⇒ Rep. Gr. 01 .

Note

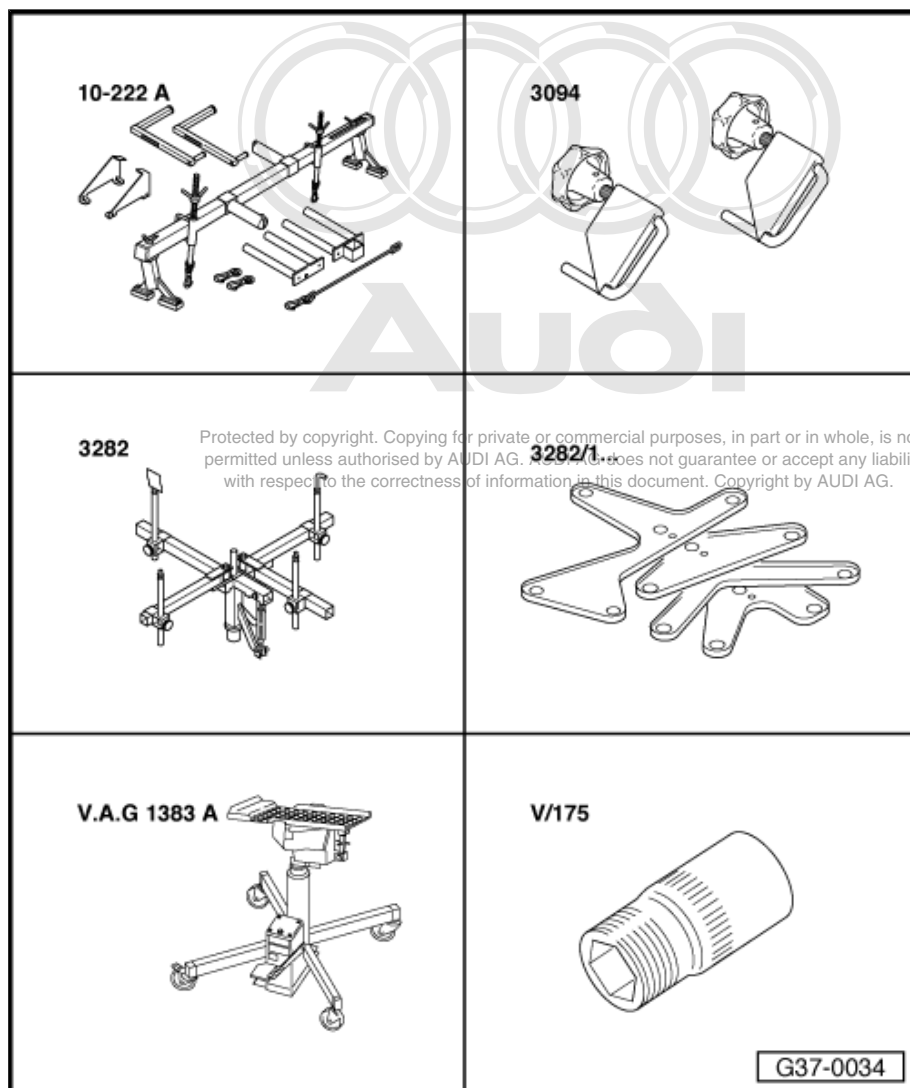
Unplugging connector causes faults to be stored.



3 Removing and installing gearbox

Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-
- ◆ Support bridge -30-211 A-
- ◆ Hose clamps, up to 25 mm -3094-
- ◆ Gearbox support -3282-
- ◆ Adjustment plate -3282/2-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ 15 mm socket attachment Matra V/175



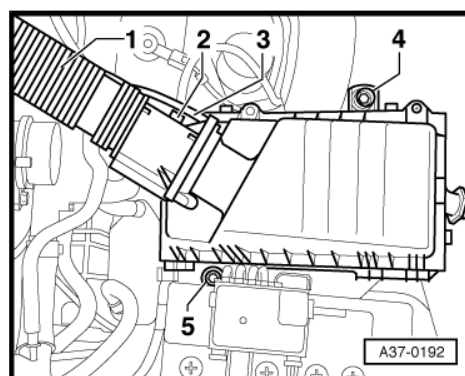
Removing

- Remove engine cover panel.
- Remove air hose -1-.
- Vehicles with TDI engine: detach breather hose -3-.
- Unplug electrical connector -2- from air mass meter -G70- .
- Remove bolts -4- and -5-, detach air cleaner housing.



Caution

Follow steps required when disconnecting battery ⇒ Rep. Gr. 27 .



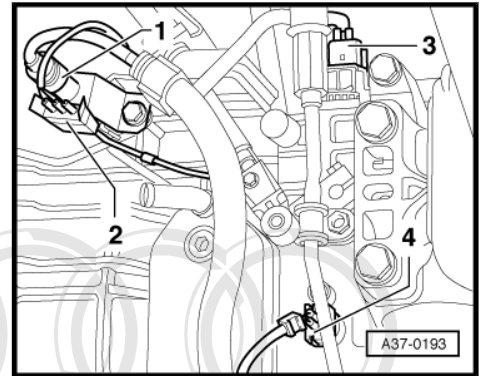
- Switch off ignition.
- Disconnect battery ⇒ Rep. Gr. 27 .
- Remove battery and battery tray ⇒ Rep. Gr. 27 .

- Unplug electrical connectors:
- 1 - to solenoid valves (10-pin connector)
- 2 - to vehicle speed sender -G68-
- 3 - on multifunction switch -F125-
- 4 - on gearbox speed sender -G38-



Note

There are two versions of gearbox speed sender -G38- : connection with and without integral wire.



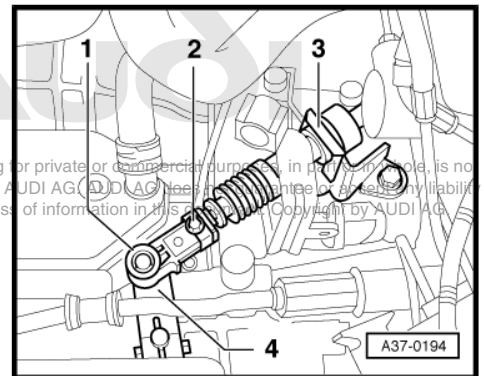
- Disengage wiring harness from retainers and guide out to side.
- Use screwdriver to pry selector lever cable -1- off selector shaft lever -4-, detach retaining clip -3- from cable support bracket.
- Detach selector lever cable and move clear to one side.



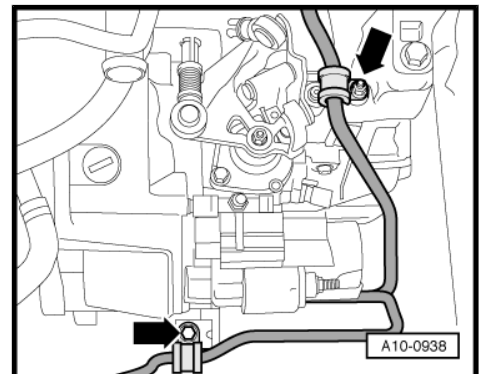
Note

Do not bend or kink the selector lever cable.

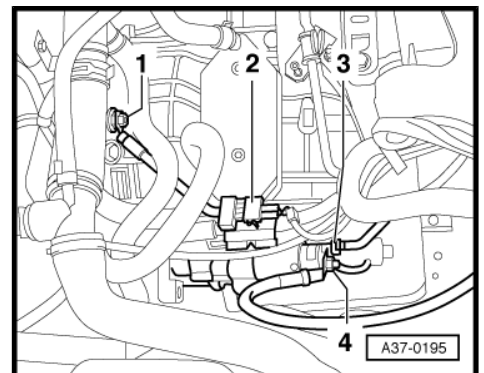
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- Unbolt power steering pressure pipe from gearbox -arrows-.



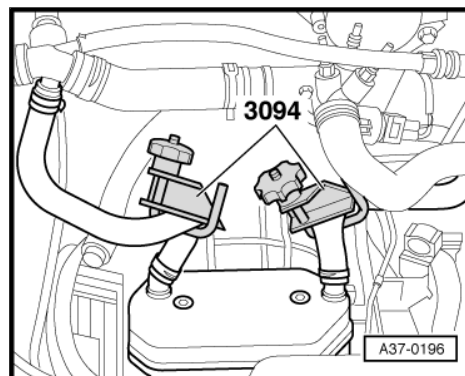
- Disconnect earth wire -1-.
- Detach wiring -3- and -4- at starter.
- Unplug connector -2- and pull out of bracket.
- Disengage wiring from bracket on starter and move clear to one side, remove bracket.



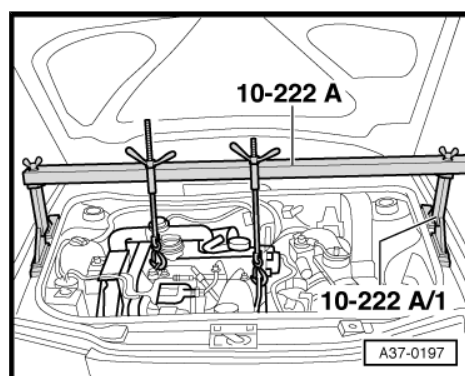
- Clamp off coolant hoses with hose clamps -3094- and detach hoses from ATF cooler.


Note

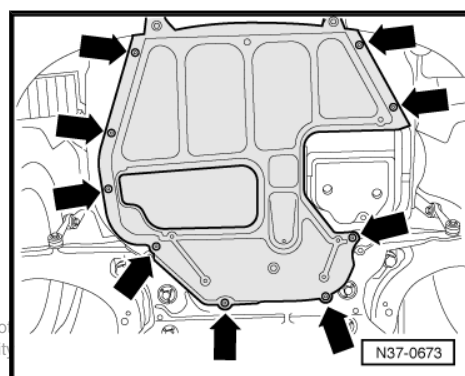
Seal off connections on ATF cooler with clean plugs or sealing caps to prevent dirt from entering.



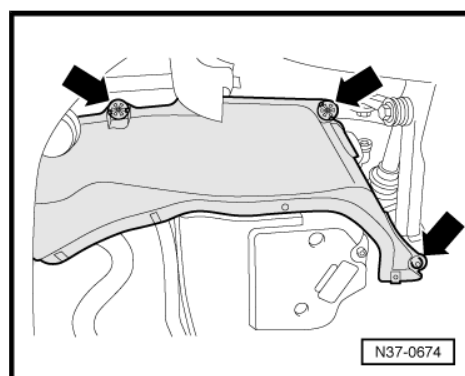
- Set up support bracket -10 - 222 A- with adapters -10 - 222 A / 3- on wing mounting flanges (left and right), as shown in illustration.
- Hook spindles into engine lifting eyes and slightly take up weight of engine/gearbox assembly via the spindles.



- Remove centre noise insulation (loosen fasteners -arrows-).



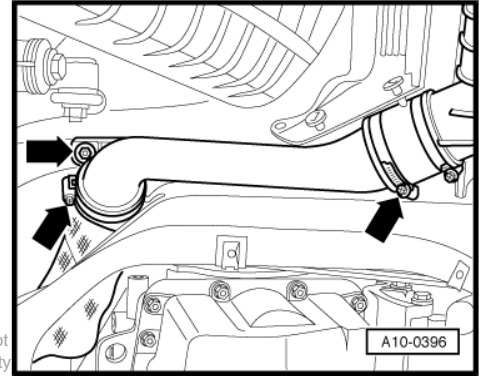
- Remove left and right noise insulation -arrows-.



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Vehicles with charge air cooler:

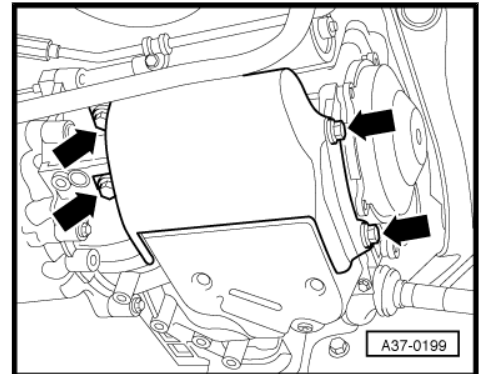
- Detach air pipe leading to charge air cooler from longitudinal member (bottom right) -arrows-.



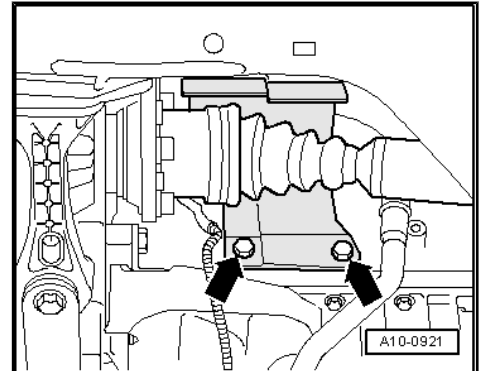
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Continued for all vehicles:

- Remove bolts -arrows- and detach guard plate from gearbox.



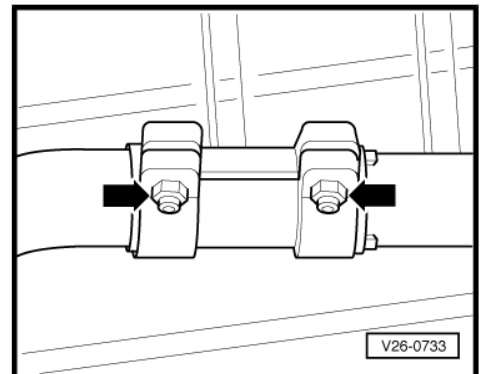
- If fitted, remove bolts -arrows- and detach heat shield for drive shaft (right-side).
- Unbolt drive shafts from gearbox flanges.
- Lift drive shaft (right-side) up and secure with wire.
- Move drive shaft (left-side) clear towards the rear and secure with wire.



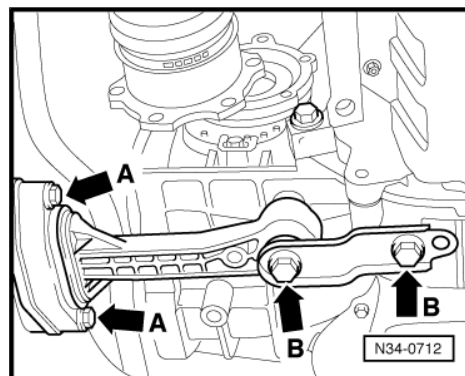
Note

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

- Disconnect exhaust system at clamp -arrows-.



- First remove bolts -A-, then bolts -B- and detach pendulum support.
- Remove plug from opening in torque converter cover plate.

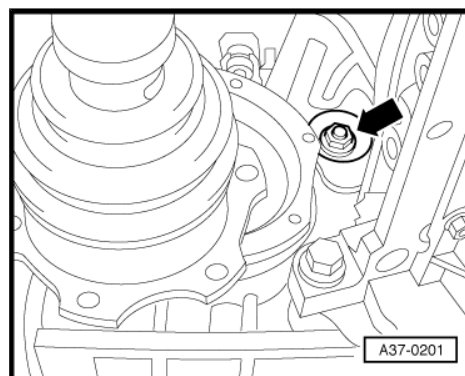


- Using 15 mm socket Matra V/175, unscrew 3 nuts -arrow- from torque converter (rotate crankshaft $\frac{1}{3}$ turn for each nut).

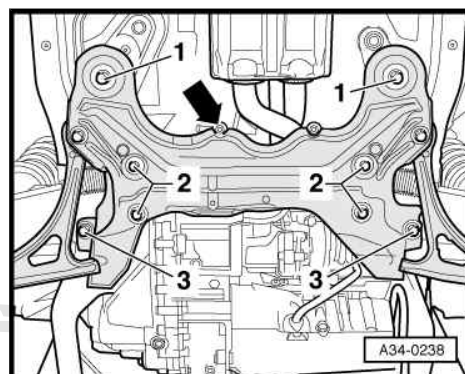


Note

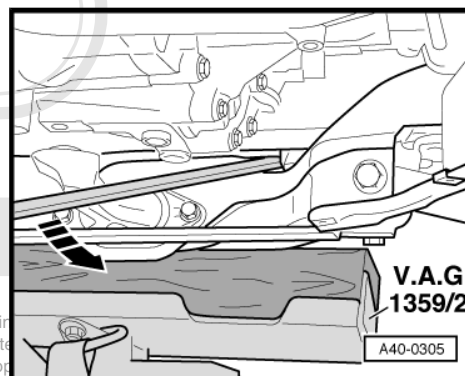
To loosen the torque converter nuts, counterhold at bolt for vibration damper.



- If fitted, disengage rubber mount at front exhaust pipe -arrow-.
- Remove bolts -2- for steering box.

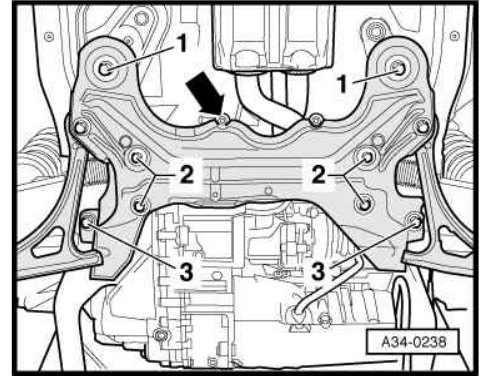


- Lever off steering box from dowel sleeve on subframe -arrow-.
- Remove bracket for power steering pipe from subframe.
- Position engine and gearbox jack -V.A.G 1383 A- below subframe (place a block of wood in between).

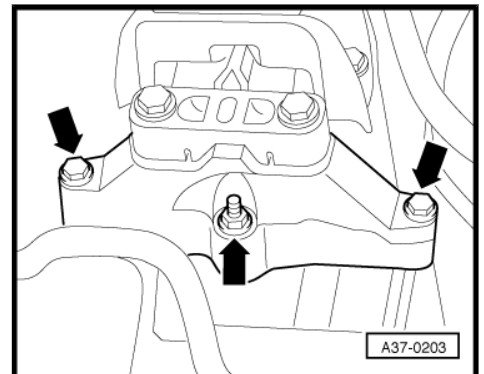


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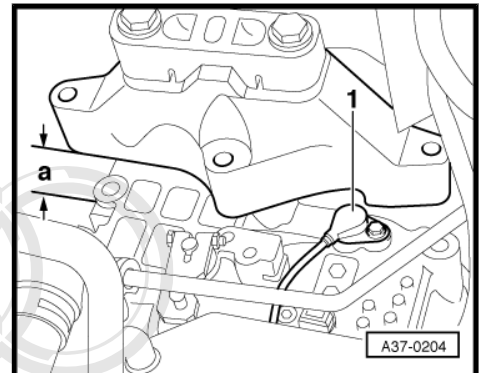
- Remove subframe bolts -1- and -3-.
- Lower subframe approx. 100 mm (subframe supports itself).



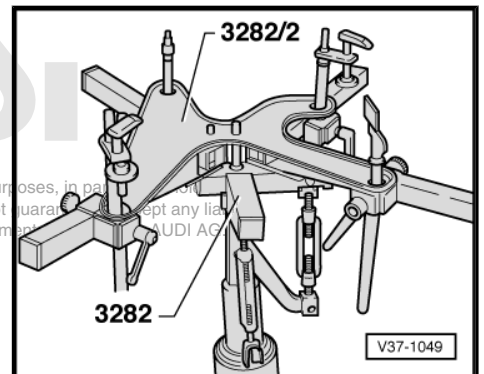
- Unbolt gearbox support (left-side) from gearbox -arrows-.
- Remove all engine/gearbox securing bolts which are accessible from above.



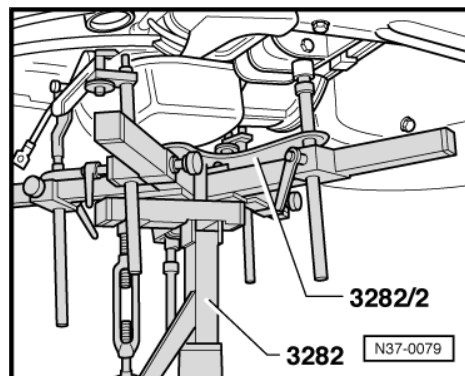
- Adjust spindles at support bracket -10 - 222 A- to lower gearbox by distance -a-.
- Dimension -a- = 60 mm



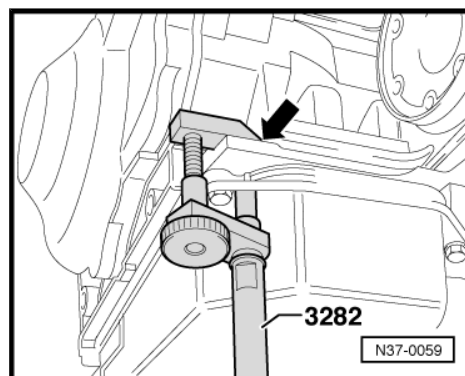
- Set up gearbox support -3282- on engine and gearbox jack - V.A.G 1383 A- .
- Place adjustment plate -3282/2- on gearbox support -3282- (adjustment plate only fits in one position).
- Align arms of gearbox support according to holes in adjustment plate.
- Secure support elements as illustrated on adjustment plate.



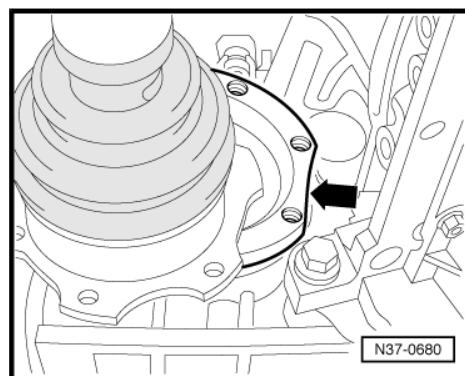
- Place engine and gearbox jack -V.A.G 1383 A- with gearbox support -3282- underneath gearbox and support gearbox.



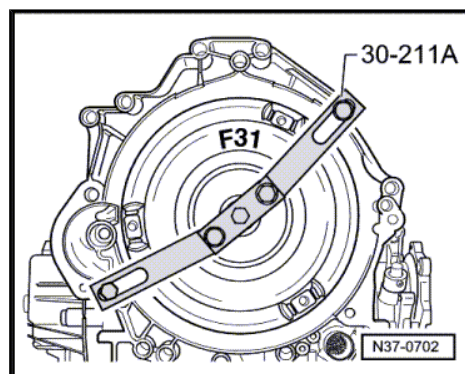
- Place safety support pin on ATF oil pan and secure to gearbox housing -arrow-.



- Turn the drive flange (right-side) so that the flat -arrow- is vertical.
- Remove starter.
- Remove all engine/gearbox securing bolts which are accessible from below.
- Push gearbox off engine and at the same time press torque converter out of drive plate.
- Press torque converter into gearbox housing.
- Slightly lower gearbox, guiding the power steering pipe past the gearbox.
- Carefully lower gearbox a bit further.



- Secure torque converter in gearbox using support bridge -30-211 A- to prevent it from falling out.



Installing



Note

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

- Tightening torques ➔ [page 57](#) , ➔ [page 132](#)
- Engine/gearbox securing bolts:

Item	Bolt	Nm
1, 2	M12x65	80
3, 4	M12x180	80
5, 6, 7	M10x50	45
8	M12x80	80
A	Dowel sleeves for centralising	

- Additional tightening torques:

Component	Nm
Drive plate to torque converter M10 x 1	57
Heat shield for drive shaft to cylinder block	35

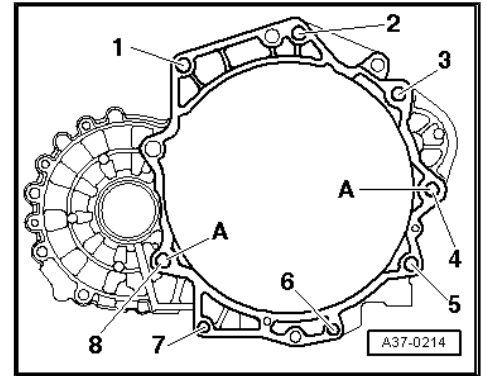
Installation is carried out in reverse sequence; note the following:



Note

- ◆ Before fitting a replacement gearbox, always clean the ATF cooler.
- ◆ Renew bolts which are tightened by turning through a specified angle.
- ◆ Renew self-locking nuts and bolts, and seals, O-rings and gaskets.
- ◆ Hose connections and hoses for charge air system must be free from oil and grease before fitting.
- ◆ Secure all hose connections with the correct hose clips (as original equipment); refer to ➔ *Electronic parts catalogue* .
- ◆ To ensure that the charge air hoses can be connected securely, you must spray the screws on used screw-type clips with rust remover prior to installation.
- ◆ If a new torque converter with integrated needle bearing is installed in a gearbox with a sleeve bearing in the turbine shaft, the sleeve bearing must be removed ➔ [page 27](#)

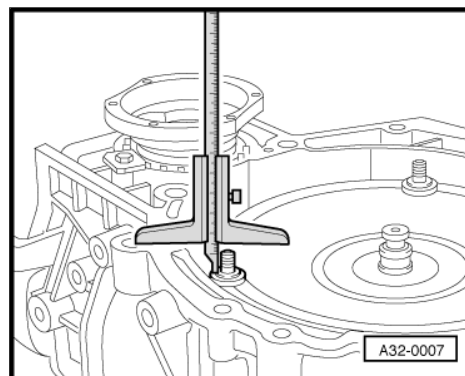
- Press torque converter hub through oil seal as far as first stop.



- Turn the torque converter, at the same time pressing it inwards lightly until the slots on the torque converter hub engage in the drive lugs on the ATF pump gear and the torque converter slides in a noticeable distance.
- If the torque converter is correctly installed, the depth between the contact faces at the bottom of the studs on the torque converter and the contact surface of the torque converter bell-housing is about 22 mm.


WARNING

- ◆ *If the torque converter has not been fully inserted, the distance will be only approx. 10 mm.*
- ◆ *If the torque converter is not fitted correctly, the drive lugs on the torque converter or the ATF pump will be seriously damaged when the gearbox is joined to the engine.*



- Before installing, ensure that the dowel sleeves on the engine are correctly seated.
- Fit intermediate plate onto dowel sleeves.
- When pushing the engine and gearbox together, ensure that no wiring or pipes etc. can become trapped.
- Secure gearbox to engine.
- Use genuine nuts for attaching torque converter to drive plate
⇒ Electronic parts catalogue .
- Use special tool Matra V/175 to tighten nuts of torque converter.
- Install subframe ⇒ Rep. Gr. 40 .
- Fit drive shafts to gearbox ⇒ Rep. Gr. 40 .
- Install pendulum support ⇒ [page 60](#) .
- Align exhaust system so it is free of stress ⇒ Rep. Gr. 26 .
- Observe correct procedure after connecting battery ⇒ Rep. Gr. 27 .
- Move selector lever to position “P” and install selector lever cable ⇒ [page 36](#) .
- Check adjustment of selector lever cable and adjust if necessary ⇒ [page 37](#) .
- Perform basic setting ⇒ Rep. Gr. 01 .
- Check gear oil level in final drive ⇒ [page 149](#) .
- Check and top up ATF level ⇒ [page 62](#) .
- Install noise insulation ⇒ Rep. Gr. 50 .
- If rumbling noises occur when driving, adjust assembly mountings ⇒ Rep. Gr. 10 .


Caution

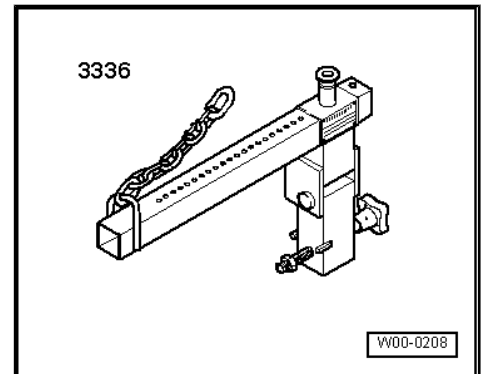
Perform wheel alignment after installation.

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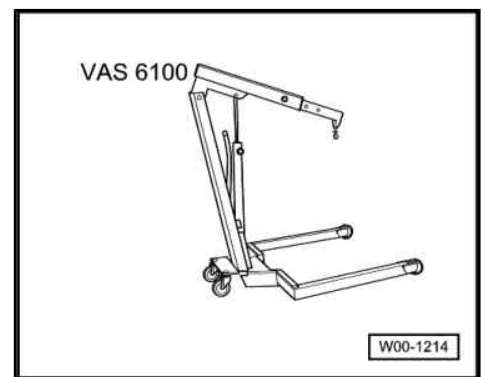
4 Transporting the automatic gearbox

Special tools and workshop equipment required

- ◆ Gearbox lifting tackle -3336-



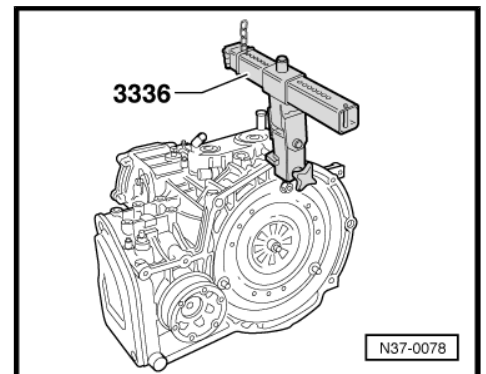
- ◆ Workshop hoist -VAS 6100-



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Gearbox lifting tackle -3336- can be used to transport the automatic gearbox and also when setting up gearbox support -3282- .

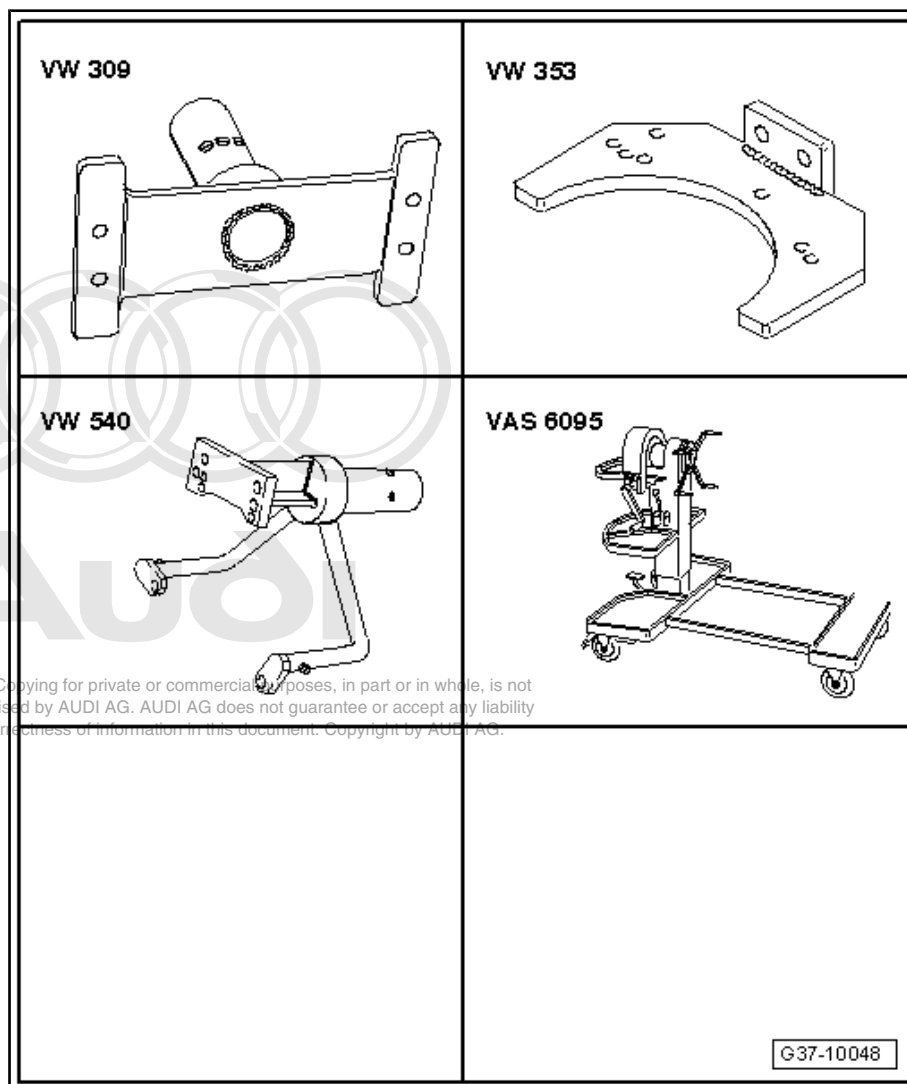
- Attach gearbox lifting tackle -3336- to flange of gearbox housing.
- Position pin so that 8 holes are visible on side facing chain.
- Lift gearbox with workshop hoist -VAS 6100- and gearbox lifting tackle -3336- .



5 Securing gearbox to engine and gearbox support

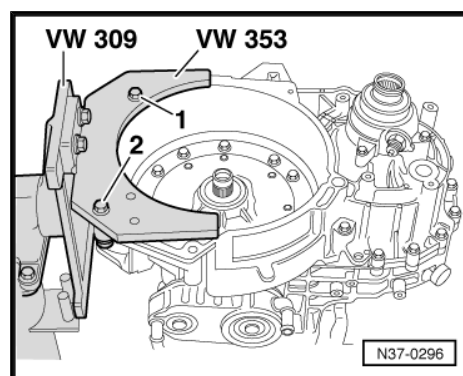
Special tools and workshop equipment required

- ◆ Support plate -VW 309-
- ◆ Gearbox support -VW 353-
- ◆ Engine and gearbox support -VW 540-
- ◆ Engine and gearbox support -VAS 6095-



Securing gearbox in vertical position

- ATF drained ⇒ [page 67](#) .
- Secure gearbox support -VW 353- to gearbox with bolts -1- and -2-.
- Bolt support plate -VW 309- to gearbox support -VW 353- .
- Using workshop hoist -VAS 6100- , insert gearbox into engine and gearbox support -VAS 6095- .



6 Exploded view - subframe

1 - Engine mounting

- ☐ Adjusting ⇒ Rep. Gr. 10

2 - Bolt

- ☐ Renew
- ☐ 40 Nm + 90°

3 - Connecting bracket

4 - Bolt

- ☐ 25 Nm

5 - Bolt

- ☐ 25 Nm

6 - Bolt

- ☐ Tightening torque ⇒ Rep. Gr. 10

7 - Centre hex stud

- ☐ Renew
- ☐ 50 Nm + 90°

8 - Gearbox mounting

- ☐ Removing and installing ⇒ [page 58](#)
- ☐ Adjusting ⇒ Rep. Gr. 10

9 - Bolt

- ☐ 25 Nm

10 - Bolt

- ☐ Renew
- ☐ 40 Nm + 90°

11 - Bolt

- ☐ Renew
- ☐ 50 Nm + 90°

12 - Gearbox support

13 - Bolt

- ☐ Renew
- ☐ 40 Nm + 90°

14 - Pendulum support

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

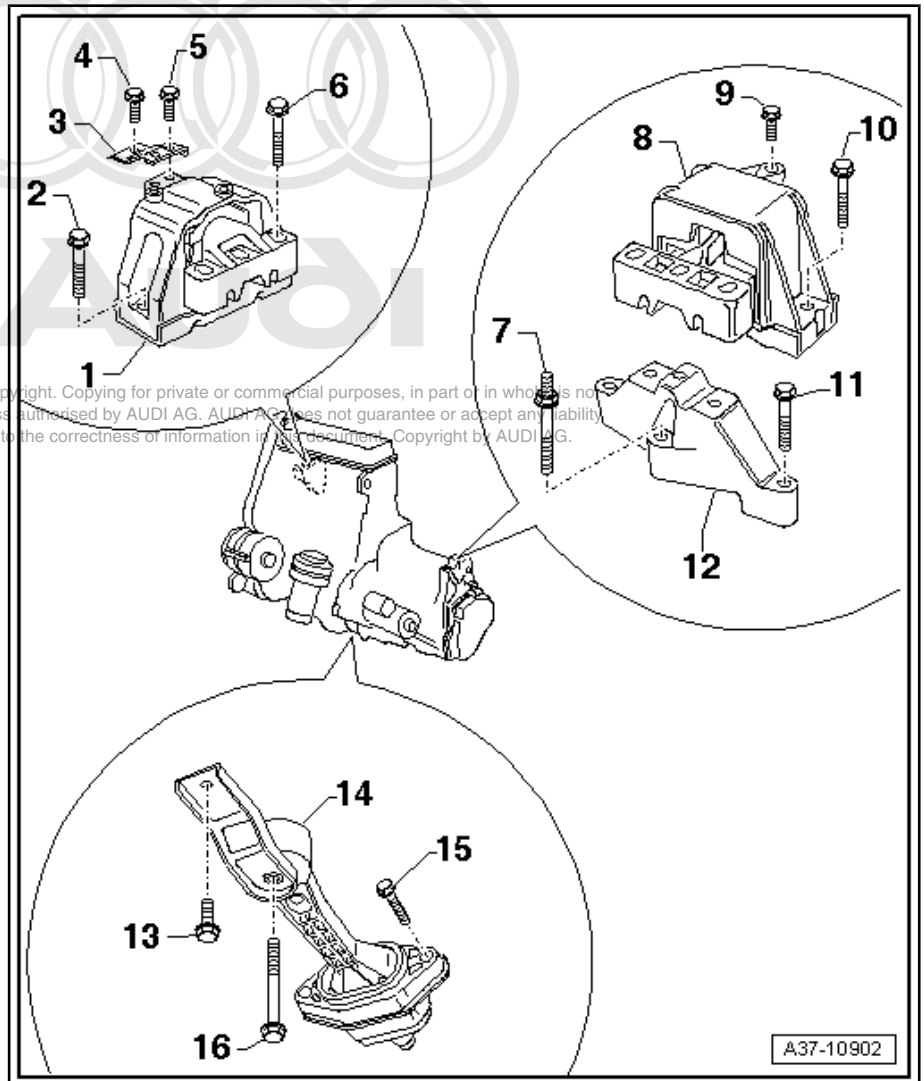
15 - Bolt

- ☐ Renew
- ☐ 20 Nm + 90°

16 - Bolt

- ☐ Renew
- ☐ 40 Nm + 90°

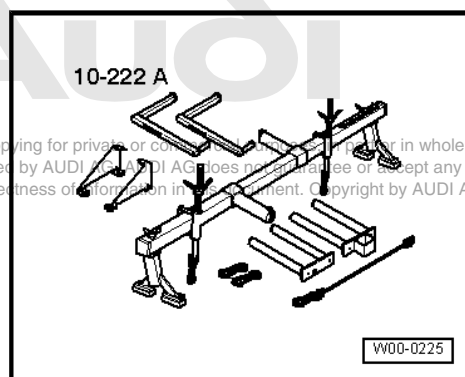
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6.1 Removing and installing gearbox mounting

Special tools and workshop equipment required

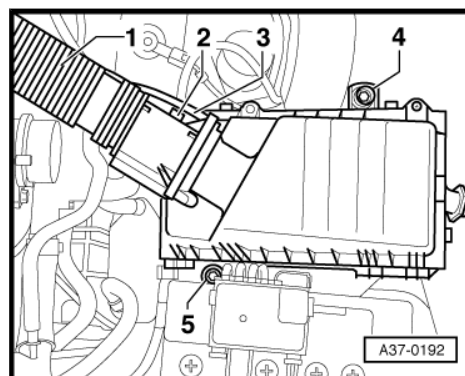
- ◆ Support bracket -10 - 222 A-



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Removing

- Remove engine cover panel.
- Remove air hose -1-.
- Vehicles with TDI engine: detach breather hose -3-.
- Unplug electrical connector -2- from air mass meter -G70- .
- Remove bolts -4- and -5-, detach air cleaner housing.



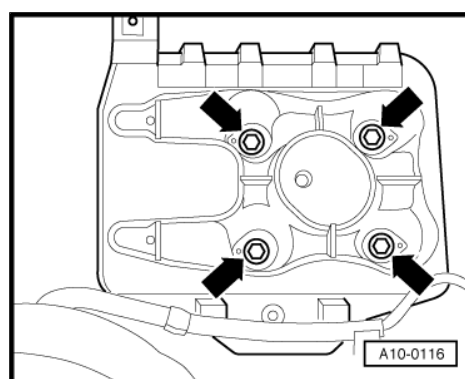
Caution

Follow steps required when disconnecting battery ⇒ Rep. Gr. 27 .

- Remove battery ⇒ Rep. Gr. 27 .

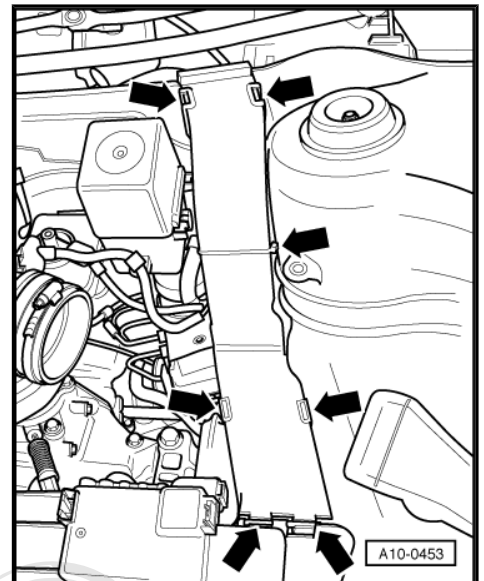
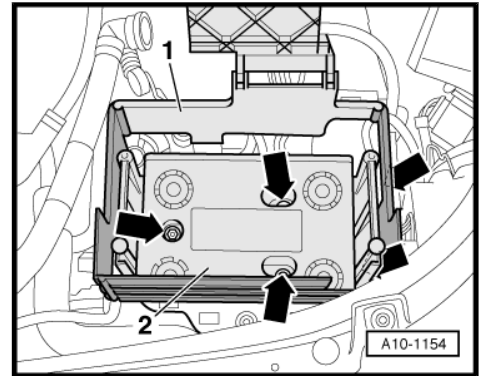
Vehicles with battery carrier (version 1):

- Remove battery tray -arrows-.

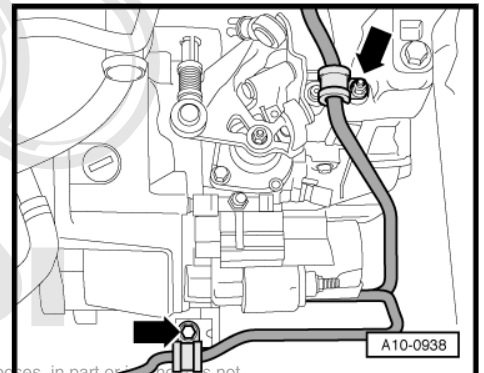


Vehicles with battery carrier (version 2):

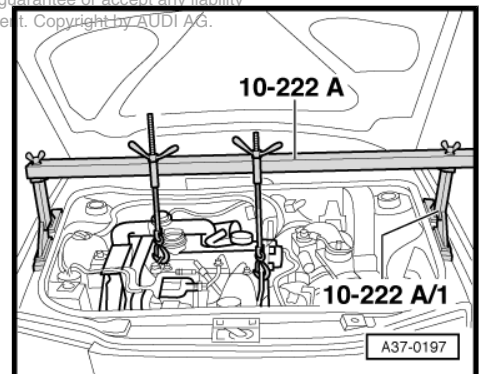
- Lift off side wall -1- together with main fuse box.
- Remove battery tray -arrows-.
- Open wiring duct on left in engine compartment -arrows-.
- Unclip wiring duct and push to side.



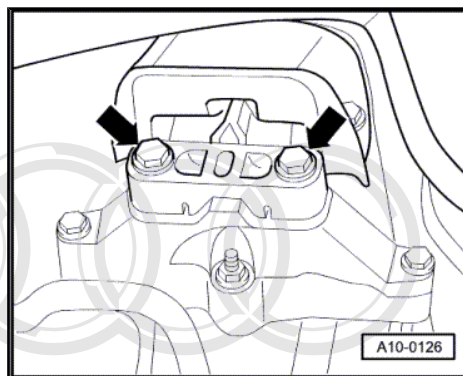
- Unbolt power steering pressure pipe from gearbox -arrows-.



- Set up support bracket -10-222 A- with adapters 10-222 A/3- on wing mounting flanges (left and right), as shown in illustration.
- Hook spindles into engine lifting eyes and slightly take up weight of engine/gearbox assembly via the spindles.



- Remove bolts -arrows-.



- Remove bolts -1- and -2- and detach gearbox mounting -A-.

Installing

- Tightening torques ⇒ [page 57](#)



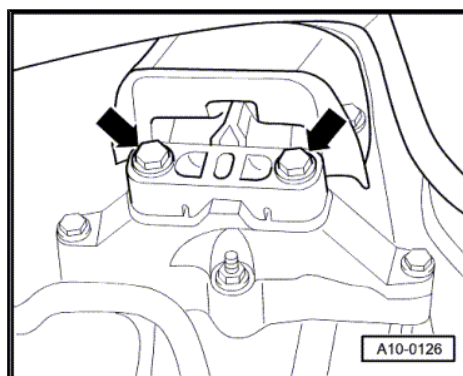
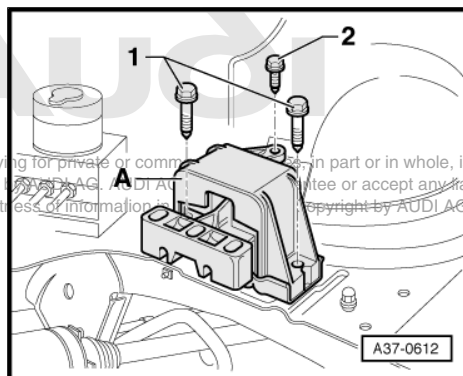
Note

Renew bolts which are tightened by turning through a specified angle.

- Secure gearbox mounting to body.
- Hand-tighten bolts -arrows- securing gearbox mounting to gearbox support initially.

The remaining installation steps are carried out in reverse sequence; note the following:

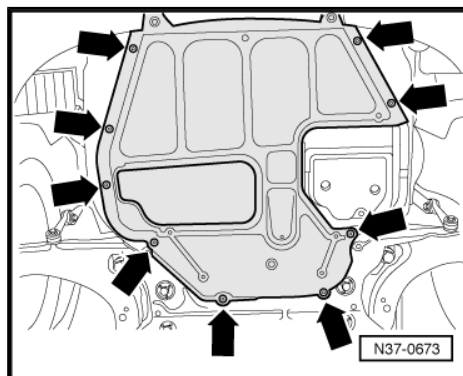
- Install battery ⇒ Rep. Gr. 27 .



6.2 Removing and installing pendulum support

Removing

- Remove centre noise insulation (loosen fasteners -arrows-).



- First remove bolts -A-, then bolts -B- and detach pendulum support.

Installing

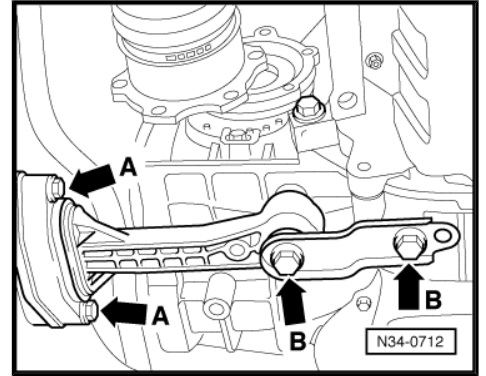
- Tightening torques ⇒ [page 57](#)

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



Note

Renew bolts which are tightened by turning through a specified angle.



- First secure pendulum support to gearbox -arrows B-, then on subframe -arrows A-.
- Install noise insulation ⇒ Rep. Gr. 50 .



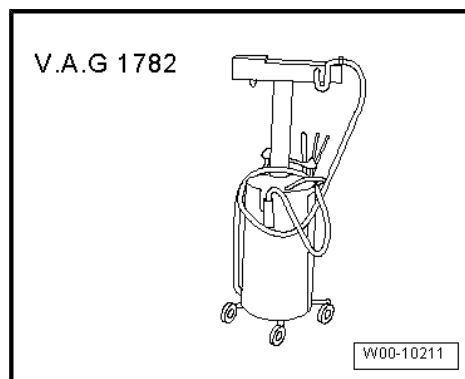
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7 ATF in gearbox

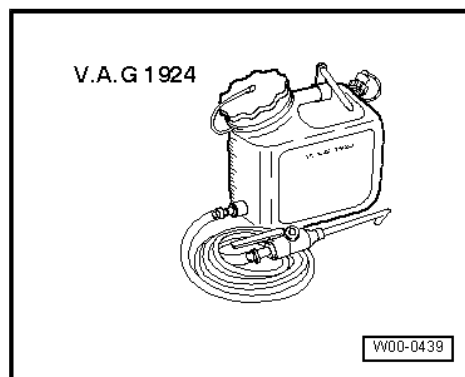
7.1 Checking and correcting ATF level

Special tools and workshop equipment required

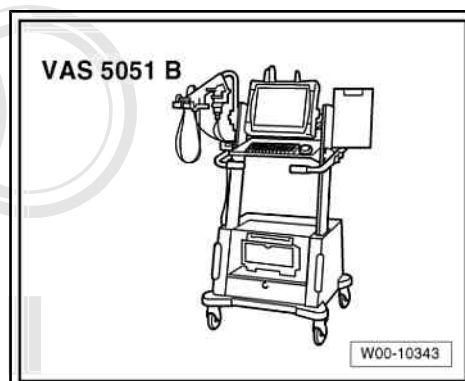
- ◆ Used oil collection and extraction unit -V.A.G 1782-



- ◆ ATF filling unit -V.A.G 1924-



- ◆ Vehicle diagnostic, testing and information system -VAS 5051B-



- ◆ Safety goggles

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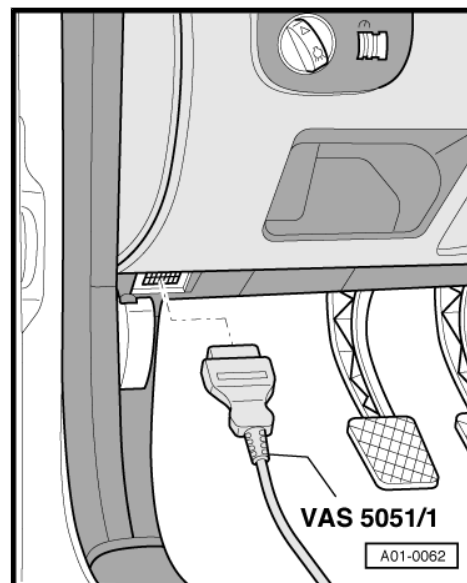
Procedure

- Gearbox must not be in emergency running (backup) mode.
- Drive vehicle onto lifting platform or inspection pit to make sure it is placed absolutely horizontal.
- Selector lever at position "P".
- Exhaust hose(s) of an exhaust gas extractor (switched on) must be connected.
- Engine idling.
- The air-conditioner and heating system must be switched off.
- Vehicle diagnostic, testing and information system -VAS 5051B- connected up; Vehicle self-diagnosis and vehicle system 02 - Gearbox electronics selected.
- The ATF temperature at the beginning of the test must not be higher than 35 °C. If necessary, first allow the gearbox to cool down.



Note

- ◆ The ATF level will vary according to the ATF temperature.
- ◆ If the ATF level is checked when the ATF temperature is too low, this will result in overfilling.
- ◆ If the level is checked when the ATF temperature is too high, this will result in underfilling.
- ◆ Both overfilling and underfilling will impair the function of the gearbox.
- ◆ The ATF temperature is taken from the reading on the vehicle diagnostic, testing and information system -VAS 5051B-.



ATF temperature reading

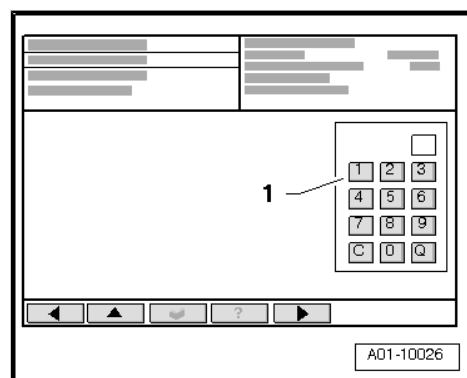
Display on -VAS 5051B- :

- From menu -1-, select function "Measured values" and advance by pressing button.



Display on -VAS 5051B- :

- Using keypad -1- press buttons for "Display group 005" and confirm entry by pressing button.



Display on -VAS 5051B- :

- Read off ATF temperature in display zone -1-.

Checking and correcting ATF level



Note

- ♦ *The ATF level is checked at the ATF inspection hole.*
- ♦ *The ATF level is correct if a small amount of fluid comes out at the ATF inspection plug when ATF temperature is between 35°C and 45°C, or 50°C in hot climates (the fluid level rises due to expansion as it warms up).*
- Fill ATF filling unit -V.A.G 1924- with the ATF for the automatic gearbox 01M.
- ATF specifications ⇒ Electronic parts catalogue .



WARNING

The ATF filling unit must be clean and the ATF must not be mixed with other types of ATF!

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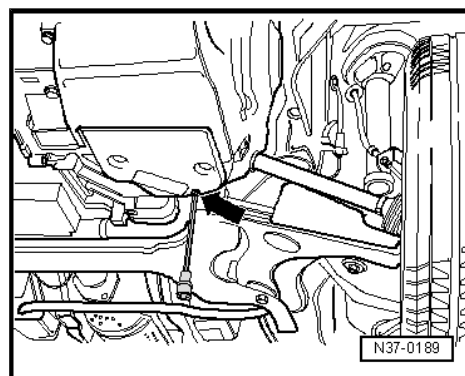
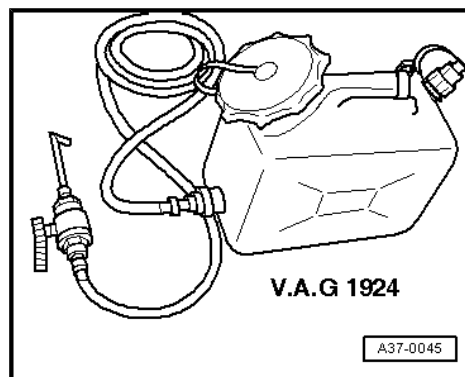
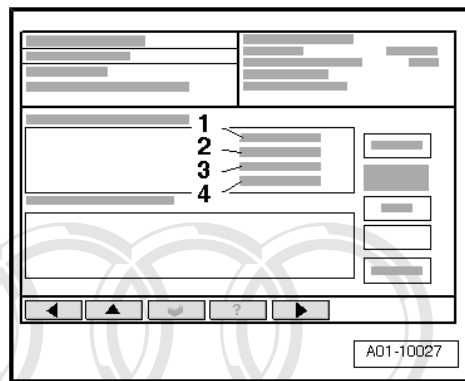
- Secure reservoir for ATF filling unit -V.A.G 1924- as high as possible on vehicle.
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



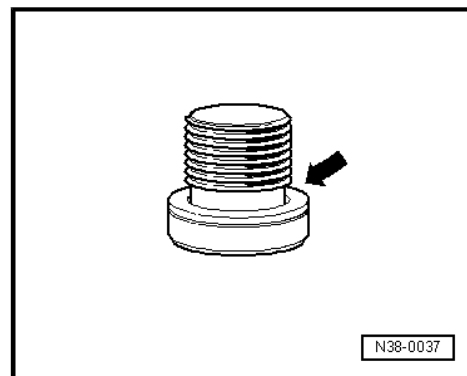
WARNING

Wear safety goggles.

