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Workshop Manual Audi A8 1994 ►

Automatic gearbox 01L, four-wheel drive

Edition 12.2010

Audi

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List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 32 - Torque converter
- 37 - Controls, housing
- 38 - Gears, control
- 39 - Final drive - rear differential
- 39 - Final drive - front 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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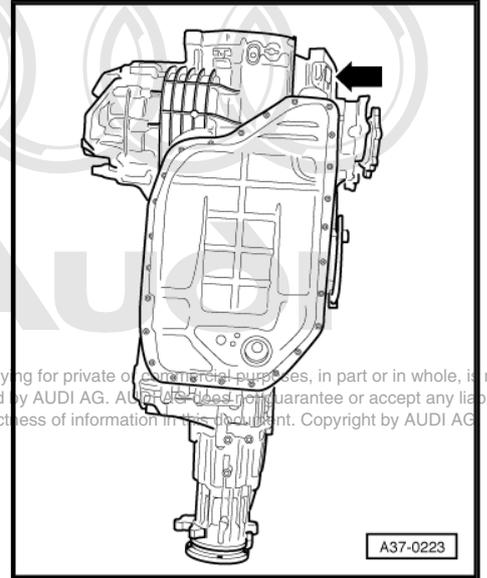
00 – Technical data

1 Gearbox identification

The 5-speed automatic gearbox 01L is installed in conjunction with 8-cylinder and 12-cylinder engines in the Audi A8 1994 ▶. Allocation ⇒ [page 2](#).

Location on gearbox

The identification plate -arrow- is located in front of the ATF oil pan on the side of the gearbox (at the bottom).

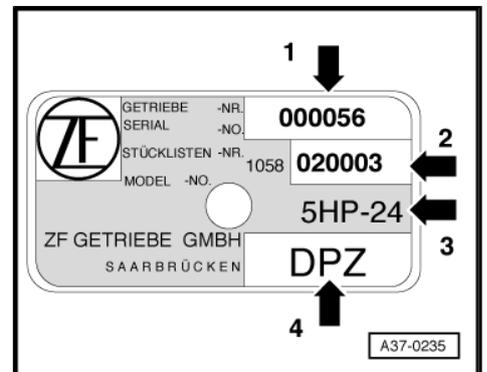


Identification plate

- 1 - Gearbox serial number
- 2 - Model number
- 3 - Gearbox identification „5HP24“
- 4 - Code letters „DPZ“



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





2 Gearbox - code letters, gearbox allocation, ratios, equipment



Note

Allocation of valve body according to gearbox code letters ⇒
Electronic parts catalogue .

Automatic gearbox		01L					
Gearbox	Code letters	CUE		DPZ		DSL	
	Manufactured from	07.96		07.96		11.96	
		to 11.96		11.96		08.97	
Torque converter	Code letters	G29		G29		G29	
Allocation	Model	Audi A8 1994 ▶		Audi A8 1994 ▶		Audi A8 1994 ▶	
	Engine	4.2 ltr. - 220 kW		4.2 ltr. - 220 kW		4.2 ltr. - 220 kW	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	29:29	1.000	29:29	1.000	35:29	1.207
	Bevel gear drive	32:11	2.909	30:11	2.727	32:11	2.909
	Ratio	2.909		2.727		3.511	
Rear axle	Spur gear drive	29:37	0.784	28:38	0.737	29:34	0.853
	Bevel gear drive	37:10	3.700	37:10	3.700	37:9	4.111
	Ratio	2.900		2.726		3.506	

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Automatic gearbox		01L					
Gearbox	Code letters	DSM		DTD		DTE	
	Manufactured from	11.96		02.97		02.97	
		to 02.97					
Torque converter	Code letters	G29		G29		G29	
Allocation	Model	Audi A8 1994 ▶		Audi A8 1994 ▶		Audi A8 1994 ▶	
	Engine	4.2 ltr. - 220 kW		4.2 ltr. - 220 kW		4.2 ltr. - 220 kW	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	

Automatic gearbox		01L					
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	29:29	1.000	29:29	1.000	29:29	1.000
	Bevel gear drive	30:11	2.727	32:11	2.909	30:11	2.727
	Ratio	2.727		2.909		2.727	
Rear axle	Spur gear drive	28:38	0.737	29:37	0.784	28:38	0.737
	Bevel gear drive	37:10	3.700	37:10	3.700	37:10	3.700
	Ratio	2.726		2.900		2.726	

Automatic gearbox		01L					
Gearbox	Code letters	DYM		ECX		ECY	
	Manufactured from	03.96		04.97		06.95	
	to	04.97					
Torque converter	Code letters	G32		G32		Q35	
Allocation	Model	Audi A8 1994 ►		Audi A8 1994 ►		Audi A8 1994 ►	
	Engine	4.2 ltr. - 250 kW		4.2 ltr. - 250 kW		4.2 ltr. - 257 kW	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
	Primary drive						
Front axle	Spur gear drive	35:29	1.207	35:29	1.207	35:29	1.207
	Bevel gear drive	34:11	3.091	34:11	3.091	34:11	3.091
	Ratio	3.730		3.730		3.730	
Rear axle	Spur gear drive	29:32	0.906	29:32	0.906	29:32	0.906
	Bevel gear drive	37:9	4.111	37:9	4.111	37:9	4.111
	Ratio	3.726		3.726		3.726	

Automatic gearbox		01L					
Gearbox	Code letters	ECZ		EDG		ESX	
	Manufactured from	09.98		04.99		01.99	
	to						
Torque converter	Code letters	P35		P35		H47	
Allocation	Model	Audi A8 1994 ►		Audi A8 1994 ►		Audi A8 1994 ►	



Automatic gearbox		01L					
Engine		4.2 ltr. - 228 kW		4.2 ltr. - 228 kW		3.3 ltr. - 165 kW TDI	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	29:29	1.000	29:29	1.000	29:29	1.000
	Bevel gear drive	32:11	2.909	30:11	2.727	30:11	2.727
	Ratio	2.909		2.727		3.727	
Rear axle	Spur gear drive	29:37	0.784	28:38	0.737	28:38	0.737
	Bevel gear drive	37:10	3.700	37:10	3.700	37:10	3.700
	Ratio	2.900		2.726		2.726	

Automatic gearbox		01L					
Gearbox	Code letters	FBE		FBF		FBG	
	Manufactured from	05.00		05.00		05.00	
	to	07.01					
Torque converter	Code letters	P35		P35		Q35	
Allocation	Model	Audi A8 1994 ▶		Audi A8 1994 ▶ USA, Canada		Audi A8 1994 ▶	
	Engine	4.2 ltr. - 228 kW		4.2 ltr. - 228 kW USA		4.2 ltr. - 265 kW	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	29:29	1.000	29:29	1.000	35:29	1.207
	Bevel gear drive	32:11	2.909	30:11	2.727	34:11	3.091
	Ratio	2.909		2.727		3.730	
Rear axle	Spur gear drive	29:37	0.784	28:38	0.737	29:32	0.906
	Bevel gear drive	37:10	3.700	37:10	3.700	37:9	4.111
	Ratio	2.900		2.726		3.726	

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Automatic gearbox		01L					
Gearbox	Code letters	FBG		FBH		FGS	
	Manufactured from	11.01		03.96		06.95	
	to			06.01			
Torque converter	Code letters	Q35		H47 U52		C44 C46	
Allocation	Model	Audi A8 1994 ►		Audi A8 1994 ►		Audi A8 1994 ►	
	Engine	4.2 ltr. - 228 kW		3.3 ltr. - 165 kW TDI		6.0 ltr. - 309 kW	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	35:29	1.207	29:29	1.000	29:29	1.000
	Bevel gear drive	34:11	3.091	30:11	2.727	32:11	2.909
	Ratio	3.730		2.727		2.909	
Rear axle	Spur gear drive	29:32	0.906	28:38	0.737	29:37	0.784
	Bevel gear drive	37:9	4.111	37:10	3.700	37:10	3.700
	Ratio	3.726		2.726		2.900	

Automatic gearbox		01L					
Gearbox	Code letters	FUM		FUN		FUU	
	Manufactured from	07.01		07.01		07.01	
	to						
Torque converter	Code letters	P35		P35		U52	
Allocation	Model	Audi A8 1994 ►		Audi A8 1994 ►		Audi A8 1994 ►	
	Engine	4.2 ltr. - 228 kW		4.2 ltr. - 228 kW USA, Canada		3.3 ltr. - 165 kW TDI	
Ratios	1st gear	3.571		3.571		3.571	
	2nd gear	2.200		2.200		2.200	
	3rd gear	1.505		1.505		1.505	
	4th gear	1.000		1.000		1.000	
	5th gear	0.804		0.804		0.804	
	Reverse gear	4.095		4.095		4.095	
Primary drive							
Front axle	Spur gear drive	29:29	1.000	29:29	1.000	29:29	1.000



Automatic gearbox		01L					
	Bevel gear drive	32:11	2.909	30:11	2.727	30:11	2.727
	Ratio	2.909		2.727		2.727	
Rear axle	Spur gear drive	29:37	0.784	28:38	0.737	28:38	0.737
	Bevel gear drive	37:10	3.700	37:10	3.700	37:10	3.700
	Ratio	2.900		2.726		2.726	

Automatic gearbox		01L					
Gearbox	Code letters	GLA					
	Manufactured from to	04.02					
Torque converter	Code letters	P35					
Allocation	Model	Audi A8 1994 ▶					
	Engine	4.2 ltr. - 228 kW					
Ratios	1st gear	3.571					
	2nd gear	2.200					
	3rd gear	1.505					
	4th gear	1.000					
	5th gear	0.804					
	Reverse gear	4.095					
Primary drive							
Front axle	Spur gear drive	29:29	1.000				
	Bevel gear drive	32:11	2.909				
	Ratio	2.909					
Rear axle	Spur gear drive	29:37	0.784				
	Bevel gear drive	37:10	3.700				
	Ratio	2.900					

3 Identification of rear final drive

The final drive 01R is assigned to the automatic gearbox 01L, four-wheel drive. For correct version, refer to ⇒ Electronic parts catalogue .

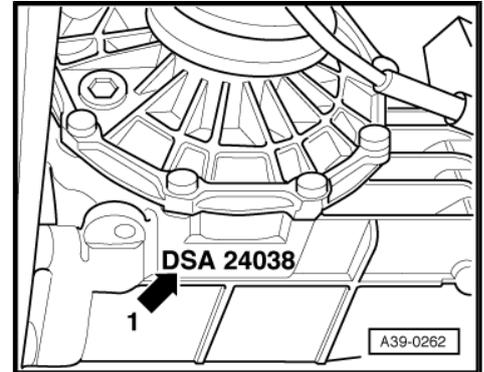
Code letters and date of manufacture of rear final drive:

Example:

DSA	24	03	8
Code letters	Day	Month	Year (1998) of manufacture

 **Note**

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



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4 Rear final drive - code letters, ratios

Rear final drive		01R		
Code letters		DGZ	DNU	DNW
Ratio	Final drive	37 : 10 = 3.700	37 : 9 = 4.111	37 : 10 = 3.700
Drive shaft flange \varnothing		108 mm	108 mm	108 mm

Rear final drive		01R		
Code letters		DSA	DUR	EUS
Ratio	Final drive	37 : 9 = 4.111	37 : 10 = 3.700	37 : 10 = 3.700
Drive shaft flange \varnothing		108 mm	108 mm	108 mm

Rear final drive		01R		
Code letters		EUU	EYA	
Ratio	Final drive	37 : 9 = 4.111	37 : 10 = 3.700	
Drive shaft flange \varnothing		108 mm	108 mm	

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5 Capacities

Planetary gearbox

Capacities	Automatic gearbox 01L
Initial filling	9.8 ltr.
Fluid change	Lifetime filling; change only after repair, if ATF oil pan is removed (up to 8 litres, depending on engine)
Lubricant	ATF ⇒ Electronic parts catalogue



Caution

Risk of malfunction or gearbox failure.

- ◆ *Only the ATF available as a replacement part for the automatic gearbox 01L may be used in the planetary gearbox ⇒ Electronic parts catalogue .*

- Checking and topping up ATF level ⇒ [page 59](#) ; changing ATF ⇒ [page 63](#) .

Front final drive

Capacities	Automatic gearbox 01L
Initial filling	Approx. 1.3 ltr.
Oil change	Lifetime filling; change only after performing repair work
Lubricant	Gear oil SAE 75 W90 (synthetic oil) ⇒ Electronic parts catalogue

- Checking and topping up gear oil in front final drive ⇒ [page 130](#) .

Transfer box

Capacities	Automatic gearbox 01L
Initial filling	0.88 ltr.
Oil change	Lifetime filling; change only after performing repair work
Lubricant	Gear oil SAE 75 W90 (synthetic oil) ⇒ Electronic parts catalogue

- Checking gear oil in transfer box and topping up ⇒ [page 141](#) .

Rear final drive

Capacities	Rear final drive 01R
Initial filling	1.5 ltr.
Oil change	Lifetime filling; change only after performing repair work
Lubricant	Gear oil SAE 75 W90 (synthetic oil) ⇒ Electronic parts catalogue

- Checking gear oil in rear final drive and topping up ⇒ [page 78](#) .

6 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.*

– Disconnect battery ⇒ Electrical system; 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.

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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.*

7 Notes on tow-starting and towing



Caution

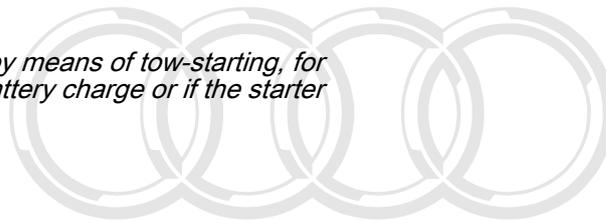
Risk of irreparable damage to gearbox.

- ◆ *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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8 Transmission layout

Gearbox diagram

A - Clutch A

B - Clutch B

C - Clutch C

D - Clutch D

E - Clutch E

F - Clutch F

F1 - Freewheel 1

W - Torque converter clutch

1 - Direction of travel

2 - Front differential

- Z4, Z5 = Front final drive gear set ⇒ [page 2](#)

3 - Output shaft for front axle

- Z1, Z2 and Z3 = Spur gears (intermediate drive for front axle) ⇒ [page 2](#)

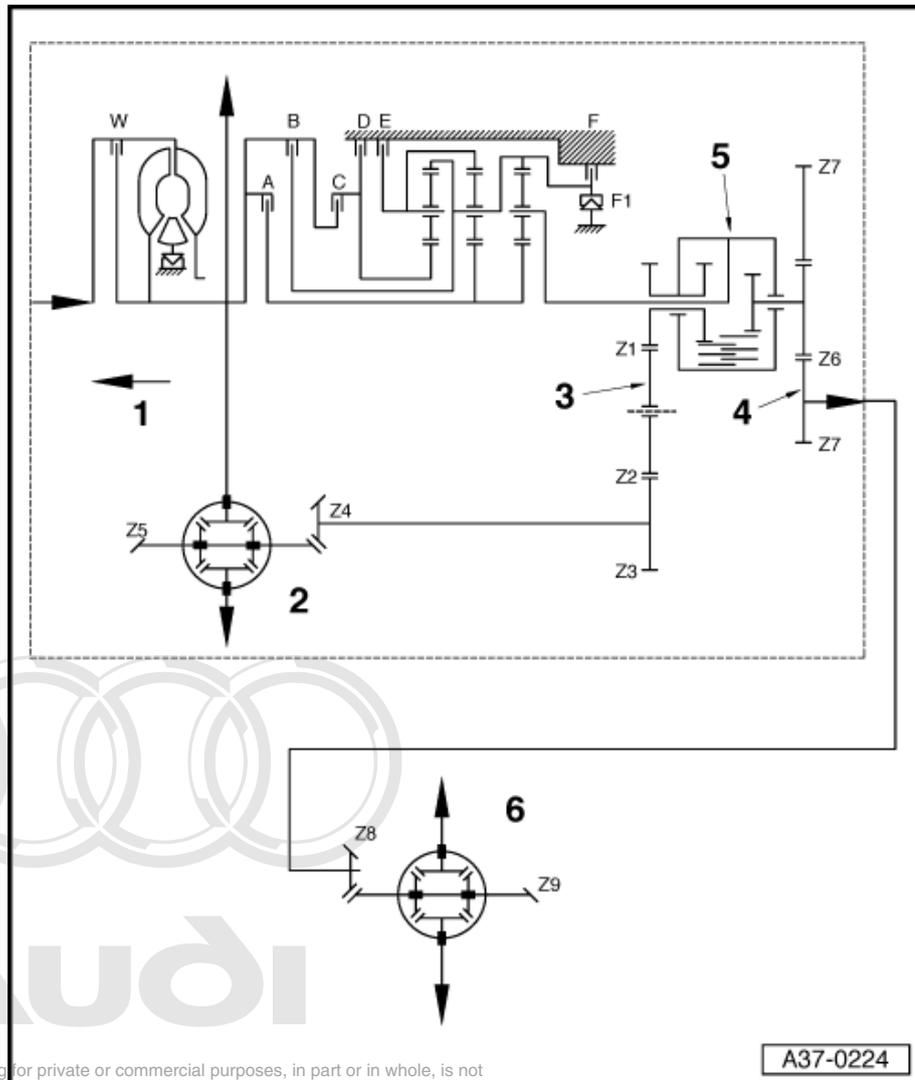
4 - Input shaft for rear axle

- Z6, Z7 = Spur gears (intermediate drive for rear axle) ⇒ [page 2](#)

5 - Self-locking centre differential

6 - Rear differential

- Z8, Z9 = Rear final drive gear set ⇒ [page 2](#)



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Actuation of selector elements

◆ In the event of malfunctions or poor acceleration and performance, the following table shows which selector elements are operated in the individual gears. In this way it is possible to establish which selector elements are not functioning correctly.

◆ Unless otherwise stated, the actuation of the clutches and solenoid valves in the various selector lever positions corresponds to the actuation for the drive position D.

Gear		Solenoid valves					Clutches									
Position	Gear engaged	Solenoid valves			Pressure regulating valves		Clutch						Free-wheel			
		N88	N89	N90	N21 5-	N21 6-	N21 7-	N21 8-	N23 3-	A	B	C	D	E	F	1st gear
		-	-	-	-	-	-	-	-							

Gear	Solenoid valves								Clutches							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
R = Reverse gear	-	x	-	x	x	-	x	-	x	-	-	x	-	-	x	-
N = Neutral	x	-	x	x	-	x	-	-	x	-	-	-	-	-	x	-
D = 1st gear	x	-	-	x	x	-	x	-	x	x	-	-	-	-	-	x
D = 2nd gear	x	x	-	x	-	x	-	(x)-	x	x	-	-	-	x	-	-
D = 3rd gear	-	x	-	x	x	x	-	(x)-	-	x	-	-	x	-	-	-
D = 4th gear	-	x	-	x	-	-	-	-x-	-	x	x	-	-	-	-	-
D = 5th gear	-	-	-	x	x	-	-	-x-	-	-	x	-	x	-	-	-
2 = 1st gear	x	-	-	x	x	x	-	x	x	x	-	-	-	-	x	x
D = 5th to 4th gear	-	x	-	x	-	x	-	-	(x)	x	-	(x)	-	-	-	-
W= Torque converter clutch	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-

„x“ = Component is actuated

„-“ = Component is not actuated

„(x)“ = Component is actuated according to driving situation (overlap)



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9 Repair instructions

9.1 Contact corrosion!

Contact corrosion can occur if unsuitable 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.

9.2 General repair instructions

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

To avoid 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 01L, self-diagnosis; Rep. gr. 01 .

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 17](#) .
- ◆ 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 ⇒ [page 19](#) .
- ◆ Check position of torque converter before installing gearbox ⇒ [page 20](#) .
- ◆ When installing gearbox ensure dowel sleeves are correctly seated.
- ◆ After installing gearbox, check the following fluid levels and top up if necessary: ATF in planetary gearbox ⇒ [page 59](#) , gear oil in front final drive ⇒ [page 130](#) and gear oil in transfer box ⇒ [page 141](#) . Capacities ⇒ [page 9](#) , specifications ⇒ Electronic parts catalogue .

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- ◆ After installing rear final drive, check fluid level and top up if necessary: gear oil in rear final drive ⇒ [page 78](#) . Capacities ⇒ [page 9](#) , specifications ⇒ Electronic parts catalogue .

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 from being 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, check the relevant fluid levels and top up if necessary: ATF in planetary gearbox ⇒ [page 59](#) , gear oil in front final drive ⇒ [page 130](#) , gear oil in transfer box ⇒ [page 141](#) and gear oil in rear final drive ⇒ [page 78](#) . Capacities ⇒ [page 9](#) , specifications ⇒ Electronic parts catalogue .

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.

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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

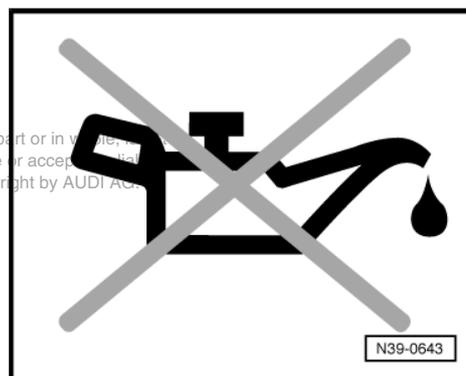
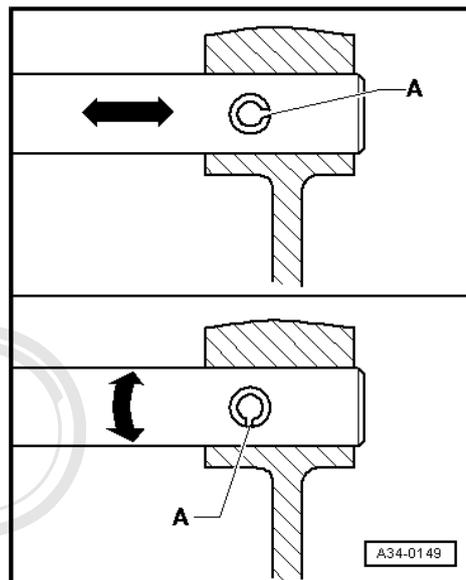
- ◆ Install needle bearings so the lettering (side with thicker metal) faces towards the installing tool.
- ◆ Lubricate bearings with gear oil or ATF, depending on fitting location.
- ◆ Do not interchange inner or outer races of bearings of the same size.
- ◆ If required, renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Tapered roller bearings for differential and pinion shaft in rear final drive are low-friction bearings. Do not additionally oil new tapered roller bearings when measuring friction torque. The bearings are pre-treated at the factory with a special type of oil for this purpose.
- ◆ 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.

Valve body

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



10 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, such as the „WYPALL 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

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .

1 - Torque converter

- Secure to prevent it falling out when gearbox is removed ⇒ [page 19](#)
- Code letters ⇒ [page 2](#)
- Checking ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32
- Checking friction lining of torque converter clutch ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32
- Draining ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32
- Installing ⇒ [page 19](#)
- Installation depth ⇒ [page 20](#)

2 - Circlip

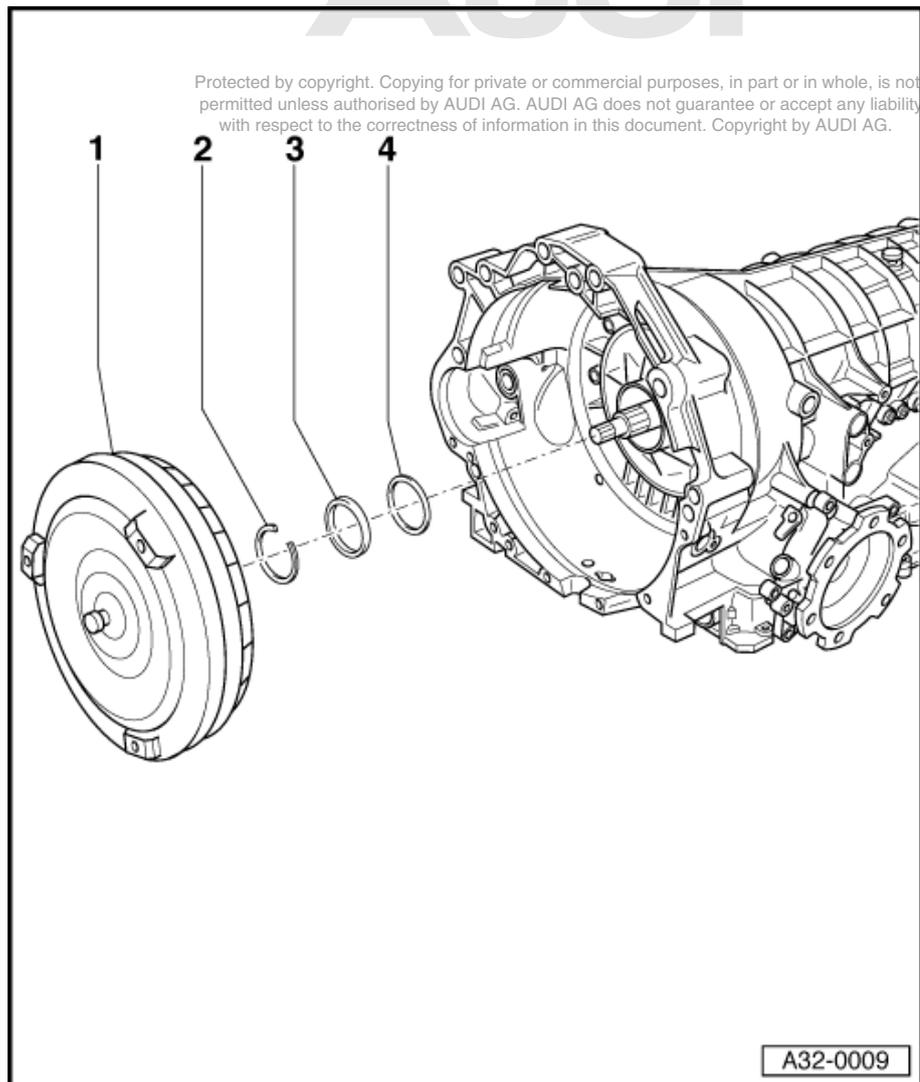
- In front of oil seal
- Renew if damaged

3 - Oil seal

- Renewing ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32

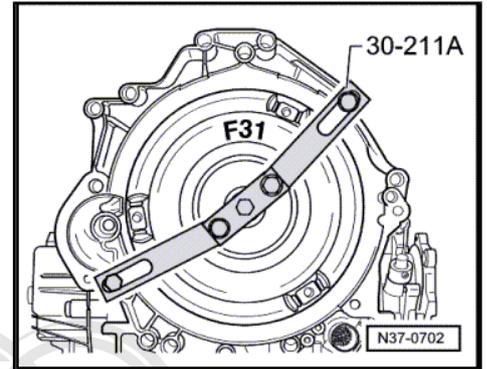
4 - Corrugated washer

- Behind oil seal
- Renew if damaged



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 Renewing oil seal for torque converter

Description of work sequence ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32 .

1.2 Draining torque converter

Description of work sequence ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32 .

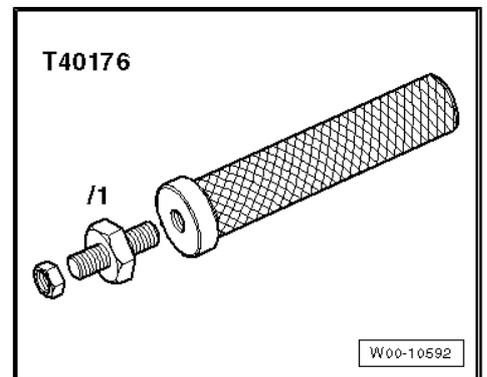
1.3 Checking torque converter

Description of work sequence ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 32 .

1.4 Installing torque converter

Special tools and workshop equipment required

- ◆ Extractor -T40176-



- ◆ Depth gauge

Procedure

- Attach extractor -T40176- to torque converter.
- Coat torque converter hub with ATF.
- Push the torque converter hub through the oil seal onto the gearbox shaft as far as the first stop.
- Push torque converter into torque converter bellhousing by hand, turning it so that torque converter hub engages in slots of internal gear of ATF pump. You should feel the torque converter slide into place.

Installation depth

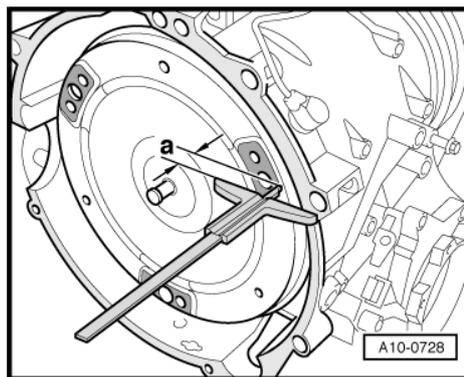


Caution

Drive lugs on ATF pump can be damaged if torque converter is not fitted correctly.

- ◆ *Checking position of torque converter.*

- If the torque converter is correctly installed, the depth -a- between the contact surfaces of the tapped holes 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 bolts to secure torque converter to drive plate => Electronic parts catalogue .

When you then install the gearbox, adhere to the following instructions:



Caution

The gearbox can be damaged if the torque converter is not fitted correctly.

- ◆ *Before and while you are tightening the bolts on the engine/gearbox connection keep checking that the torque converter can still be rotated behind the drive plate.*

- ◆ *If the torque converter cannot be turned, the drive lugs on the ATF pump and consequently the gearbox will be irreparably damaged when the bolts are fully tightened.*

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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.*



Caution

- ◆ *Contact corrosion! Notes ⇒ [page 14](#).*



Note

- ◆ *Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2-.*
- ◆ *The centre console must be removed for repair work to be carried out ⇒ Rep. gr. 68.*

Part 1



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1 - Selector lever handle

- To remove, push sleeve for selector lever downwards, pull the button in the handle out as far as it will go, and then remove the handle by pulling it upwards
- To install, press handle onto selector lever and pull sleeve upwards to secure

2 - Sleeve for selector lever

- Check to ensure that the seal in the sleeve is fitted correctly and whether it is damaged in any way

3 - Cover

- With selector indicator
- To remove, release retaining tabs on shift unit
- Lift out together with [⇒ Item 5 \(page 22\)](#) and [⇒ Item 4 \(page 22\)](#)
- Unclip cable bracket on shift unit and unplug electrical connector
- Wiring layout: left side [⇒ page 25](#), right-side [⇒ page 25](#)

4 - Light strip

- With wiring harness and LEDs for basic illumination and upshift/downshift indicator for tiptronic
- Wiring layout: left side [⇒ page 25](#), right-side [⇒ page 25](#)

5 - Symbol insert

- Detach insert together with light strip from cover

6 - Bolt

- 4x
- Use with washer

7 - Sliding cover

- Unclip cable bracket on shift unit and unplug electrical connector
- Pull sliding cover out of guide together with gear selection indicator
- Wiring layout: left side [⇒ page 25](#), right-side [⇒ page 25](#)

8 - Gear selection indicator

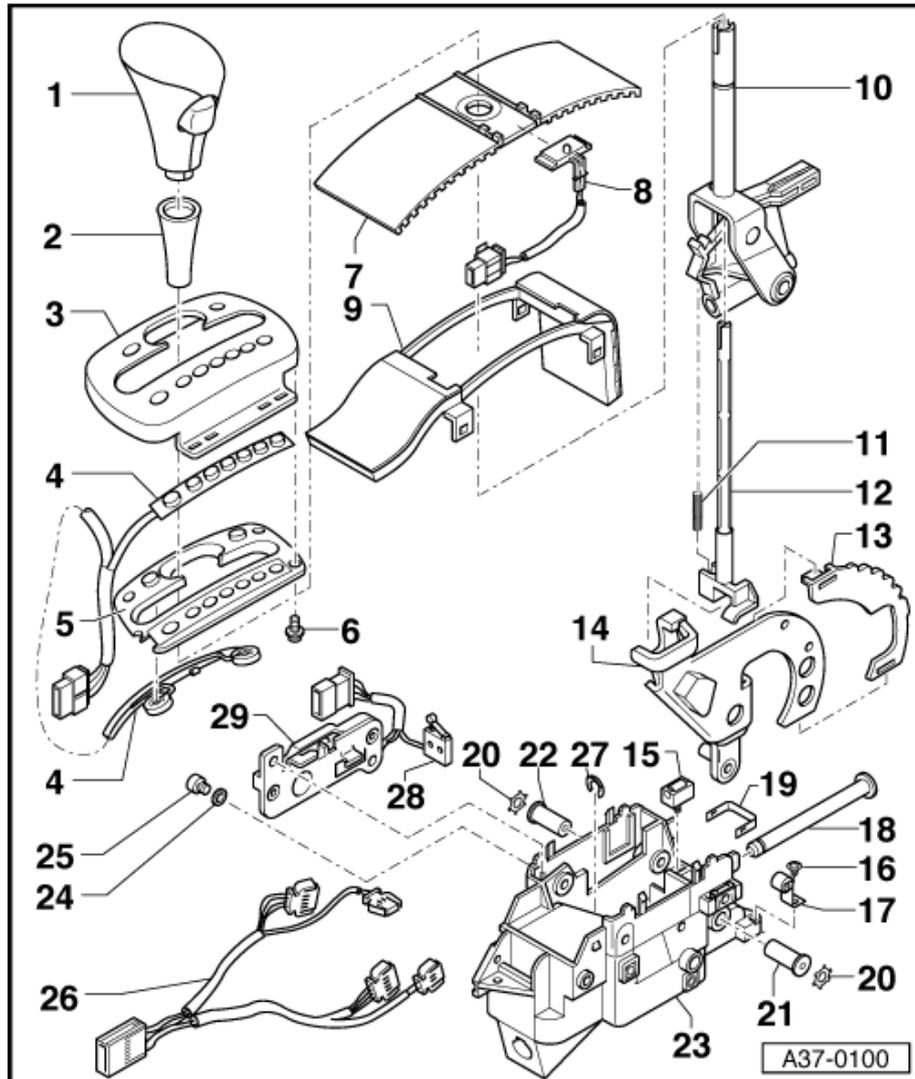
- With bulb holder and wiring harness
- Unclip 4 retainer lugs on sliding cover (move bulb holder slightly towards centre of sliding cover)

9 - Guide

- To remove, release 4 retaining tabs on shift unit

10 - Selector lever

- Remove together with pull rod and spring



11 - Spring

- For pull rod

12 - Pull rod

- Insert in selector lever together with spring

13 - Detent plate

- Release retaining tabs to remove ⇒ [page 26](#)

14 - Cable lever

- Before installing, grease bearings supporting cable lever pivot shafts

15 - Detent for tiptronic

16 - Bolt

17 - Detent spring with roller

- Removing and installing ⇒ [page 26](#)

18 - Pin

- For selector lever
- Push out towards rear to remove
- To install, place shouldered surface on head of pin against contact surface of shift unit

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19 - Retaining clip

- For tiptronic switch -F189- (recognition)
- Release retaining tabs to remove ⇒ [page 26](#)

20 - Serrated ring

- To axially secure the cable lever pivot shafts
- 2 pieces (left and right)
- Renew
- Pry off with screwdriver to remove

21 - Cable lever pivot shaft (left)

- Short version
- To support cable lever

22 - Cable lever pivot shaft (right)

- Long version
- To support cable lever

23 - Shift unit

24 - Washer

25 - Hexagon socket head bolt

- 2x
- Use with washer
- For securing tiptronic switch -F189- (upshift/downshift switch)

26 - Wiring harness

- Wiring layout: left side ⇒ [page 25](#) , right-side ⇒ [page 25](#)

27 - Retaining clip

- For pin ⇒ [Item 18 \(page 23\)](#)

28 - tiptronic switch -F189- (recognition)

- Checked via self-diagnosis
- To install, attach to pins in shift unit and secure to shift unit with retaining clip ⇒ [page 26](#)
- Combined as one unit with tiptronic switch -F189- (upshift/downshift switch)

29 - tiptronic switch -F189- (upshift/downshift switch)

- Checked via self-diagnosis



- Remove with selector lever in position „D“
- Combined as one unit with tiptronic switch -F189- (recognition)
- Unclip cable bracket on shift unit and unplug connector
- Wiring layout: left side => [page 25](#) , right-side => [page 25](#)

30 - Retaining clip

- For pin

31 - Shear pin

- Drive in and drive out with drift

32 - Lever

- For locking cable

33 - Ignition/starter switch

- With ignition key removal lock

34 - Bolt

- With washer
- 9 Nm

35 - Locking cable

- For ignition key removal lock
- Do not kink
- Removing and installing => [page 35](#)
- Adjusting => [page 36](#)

36 - Pin

- For lever

37 - Retaining clip

- To secure selector lever cable to selector lever

38 - Selector lever cable (rear)

- Do not kink
- Removing and installing => [page 29](#)
- Adjusting => [page 32](#)
- Disconnecting selector lever cable => [page 26](#)

39 - Locking plate

40 - Selector lever cable (front)

- Do not kink
- Removing and installing => [page 29](#)
- Adjusting => [page 32](#)
- Disconnecting selector lever cable => [page 26](#)

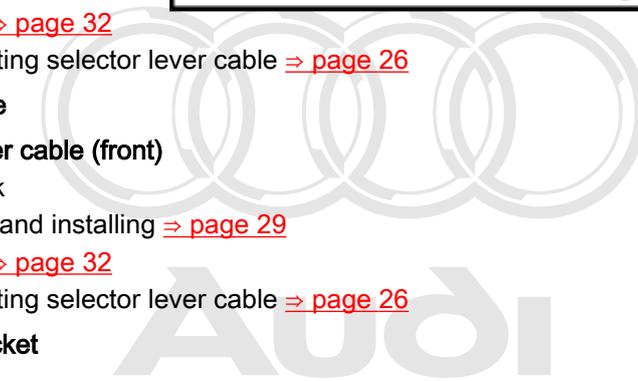
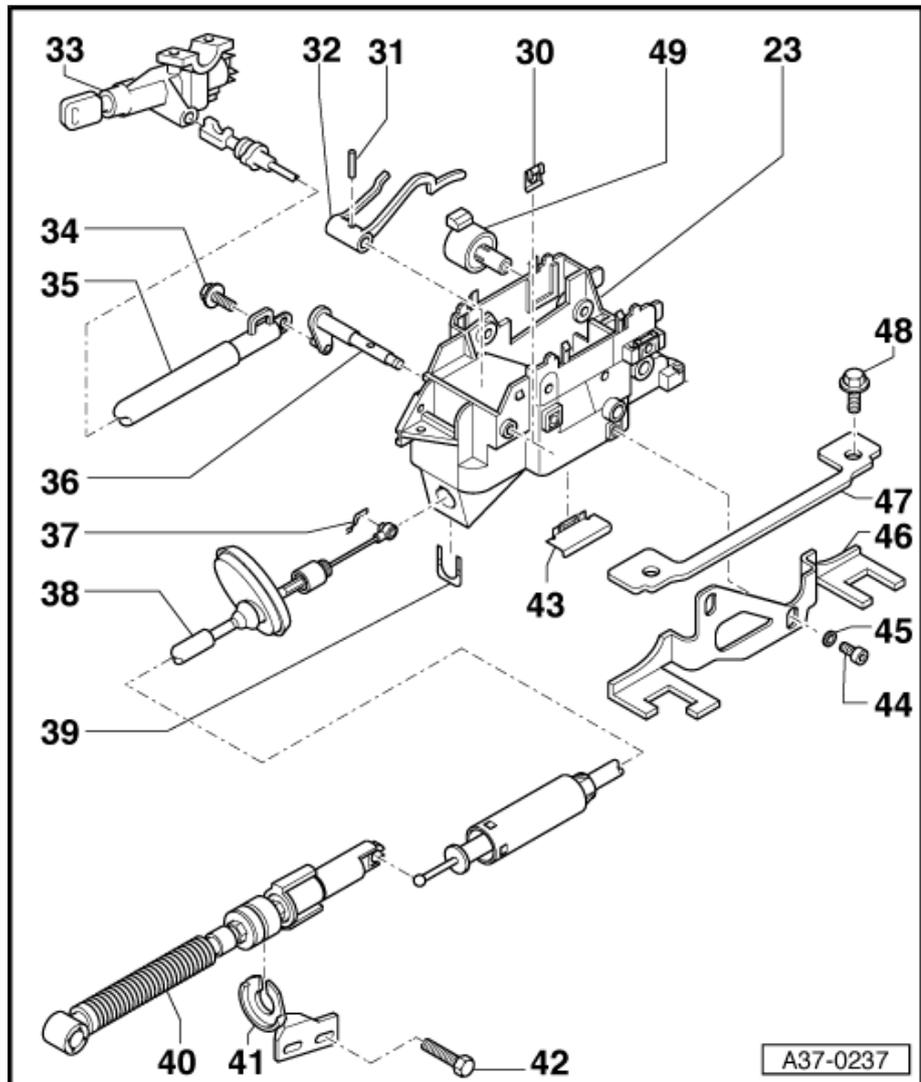
41 - Support bracket

42 - Bolt

- 23 Nm

43 - Locking plate

- For selector lever lock solenoid -N110-



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- ❑ Release snap connection to shift unit using a screwdriver => [page 26](#)

44 - Hexagon socket head bolt

- ❑ 4x

45 - Washer

46 - Retaining plate

- ❑ 2 pieces (left and right)

47 - Locking plate

- ❑ 2 pieces (left and right)

48 - Bolt

- ❑ 4x
- ❑ 8 Nm

49 - Selector lever lock solenoid -N110-

- ❑ Removing and installing => [page 26](#)
- ❑ Can be tested via electrical check and measured value block => [Rep. gr. 01](#)

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Wiring layout (left-side) on selector mechanism

A - Electrical connector for basic illumination and tiptronic upshift/downshift indicator

B - Electrical connector on wiring harness for selector mechanism

C - Electrical connector for individual gear lamps

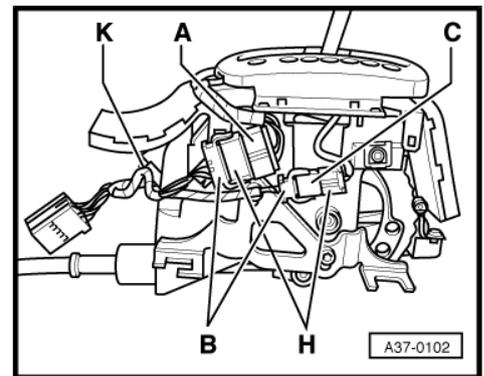
H - Retainer for connectors

K - Cable tie for securing wiring harness



Note

No wiring should be installed between the body and the selector mechanism.