- When ATF reaches temperature of 35 °C, unscrew ATF inspection plug -A-.



- Cut open seal -arrow- for plug and renew.

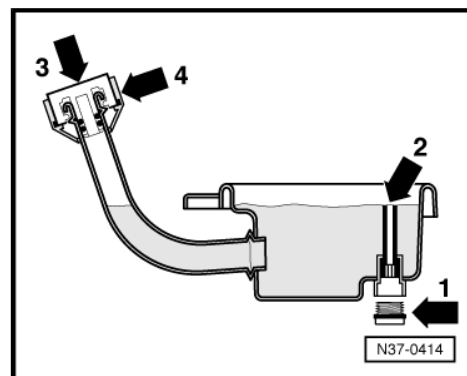


i Note

When the plug is opened, a small amount of ATF will always run out of the overflow pipe -arrow 2-.

- Check whether overflow pipe is screwed in as far as it will go (2 Nm).

If ATF continues to come out through ATF inspection opening via overflow pipe before ATF has reached a temperature of 40 °C, the ATF level is OK.



i Note

- ♦ *The ATF inspection plug must be screwed in again at the latest when the ATF reaches a temperature of 45 °C (countries with hot climates: 50 °C).*
- ♦ *If ATF temperature exceeds 45 °C too much fluid will escape as it expands when heated. In this case the quantity of fluid in the gearbox is NOT sufficient!*

- Fit new seal on plug -arrow 1- and tighten.
- Tightening torque: 15 Nm

The ATF check is now completed.

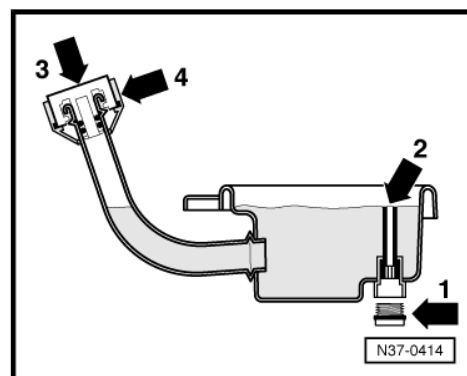
- Exit from function "Measured values" by pressing button.
- Press "End output".
- Switch off ignition and unplug diagnostic connector.

If no ATF emerges from ATF inspection hole when ATF has reached 40 °C, fill up with ATF ⇒ [page 65](#) .

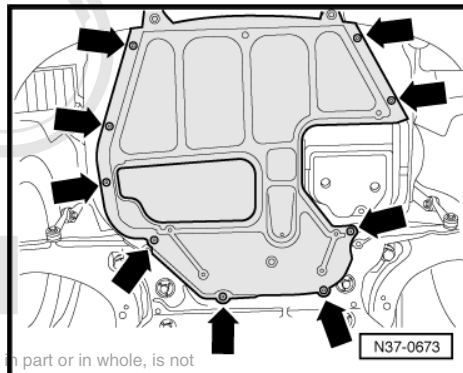
Filling up ATF

i Note

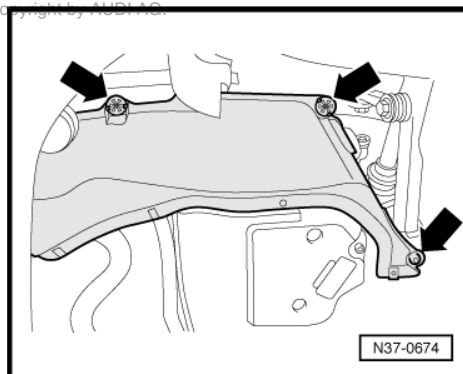
Engine keeps running at idle speed.



- Remove centre noise insulation (loosen fasteners -arrows-).



- Remove left noise insulation -arrows-.

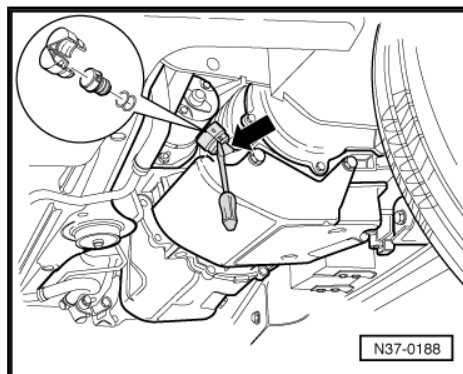


- Prise off cap -arrow- securing sealing plug.



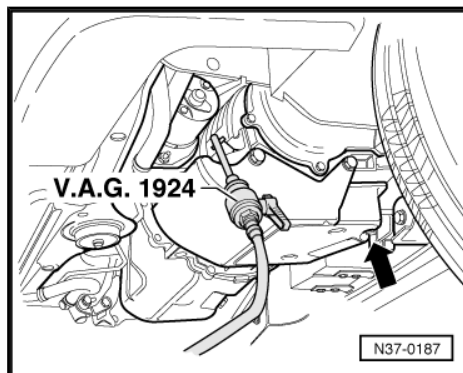
Note

- ◆ The cap -arrow- securing the sealing plug is supplied in two versions.
- ◆ The cap with snap-lock is damaged upon removal and must be renewed.
- ◆ The cap with a spring retainer can be used again.
- Detach sealing plug from filler pipe and attach pipe of ATF filling unit -V.A.G 1924- to filler pipe.
- Fill with ATF using ATF filling unit -V.A.G 1924- until ATF comes out of inspection hole -arrow-.

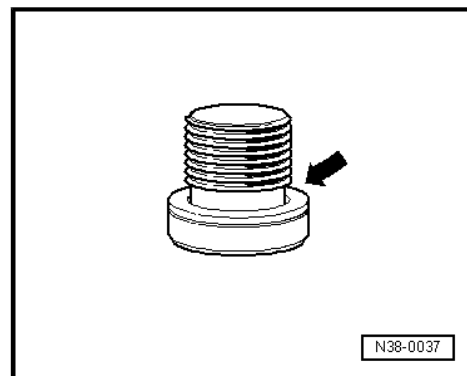


Note

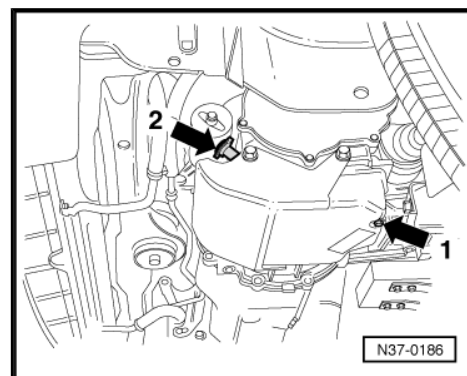
- ◆ The ATF inspection plug must be screwed in again at the latest when the ATF reaches a temperature of 45 °C (countries with hot climates: 50 °C).
- ◆ If ATF temperature exceeds 45 °C too much fluid will escape as it expands when heated. In this case the quantity of fluid in the gearbox is NOT sufficient!
- ◆ If necessary, switch off engine and allow gearbox to cool down.



- Cut open seal -arrow- for plug and renew.



- Fit new seal on plug -arrow 1- and tighten.
- Tightening torque: 15 Nm
- Attach sealing plug to filler pipe and secure with a new cap -arrow 2-:
- ◆ Renew cap with snap-lock and press onto sealing plug.
- ◆ Push cap with spring retainer onto sealing plug until it engages.
- Exit from function “Measured values” by pressing button.
- Press “End output”.
- Switch off ignition and unplug diagnostic connector.
- Install noise insulation ⇒ Rep. Gr. 50 .

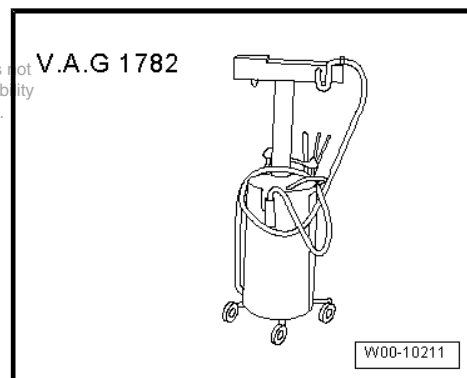


7.2 Changing ATF or filling up after performing repairs

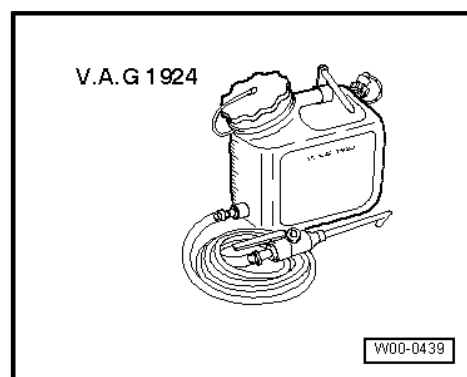
Special tools and workshop equipment required

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

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- ◆ ATF filling unit -V.A.G 1924-



- ◆ Allen key (5 mm)
- ◆ Safety goggles

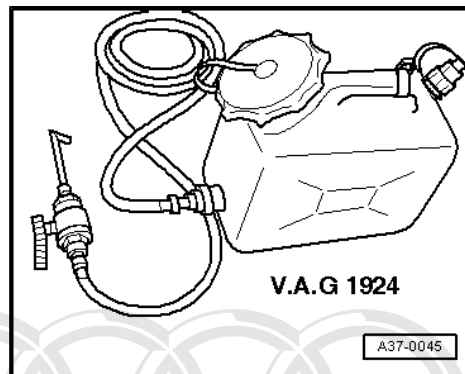
Procedure

- Engine not running.
- Fill ATF filling unit -V.A.G 1924- with the ATF for the automatic gearbox 01M.
- ATF specifications ⇒ Electronic parts catalogue .



WARNING

The ATF filling unit must be clean and the ATF must not be mixed with other types of ATF!



Note

- ◆ Observe relevant disposal regulations.
- ◆ The engine must not be started and vehicle must not be towed without ATF in gearbox.
- ◆ Before fitting a replacement gearbox, always clean the ATF cooler.
- Secure reservoir for ATF filling unit -V.A.G 1924- as high as possible on vehicle.

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Draining ATF

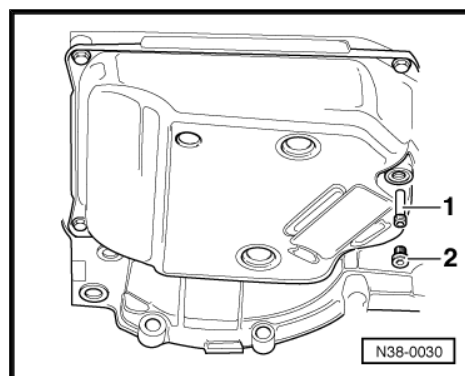
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



WARNING

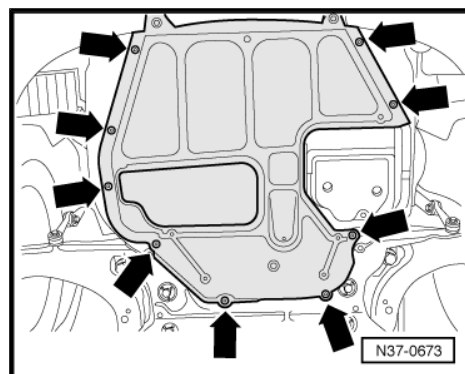
Wear safety goggles.

- Remove ATF inspection plug -2-.
- Drain ATF.
- Unscrew overflow pipe -1- and allow remaining ATF to drain.

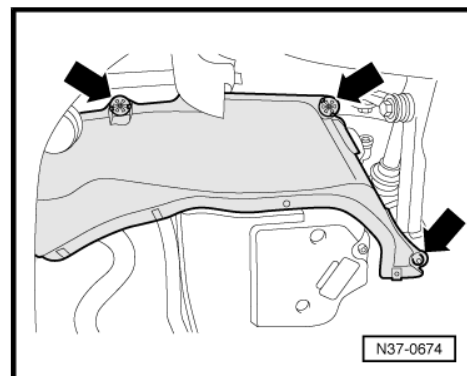


Filling up ATF

- Screw overflow pipe -1- back in as far as it will go (2 Nm).
- Hand-tighten inspection plug -2-.
- Remove centre noise insulation (loosen fasteners -arrows-).



- Remove left noise insulation -arrows-.

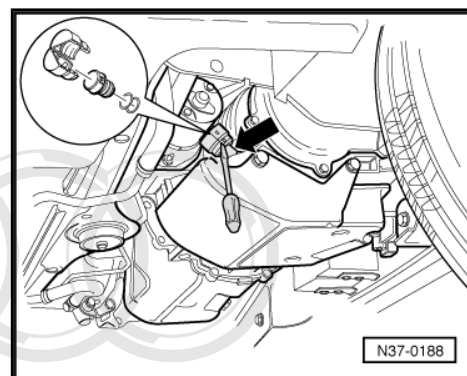


- Prise off cap -arrow- securing sealing plug.

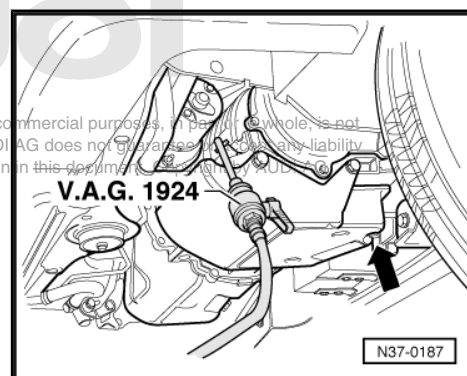


Note

- ◆ The cap -arrow- securing the sealing plug is supplied in two versions.
- ◆ The cap with snap-lock is damaged upon removal and must be renewed.
- ◆ The cap with a spring retainer can be used again.



- Detach sealing plug from filler pipe and attach pipe of ATF filling unit -V.A.G 1924- to filler pipe.
- Use ATF filling unit -V.A.G 1924- to fill gearbox with 3 litres of ATF.
- Start engine.
- With brake pressed, select all gear positions "P, R, N, D, 3, 2" one after the other at idling speed, maintaining each position for at least 3 seconds.
- Shift selector lever into position "P".
- Check and top up ATF level ⇒ [page 62](#) .



Note

Observe all notes and test requirements for "Checking and correcting ATF level".



Caution

Both overfilling and underfilling will impair the function of the gearbox.

8 Exploded view - ATF cooler and ATF filler pipe



Note

- ◆ Rules for cleanliness when working on the automatic gearbox
⇒ [page 24](#).
- ◆ General repair instructions ⇒ [page 21](#).

1 - O-ring

- ☐ Renew
- ☐ Lubricate with ATF when fitting

2 - Banjo bolt

- ☐ 35 Nm

3 - ATF cooler

- ☐ After removing and installing, check and correct ATF level
⇒ [page 62](#).

4 - O-ring

- ☐ Renew
- ☐ Lubricate with ATF when fitting

5 - Cap

- ☐ Secures sealing plug
- ☐ Cap with snap-lock is damaged upon removal and must be renewed
- ☐ Cap with a spring retainer can be used for a second time

6 - Sealing plug

7 - O-rings

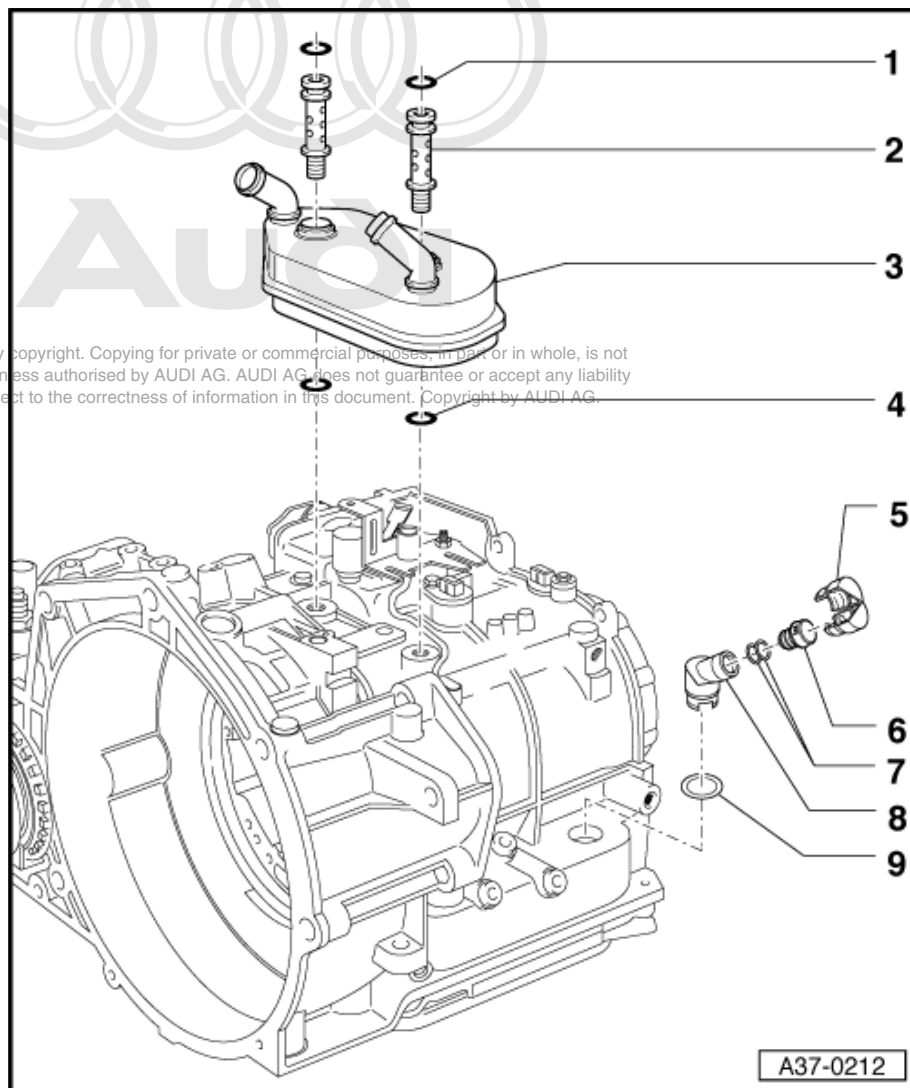
- ☐ Renew
- ☐ Lubricate with ATF when fitting

8 - ATF filler pipe

- ☐ Removing:
 - Remove ATF oil pan
⇒ [page 133](#).
 - Compress retaining clips of ATF filler pipe.

9 - O-ring

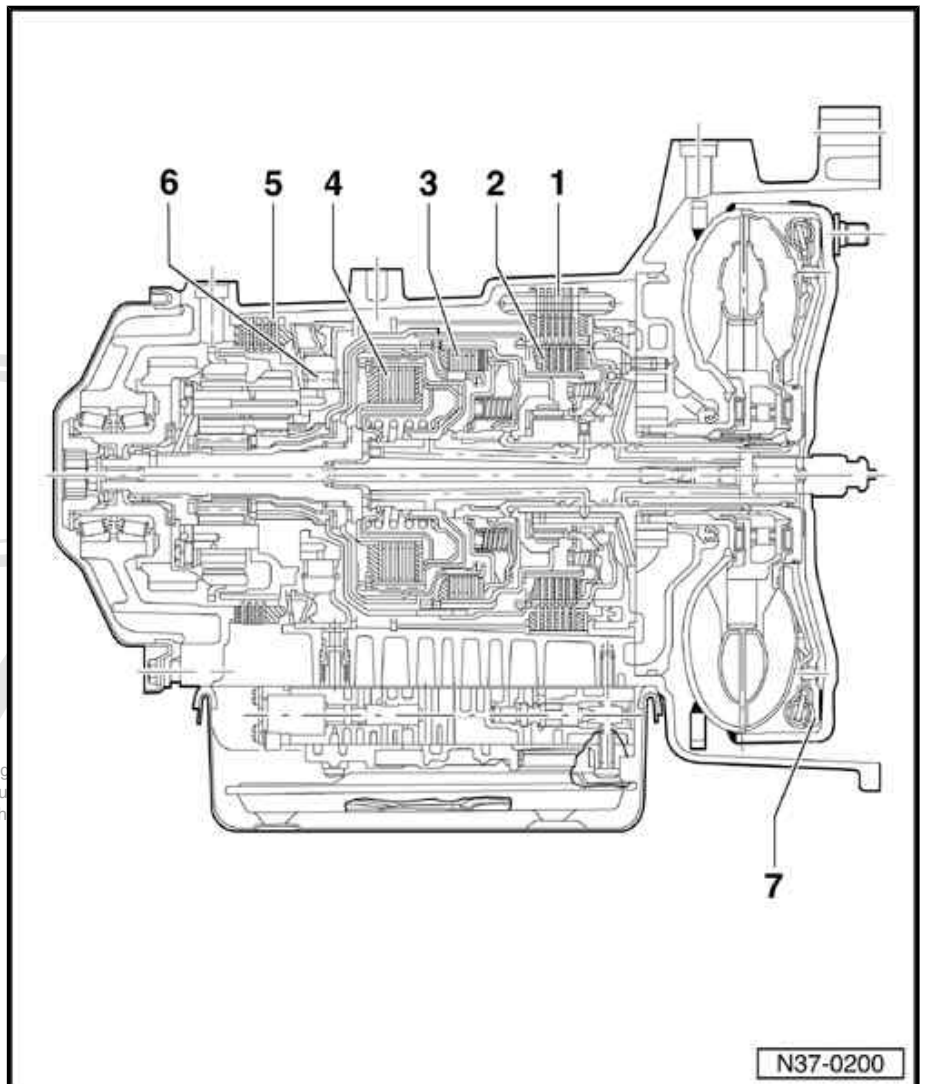
- ☐ Renew
- ☐ Lubricate with ATF when fitting



9 Gearbox with selector elements

Position of selector elements

- 1 - 2nd and 4th gear brake "B2"
- 2 - Reverse gear clutch "K2"
- 3 - 1st to 3rd gear clutch "K1"
- 4 - 3rd and 4th gear clutch "K3"
- 5 - Reverse gear brake "B1"
- 6 - Freewheel
- 7 - Torque converter lock-up clutch (TCC)



Actuation of selector elements



Note

- ◆ In the event of problems with poor acceleration and performance or other transmission faults, the following table shows which selector elements are operated in the individual gears. It is thus possible to establish which selector elements are not functioning correctly.
- ◆ Before starting repairs to the gearbox, first carry out the self-diagnosis ⇒ Rep. Gr. 01.

Gear	"B1"	"B2"	"K1"	"K2"	"K3"	F	TCC
R	X			X			
1H			X			X	
1M			X			X	X



Gear	"B1"	"B2"	"K1"	"K2"	"K3"	F	TCC
2H		X	X				
2M		X	X				X
3H			X		X		
3M			X		X		X
4H		X			X		
4M		X			X		X

X - Closed clutches, brakes or freewheel

H - Hydraulic

M - Mechanical



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10 Exploded view - dismantling planetary gearbox



Note

- ◆ General repair instructions ⇒ [page 21](#).
- ◆ An exchange component which contains all the selector elements and the valve body is available for the automatic gearbox 01M ⇒ [page 15](#).
- ◆ The exchange component is assigned to the gearbox code letters ⇒ [page 3](#).
- ◆ Installation instructions ⇒ [page 80](#).



Note

Sequence of removal:

-items 2, 21, 20, 27, 26, 25, 11, 10, 9, 5 (together with 6 or with 7 and 8), 24, 23, 22, 4, 3, 1, 12, 13, 14, 15, 16, 17, 18-

1 - Large sun gear

- ☐ Lift out

2 - Sealing plug

- ☐ Remove before removing freewheel
⇒ [page 130](#)

3 - Large input shaft

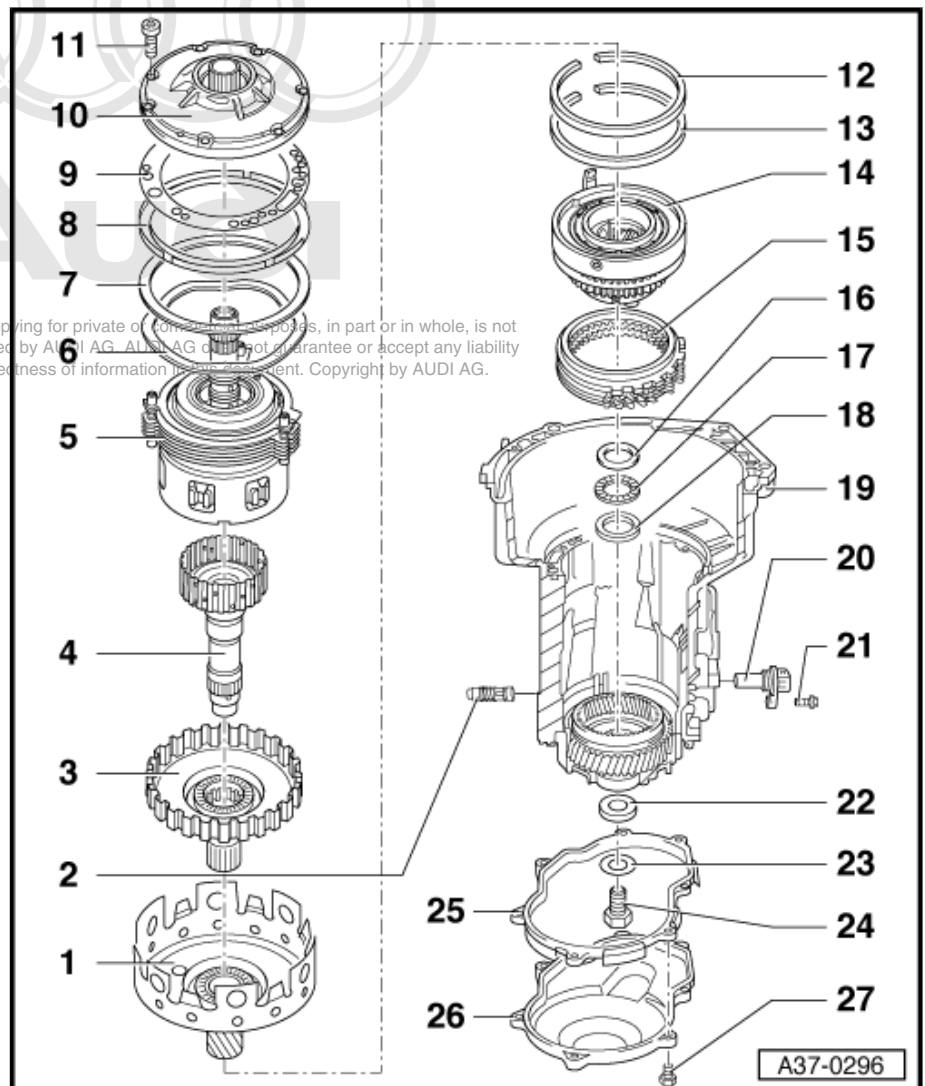
- ☐ Lift out

4 - Small input shaft

- ☐ Unscrew bolt
⇒ [Item 24 \(page 75\)](#) to remove
- ☐ Lift out

5 - Clutch/brake assembly

- ☐ With 3rd and 4th gear clutch "K3" and turbine shaft
- ☐ With 1st to 3rd gear clutch "K1"
- ☐ Depending on version, clutches "K1" and "K3" may be pressed together
- ☐ Pressing "K1" off "K3"
⇒ [page 78](#)
- ☐ With reverse gear clutch "K2"
- ☐ With 2nd and 4th gear brake "B2"
- ☐ With supporting tube for "B2"
- ☐ Lift out together on turbine shaft





6 - Corrugated washer

- ☐ Not fitted in gearboxes with shim and retaining ring for brake "B2" (code letters ⇒ [page 3](#))

7 - Shim

- ☐ Not fitted in gearboxes with corrugated washer on last outer plate for brake "B2" (code letters ⇒ [page 3](#))

8 - Retaining ring

- ☐ Not fitted in gearboxes with corrugated washer on last outer plate for brake "B2" (code letters ⇒ [page 3](#))

9 - Gasket

- ☐ Remove

10 - ATF pump

- ☐ Unfasten all bolts -item 11- for removal
- ☐ To press off the pump, screw two M8 bolts evenly into the two threaded holes

11 - Bolt

- ☐ For ATF pump

12 - Circlip

- ☐ For supporting tube for "B2"
- ☐ Lift out

13 - Circlip

- ☐ For freewheel
- ☐ Lift out

14 - Freewheel

- ☐ With planet carrier
- ☐ Remove the following components prior to removal: valve body, sealing plug -item 2- ⇒ [page 130](#) and gearbox speed sender -G38- -item 20-

15 - Reverse gear brake "B1"

- ☐ Remove pressure plate together with plates and shim(s) from the top

16 - Washer

- ☐ For axial needle bearing
- ☐ Remove

17 - Axial needle bearing

- ☐ Remove

18 - Washer

- ☐ For axial needle bearing
- ☐ Remove

19 - Gearbox housing

- ☐ With input gear
- ☐ Input gear does not have to be removed when dismantling planetary gearbox
- ☐ Removing and installing input gear ⇒ [page 161](#)

20 - Gearbox speed sender -G38-

- ☐ Remove before removing freewheel
- ☐ Removing and installing ⇒ [page 145](#)

21 - Bolt

22 - Shim

- ☐ For planet carrier
- ☐ Detach after unfastening bolt -item 24-

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23 - Washer

- ☐ Detach after unfastening bolt -item 24-

24 - Bolt

- ☐ For small input shaft
- ☐ Remove

25 - Gasket

26 - Cover

27 - Bolt

10.1 Dismantling planetary gearbox

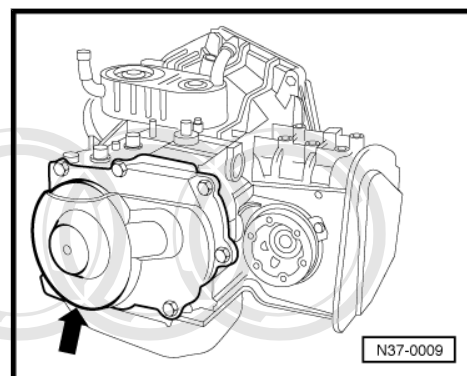
Procedure

- Drain ATF ⇒ [page 67](#) .
- Remove gearbox ⇒ [page 46](#) .
- Take out torque converter.
- Seal off ATF cooler with clean plugs.
- Secure gearbox to engine/gearbox support ⇒ [page 56](#) .
- Remove gearbox housing cover with gasket -arrow-.
- Unscrew bolts on ATF oil pan in diagonal sequence and remove ATF oil pan.

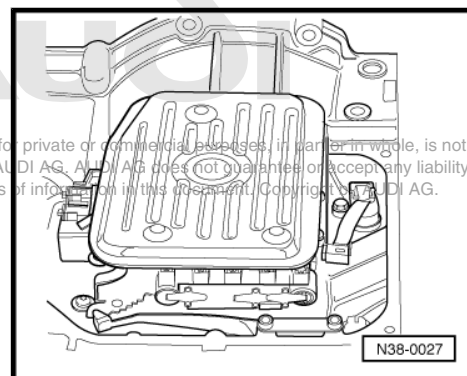


Caution

Additionally renew torque converter if remaining ATF contains metal particles.



- Pull ATF strainer off valve body.
- Remove valve body with conductor strip ⇒ [page 130](#) .



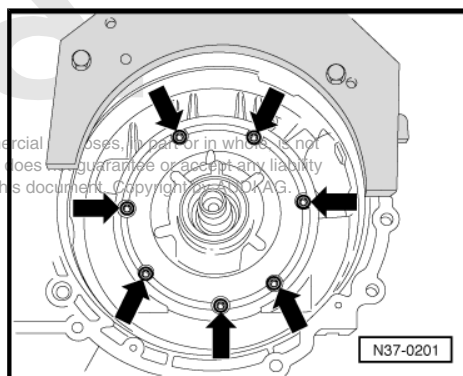
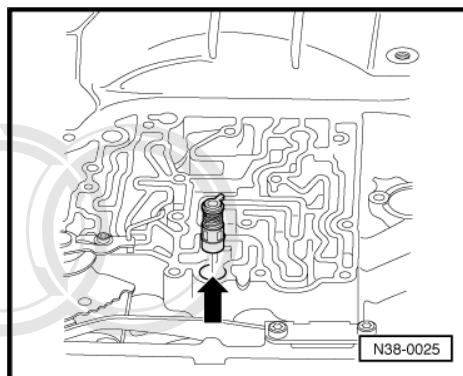
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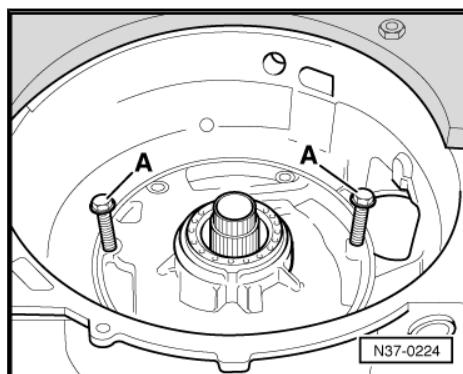
Caution

Remove sealing plug and gearbox speed sender to prevent them from being damaged.

- Pull out sealing plug for "B1".
- Remove gearbox speed sender -G38-
⇒ [Item 30 \(page 142\)](#) .
- Remove bolts -arrows- for ATF pump.



- To remove ATF pump, screw two M8 bolts -A- into tapped holes of ATF pump.
- Tighten bolts -A- evenly to press ATF pump off gearbox and remove.
- Remove gasket, corrugated washer, retaining ring and shim.

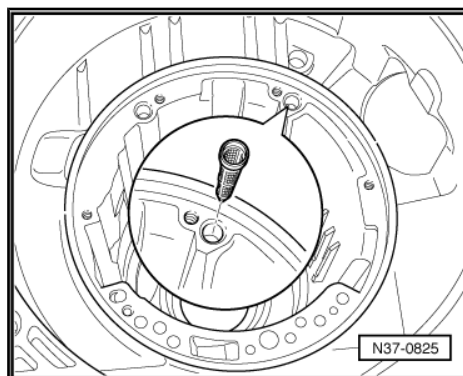


- If fitted, remove strainer.



Note

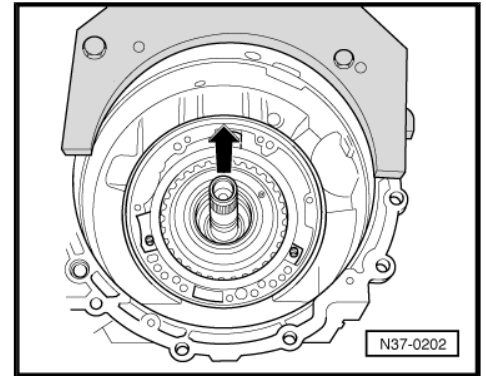
The strainer is installed in the return pipe of the ATF cooler. It cannot be retrofitted in older gearboxes.



- Take hold of turbine shaft and pull out all clutches together with supporting tube for “B2”, plates for “B2”, springs and spring caps -arrow-.

i Note

- ◆ Depending on version, clutches “K1” and “K3” may be pressed together
- ◆ “K1” does not have to be pressed off “K3” unless one of the clutches is to be dismantled or replaced.
- ◆ Pressing “K1” off “K3” ⇒ [page 78](#).

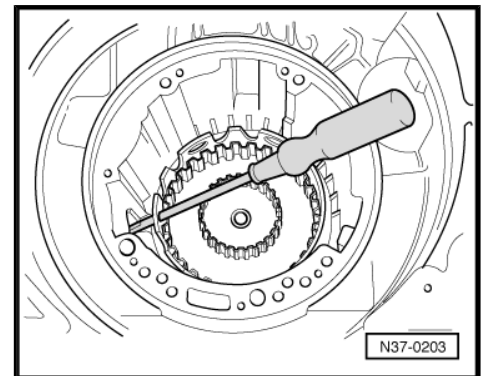


- Engage parking lock.
- To slacken off the bolt for the small input shaft, insert a screwdriver through one of the holes in the large sun gear.

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i Note

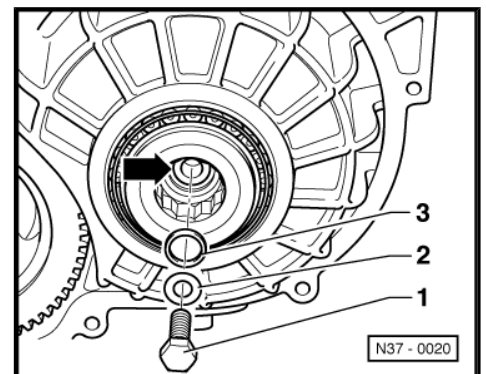
If the parking lock cannot be engaged, also block the large input shaft using a second screwdriver.



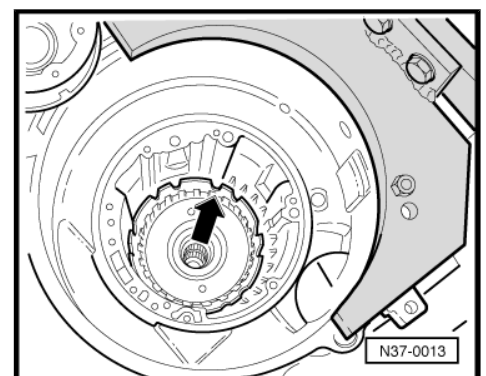
- Remove bolt -1- for small input shaft and detach with washer -2- and shim -3-.
- Pull out small input shaft.

i Note

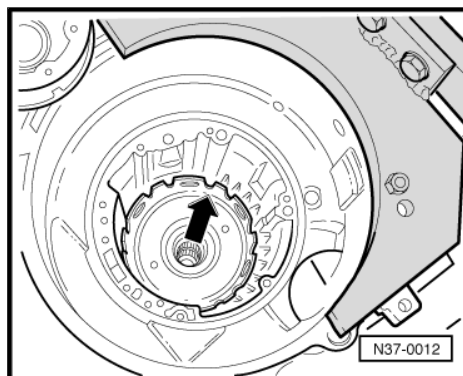
The axial needle bearing for the planet carrier remains in the gearbox/input gear.



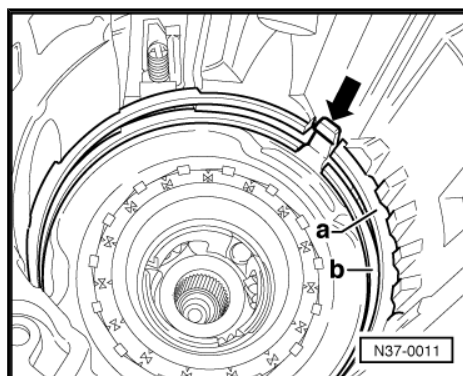
- Pull out large input shaft -arrow-.



- Pull out large sun gear -arrow-.



- Remove circlips for supporting tube -a- and freewheel -b-.
- Take hold of the inside of the planet carrier and pull it out together with freewheel and dished spring.
- Remove pressure plate, plates and shim(s) of the reverse gear brake "B1".
- Take off axial bearing and washers.



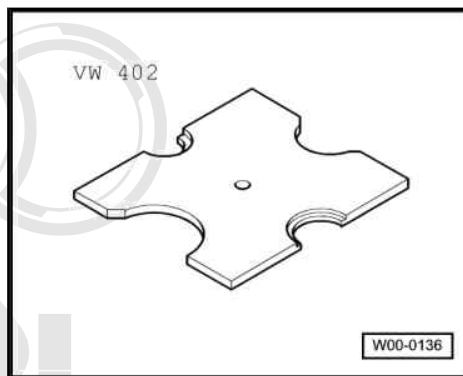
Note

- ♦ *The input gear does not have to be removed when dismantling the planetary gearbox. Removing and installing input gear ⇒ [page 159](#).*
- ♦ *Assembling planetary gearbox ⇒ [page 86](#).*

10.2 Pressing "K1" off "K3"

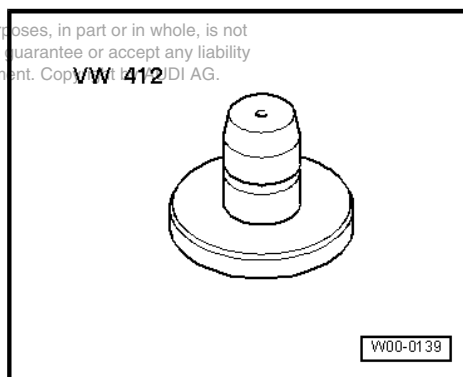
Special tools and workshop equipment required

- ♦ Thrust plate -VW 402-

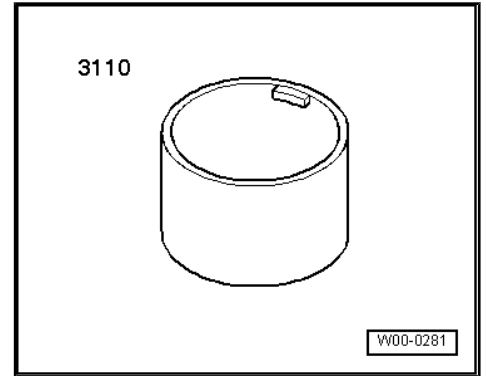


- ♦ Press tool -VW 412-

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◆ Tube -3110-



Work sequence

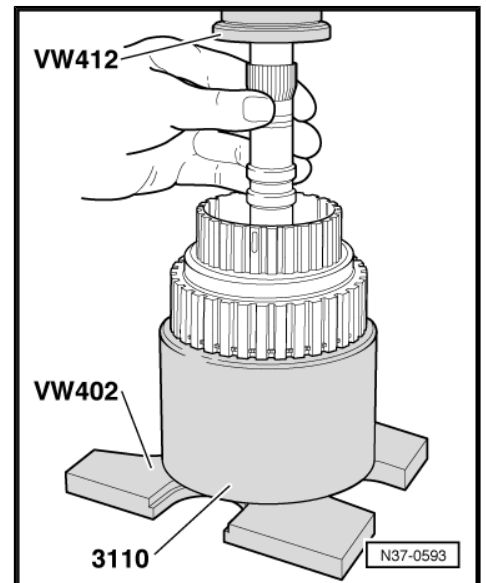
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i Note

- ◆ Depending on version, clutches "K1" and "K3" may be pressed together
- ◆ "K1" does not have to be pressed off "K3" unless one of the clutches is to be dismantled or replaced.
- Make sure that the contact surfaces of the tools are flat and smooth and are not damaged.
- The lug on tube -3110- faces thrust plate -VW 402- .
- Hold turbine shaft when pressing off.

i Note

Pressing clutch "K1" onto "K3" ⇒ [page 93](#) .



11 Exploded view - assembling planetary gearbox



Note

- ♦ An exchange component which contains all the selector elements and the valve body is available for the automatic gearbox 01M ➔ [page 15](#).
- ♦ The exchange component is assigned to the gearbox code letters ➔ [page 3](#).

I - Installing planet carrier
➔ [page 80](#)

II - Installing reverse gear brake "B1" as far as circlip for supporting tube for "B2"
➔ [page 81](#)

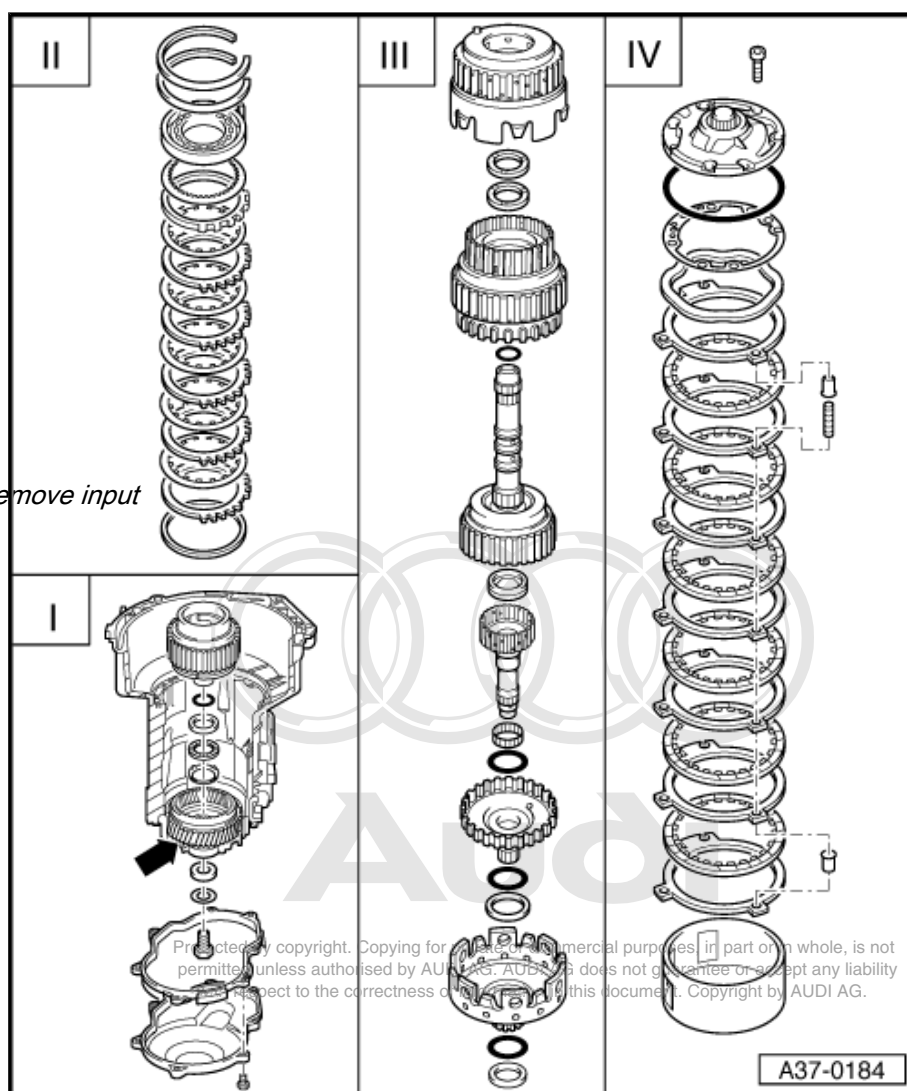
III - Installing large sun gear as far as reverse gear clutch "K2"
➔ [page 82](#)

IV - Installing supporting tube for "B2" as far as ATF pump
➔ [page 84](#)



Note

It is not necessary to remove input gear -arrow-.



11.1 Exploded view I - installing planet carrier



Note

Assembling planetary gearbox ➔ [page 86](#).

1 - Planet carrier

- ☐ Adjusting ⇒ [page 97](#)

2 - O-ring

- ☐ Renew
- ☐ Insert in planet carrier

3 - Washer

- ☐ For axial needle bearing

4 - Axial needle bearing

5 - Washer

- ☐ For axial needle bearing
- ☐ Installation position:
smooth side faces input
gear

6 - Gearbox housing

- ☐ With planet carrier in-
stalled

7 - Input gear

- ☐ Do not remove when
dismantling planetary
gearbox
- ☐ Removing and installing
input gear or axial nee-
dle bearing for planet
carrier ⇒ [page 159](#)

8 - Shim

- ☐ For planet carrier
- ☐ Determining thickness
⇒ [page 97](#)

9 - Washer

10 - Bolt

- ☐ For small input shaft
- ☐ 30 Nm

11 - Spacer bush

- ☐ 7x; press into gasket

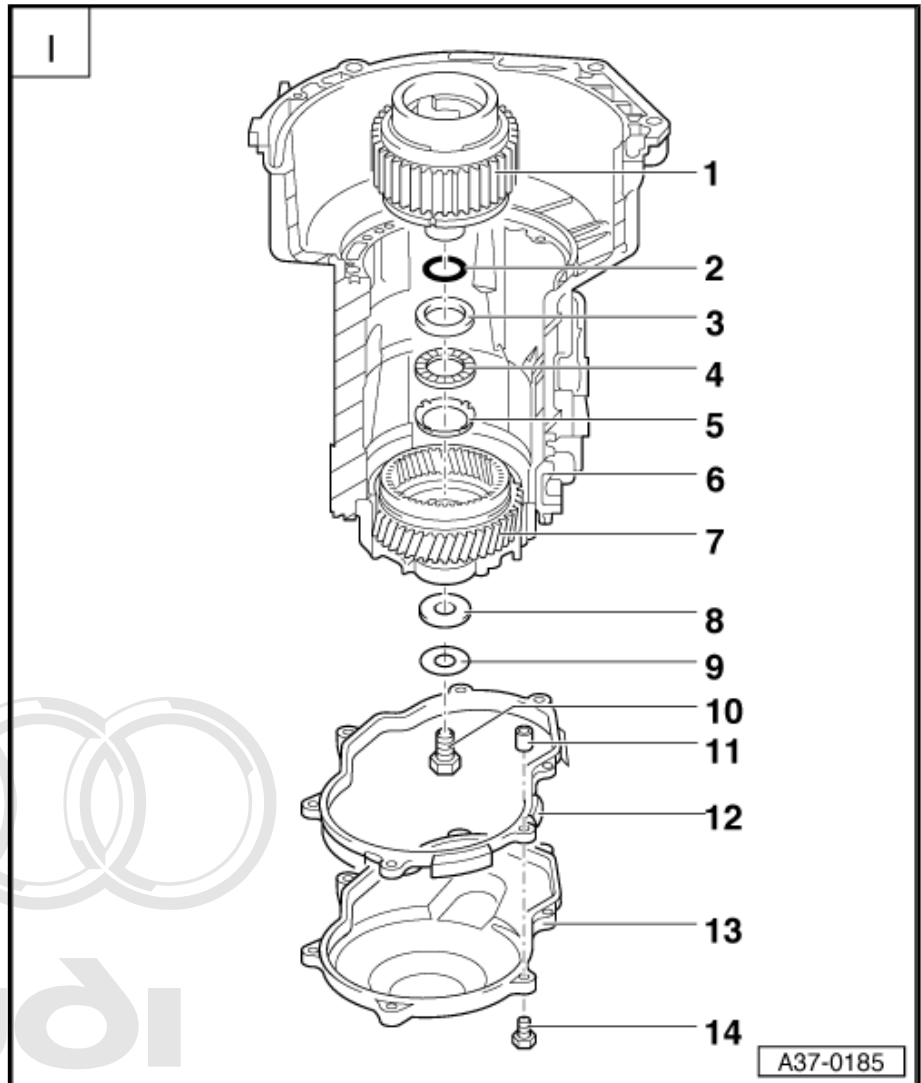
12 - Gasket

- ☐ Renew

13 - Cover

14 - Bolt

- ☐ Install bolts with locking fluid; for locking fluid refer to ⇒ Electronic parts catalogue .
- ☐ 8 Nm



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11.2 Exploded view II - installing freewheel and reverse gear brake "B1"



Note

Assembling planetary gearbox ⇒ [page 86](#) .

1 - Circlip

- ☐ For supporting tube "B2"
- ☐ Installation position: open ends of circlip face retaining wedge of free-wheel

2 - Circlip

- ☐ For freewheel
- ☐ Installation position: open ends of circlip face retaining wedge of free-wheel

3 - Freewheel with piston "B1"

- ☐ Exploded view
⇒ [page 119](#)
- ☐ Install with assembly ring -3267-

4 - Dished spring

- ☐ Installation position: convex side must face freewheel

5 - Pressure plate "B1"

- ☐ Installation position: flat side must face plates
- ☐ Varying thickness depending on number of inner plates fitted
- ☐ Spare part is allocated according to gearbox code letters

6 - Inner plate "B1"

- ☐ Quantity ⇒ [page 3](#)
- ☐ Soak new inner plate in ATF for 15 minutes before installing.

7 - Outer plate "B1"

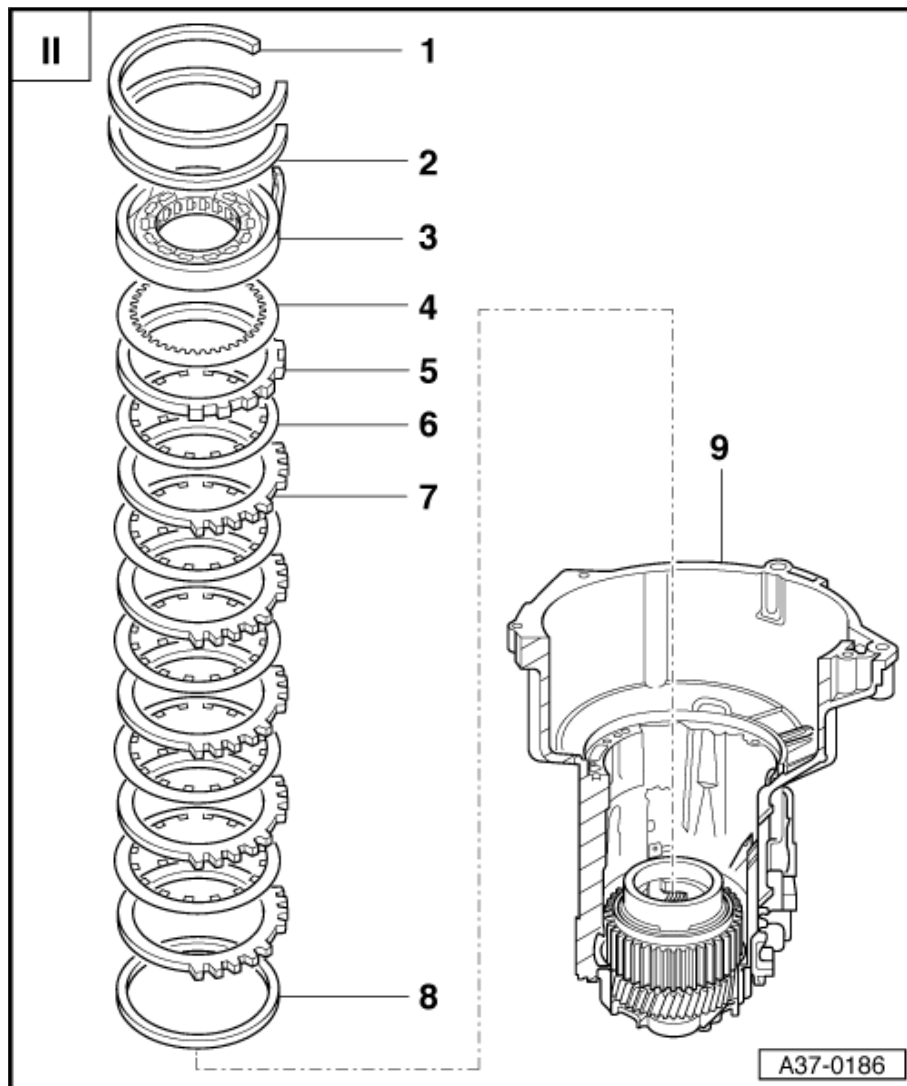
- ☐ Quantity ⇒ [page 3](#)

8 - Shim

- ☐ Determining thickness ⇒ [page 101](#)
- ☐ 1 or 2 shims can be installed

9 - Gearbox housing

- ☐ With planet carrier installed



11.3 Exploded view III - installing large sun gear as far as reverse gear clutch "K2"


Note

Assembling planetary gearbox ⇒ [page 86](#) .

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1 - Reverse gear clutch "K2"

- ☐ Dismantling and assembling ➔ [page 125](#)
- ☐ When installing, rotate clutch until all the inner plates have meshed

2 - Shim

- ☐ Determining thickness ➔ [page 104](#)
- ☐ 1 or 2 shims can be installed

3 - 1st to 3rd gear clutch "K1"

- ☐ Depending on version, clutches "K1" and "K3" may be pressed together
- ☐ Pressing "K1" off "K3" ➔ [page 78](#)
- ☐ Dismantling and assembling ➔ [page 121](#)
- ☐ Pressing clutch "K1" on to "K3" ➔ [page 93](#)
- ☐ Spare part is allocated according to gearbox code letters

4 - O-ring

- ☐ Renew
- ☐ Press "K1" off "K3" to renew O-ring ➔ [page 78](#)

5 - 3rd and 4th gear clutch "K3" with turbine shaft

- ☐ Depending on version, clutches "K1" and "K3" may be pressed together
- ☐ Pressing "K1" off "K3" ➔ [page 78](#)
- ☐ Dismantling and assembling ➔ [page 127](#)
- ☐ Pressing clutch "K1" onto "K3" ➔ [page 93](#)
- ☐ When installing, rotate clutch until all the inner plates have meshed
- ☐ There are two different versions of turbine shafts ➔ [page 26](#)
- ☐ Spare part is allocated according to gearbox code letters

6 - Axial needle bearing

- ☐ With washer
- ☐ Lightly lubricate washer with ATF so that bearing sticks to 3rd and 4th gear clutch
- ☐ Installation position: axial needle bearing must face small input shaft

7 - Small input shaft

8 - Needle bearing

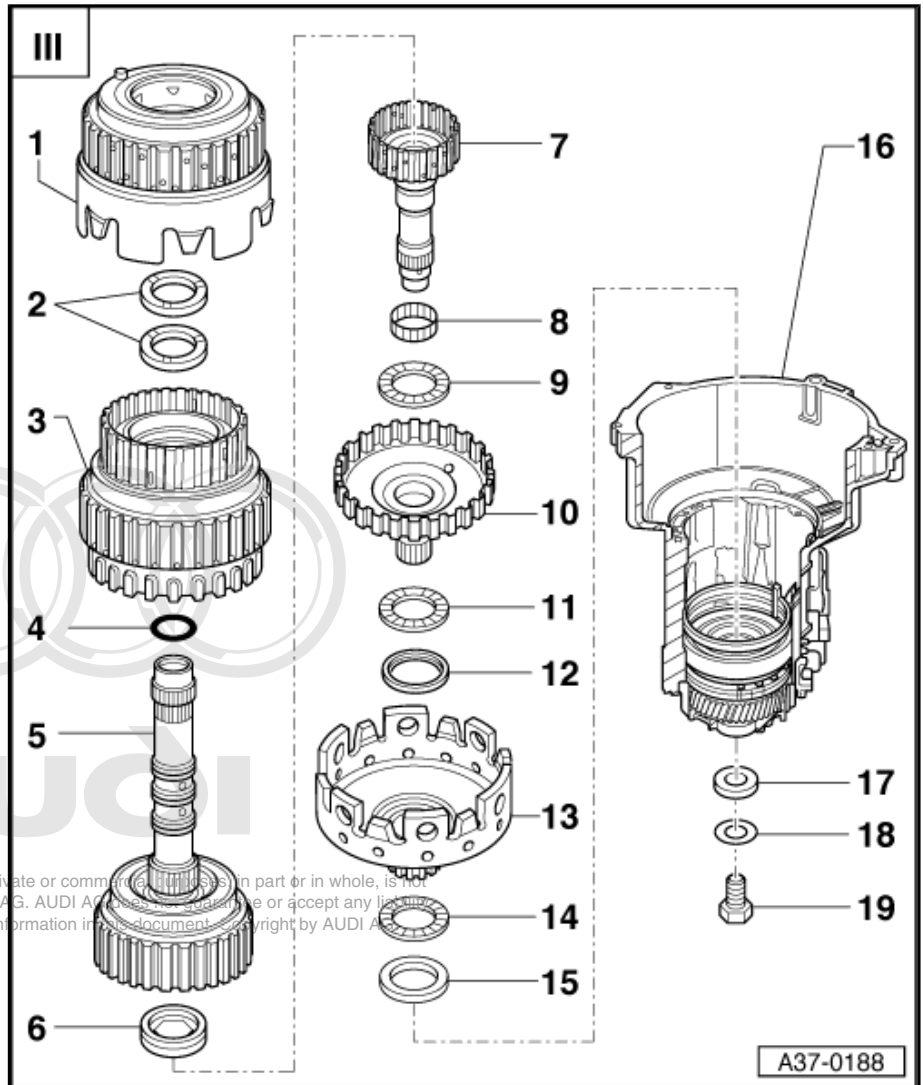
9 - Axial needle bearing

10 - Large input shaft

11 - Axial needle bearing

12 - Washer

- ☐ With shoulder



A37-0188



- ☐ For axial needle bearing
- ☐ Installation position: shoulder must face large sun gear

13 - Large sun gear

14 - Axial needle bearing

15 - Washer

- ☐ For axial needle bearing

16 - Gearbox housing with freewheel and circlips installed

17 - Shim

- ☐ For planet carrier
- ☐ Determining thickness ⇒ [page 97](#)

18 - Washer

19 - Bolt

- ☐ For small input shaft
- ☐ 30 Nm

11.4 Exploded view IV - installing supporting tube for "B2" as far as ATF pump



Note

Assembling planetary gearbox ⇒ [page 86](#) .



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1 - Bolt

- ☐ 7x
- ☐ 8 Nm and then turn 90° further

2 - ATF pump with piston "B2"

- ☐ Exploded view
⇒ [page 117](#)
- ☐ Spare part is allocated according to gearbox code letters

3 - O-ring

- ☐ Renew
- ☐ Place on ATF pump

4 - Gasket

- ☐ Renew

5 - Retaining ring

- ☐ Not fitted in gearboxes with corrugated washer on last outer plate for brake "B2" (code letters ⇒ [page 3](#))

6 - Shim

- ☐ Not fitted in gearboxes with corrugated washer on last outer plate for brake "B2" (code letters ⇒ [page 3](#))
- ☐ Determining thickness of shims ⇒ [page 108](#)

7 - Corrugated washer

- ☐ Not fitted in gearboxes with shim and retaining ring for brake "B2" (code letters ⇒ [page 3](#))

8 - Outer plate "B2"

- ☐ Quantity ⇒ [page 3](#)
- ☐ The thickness of the outer plate for adjustment of "B2" ⇒ [page 108](#) only has to be determined in gearboxes with corrugated washer (-item 7-)
- ☐ 1 or 2 outer plates can be installed
- ☐ On gearboxes without corrugated washer (-item 7-), the thickness of the outer plate -B2- is always 3 mm.

9 - Inner plate "B2"

- ☐ Quantity ⇒ [page 3](#)
- ☐ Soak new inner plate in ATF for 15 minutes before installing.

10 - Outer plate "B2"

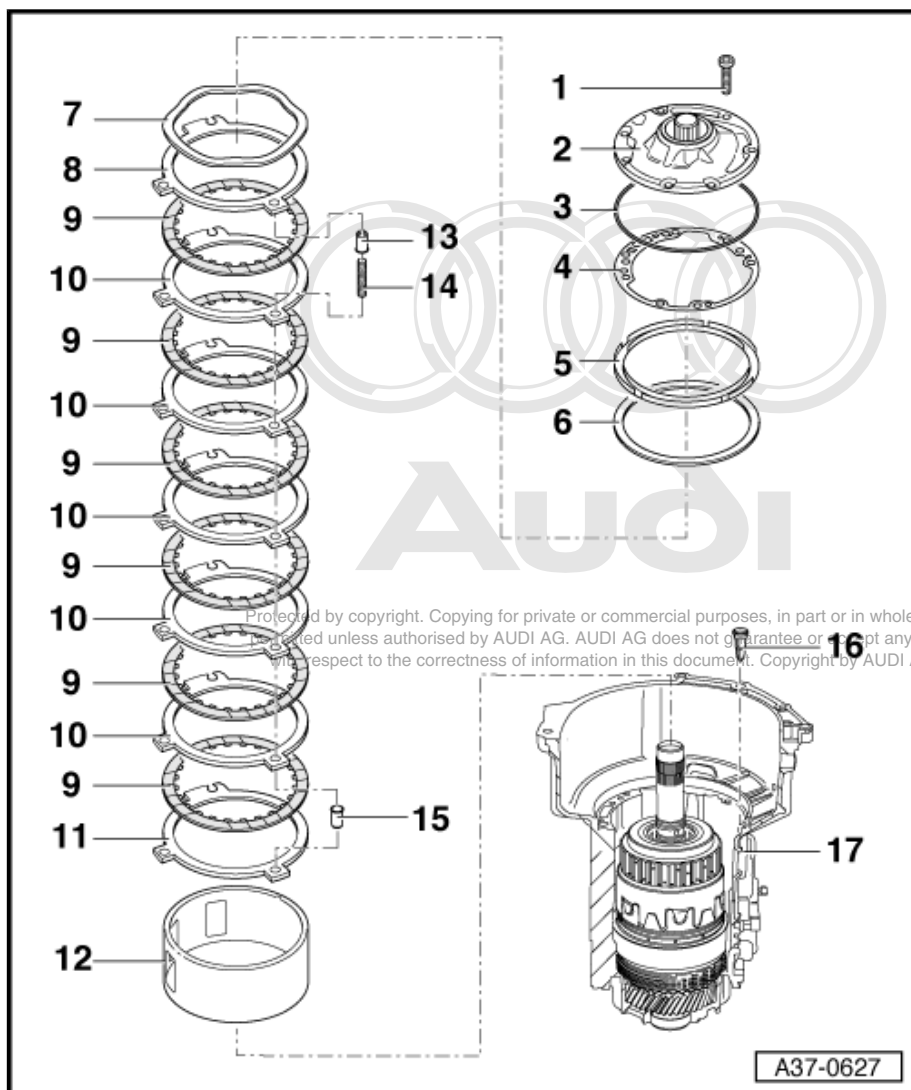
- ☐ Quantity ⇒ [page 3](#)
- ☐ Always install 2 mm thick outer plates

11 - Outer plate "B2"

- ☐ Fit 3 mm thick outer plate to supporting tube

12 - Supporting tube for "B2"

- ☐ For clutch pack "B2"
- ☐ Varying length depending on number of inner plates fitted
- ☐ Insert in such a way that notch locates on wedge of freewheel



- ☐ Spare part is allocated according to gearbox code letters

13 - Spring cap

- ☐ Install 3 spring caps before installing last outer plate
- ☐ If 2 outer plates -item 8- are fitted, insert spring caps into both plates together

14 - Spring

- ☐ 3x

15 - Spring cap

- ☐ Install 3 spring caps after installing first outer plate

16 - Strainer

- ☐ Not fitted on all gearboxes
- ☐ Installed in return pipe of ATF cooler ⇒ [page 76](#)
- ☐ Gearbox housing must be provided with corresponding recess for installing strainer

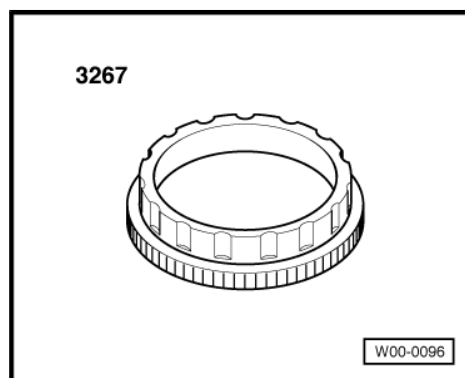
17 - Gearbox housing

- ☐ With clutches installed

11.5 Assembling planetary gearbox

Special tools and workshop equipment required

- ◆ Assembly ring -3267-

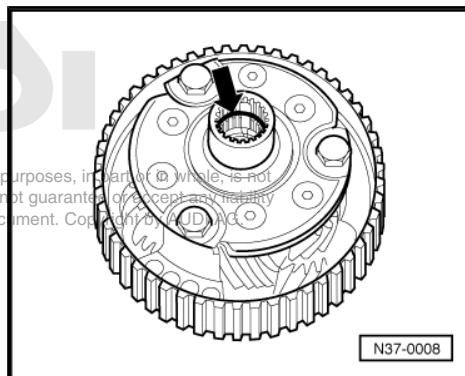


Procedure



Note

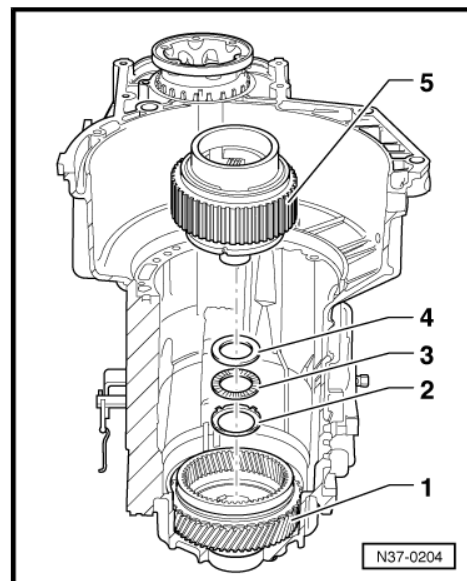
- ◆ *When installing an exchange component, use all new parts supplied with the exchange component; do not reuse old parts.*
- ◆ *The planet carrier must be adjusted after renewing planet carrier, large sun gear, large input shaft or small input shaft*
⇒ [page 97](#).
- Insert O-ring -arrow- in planet carrier.



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- Fit axial needle bearing with washers and planet carrier in input gear in the sequence stated.

- 1 - Input gear (is installed in gearbox housing)
⇒ [Item 19 \(page 74\)](#)
- 2 - Washer for axial needle bearing; insert smooth side into input gear
- 3 - Axial needle bearing
- 4 - Washer for axial needle bearing
- 5 - Planetary carrier with O-ring fitted

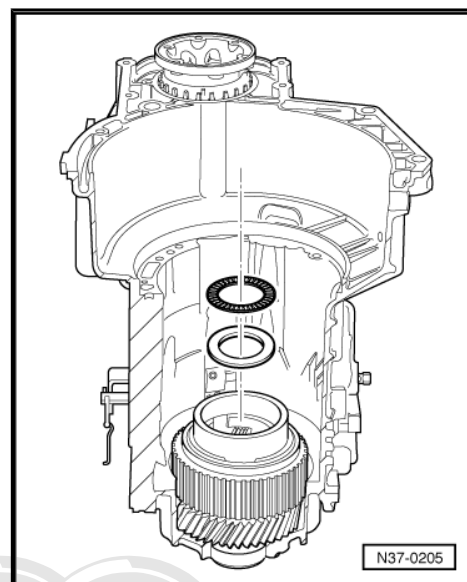


- Place washer and axial needle bearing on small sun gear in planet carrier.
- Centralize washer and axial needle bearing in small sun gear.



Note

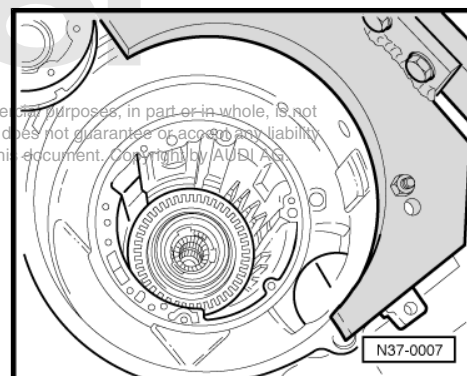
- ◆ Reverse gear brake "B1" must be adjusted when renewing the following components ⇒ [page 100](#) :
- ◆ Freewheel
- ◆ Piston for reverse gear brake "B1"
- ◆ Plates
- ◆ Gearbox housing
- Insert shim(s).
- Insert inner and outer plates "B1".
- Insert pressure plate with flat side facing plates.



Note

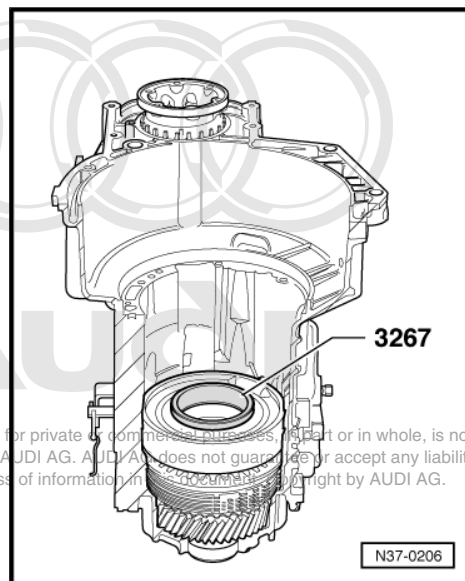
The thickness of the pressure plate varies depending on the number of plates ⇒ [Item 5 \(page 82\)](#) and the replacement part is assigned to the gearbox code.

- Insert dished spring with convex side facing towards free-wheel.

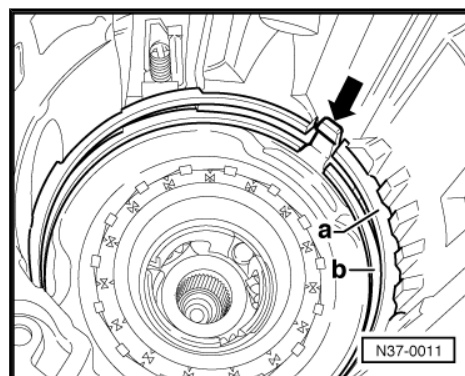


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- Preload freewheel rollers with assembly ring -3267- and insert freewheel.

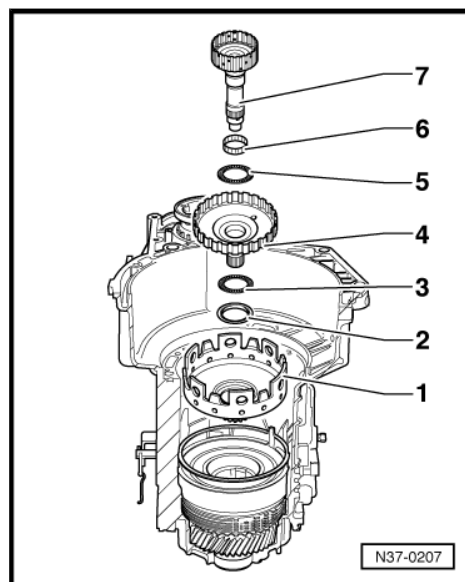


- Install circlip -b- for freewheel and circlip -a- for supporting tube.
- Fit gaps of circlips over retaining wedge -arrow- of freewheel.
- Install gearbox speed sender -G38- ⇒ [page 145](#) .
- Measure “B1” to check adjustment ⇒ [page 103](#) .

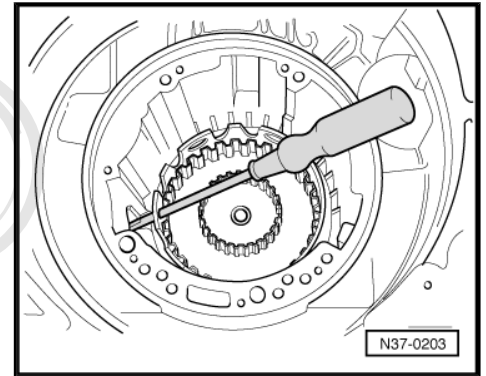


- Fit components into gearbox housing in the sequence stated:

- 1 - Large sun gear
- 2 - Washer for axial needle bearing (shoulder must face large sun gear)
- 3 - Axial needle bearing
- 4 - Large input shaft
- 5 - Axial needle bearing
- 6 - Needle bearing
- 7 - Small input shaft



- Engage parking lock.
- To tighten the bolt for the small input shaft, insert a screwdriver through one of the holes in the large sun gear.



- Insert shim -3- onto shoulder of small input shaft -arrow-.

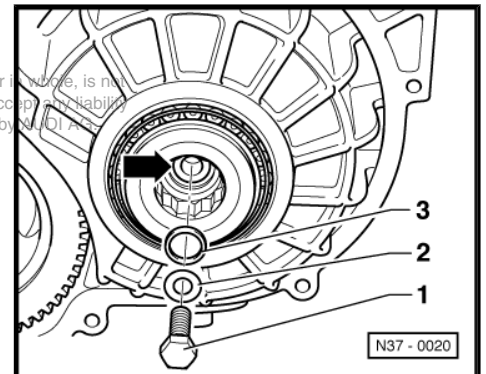


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Determine thickness of shim ⇒ [page 97](#) .

- Fit bolt -1- for small input shaft with washer -2- and tighten.
- Tightening torque: 30 Nm
- Carry out check measurement of planet carrier ⇒ [page 100](#) .



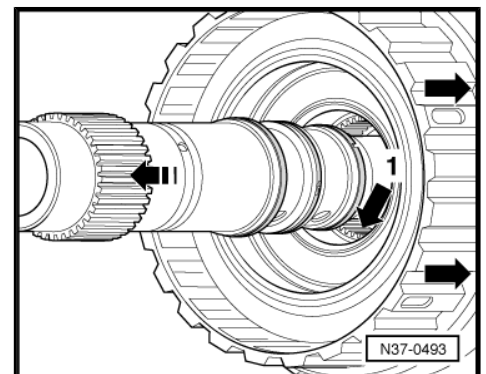
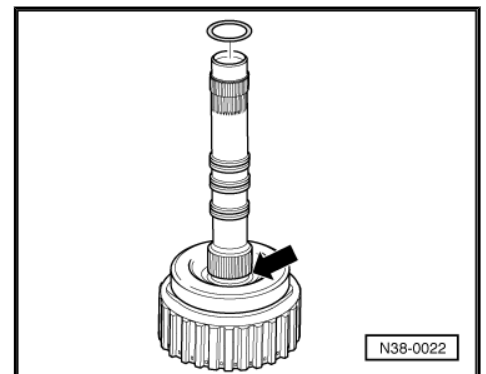
- Lubricate new O-ring with ATF.
- Insert O-ring in groove of turbine shaft -arrow-.



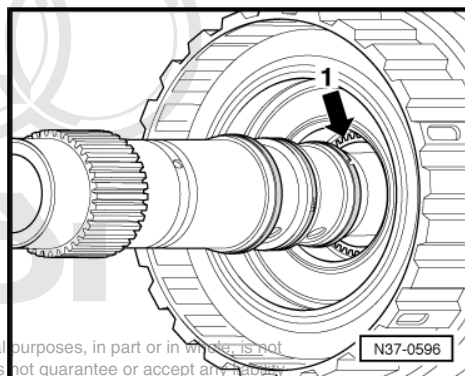
Note

Depending on version, clutches "K1" and "K3" must be pressed together before installing.

- Check whether clutch "K1" can be fully fitted onto splines of turbine shaft of "K3".
- Fit clutch "K1" onto "K3" by hand.



- If splines -arrow 1- in hub of "K1" are visible, the two clutches must be pressed together ⇒ [page 93](#) .
- If the resistance of the O-ring is overcome when the two clutches are fitted together (by hand!), the splines -arrow 1- of "K1" are no longer visible. The clutches then no longer need to be pressed together.
- Continue to assemble gearbox.



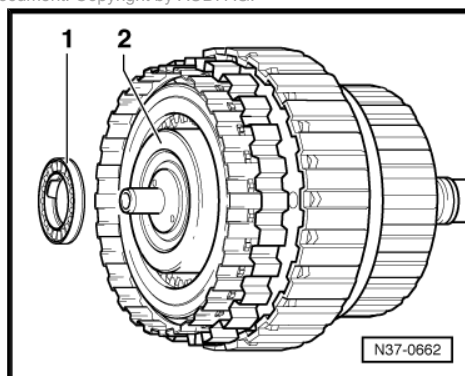
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- Clip axial needle bearing with washer -1- onto 3rd and 4th gear clutch "K3" -item 2-.
- Installation position: washer of bearing faces "K3".

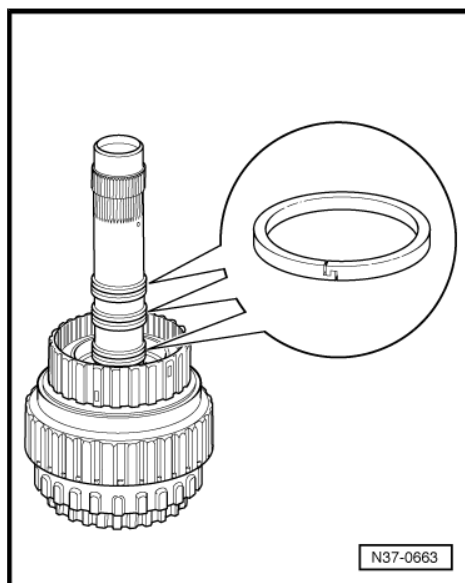


Note

Moisten washer of axial needle bearing with ATF so that it sticks to "K3".



- Ensure piston rings seat correctly on "K3".
- Ensure that the ends of the piston rings are hooked together.

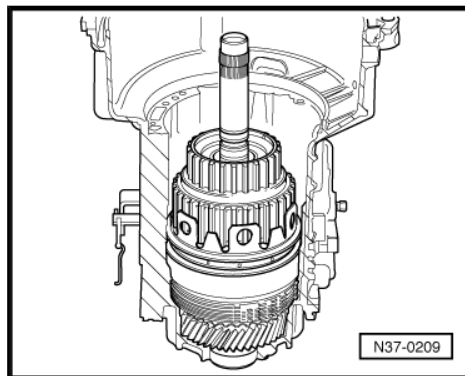


- Insert 3rd and 4th gear clutch "K3" with axial needle bearing and washer.



Note

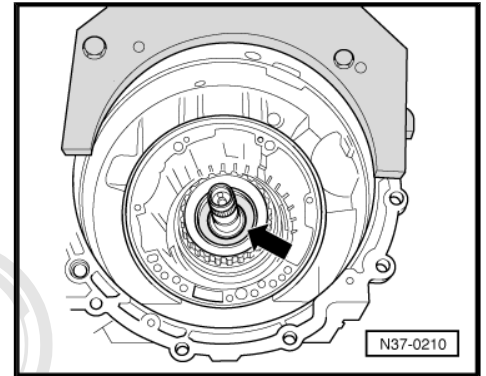
- ♦ *If "K1" and "K3" are pressed together, the two clutches can only be installed together as one unit.*
- ♦ *If "K1" and "K3" are not pressed together, it is easier to fit the two clutches individually.*
- ♦ *When installing, rotate clutch until all the plates have meshed.*



- Insert shim(s) -arrow- in “K1”.

i Note

- ◆ When renewing “K1”, “K2”, the small input shaft or the ATF pump the shim must be measured again ⇒ [page 103](#).
- ◆ Up to 3 shims can be installed.

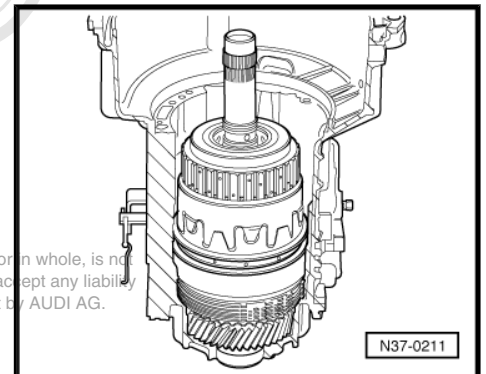


- Insert reverse gear clutch “K2”.

i Note

When installing, rotate reverse gear clutch “K2” until all the plates have meshed.

- Insert supporting tube for clutch pack of 2nd and 4th gear brake “B2” in such a way that recess on lower part of supporting tube engages in retaining wedge of freewheel.

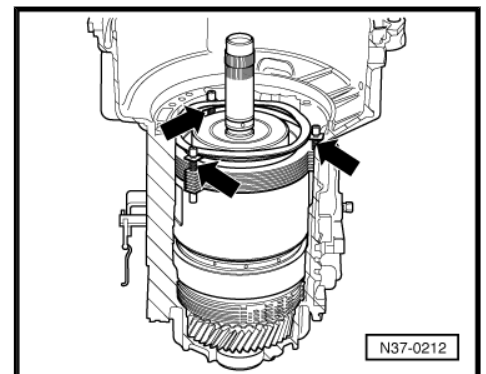


- Install plates of 2nd and 4th gear brake “B2” in the sequence stated:

1. First insert a 3 mm thick outer plate.
2. Insert three spring caps in outer plate.
3. Insert compression springs -arrows-.
4. Insert all plates with the exception of the last outer plate.
5. Fit three spring caps on compression springs.

i Note

- ◆ Adjust 2nd and 4th gear brake “B2” when renewing the following components:
- ◆ Gearbox housing
- ◆ Supporting tube
- ◆ ATF pump
- ◆ Corrugated washer
- ◆ Retaining ring
- ◆ Plates
- ◆ These replacement parts must be allocated according to the gearbox code.



There are two versions of brake "B2":

A - Brake with corrugated washer

B - Brake with retaining ring

Gearboxes in which a corrugated washer is fitted on the last outer plate in brake "B2" (code letters ➔ [page 3](#)):



Note

On these gearboxes, the thickness of the last outer plate determines the clearance of brake "B2". Determining required thickness of last outer plate ➔ [page 108](#).

- Fit last outer plate after determining required thickness.



Note

If the measurement requires two outer plates to be installed, they must be fitted onto the spring caps together.

- Install corrugated washer.

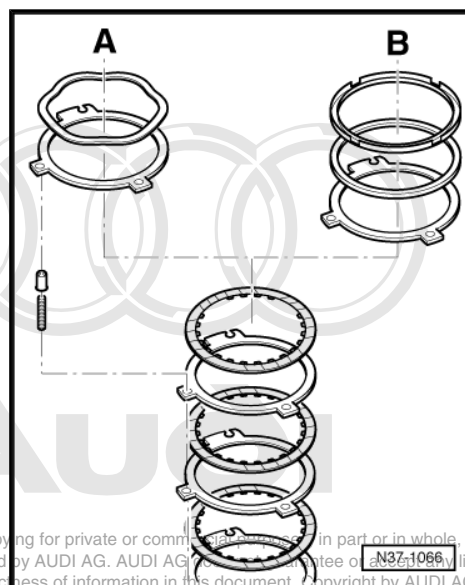
Gearboxes in which a shim and a retaining ring are fitted in brake "B2" (code letters ➔ [page 3](#)):



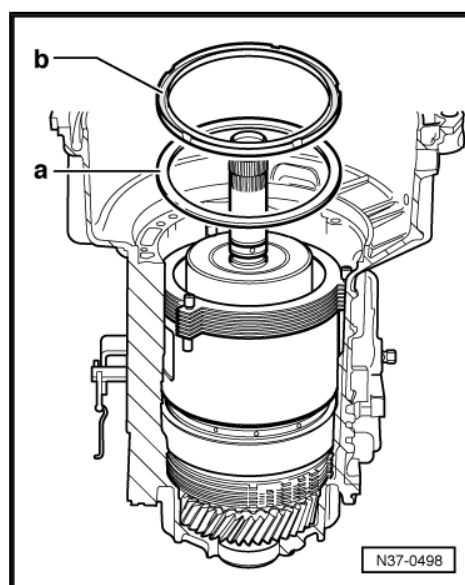
Note

On these gearboxes, the last outer plate is always 3 mm thick. The clearance of brake "B2" is determined by the shim -a- on which the retaining ring -b- is fitted.

- Fit last outer plate with a thickness of "3 mm".
- Determine thickness of required shim ➔ [page 107](#) and install shim.
- Fit retaining ring onto shim.
- Installation position: smooth side faces shim



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Continued for all gearboxes:

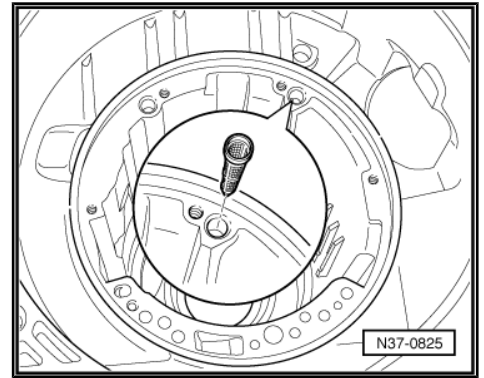
- If fitted, clean strainer and install.



Note

The strainer is installed in the return pipe of the ATF cooler. It cannot be retrofitted in older gearboxes.

- Insert gasket for ATF pump, paying attention to position of holes.
- Lightly lubricate new O-ring with ATF and fit O-ring on ATF pump.



Note

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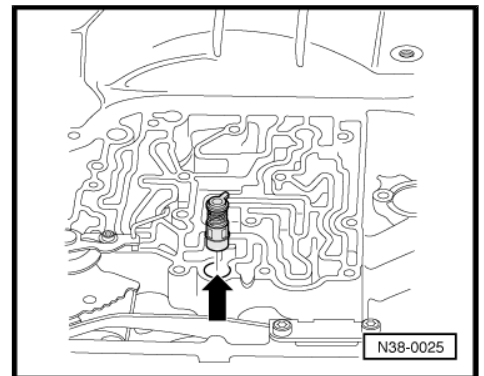
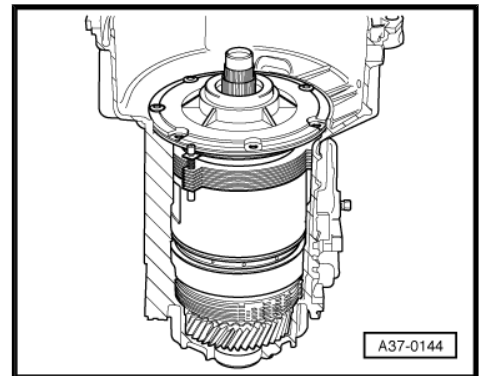
Ensure the piston rings are properly seated.



Caution

Do not damage O-ring when inserting ATF pump.

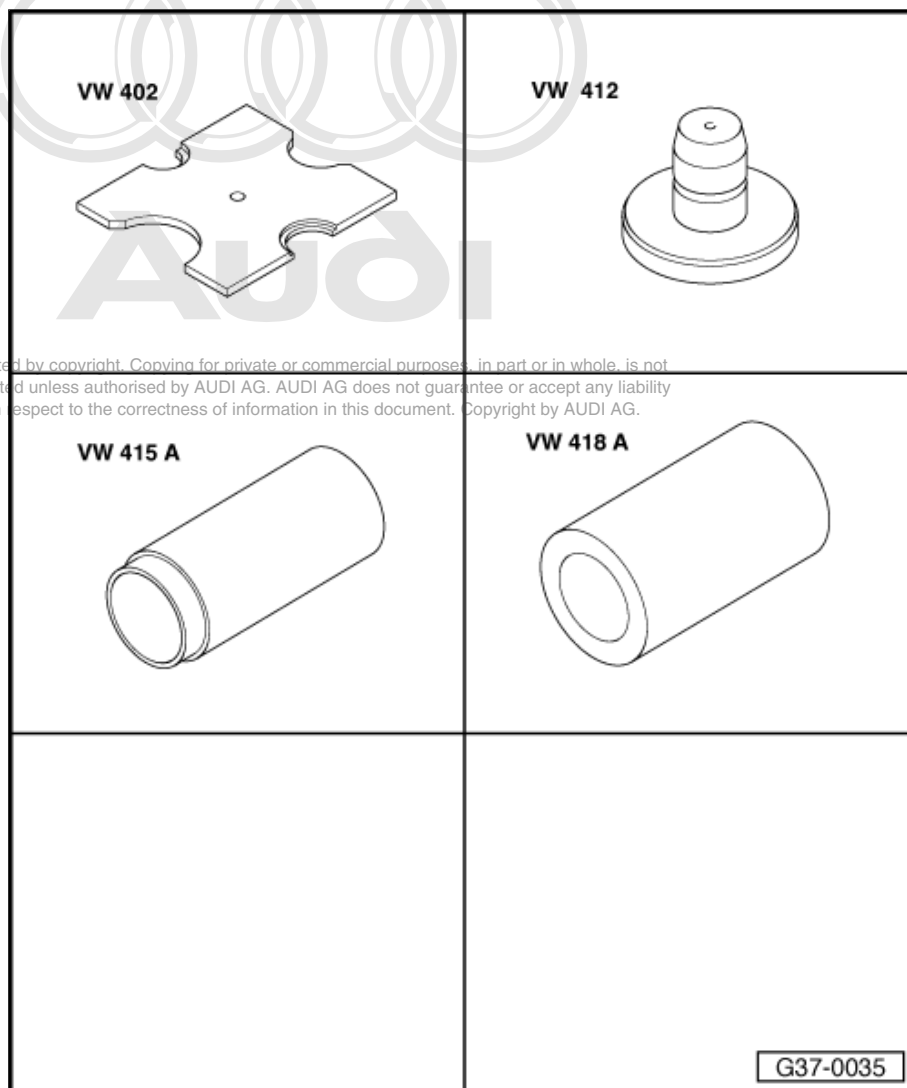
- Insert ATF pump and push onto stop by hand.
 - Tighten bolts evenly in diagonal sequence.
- Tightening torque:
- 8 Nm and then turn 90° further.
- Carry out check measurement of clutch play ➔ [page 106](#) .
 - Fit sealing plug with O-rings.
 - Installation position: lug -arrow- engages in oil passage.
 - Install valve body with conductor strip ➔ [page 130](#) .
 - Install ATF oil pan ➔ [page 133](#) .
 - Install torque converter ➔ [page 30](#) , note assignment ➔ [page 26](#) .
 - Install gearbox ➔ [page 52](#) .
 - Fill up with ATF after repairs ➔ [page 67](#) .



11.6 Pressing clutch "K1" onto "K3"

Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415 A-
- ◆ Tube -VW 418 A-



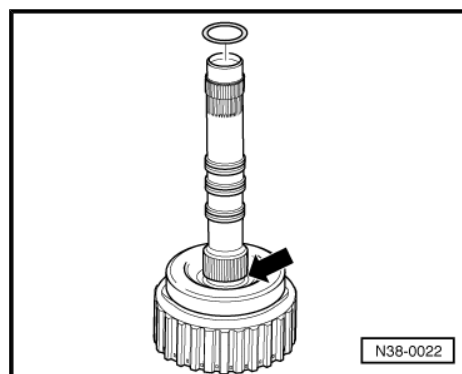
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Procedure

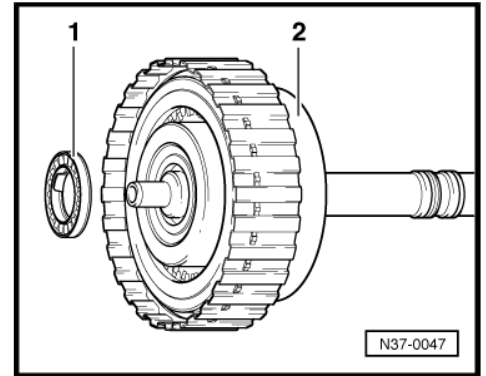


Note

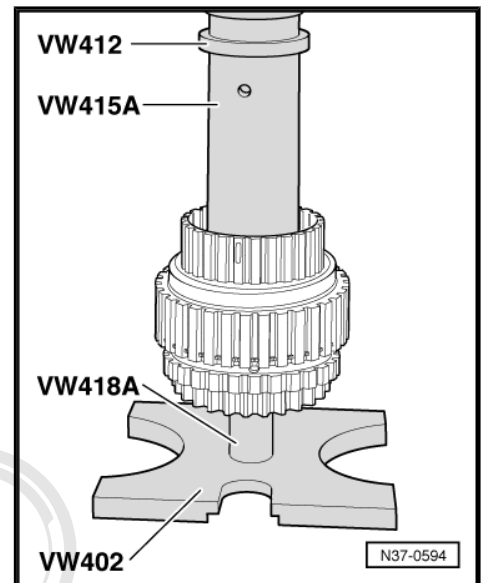
- ◆ Depending on version, clutches "K1" and "K3" must be pressed together before installing.
 - ◆ If "K1" and "K3" were separated during the repair or were supplied separately as replacement parts, they must be pressed together as follows.
- Lubricate new O-ring with ATF.
 - Insert O-ring in groove of turbine shaft -arrow-.



- Clip axial needle bearing with washer -1- onto 3rd and 4th gear clutch "K3" -item 2-.
- Make sure that the contact surfaces of the tools are flat and smooth and are not damaged.



- Prepare "K1" and "K3" for pressing together as shown here.

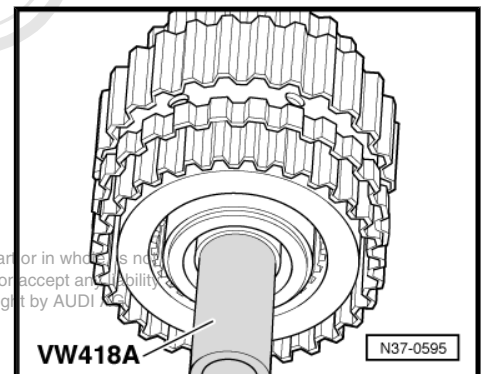


- Before pressing, centrally align tube -VW 418 A- on surface for axial needle bearing.

Note

Illustration shows "K3" from below.

- Carefully press on clutch "K1" as far as noticeable stop.
- Do not exert further pressure on clutches!
- Continuation of work sequence ⇒ [page 90](#) .



12 Overview - adjusting planetary gearbox

I - Planet carrier

- ❑ Determining thickness of shim -A- ⇒ [page 97](#)

II - Reverse gear brake "B1"

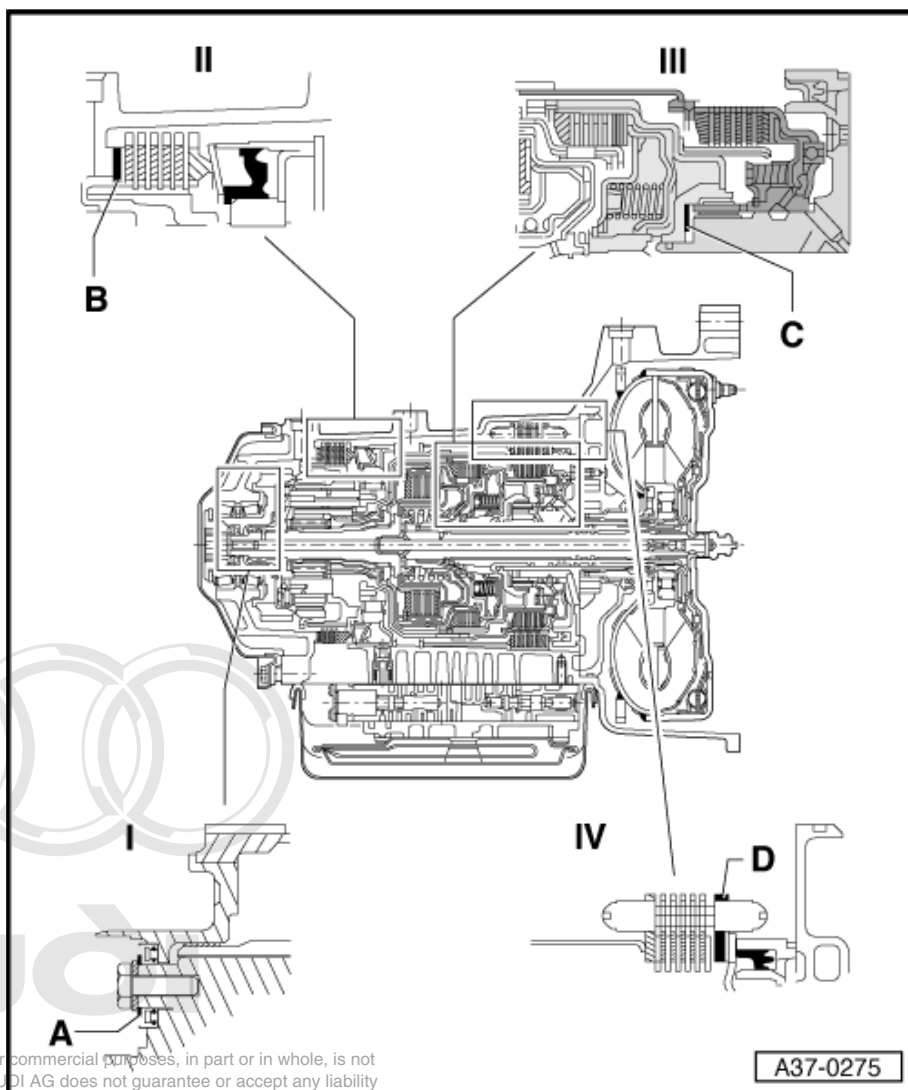
- ❑ Determining thickness of shim -B- ⇒ [page 101](#)

III - Clutch play

- ❑ Determining thickness of shim -C- ⇒ [page 104](#)

IV - 2nd and 4th gear brake "B2"

- ❑ Determining thickness of outer plate -D- (on gearboxes with corrugated washer) ⇒ [page 108](#)
- ❑ Determining thickness of shim -D- (on gearboxes with retaining ring and shim) ⇒ [page 113](#)



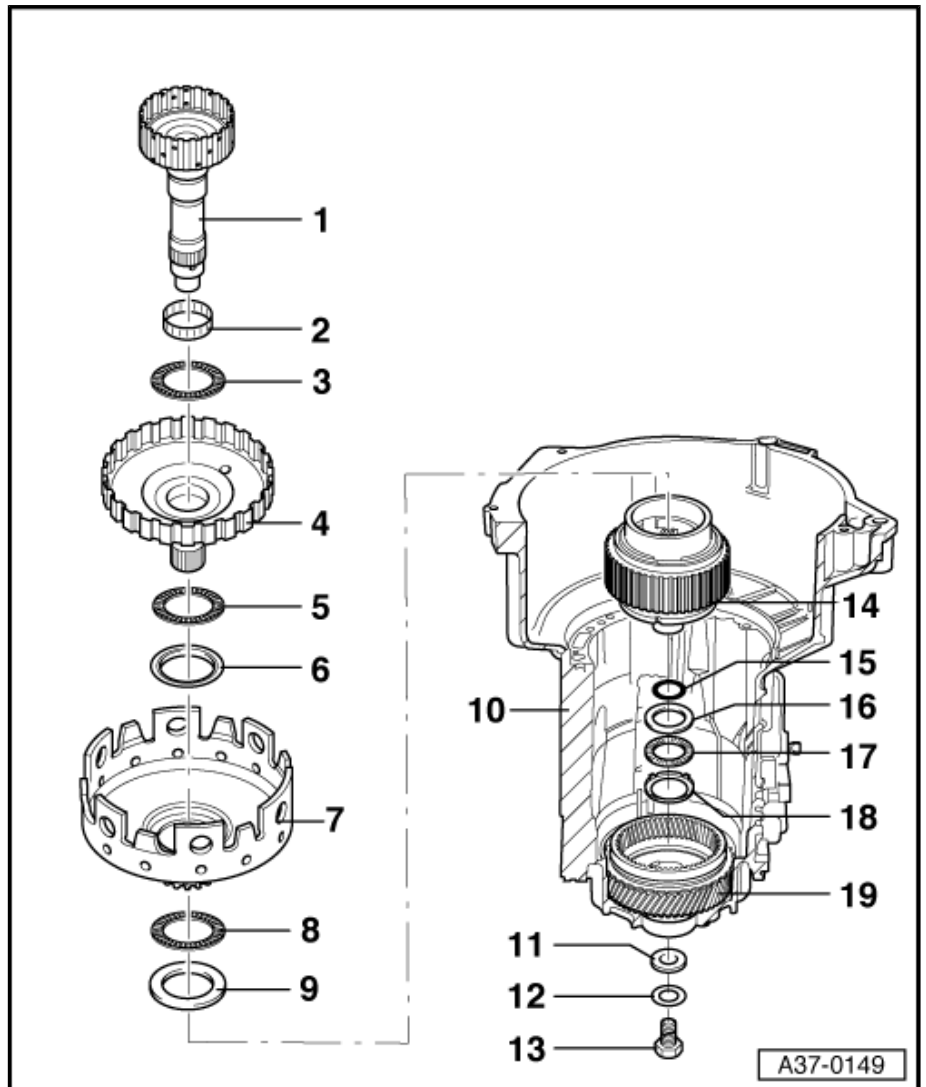
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A37-0275

12.1 Exploded view I - adjusting planet carrier

- To adjust planet carrier, install components in gearbox housing without shim -item 11-.

- 1 - Small input shaft
- 2 - Needle bearing
- 3 - Axial needle bearing
- 4 - Large input shaft
- 5 - Axial needle bearing
- 6 - Washer
 - ☐ Insert in large sun gear ⇒ [page 86](#)
- 7 - Large sun gear
- 8 - Axial needle bearing
- 9 - Washer
- 10 - Gearbox housing
 - ☐ With input gear and axial needle bearing
 - ☐ Axial needle bearing remains in input gear
 - ☐ If axial needle bearing is damaged ⇒ [page 161](#)
- 11 - Shim
 - ☐ Do not install when adjusting planet carrier
- 12 - Washer
- 13 - Bolt
 - ☐ For small input shaft
 - ☐ 30 Nm
- 14 - Planet carrier
- 15 - O-ring
 - ☐ Renew
 - ☐ Insert in planet carrier ⇒ [page 86](#)
- 16 - Washer for axial needle bearing
- 17 - Axial needle bearing
- 18 - Washer for axial needle bearing
 - ☐ Install smooth side in input gear
- 19 - Input gear
 - ☐ Do not remove when adjusting planet carrier
 - ☐ Removing and installing input gear or axial needle bearing for planet carrier ⇒ [page 159](#)

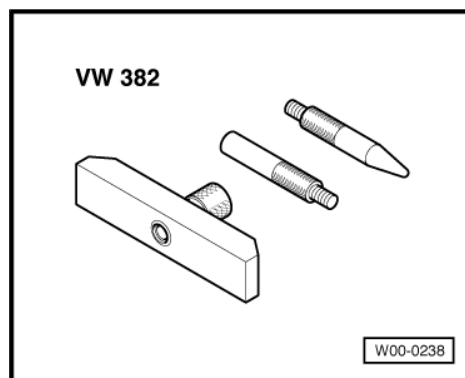


12.2 Adjusting planet carrier

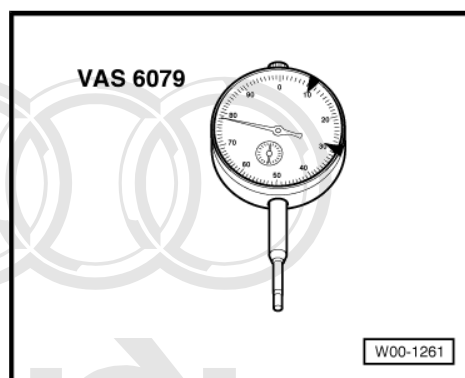
Special tools and workshop equipment required

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◆ Measuring tool -VW 382-



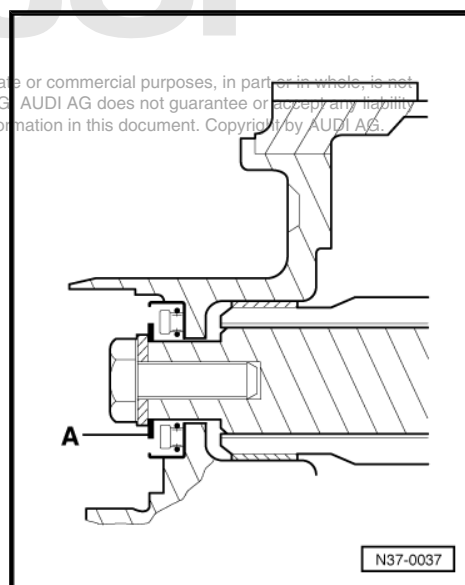
◆ Dial gauge -VAS 6079-



Determining thickness of shim(s) -A-

- To adjust planet carrier, install components -item 1 ... 9- and -14 ... 18- ⇒ [page 97](#) in gearbox housing

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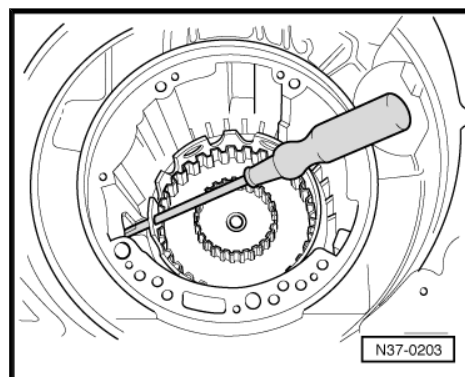


- Engage parking lock.
- Insert screwdriver through hole of large sun gear to loosen and tighten bolt for small input shaft.



Note

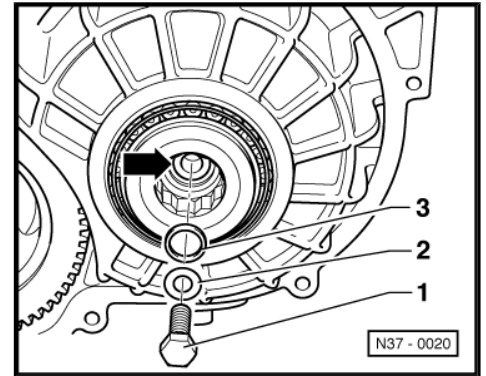
If the parking lock cannot be engaged, also block the large input shaft using a second screwdriver.



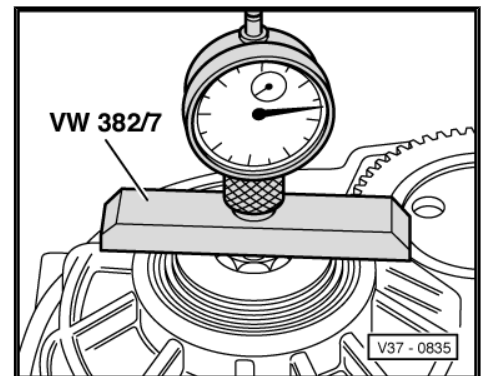
- Fit bolt -1- for small input shaft with washer -2- only and tighten.
- Tightening torque: 30 Nm

Note

Shim -3- is not fitted at this stage.