Wiring layout (right-side) on selector mechanism

B - Electrical connector on wiring harness for selector mechanism

D - Electrical connector for tiptronic switch -F189-

E - Electrical connector for selector lever lock solenoid -N110-

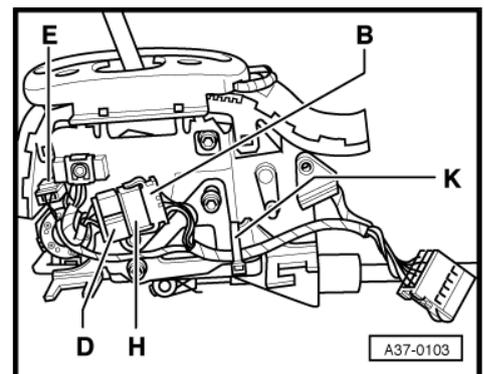
H - Retainer for connectors (does not apply to USA vehicles)

K - Cable tie for securing wiring harness



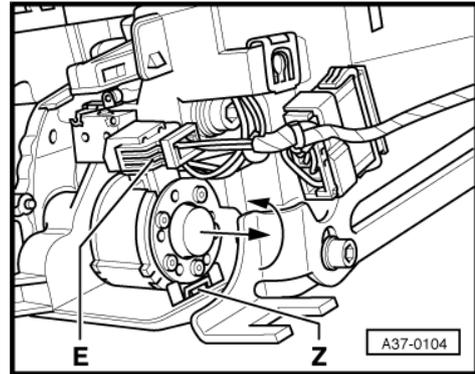
Note

No wiring should be installed between the body and the selector mechanism.



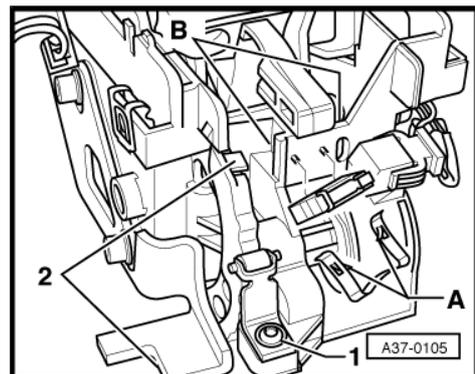
Removing and installing selector lever lock solenoid -N110-

- Disconnect gear selector mechanism from vehicle
⇒ [page 29](#) .
- Unclip electrical connector -E-.
- Release retaining tab -Z- of locking plate on selector mechanism.
- Pull out selector lever lock solenoid -N110- -arrow-.
- Check selector mechanism after replacing selector lever lock solenoid -N110- ⇒ [page 27](#) .



Removing and installing tiptronic switch -F189- (recognition)

- Remove guide with sliding cover.
- Release retaining tabs -A- of retaining clip -item B-.
- Detach tiptronic switch -F189- (recognition) from retaining pins of selector mechanism.



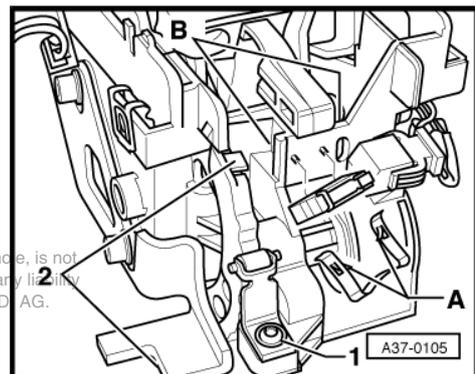
Removing and installing detent plate and detent spring with roller

- Remove guide with sliding cover.
- Unscrew bolt -1- and remove detent spring with roller.
- Shift selector lever into position „P“.
- Release retaining tabs -2- on detent plate and remove detent plate.

Installing:

- Clip the detent plate onto the cable lever.
- Screw the detent spring and roller onto the selector mechanism.

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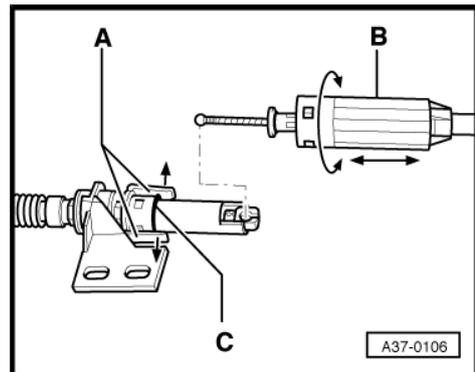
Disconnecting and reconnecting selector lever cable and support bracket

Disconnecting:

- Lift tabs -A- slightly, turn sleeve -B- through approx. 45° and release.
- Detach sleeve -B- from front of selector lever cable.
- Detach ball head from ball socket.

Reconnecting:

- Check seal -C- for damage and renew if necessary.
- Check that seal is correctly seated.
- Insert ball head in ball socket.
- Slide on sleeve and turn approx. 45°.
- Make sure that sleeve locks in place.



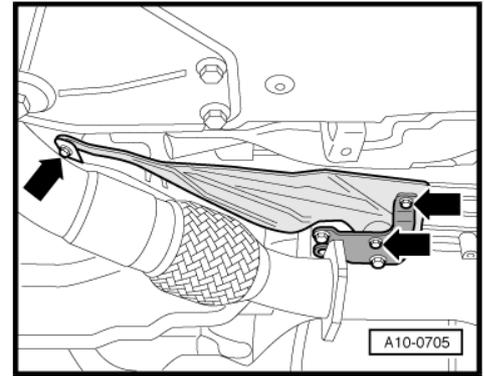
Heat shield for selector lever cable - tightening torque

- Tighten bolts -arrows- to 8 Nm.



Note

Illustration shows 8-cylinder TDI engine.



1.1 Checking selector mechanism

Overview:

- ◆ 1. Checking operation of selector mechanism ⇒ [page 27](#)
- ◆ 2. Checking ignition key removal lock ⇒ [page 28](#)
- ◆ 3. Checking interlock button on selector lever handle ⇒ [page 28](#)

1. Checking operation of selector mechanism

- ◆ It should not be possible to operate the starter while the selector lever is in position „R“ or „D“ and „2“, „3“ or „4“, or in „S“ and the „tiptronic gate“.
- ◆ On right-hand drive vehicles the starter should not operate in selector lever positions „P“ and „N“ when the locking button in the selector lever handle is pressed.
- ◆ 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. Selector lever lock solenoid -N110- blocks selector lever.
- Press and hold brake pedal.
- Selector lever lock solenoid -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, 4, 3 and 2“ or „S“ 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 position „N“ 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. Selector lever lock solenoid -N110- blocks selector lever.



- Depress brake pedal.
- Selector lever lock solenoid -N110- releases selector lever. Shifting into position „D“ is possible.

Selector lever in „D“ position, ignition and lights switched on:

- Shift the selector lever out of „D“ into the tiptronic gate.
- The illuminated „D“ symbol in the selector mechanism cover should go out and the „+“ and „-“ symbols should light up.
- The selector lever position indicator in the instrument cluster should switch from „PRND432“ or „PRNDS“ to „54321“ when the selector lever is shifted into the „tiptronic gate“.
- If the specified results are not obtained, perform self-diagnosis ⇒ Rep. gr. 01
- Adjust selector lever cable ⇒ [page 32](#) .
- Check interlock button on selector lever handle ⇒ [page 28](#) .
- 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.
- 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.
- Perform self-diagnosis ⇒ Rep. gr. 01 and check selector lever lock solenoid -N110- .
- Adjust selector lever cable ⇒ [page 32](#) .

1.2 Removing and installing selector lever cable

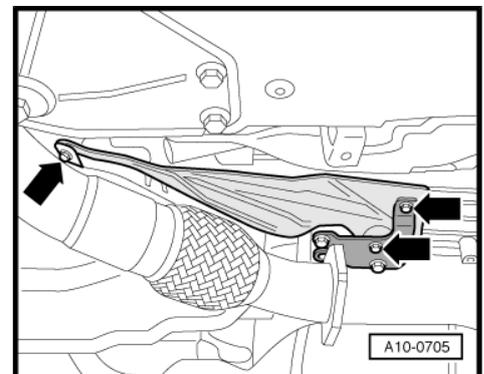
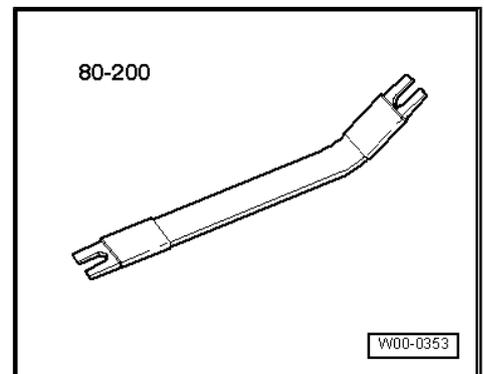
Special tools and workshop equipment required

- ◆ Removal lever -80-200-

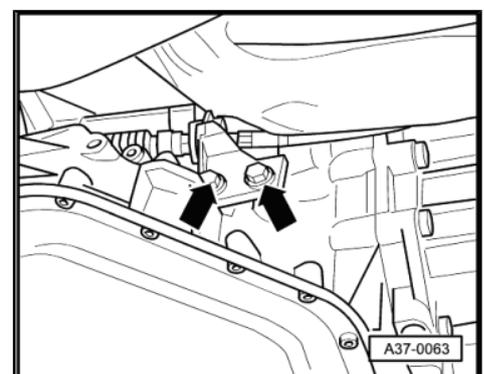


Removing

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- Shift selector lever into position „P“
 - Unbolt heat shield for selector lever cable on left of gearbox -arrows-.

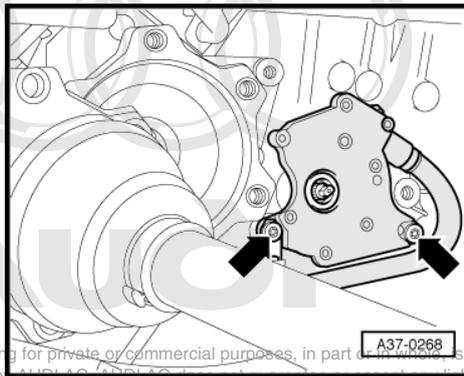


- Remove gearbox support (left-side) ⇒ [page 55](#) .
- Unscrew support bracket for selector lever cable -arrows-.





- Remove multi-function switch -F125- -arrows- (leave electrical connector attached).



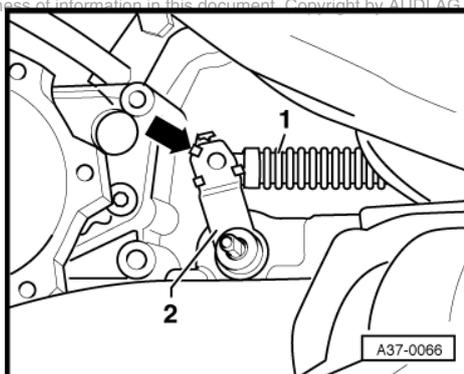
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- Use removal lever -80 - 200- to prise selector lever cable -1- off selector shaft lever -2- (remove retaining clip -arrow- if fitted).

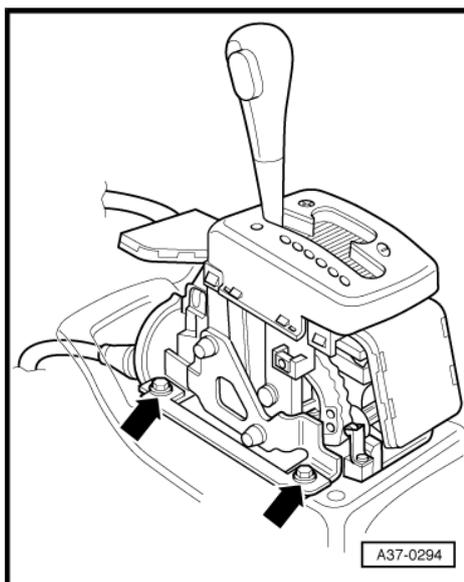


Note

Do not bend or kink the selector lever cable.



- Remove centre console ⇒ Rep. gr. 68 .
- Detach locking cable from selector mechanism ⇒ [page 35](#) .
- Remove bolts -arrows- and lift selector mechanism slightly.

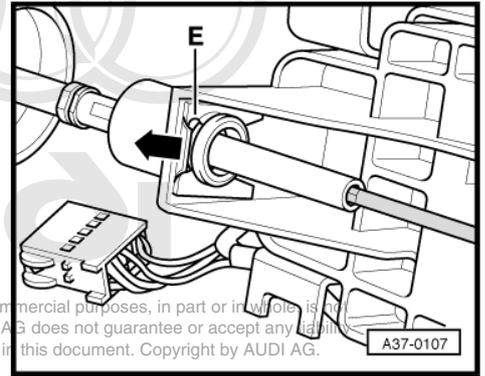


- Remove locking plate -E- for selector lever cable at rear of selector mechanism by pulling it off downwards -arrow-.
- Release retaining clip on cable lever by pressing the two ends together and pull selector lever cable off cable lever.

i Note

Do not bend or kink the selector lever cable.

- Pull selector lever cable out with protecting sleeve.
- If necessary, detach selector lever cable from support bracket => [page 26](#).



Installing

- Tightening torques => [page 21](#)
- Additional tightening torques:

Component	Nm
Selector lever cable to support bracket	12

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

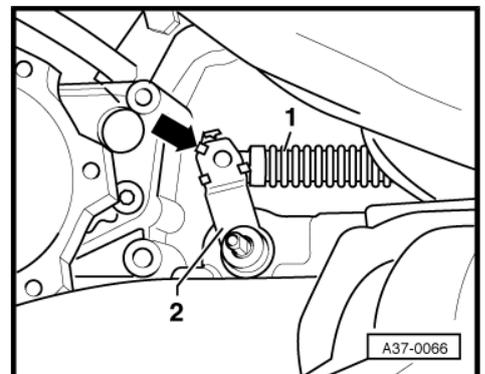
i Note

- ◆ *Lubricate all bearings and moving surfaces with polycarbamide grease -G 052 142 A2-.*
- ◆ *Do not bend or kink the selector lever cable.*

- Press selector shaft lever -2- on gearbox towards the rear as far as it will go -arrow- until parking lock engages.

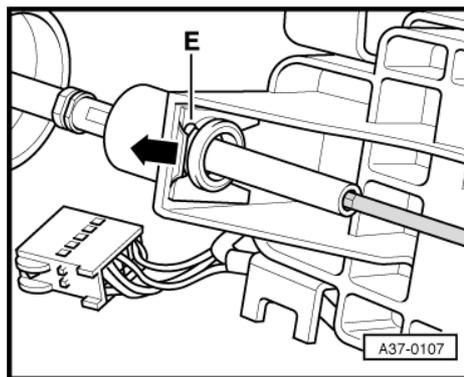
i Note

-Item 1- can be disregarded.





- Insert selector lever cable in selector mechanism.
- The marking on the grommet must face upwards.
- Fit selector lever cable onto selector lever.
- Insert locking plate -E- in groove on selector lever cable with angled end pointing towards the rear.
- Check adjustment of selector lever cable and adjust if necessary ⇒ [page 32](#) .
- Install multifunction switch -F125- ⇒ [page 75](#) .
- Install heat shield for selector lever cable ⇒ [page 27](#) .
- Secure locking cable to selector mechanism ⇒ [page 35](#) .
- Install centre console ⇒ Rep. gr. 68 .
- Install gearbox support (left-side) ⇒ [page 55](#) .

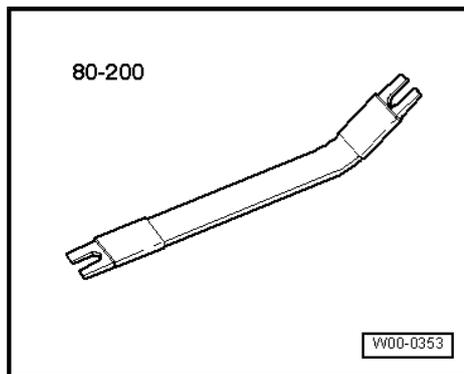


1.3 Checking and adjusting selector lever cable

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Special tools and workshop equipment required

- ◆ Removal lever -80 - 200-

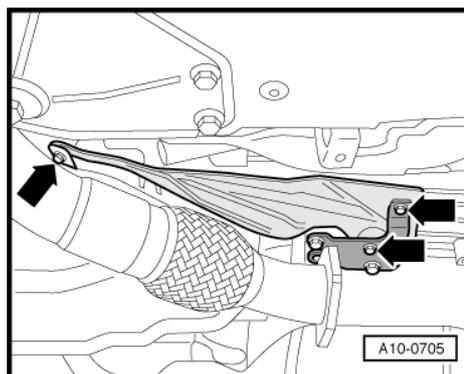


Preparation

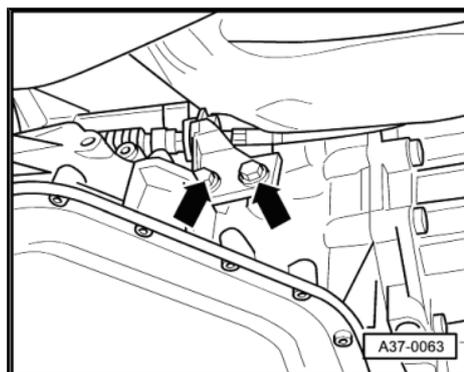
- Shift selector lever into position „P“.
- Unbolt heat shield for selector lever cable on left of gearbox -arrows-.



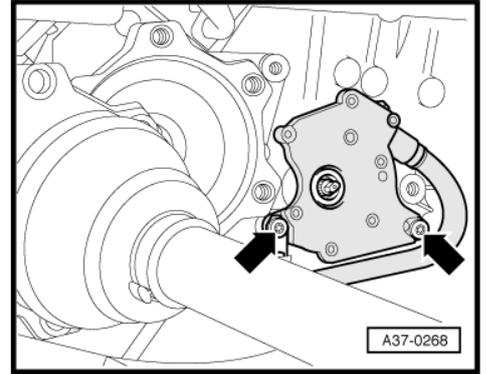
Illustration shows 8-cylinder TDI engine.



- Remove gearbox support (left-side) ⇒ [page 55](#) .
- Unscrew support bracket for selector lever cable -arrows-.

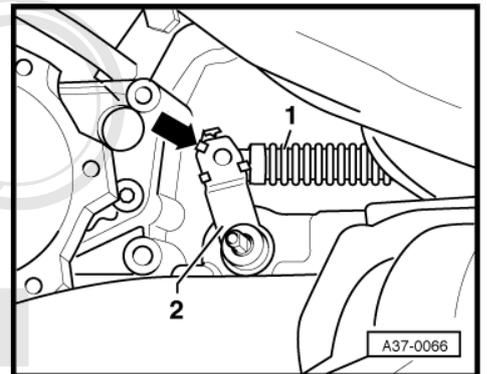


- Remove multi-function switch -F125- -arrows- (leave electrical connector attached).



Checking

- Use removal lever -80 - 200- to prise selector lever cable -1- off selector shaft lever -2- (remove retaining clip -arrow- if fitted).
- Shift selector lever from position „P“ to „2“ or „S“.
- Selector mechanism and selector lever cable must move freely. If necessary renew selector lever cable or service selector mechanism.
- Shift selector lever into position „P“.
- Shift selector shaft lever to „P“ position in direction of -arrow- (all the way to the rear).
- The parking lock must engage; it should no longer be possible to turn both front wheels in the same direction.
- It should be possible to push selector lever cable onto selector shaft lever; adjust selector lever cable if necessary.



Adjusting

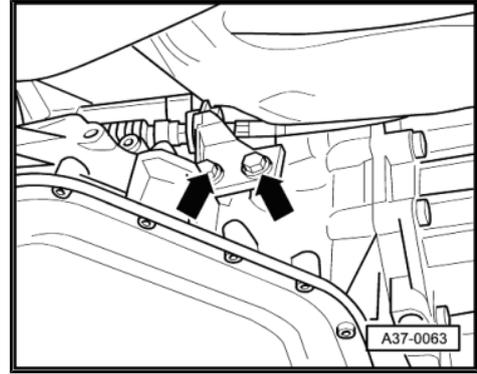
- Selector lever cable is not attached to selector shaft lever. If necessary, lever off selector lever cable using removal lever -80 - 200- .
- Tightening torque => [page 21](#)
- Additional tightening torques:

Component	Nm
Selector lever cable to support bracket	12

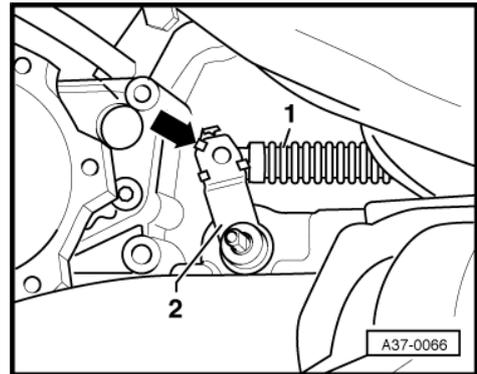
- Shift selector lever into position „P“.
- Shift selector shaft lever to „P“ position in direction of -arrow- (all the way to the rear).
- The parking lock must engage; it should no longer be possible to turn both front wheels in the same direction.



- Slacken off bolts -arrows- on support bracket.
- Push support bracket towards front or towards rear until ball socket of selector lever cable aligns with ball head of selector shaft lever.
- Hold support bracket in this position and tighten bolts -arrows- securing support bracket.



- Press selector lever cable -1- onto selector shaft lever -2-.
- Install multifunction switch -F125- ⇒ [page 75](#) .
- Install heat shield for selector lever cable ⇒ [page 27](#) .
- Install gearbox support (left-side) ⇒ [page 55](#) .
- Check selector mechanism ⇒ [page 27](#) .