- Set up measuring tool as shown in illustration. Position tip of dial gauge with 1 mm preload on centre of bolt head for small input shaft.
- Set dial gauge to "0".
- Push small input shaft upwards and take reading.
- Measurement in following example: 2.00 mm.
- Determine thickness of shim(s) "A" according to following table: for part numbers refer to ⇒ Electronic parts catalogue :

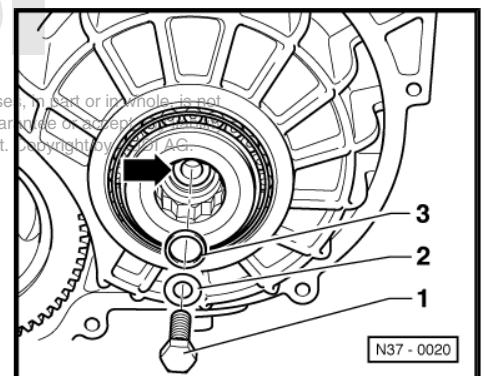


Measured value in mm	Shim(s) in mm	Measured value in mm	Shim(s) in mm
1.26 ... 1.35	1.0	2.26 ... 2.35	1.0 + 1.0
1.36 ... 1.45	1.1	2.36 ... 2.45	1.0 + 1.1
1.46 ... 1.55	1.2	2.46 ... 2.55	1.1 + 1.1
1.56 ... 1.65	1.3	2.56 ... 2.65	1.1 + 1.2
1.66 ... 1.75	1.4	2.66 ... 2.75	1.2 + 1.2
1.76 ... 1.85	1.5	2.76 ... 2.85	1.2 + 1.3
1.86 ... 1.95	1.6	2.86 ... 2.95	1.3 + 1.3
1.96 ... 2.05	1.7	2.96 ... 3.05	1.3 + 1.4
2.06 ... 2.15	1.8	3.06 ... 3.15	1.4 + 1.4
2.16 ... 2.25	1.9	3.16 ... 3.25	1.4 + 1.5

- Remove bolt -1- for small input shaft.
- Insert correct shim -3- on small input shaft -arrow-.

Example: if the reading is 2.00 mm use a shim with a thickness of 1.7 mm.

- Fit bolt -1- for small input shaft with washer -2- and tighten.
- Tightening torque: 30 Nm
- Carry out check measurement of planetary carrier, as described below.



Check measurement of planet carrier

- Set up measuring tool as shown in illustration. Position tip of dial gauge with 1 mm preload on centre of bolt head for small input shaft.
- Move small input shaft up and down and take reading of play on dial gauge.

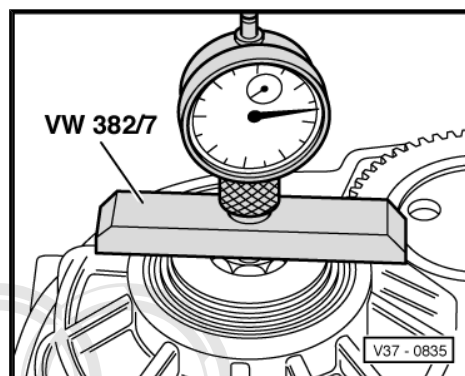
Play:

- Minimum: 0.23 mm.
- Maximum: 0.37 mm.



Note

If the planet carrier has been adjusted with reverse gear brake "B1" and freewheel removed, then install reverse gear brake "B1" before installing planet carrier
⇒ ["11.5 Assembling planetary gearbox", page 86](#).



12.3 Exploded view II - adjusting reverse gear brake "B1"

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1 - Circlip

2 - Freewheel with piston "B1"

3 - Dished spring

- ❑ Installation position: convex side must face freewheel

4 - Pressure plate

- ❑ Installation position: flat side must face plates
- ❑ Varying thickness depending on number of inner plates fitted
- ❑ Spare part is allocated according to gearbox code letters

5 - Inner plate "B1"

- ❑ Quantity ⇒ [page 3](#)

6 - Outer plate "B1"

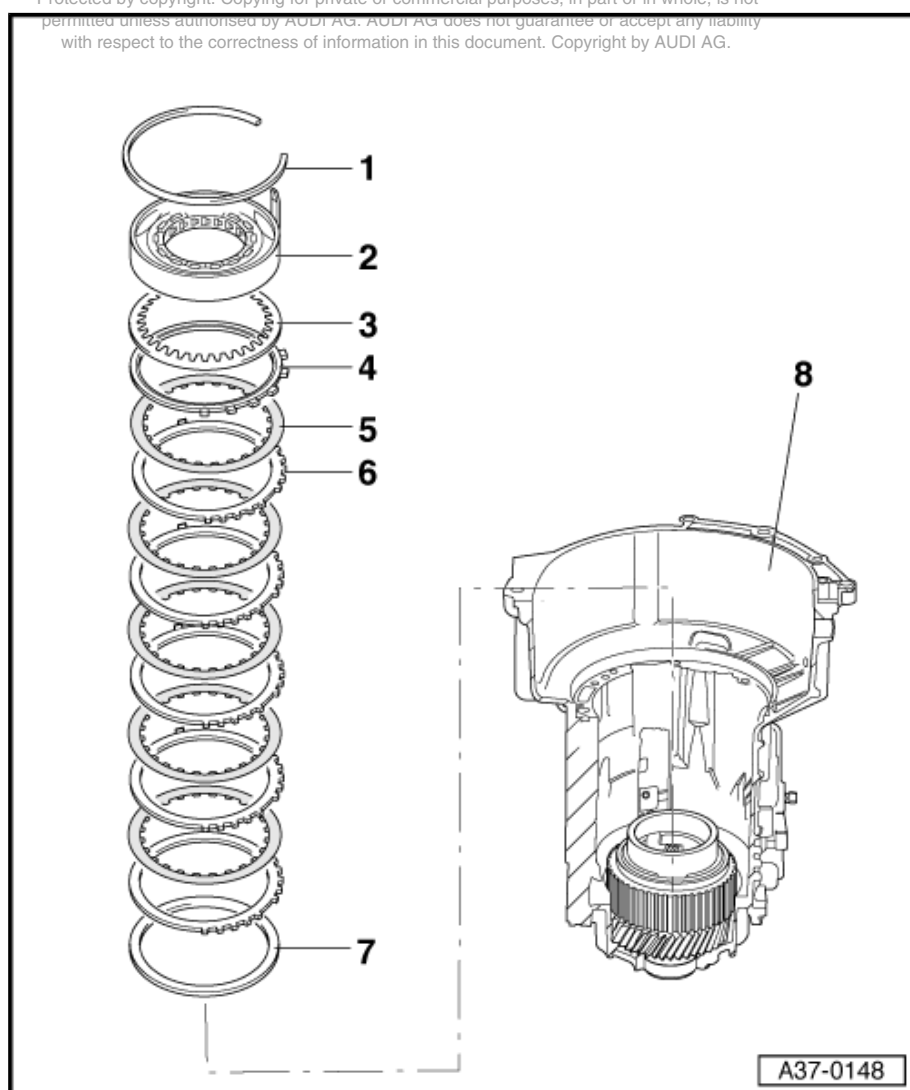
- ❑ Quantity ⇒ [page 3](#)

7 - Shim

- ❑ 1 or 2 shims can be installed

8 - Gearbox housing

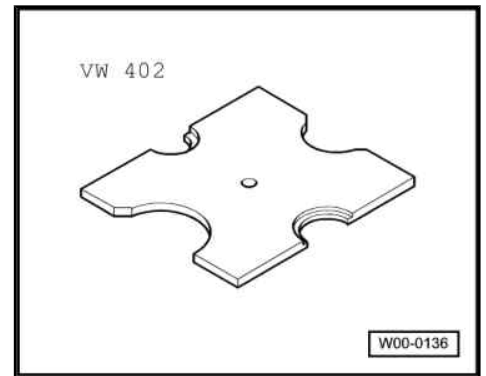
- ❑ With input gear and planet carrier installed



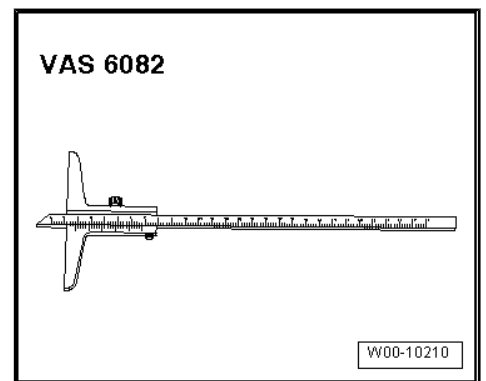
12.4 Adjusting reverse gear brake "B1"

Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-



- ◆ Depth gauge -VAS 6082-



- ◆ Feeler gauge

Determining thickness of shim(s) -B-

The thickness of the shim(s) is governed by gap dimension -x-. This gap dimension is calculated according to the following formula:

$$-x- = -K- + (-l : 2) - m-$$

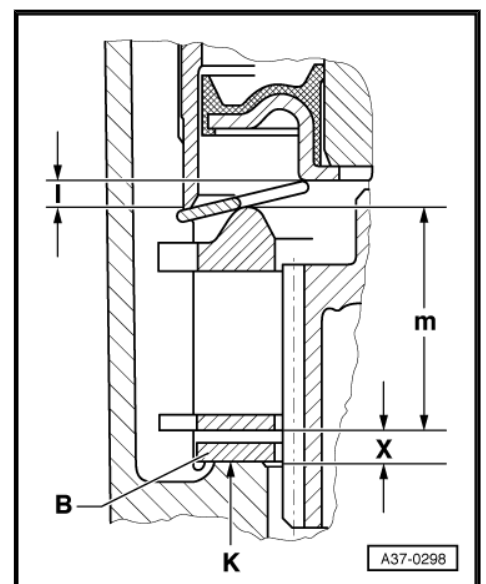
B - Shim

x - Gap dimension

l - Position of piston in freewheel; determining value
⇒ [page 102](#)

m - Height of clutch pack including pressure plate; determining value
⇒ [page 102](#)

K - Constant value is 26.9 mm; value is determined by installation height in gearbox housing and is not adjustable

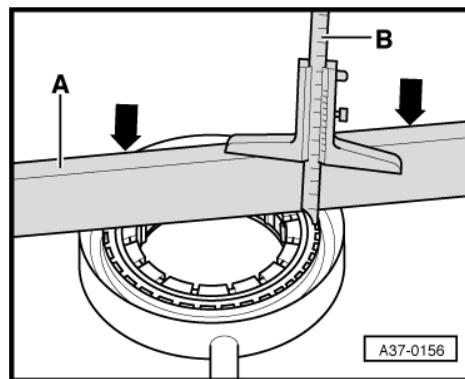


Determining value "l"

- Press piston into freewheel as far as stop.
- Place straightedge -A- on outer race of freewheel and hold in position -arrows-.
- Use depth gauge -VAS 6082- -item B- to measure to inner edge of piston.

- Example of value "l":

Measured value	51.8 mm
– Straightedge	– 48.2 mm
= Determined value "l"	3.6 mm

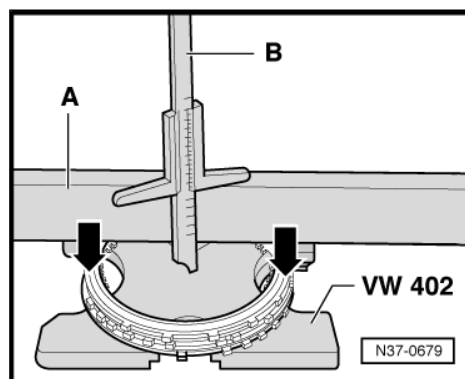


Determining value "m"

- Place straightedge -A- on thrust plate.
- Compress clutch pack including pressure plate in direction of -arrow- and measure thickness of clutch pack with depth gauge -VAS 6082- -item B-.

- Example of value "m":

Measured value	73.5 mm
– Straightedge	– 48.2 mm
= Determined value "m"	25.3 mm



- Example for calculating gap "x":

$$x = K + (l : 2) - m$$

- $x = 26.9 \text{ mm} + (3.6 \text{ mm} : 2) - 25.3 \text{ mm} = 3.4 \text{ mm}$
- Determine shim(s) "B" according to following table: for part numbers refer to ➔ Electronic parts catalogue :

Gap "x" (mm)	Shim(s) in mm	Gap "x" (mm)	Shim(s) in mm
2.36 ... 2.45	1.0	3.36 ... 3.45	1.0 + 1.0
2.46 ... 2.55	1.1	3.46 ... 3.55	1.0 + 1.1
2.56 ... 2.65	1.2	3.56 ... 3.65	1.1 + 1.1
2.66 ... 2.75	1.3	3.66 ... 3.75	1.1 + 1.2
2.76 ... 2.85	1.4	3.76 ... 3.85	1.2 + 1.2
2.86 ... 2.95	1.5	3.86 ... 3.95	1.2 + 1.3
2.96 ... 3.05	1.6	3.96 ... 4.05	1.3 + 1.3
3.06 ... 3.15	1.7	4.06 ... 4.15	1.3 + 1.4
3.16 ... 3.25	1.8	4.16 ... 4.25	1.4 + 1.4
3.26 ... 3.35	1.9		

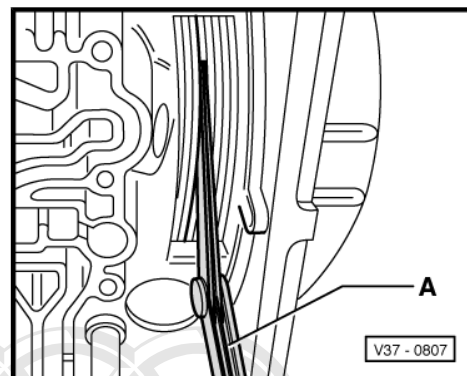
- After determining shim for "B1", carry out check measurement as described below.

Check measurement for reverse gear brake "B1"

- Install components as far as freewheel and secure with circlip
⇒ [page 86](#) .
- Use feeler gauge -A- to measure clearance between plates
(accessible through recess next to valve body flange).

Play:

- Minimum: 1.25 mm.
- Maximum: 1.55 mm.



12.5 Exploded view III - adjusting clutch play between "K1" and "K2"



Note

To adjust clutch play, install components without shim(s) ⇒ [Item 2 \(page 103\)](#) ⇒ [page 86](#) .

1 - Reverse gear clutch "K2"

2 - Shims

- ☐ Do not install when adjusting clutch play
- ☐ Up to 3 shims may be fitted

3 - 1st to 3rd gear clutch "K1"

4 - O-ring

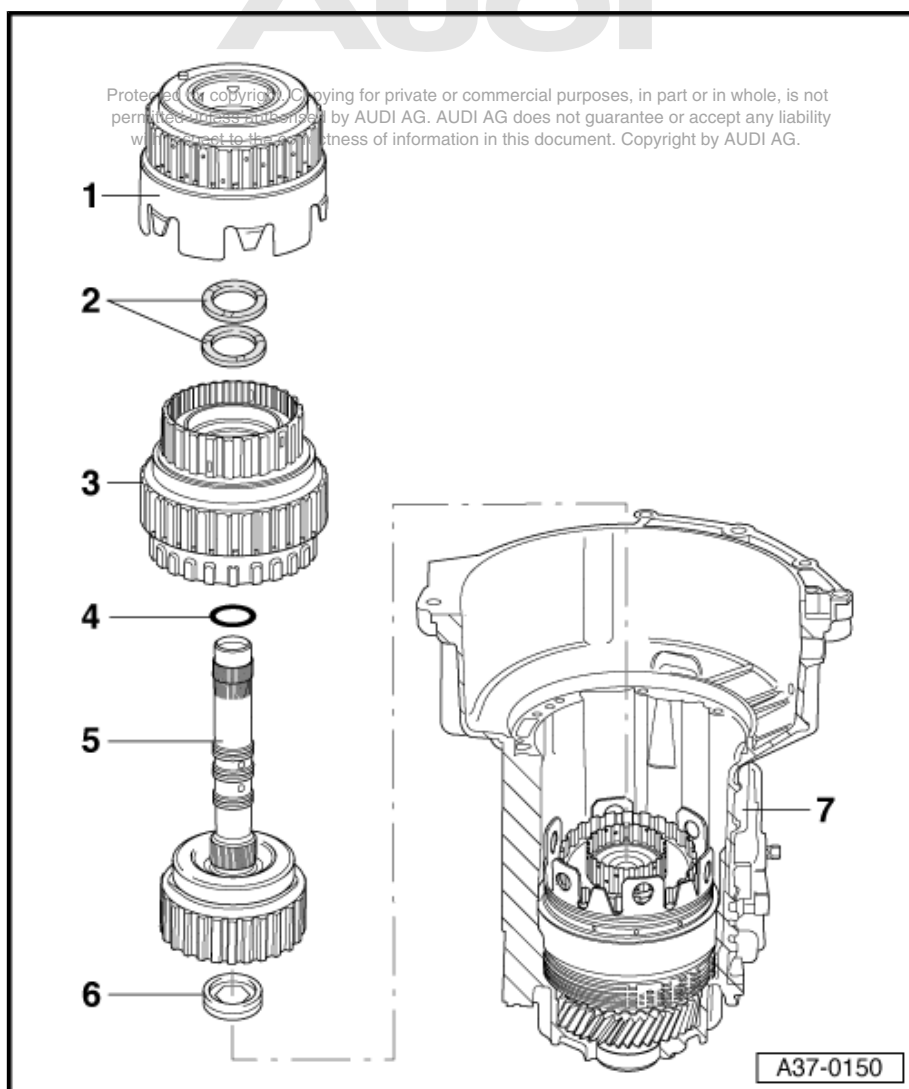
5 - 3rd and 4th gear clutch "K3" with turbine shaft

6 - Axial needle bearing with washer

- ☐ Installation position: axial needle bearing must face small input shaft
- ☐ Washer faces "K3"

7 - Gearbox housing

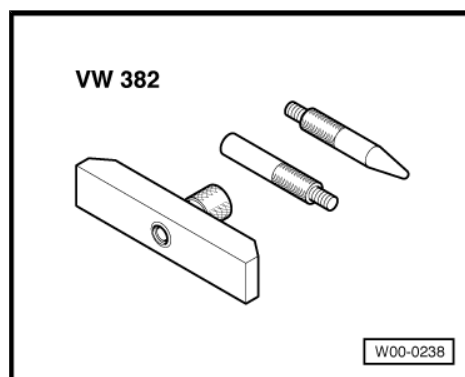
- ☐ Planetary gearbox installed as far as small input shaft ⇒ [page 86](#)



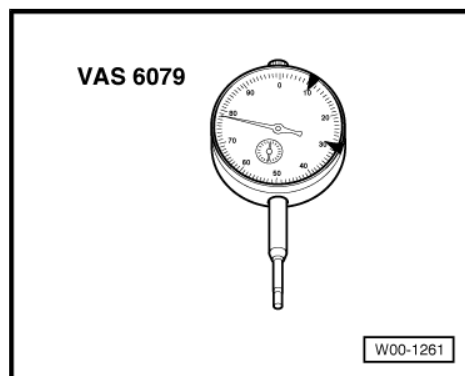
12.6 Adjusting clutch play between “K1” and “K2”

Special tools and workshop equipment required

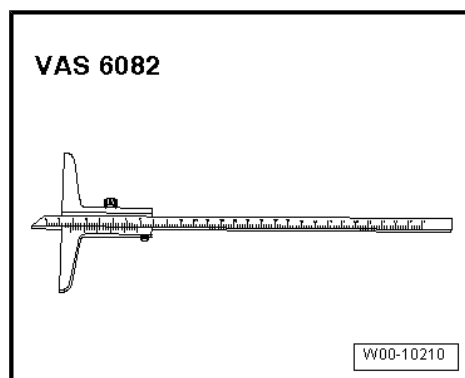
- ◆ Measuring tool -VW 382-



- ◆ Dial gauge -VAS 6079-



- ◆ Depth gauge -VAS 6082-



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Determining thickness of shim(s) -C-

- Planet carrier installed and adjusted ⇒ [page 86](#) .
- For the measuring sequence the gearbox housing must be clamped into engine and gearbox support so that the input gear is facing downwards, as shown in illustration ⇒ [page 103](#) .

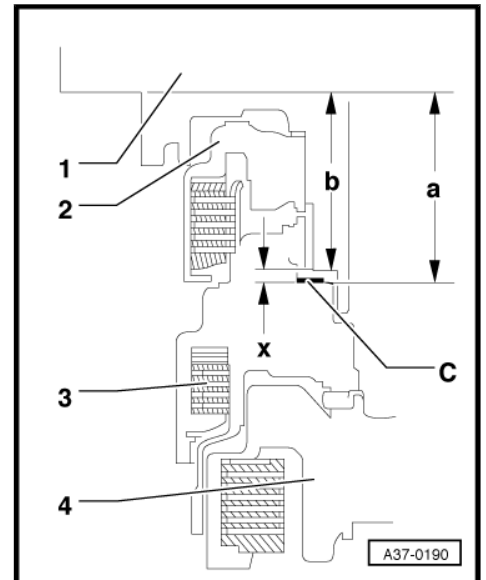
The thickness of the shim is governed by gap dimension -x-. This gap dimension is calculated according to the following formula:

$$-x- = -a- - -b-$$

- 1 - ATF pump
- 2 - Reverse gear clutch "K2"
- 3 - 1st to 3rd gear clutch "K1"
- 4 - 3rd and 4th gear clutch "K3"
- C - Shim(s)
- x - Gap dimension

a - Installation position of clutch "K1"; determining value
⇒ [page 105](#)

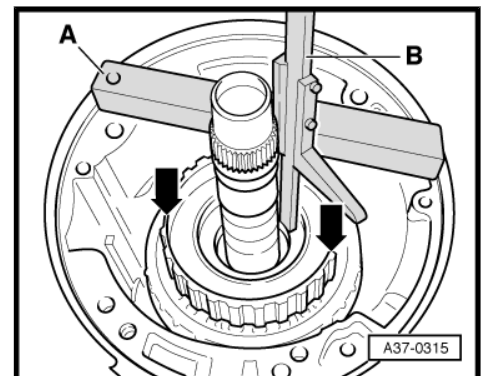
b - Size of ATF pump housing; determining value ⇒ [page 106](#)
⇒ [page 106](#)



Determining value "a"

- Place short straightedge -A- on pump flange in gearbox housing.
- Press "K1" downwards in direction of -arrow- and measure into "K1" using depth gauge -VAS 6082- -item B-.
- Example of value "a":

Measured value	73.7 mm
- Straightedge	- 19.5 mm
= Determined value "a"	54.2 mm

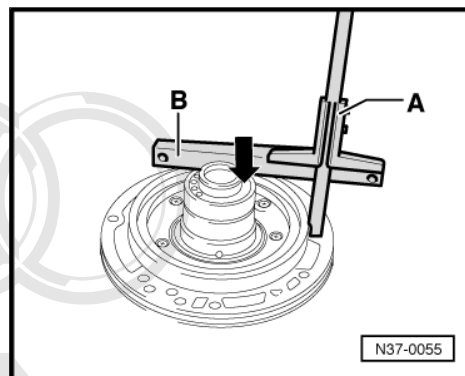


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Determining value "b"

- Fit paper gasket onto flange of ATF pump.
- Place straightedge -B- on stator support -arrow- and use depth gauge -VAS 6082- -item A- to measure down to paper gasket on flange of ATF pump.
- Example of value "b":

Measured value	70.5 mm
– Straightedge	– 19.5 mm
= Determined value "b"	51.0 mm



- Example for calculating gap "x":

$$x = a - b$$

- $x = 54.2 \text{ mm} - 51.0 \text{ mm} = 3.2 \text{ mm}$

- Determine shim(s) "C" according to following table: for part numbers refer to ⇒ Electronic parts catalogue :

Gap "x" (mm)	Shim(s) in mm
... 2.54	1.4
2.55 ... 3.09	1.0 + 1.0
3.10 ... 3.49	1.2 + 1.2
3.50 ... 3.89	1.4 + 1.4
3.90 ... 4.29	1.6 + 1.6
4.30 ... 4.69	1.8 + 1.8
4.70 ... 5.04	1.2 + 1.2 + 1.6
5.05 ... 5.25	1.2 + 1.2 + 1.8

The shims are colour-coded according to thickness:

Blue	= 1.0 mm
Green	= 1.2 mm
White	= 1.4 mm
Black	= 1.6 mm
Grey	= 1.8 mm

- After installing ATF pump, carry out check measurement of clutch play as described in the following.

Check measurement (clutch play)

- The clutch play cannot be measured until the ATF pump has been installed.
- Reverse gear clutch "K1" must be installed.
- Attach dial gauge holder to gearbox housing and place tip of dial gauge on turbine shaft with a preload of 1 mm.

i Note

The gearbox must be moved to its installation position so that the turbine shaft can be moved.



Caution

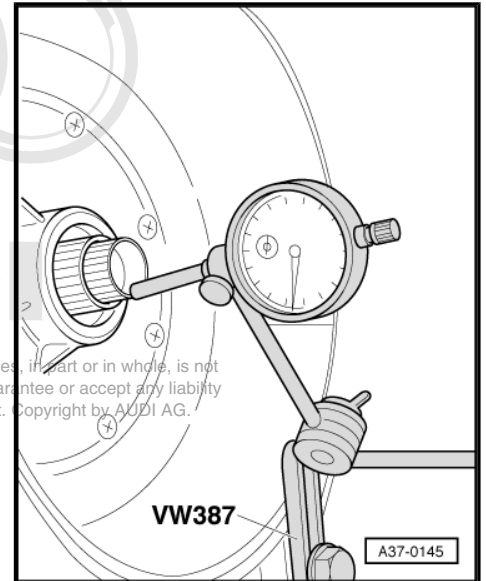
The turbine shaft may only be moved by hand as the use of tools would damage the splines.

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- Pull turbine shaft out and push it in (shaft will be difficult to move) and read off play on dial gauge.

Clutch play:

- Minimum: 0.5 mm.
- Maximum: 1.2 mm.



12.7 Exploded view IV - adjusting 2nd and 4th gear brake "B2" on gearboxes with corrugated washer on last outer plate

1 - Gearbox housing

2 - Circlip

- ☐ For supporting tube
- ☐ Installation position: open ends face retaining wedge of freewheel

3 - Supporting tube for "B2"

- ☐ Insert in such a way that notch engages on wedge of freewheel
- ☐ Spare part is allocated according to gearbox code letters

4 - Outer plate "B2"

- ☐ 3 mm thick

5 - Spring cap

- ☐ Fit after installing first outer plate -item 4-

6 - Spring cap

- ☐ Do not install when adjusting "B2"
- ☐ Fit before installing last outer plate

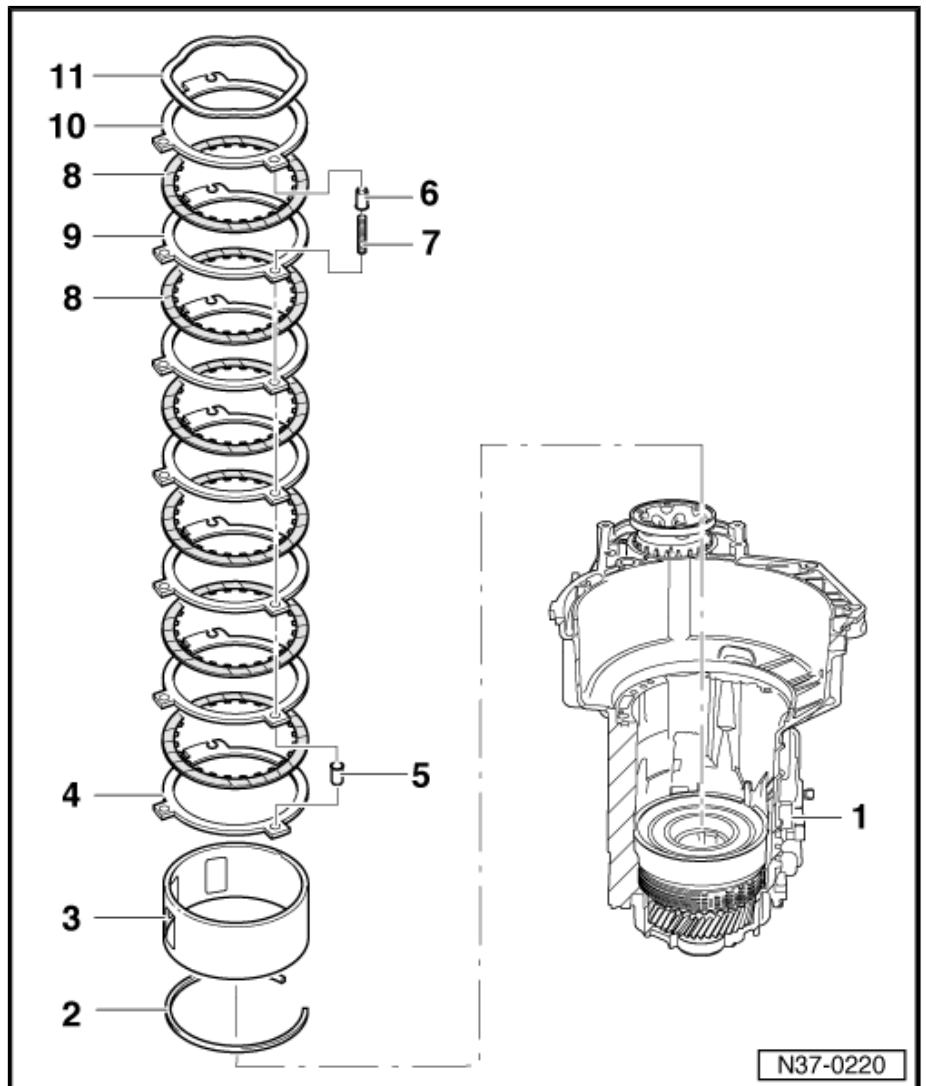
7 - Spring

8 - Inner plate "B2"

- ☐ Quantity ➔ [page 3](#)
- ☐ Spare part is allocated according to gearbox code letters

9 - Outer plate "B2"

- ☐ Quantity ➔ [page 3](#)



- ❑ Always install 2 mm thick outer plates

10 - Outer plate "B2"

- ❑ Do not install when adjusting "B2"
- ❑ 1 or 2 outer plates may be fitted

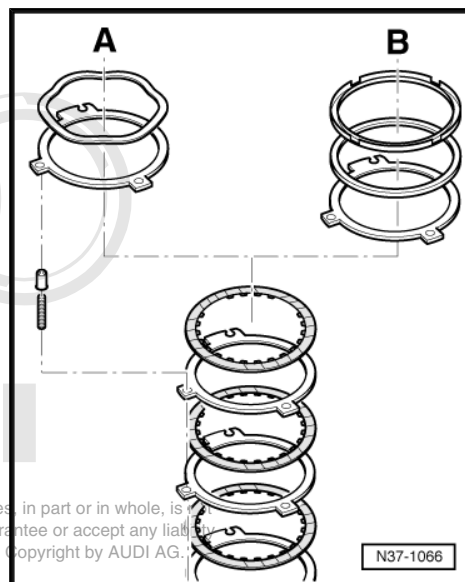
11 - Corrugated washer

- ❑ Do not install when adjusting "B2"

There are two different gearbox types

A - Gearboxes in which a corrugated washer is fitted on the last outer plate in brake "B2" (code letters ➔ [page 3](#)) ➔ [page 108](#) .

B - Gearboxes in which a shim and a retaining ring are fitted in brake "B2" (code letters ➔ [page 3](#)) ➔ [page 113](#) .



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12.8 Adjusting 2nd and 4th gear brake "B2" on gearboxes with corrugated washer on last outer plate

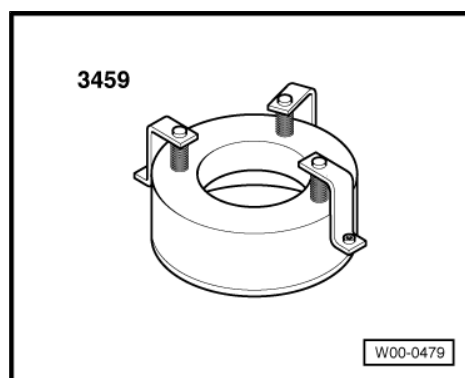


Note

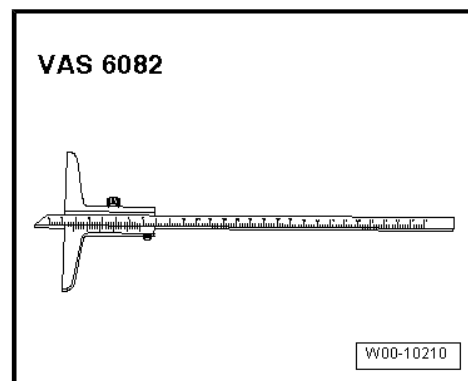
- ◆ Gearbox code letters ➔ [page 3](#) .
- ◆ On these gearboxes, the thickness of the last outer plate(s) determines the clearance of brake "B2" ➔ [Item 10 \(page 108\)](#) .
- ◆ Adjustment instructions for gearboxes without corrugated washer ➔ [page 113](#) .

Special tools and workshop equipment required

- ◆ Setting tool -3459-



◆ Depth gauge -VAS 6082-



Procedure

- To adjust, fit components without corrugated washer
⇒ [Item 11 \(page 108\)](#) , without last outer plate
⇒ [Item 10 \(page 108\)](#) and without spring cap
⇒ [Item 6 \(page 107\)](#) .



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Determining thickness of last outer plate -D-

The thickness of the outer plate(s) is governed by gap dimension -x-. This gap dimension is calculated according to the following formula:

$$-x- = -a- - b- - 3.6 \text{ mm}$$

D - Outer plate(s)

x - Gap dimension

a - Installation position of 2nd and 4th gear brake "B2"; determining value ➔ [page 110](#)

b - Size of ATF pump housing; determining value ➔ [page 111](#)

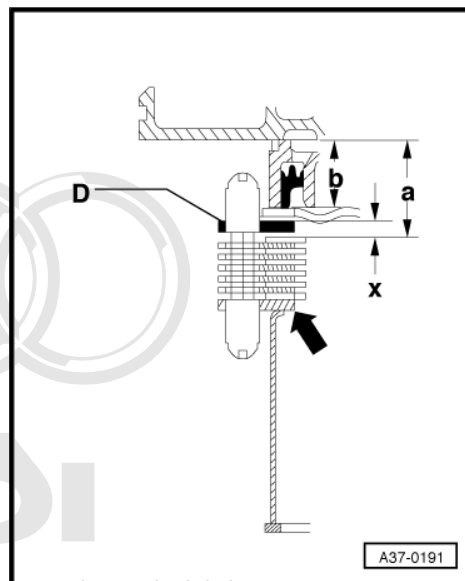


Note

♦ The illustration shows a sectional view of the assembled brake "B2". The setting tool -3459- that is used to exert a force on the clutch pack is not shown.

♦ The value of "3.6 mm" takes into account the settling of the plates due to the force exerted by setting tool -3459-.

♦ The first outer plate -arrow- is 3 mm thick.



Determining value "a"

– Assemble planetary gearbox as far as last inner plate for "B2" ➔ [page 86](#).



Note

The last outer plate, the last 3 spring caps and the corrugated washer are not installed.

- Apply setting tool -3459- to the last inner plate and turn so that the 3 clips align with the 3 holes for the ATF pump.
- Bolt setting tool -3459- to flange for ATF pump: tightening torque 5 Nm.



Note

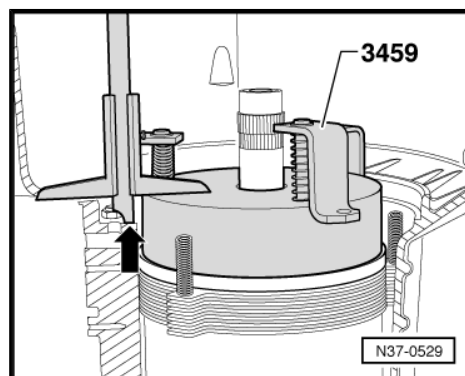
The clutch pack for "B2" is now pressed together for the measurements.

- Use depth gauge -VAS 6082- to measure from pump flange/gearbox housing -arrow- to setting tool -3459-.

- Example of value "a":

Height of setting tool -3459-	60.0 mm
– Measured value	– 29.8 mm
= Determined value "a"	30.2 mm

- Detach setting tool -3459-.



Determining value "b"

- Push piston into ATF pump onto stop.
- Fit paper gasket onto flange of ATF pump.
- Place straightedge -B- on stator support -arrows- and use depth gauge -VAS 6082- -item A- to measure down to paper gasket on flange of ATF pump.

- Example of value "b":

Measured value	40.1 mm
– Straightedge	– 19.5 mm
= Determined value "b"	20.6 mm

- Example for calculating gap "x":

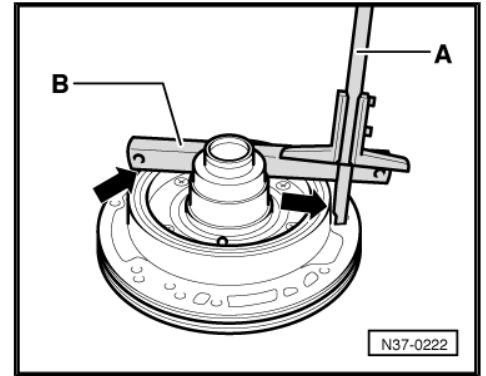
$$x = a - b - 3.6 \text{ mm}$$

- $x = 30.2 \text{ mm} - 20.6 \text{ mm} - 3.6 \text{ mm} = 6.0 \text{ mm}$

- Determine thickness of outer plate(s) "D" according to following table: for part numbers refer to ⇒ Electronic parts catalogue .

Gap "x" (mm)	Outer plate(s) in mm
4.25 ... 4.49	2.75
4.50 ... 4.74	3.00
4.75 ... 4.99	3.25
5.00 ... 5.24	3.50
5.25 ... 5.49	3.75
5.50 ... 5.74	2.00 + 2.00
5.75 ... 5.99	2.00 + 2.25
6.00 ... 6.24	2.25 + 2.25
6.25 ... 6.49	2.25 + 2.50
6.50 ... 6.74	2.50 + 2.50
6.75 ... 7.00	2.50 + 2.75

- Fit three spring caps on compression springs.
- Install last outer plate(s) of the required thickness.
- Install corrugated washer.
- Further procedure ⇒ [page 93](#) .



12.9 Exploded view IV- adjusting 2nd and 4th gear brake "B2" on gearboxes with shim and retaining ring

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1 - Gearbox housing

2 - Circlip

- ☐ For supporting tube
- ☐ Installation position: open ends face retaining wedge of freewheel

3 - Supporting tube for "B2"

- ☐ Insert in such a way that notch engages on wedge of freewheel
- ☐ Spare part is allocated according to gearbox code letters

4 - Outer plate "B2"

- ☐ 3 mm thick

5 - Spring cap

- ☐ Fit after installing first outer plate -item 4-

6 - Spring cap

- ☐ Do not install when adjusting "B2"
- ☐ Fit before installing last outer plate

7 - Spring

- ☐ Spare part is allocated according to gearbox code letters

8 - Inner plate "B2"

- ☐ Quantity ➔ [page 3](#)
- ☐ Spare part is allocated according to gearbox code letters

9 - Outer plate "B2"

- ☐ Quantity ➔ [page 3](#)
- ☐ Always install 2 mm thick outer plates

10 - Outer plate "B2"

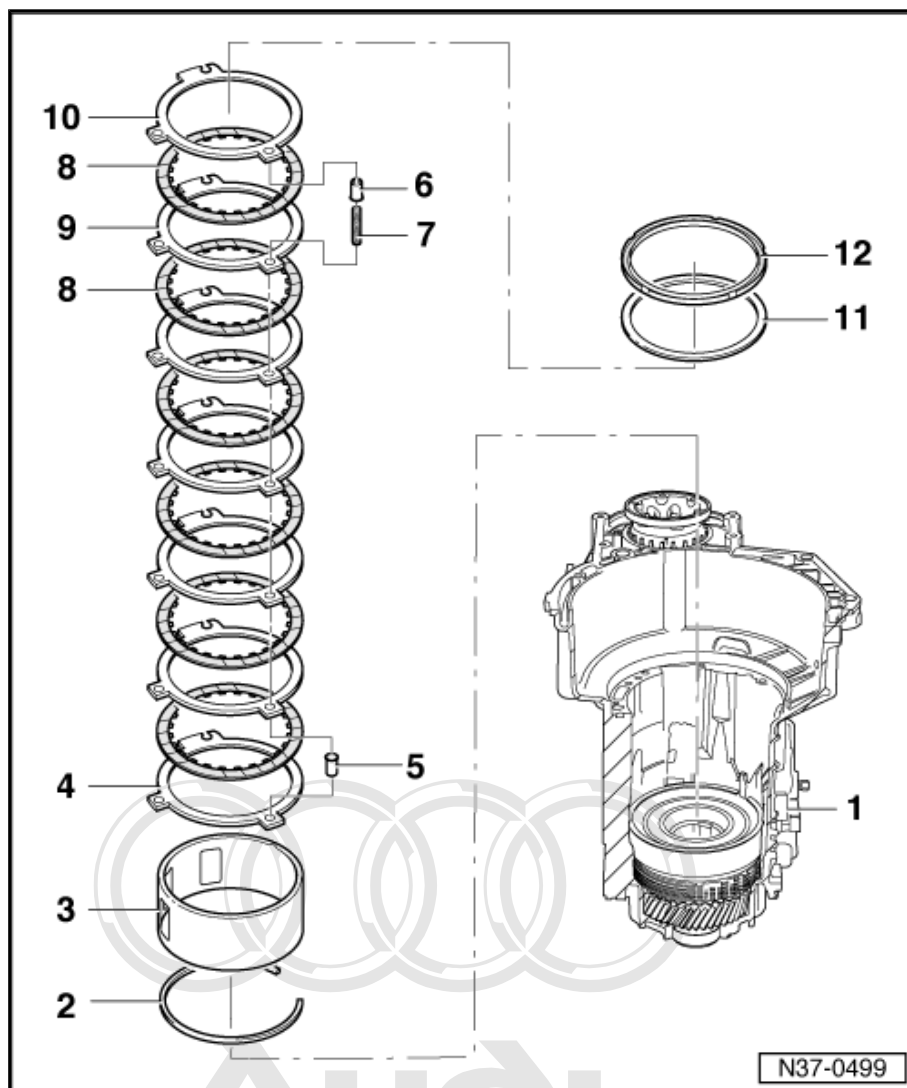
- ☐ 3 mm thick
- ☐ Do not install when adjusting "B2"

11 - Shim

- ☐ Do not install when adjusting "B2"

12 - Retaining ring

- ☐ Is fitted with smooth side on last inner plate -item 8- when adjusting "B2"

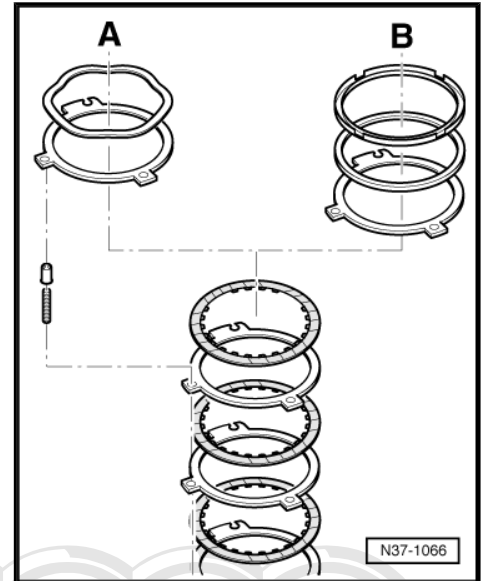


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There are two different gearbox types

A - Gearboxes in which a corrugated washer is fitted on the last outer plate in brake "B2" (code letters ⇒ [page 3](#)) ⇒ [page 108](#) .

B - Gearboxes in which a shim and a retaining ring are fitted in brake "B2" (code letters ⇒ [page 3](#)) ⇒ [page 113](#) .



12.10 Adjusting 2nd and 4th gear brake "B2" on gearboxes with shim and retaining ring

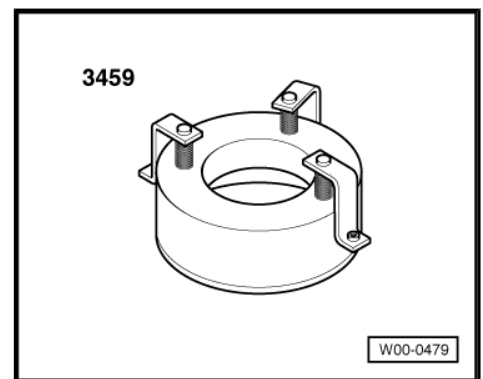
Note

- ◆ Gearbox code letters ⇒ [page 3](#) .
- ◆ With these gearboxes, the thickness of the shim ⇒ [Item 11 \(page 112\)](#) determines the clearance of brake "B2".
- ◆ Adjustment instructions for gearboxes with corrugated washer ⇒ [page 108](#) .

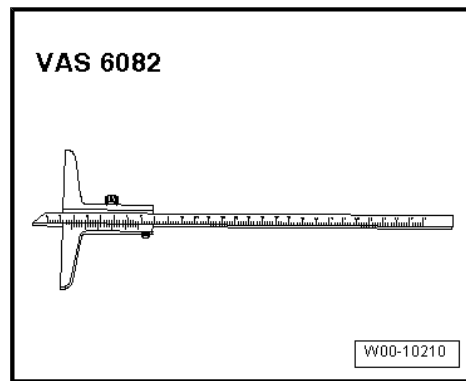
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Special tools and workshop equipment required

- ◆ Setting tool -3459-



◆ Depth gauge -VAS 6082-



Procedure

- To adjust, fit components without shim
⇒ [Item 11 \(page 112\)](#) , without last outer plate
⇒ [Item 10 \(page 112\)](#) and without spring caps
⇒ [Item 6 \(page 112\)](#) .

Determining thickness of shim(s)

The thickness of the shim is governed by gap dimension "x". This gap dimension is calculated according to the following formula:

$$-x- = -a- - -b- - 2.65 \text{ mm}$$

x - Gap dimension

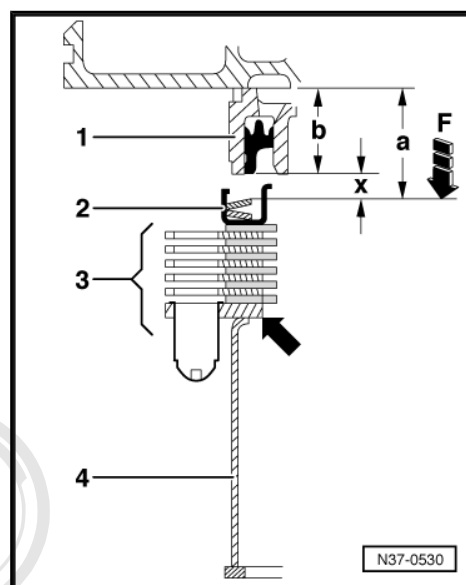
a - Installation position of 2nd and 4th gear brake "B2"; determining value ⇒ [page 115](#)

b - Size of ATF pump housing; determining value ⇒ [page 116](#)



Note

- ◆ The illustration shows a sectional view of the assembled brake "B2". Setting tool -3459- for exerting force -F- on clutch pack is not shown.
- ◆ The value "2.65 mm" takes into account the amount of settling force -F- exerted by setting tool -3459- .
- ◆ The first outer plate -arrow- is 3 mm thick.



- 1 - ATF pump
- 2 - Retaining ring
- 3 - Plates of "B2" without last outer plate
- 4 - Supporting tube



Note

The last outer plate must not be fitted when measuring.

Determining value "a"

- Assemble planetary gearbox as far as last inner plate for "B2"
⇒ [page 86](#) .



Note

The last outer plate and the shim are not installed.

- Fit retaining ring with smooth side on last inner plate.
- Apply setting tool -3459- to retaining ring and turn so that the 3 clips align with the 3 holes for the ATF pump.
- Bolt setting tool -3459- to flange for ATF pump: tightening torque 5 Nm.



Note

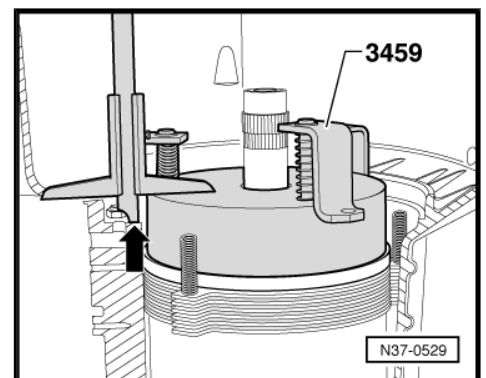
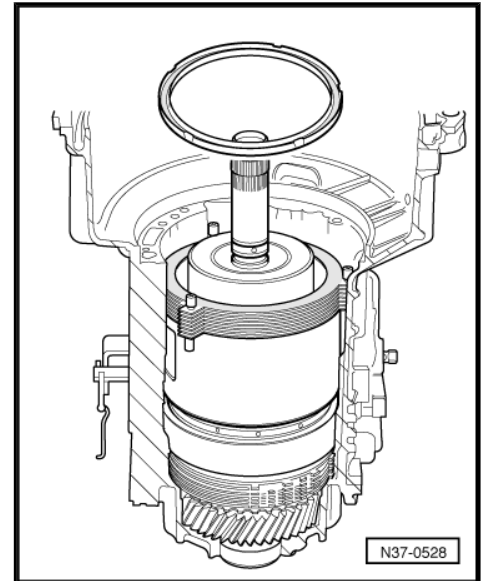
The clutch pack for "B2" is now pressed together for the measurements.

- Use depth gauge -VAS 6082- to measure from pump flange/ gearbox housing -arrow- to setting tool -3459- .

- Example of value "a":

Height of setting tool -3459-	60.0 mm
– Measured value	– 32.3 mm
= Determined value "a"	27.3 mm

- Detach setting tool -3459- .
- Remove retaining ring.



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Determining value "b"

- Push piston into ATF pump onto stop.
- Fit paper gasket onto ATF Pump.
- Place straightedge -B- on stator support -arrows- and use depth gauge -VAS 6082- -item A- to measure down to paper gasket on flange of pump.

- Example of value "b":

Measured value	39.8 mm
– Straightedge	– 19.5 mm
= Determined value "b"	20.3 mm

- Example for calculating gap "x":

$$x = a - b - 2.65 \text{ mm}$$

- $x = 27.3 - 20.3 - 2.65 \text{ mm} = 4.35 \text{ mm}$

- Determine shim(s) according to following table: for part numbers refer to ⇒ Electronic parts catalogue :

Gap "x" (mm)	Shim(s) in mm
3.25 ... 3.50	1.0
3.51 ... 3.75	1.25
3.76 ... 4.00	1.50
4.01 ... 4.25	1.75
4.26 ... 4.50	1.00 + 1.00
4.51 ... 4.75	1.00 + 1.25
4.76 ... 5.00	1.25 + 1.25
5.01 ... 5.25	1.25 + 1.50
5.26 ... 5.50	1.50 + 1.50
5.51 ... 5.75	1.50 + 1.75
5.76 ... 6.00	1.75 + 1.75

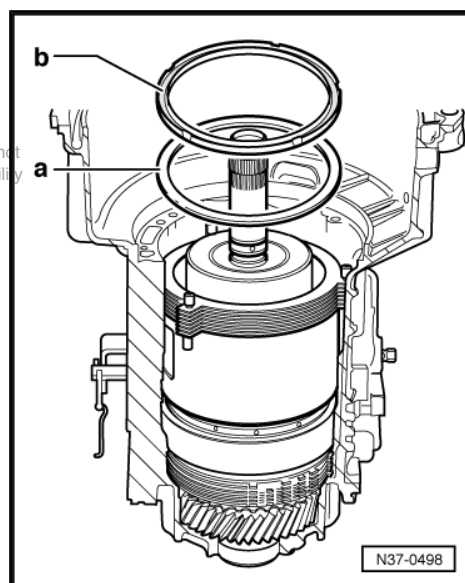
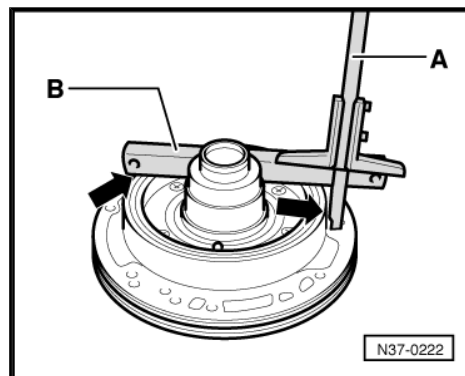
- Fit three spring caps on compression springs.
- Fit last outer plate with a thickness of "3 mm".

- Install correct shim(s) -a-.

- Fit retaining ring -b- on shim(s).

- Installation position: smooth side faces shim.

- Further procedure ⇒ [page 92](#)



38 – Gears, control

1 Exploded view - ATF pump



Replacement ATF pump parts and the ATF pump are allocated according to gearbox code.