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1.4 Removing and installing locking cable

1 - Locking cable

Removing



Note

The locking cable must not be bent or kinked.

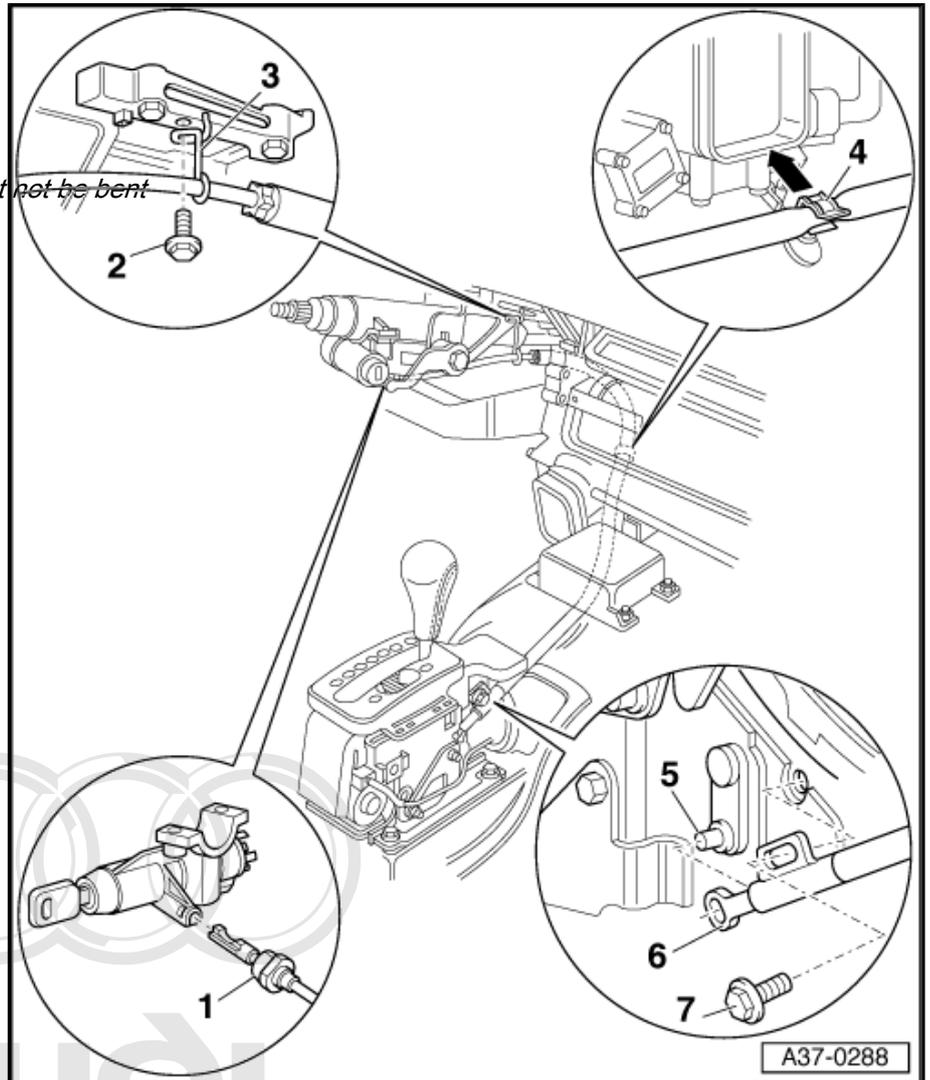
- Shift selector lever to position „2“ or „S“.



Caution

On vehicles with telematics: activate service mode of telematics control unit before disconnecting battery => Radio, telephone, navigation system, self-diagnosis; Rep. gr. 01.

- Refer to coding on vehicles with encoded radio/ radio navigation system (RNS); obtain coding if necessary.
- Disconnect earth strap on battery (in luggage compartment) with ignition switched off => Electrical system; Rep. gr. 27.
- Remove driver's storage compartment => Rep. gr. 68.



- Remove centre console => Rep. gr. 68.
- Remove steering column switch => Rep. gr. 94.
- Turn ignition key to „ignition on“ position.
- Shift selector lever into position „P“.
- Lift locking clip on locking device and pull locking cable -1- out of ignition/starter switch.
- Unbolt locking cable support bracket from gear selector mechanism and disengage locking cable eye -6-.
- Slacken bolt -2- on steering column and remove locking cable together with wire retainer -3-.
- Unbolt airbag control unit => Rep. gr. 69.
- Release locking cable from retaining clip -4- and remove.

Installing

- Route locking cable so it is free of kinks.



- Locate locking cable along groove in insulating material on gearbox tunnel, and fit airbag control unit ⇒ Rep. gr. 69 .
- Turn ignition key to „ignition on“ position.
- Insert locking cable -1- into ignition/starter switch.
- Engage locking clip on locking device.
- Tighten bolt -2- for wire retainer -3-.
- Turn ignition/starter switch to locked position („ignition off“).
- Shift selector lever into position „P“.
- Hook eye of locking cable -6- onto pin -5-.
- Loosely tighten bolt -7- for locking cable support bracket at selector mechanism.
- Adjust locking cable ⇒ [page 36](#) .

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

**Note**

- ◆ *When reconnecting battery, remember to activate vehicle equipment (radio/navigation system (RNS), clock, electric windows) according to Owner's Manual.*
- ◆ *On vehicles with telematics: deactivate service mode of telematics control unit ⇒ Radio, telephone, navigation system, self-diagnosis; Rep. gr. 01*

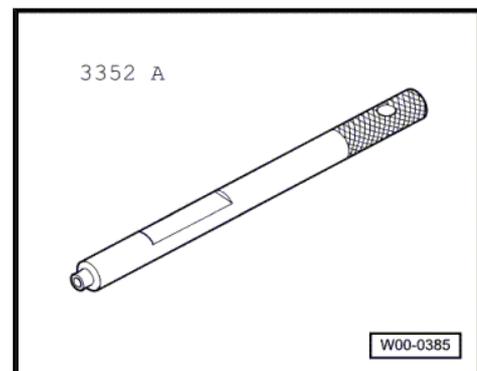
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 ◆ *For further procedures after re-connecting voltage supply ⇒ Rep. gr. 24 .*

Tightening torque

Component	Nm
Wire retainer to steering column	9

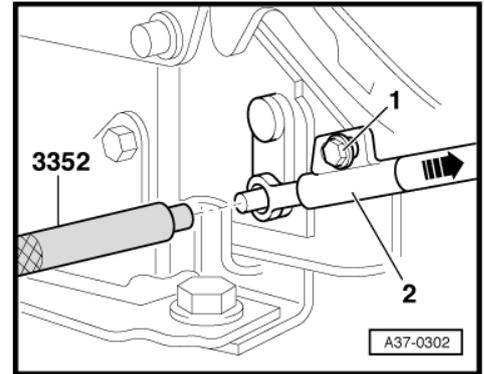
1.5 Adjusting locking cable**Special tools and workshop equipment required**

- ◆ Locking cable adjustment gauge -3352 A-



Procedure

- Tightening torque ⇒ [page 21](#)
- Slacken bolt -1-.
- It should be possible to move support bracket -2- for locking cable by hand.
- Insert the locking cable adjustment gauge -3352 A- between the pin on the locking cable lever and the locking cable eye.
- Pull locking cable in direction of -arrow- and tighten bolt.
- Remove adjustment gauge.
- Always check ignition key removal lock after adjusting locking cable ⇒ [page 27](#) .



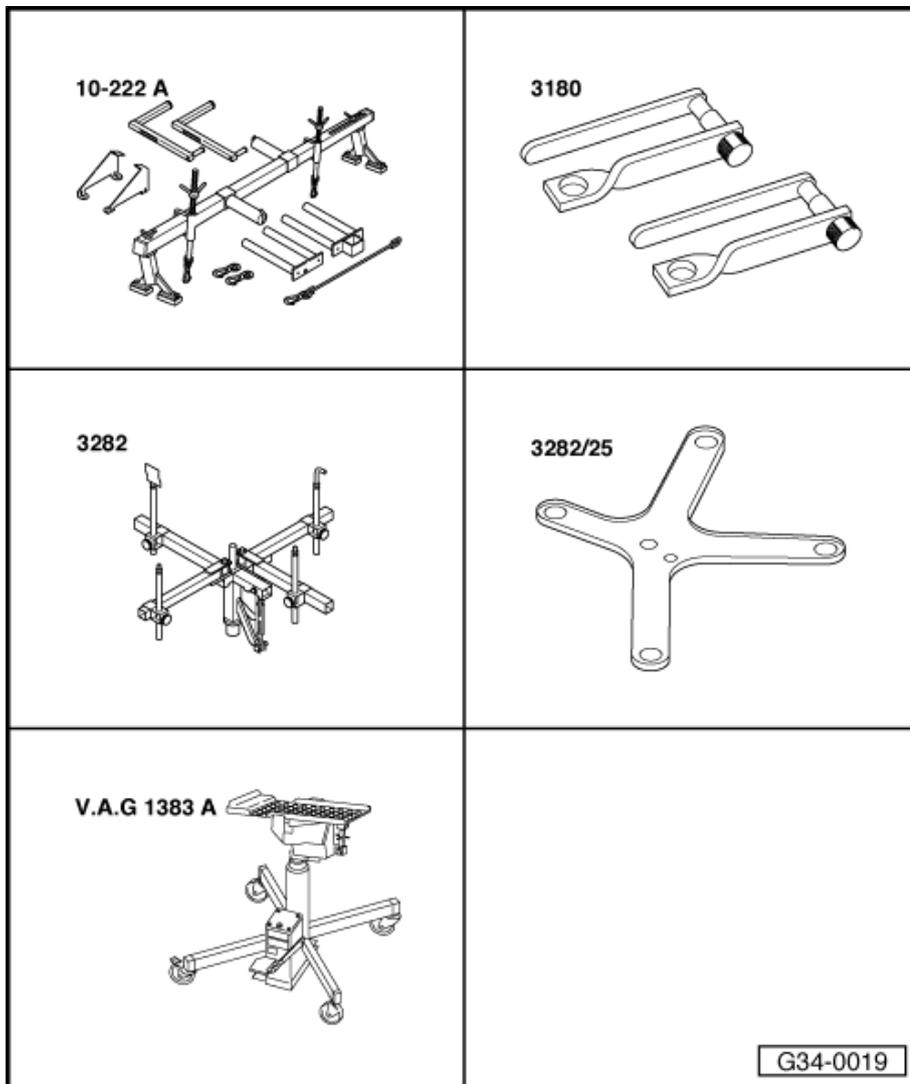
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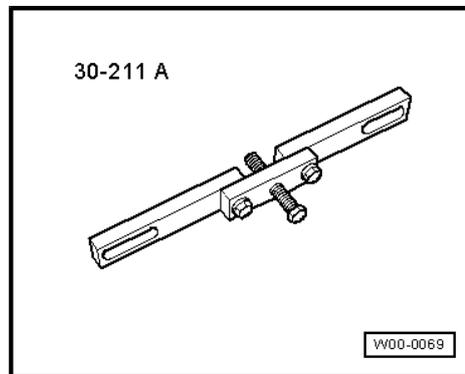
2 Removing and installing gearbox - vehicles with 8-cylinder petrol engine

Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A- with hook -10 - 222 A /2- and adapter -10 - 222 A /4-
- ◆ Retainers -3180-
- ◆ Gearbox support -3282-
- ◆ Adjustment plate -3282/25-
- ◆ Engine and gearbox jack - V.A.G 1383 A-

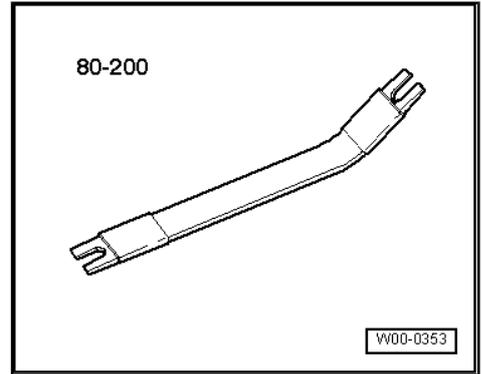


- ◆ Support bridge -30 - 211 A-

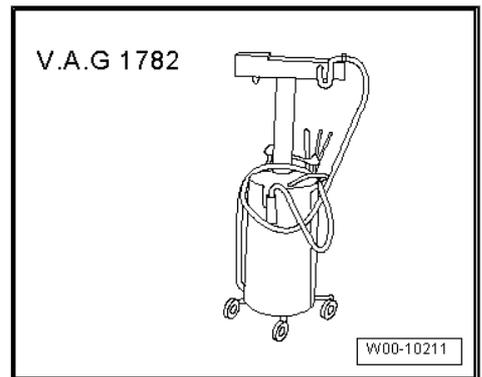


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- ◆ Removal lever -80 - 200-



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

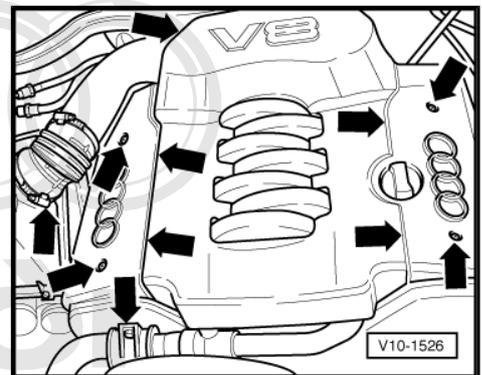


Removing

 **Caution**

- ◆ **Contact corrosion! Notes ⇒ page 14 .**
- ◆ **On vehicles with telematics: activate service mode of telematics control unit before disconnecting battery ⇒ Radio, telephone, navigation system, self-diagnosis; Rep. gr. 01 .**

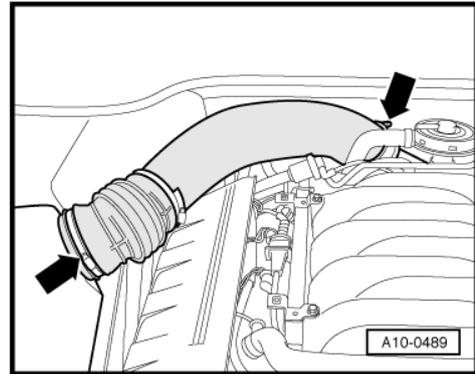
- Refer to coding on vehicles with encoded radio/radio navigation system (RNS); obtain coding if necessary.
- Disconnect earth strap on battery (in luggage compartment) with ignition switched off ⇒ Electrical system; Rep. gr. 27 .
- Remove engine cover panel -arrows-.



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- Remove air pipe between air cleaner and throttle valve unit -arrows-.
- Remove air hoses between air cleaner housing and lock carrier.

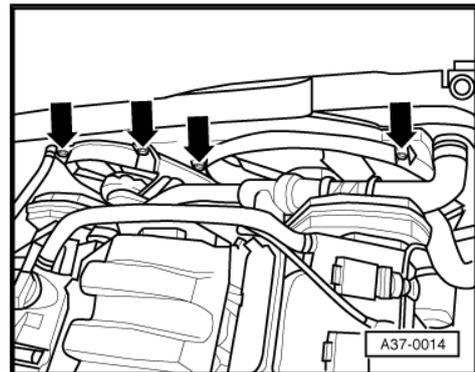


- Remove bolts -arrows- for radiator cowl and radiator fan.

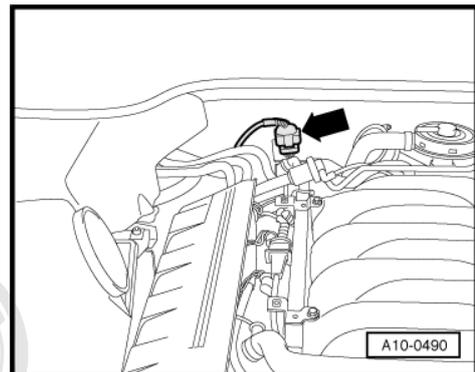


Note

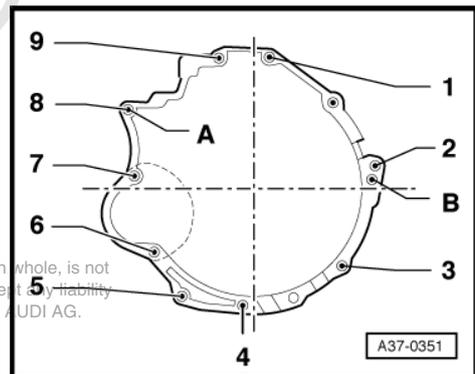
Radiator fan can be placed to one side with electrical wiring connected.



- Unplug electrical connectors for Lambda probes on left -arrow- and right of throttle valve unit.
- Remove top nuts for front exhaust pipes on left and right => Rep. gr. 26 .

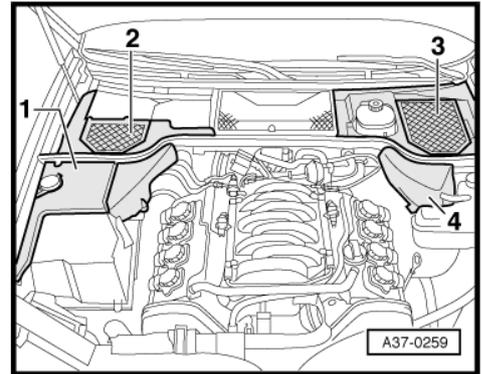


- Remove engine/gearbox securing bolts which are accessible from above.

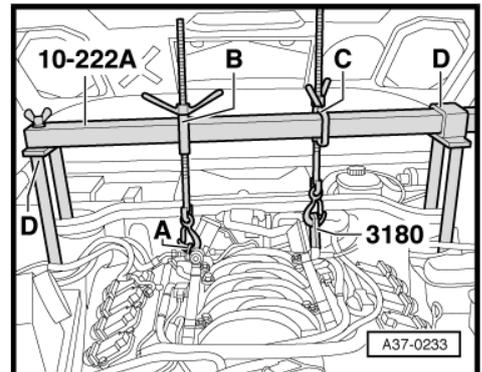


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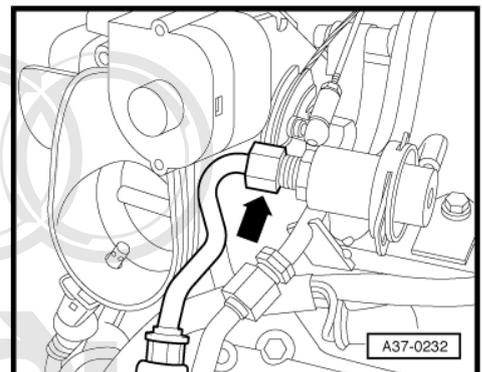
- Remove covers -1 ... 4-.



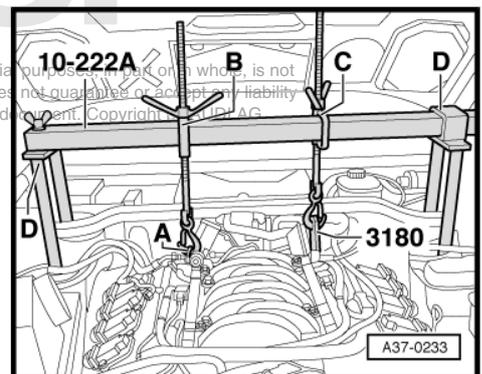
- Set up support bracket -10 - 222 A- with 2x adapters -10-222 A /4- -item D- and 2 spindles.
 - The spindle -B- is positioned in front of the support bracket.
 - The spindle -C- is positioned behind the support bracket.
- Position support bracket -10 - 222 A- onto bolts on suspension strut mountings and check stability.



- Unscrew fuel line from fuel pressure regulator -arrow-.



- Fit and secure retainer -3180- from gearbox side in engine lifting eye.
- Insert hook -10 - 222 A /2- -item A- in engine lifting eye at fuel pressure regulator.
- Partly take up weight of engine via spindles -B- and -C-.



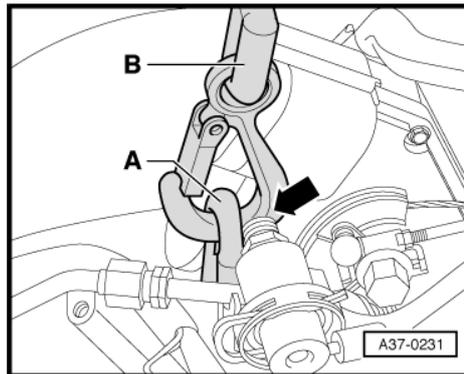
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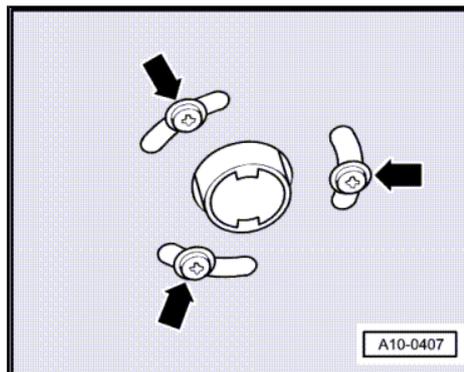
Caution

Risk of damage

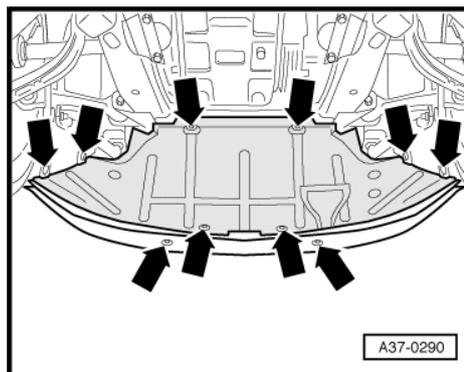
- ◆ *When raising or lowering the engine make sure that neither hook -B- nor hook -A- makes contact with the fuel pressure regulator -arrow-.*



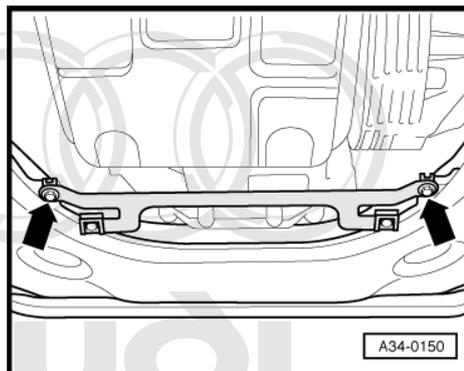
- Remove front wheels.
- On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



- Remove noise insulation panel -arrows-.