1 - Piston ring

- ☐ Check that it is correctly seated ⇒ [page 118](#)
- ☐ Removing and installing ⇒ [page 118](#)

2 - Piston ring

- ☐ Removing and installing ⇒ [page 118](#)
- ☐ Check that it is correctly seated ⇒ [page 118](#)

3 - Piston ring

- ☐ Check that it is correctly seated ⇒ [page 118](#)
- ☐ Removing and installing ⇒ [page 118](#)

4 - Thrust washer

5 - Piston

- ☐ Sealing lips are vulcanised to piston
- ☐ To remove, prise out of stator support by applying screwdriver at several points
- ☐ Moisten sealing lips with ATF before installing
- ☐ Installation position: sealing lip must face stator support
- ☐ Turn piston slightly when installing

6 - Bolt

- ☐ 10 Nm and then turn 45° further

7 - Stator support

8 - Outer gear

- ☐ Installation position: manufacturer's mark -arrow- must face stator support
- ☐ If outer gear is incorrectly installed, the ATF pump may not operate freely in the installed position

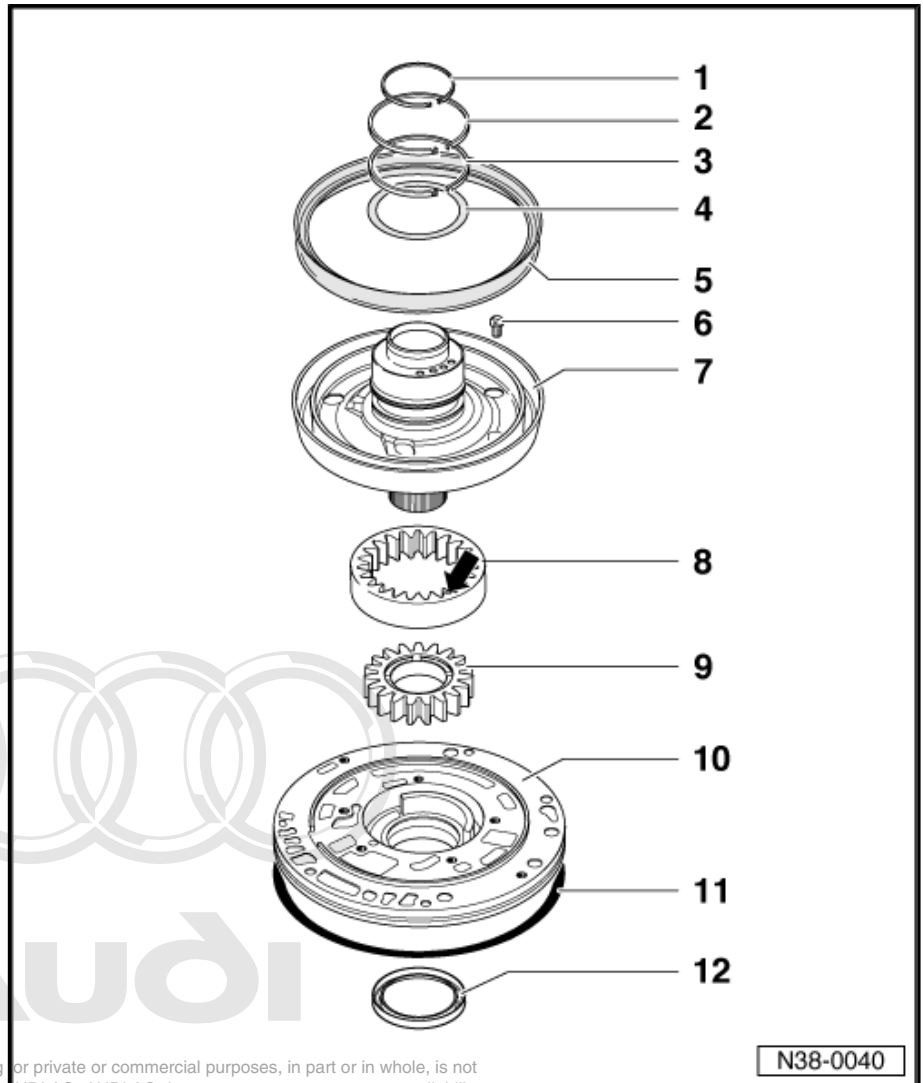
9 - Inner gear

- ☐ Installation position: large shoulder must face stator support

10 - Housing for ATF pump

11 - O-ring

- ☐ Renew

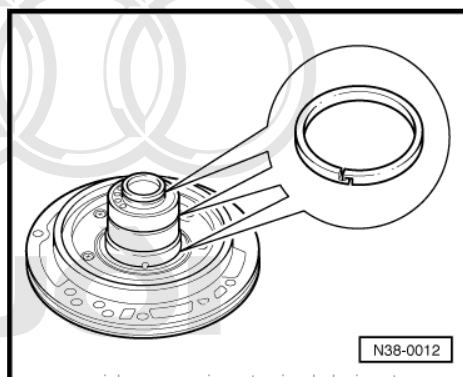


12 - Oil seal for torque converter

- ❑ Renewing ➔ [page 28](#)

Checking seating of piston rings

- Ensure that the ends of the piston rings are hooked together.



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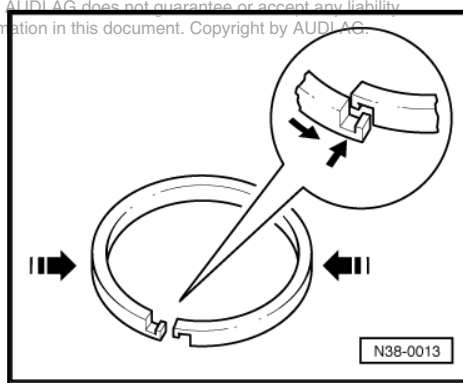
Removing and installing piston ring

Removing

- Press ends of piston ring together and release by hand.
- Press two ends of piston ring apart and remove; do not twist piston ring out of groove on one side.

Installing

- Fit piston ring in groove.
- To hook ends together press sides of ring in and guide ends over one another.



2 Exploded view - freewheel with piston "B1"

1 - Rollers

- ☐ Installing ➔ [page 120](#)

2 - Springs

- ☐ Installing ➔ [page 120](#)

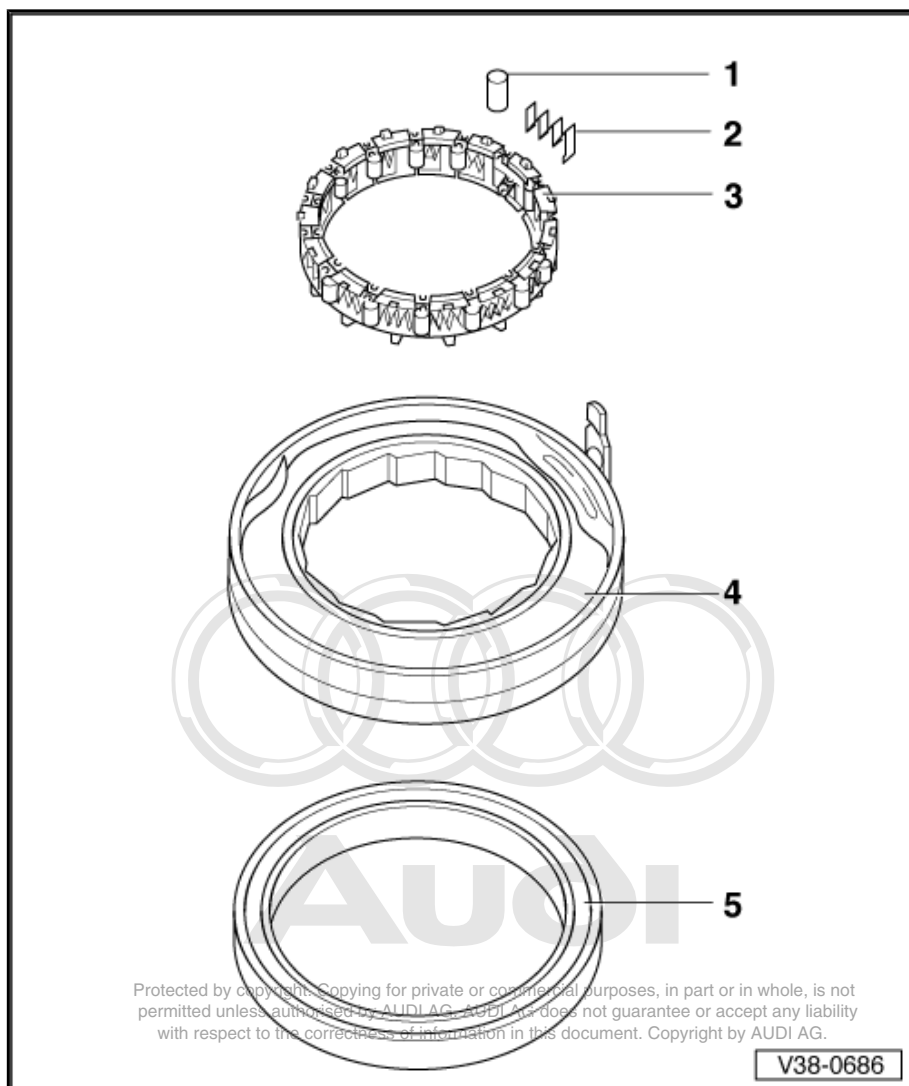
3 - Cage

- ☐ Removing and installing ➔ [page 119](#)
- ☐ Installation position ➔ [page 120](#)

4 - Outer race

5 - Piston

- ☐ Sealing lips are vulcanised to piston
- ☐ To remove, prise out of outer race by applying screwdriver at several points
- ☐ Moisten sealing lips with ATF before installing
- ☐ Installation position ➔ [page 120](#)
- ☐ Turn piston slightly when installing



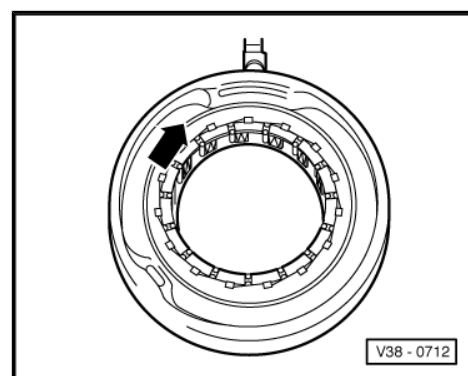
Removing and installing cage

Removing

- Turn cage in anti-clockwise direction as far as stop.
- Press cage upwards and out of outer race.

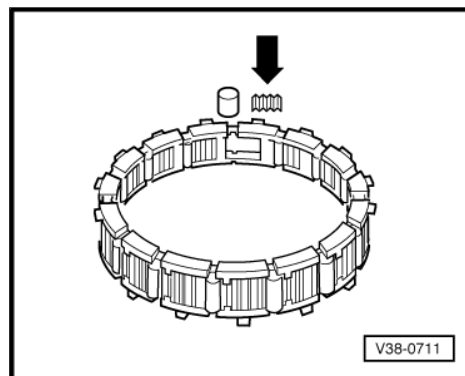
Installing

- Insert cage into outer race.
- ◆ Installation position ➔ [page 120](#)
- To secure, turn cage clockwise as far as it will go -arrow-.

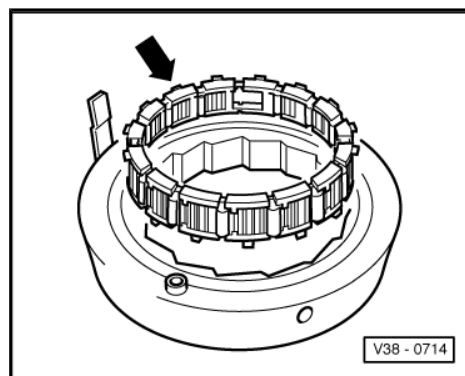


Installing rollers and springs

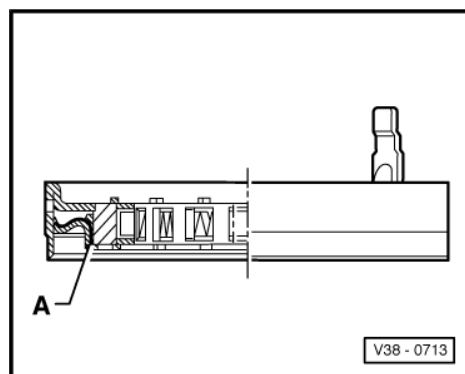
- Insert springs so that long end of spring -arrow- engages in cage.
- Then insert roller between cage and spring.

**Installation position of cage in outer race**

- Install with large lugs -arrow- facing up.

**Installed position of piston**

- Insert piston -A- as shown.



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3 Exploded view - 1st to 3rd gear clutch "K1"

Note

- ◆ The clutch must only be dismantled when cleaning or carrying out visual check.
- ◆ Depending on version, clutches "K1" and "K3" may be pressed together
- ◆ Pressing "K1" off "K3" ⇒ [page 78](#).
- ◆ Pressing clutch "K1" onto "K3" ⇒ [page 93](#).

1 - Supporting ring

- ☐ Unclip in 4 pieces from inner plate carrier
- ☐ Fitting ⇒ [page 123](#)

2 - Inner plate carrier

- ☐ Fitting ⇒ [page 123](#)
- ☐ Assembling ⇒ [page 123](#)

3 - Circlip

- ☐ Different thicknesses
- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location

4 - Pressure plate

- ☐ Installation position: smooth side faces inner plate
- ☐ Insert together with inner plate carrier ⇒ [page 123](#)

5 - Inner plate

- ☐ Quantity ⇒ [page 3](#)
- ☐ Soak new inner plate in ATF for 15 minutes before installing.
- ☐ Installing ⇒ [page 123](#)

6 - Outer plate

- ☐ Quantity ⇒ [page 3](#)
- ☐ 1.5 mm thick
- ☐ Installing ⇒ [page 123](#)

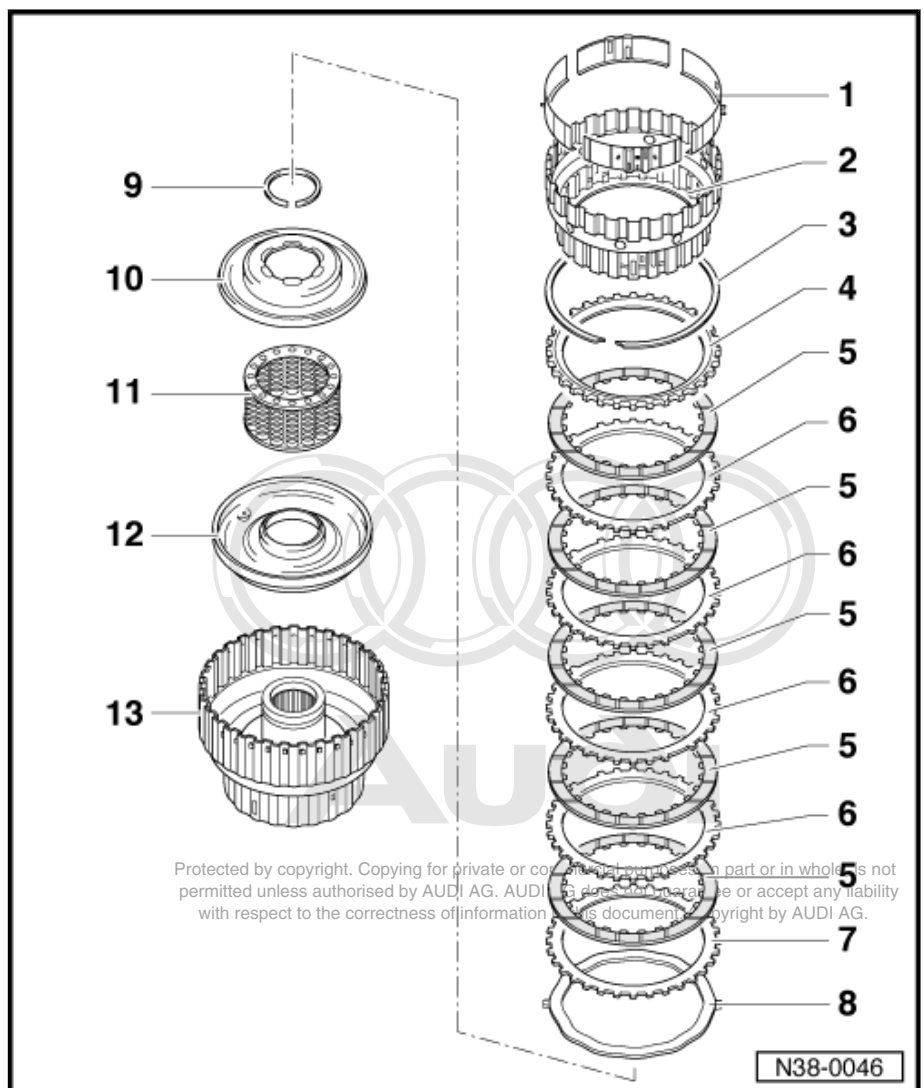
7 - Outer plate

- ☐ 2.0 mm thick
- ☐ Installing ⇒ [page 123](#)

8 - Corrugated washer

9 - Circlip

- ☐ Removing and installing ⇒ [page 123](#)



- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location

10 - Piston cap

- ☐ Sealing lips are vulcanised to cap
- ☐ Moisten sealing lips with ATF before installing
- ☐ Turn piston cap slightly when installing

11 - Intermediate spring ring

- ☐ With spring supporting shell and compression springs

12 - Piston

- ☐ To remove, prise out of clutch housing by applying screwdriver at several points
- ☐ Sealing lips are vulcanised to piston
- ☐ Moisten sealing lips with ATF before installing
- ☐ Turn piston slightly when installing

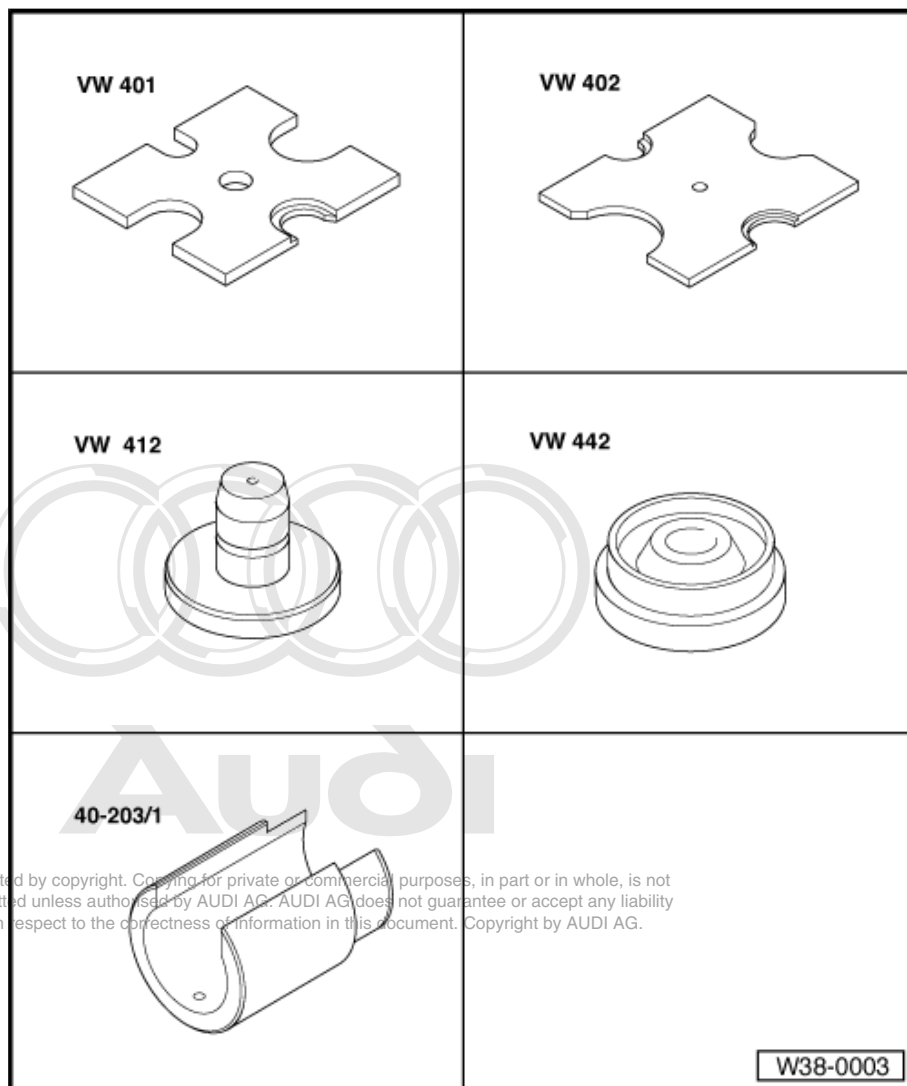
13 - Clutch housing

- ☐ Before fitting inner plate carrier, insert corrugated washer -item 8-, outer plates and inner plates into clutch housing ⇒ [page 123](#)

3.1 Dismantling and assembling 1st to 3rd gear clutch "K1"

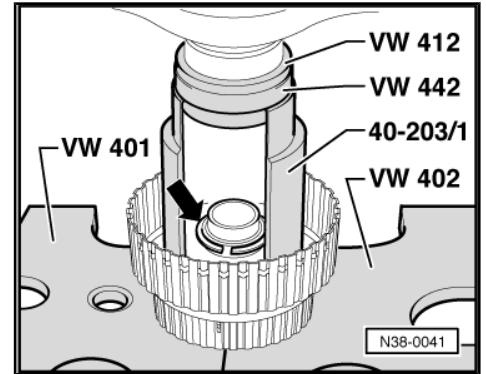
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 412-
- ◆ Press tool -VW 442-
- ◆ Tube -40 - 203/1-



Removing and installing circlip

- Press piston cap with intermediate spring ring down far enough for the circlip -arrow- to be prised out of or inserted into the groove.



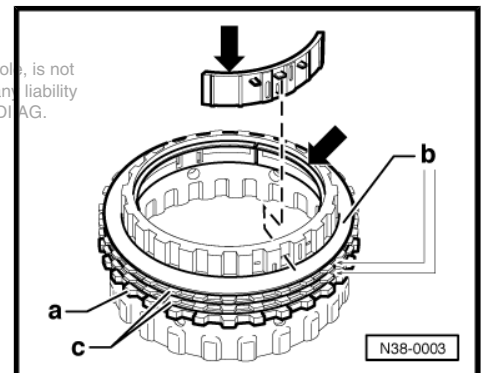
Fitting pressure plate and clutch plates onto inner plate carrier

- Fit pressure plate -a- as follows:
- Smooth side faces inner plate carrier.
- Stepped side faces inner plate carrier.
- Install 3 inner plates -b- and 2 outer plates -c- (1.5 mm).
- Clip in supporting ring with step -arrows- facing upwards.



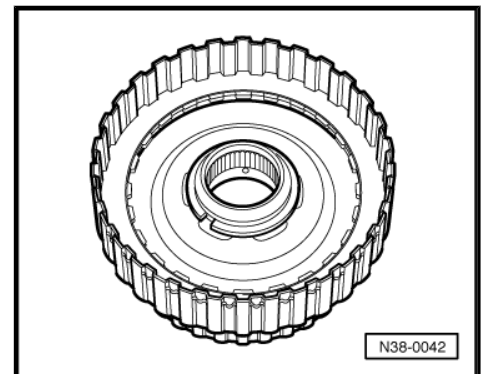
Note

- ◆ Engage locating lugs correctly.
- ◆ Install corrugated washer and remaining plates in clutch housing => [page 123](#).



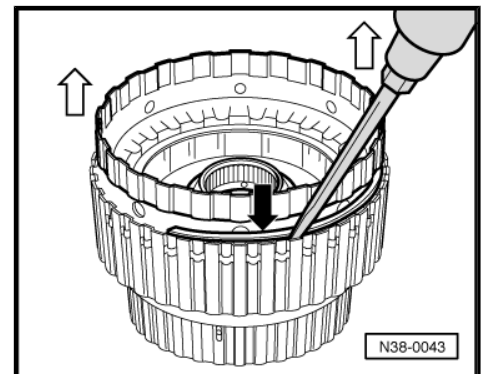
Inserting corrugated washer and outer and inner plates into clutch housing

- First insert corrugated washer.
- Insert 2 mm thick outer plate.
- Insert remaining inner and outer plates.



Inserting inner plate carrier and installing circlip

- To fit circlip -black arrow-, lift inner plate carrier slightly -white arrows-.



4 Exploded view - reverse gear clutch "K2"



Note

- ♦ The clutch must only be dismantled when cleaning or carrying out visual check.
- ♦ Be careful not to damage the ball valve when repairing the clutch.

1 - Circlip

- ☐ Different thicknesses
- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location

2 - Pressure plate

- ☐ Installation position: smooth side faces inner plate

3 - Inner plate

- ☐ Quantity ➔ [page 3](#)
- ☐ Soak new inner plate in ATF for 15 minutes before installing.

4 - Outer plate

- ☐ Quantity ➔ [page 3](#)

5 - Corrugated washer

6 - Circlip

- ☐ Removing and installing ➔ [page 125](#)
- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location
- ☐ Installation position ➔ [page 126](#)

7 - Spring support plate

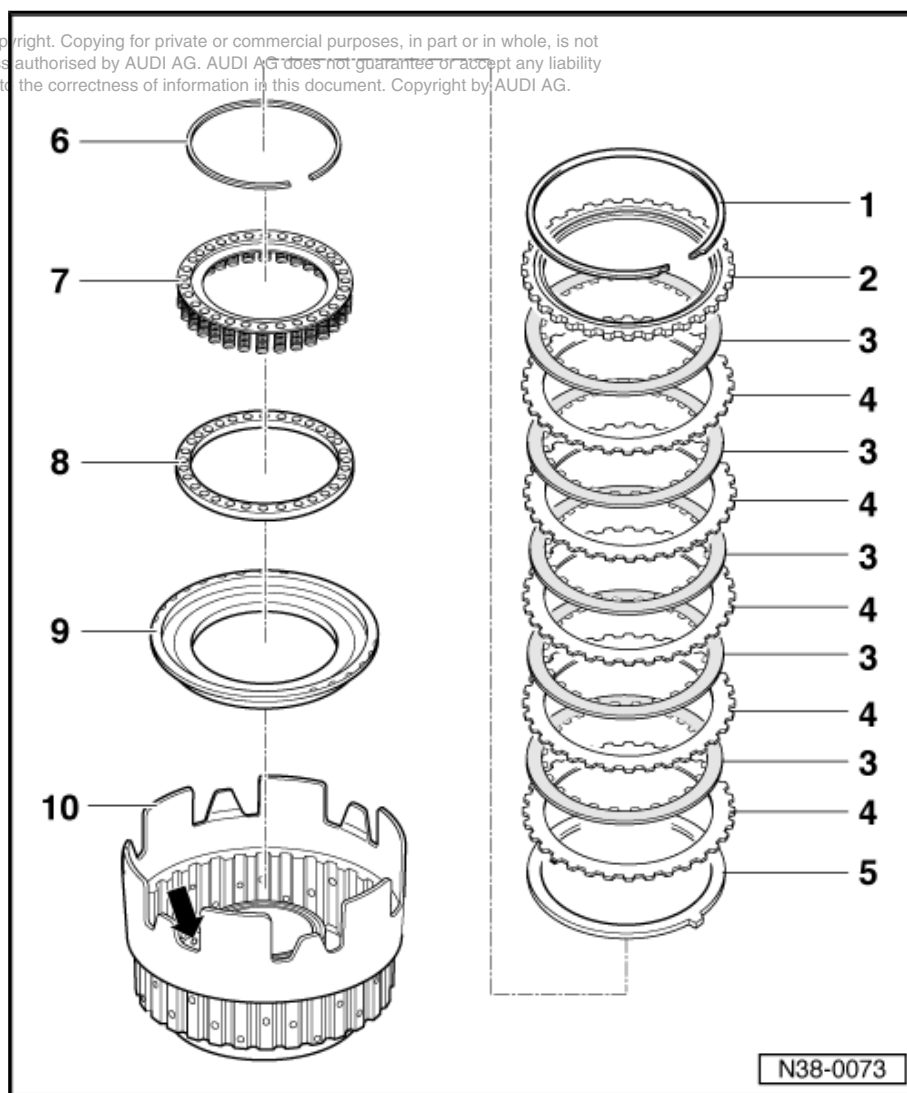
- ☐ With springs
- ☐ Installation position ➔ [page 126](#)

- ☐ To fit, preassemble with spring support ring Ensure springs are correctly seated

8 - Spring support ring

9 - Piston

- ☐ Sealing lips are vulcanised to piston
- ☐ To remove, prise out of clutch housing by applying screwdriver at several points
- ☐ Moisten sealing lips with ATF before installing
- ☐ Keep piston straight when installing



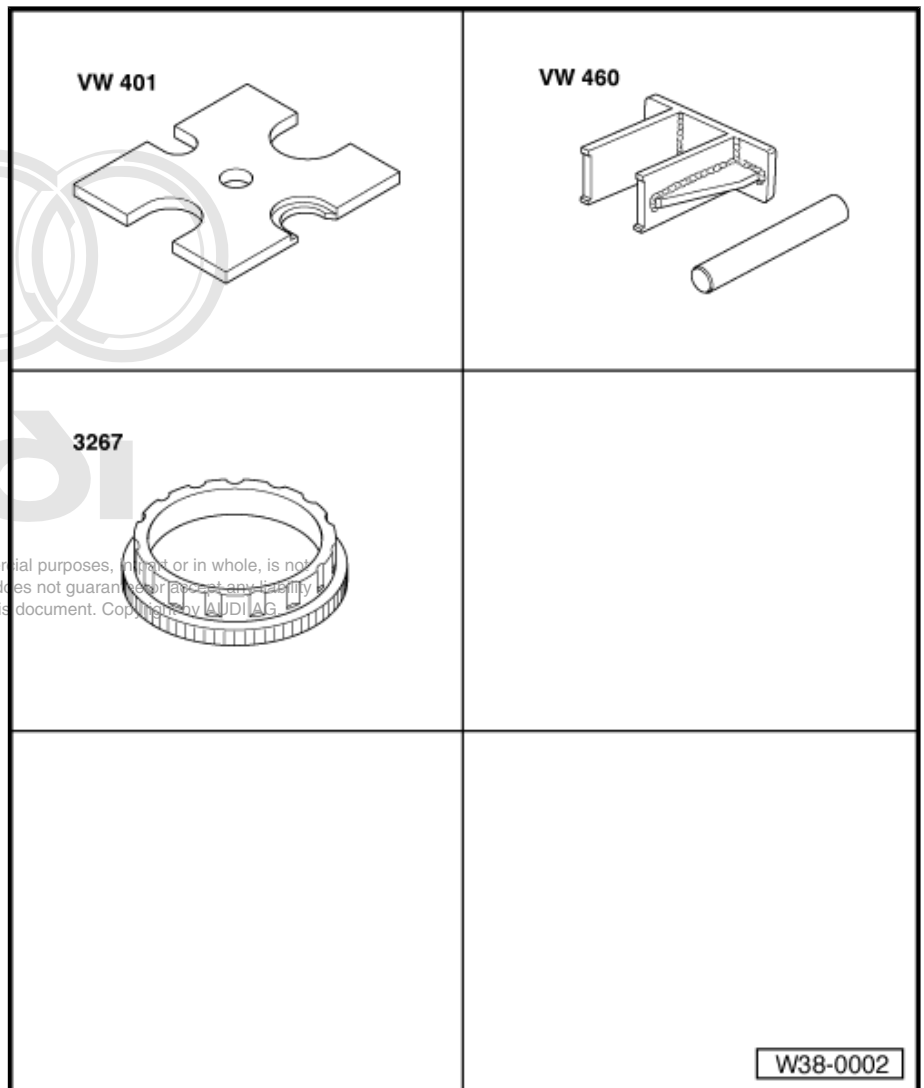
10 - Clutch housing

- ☐ With ball valve -arrow-

4.1 Dismantling and assembling reverse gear clutch "K2"

Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Removing tool -VW 460-
- ◆ Assembly ring -3267-



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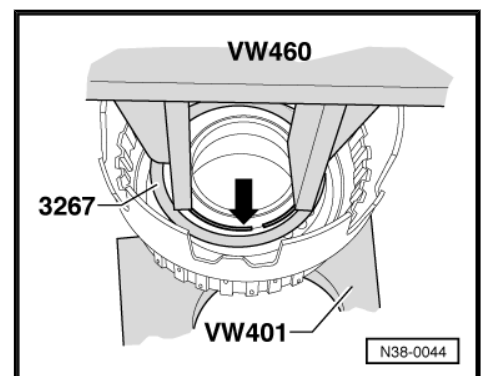
Removing and installing circlip



Caution

Do not damage ball valve in clutch housing.

- Carefully press down spring support plate with assembly ring -3267- until circlip -arrow- can be removed and installed.





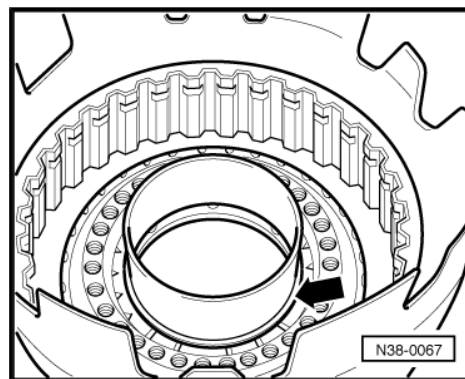
Installation position of spring support plate and circlip

- Circlip -arrow- must be seated in groove on clutch housing.
- Spring support plate must be centred relative to hub.



Note

Do not confuse the groove with the shoulder on the shaft.



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5 Exploded view - 3rd and 4th gear clutch "K3" with turbine shaft



Note

- ◆ The clutch must only be dismantled when cleaning or carrying out visual check.
- ◆ Depending on version, clutches "K1" and -K3- may be pressed together
- ◆ Pressing "K1" off "K3" ⇒ [page 78](#).
- ◆ Pressing clutch "K1" onto "K3" ⇒ [page 93](#).

1 - Circlip

- ☐ Different thicknesses
- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location

2 - Pressure plate

- ☐ Install with stepped side facing circlip

3 - Inner plate

- ☐ Quantity ⇒ [page 3](#)
- ☐ Soak new inner plate in ATF for 15 minutes before installing.

4 - Outer plate

- ☐ Quantity ⇒ [page 3](#)

5 - Pressure plate

- ☐ Peened with corrugated washer -item 6-
- ☐ Install with peened corrugated washer facing piston

6 - Corrugated washer

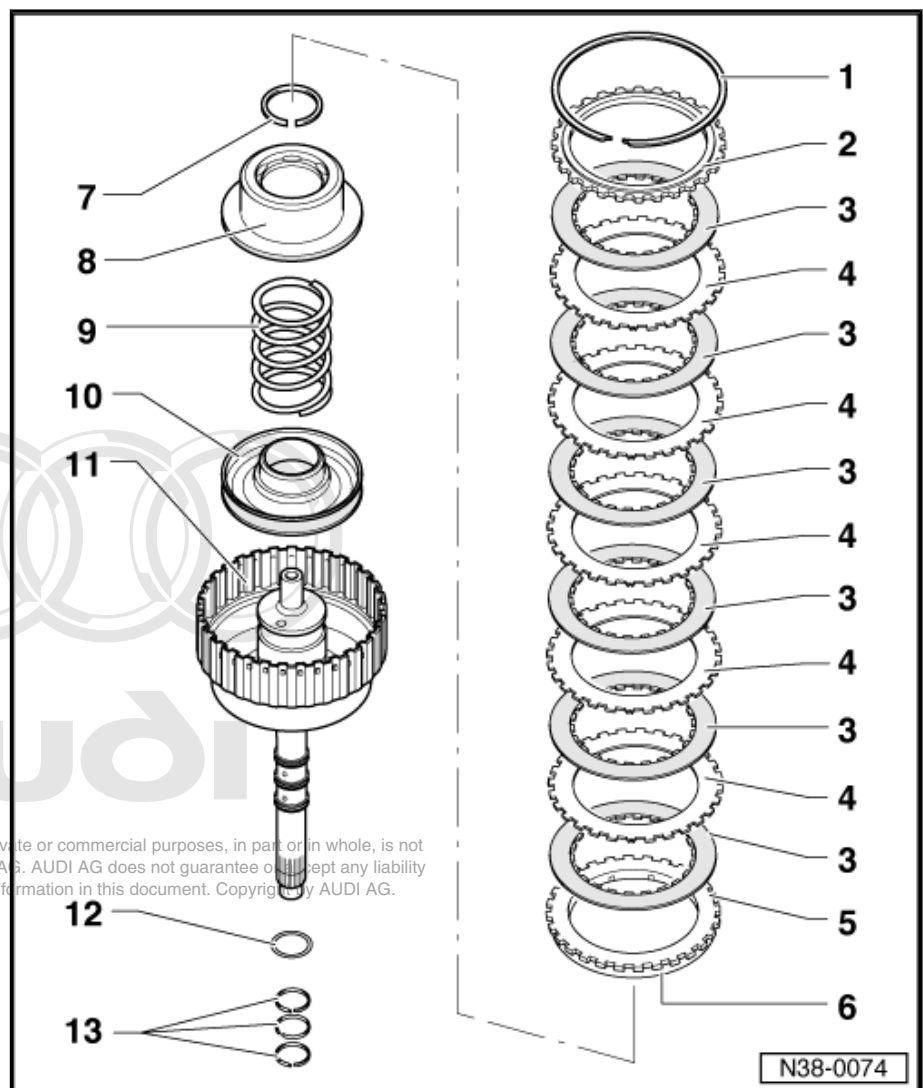
- ☐ Peened with pressure plate -item 5-
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7 - Circlip

- ☐ Different thicknesses
- ☐ Removing and installing ⇒ [page 129](#)
- ☐ Do not interchange with circlips of other clutches
- ☐ Mark after removal and re-install at same location

8 - Piston cap

- ☐ Is under strong spring pressure
- ☐ Sealing lips are vulcanised to piston cap
- ☐ Removing and installing ⇒ [page 129](#)
- ☐ Moisten sealing lips with ATF before installing



- ☐ Turn piston cap slightly when installing

9 - Spring

- ☐ Seat between piston and piston cap

10 - Piston

- ☐ Sealing lips are vulcanised to piston
- ☐ Moisten sealing lips with ATF before installing
- ☐ Turn piston slightly when installing

11 - Clutch housing with turbine shaft

- ☐ There are two different versions of turbine shafts ⇒ [page 26](#)
- ☐ Height of clutch housing varies according to number of inner and outer plates

12 - O-ring

- ☐ Renew
- ☐ Installing ⇒ [page 129](#)

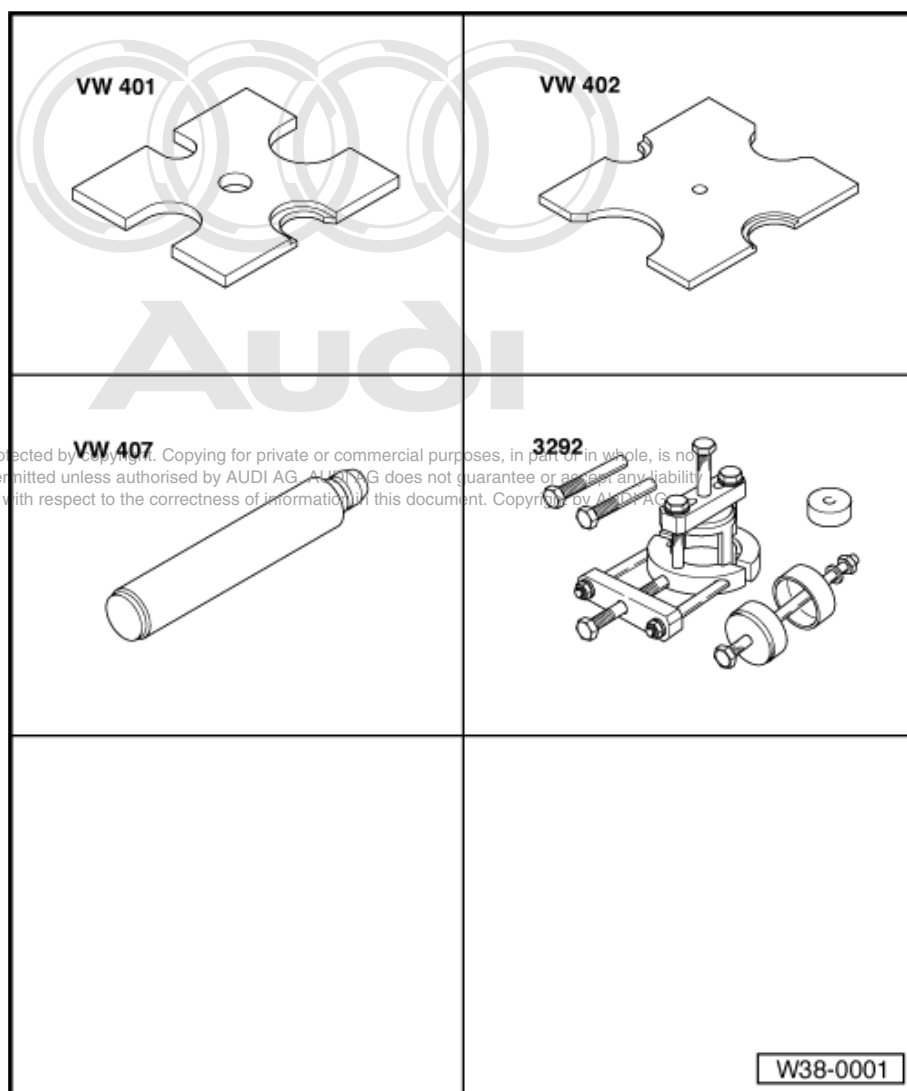
13 - Piston ring

- ☐ Removing and installing ⇒ [page 129](#)
- ☐ Check that it is correctly seated ⇒ [page 129](#)

5.1 Dismantling and assembling 3rd and 4th gear clutch “K3” with turbine shaft

Special tools and workshop equipment required

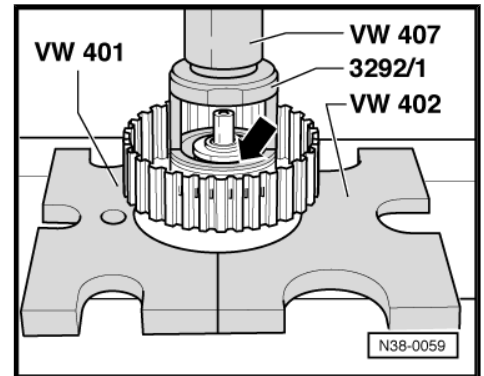
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-



◆ Assembly tool -3292-

Removing and installing circlip and piston

- Carefully press down piston cap until circlip -arrow- can be removed/installed.



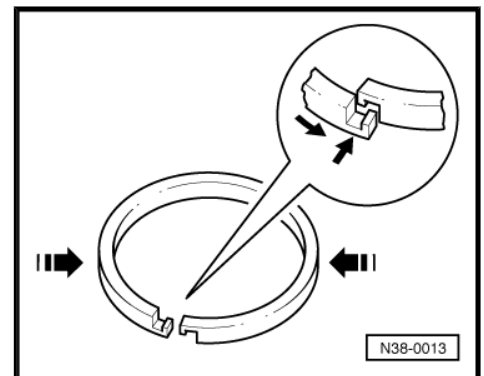
Removing and installing piston ring

Removing

- Press ends of piston ring together and release by hand.
- Press two ends of piston ring apart and remove; do not twist piston ring out of groove on one side.

Installing

- Fit piston ring in groove.
- To hook ends together press sides of ring in and guide ends over one another.



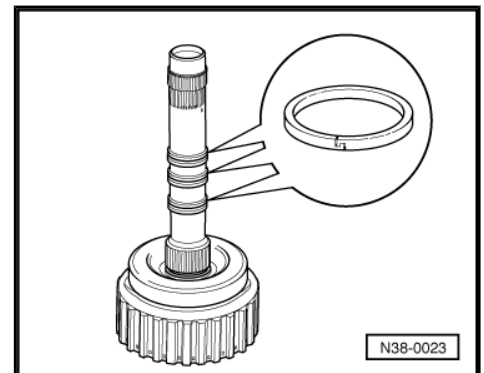
Checking seating of piston rings



Note

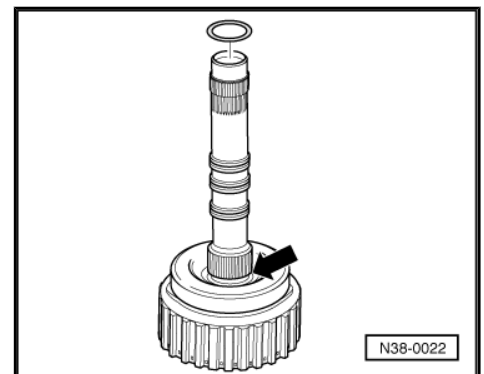
A piston ring is installed on the pump shaft inside the clutch housing.

- Ensure that the ends of the piston rings are hooked together.



Installing O-ring

- Insert O-ring in groove -arrow- of turbine shaft.



6 Exploded view - ATF oil pan, valve body



WARNING

Do not run engine or tow vehicle with ATF oil pan removed or when there is no ATF in the gearbox.



Note

- ◆ General repair instructions ⇒ [page 21](#) .
- ◆ Rules for cleanliness when working on the automatic gearbox ⇒ [page 24](#) .
- ◆ Lubricate O-rings with ATF. Other types of lubricant will cause the gearbox hydraulics to malfunction.
- ◆ An exchange component which contains all the selector elements and the valve body is available for the automatic gearbox 01M ⇒ [page 15](#) .
- ◆ The exchange component is assigned to the gearbox code letters ⇒ [page 3](#) .
- ◆ Installation instructions ⇒ [page 80](#) .
- ◆ Always renew valve body if it has collected dirt or if it is defective.
- ◆ The components shown in the following illustration can be removed with the gearbox in the vehicle.



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1 - ATF inspection plug

- ☐ Checking and correcting ATF level
⇒ [page 62](#).
- ☐ 15 Nm

2 - Overflow pipe

- ☐ Draining ATF
⇒ [page 67](#)
- ☐ Screw in as far as stop
(2 Nm)

3 - ATF oil pan

- ☐ Removing and installing
⇒ [page 133](#)

4 - Bolt

- ☐ Tighten in several stages and in diagonal sequence to 12 Nm

5 - Magnet

- ☐ Insert in the recess in oil pan

6 - Spacer bush

- ☐ Press into gasket

7 - Gasket

- ☐ Renew
- ☐ Clip spacer bushes -item 6- into gasket

8 - ATF strainer

- ☐ Removing and installing
⇒ [page 134](#)

9 - Bolt

- ☐ Tightening torque and sequence ⇒ [page 133](#)

10 - Seal

- ☐ Renew
- ☐ Lubricate with ATF and insert in valve body

11 - Valve body

- ☐ Identification ⇒ [page 132](#)
- ☐ Removing and installing ⇒ [page 135](#)
- ☐ Fit seal -item 10-
- ☐ Perform basic setting after installing new valve body ⇒ Rep. Gr. 01

12 - Bolt

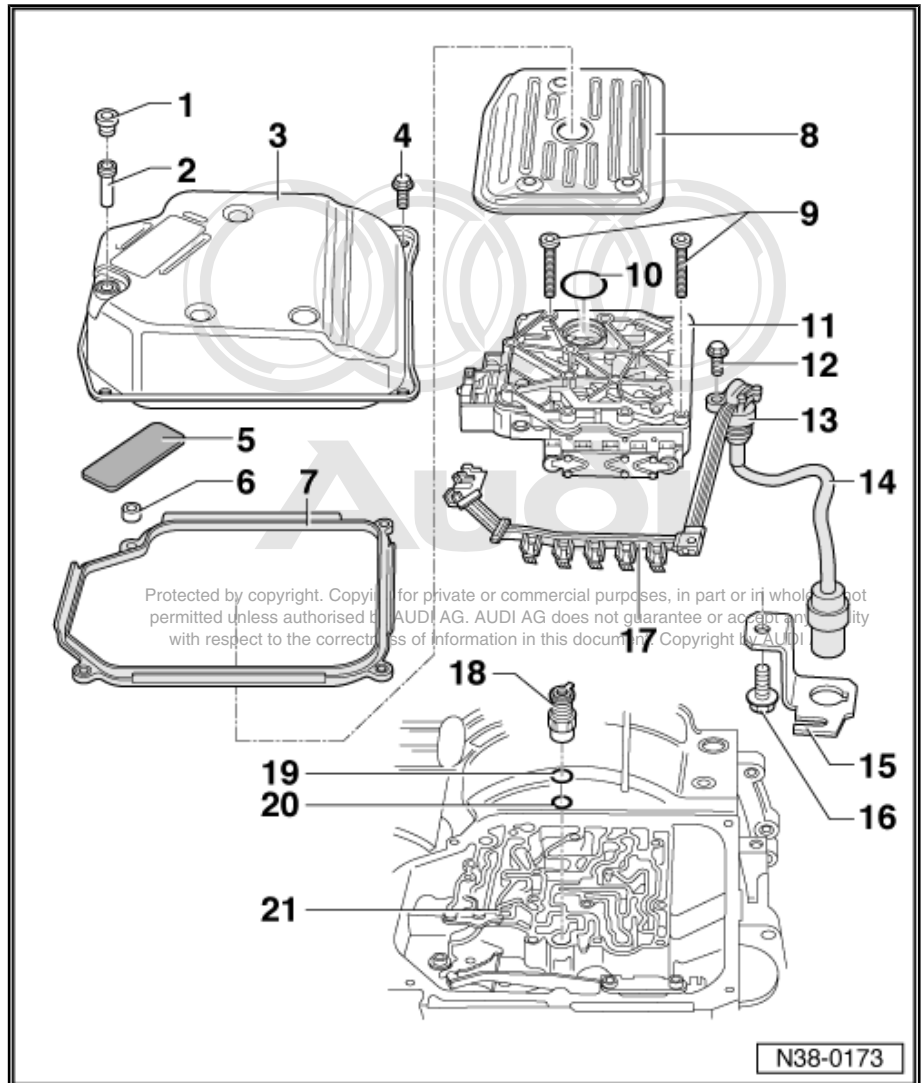
- ☐ For leadthrough
- ☐ 10 Nm

13 - O-ring

- ☐ For leadthrough
- ☐ Renew

14 - Conductor strip

- ☐ With leadthrough and connector
- ☐ With integrated gearbox oil temperature sender -G93-
- ☐ Removing and installing ⇒ [page 138](#)



15 - Retaining clip

- ☐ Installing ⇒ [page 133](#)

16 - Bolt

- ☐ 20 Nm

17 - Connector for solenoid valves

- ☐ Pull connector off solenoid valves using lever for conductor strip -3373- ⇒ [page 138](#)

18 - Sealing plug

- ☐ Take out before removing and installing freewheel
- ☐ Insert so that lug is located in groove on housing ⇒ [page 133](#)

19 - O-ring

- ☐ Renew
- ☐ Lubricate with ATF and fit onto sealing plug -item 18-

20 - O-ring

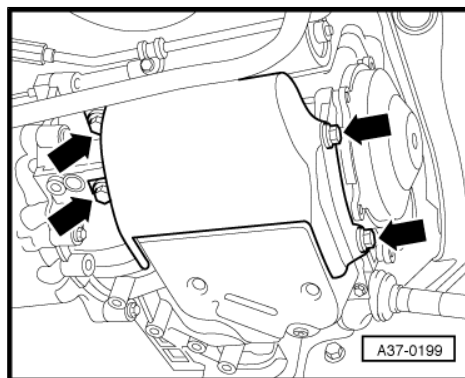
- ☐ Renew
- ☐ Lubricate with ATF and fit onto sealing plug -item 18-

21 - Operating rod for manual selector valve

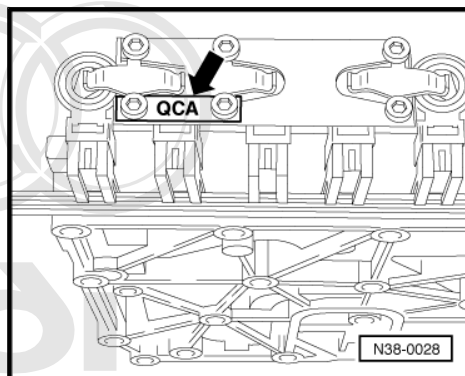
- ☐ Adjusting ⇒ [page 137](#)

Guard plate for ATF oil pan - tightening torque

- Tighten bolts -arrows- to 45 Nm.

**Identification of valve body**

- ◆ Code letters are stamped on identification plate. The identification plate must remain assigned to the valve body.
- ◆ Allocation of valve body according to gearbox code letters ⇒ [page 3](#)



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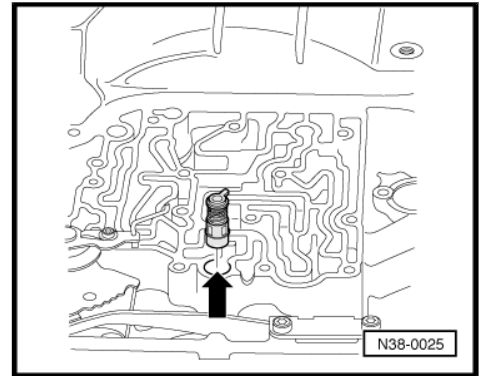
Inserting sealing plug



Note

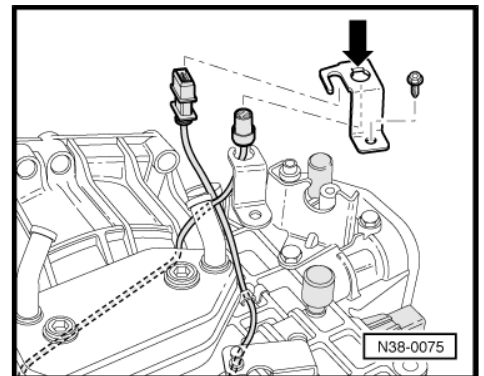
Pull the sealing plug out of the gearbox housing before removing and installing the freewheel, otherwise the sealing plug and the O-rings will be damaged.

- Lightly lubricate new O-rings with ATF and fit onto sealing plug.
- Insert sealing plug in hole in gearbox housing -arrow-.



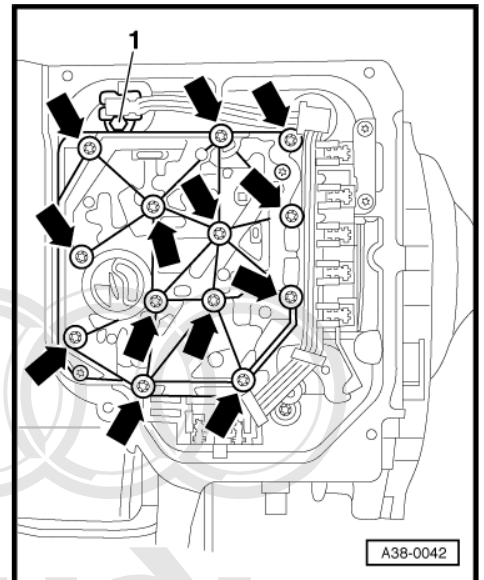
Installing retaining clip for 10-pin connector for conductor strip

- Fit connector for conductor strip in lower retainer.
- Fit upper retainer with recess -arrow- onto lug of connector.
- Tighten bolt.



Valve body - tightening torque and sequence

- Tighten bolts for valve body -arrows- in two stages as follows:
1. Hand-tighten.
 2. Then tighten alternately crosswise from inside to outside to 5 Nm.



6.1 Removing and installing ATF oil pan

Removing

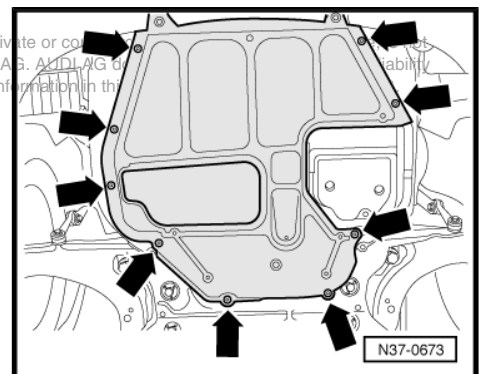
- Drain ATF ⇒ [page 67](#) .



Note

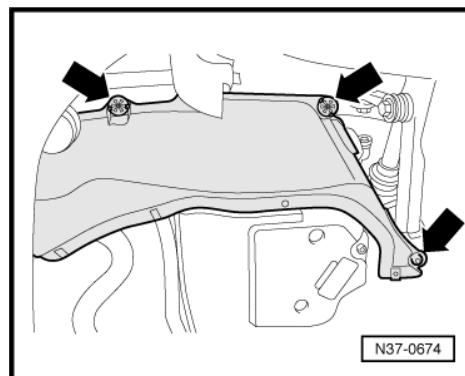
Some ATF always remains in the oil pan.

- Remove centre noise insulation (loosen fasteners -arrows-).



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- Remove left noise insulation -arrows-.

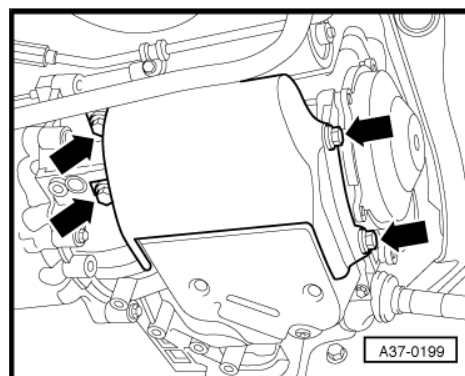


- Remove bolts -arrows- and detach guard plate from gearbox.
- Unscrew bolts on ATF oil pan in diagonal sequence and remove.



Note

Clean magnet in ATF oil pan. Ensure that the magnet is in full contact with the ATF oil pan



Installing

- Tightening torques ⇒ [page 130](#) , ⇒ [page 132](#)

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



Note

Renew seals and gaskets.

- Fill up with ATF after repairs ⇒ [page 67](#) .
- Install noise insulation ⇒ Rep. Gr. 50 .

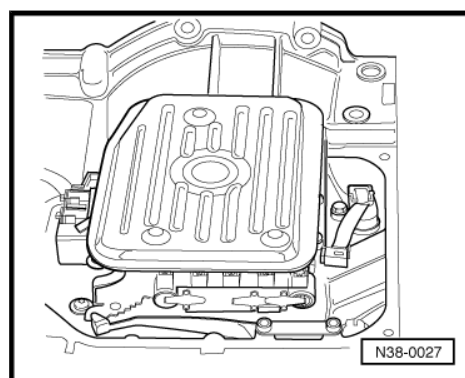
6.2 Removing and installing ATF strainer

Removing

- Remove ATF oil pan ⇒ [page 133](#)
- Pull ATF strainer off valve body.

Installing

- Before installing ATF strainer, insert seal in valve body.
- Lubricate seal in valve body with ATF.
- Push ATF strainer approx. 3 mm into valve body (do not push in fully).
- When installing oil pan the ATF strainer will be pushed into correct installation position.
- Install ATF oil pan ⇒ [page 133](#) .
- Fill up with ATF after repairs ⇒ [page 67](#) .



6.3 Removing and installing valve body

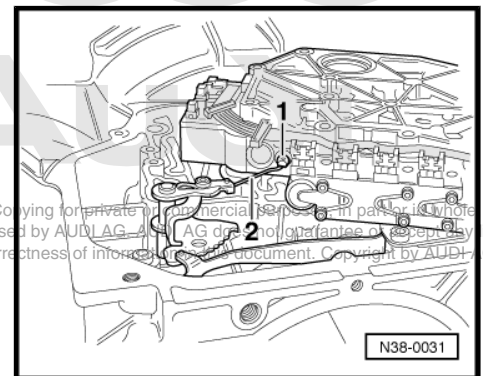
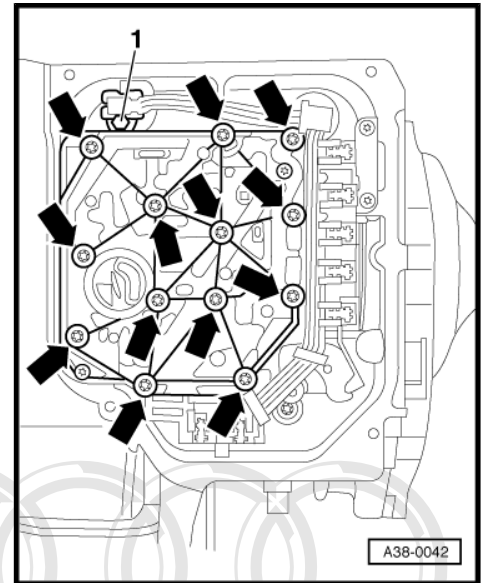
Removing

- Shift selector lever into position "1".
- Remove ATF strainer ➔ [page 134](#).
- Remove securing bolt -1- for leadthrough.
- Push leadthrough out of gearbox housing from outside to inside.
- Unscrew bracket for 10-pin connector, disengage connector.
- Push 10-pin connector out of gearbox housing from outside to inside.
- Unfasten bolts -arrows- and remove.



Note

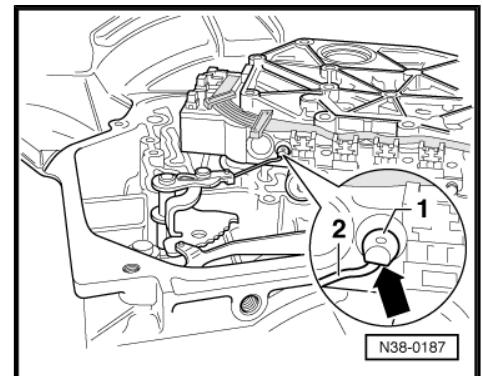
- ◆ *Only remove bolts indicated.*
- ◆ *If other bolts are loosened, this may affect the operation of the valve body or the valve body could come apart.*
- Detach valve body from gearbox, carefully disengaging operating rod -2- for manual selector valve from manual selector valve -1-.
- Secure manual selector valve to prevent it falling out.
- Guide out wiring to 10-pin connector.



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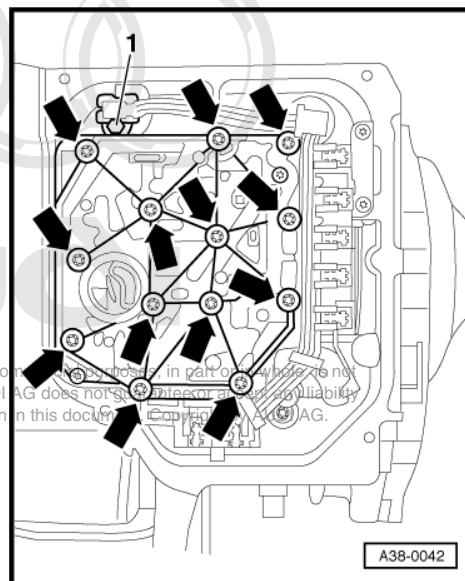
Installing

- Tightening torque ➔ [page 130](#).
- Fit valve body on gearbox without using any force.
- Turn manual selector valve -1- so that flat side -arrow- faces operating rod -2-.
- Push operating rod with lever into manual selector valve, as shown in illustration.
- Installation position of manual selector valve: flat part of manual selector valve -1- must face gearbox.



- Tighten bolts for valve body ➔ [page 133](#) .
- Route conductor strip so that it is not kinked or twisted when installing.
- Insert 10-pin connector through gearbox housing.
- Fit leadthrough and tighten securing bolt -1-.
- Adjust operating rod for manual selector valve ➔ [page 137](#) .
- Install ATF strainer ➔ [page 134](#) .
- Fill up with ATF after repairs ➔ [page 67](#) .

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6.4 Operating rod for manual selector valve - renewing steel spring and bolt for selector shaft

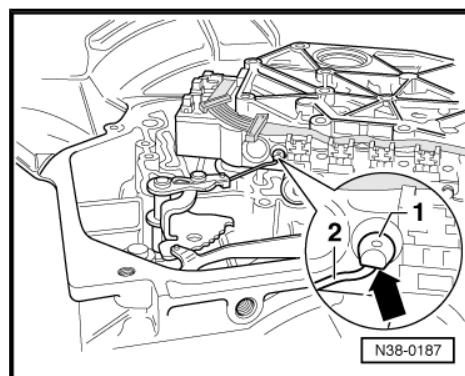
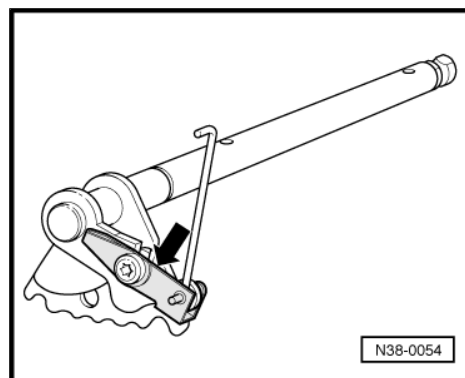
Procedure

- Valve body installed.
- Remove bolt for steel spring -arrow-.
- Detach steel spring with operating rod and lever from selector shaft in gearbox.
- Unhook operating rod from manual selector valve.

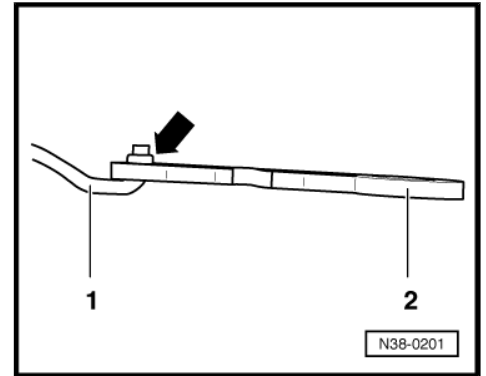


Note

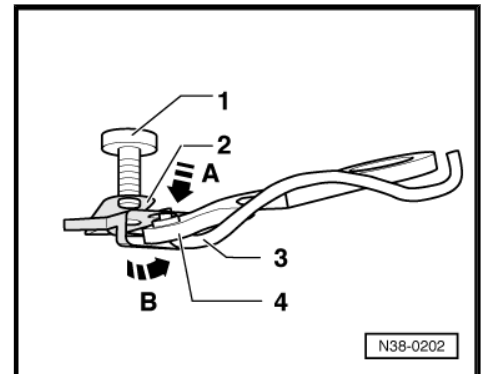
- ◆ *Make sure that the manual selector valve does not fall out of the valve body.*
- ◆ *The bolt with steel spring must always be renewed after removal.*
- Move selector shaft with selector segment to position "1".
- Pull manual selector valve slightly out of valve body.
- Turn manual selector valve -1- so that flat side -arrow- faces operating rod -2-.
- Push operating rod with lever into manual selector valve, as shown in illustration.
- Installation position of manual selector valve: flat part of manual selector valve -1- must face gearbox.



- Insert operating rod -1- from below into collar -arrow- of lever -2- on selector shaft.



- Attach new steel spring -2- with new bolt -1- to end of operating rod -3- -arrow A- and push over operating rod with retaining tab at bottom -arrow B-. At the same time, centralise steel spring at top of collar on lever -arrow A-.
- Swivel steel spring over lever as far as it will go.
- Screw in bolt further until it lies flush with bottom edge of lever.



i Note

The bolt is not tightened fully until the operating rod has been adjusted.

- Adjust operating rod for manual selector valve ➔ [page 137](#) .

6.5 Adjusting operating rod for manual selector valve

Procedure

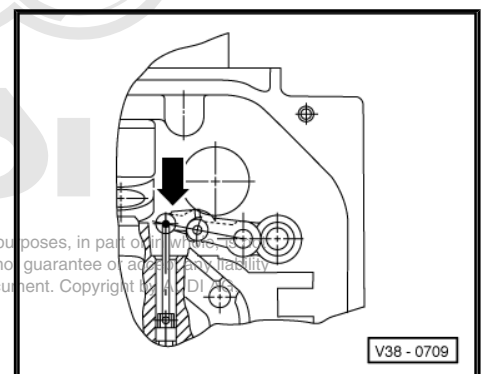
i Note

The bolt with steel spring must always be renewed after removal ➔ [page 136](#) .

- Shift selector shaft into position "P".
- Push operating rod with manual selector valve into valve body as far as the stop in direction of -arrows- and tighten bolt securing lever.
- Tightening torque: 4 Nm

i Note

- ◆ **Before adjustment can be performed, the manual selector valve must be inserted in the valve body as far as it will go. Counter-hold in direction of -arrow- when tightening bolt.**
- ◆ **Do not apply pressure to small limiting lever for steel spring, otherwise adjustment will be incorrect.**
- ◆ **Check: in selector lever position "1", manual selector valve must be flush with outside of valve body.**



6.6 Removing and installing conductor strip with 10-pin connector

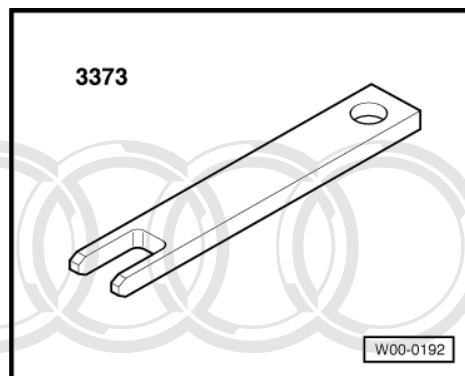


Note

Gearbox oil temperature sender -G93- is integrated in the conductor strip.

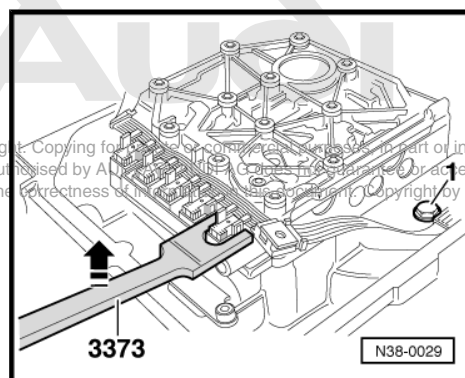
Special tools and workshop equipment required

- ◆ Lever for conductor strip -3373-



Removing

- Valve body installed or removed.
- Remove ATF strainer ⇒ [page 134](#) .
- Remove conductor strip with lever for conductor strip -3373-
- Apply lever for conductor strip -3373- as far as it will go under connectors for solenoid valves.
- Detach connector in direction of -arrow-.
- Remove securing bolt -1- for leadthrough.
- Push leadthrough out of gearbox housing from outside to inside.
- Unscrew bracket for 10-pin connector, disengage connector.



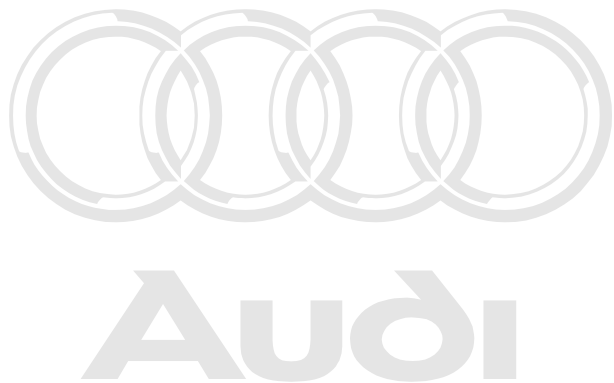
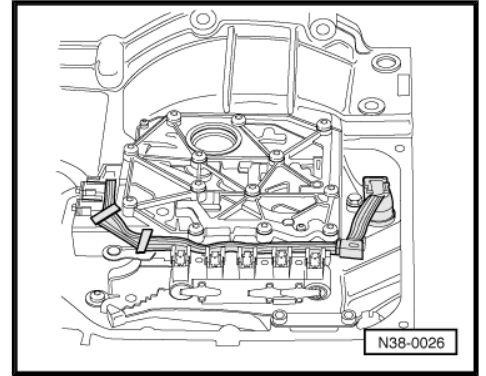
Note

If the locking tabs on the solenoid valves are damaged, the valve body must be renewed.

- Guide out wiring to 10-pin connector when removing.

Installing

- Tightening torque ⇒ [page 130](#) .
- Route conductor strip so that it is not kinked or twisted when installing.
- Press individual connectors of conductor strip onto solenoid valves, making sure that connectors engage correctly.
- Insert 10-pin connector through gearbox housing.
- Insert leadthrough and tighten securing bolt.
- Install ATF strainer ⇒ [page 134](#) .
- Perform basic setting ⇒ Rep. Gr. 01 .
- Fill up with ATF after repairs ⇒ [page 67](#) .



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7 Exploded view - parking lock, senders and switch on gearbox housing



WARNING

Do not run engine or tow vehicle with ATF oil pan removed or when there is no ATF in the gearbox.



Note

- ◆ General repair instructions ⇒ [page 21](#) .
- ◆ Rules for cleanliness when working on the automatic gearbox ⇒ [page 24](#) .
- ◆ Lubricate O-rings with ATF. Other types of lubricant will cause the gearbox hydraulics to malfunction.
- ◆ Multifunction switch -F125-, gearbox speed sender -G38- and vehicle speed sender -G68- can be checked via self-diagnosis ⇒ Rep. Gr. 01 .
- ◆ Dismantling/assembly of parking lock involves removal of output gear ⇒ ["5 Exploded view - output shaft", page 164](#) .



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1 - Bolt

- ☐ Renewing steel spring and bolt for operating mechanism of manual selector valve
⇒ [page 136](#)
- ☐ 4 Nm

2 - Operating mechanism for manual selector valve

- ☐ Adjusting ⇒ [page 137](#)
- ☐ Renewing steel spring and bolt for operating mechanism of manual selector valve
⇒ [page 136](#)

3 - Selector shaft

- ☐ With selector segment
- ☐ Removing and installing
⇒ [page 144](#)

4 - Spring pin

- ☐ Removing and installing
⇒ [page 144](#)

5 - Engaging lever

- ☐ Insert together with selector shaft and detent segment

6 - Detent segment

- ☐ Insert together with selector shaft and engaging lever

7 - Securing clip

8 - Bolt

- ☐ 10 Nm

9 - Spring for selector segment

10 - Bolt

- ☐ 10 Nm

11 - Circlip

- ☐ Renew
- ☐ Only install on shafts with groove for circlip

12 - Washer

13 - Shaft for detent lever

- ☐ Is secured by circlip and bearing cover of output shaft

14 - Return spring

- ☐ Fitting ⇒ [page 144](#)

15 - Detent lever

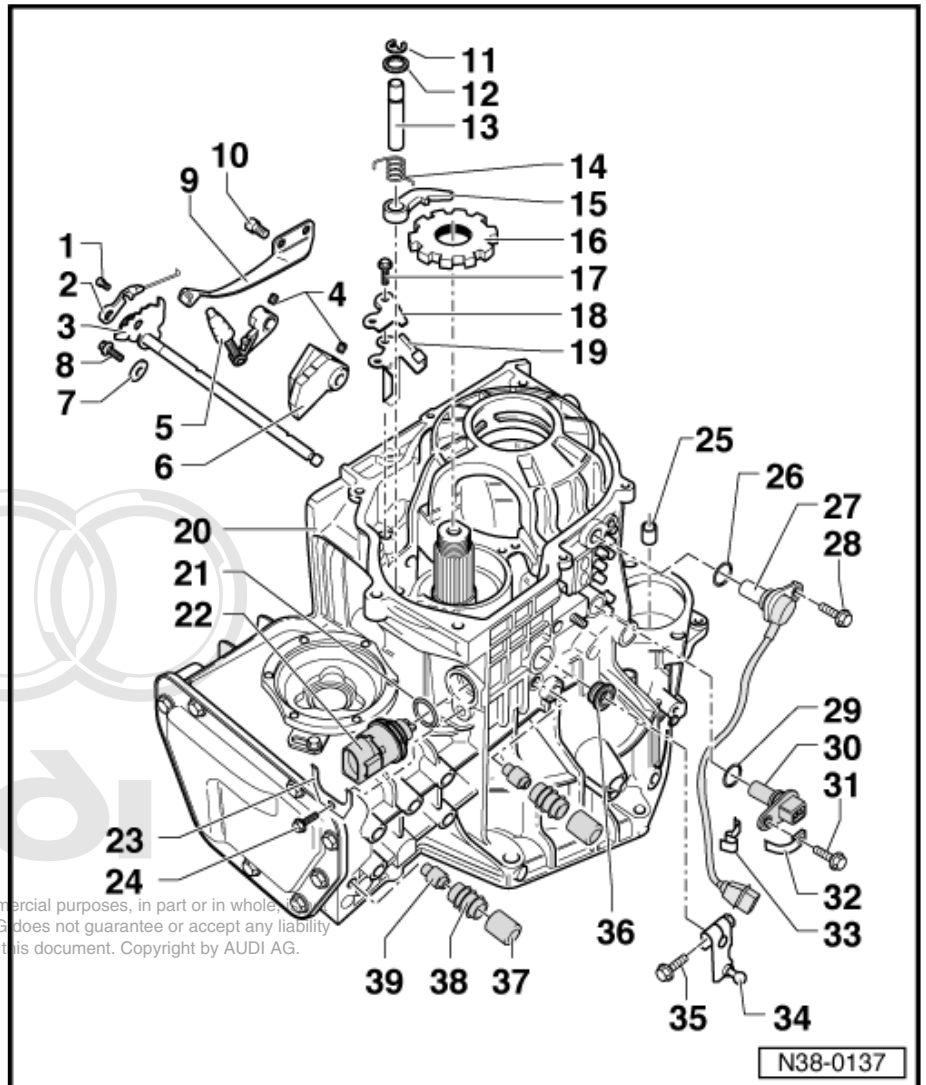
- ☐ Insert with return spring ⇒ [page 144](#)

16 - Parking lock gear

- ☐ Installation position: rounded side faces splines of output shaft

17 - Bolt

- ☐ 14 Nm





18 - Support plate

- ☐ Installing ⇒ [page 144](#)

19 - Guide plate

- ☐ Install before fitting support plate ⇒ [page 144](#)

20 - Gearbox housing

- ☐ Input gear does not have to be removed when dismantling parking lock

21 - O-ring

- ☐ Renew

22 - Multi-function switch -F125-

- ☐ Checked via self-diagnosis ⇒ Rep. Gr. 01
- ☐ Remove before removing selector shaft -item 3-
- ☐ Removing and installing ⇒ [page 145](#)
- ☐ 10 Nm

23 - Bracket

- ☐ For multi-function switch -F125-

24 - Bolt

- ☐ 10 Nm

25 - Mounting bush for starter

- ☐ Extracting and driving in ⇒ [page 145](#)

26 - O-ring

- ☐ Renew

27 - Vehicle speed sender -G68-

- ☐ Checked via self-diagnosis ⇒ Rep. Gr. 01
- ☐ Dirt impairs function; clean if necessary
- ☐ Removing and installing ⇒ [page 146](#)

28 - Bolt

- ☐ 10 Nm

29 - O-ring

- ☐ Renew

30 - Gearbox speed sender -G38-

- ☐ Checked via self-diagnosis ⇒ Rep. Gr. 01
- ☐ Dirt impairs function; clean if necessary
- ☐ Removing and installing ⇒ [page 145](#)

31 - Bolt

- ☐ 10 Nm

32 - Retaining clip

- ☐ For wiring to vehicle speed sender -G68-

33 - Retaining clip

- ☐ For wiring to vehicle speed sender

34 - Lever

- ☐ For selector shaft

35 - Bolt

- ☐ 10 Nm

36 - Breather cap

37 - Seal

- ☐ Lever out with screwdriver

- ☐ Drive in until flush with tube -VW 423-

38 - Breather

39 - Breather pipe

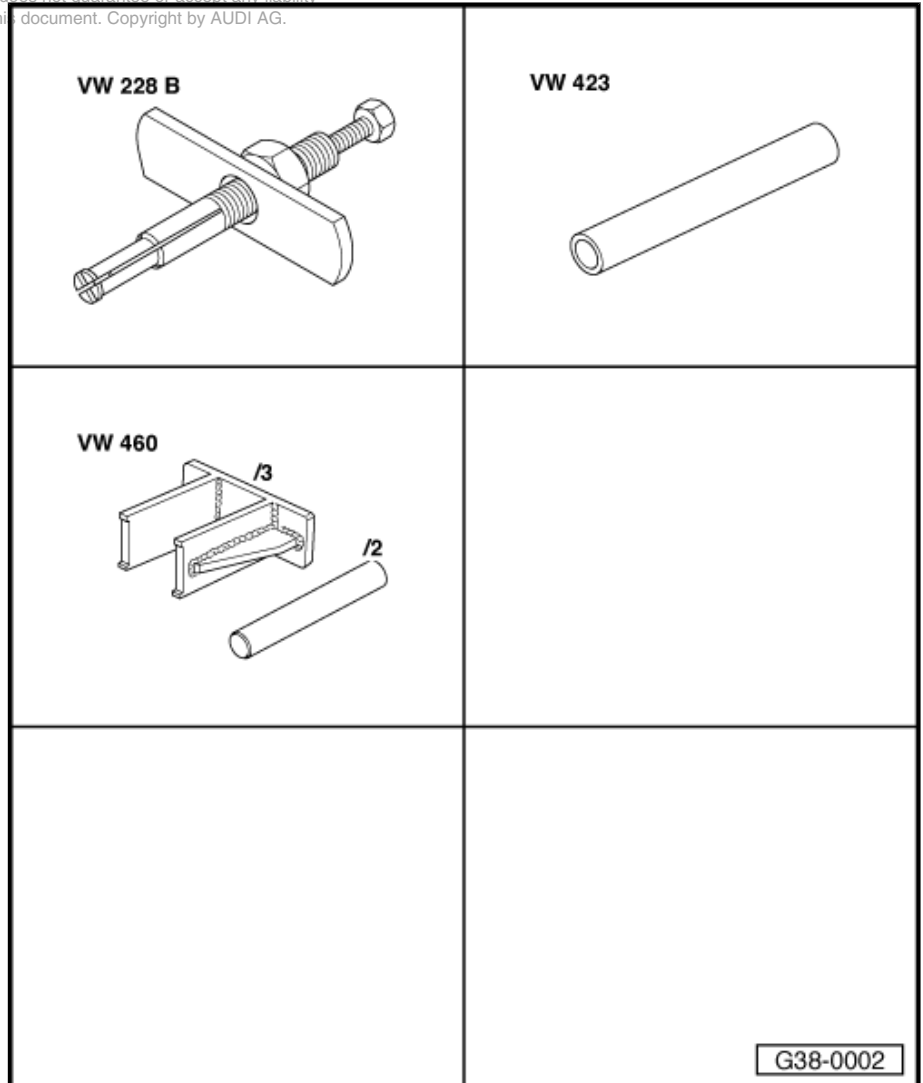
- ☐ Remove using pliers
- ☐ Drive onto stop with drift -VW 460/2-

7.1 Dismantling and assembling parking lock

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Special tools and workshop equipment required

- ◆ Extractor -VW 228 B-
- ◆ Tube -VW 423-
- ◆ Removing tool -VW 460-



Removing and installing spring pins -arrows-

Driving out



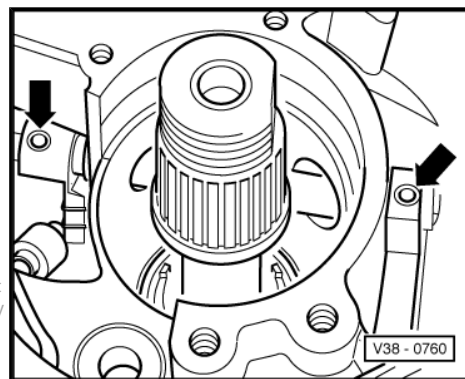
Caution

Spring pin of detent lever can drop into planetary gearbox.

- Drive out spring pin for engaging lever and spring pin for detent segment only far enough to remove selector shaft.

Driving in

- Position spring pins at front of component.
- After inserting selector shaft, detent lever and detent segment, drive in spring pins until they are flush.



Removing and installing selector shaft with selector segment



Caution

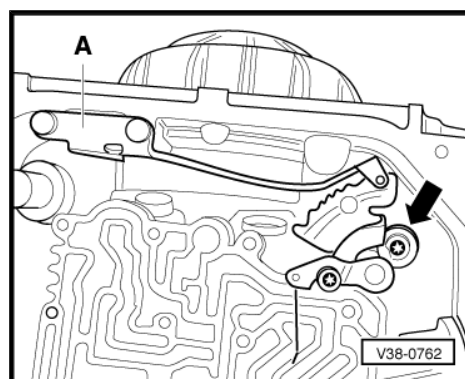
Do not damage conductor strip when valve body is installed.

- Remove spring for selector segment -A-.
- Unfasten bolt and remove with washer -arrow-.

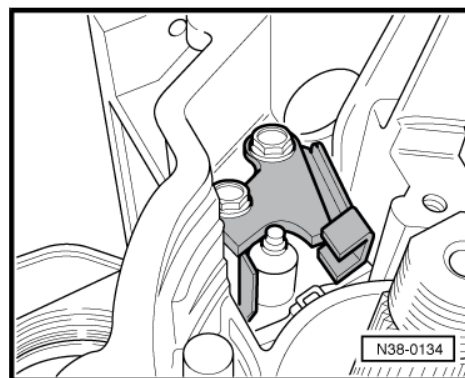


Note

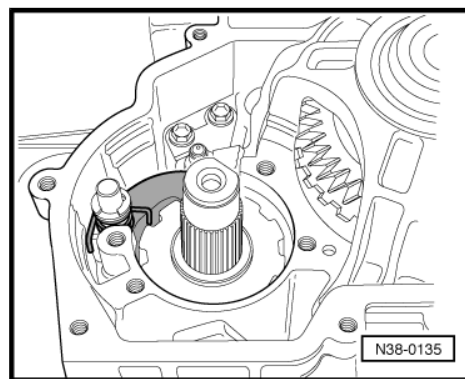
The washer prevents selector shaft movement.



Inserting guide plate and support plate



Inserting detent lever with return spring



Removing and installing multi-function switch -F125-

- ◆ Fitting location: on rear of gearbox.

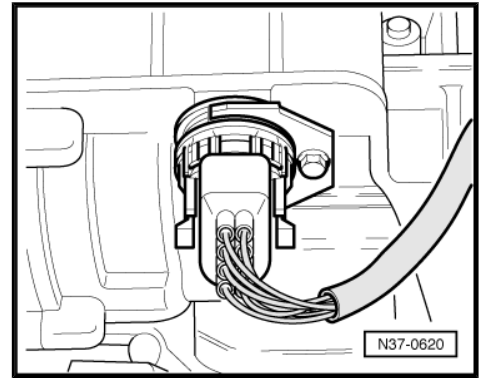
Removing

- Unplug electrical connector.
- Remove bolt and detach bracket.
- Detach multi-function switch -F125- .

Installing

- Tightening torque ⇒ [page 140](#) .

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



Note

Renew O-ring.

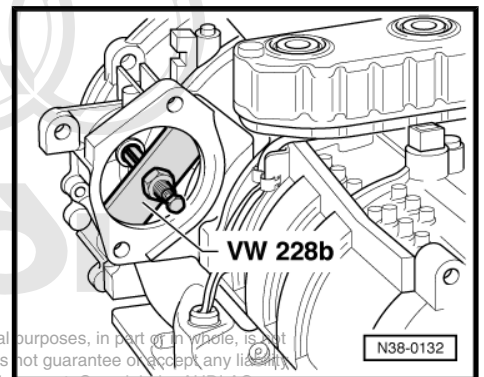
Pulling out starter bush and driving in

Pulling out

- Remove starter ⇒ Rep. Gr. 27 .
- Pull out starter bush.

Driving in

- Lubricate mounting bush.
- Drive in starter bush.
- Install starter ⇒ Rep. Gr. 27



7.2 Removing and installing gearbox speed sender -G38-

- ◆ Fitting location: on top of gearbox.

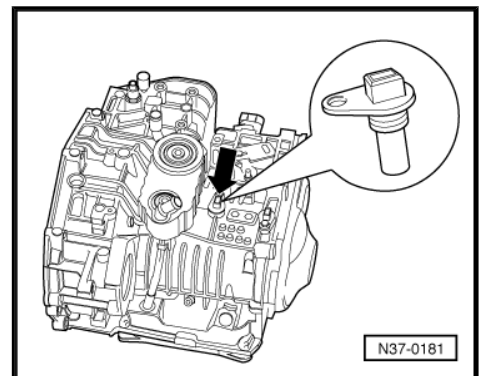
Removing

- Unplug electrical connector.
- Remove bolt and pull out gearbox speed sender -G38- .

Installing

- Tightening torque ⇒ [page 140](#) .

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



Note

Renew O-ring.

- Lubricate O-ring with ATF.

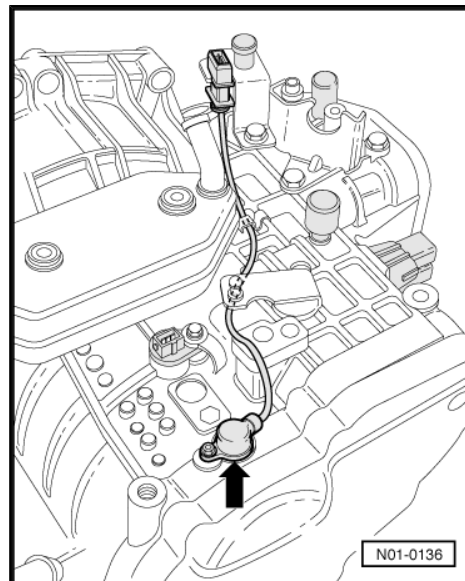
7.3 Removing and installing vehicle speed sender -G68-

Fitting location: on top right of gearbox.



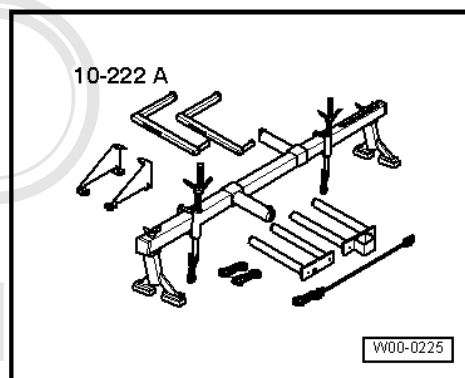
Note

When the gearbox is installed the sender is covered by the assembly mounting (left-side).



Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-



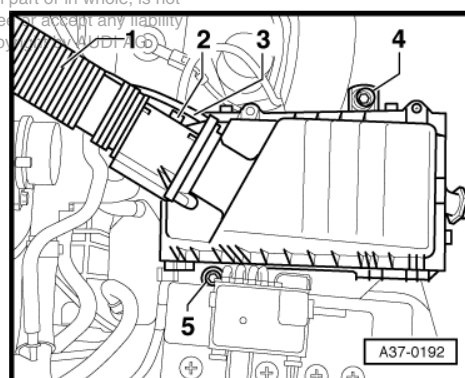
Removing

- Remove engine cover panel.
- Remove air hose -1-.
- Vehicles with TDI engine: detach breather hose -3-.
- Unplug electrical connector -2- from air mass meter -G70- .
- Remove bolts -4- and -5-, detach air cleaner housing.



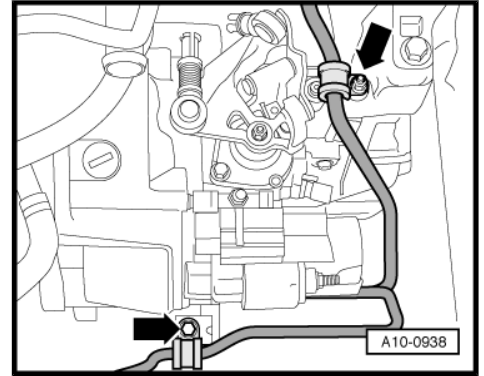
Caution

Follow steps required when disconnecting battery ⇒ Rep. Gr. 27 .

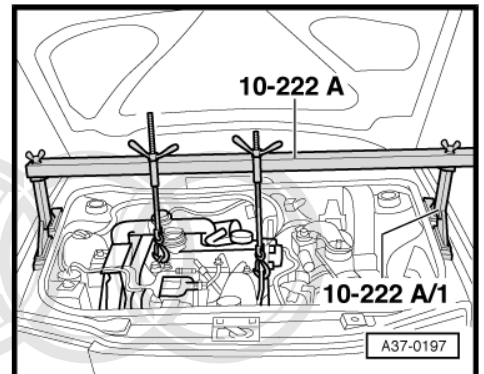


- Switch off ignition.
- Disconnect battery ⇒ Rep. Gr. 27 .
- If necessary, remove battery and battery tray ⇒ Rep. Gr. 27 .

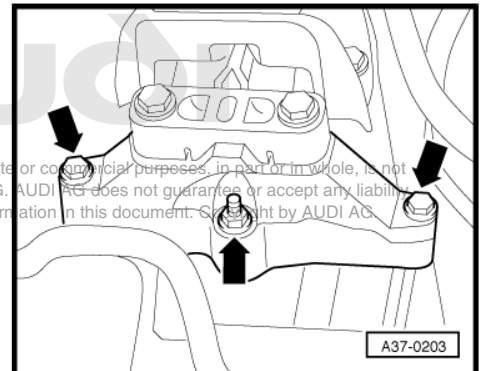
- Unbolt power steering pressure pipe from gearbox -arrows-.



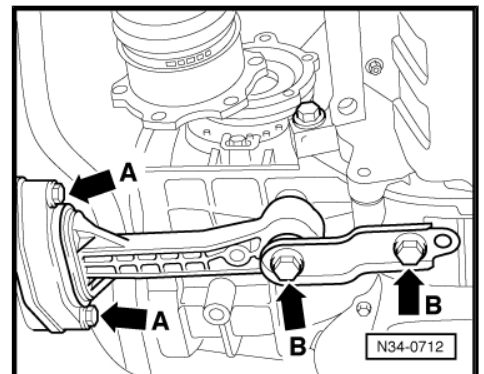
- Set up support bracket -10 - 222 A- with adapters -10 - 222 A / 3- on wing mounting flanges (left and right), as shown in illustration.
- Hook spindles into engine lifting eyes and slightly take up weight of engine/gearbox assembly via the spindles.



- Unbolt gearbox support (left-side) from gearbox -arrows-.



- First remove bolts -A-, then bolts -B- and detach pendulum support.



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- Adjust left spindle at support bracket -10 - 222 A- to lower gearbox by distance -a-.
- Dimension -a- = 60 mm
- Unplug electrical connector.
- Remove bolt -1- and pull out gearbox speed sender -G38- .

Installing

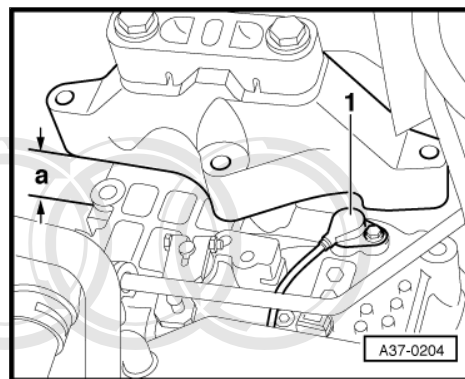
- Tightening torque ⇒ [page 140](#) .

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

**Note**

Renew O-ring.

- Lubricate O-ring with ATF.
- Install gearbox support ⇒ [page 57](#) .
- Install pendulum support ⇒ [page 60](#) .



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39 – Final drive - differential

1 Checking gear oil level in final drive

Procedure

- Carry out a short test drive in order to heat gear oil to approx. 60 °C.
- Drive vehicle onto a lifting platform or over an inspection pit in order for it to be absolutely horizontal.
- Switch off engine and let gear oil drip into gearbox housing for 5 minutes.

Vehicles without inspection plug in final drive



Note

Check gear oil level at drive for speedometer sender -G22- .

- Remove drive for speedometer sender at top of gearbox -arrow- and clean with cloth.
- Install drive for speedometer sender and remove again, check gear oil level.
- Specification: gear oil level between “Min” and “Max”.



Note

- ◆ *The gear oil quantity between “Min” and “Max” is 0.1 litre.*
- ◆ *Excess gear oil can be drawn off with used oil collection and extraction unit -V.A.G 1782- .*
- Top up gear oil as necessary; specification ➔ [page 12](#) .
- Install drive for speedometer sender -G22- ➔ [page 173](#) .

Vehicles with inspection plug in final drive

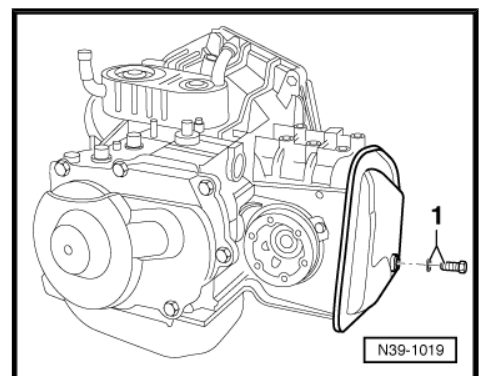
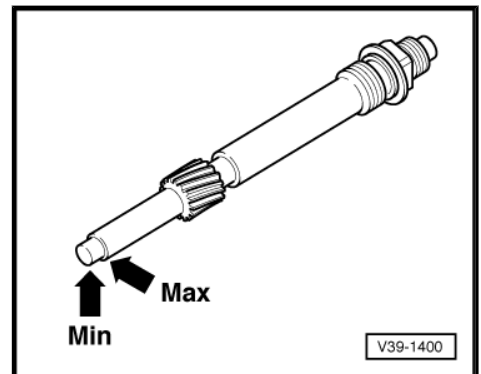
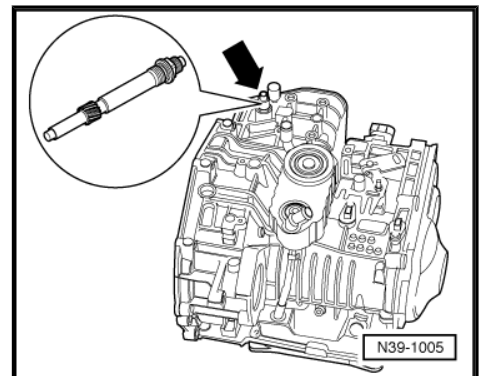
- Remove plug -1-.
- Check the oil level with a suitable improvised tool, e.g. bent wire.
- Specification: gear oil level up to bottom lip of filler hole.
- Top up gear oil as necessary; specification ➔ [page 12](#) .



Note

Renew seal on plug.

- Tighten plug.
- Tightening torque: 25 Nm.



2 Exploded view - flange shafts

6 - Oil seal

- ☐ For flange shaft (right-side)
- ☐ Renewing ⇒ [page 156](#)

7 - Tapered ring

- ☐ Installation position: shoulder faces thrust washer

8 - Thrust washer

- ☐ Place above compression spring

9 - Spring

10 - Flange shaft (right-side)

- ☐ Removing and installing ⇒ [page 153](#)
- ☐ Fit with tapered ring, thrust washer and compression spring

11 - Dished spring

- ☐ Installation position: convex side must face outwards

12 - Circlip

13 - Cover plate

16 - Cover plate

17 - Circlip

18 - Dished spring

- ☐ Installation position: convex side must face outwards

19 - Flange shaft (left-side)

- ☐ Removing and installing ⇒ [page 150](#)
- ☐ Fit with tapered ring, thrust washer and compression spring

20 - Spring

21 - Thrust washer

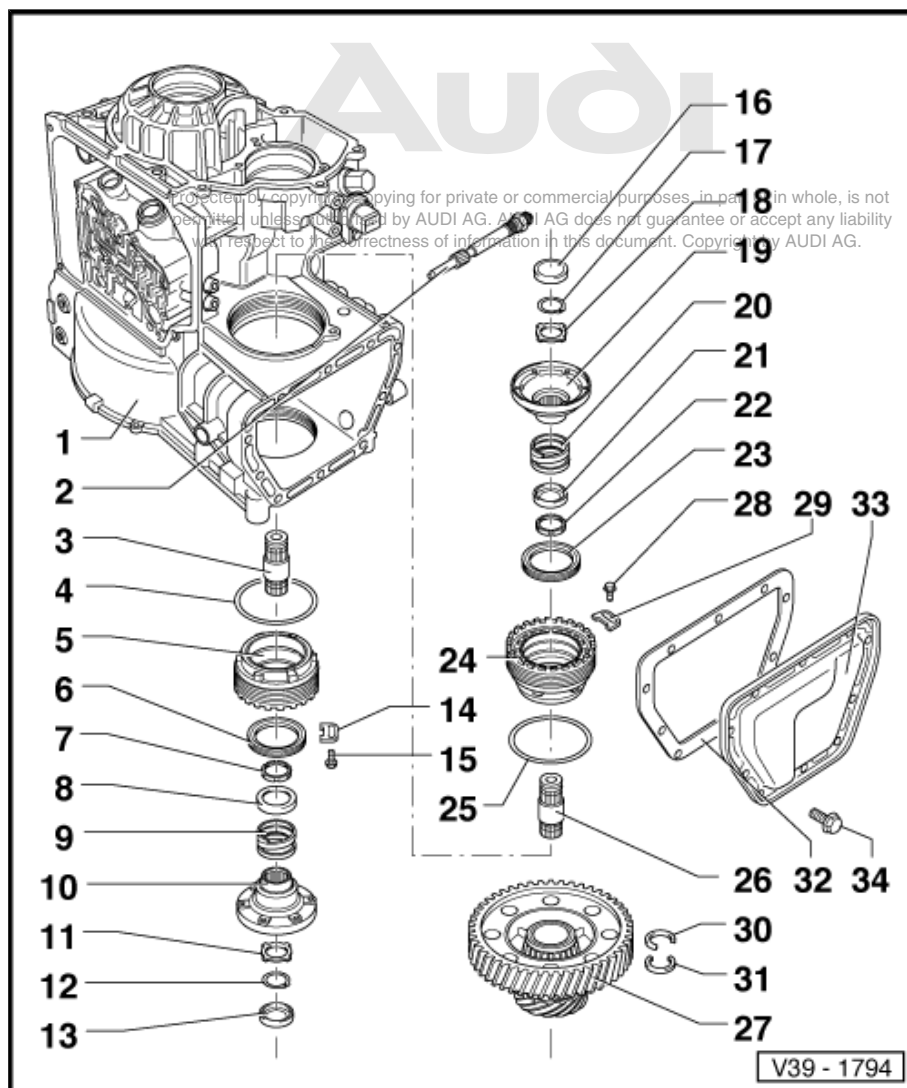
- ☐ Place above compression spring

22 - Tapered ring

- ☐ Installation position: shoulder faces thrust washer

23 - Oil seal

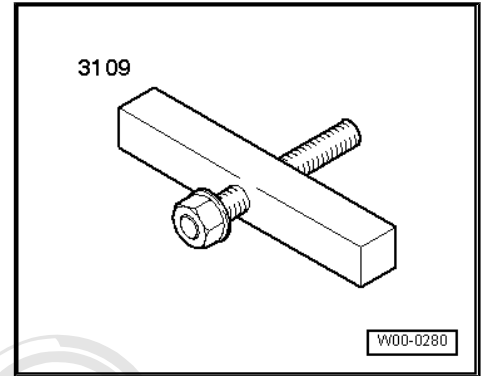
- ☐ For flange shaft (left-side)
- ☐ Renewing ⇒ [page 154](#)



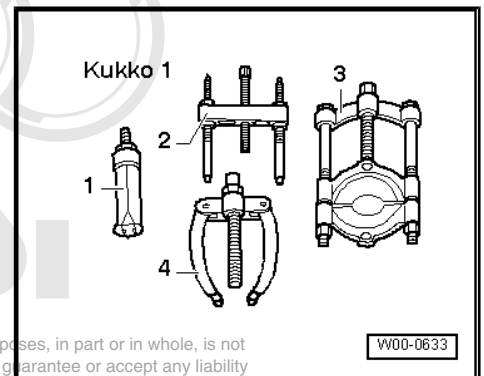
2.1 Removing and installing flange shaft (left-side)

Special tools and workshop equipment required

◆ Puller -3109-



◆ -2- Kukko 18/0 puller



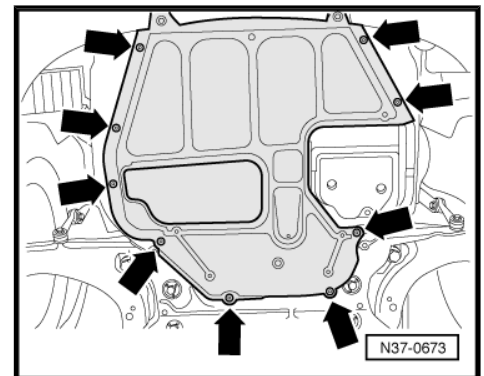
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◆ Bolts M8x35 (2x)

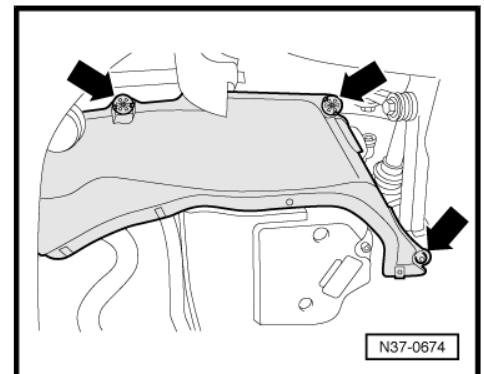
◆ Washers Ø 8 mm (2x)

Removing

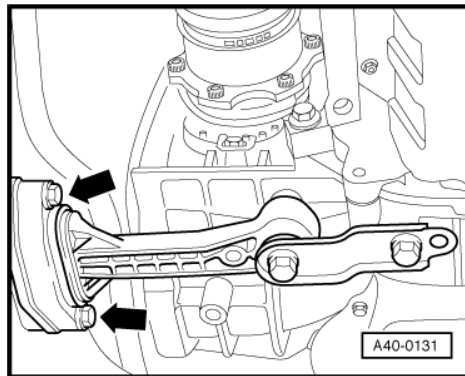
- Gearbox in vehicle
- Remove front left wheel.
- Remove centre noise insulation (loosen fasteners -arrows-).



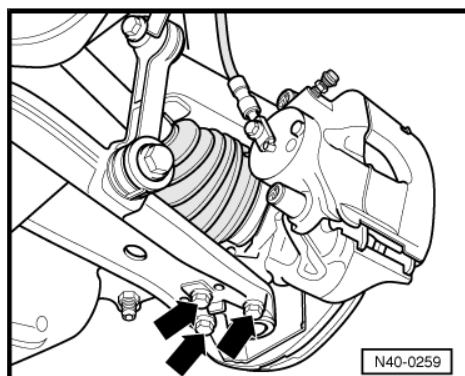
- Remove left noise insulation -arrows-.
- Unbolt drive shaft (left-side) from flange shaft.



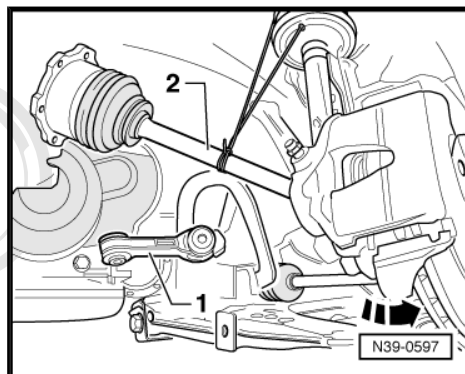
- Remove bolts -arrows- for pendulum support at subframe.



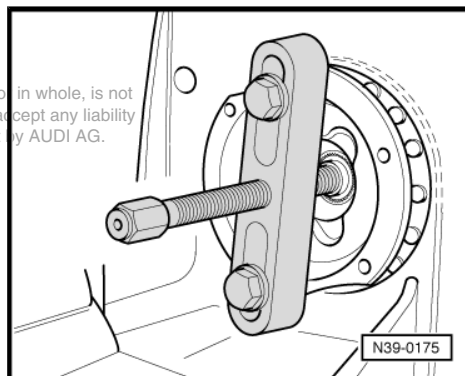
- Remove bolts -arrows- for swivel joint.



- Unscrew coupling rod (left-side) -1- from wishbone and move upwards.
- Swing wheel bearing housing outwards -arrow-.
- Guide drive shaft out between subframe and gearbox; at the same time have a 2nd mechanic push the engine/gearbox assembly forwards.
- Lift drive shaft and secure to suspension strut with wire.
- Pierce and prise out cap in drive flange using screwdriver.



- Attach puller Kukko 18/0 to drive flange with 2 bolts 8x35 and Ø 8 mm washers.
- Detach flange shaft.



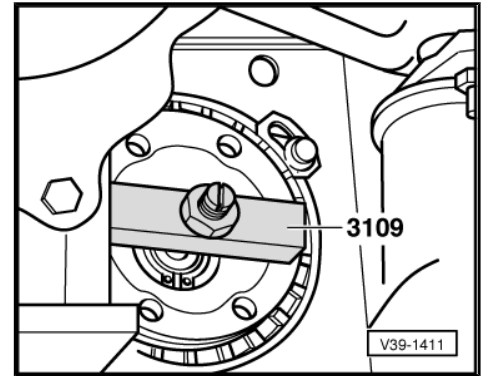
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Installing

- Attach flange shaft, dished spring and circlip.
- Use puller -3109- or drive flange installing tool -VW 391- to draw in flange shaft.

The remaining installation steps are carried out in reverse sequence; note the following:

- Install drive shaft (left-side) ⇒ Rep. Gr. 40 .
- Install wishbone and swivel joint with new bolts and new locking plate ⇒ Rep. Gr. 40 .
- Install noise insulation ⇒ Rep. Gr. 50 .
- Check gear oil level in final drive ⇒ [page 149](#) .



Caution

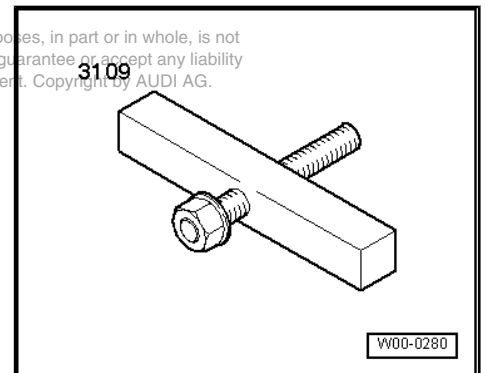
Perform wheel alignment after installation.