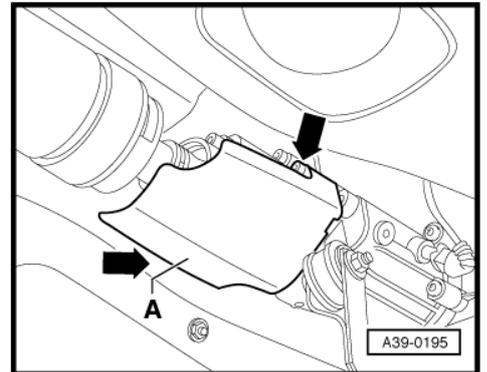
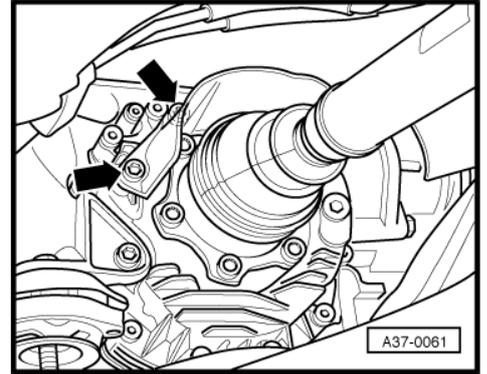


- Unbolt bracket for noise insulation -arrows-.
- Unclip vent hose for alternator.



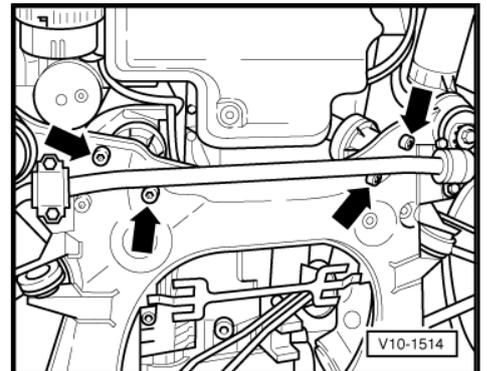
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- Unscrew heat shield -arrows- for drive shaft (left and right).
- Unbolt drive shafts (left and right) from gearbox flange shafts
⇒ Rep. gr. 40 .
- Unbolt heat shield for selector lever cable on left of gearbox.
- Remove bottom nuts for front exhaust pipes on left and right
⇒ Rep. gr. 26 .
- Remove Lambda probes after catalytic converter ⇒ Rep. gr. 24 .
- Unfasten clamps and remove front exhaust pipes with catalytic converters and Lambda probes ⇒ Rep. gr. 26 .
- Unbolt heat shield -A- for propshaft -arrows-.
- Remove bolts from propshaft at transfer box.
- Slide propshaft together towards rear final drive. The constant velocity joints can be moved axially.
- Tie up or support propshaft.



- Remove bottom bolts -arrows- for engine mountings

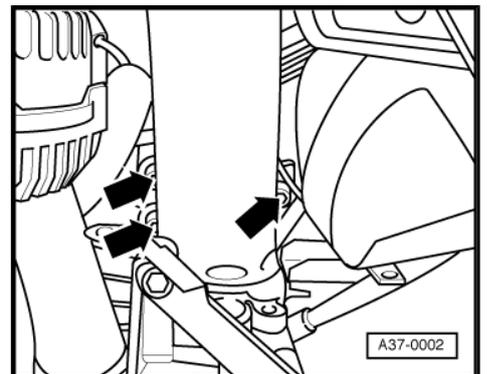
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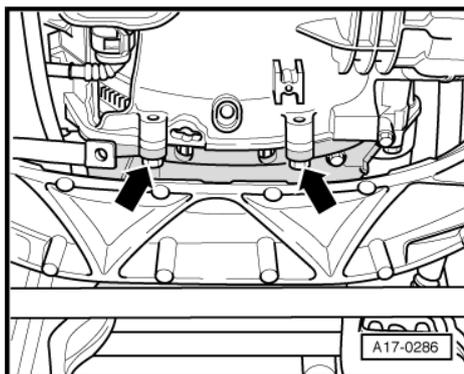
- Remove bolts -arrows- for torque reaction support (front right).
- Raise engine with spindles until engine mountings lift away from subframe.

i Note

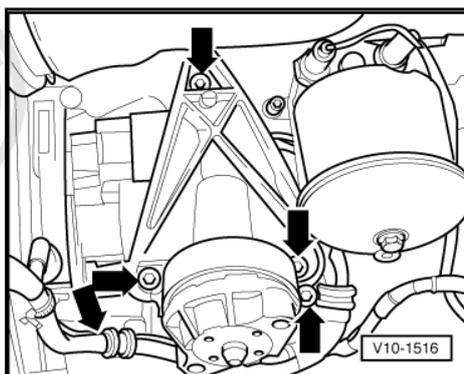
Make sure that the insulating material on the bulkhead is not damaged by the throttle valve unit.



- Remove bolts -arrows- between top section of sump and gear-box.

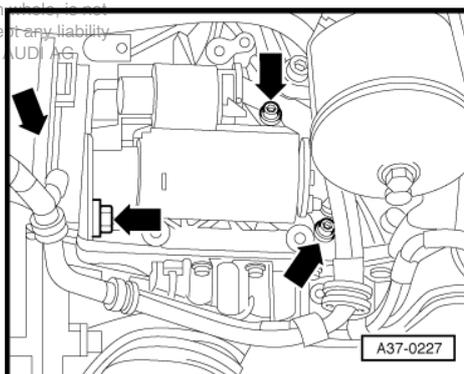


- Unscrew engine support (right-side) and cable clamps -arrows-; put down engine support on subframe.

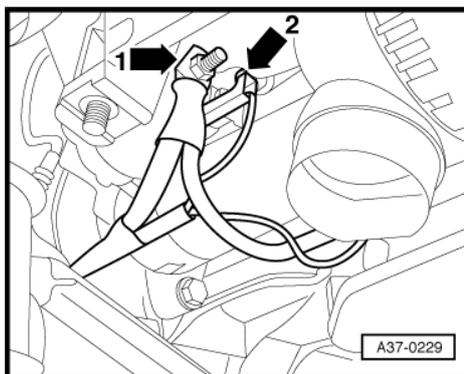


- Remove bolts -arrows- and pull out starter slightly.

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- Remove nut and detach B+ wire -arrow 1-.
- Unplug electrical connector -arrow 2- for terminal 50.
- Remove starter.

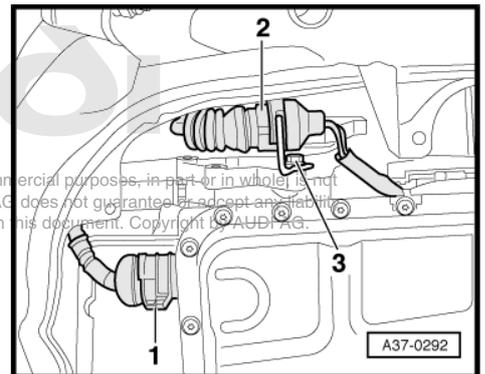
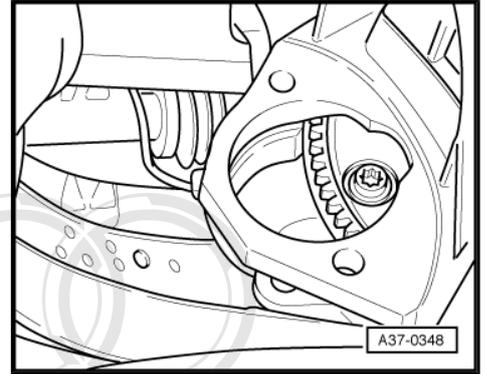


- Unscrew 3 Torx socket head bolts from torque converter through opening for starter (rotate crankshaft $\frac{1}{3}$ turn for each bolt).

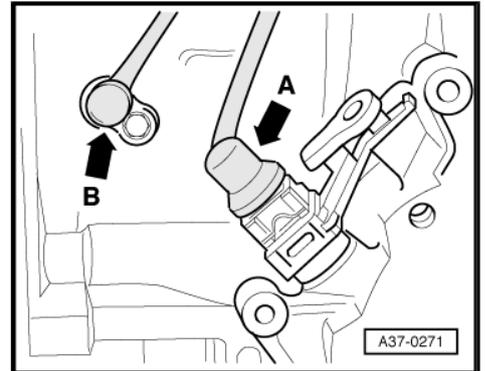
i Note

To loosen the torque converter bolts, counterhold at central bolt of vibration damper.

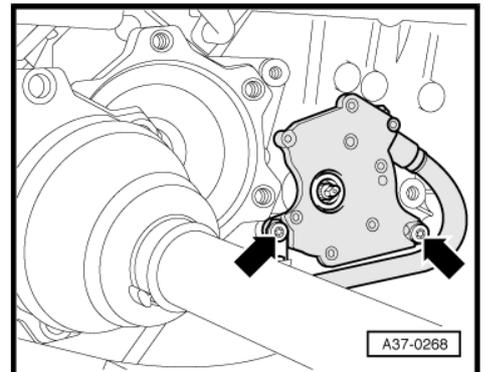
- Shift selector lever into position „P“.
- Lower engine, insert left engine mounting in subframe and tighten bottom bolts slightly.
- Turn locking lever -1- and unplug electrical connector for gearbox wiring harness.
- Unplug electrical connector -2- of multi-function switch - F125- .
- Unbolt bracket -3- for connector and guide out connector with bracket from underneath.



- Unplug electrical connector -arrow A- at speedometer sender -G22- .
- Unscrew engine speed sender -G28- -arrow B- (front left) from gearbox.

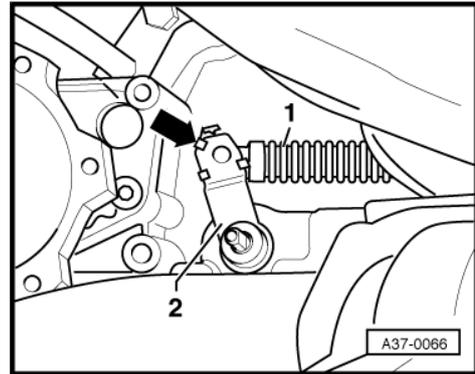


- Unscrew multi-function switch -F125- to protect it from damage -arrows- and move wiring harness clear.

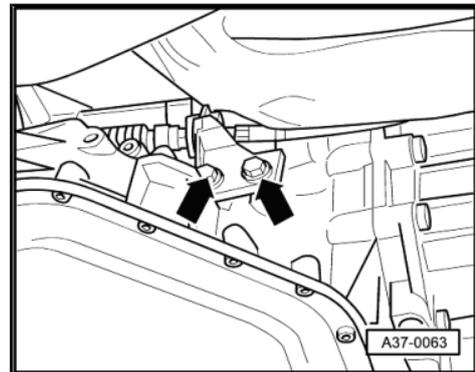




- Use removal lever -80 - 200- to prise selector lever cable -1- off selector shaft lever -2- (remove retaining clip -arrow- if fitted).



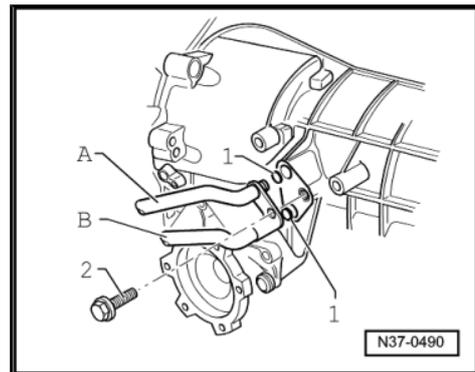
- If necessary, mark position of selector lever cable support bracket on gearbox housing for later installation, and unbolt support bracket -arrows-.
- Unbolt retaining clip for ATF lines from engine support (left-side).
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



Note

Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#).

- Remove bolt -2-.
- Pull out ATF lines -A- and -B- and move clear to one side.



Note

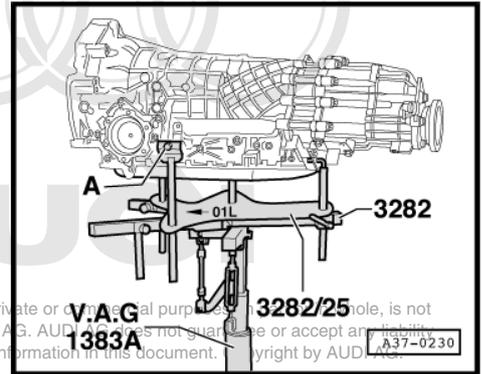
-Item 1- can be disregarded.

- Seal pipes and gearbox connections with clean sealing plugs to prevent ATF from escaping.
- Set up gearbox support -3282- on engine and gearbox jack -1383 A- .
- Place adjustment plate -VAS 3282/25- on gearbox support -3282- (adjustment plate only fits in one position).
- Align arms of gearbox support according to holes in adjustment plate.

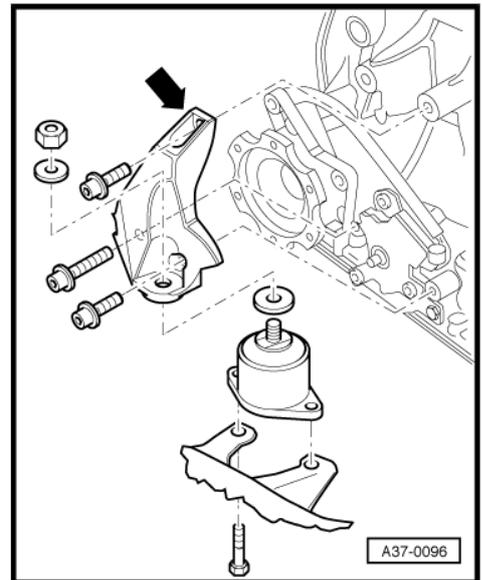


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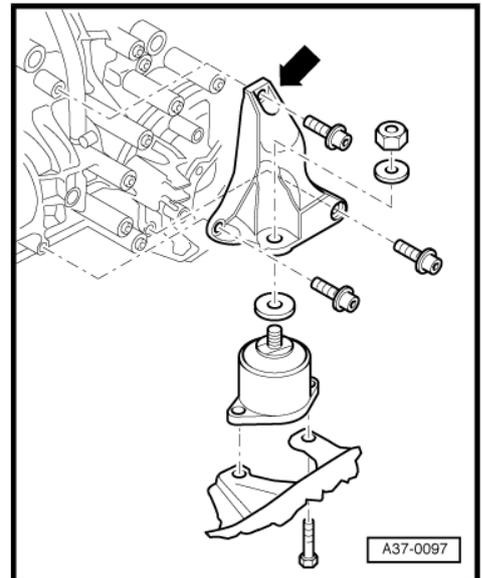
- Attach support elements as illustrated on adjustment plate.
- Place engine and gearbox jack -1383 A- with gearbox support -3282- underneath gearbox and support gearbox.
- The arrow symbol on the adjustment plate points in the direction of travel.
- Align adjustment plate parallel to gearbox and secure left support to gearbox with bolt M10 -item A-.



- Remove gearbox support -arrow- (left-side) together with gearbox mounting.

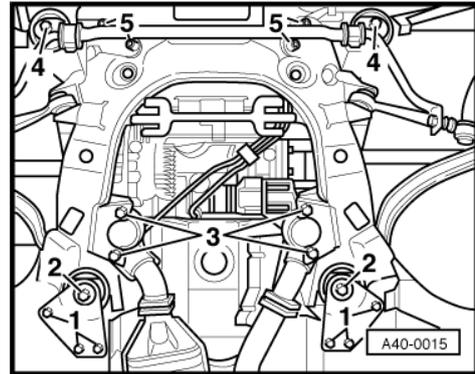


- Remove gearbox support -arrow- (right-side) together with gearbox mounting.





- Remove bolts -1- and -2- at rear of subframe.



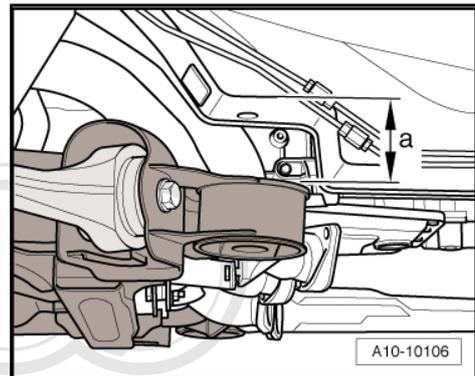
- The subframe should be lowered by -a- = approx. 100 mm from the mounting point on the body.



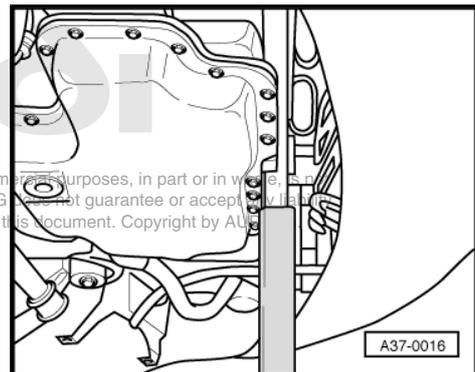
Note

Do not loosen the two bolts at front of subframe, otherwise wheel alignment must be performed.

- Lower gearbox slightly at the rear.

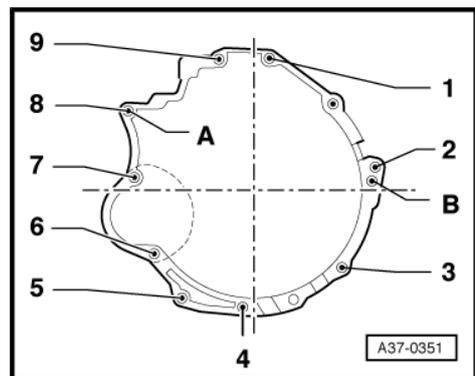


- Support engine at front with commercially available support.

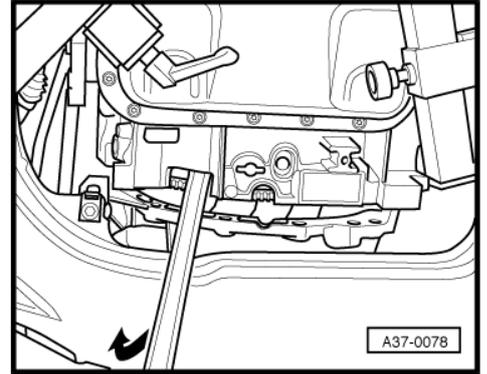


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- Remove remaining engine/gearbox securing bolts.



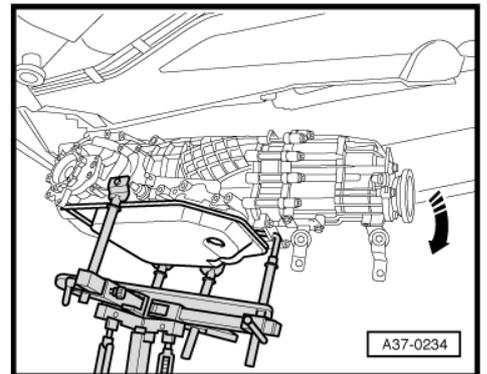
- Press gearbox off engine and at the same time press torque converter out of drive plate.



- Lower rear end of gearbox by adjusting gearbox support -3282- accordingly.
- Unplug electrical connector for gearbox output speed sender -G195- at transfer box (rear right).
- Move electrical wiring clear.
- Guide the gearbox out diagonally downwards/to the rear.

i Note

- ◆ *If necessary, reduce tension at spindle of support bracket -10 - 222 A- .*
- ◆ *Ensure that there is sufficient room between bulkhead and engine.*



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

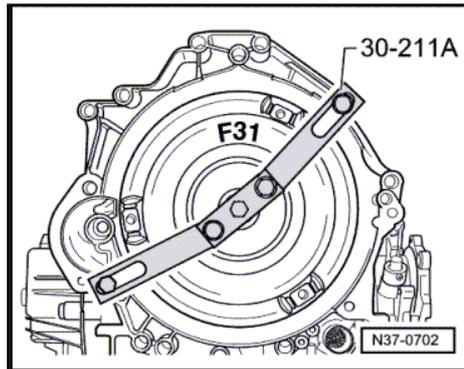
Installing

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



Note

- ◆ Clean ATF lines and ATF cooler before installing a replacement gearbox => [page 66](#) .
 - ◆ Renew bolts which are tightened by turning through a specified angle.
 - ◆ Renew self-locking nuts and bolts, and seals, O-rings and gaskets.
 - ◆ Use new genuine bolts to secure torque converter to drive plate => *Electronic parts catalogue* .
 - ◆ After detaching propshaft, it is important to clean out any locking fluid residues from threads in flange shafts on gearbox and in flange for propshaft on rear final drive. Otherwise there is a danger that the new bolts will seize when they are screwed in and then shear off the next time they are removed. The threads can be cleaned with a thread tap.
 - ◆ Secure all hose connections with the correct hose clips (as original equipment); refer to => *Electronic parts catalogue* .
 - ◆ All cable ties which are released or cut open during removal must be fitted in the same position when installing.
- Before installing gearbox, tie electrical wiring off to one side so that it cannot be trapped between the engine and the gearbox.
 - Check that dowel sleeves for centralising engine/gearbox are in the cylinder block, install if necessary.