2.2 Removing and installing flange shaft (right-side)

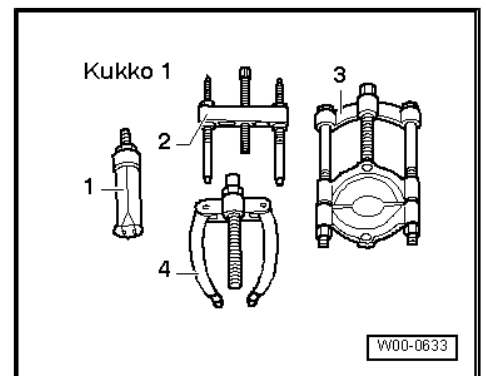
Special tools and workshop equipment required

- ◆ Puller -3109-

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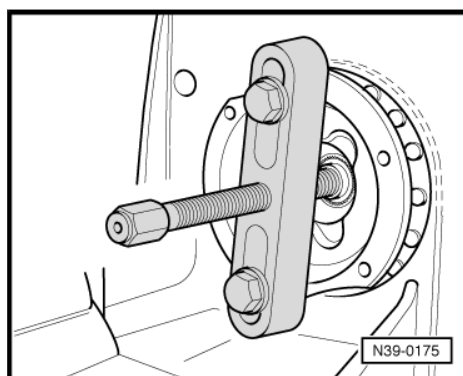
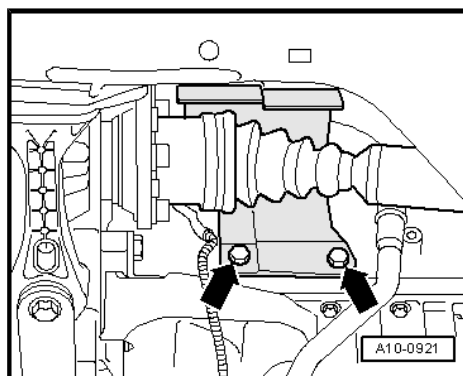
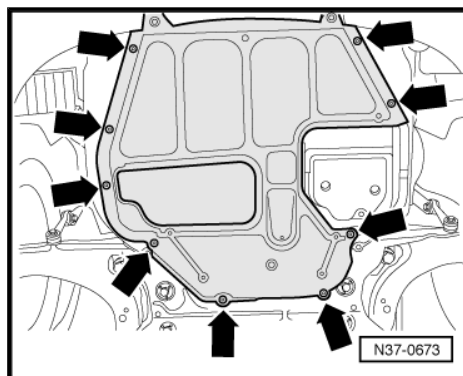
- ◆ -2- Kukko 18/0 puller



- ◆ Bolts M8x35 (2x)
- ◆ Washers Ø 8 mm (2x)

Removing

- Gearbox in vehicle
- Remove centre noise insulation (loosen fasteners -arrows-).
- Remove noise insulation (right-side).
- If fitted, remove bolts -arrows- and detach heat shield for drive shaft (right-side).
- Unbolt drive shaft from flange shaft (right side).
- Lay drive shaft to one side and secure.
- If necessary, remove drive shaft completely ⇒ Rep. Gr. 40 .
- Pierce and prise out cap in drive flange using screwdriver.
- Attach puller Kukko 18/0 to drive flange with 2 bolts 8x35 and Ø 8 mm washers.
- Detach flange shaft.

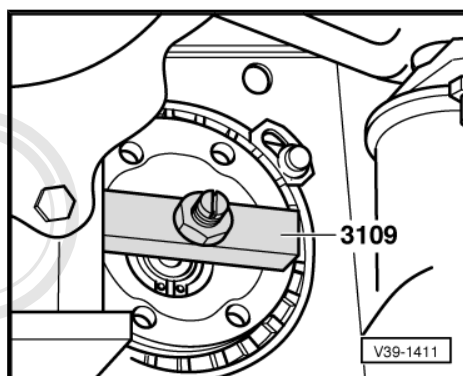


Installing

- Attach flange shaft, dished spring and circlip.
- Use puller -3109- or drive flange installing tool -VW 391- to draw in flange shaft.

The remaining installation steps are carried out in reverse sequence; note the following:

- Install drive shaft (right-side) ⇒ Rep. Gr. 40 .
- Install noise insulation ⇒ Rep. Gr. 50 .
- Check gear oil level in final drive ⇒ [page 149](#) .

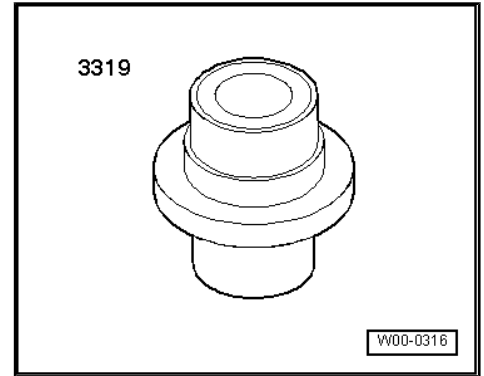


2.3 Renewing oil seal for flange shaft (left-side)

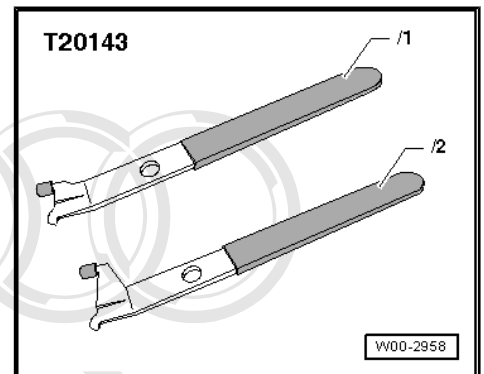
Special tools and workshop equipment required

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◆ Thrust piece -3319-



◆ Extractor tool -T20143-

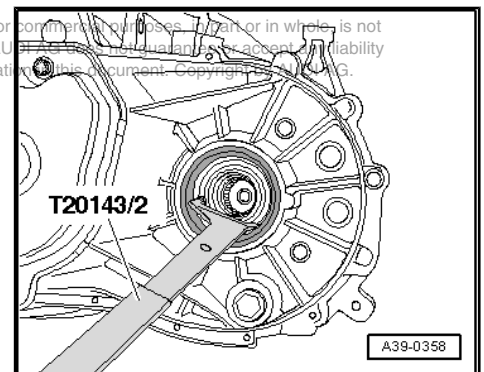


◆ M10 threaded rod, approx. 80 mm long

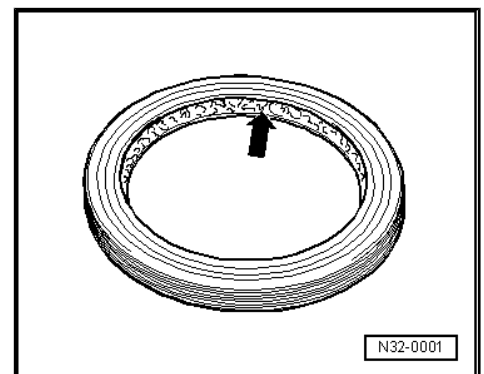
◆ Nut M10 with washer

Procedure

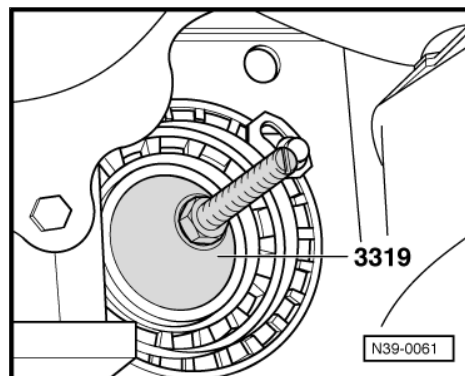
- Remove flange shaft (left-side) ⇒ [page 150](#)
- Use extractor tool -T20143/2- to pull out flange shaft oil seal.



- Lightly lubricate outer circumference and sealing lips of oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .



- Draw in new oil seal for flange shaft as far as stop using thrust piece -3319-, threaded rod M10 (approx. 80 mm long) and nut with washer.
- Installation position: open side of oil seal points towards gear-box.
- Oil seal must be seated in gearbox housing at uniform depth all round.
- Install flange shaft (left-side) ⇒ [page 150](#) .

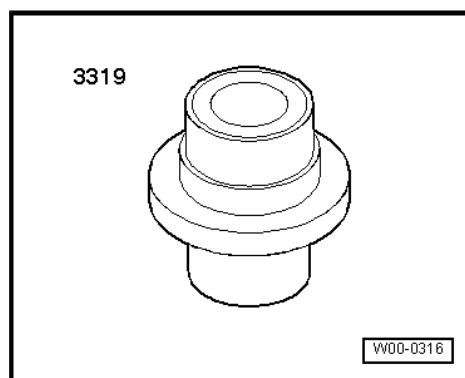


2.4 Renewing oil seal for flange shaft (right-side)

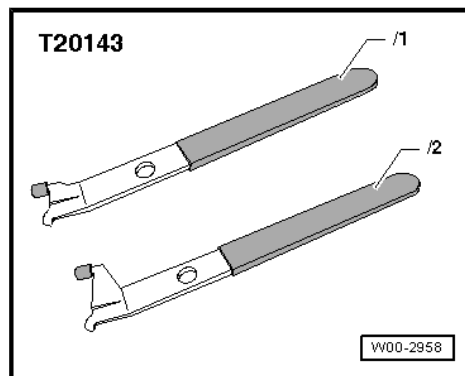
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Special tools and workshop equipment required

- ◆ Thrust piece -3319-



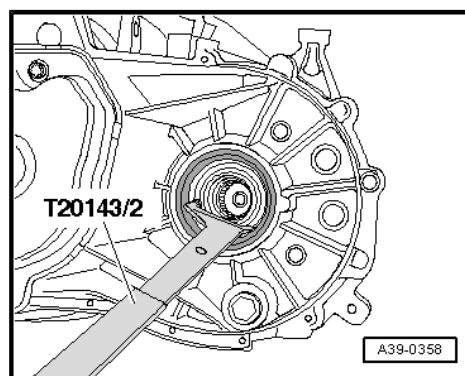
- ◆ Extractor tool -T20143-



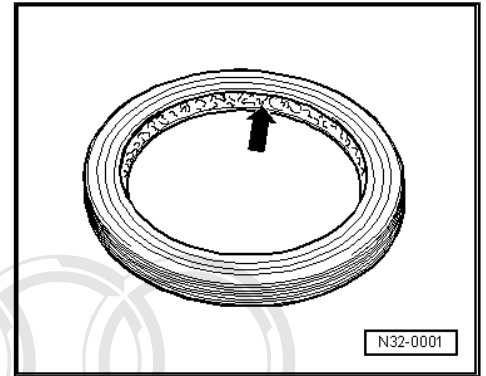
- ◆ M10 threaded rod, approx. 80 mm long
- ◆ Nut M10 with washer

Procedure

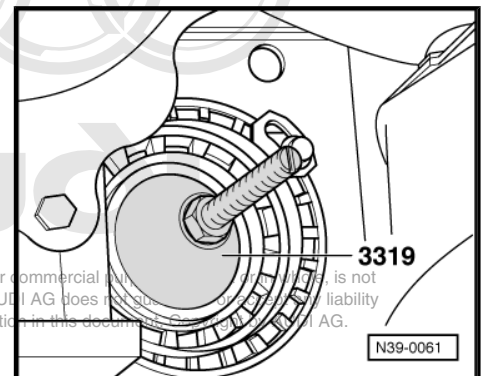
- Remove flange shaft (right-side) ⇒ [page 153](#) .
- Use extractor tool -T20143/2- to pull out flange shaft oil seal.



- Lightly lubricate outer circumference and sealing lips of oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .



- Draw in new oil seal for flange shaft as far as stop using thrust piece -3319-, threaded rod M10 (approx. 80 mm long) and nut with washer.
- Installation position: open side of oil seal points towards gearbox.
- Oil seal must be seated in gearbox housing at uniform depth all round.
- Install flange shaft (right-side) ⇒ [page 153](#)



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3 Repair overview - final drive

1 - Planetary gearbox

- ☐ Dismantling ⇒ [page 73](#)
- ☐ Assembling ⇒ [page 86](#)

2 - Input gear

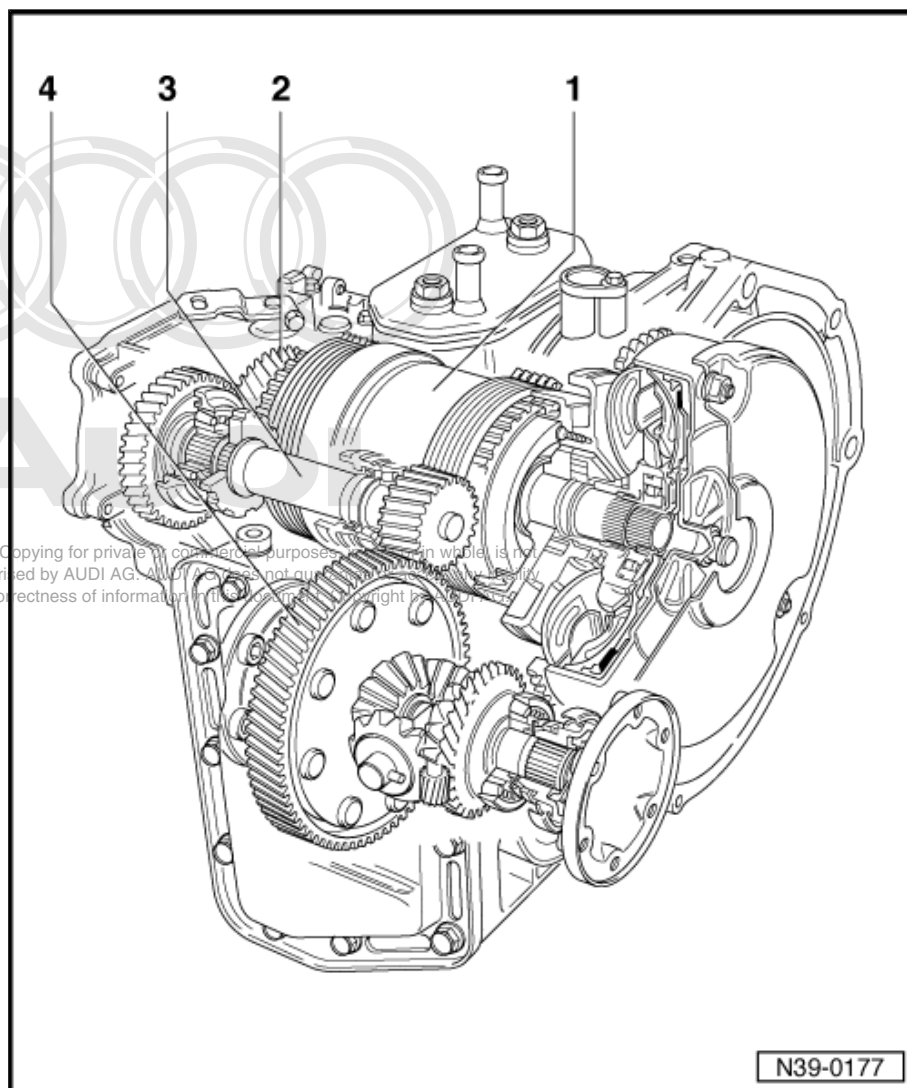
- ☐ Removing and installing ⇒ [page 159](#)
- ☐ ⇒ "8 Overview - adjusting final drive", [page 185](#)
- ☐ Adjusting ⇒ [page 189](#)
- ☐ Components of planetary gearbox must be removed before repair work can be performed on input gear.

3 - Output shaft

- ☐ Removing and installing ⇒ [page 164](#)
- ☐ ⇒ "8 Overview - adjusting final drive", [page 185](#)
- ☐ Adjusting ⇒ [page 186](#)

4 - Differential

- ☐ Removing and installing ⇒ [page 173](#)
- ☐ Dismantling and assembling ⇒ [page 179](#)
- ☐ ⇒ "8 Overview - adjusting final drive", [page 185](#)
- ☐ Adjusting ⇒ [page 190](#)



4 Exploded view- input gear



Note

- ◆ The input gear can only be removed after the planetary gearbox has been removed ⇒ [page 73](#).
- ◆ The output shaft and differential do not need to be removed in order to remove input gear.
- ◆ Always renew input gear and output gear together.
- ◆ If required, renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Do not interchange inner or outer races of bearings of the same size.
- ◆ Table of adjustments when renewing individual components of gearbox ⇒ [page 186](#).

1 - Socket head fastener

- ☐ Engage parking lock for removal and installation
- ☐ Removing and installing ⇒ [page 163](#)
- ☐ Insert axial needle bearing -item 7- before fitting socket head fastener
- ☐ 250 Nm

2 - Dished spring

- ☐ Installation position: convex side must face socket head fastener

3 - Shim

- ☐ Determining thickness ⇒ [page 189](#)

4 - Tapered roller bearing inner race

- ☐ After determining thickness of shim ⇒ [Item 3 \(page 159\)](#), fit onto input gear ⇒ [page 162](#) with locking fluid -AMV 185 101 A1-

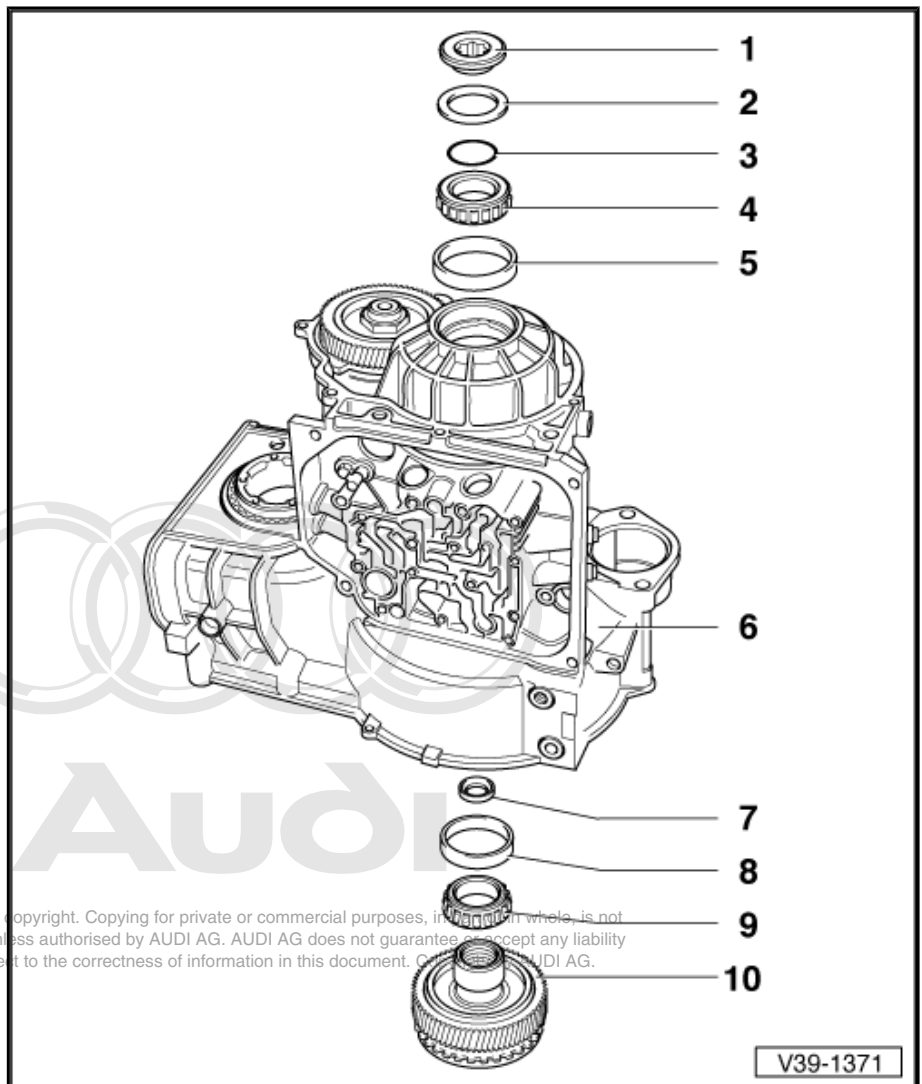
5 - Tapered roller bearing outer race

- ☐ Drive out with drift
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting
- ☐ Drive in with thrust plate -30 - 205-

6 - Gearbox housing

7 - Axial needle bearing

- ☐ Insert in input gear before fitting socket head fastener -item 1-
- ☐ Installation position: flat side faces input gear





8 - Tapered roller bearing outer race

- ☐ Drive out with drift
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting
- ☐ Drive in with thrust plate -30 - 205- and drift of suitable length

9 - Tapered roller bearing inner race

- ☐ Remove together with input gear -item 10-
- ☐ Pulling off ⇒ [page 162](#)
- ☐ Pressing on ⇒ [page 162](#)
- ☐ Apply locking fluid -AMV 185 101 A1- when fitting
- ☐ To install, drive a few millimetres onto input gear -item 10- and then draw in using socket head fastener -item 1-

10 - Input gear

- ☐ With impulse wheel for vehicle speed sender -G68-
- ☐ Number of teeth ⇒ [page 3](#)
- ☐ Removing ⇒ [page 163](#)
- ☐ Adjusting ⇒ [page 189](#)
- ☐ If signs of damage exist, always renew input gear and output gear together
- ☐ If input gear is renewed, adjust planet carrier ⇒ [page 97](#)

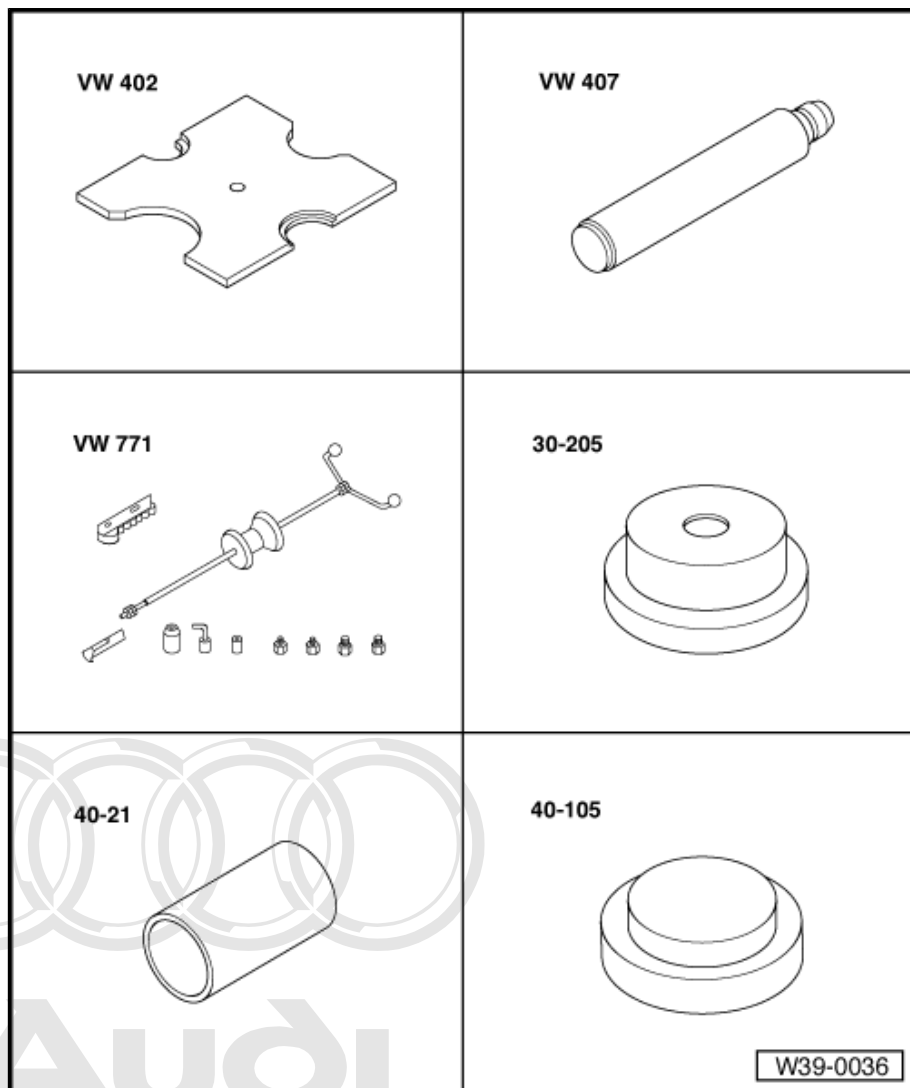


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4.1 Removing and installing input gear

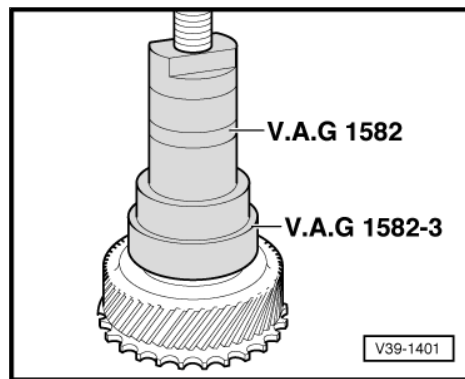
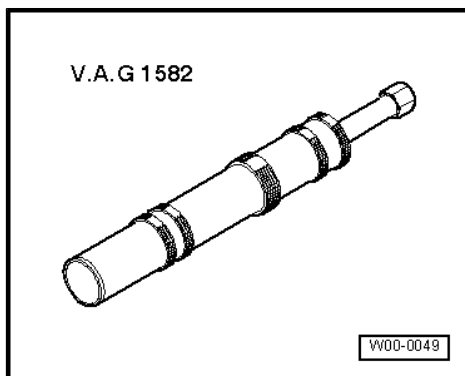
Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Multi-purpose tool -VW 771-
- ◆ Thrust plate -30 - 205-
- ◆ Press tool -40 - 21-
- ◆ Thrust plate -40 - 105-

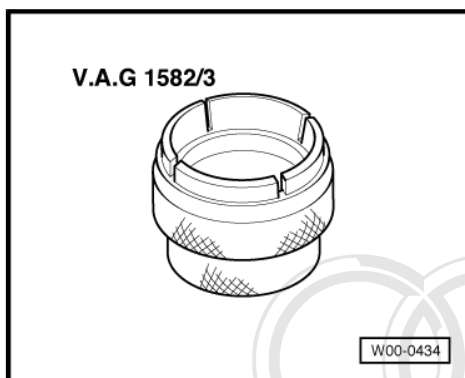


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- ◆ Tapered roller bearing puller -V.A.G 1582-



- ◆ Adapter -V.A.G 1582/3-



Pulling off tapered roller bearing inner race

- Fit thrust plate -40 - 105- onto input gear.

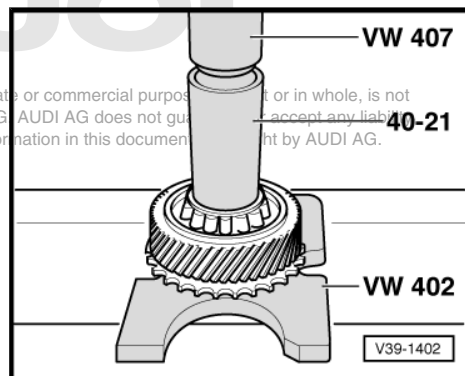
Pressing on tapered roller bearing inner race



Caution

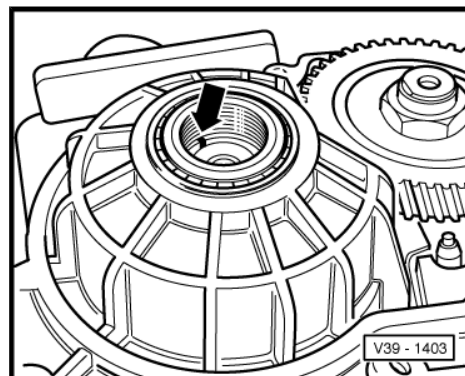
A thrust piece must be placed below the hub of the input gear to avoid damaging the input gear.

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Installing tapered roller bearing inner race

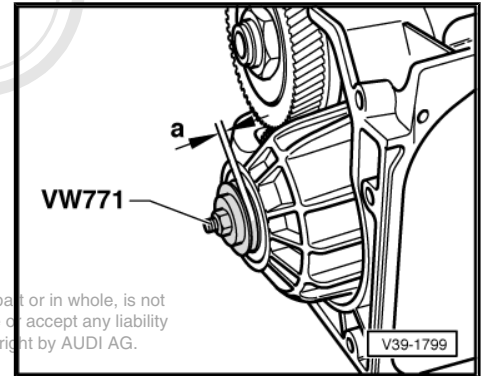
- Apply locking fluid -AMV 185 101 A1- when installing tapered roller bearing inner race -arrow-.



Removing input gear

- Insert socket head fastener (without dished spring, shim and axial needle bearing) far enough to leave a gap between socket head fastener and tapered roller bearing inner race.
- Dimension -a- = 3 mm
- Drive out input gear with multi-purpose tool -VW 771- as far as the stop of the tapered roller bearing inner race.
- Remove multi-purpose tool -VW 771- and take out input gear.

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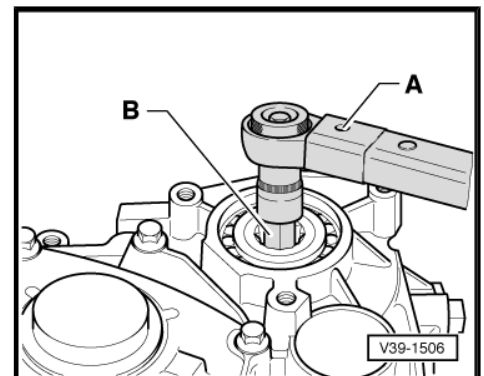


Removing and installing socket head fastener

- Engage parking lock to loosen and tighten.

A - Torque wrench

B - Socket attachment, 22 mm



5 Exploded view - output shaft



Note

- ◆ To remove output shaft, first remove parking lock gear and then selector shaft ➔ [page 143](#).
- ◆ Table of adjustments when renewing individual components of gearbox ➔ [page 186](#).

1 - Output shaft

- ☐ Number of teeth
➔ [page 3](#)
- ☐ Removing ➔ [page 171](#)
- ☐ Paired with final drive gear; renew complete final drive gear set if damaged
- ☐ Adjusting ➔ [page 186](#)

2 - Gearbox housing

3 - Locking bolt

- ☐ Remove bolt before removing or installing bearing support ring -item 13-
- ☐ Insert with sealing compound -AKD 456 000 02-
- ☐ 12 Nm

4 - Hexagon nut

- ☐ Renew
- ☐ Engage parking lock to loosen and tighten.
- ☐ Tightening torque
➔ [page 189](#)
- ☐ Peen collar of hexagon nut using a drift

5 - Output gear

- ☐ Number of teeth
➔ [page 3](#)
- ☐ Pulling off ➔ [page 169](#)
- ☐ If signs of damage exist, always renew input gear and output gear together.

6 - Tapered roller bearing inner race

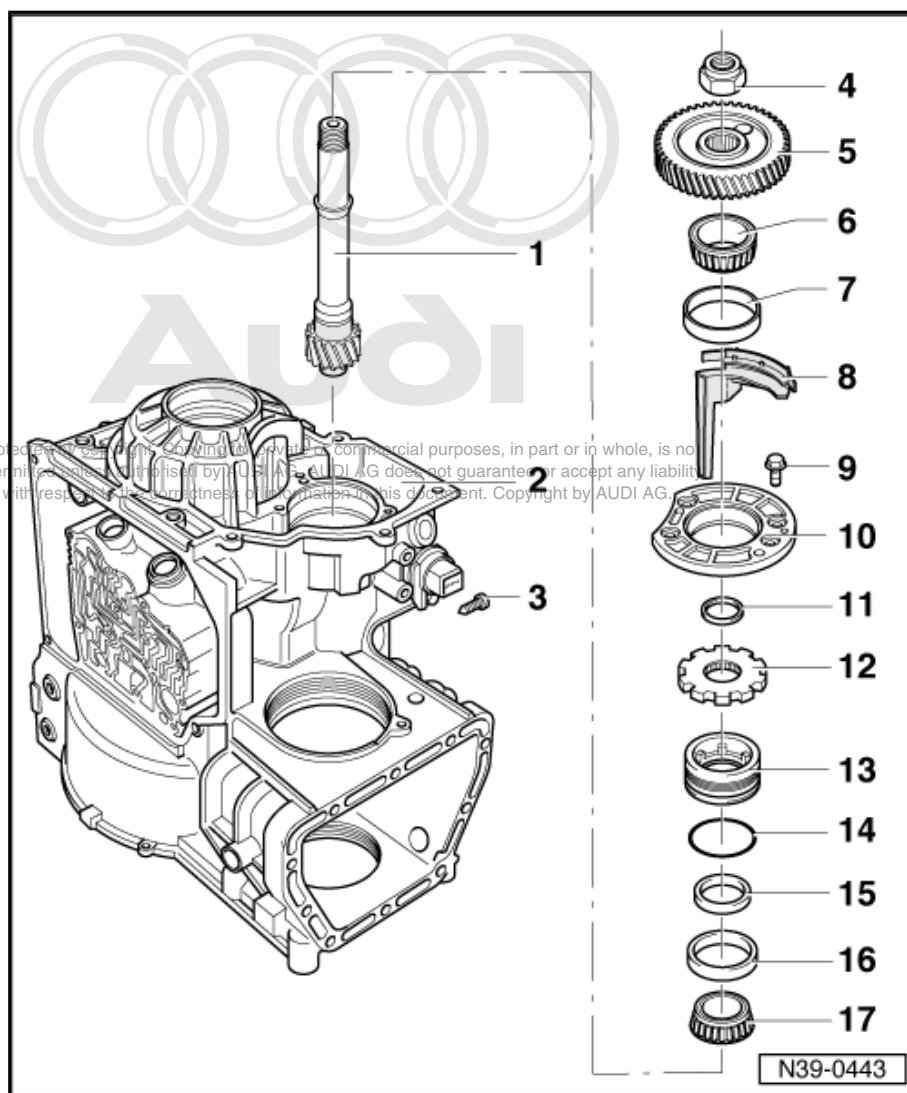
- ☐ Pulling off ➔ [page 170](#)
- ☐ Pressing on ➔ [page 170](#)

7 - Tapered roller bearing outer race

- ☐ Drive out using a copper drift
- ☐ Removing ➔ [page 170](#)
- ☐ Pressing in ➔ [page 170](#)

8 - ATF oil deflector

- ☐ Not fitted on all versions
- ☐ Install together with bearing cover -item 10-



9 - Bolt

- ☐ 25 Nm

10 - Bearing cover

11 - Shim

- ☐ Determining thickness ⇒ [page 186](#)

12 - Parking lock gear

- ☐ Installation position: rounded side faces splines of output shaft

13 - Bearing support ring

- ☐ Remove bolt -item 3- before removing or installing bearing support ring
- ☐ Bearing support ring can only be unscrewed after removing selector shaft ⇒ [page 143](#)
- ☐ Removing and installing ⇒ [page 171](#)
- ☐ Carefully insert bearing support ring; sealing lip and spring of seal must not be damaged.
- ☐ Bearing support ring with seal for output shaft ⇒ [page 171](#)
- ☐ 200 Nm

14 - O-ring

- ☐ Renew
- ☐ Fit onto bearing support ring -item 13-

15 - Oil seal for output shaft

- ☐ Drive out with screwdriver
- ☐ Installation position ⇒ [page 171](#)
- ☐ Driving in ⇒ [page 171](#)

16 - Tapered roller bearing outer race

- ☐ Driving in ⇒ [page 172](#)

17 - Tapered roller bearing inner race

- ☐ Drive out with drift
- ☐ Pressing on ⇒ [page 172](#)

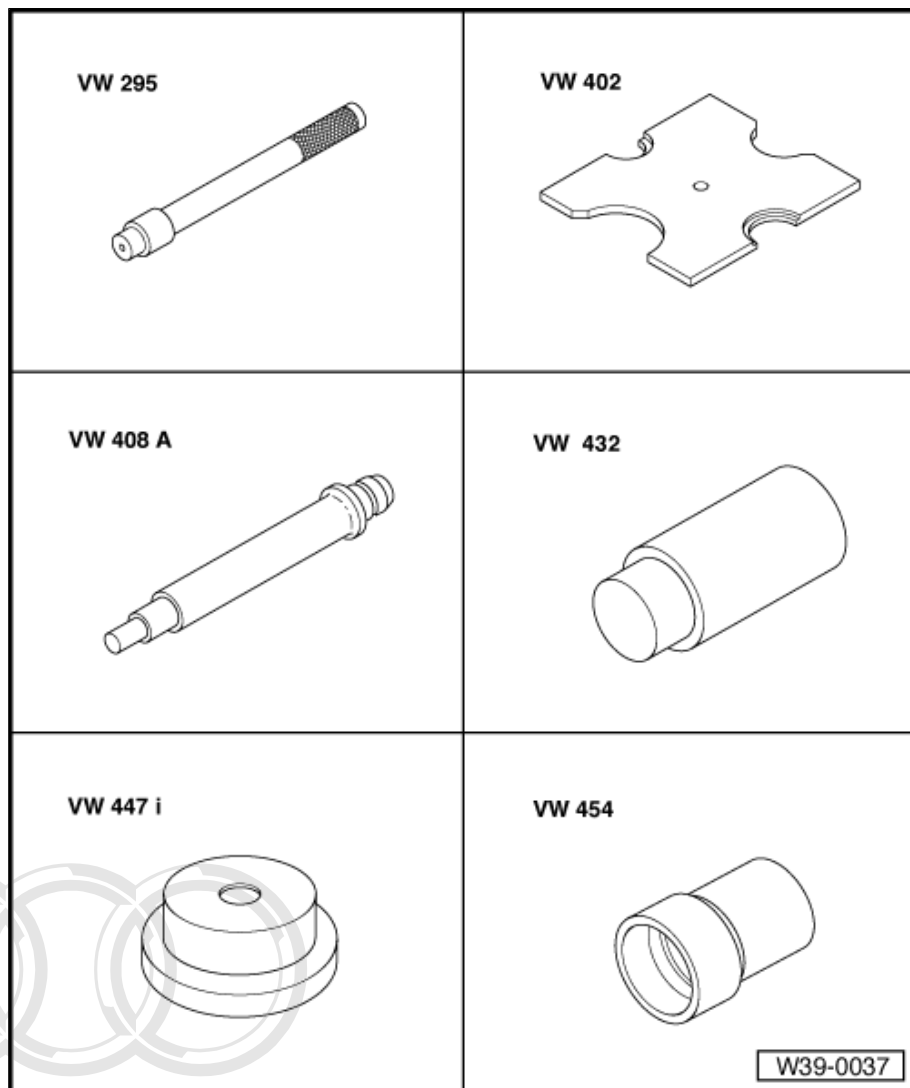


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5.1 Removing and installing output shaft

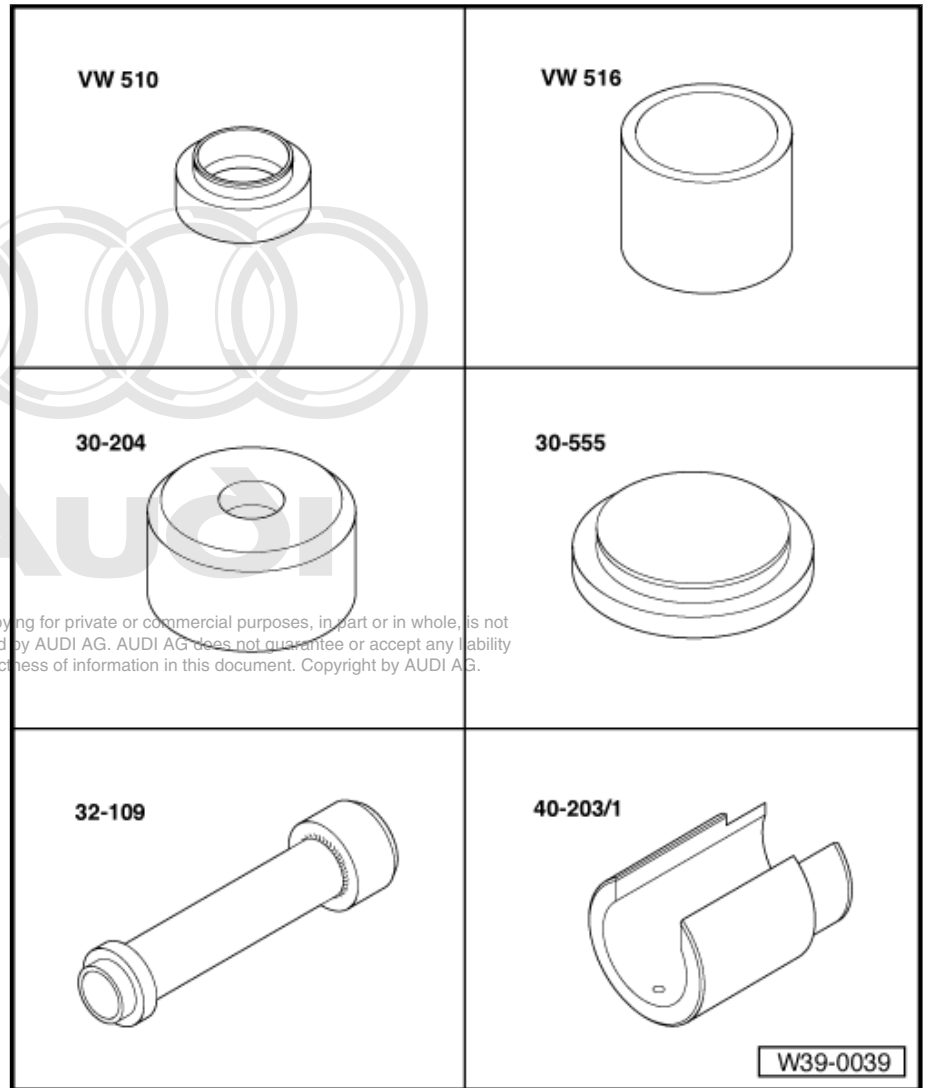
Special tools and workshop equipment required

- ◆ Drift -VW 295-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 432-
- ◆ Thrust plate -VW 447 i-
- ◆ Press tool -VW 454-



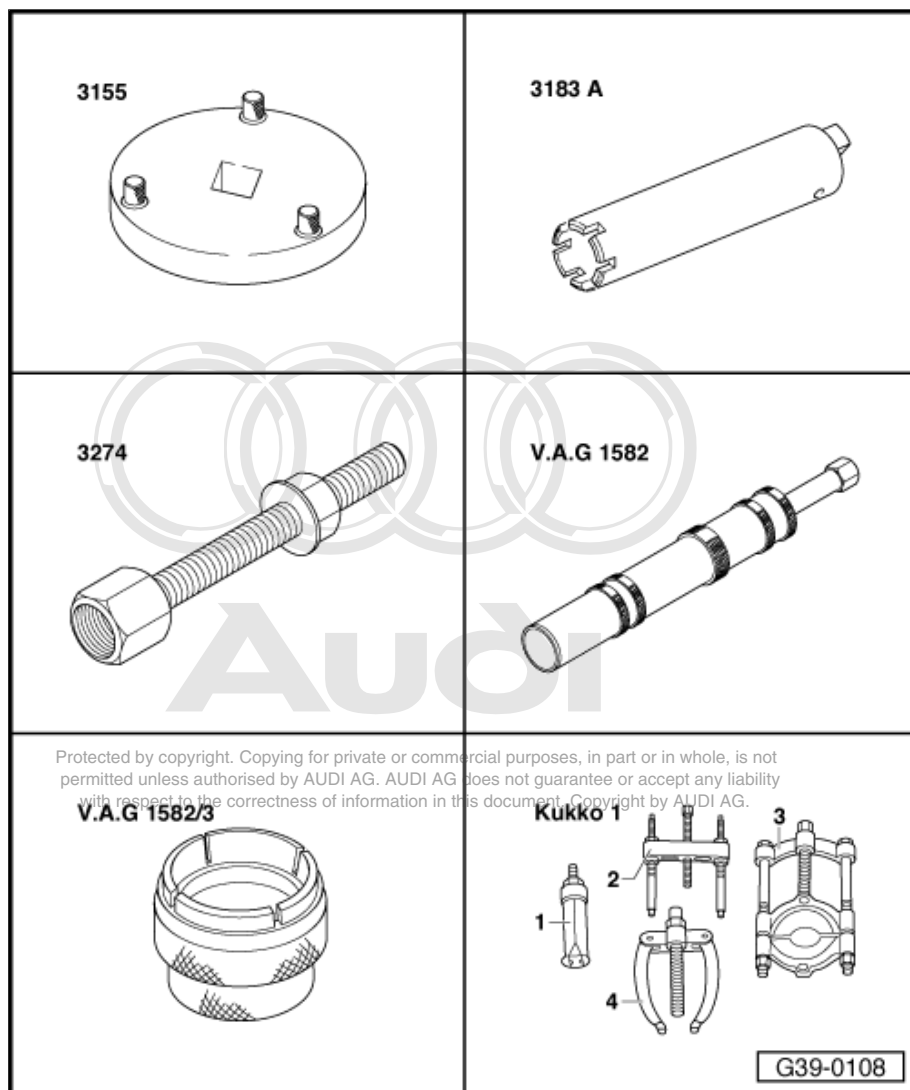

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- ◆ Thrust pad -VW 510-
- ◆ Tube -VW 516-
- ◆ Installing ring -30 - 204-
- ◆ Press tool -30 - 555-
- ◆ Tube -32 - 109-
- ◆ Tube -40 - 203/1-



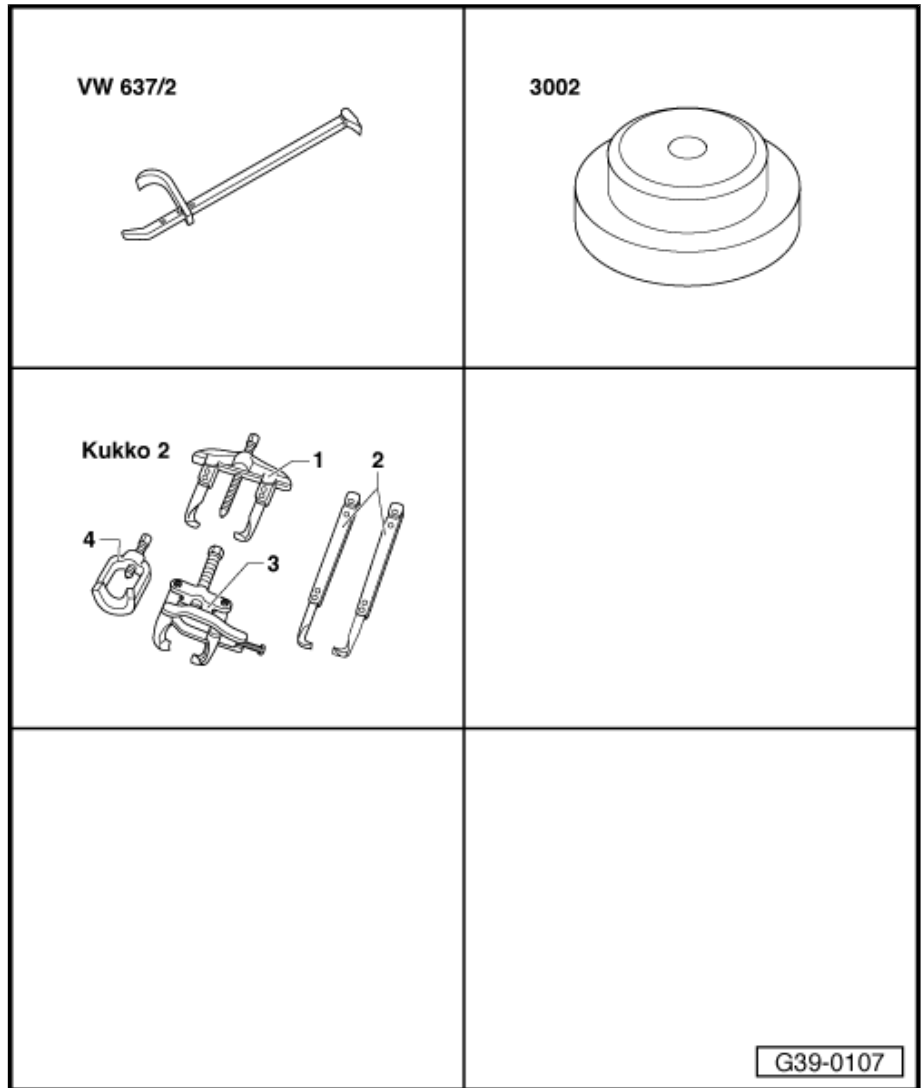
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- ◆ Slotted nut wrench -3155-
- ◆ Castellated box spanner
-3183 A- with guide sleeve
-3183 A/1-
- ◆ Adapter -3274-
- ◆ Tapered roller bearing puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/4-
- ◆ -1- Kukko internal puller
21/7
- ◆ -4- Kukko 22/2 counter-
support



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- ◆ Hub cover puller -VW 637/2-
- ◆ Thrust piece -3002-
- ◆ -1- Puller Kukko 20/10
- ◆ Hook Matra V/172



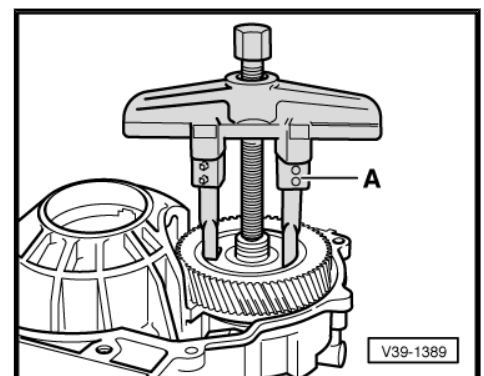
Pulling off output gear

A - Puller Kukko 20/10 and hook Matra V/172



Note

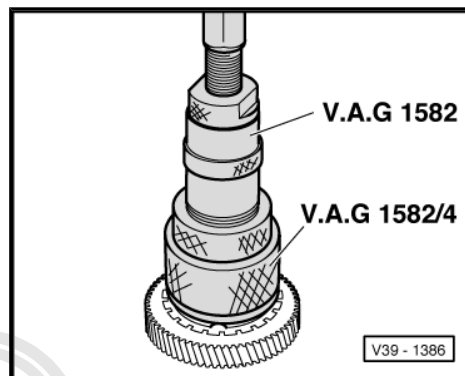
Output gears without drilled-through holes in the hub can be pulled off by hand.



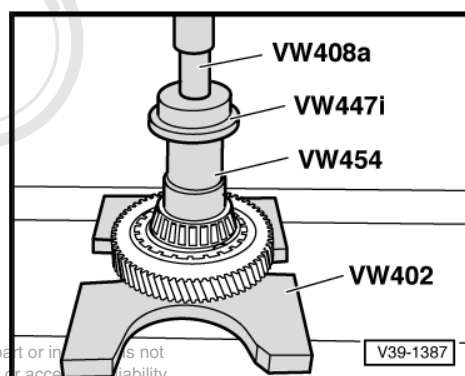
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Pulling off tapered roller bearing inner race

- Position thrust piece -3002- onto flange of output gear.



Pressing on tapered roller bearing inner race



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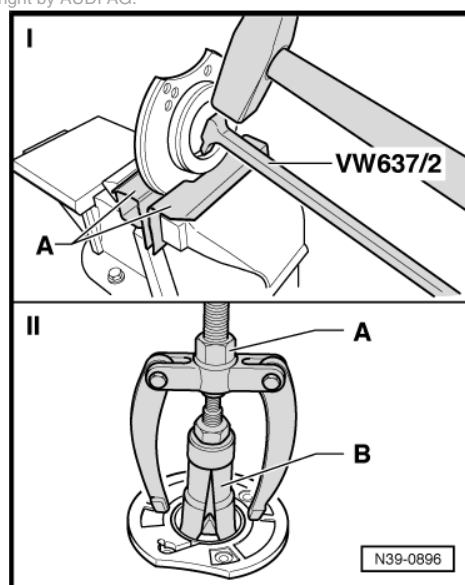
Removing tapered roller bearing outer race

- Secure bearing cover in vice using soft jaws -A-.
- Knock tapered roller bearing outer race slightly out of bearing cover by carefully tapping on alternate sides.
- Pull tapered roller bearing outer race out of bearing cover.

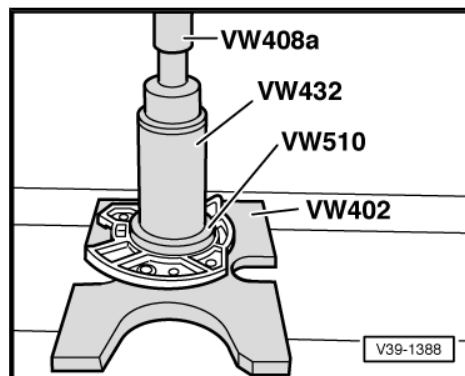
A - Counter-support Kukko 22/2

B - Internal puller 46 ... 58 mm Kukko 21/7

- Check bearing cover for damage.



Pressing in tapered roller bearing outer race



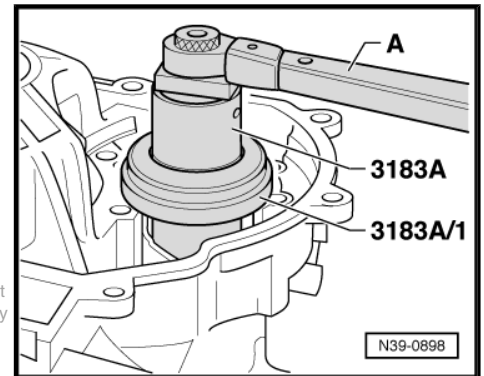
Removing and installing bearing support ring

- Tightening torques ⇒ [page 164](#)
- Remove securing bolt ⇒ [Item 3 \(page 164\)](#) .

A - Torque wrench

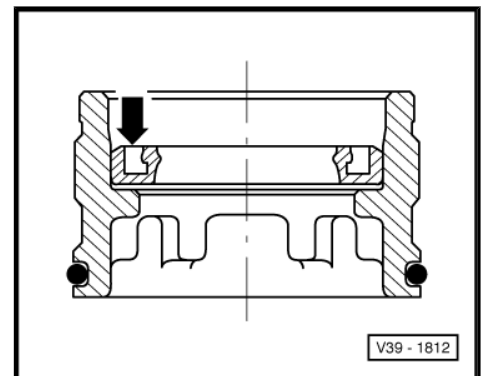
- Tighten bearing support ring. Apply sealing compound -AKD 456 000 02- to securing bolt before fitting and tighten bolt.