Note

If the dowel sleeves get stuck in the gearbox housing they must be removed and new dowel sleeves must be fitted on the engine.

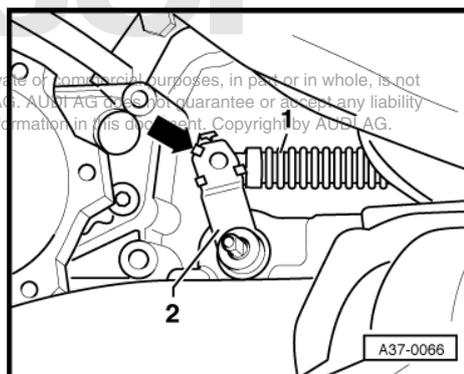
- Press selector shaft lever -2- on gearbox towards the rear as far as it will go -arrow- until parking lock engages.



Note

-Item 1- can be disregarded.

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- Before installing the gearbox ensure that the torque converter has been correctly fitted in the gearbox ⇒ [page 19](#) .

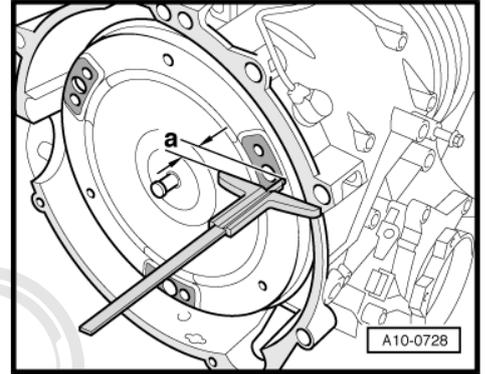


Caution

Drive lugs on ATF pump can be damaged if torque converter is not fitted correctly.

- ◆ *Checking position of torque converter.*

- If the torque converter is correctly installed, the depth -a- between the contact surfaces of the tapped holes 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.

- Make sure that no wiring or pipes are trapped when bringing engine and gearbox together.



Caution

The gearbox can be damaged if the torque converter is not fitted correctly.

- ◆ *Before and while you are tightening the bolts on the engine/gearbox connection keep checking that the torque converter can still be rotated behind the drive plate.*
- ◆ *If the torque converter cannot be turned, the drive lugs on the ATF pump and consequently the gearbox will be irreparably damaged when the bolts are fully tightened.*

- If necessary, re-insert adjustment plate between front longitudinal member and torque reaction support.
- Install subframe ⇒ Rep. gr. 40 .
- Install gearbox supports with gearbox mountings ⇒ [page 55](#) .
- Adjust selector lever cable ⇒ [page 32](#) .
- Install multifunction switch -F125- ⇒ [page 75](#) .
- Install heat shield for selector lever cable ⇒ [page 27](#) .
- Install ATF lines ⇒ [page 66](#) .
- Bolt propshaft to transfer box ⇒ „5.1 Removing and installing propshaft“, [page 152](#) .
- Install heat shield for propshaft ⇒ [page 152](#) .
- Bolt drive shafts to gearbox flange shafts ⇒ Rep. gr. 40 .
- Install heat shield for drive shaft ⇒ [page 134](#) .
- Install starter ⇒ Electrical system; Rep. gr. 27 .
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .



Note

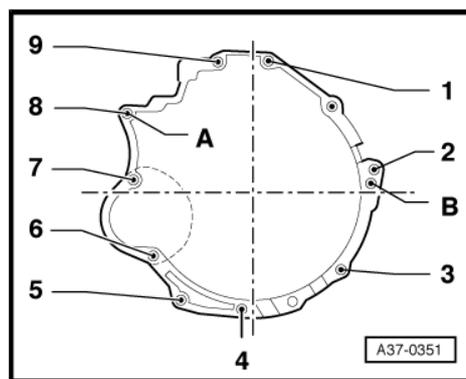
- ◆ *When reconnecting battery, remember to activate vehicle equipment (radio/navigation system (RNS), clock, electric windows) according to Owner's Manual.*
- ◆ *On vehicles with telematics: deactivate service mode of telematics control unit ⇒ Rep. gr. 01*
- ◆ *For further procedures after reconnecting voltage supply ⇒ Rep. gr. 24 .*

- Check oil level in front final drive ⇒ [page 130](#) .
- Check ATF level and top up as required ⇒ [page 59](#) .

Tightening torques

Engine/gearbox securing bolts

Item	Bolt	Nm
1, 8, 9	M12x75	65
2	M12x90	65 ¹⁾
3	M10x60 or M10x45	45
4, 5	M10x45	45
6	M10x80	65
7	M12x110 or M12x90	65
A, B	Dowel sleeves for centralising	
• ¹⁾ With bracket for ATF line		



Component		Nm
Bolts/nuts	M6	10
	M8	20
	M10	45
	M12	65
Except for the following:		
Drive plate to torque converter	M10 x1	85 ¹⁾
Engine mounting to subframe		40
Engine support to cylinder block		40
Torque reaction support to longitudinal member		40
Bracket to starter		10
Cross member to body		25
• ¹⁾ Renew bolts.		

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3 Removing and installing gearbox - vehicles with 8-cylinder TDI engine

Automatic gearbox 01L is removed together with engine towards front of vehicle and is then detached from engine.

- Removing and installing engine together with gearbox ⇒ Rep. gr. 10 .



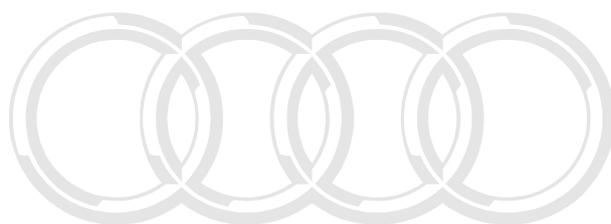
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4 Removing and installing gearbox - vehicles with 12-cylinder engine

Automatic gearbox 01L is removed together with engine towards front of vehicle and is then detached from engine.

- Removing and installing engine together with gearbox ⇒ Rep. gr. 10 .



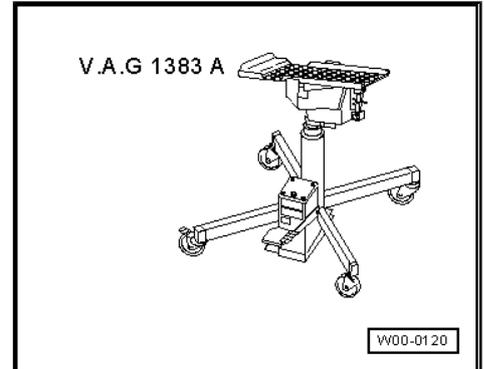
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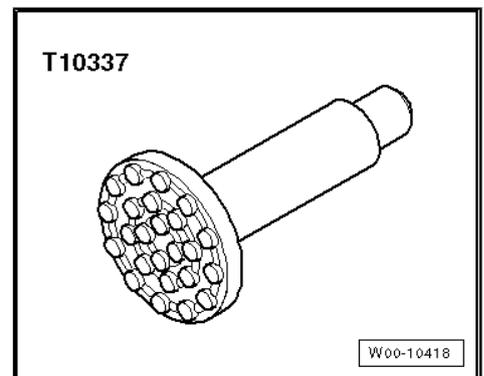
5 Removing and installing gearbox support (left and right)

Special tools and workshop equipment required

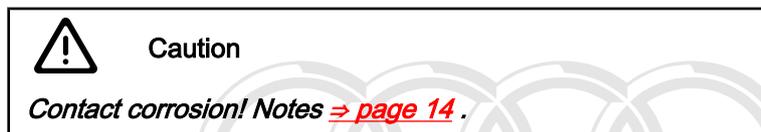
- ◆ Engine and gearbox jack -V.A.G 1383 A-



- ◆ Gearbox support -T10337-



Removing

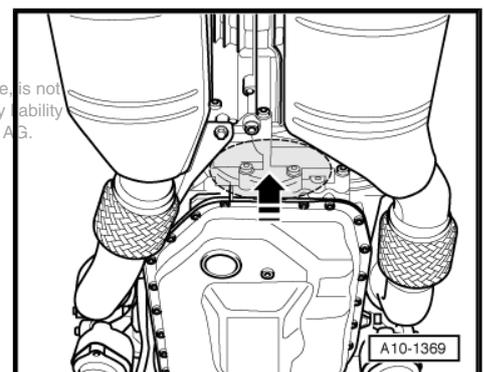


Note

The weight of the gearbox must be supported as described here if both gearbox supports are removed. It is not necessary to use engine and gearbox jack if only one of the supports is removed.

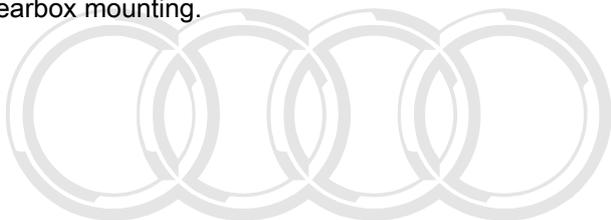
- Apply engine and gearbox jack -V.A.G 1383 A- with gearbox support -T10337- behind ATF oil pan on transfer box at the point marked -arrow-

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Gearbox support (left-side):

- Remove gearbox support (left-side) -arrow- together with gearbox mounting.



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Gearbox support (right-side):

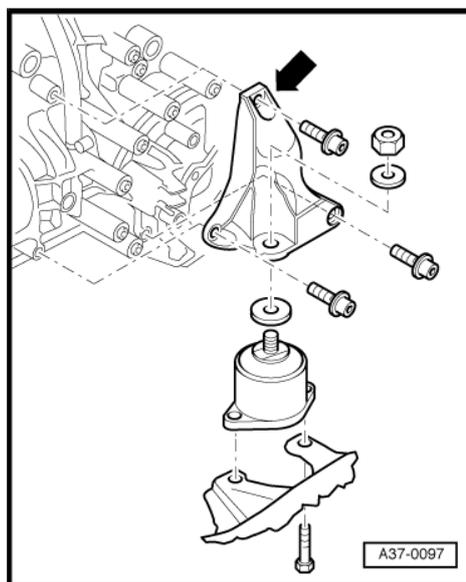
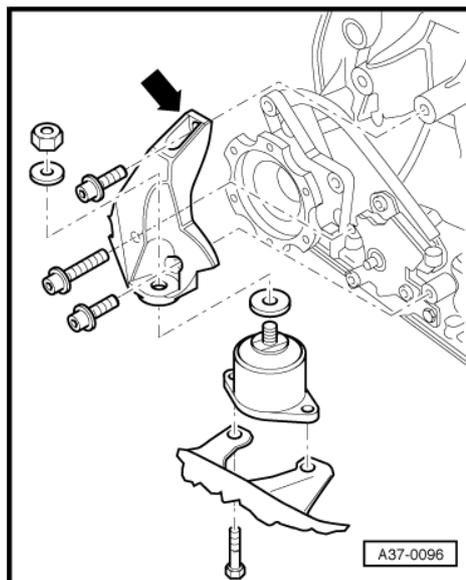
- Remove gearbox support (right-side) -arrow- together with gearbox mounting.

Installing

- Tightening torques:

Component		Nm
Gearbox support to:	Gearbox	42
	Gearbox mounting	42
Gearbox mounting to subframe		40

Perform installation in reverse sequence of removal.



6 Transporting automatic gearbox

Description of work sequence ⇒ Servicing automatic gearbox
01L, four-wheel drive; Rep. gr. 37 ; Transporting automatic gear-
box .



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7 **Securing gearbox to engine and gearbox support**

Description of work sequence ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 37 ; Securing gearbox to engine and gearbox support .

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8 Exploded view - ATF drain plug, inspection plug and filler plug

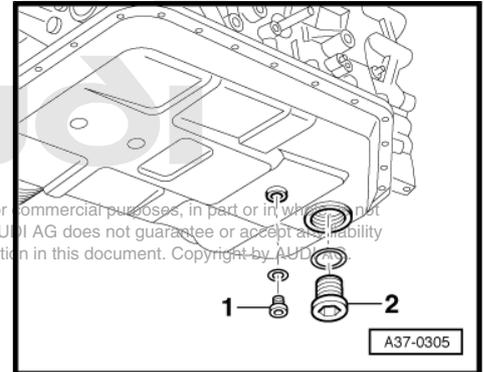
Plug for ATF inspection hole and ATF drain plug

1 - ATF drain plug - hexagon socket, 5 mm

- Renew ATF drain plug with seal.
- Tightening torque: 12 Nm.

2 - ATF inspection and filler plug - hexagon socket, 17 mm

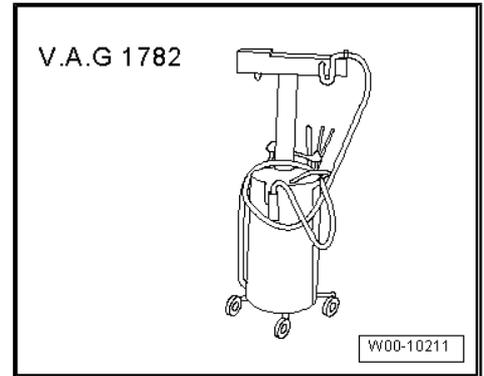
- Renew O-ring
- Tightening torque: 80 Nm.



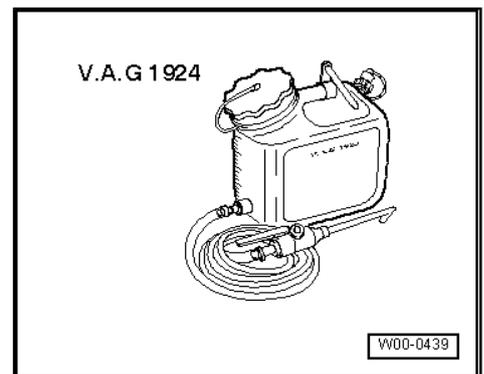
8.1 Checking and topping up ATF level in planetary gearbox

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 tester
- ◆ Safety goggles

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 tester 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 30 °C. If necessary, first allow the gearbox to cool down.



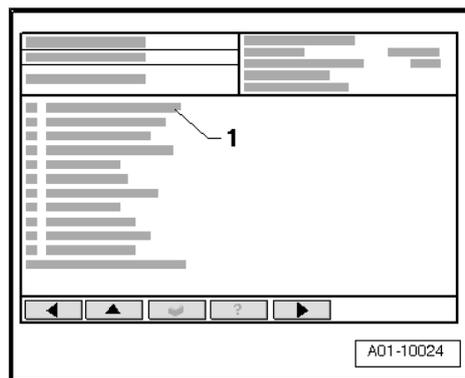
Note

- ◆ *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 tester .*

ATF temperature reading

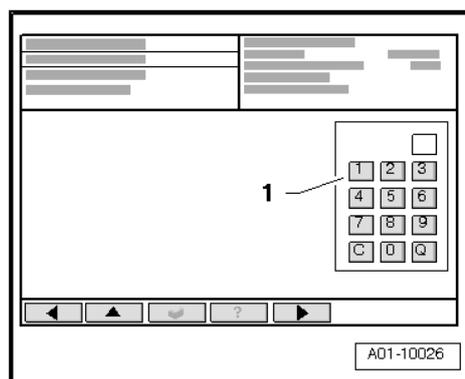
Indicated on vehicle diagnostic tester (example):

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



Indicated on vehicle diagnostic tester (example):

- Using keypad -1- press button for „Display group 004“ and confirm entry by pressing button.



Indicated on vehicle diagnostic tester (example):

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

Checking and correcting ATF level

- Tightening torque ⇒ [page 59](#)

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 hole when ATF temperature is between 30°C and 45°C, or 50°C in hot climates (the fluid level rises due to expansion as it warms up).*

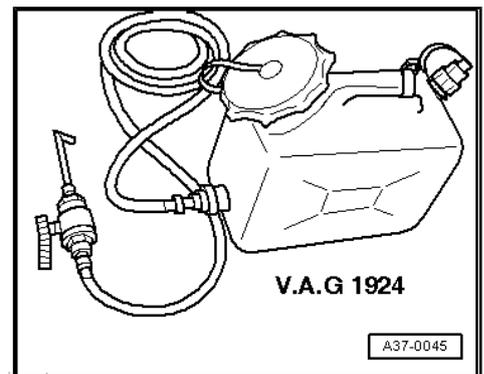
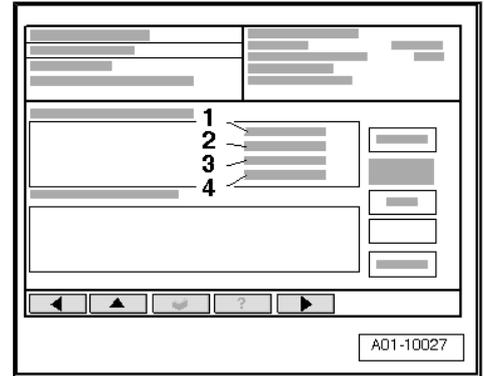
Caution

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

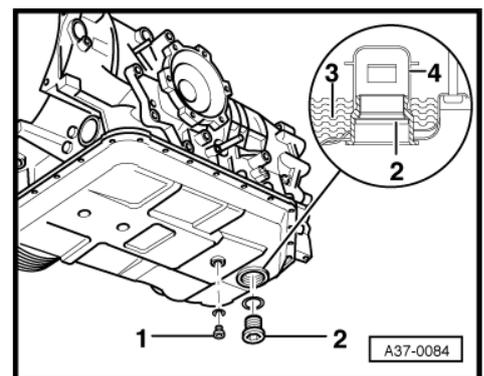
- Fill the ATF filling unit -V.A.G 1924- with the ATF for the automatic gearbox 01L.
- ATF specifications ⇒ Electronic parts catalogue .
- Secure reservoir for ATF filling unit -V.A.G 1924- as high as possible on vehicle.
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.

WARNING

Wear safety goggles.

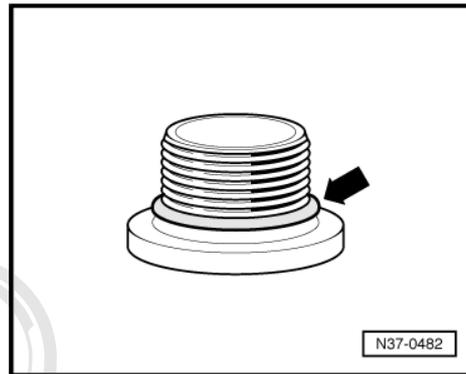


- When ATF reaches temperature of 35 °C, unscrew plug -2- for ATF inspection hole.





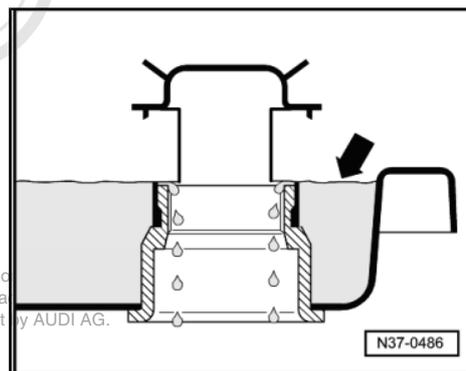
- Cut open seal -arrow- for plug and renew.



Note

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

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.



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 for ATF inspection hole and tighten.

The ATF check is now completed.

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

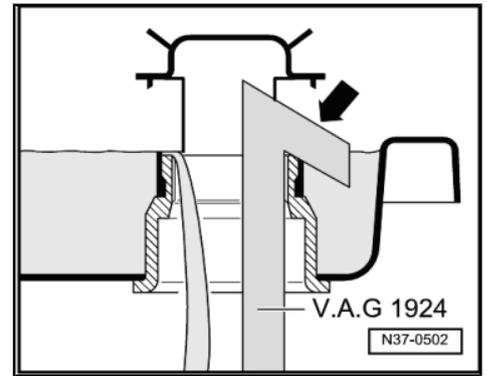
If no ATF emerges from ATF inspection hole when ATF has reached 40 °C, fill up with ATF => [page 63](#) .

Filling up ATF

- Guide filler nozzle -arrow- of ATF filling unit -V.A.G 1924- through ATF inspection hole into an opening in the deflector cap, taking care not to push the deflector cap upwards out of position.
- Fill with ATF using ATF filling unit until ATF comes out of inspection hole.

Note

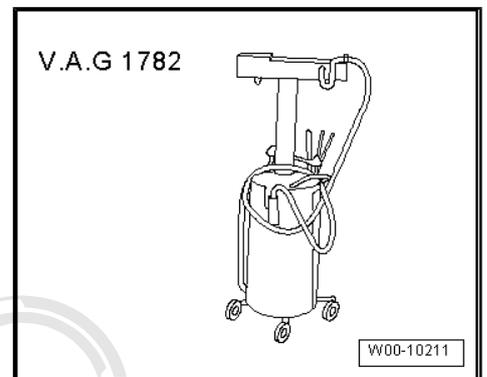
- ◆ *The ATF inspection plug must be screwed in again at the latest when the ATF reaches a temperature of 45 °C (countries with hot climates: 50 °C).*
- ◆ *If ATF temperature exceeds 45 °C too much fluid will escape as it expands when heated. In this case the quantity of fluid in the gearbox is NOT sufficient!*
- ◆ *If necessary, switch off engine and allow gearbox to cool down.*
- Fit new seal on plug for ATF inspection hole and tighten.
- Exit from function „Measured values“ by pressing  button.
- Press „End output“.
- Switch off ignition and unplug diagnostic connector.



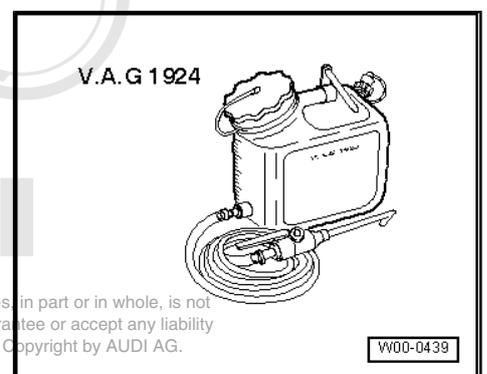
8.2 Draining ATF and filling up after repairs

Special tools and workshop equipment required

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



- ◆ ATF filling unit -V.A.G 1924-



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- ◆ Safety goggles



Procedure

- Engine not running.
- Tightening torques ⇒ [page 59](#)



Note

- ◆ *Observe relevant disposal regulations.*
- ◆ *The engine must not be started and vehicle must not be towed without ATF in gearbox.*
- ◆ *Always clean ATF lines and ATF cooler before installing a replacement gearbox.*

Draining ATF

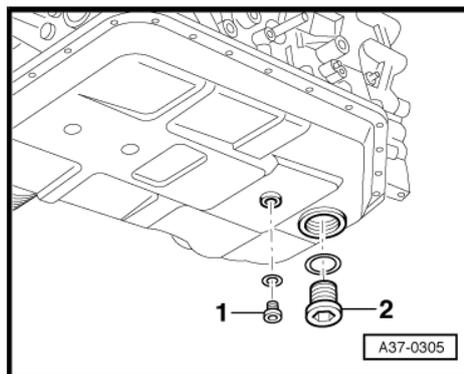
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



WARNING

Wear safety goggles.

- Unscrew ATF drain plug -1-.
- Drain ATF.



Note

Renew the ATF drain plug.

- Tighten new ATF drain plug.

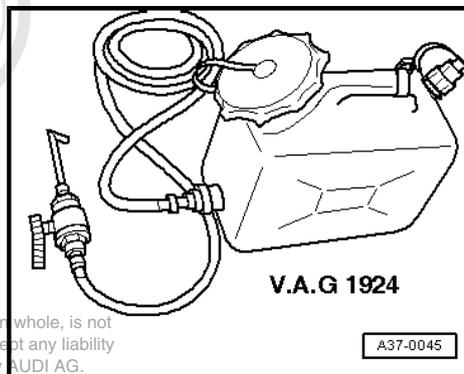
Filling up ATF



Caution

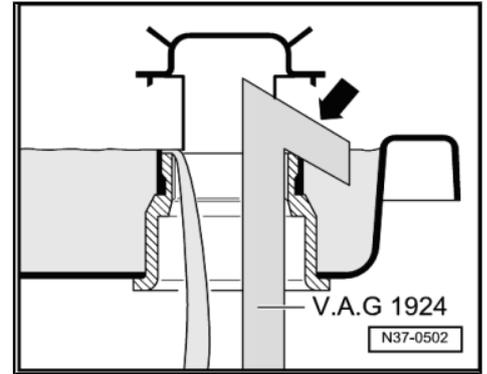
The ATF filling unit must be clean and the ATF must not be mixed with other types of ATF!

- Fill the ATF filling unit -V.A.G 1924- with the ATF for the automatic gearbox 01L.
- ATF specifications ⇒ [Electronic parts catalogue](#) .



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- Secure reservoir for ATF filling unit -V.A.G 1924- as high as possible on vehicle.
- Guide filler nozzle -arrow- of ATF filling unit -V.A.G 1924- through ATF inspection hole into an opening in the deflector cap, taking care not to push the deflector cap upwards out of position.
- Fill with ATF using ATF filling unit until ATF comes out of inspection hole.
- Shift selector lever into position „P“.
- Start engine.
- With the engine idling press the brake pedal and shift the selector lever through all the selector lever positions, leaving the selector lever 10 seconds in each position.
- Shift selector lever into position „P“.
- Check ATF level and top up as required ⇒ [page 59](#) .



 **Note**

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



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9 Exploded view - ATF lines



Note

- ◆ *Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#).*
- ◆ *Thoroughly clean all joints and connections and the surrounding areas before dismantling.*

1 - Bolt

- Do not tighten until pipes have been fully inserted
- 20 Nm

2 - O-ring

- Renew

3 - ATF line

- From cooler
- Observe markings on gearbox housing
- Push ATF pipes fully in by hand as far as stop, then bolt on

4 - Bolt

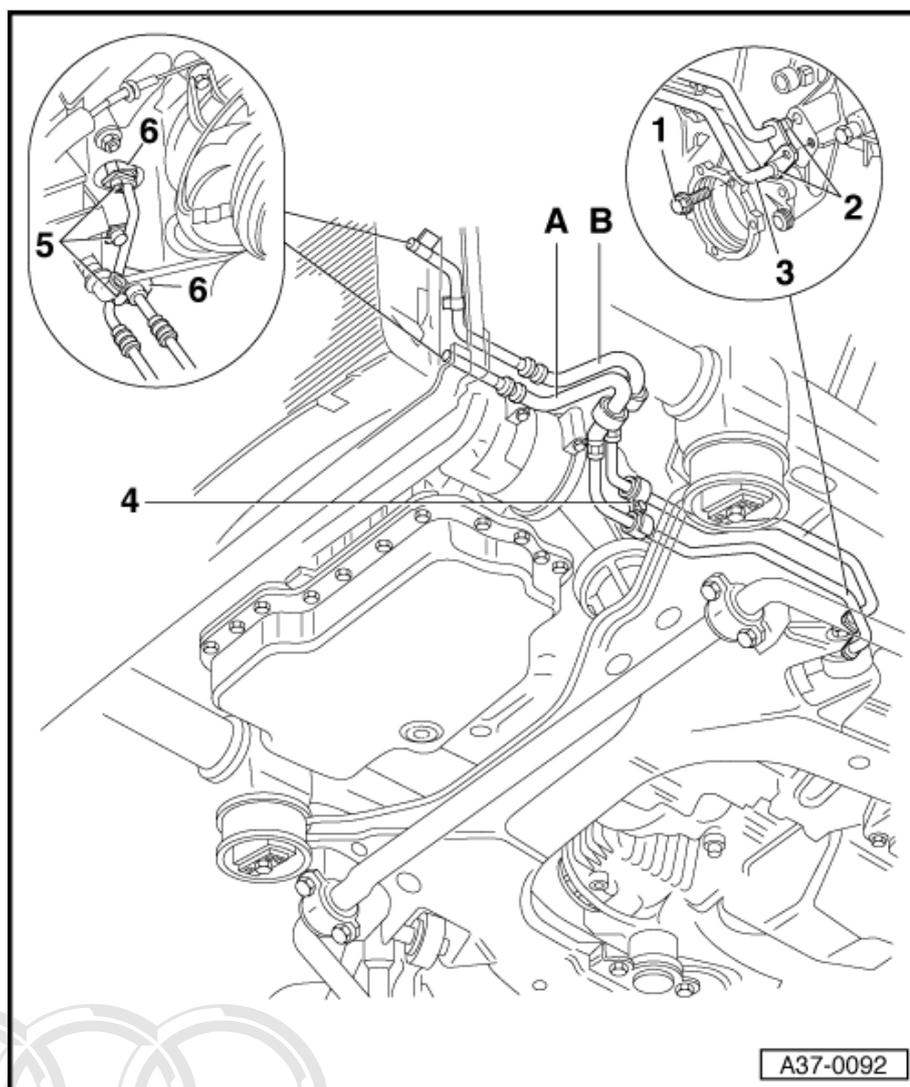
- 10 Nm

5 - Bolt

- Do not tighten until pipes have been fully inserted
- 5 Nm

6 - O-ring

- Renew



9.1 Cleaning ATF lines and ATF cooler

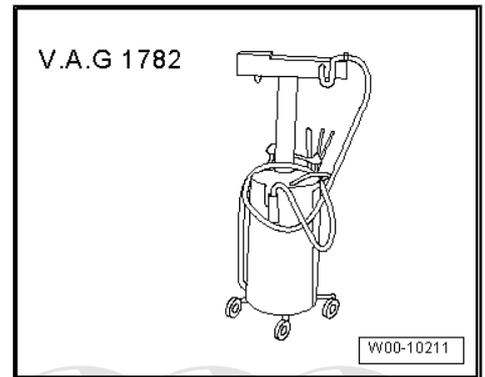


Note

- ◆ *Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#).*
- ◆ *Always clean ATF lines and ATF cooler before installing a replacement gearbox.*
- ◆ *If the ATF which emerges during cleaning is very dirty, the ATF lines and ATF cooler must additionally be flushed out with clean ATF.*

Special tools and workshop equipment required

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



- ◆ Hose, approx. 18 mm dia.
- ◆ Compressed-air gun (commercially available)
- ◆ Safety goggles

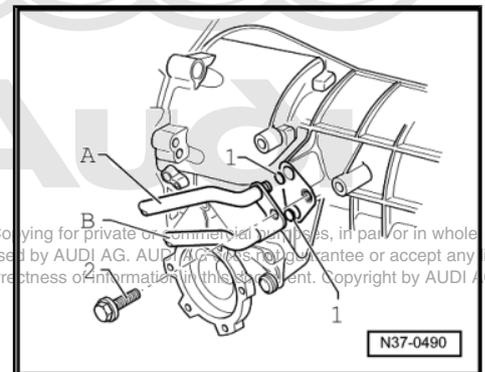
Procedure

- Remove bolt -2-.
- Pull out ATF lines -A- and -B-.

Note

-Item 1- can be disregarded.

- Connect a hose of approx. 18 mm dia. to ATF line -A- and secure with a hose clip. Hang other end of hose into drip tray of used oil collection and extraction unit -V.A.G 1782- .



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WARNING

Wear safety goggles.

- Blow through ATF line -A- with a compressed-air gun.
- Push hose onto ATF line -B- and repeat procedure.
- Install ATF lines ⇒ [page 66](#) .
- Check ATF level and top up as required ⇒ [page 59](#) .



38 – Gears, control

1 Exploded view - ATF oil pan, ATF strainer and 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 14](#) .*
- ◆ *Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#) .*
- ◆ *Lubricate O-rings with ATF. Other types of lubricant will cause the gearbox hydraulics to malfunction.*
- ◆ *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 drain plug

- Renew
- Tightening torque
⇒ [page 59](#)

2 - Seal

- Not available separately

3 - Bolt

- Tightening torque and sequence ⇒ [page 71](#)

4 - ATF oil pan

- Removing and installing
⇒ [page 71](#)

5 - Gasket

- Renew

6 - ATF strainer

- Removing and installing
⇒ [page 73](#)

7 - O-ring

- Renew
- Lubricate with ATF when fitting

8 - Bolt

- Different lengths
- Tightening torque and sequence ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 ; Exploded view - ATF oil pan, ATF strainer and valve body

9 - Valve body

- Removing and installing ⇒ [page 73](#)

10 - O-ring

- Renew
- Lubricate with ATF when fitting

11 - Speedometer sender -G22-

- Removing and installing ⇒ [page 74](#)

12 - Gearbox output speed sender -G195-

- Removing and installing ⇒ [page 74](#)
- 30 Nm

13 - Oil seal

- For selector shaft
- Removing and installing ⇒ [page 76](#)

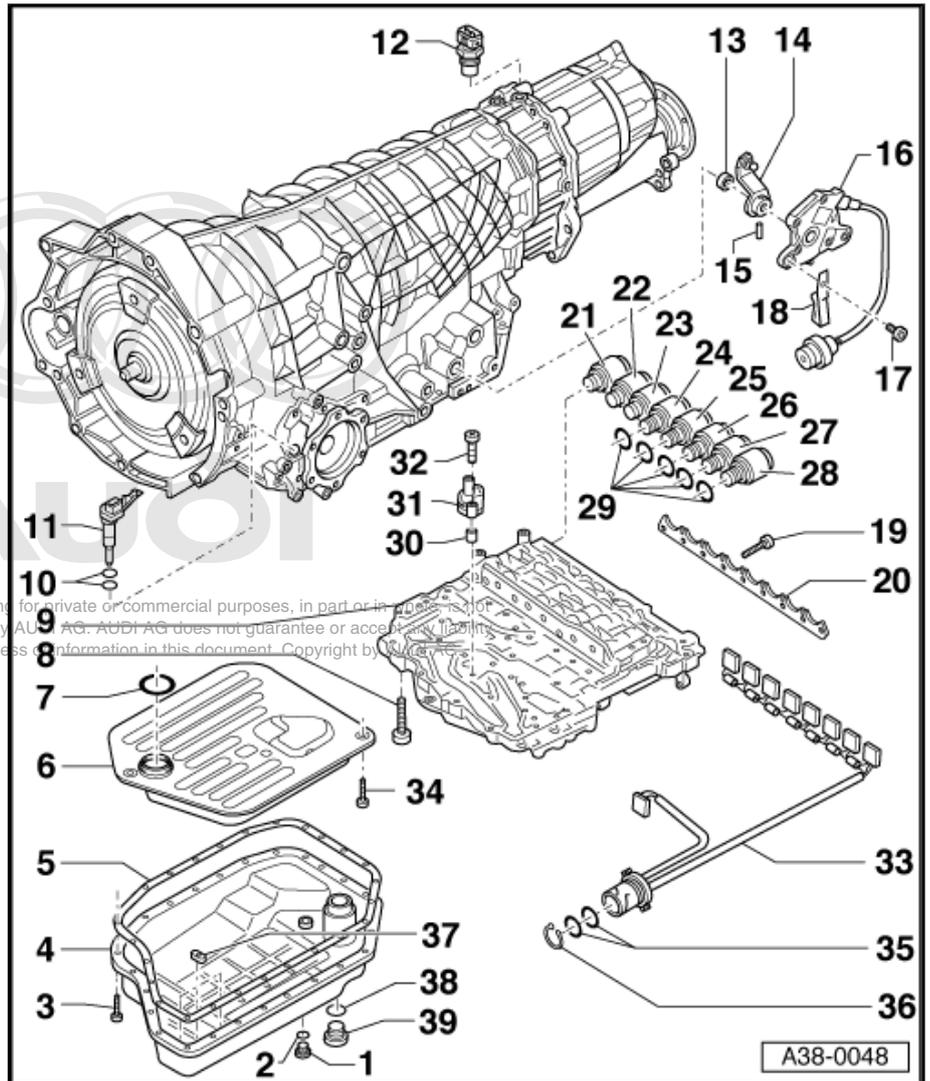
14 - Lever

- For selector shaft
- To remove, first remove spring pin -item 15-

15 - Spring pin

16 - Multifunction switch -F125-

- Removing and installing ⇒ [page 75](#)



**17 - Bolt**

- 8 Nm

18 - Bracket

- For multifunction switch wiring harness
- Secured with bolts for multifunction switch

19 - Bolt

- Tightening torque ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 ; Exploded view - ATF oil pan, ATF strainer and valve body

20 - Retainer

- For solenoid valves
- Must be removed when the solenoid valves are renewed

21 - Solenoid valve 3 -N90-

- Without O-ring
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

22 - Solenoid valve 2 -N89-

- Without O-ring
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

23 - Solenoid valve 1 -N88-

- Without O-ring
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

24 - Automatic gearbox pressure regulating valve 5 -N233-

- With O-ring
- Lubricate O-ring with ATF before fitting
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

25 - Automatic gearbox pressure regulating valve 2 -N216-

- With O-ring
- Lubricate O-ring with ATF before fitting
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

26 - Automatic gearbox pressure regulating valve 3 -N217-

- With O-ring
- Lubricate O-ring with ATF before fitting
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

27 - Automatic gearbox pressure regulating valve 4 -N218-

- With O-ring
- Lubricate O-ring with ATF before fitting
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

28 - Automatic gearbox pressure regulating valve 1 -N215-

- With O-ring
- Lubricate O-ring with ATF before fitting
- For removing and installing ⇒ [„1.1 Removing and installing ATF oil pan“, page 71](#)

29 - O-ring

- Renew
- Lubricate with ATF when fitting

30 - Spacer sleeve

- Length: 8.7 mm

31 - Gearbox input speed sender -G182-

- Removing and installing ⇒ [page 73](#)

32 - Bolt

- Tightening torque ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 ; Exploded view - ATF oil pan, ATF strainer and valve body

33 - Wiring harness in gearbox

- Gearbox oil temperature sender -G93- integrated in wiring harness
- Removing and installing ⇒ [page 73](#)

34 - Bolt

- For securing ATF strainer
- Tightening torque ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 ; Exploded view - ATF oil pan, ATF strainer and valve body

35 - O-ring

- Renew
- Lubricate with ATF when fitting

36 - Circlip

- Renew if damaged

37 - Magnet

- Qty. 4; located in recesses on oil ATF pan
- Clean
- Ensure that the magnet is in full contact with the ATF oil pan

38 - O-ring

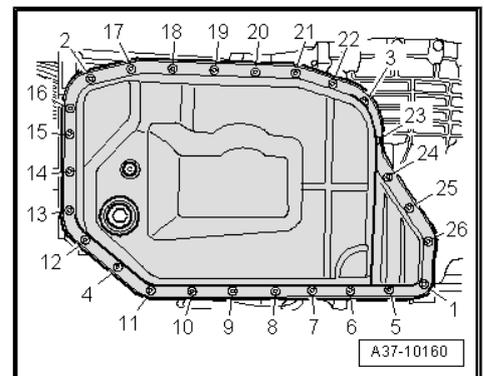
- Renew

39 - ATF inspection and filler plug

- Tightening torque ⇒ [page 59](#)

ATF oil pan - tightening specifications

- Tighten bolts for ATF oil pan in sequence -1 ... 26- in several stages.
- Tightening torque: 11 Nm

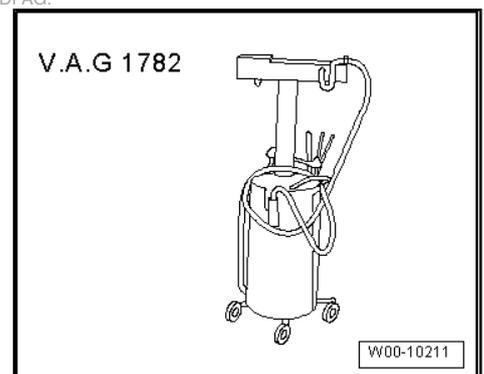


1.1 Removing and installing ATF oil pan

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Special tools and workshop equipment required

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





- ◆ Safety goggles

Removing



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



WARNING

Wear safety goggles.

- Remove ATF drain plug -1-.
- Drain ATF.



Note

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- ◆ *Observe relevant disposal regulations.*
- ◆ *Some ATF always remains in the oil pan.*
- ◆ *The engine must not be started and vehicle must not be towed without ATF in gearbox.*

- Unscrew bolts for ATF oil pan in sequence -26 ... 1-.
- Remove ATF oil pan.

Installing

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

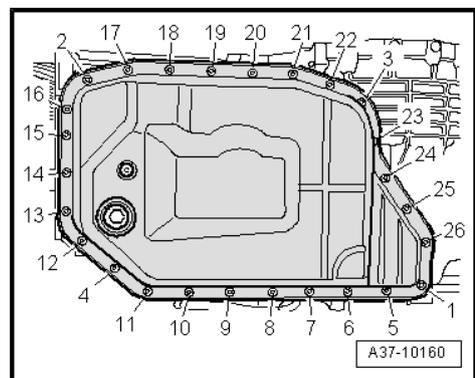
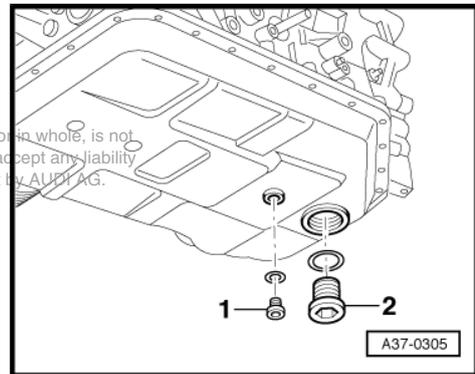
Tightening torques ⇒ [page 68](#)



Note

Renew gasket.

- Clean all magnets in recesses on ATF oil pan. Ensure that magnets make full contact with ATF oil pan.
- Clean sealing surface thoroughly; remaining material from the previous gasket must be removed completely.
- Tighten bolts for ATF oil pan; tightening specifications ⇒ [page 71](#) .