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Bearing support ring with seal for output shaft

- Installation position: open end of seal -arrow- faces tapered roller bearing outer race



Driving in seal for output shaft

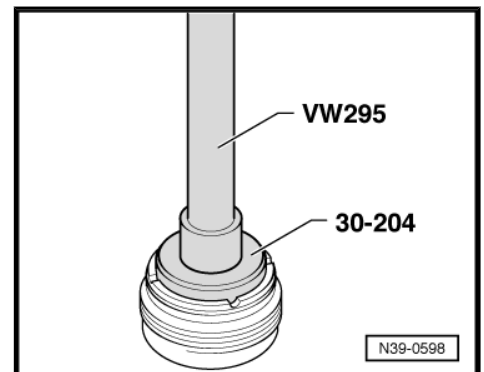
- Carefully install oil seal.
- Installation position: sealing lip points outwards to installing ring -30 - 204- .



Note

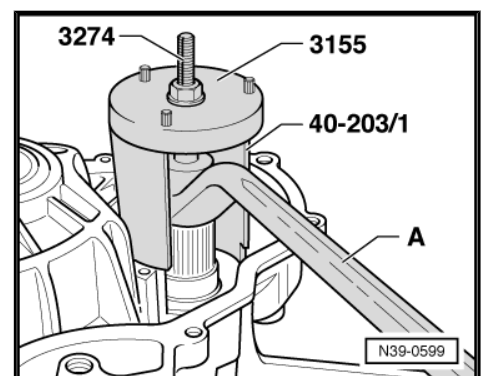
Sealing lip and spring of seal must not be damaged.

- Drive in seal onto stop.



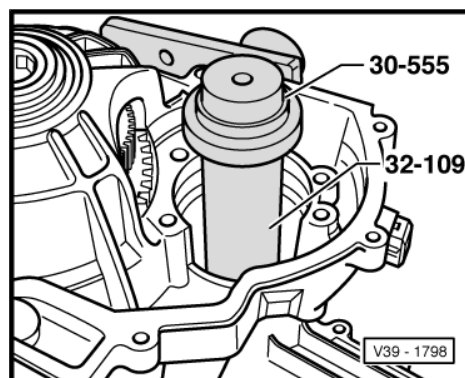
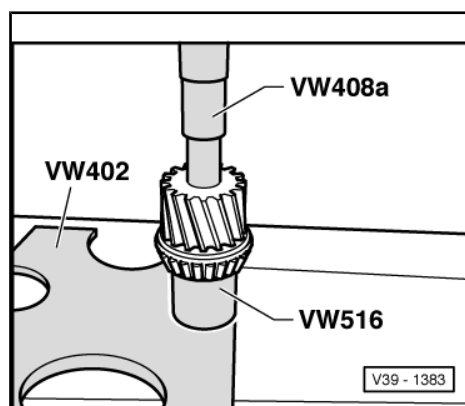
Removing output shaft

A - Open ring spanner, 32 mm



Driving in tapered roller bearing outer race

- Insert output shaft with tapered roller bearing inner race, then drive in outer race.

**Pressing on tapered roller bearing inner race**

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6 Exploded view I - differential



Note

- ◆ If tapered roller bearings are to be re-used, mark the adjuster ring [⇒ page 175](#)
- ◆ The output shaft does not need to be removed when removing and installing the differential.

1 - Gearbox housing

2 - Drive for speedometer sender -G22-

- ☐ With marking for gear oil level [⇒ page 176](#)
- ☐ 10 Nm

3 - Output shaft to flange shaft

- ☐ Remove before removing differential
- ☐ To remove, first remove circlip -item 31-
- ☐ Install only after adjusting differential
- ☐ Installation position: thread faces flange shaft

4 - O-ring

- ☐ Renew

5 - Adjuster ring

- ☐ Removing [⇒ page 175](#)
- ☐ When re-installing used bearings mark original position and set to the same position when installing [⇒ page 175](#)
- ☐ Note adjustment instructions when installing new bearings [⇒ "8.4 Adjusting differential", page 190](#)

6 - Oil seal for flange shaft

- ☐ Can be renewed with gearbox in vehicle [⇒ page 156](#)

7 - Tapered ring

- ☐ Installation position: shoulder faces thrust washer

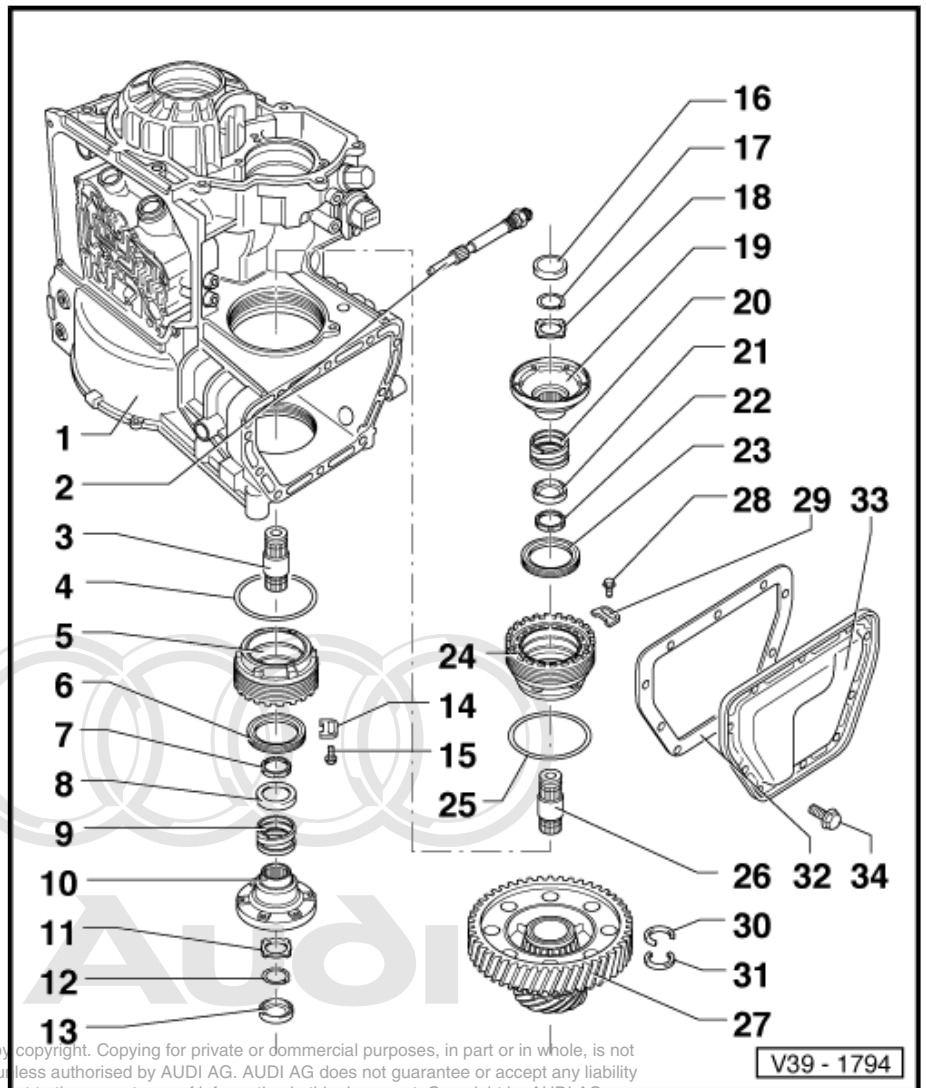
8 - Thrust washer

- ☐ Place above compression spring

9 - Spring

10 - Flange shaft

- ☐ Remove before taking out inner circlip on differential bevel gear
- ☐ Removing and installing [⇒ page 153](#)
- ☐ Fit with tapered ring, thrust washer and compression spring





11 - Dished spring

- ☐ Installation position: convex side must face outwards

12 - Circlip

13 - Cover plate

14 - Retaining clip

15 - Bolt

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

16 - Cover plate

17 - Circlip

18 - Dished spring

- ☐ Installation position: convex side must face outwards

19 - Flange shaft

- ☐ Remove before taking out inner circlip on differential bevel gear
- ☐ Removing and installing ⇒ [page 154](#)
- ☐ Fit with tapered ring, thrust washer and compression spring

20 - Spring

21 - Thrust washer

- ☐ Place above compression spring

22 - Tapered ring

- ☐ Installation position: shoulder faces thrust washer

23 - Flange shaft oil seal

- ☐ Can be renewed with gearbox in vehicle ⇒ [page 150](#)

24 - Bearing body

- ☐ Remove with slotted nut wrench -3155-
- ☐ Note adjustment instructions when installing new bearings ⇒ ["8.4 Adjusting differential", page 190](#)
- ☐ Installing ⇒ [page 176](#)
- ☐ 150 Nm

25 - O-ring

- ☐ Renew

26 - Output shaft to flange shaft

- ☐ Remove before removing differential
 - ☐ To remove, first remove circlip -item 30-
 - ☐ Install only after adjusting differential
 - ☐ Installation position: thread faces flange shaft
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27 - Differential

- ☐ Before removing differential, take out bearing body, adjuster ring and output shafts
- ☐ Dismantling and assembling ⇒ [page 179](#)

28 - Bolt

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

29 - Retaining clip

- ☐ After adjusting tapered roller bearings, secure bearing body -item 24- and adjuster ring -item 5-.

30 - Circlip

- ☐ Do not remove until after removal of flange shaft, as compression spring -item 20- is preloaded
- ☐ Removing and installing ⇒ [page 176](#)

31 - Circlip

- ☐ Do not remove until after removal of flange shaft, as compression spring -item 9- is preloaded
- ☐ Removing and installing ⇒ [page 176](#)

32 - Gasket

- ☐ Renew

33 - Cover

- ☐ For differential

34 - Bolt

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



Note

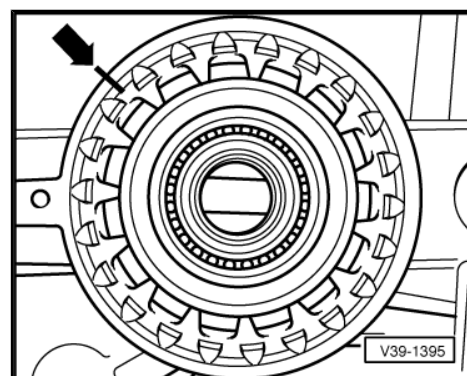
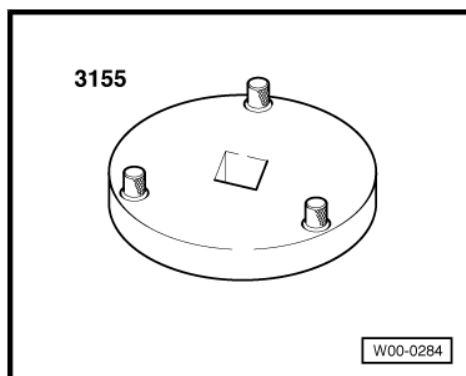
After adjusting tapered roller bearings, secure bearing body and adjuster ring.

- ☐ 28 Nm

6.1 Removing and installing differential

Special tools and workshop equipment required

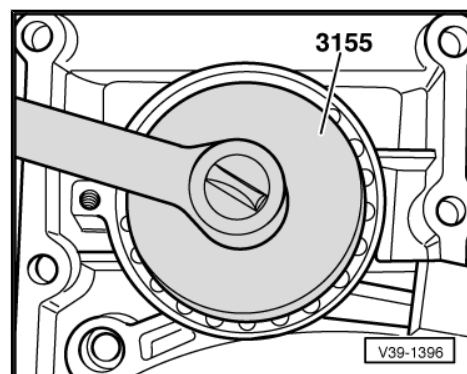
- ◆ Slotted nut wrench -3155-



Marking adjuster ring

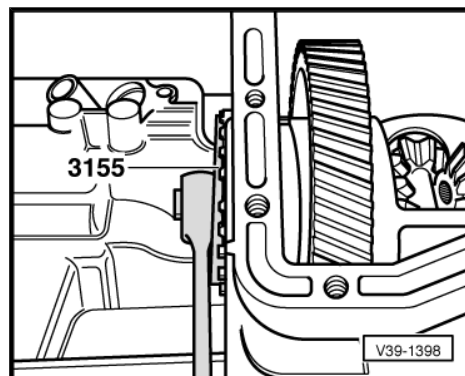
- When reinstalling used bearings, mark original position -arrow- and set to the same position when installing.

Removing adjuster ring



Installing bearing body

- Insert differential and screw in bearing body as far as stop.



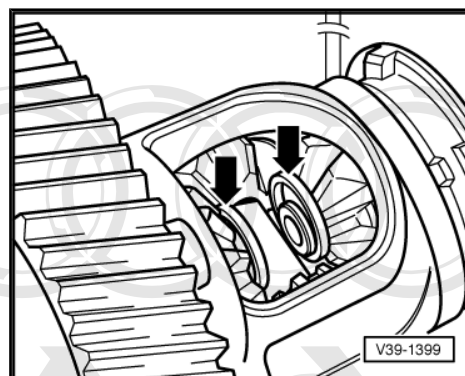
Removing and installing circlip

- Use 2 screwdrivers to remove or install circlip -arrow-.



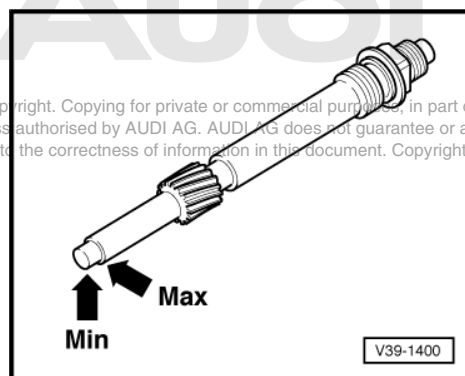
WARNING

Do not remove circlip until after pulling off drive flange, as compression spring is preloaded.



Drive for speedometer sender -G22-

- Checking oil level in final drive ➔ [page 149](#) .



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7 Exploded view II - differential

Note

- ◆ Heat tapered roller bearing inner race to approx. 100°C before pressing on.
- ◆ Heat adjuster ring for tapered roller bearing to approx. 100 °C before pressing in tapered roller bearing outer race.

1 - Differential cage

- ☐ Final drive gear is riveted onto differential cage and then machined
- ☐ If the differential or the final drive gear is damaged, the differential cage must be renewed together with the riveted final drive gear
- ☐ Number of teeth of final drive gear ➔ [page 3](#)

2 - Output shaft to flange shaft

- ☐ Removing and installing ➔ [page 173](#)

3 - Tapered roller bearing inner race

- ☐ There are tapered roller bearings of different sizes. The installation position can vary
- ☐ Pulling off ➔ [page 181](#) and ➔ [page 182](#)
- ☐ Pressing on ➔ [page 182](#) (if the size of the bearings is the same on both sides)
- ☐ Pressing on ➔ [page 182](#)

4 - Tapered roller bearing outer race

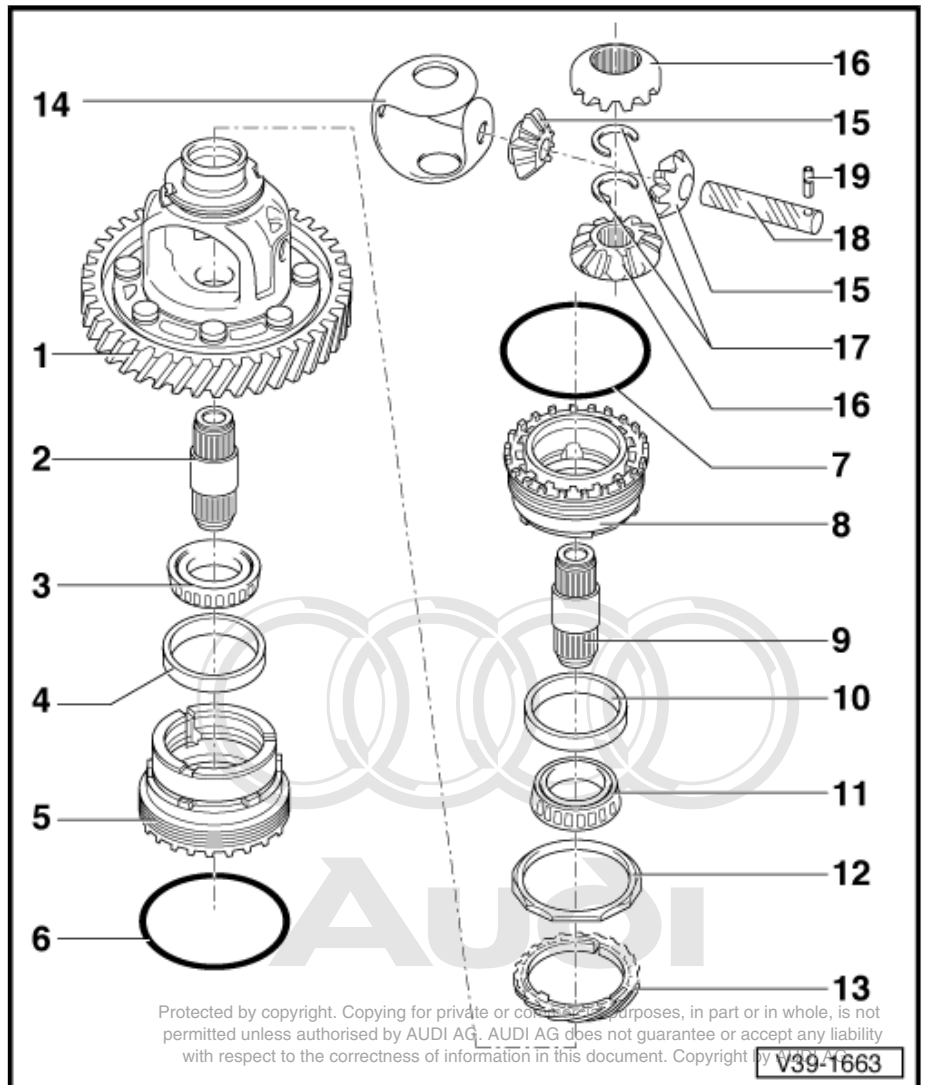
- ☐ Always heat adjuster ring when removing and installing
- ☐ Drive out with drift
- ☐ Pressing in ➔ [page 183](#)

5 - Bearing body for tapered roller bearing

- ☐ There are various types of bearing bodies.
- ☐ Removing and installing ➔ ["6 Exploded view I - differential", page 173](#)
- ☐ Pulling off tapered roller bearing inner race ➔ [page 183](#)
- ☐ Pressing on tapered roller bearing outer race ➔ [page 183](#)
- ☐ Pressing on tapered roller bearing inner race ➔ [page 184](#)

6 - O-ring

- ☐ Renew



7 - O-ring

- ☐ Renew

8 - Adjuster ring for tapered roller bearing

- ☐ Removing and installing ⇒ [“6 Exploded view I - differential”, page 173](#)

9 - Output shaft to flange shaft

- ☐ Removing and installing ⇒ [“6 Exploded view I - differential”, page 173](#)

10 - Tapered roller bearing outer race

- ☐ Always heat adjuster ring when removing and installing
- ☐ Drive out with drift
- ☐ Pressing in ⇒ [page 183](#)

11 - Tapered roller bearing inner race

- ☐ Remove -item 12- and -item 13- before pulling off
- ☐ Pulling off ⇒ [page 181](#) (if the size of the bearings is the same on both sides)
- ☐ Pressing on ⇒ [page 182](#)

12 - Driver bush

- ☐ Drive off together with drive wheel for speedometer sender -item 13-
- ☐ Drive on with drift

13 - Drive wheel for speedometer sender -G22-

- ☐ Drive out with drift
- ☐ Fit with driver bush -item 12-

14 - One-piece thrust washer

- ☐ Place into differential cage before inserting bevel gears

15 - Planet pinions

- ☐ Fitting ⇒ [page 182](#)

16 - Sun wheels

- ☐ Fitting ⇒ [page 182](#)

17 - Circlip

- ☐ Do not remove circlip until flange shaft has been pulled off, as compression spring is preloaded.

18 - Differential pinion pin

- ☐ To remove, pull out spring pin ⇒ [page 184](#)
- ☐ Drive out with drift
- ☐ When driving in, do not damage one-piece thrust washer

19 - Spring pin

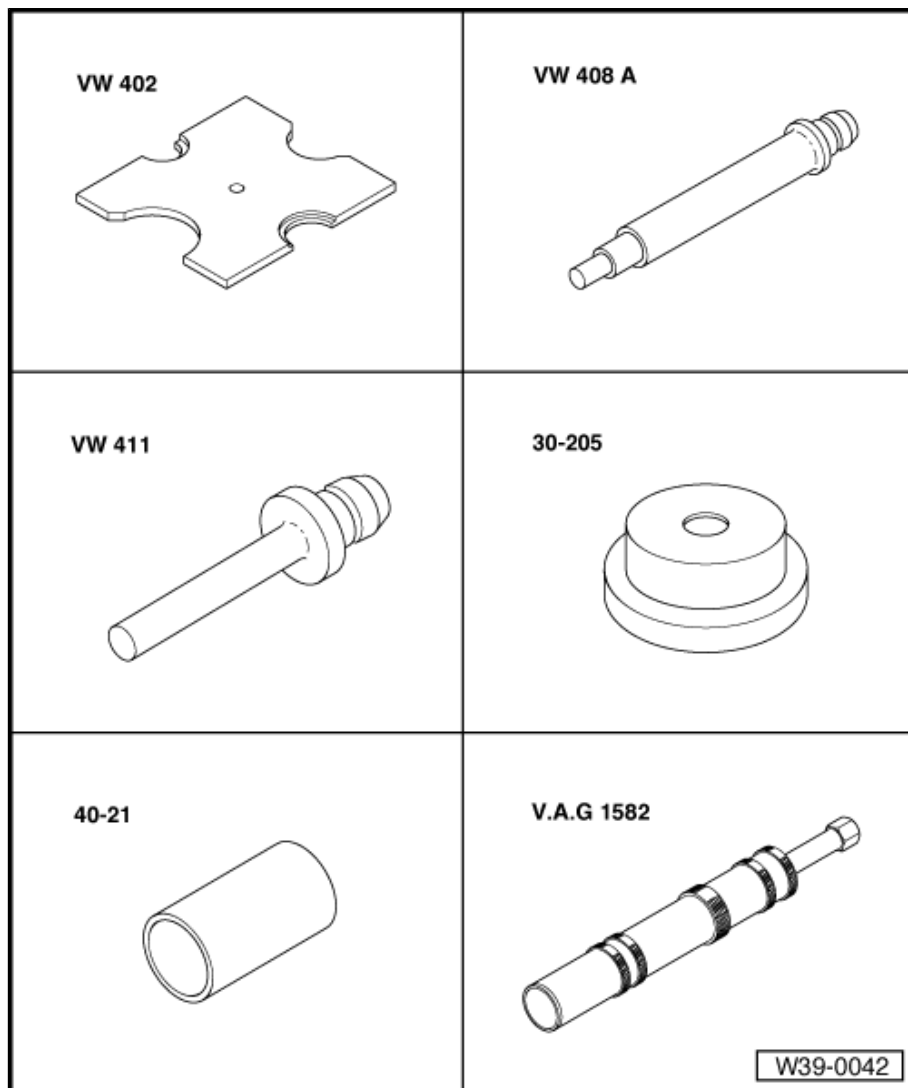
- ☐ Renew
- ☐ For securing differential pinion pin
- ☐ Removing and installing ⇒ [page 184](#)

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7.1 Dismantling and assembling differential

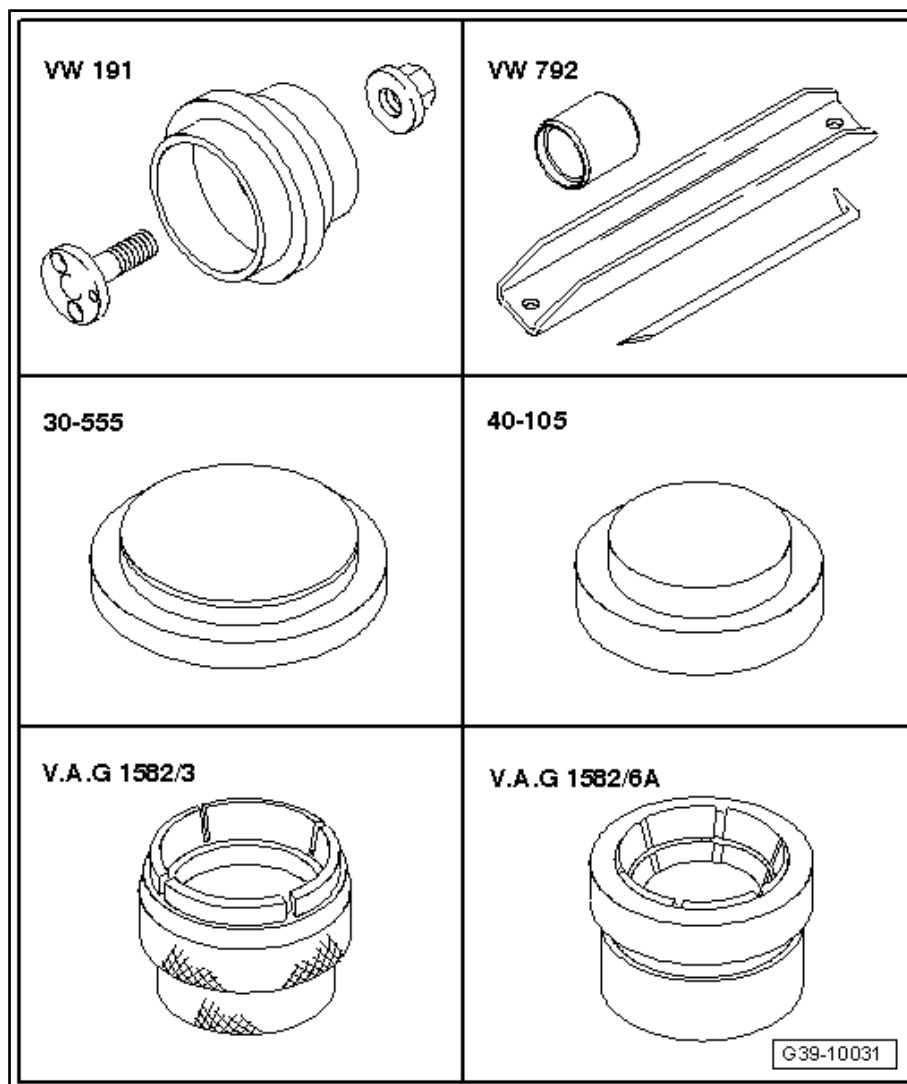
Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 411-
- ◆ Thrust plate -30 - 205-
- ◆ Press tool -40 - 21-
- ◆ Tapered roller bearing puller -V.A.G 1582-



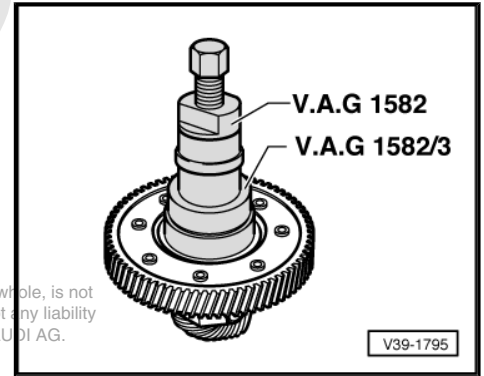
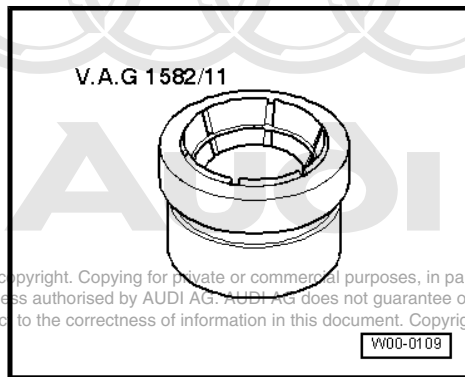
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- ◆ Crankshaft seal installing tool -VW 191-
- ◆ Assembly device -VW 792-
- ◆ Press tool -30 - 555-
- ◆ Thrust plate -40 - 105-
- ◆ Adapter -V.A.G 1582/3-
- ◆ Adapter -V.A.G 1582/6A-

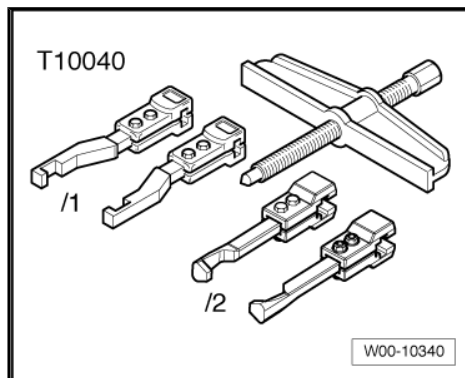


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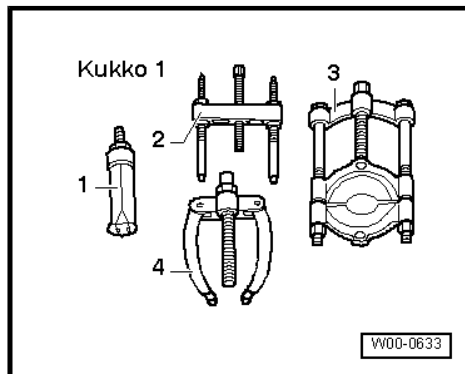
- ◆ Adapter -V.A.G 1582/11-



- ◆ Two-arm puller - T10040-



- ◆ -1- Internal puller 46 ... 58 mm Kukko 21/7



- ◆ -4- Kukko 22/2 counter-support

Pulling off tapered roller bearing inner race

- Place press tool -30 - 555- or thrust plate -40 - 105- on differential cage.
- If larger type of bearing is fitted, use adapter -V.A.G 1582/6A- .

Pressing on tapered roller bearing inner race



WARNING

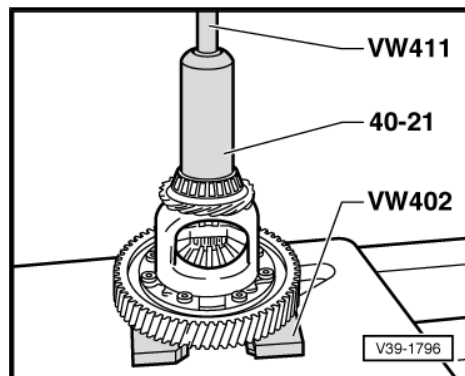
Wear protective gloves.

- Heat tapered roller bearing inner race to approx. 100°C before pressing on.

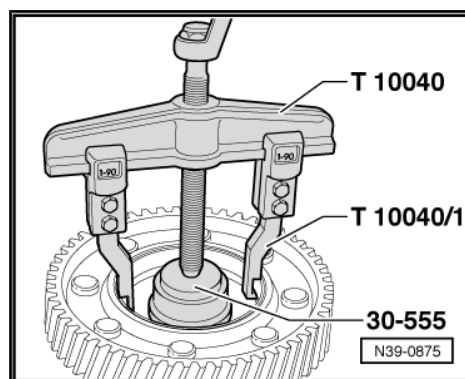


Note

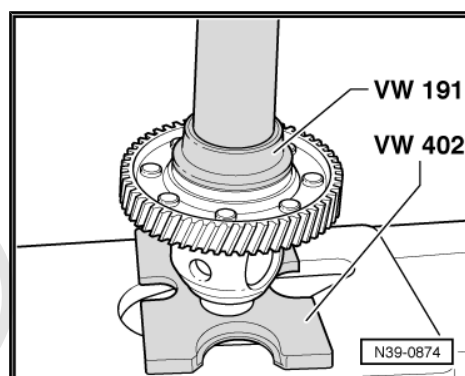
Pressing on inner race on the other side is identical.



Pulling out tapered roller bearing outer race



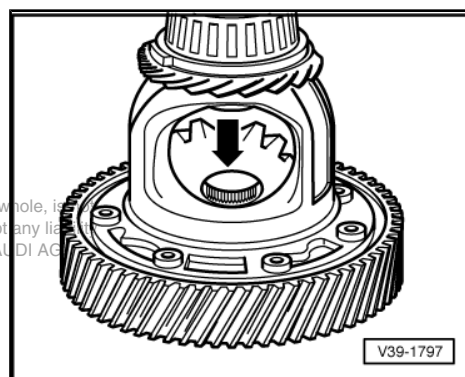
Pressing in tapered roller bearing outer race



Installing bevel gears

- Lubricate one-piece thrust washer with gear oil and install.
- Insert planet pinions, drive in differential pinion pin and secure with spring pin.
- Insert sun wheels (spaced 180° apart) and pivot into position -arrow-.

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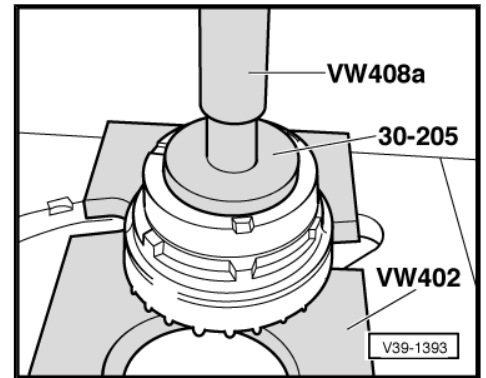
Pressing in tapered roller bearing outer race



WARNING

Wear protective gloves.

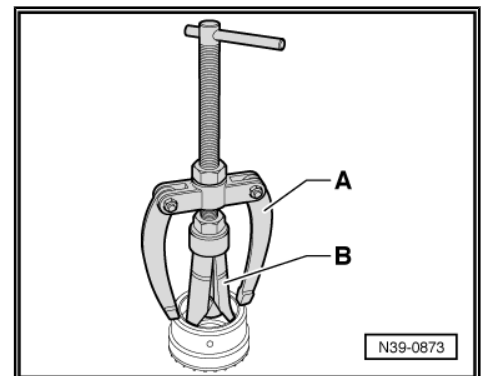
- Heat adjuster ring for tapered roller bearing to approx. 100 °C before pressing in tapered roller bearing outer race.
- With adjuster ring or bearing body heated, insert outer race and press home as far as the stop.



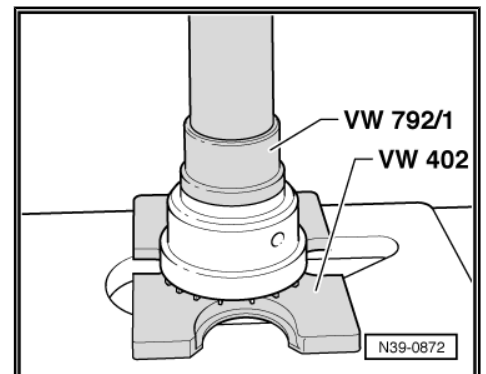
Pulling out tapered roller bearing outer race

A - Counter-support Kukko 22/2

B - Internal puller 46 ... 58 mm Kukko 21/7

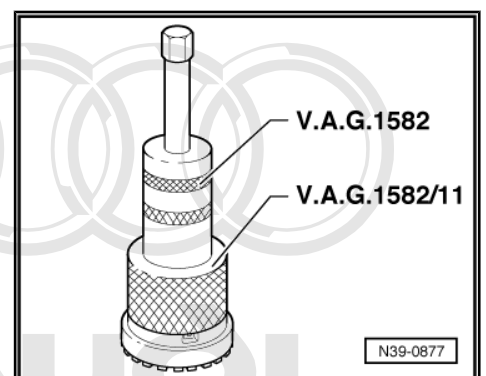


Pressing in tapered roller bearing outer race



Pulling off tapered roller bearing inner race

- Place thrust piece -VW 433- on bearing body.

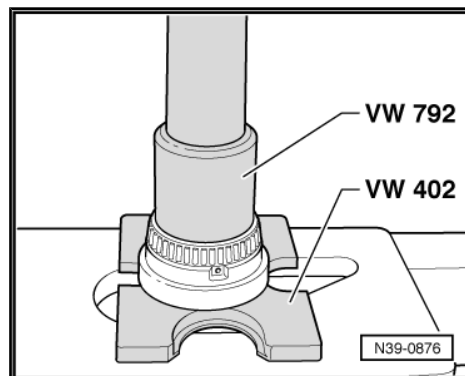


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Pressing on tapered roller bearing inner race**WARNING**

Wear protective gloves.

- Heat tapered roller bearing inner race to approx. 100°C before pressing on.

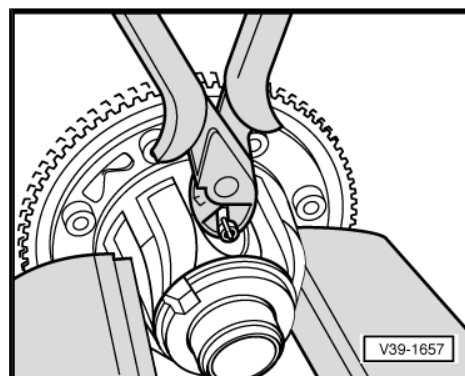
**Removing and installing spring pin for differential pinion pin****Removing**

- Pull out spring pin with side-cutting pliers.

Installing**Note**

Renew spring pin.

- Length of spring pin 28.5 mm
- Drive in spring pin as far as the stop.



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8 Overview - adjusting final drive

Note

- ◆ Refer to the following table to avoid unnecessary adjustment work ➔ [page 186](#).
- ◆ Lubricate all bearings with gear oil or ATF before installing (according to which lubricant the bearing runs in).
- ◆ Do not interchange inner or outer races of bearings of the same size.
- ◆ Check shims for burrs and damage. Install only shims which are in perfect condition.
- ◆ Use a micrometer to measure the shims at several points.

1 - Input gear

- ☐ Adjusting ➔ [page 189](#)
- ☐ Only renew together with output gear

2 - Output shaft

- ☐ Adjusting ➔ [page 186](#)

3 - Differential

- ☐ Adjusting ➔ [page 190](#)

4 - Shim for input gear

- ☐ Determine thickness according to table ➔ [page 188](#)

5 - Shim for output shaft

- ☐ Determine thickness according to table ➔ [page 188](#)

6 - Adjuster ring for differential

7 - Tapered roller bearings for input gear

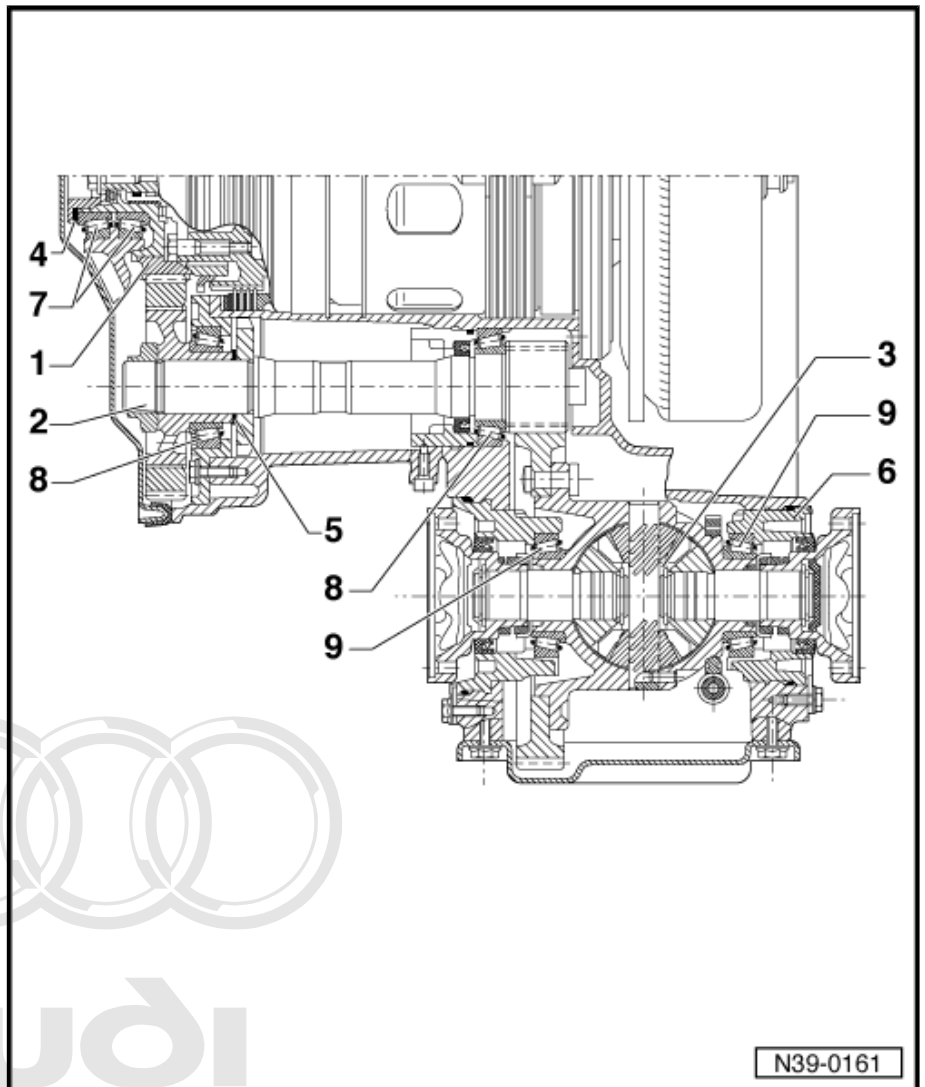
- ☐ Renew together
- ☐ Re-determine shim when renewing tapered roller bearings
- ☐ Adjusting ➔ [page 189](#)

8 - Tapered roller bearings for output shaft

- ☐ Renew together
- ☐ Re-determine shim when renewing tapered roller bearings
- ☐ Adjusting ➔ [page 186](#)

9 - Tapered roller bearings for differential

- ☐ Renew together
- ☐ Adjusting ➔ [page 190](#)



8.1 Table of adjustments



Note

If repairs have been carried out on the gearbox, it is only necessary to adjust the input gear, output shaft with output gear or differential cage if components have been renewed which have a direct effect on the adjustment of the final drive. Refer to the following table to avoid unnecessary adjustment work:

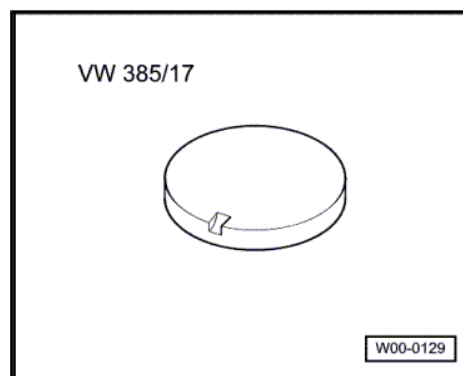
Components renewed:	Adjustment		
	Differential cage ⇒ page 190	Adjusting input gear ¹⁾ ⇒ page 189	Adjusting output shaft with output gear ¹⁾ ⇒ page 186
Gearbox housing	X	X	X
Input gear ¹⁾		X	X
Tapered roller bearings for input gear		X	
Output gear ¹⁾		X	X
Output shaft			X
Tapered roller bearings for output shaft			X
Differential cage with final drive gear	X		
Tapered roller bearings for differential, bearing body or adjuster ring	X		
Bearing support ring, parking lock gear or bearing cover			X

• ¹⁾ Always renew input gear and output gear together.

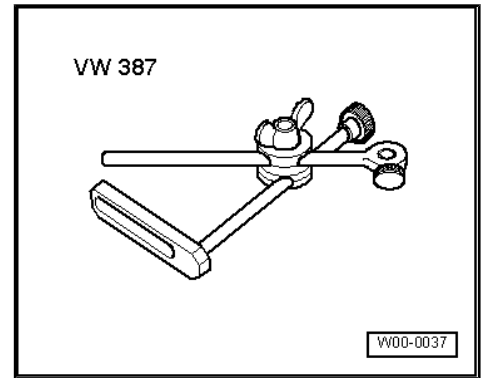
8.2 Adjusting output shaft

Special tools and workshop equipment required

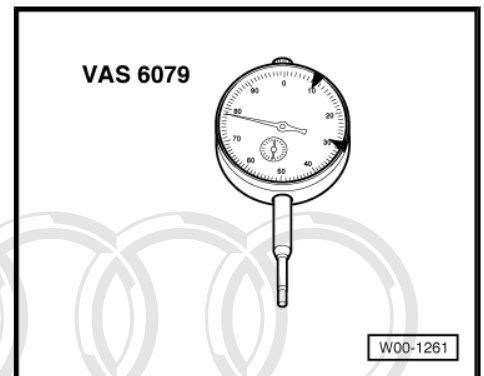
- ♦ Measuring plate -VW 385/17-



◆ Universal dial gauge bracket -VW 387-

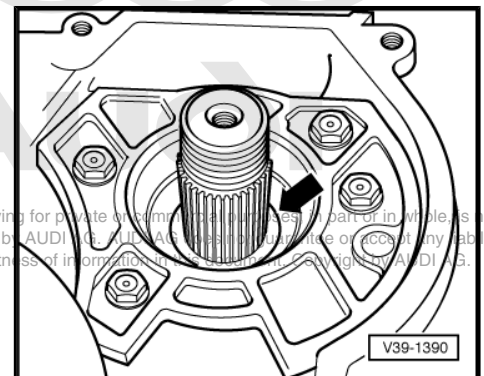


◆ Dial gauge -VAS 6079-



Procedure

- Support ring for output shaft bearing is installed and secured.
- Parking lock mechanism and parking lock gear are installed.
- Fit two shims (each 1.5 mm thick) -arrow- on output shaft.
- Fit output gear with tapered roller bearing on output shaft and tighten hexagon nut (41 mm) to 250 Nm; engage parking lock when performing this step.



- Set up measuring tool as shown in illustration. Set dial gauge -VAS 6079- item A- to "0" with 1 mm preload.
- Move output shaft up and down. Read off play on dial gauge and note reading.



Note

When taking measurements, do not turn the output shaft as the bearings will otherwise settle and falsify the measurement results.

- Measurement in following example: 0.93 mm.

Determining thickness of shim

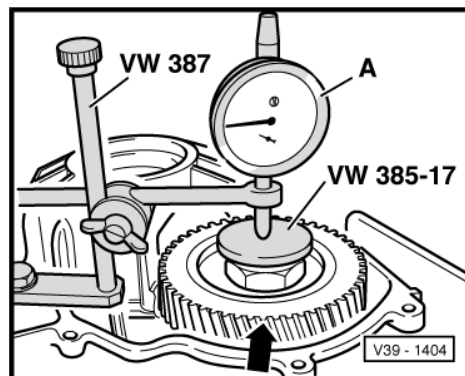
The specified bearing preload is obtained as follows:

Inserted shims – measured value – bearing preload (0.12 mm)
– settling allowance (0.10 mm)

- Example:

Inserted shims	3.00 mm
– Measured value	– 0.93 mm
– Bearing preload	– 0.12 mm
– Settling allowance	– 0.10 mm
= Thickness of shim	1.85 mm

- Detach output gear
- Determine shim(s) according to following table: for part numbers refer to ⇒ Electronic parts catalogue :



Measured value in mm	Shim	Measured value in mm	Shim	Measured value in mm	Shim
0.975 ... 0.999	1.000	1.550 ... 1.574	1.575	2.125 ... 2.149	2.150
1.000 ... 1.024	1.025	1.575 ... 1.599	1.600	2.150 ... 2.174	2.175
1.025 ... 1.049	1.050	1.600 ... 1.624	1.625	2.175 ... 2.199	2.200
1.050 ... 1.074	1.075	1.625 ... 1.649	1.650	2.200 ... 2.224	2.225
1.075 ... 1.099	1.100	1.650 ... 1.674	1.675	2.225 ... 2.249	2.250
1.100 ... 1.124	1.125	1.675 ... 1.699	1.700	2.250 ... 2.274	2.275
1.125 ... 1.149	1.150	1.700 ... 1.724	1.725	2.275 ... 2.299	2.300
1.150 ... 1.174	1.175	1.725 ... 1.749	1.750	2.300 ... 2.324	2.325
1.175 ... 1.199	1.200	1.750 ... 1.774	1.775	2.325 ... 2.349	2.350
1.200 ... 1.224	1.225	1.775 ... 1.799	1.800	2.350 ... 2.374	2.375
1.225 ... 1.249	1.250	1.800 ... 1.824	1.825	2.375 ... 2.399	2.400
1.250 ... 1.274	1.275	1.825 ... 1.849	1.850	2.400 ... 2.424	2.425
1.275 ... 1.299	1.300	1.850 ... 1.874	1.875	2.425 ... 2.449	2.450
1.300 ... 1.324	1.325	1.875 ... 1.899	1.900	2.450 ... 2.474	2.475
1.325 ... 1.349	1.350	1.900 ... 1.924	1.925	2.475 ... 2.499	2.500
1.350 ... 1.374	1.375	1.925 ... 1.949	1.950	2.500 ... 2.524	2.525
1.375 ... 1.399	1.400	1.950 ... 1.974	1.975	2.525 ... 2.549	2.550
1.400 ... 1.424	1.425	1.975 ... 1.999	2.000	2.550 ... 2.574	2.575
1.425 ... 1.449	1.450	2.000 ... 2.024	2.025	2.575 ... 2.599	2.600
1.450 ... 1.474	1.475	2.025 ... 2.049	2.050	2.600 ... 2.624	2.625
1.475 ... 1.499	1.500	2.050 ... 2.074	2.075	2.625 ... 2.649	2.650
1.500 ... 1.524	1.525	2.075 ... 2.099	2.100	2.650 ... 2.674	2.675

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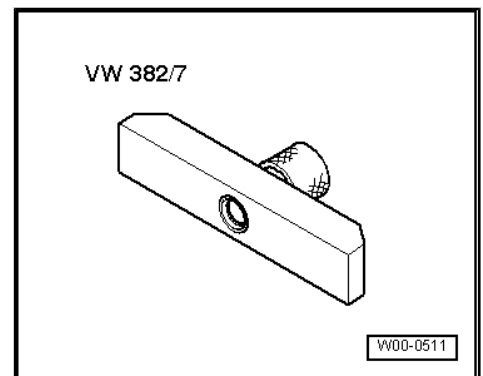
Measured value in mm	Shim	Measured value in mm	Shim	Measured value in mm	Shim
1.525 ... 1.549	1.550	2.100 ... 2.124	2.125	2.675 ... 2.700	2.700

- Fit shim on output shaft.
- Reinstall output gear, tighten hexagon nut to 250 Nm and secure nut by peening collar of nut using a drift.

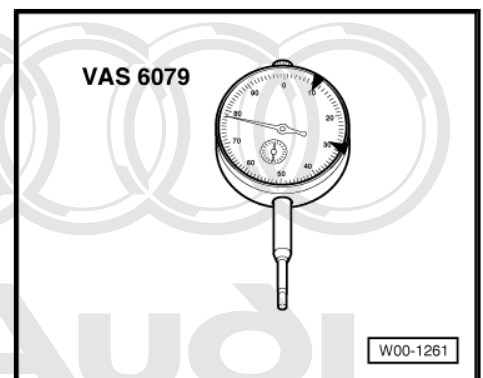
8.3 Adjusting input gear

Special tools and workshop equipment required

- ◆ Measuring tool -VW 382/7-



- ◆ Dial gauge -VAS 6079-



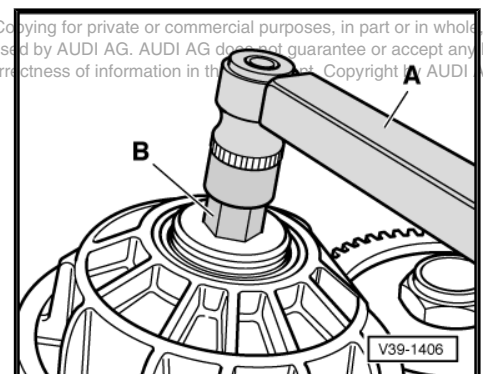
Procedure

- Engage parking lock.
- Tighten socket head fastener to 100 Nm without dished spring and without shim.

A - Torque wrench

B - Socket attachment, 22 mm

- Remove socket head fastener.



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- Set up measuring tool as shown in illustration. Preload dial gauge to 3 mm and set to “0”.
- Measure distance between input gear and tapered roller bearing inner race, and note dial gauge reading.
- Measurement in following example: 1.00 mm.

Determining thickness of shim(s)

The specified bearing preload is obtained as follows:

Dished spring (1.50 mm) + measured value – bearing preload (0.18 mm)

- Example:

Dished spring	1.50 mm
+ Measured value	+ 1.00 mm
– Bearing preload	– 0.18 mm
= Thickness of shim	2.32 mm

- Select correct shim according to table and fit onto input shaft.
Table of shims ⇒ [page 188](#).



Note

*Fit axial needle bearing for input shaft before tightening socket head fastener. Installation position
⇒ “4 Exploded view- input gear”, page 159.*

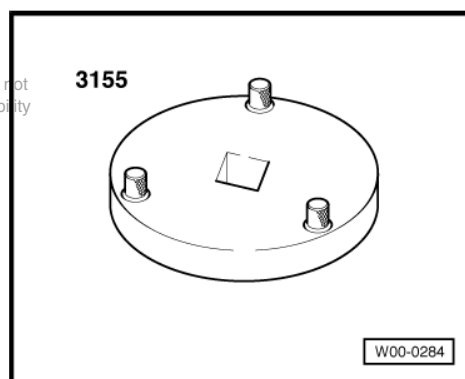
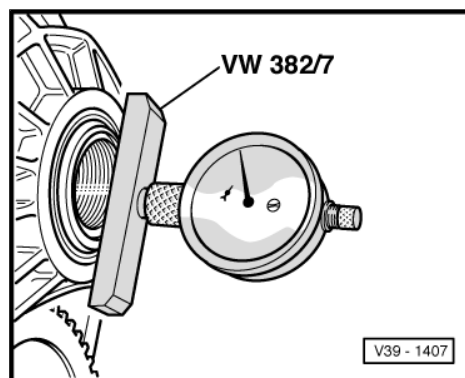
- Insert axial needle bearing and tighten socket head fastener including dished spring to 250 Nm.

8.4 Adjusting differential

Special tools and workshop equipment required

- ♦ Slotted nut wrench -3155-

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Procedure

- Tighten bearing body with slotted nut wrench -3155- to 150 Nm as far as the stop and secure.
- Tighten adjuster ring to 50 Nm and mark.

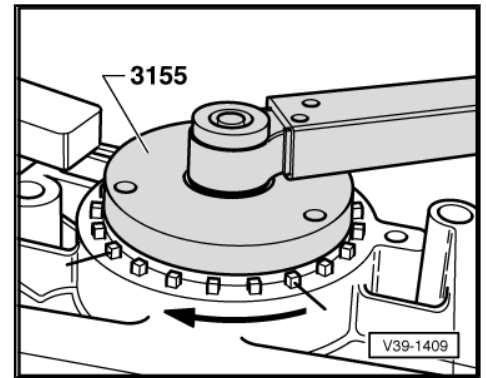


Note

When performing measurements, do not turn differential as bearings will otherwise settle and falsify measurement results.

- Turn adjuster ring further by five locking lugs -arrow- and secure.

This sets the preload of the tapered roller bearings.



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