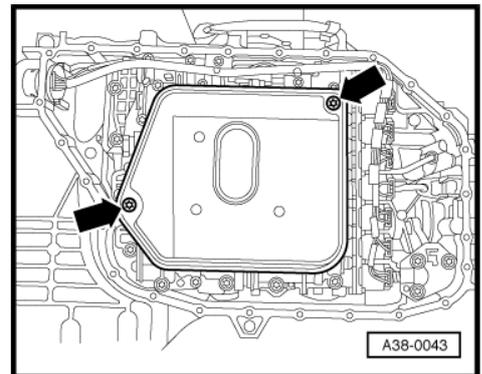
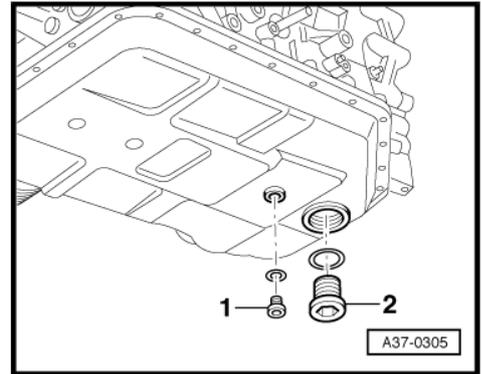
- Tighten new drain plug -1-; tightening torque ⇒ [page 59](#) .
- Fill up with ATF ⇒ [page 63](#) .



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1.2 Removing and installing ATF strainer

- Remove ATF oil pan ⇒ [page 71](#) .
- Removing and installing ATF strainer ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 .



1.3 Removing and installing valve body

- Remove ATF oil pan ⇒ [page 71](#) .
- Removing and installing valve body ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 .

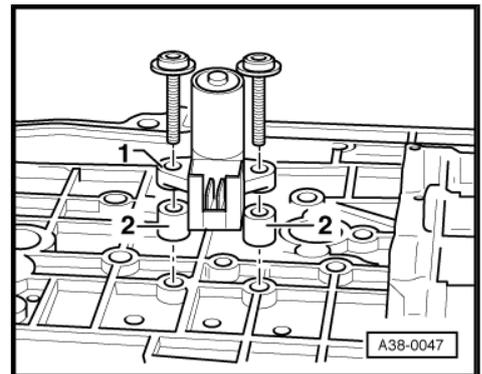
1.4 Removing and installing gearbox input speed sender -G182-

- Remove ATF oil pan ⇒ [page 71](#) .
- Removing and installing gearbox input speed sender -G182- ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 .



Note

Fitting location: the gearbox input speed sender -G182- is attached to the reverse side of the valve body.



1.5 Removing and installing wiring harness in gearbox

- Remove ATF oil pan ⇒ [page 71](#) .
- Removing and installing wiring harness in gearbox ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 38 .

1.6 Removing and installing gearbox oil temperature sender -G93-

The gearbox oil temperature sender -G93- is integrated in the gearbox wiring harness. Removing and installing ⇒ „1.5 Removing and installing wiring harness in gearbox“, page 73.

1.7 Removing and installing gearbox output speed sender -G195-

Removing

- Unplug electrical connector.
- Unscrew gearbox output speed sender -G195- -item C- from transfer box.



Note

-Items A, B- and -arrows- can be disregarded.

Installing

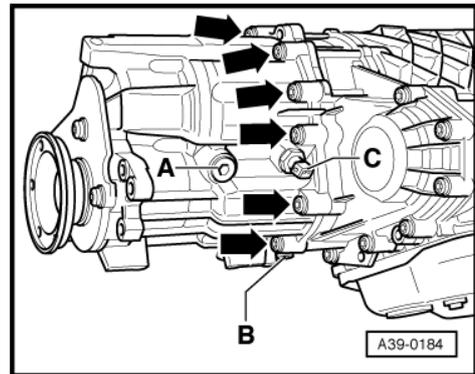
- Tightening torque ⇒ [page 68](#)

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



Note

- ◆ *Speed senders that have been dropped can no longer be used (permanent magnet broken).*
- ◆ *If gearbox oil comes out when the sender is renewed, change or fill up the gear oil in the transfer box after completing the repair work ⇒ [page 142](#).*



1.8 Removing and installing speedometer sender -G22-

Removing

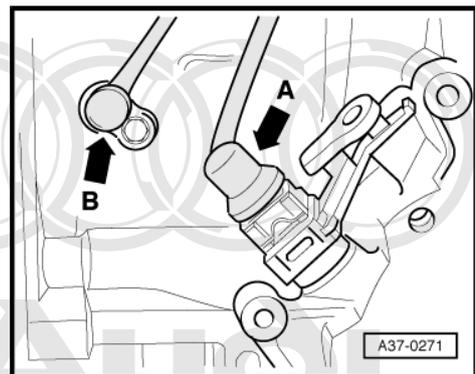
- Unplug electrical connector -arrow A- for speedometer sender -G22- on gearbox.



Note

-Arrow B- can be disregarded.

- Push down the retaining clip holding the sender, turn it, and pull out the sender.



Installing

- Tightening torque ⇒ [page 68](#)

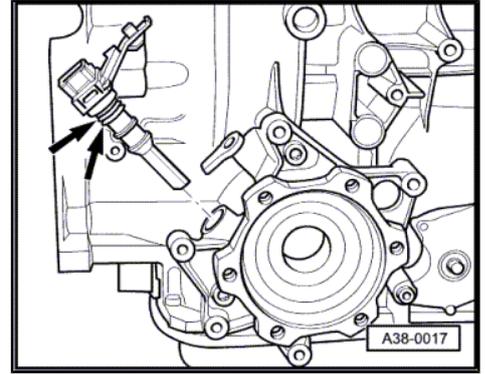
Installation is carried out in reverse sequence; note the following:



Note

Renew O-rings.

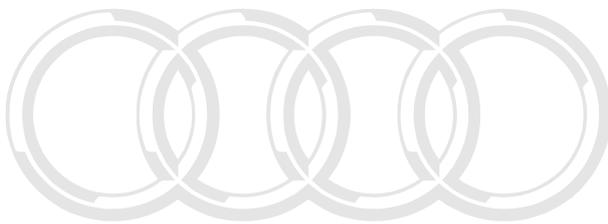
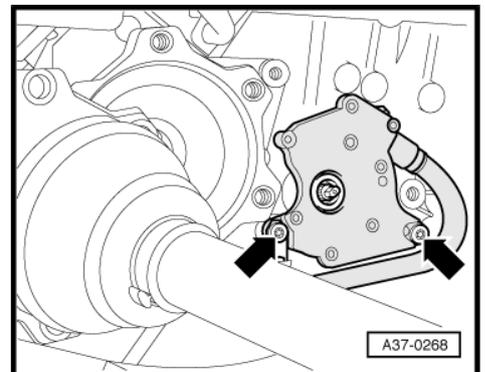
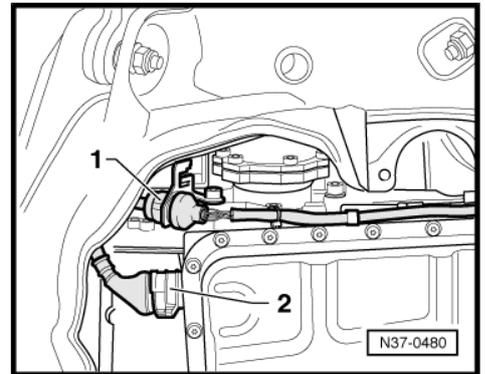
- Lightly lubricate O-rings -arrows- with ATF before installation to prevent them getting crushed during assembly.
- Fit sender and engage retaining clip on mounting bracket for flange shaft.



1.9 Removing and installing multifunction switch -F125-

Removing

- Remove gearbox support (left-side) ⇒ [page 55](#) .
- Unplug electrical connector -1- from multifunction switch -F125- .
- Remove bolts -arrows-.
- Move clear wiring harness and pull multifunction switch -F125- off selector shaft.



Audi



Installing

- Tightening torque ⇒ [page 68](#)
- Fit multifunction switch -F125- onto selector shaft. The flat surface in the splines of the switch -3- must coincide with the flat surface on the selector shaft -1-.



Note

Fit the multifunction switch -F125- centrally on the selector shaft. Take care to keep it straight and do not use excessive force. This could damage the switch contacts.

- Turn switch so that drilling -4- on switch housing can be fitted on locating pin -2- on gearbox housing.

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

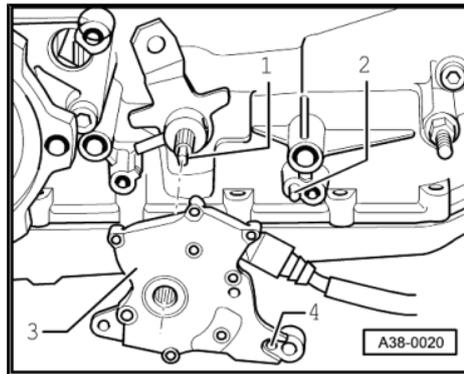
- Install gearbox support (left-side) ⇒ [page 55](#)

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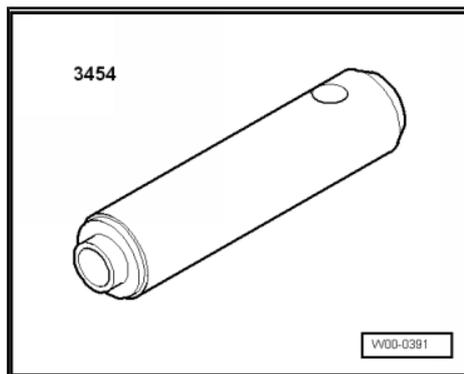
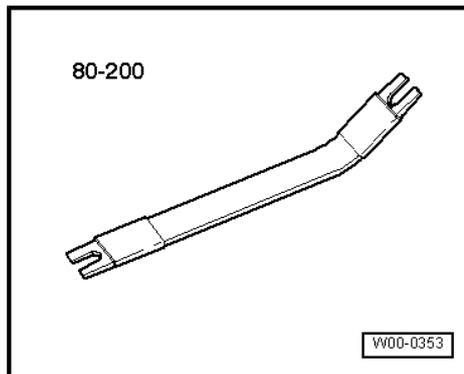
1.10 Renewing oil seal for selector shaft

Special tools and workshop equipment required

- ◆ Removal lever -80 - 200-



- ◆ Assembly sleeve -3454-



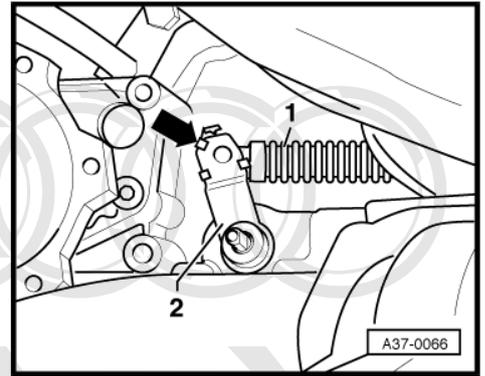
Procedure

- Remove gearbox support (left-side) ⇒ [page 55](#) .
- Remove multifunction switch -F125- ⇒ [page 75](#) .

- Use removal lever -80 - 200- to prise selector lever cable -1- off selector shaft lever -2- (remove retaining clip -arrow- if fitted).

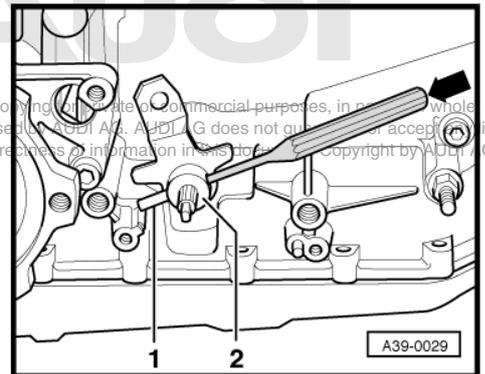
i Note

Do not bend or kink the selector lever cable.

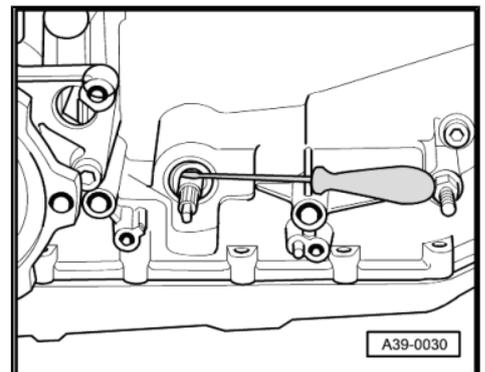


- Drive out roll pin -1- at selector shaft lever -2- towards the front -arrow- (as seen in direction of travel) until it is possible to detach selector shaft lever from selector shaft.

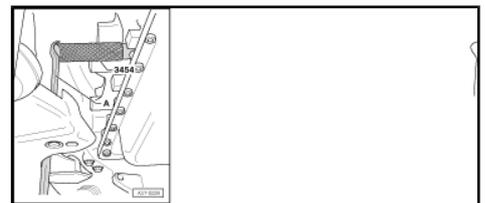
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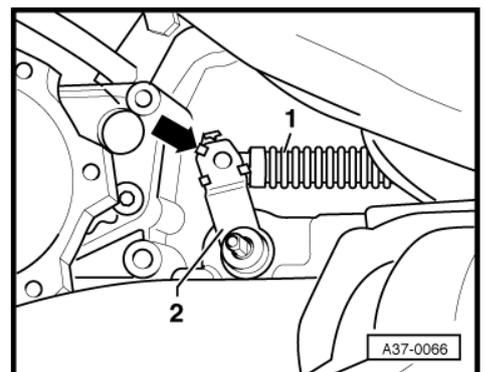
- Push a small screwdriver through the oil seal and pull it out.
- Lubricate the outer circumference and the space between sealing lips with ATF.
- Installation position: open side of oil seal points towards gearbox



- Push new oil seal onto assembly sleeve -3454- and drive in until assembly sleeve reaches stop, ensuring that seal remains straight.
- Before installing, drive the roll pin in the selector shaft lever back through the lever in the opposite direction.
- Push selector shaft lever onto selector shaft and drive in roll pin.



- Press selector lever cable -1- onto selector shaft lever -2-.
- Install multifunction switch -F125- => [page 75](#) .
- Install gearbox support (left-side) => [page 55](#) .





39 – Final drive - rear differential

1 Overview - gear oil in rear final drive

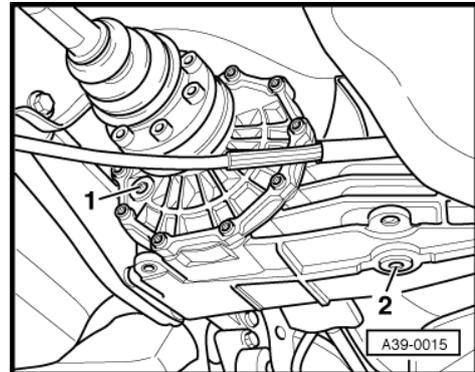
Oil filler plug and oil drain plug

1 - Oil filler plug

- Tightening torque: 35 Nm.

2 - Oil drain plug

- Tightening torque: 35 Nm.

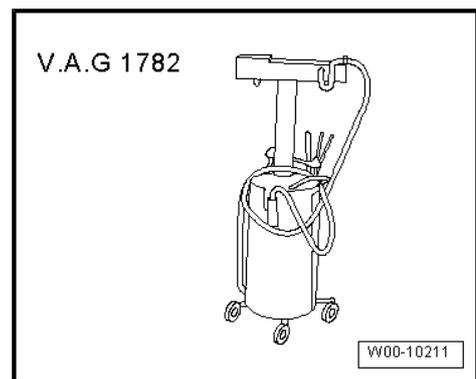


1.1 Checking gear oil in rear final drive and topping up

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Special tools and workshop equipment required

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



- ◆ Safety goggles

Procedure

- Tightening torque ⇒ [page 78](#)



Note

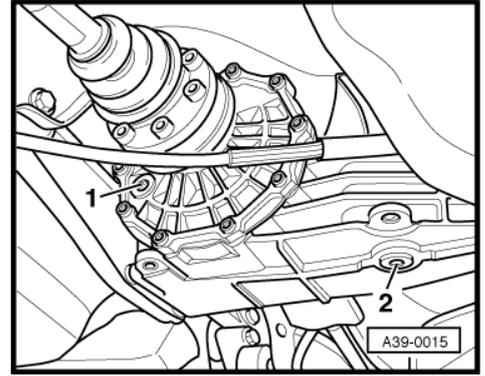
- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Drive vehicle onto a four-column lifting platform or over an inspection pit in order for it to be absolutely horizontal.
- Place used oil collection and extraction unit -V.A.G 1782- below rear final drive.



WARNING

Wear safety goggles.

- Remove plug from oil filler hole -1-.
- Specification: oil level up to bottom lip of filler hole
- Top up or allow excess gear oil to drain off; specification ⇒ Electronic parts catalogue .
- Fit screw plug for oil filler hole.



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2 Exploded view - rear final drive



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- ◆ *Adjustment work is required when renewing the parts marked with 1)* ⇒ [page 117](#) .

General view

1 - Final drive housing

2 - Spacer sleeve

- Renew

3 - Flange for propshaft

- Removing and installing ⇒ [„4.1 Dismantling and assembling pinion shaft“, page 107](#)
- Measuring and marking radial run-out at flange for propshaft ⇒ [page 89](#)

4 - Pinion shaft

- Is mated with crown wheel, always renew together as a set
- Removing and installing ⇒ [page 107](#)

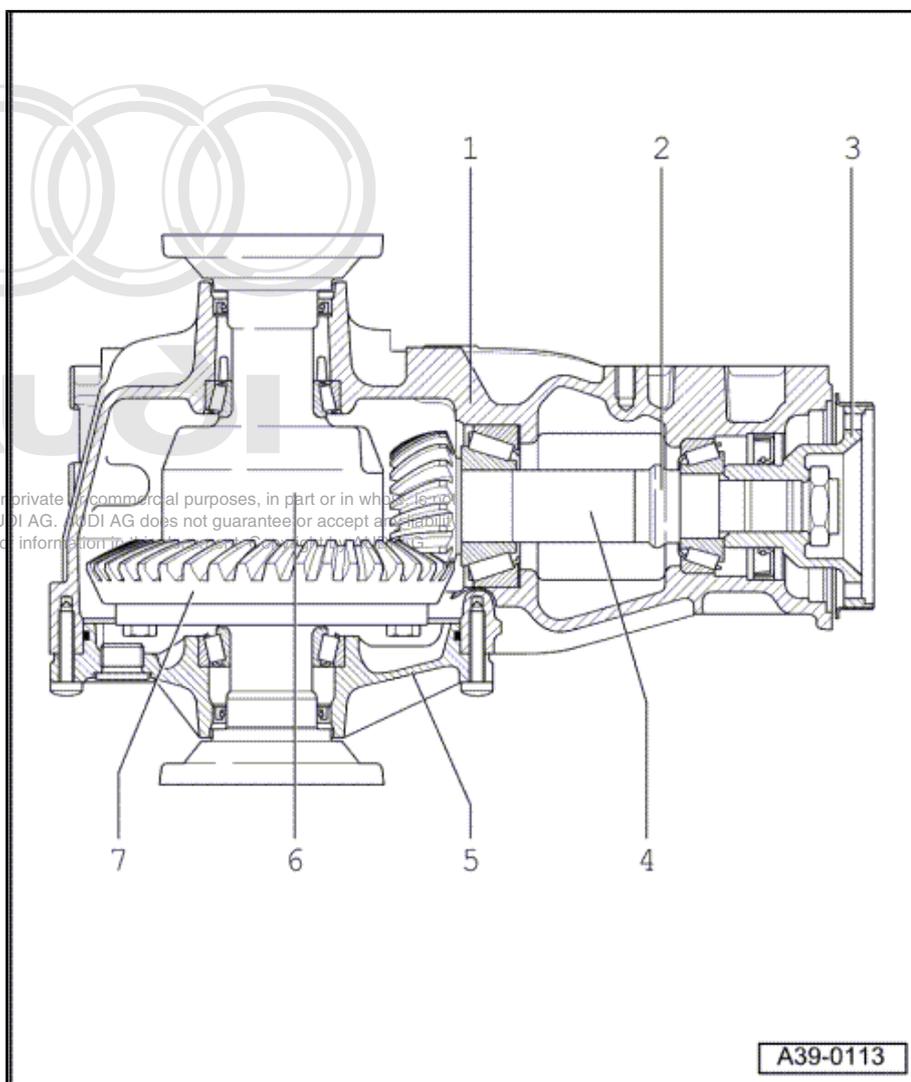
5 - Cover for final drive

6 - Differential

- Must be removed before taking out pinion shaft
- Removing and installing ⇒ [page 98](#)
- Dismantling and assembling ⇒ [page 99](#)

7 - Crown wheel

- Is mated with pinion shaft (final drive gear set), always renew together as a set
- Removing and installing ⇒ [„3.2 Dismantling and assembling differential“, page 99](#)



Exploded view

1 - Breather sleeve

- With rubber valve
- Installation position
⇒ [page 82](#)

2 - Final drive housing 1)

- With pinion shaft
- Removing and installing pinion shaft
⇒ [page 107](#)

3 - Outer race for large tapered roller bearing 1)

- Driving out ⇒ [page 103](#)
- Pressing in ⇒ [page 103](#)

4 - Shim „S1“

- Note thickness
- Table of adjustments
⇒ [page 117](#)

5 - Cover for final drive 1)

- With O-ring
- Renewing O-ring
⇒ [page 139](#)

6 - Bolt

- Tightening torque
⇒ [page 135](#)

7 - Oil seal

- For flange shaft (right-side)
- Renewing ⇒ [page 95](#)

8 - Bolt

- 25 Nm

9 - Flange shaft (right-side)

- Removing and installing ⇒ [page 95](#)

10 - Oil filler plug

- Tightening torque ⇒ [page 78](#)

11 - Differential with crown wheel 1)

- Dismantling and assembling ⇒ [page 99](#)

12 - Oil drain plug

- Tightening torque ⇒ [page 78](#)

13 - Bush

- Holds magnet in position
- Drive in onto stop

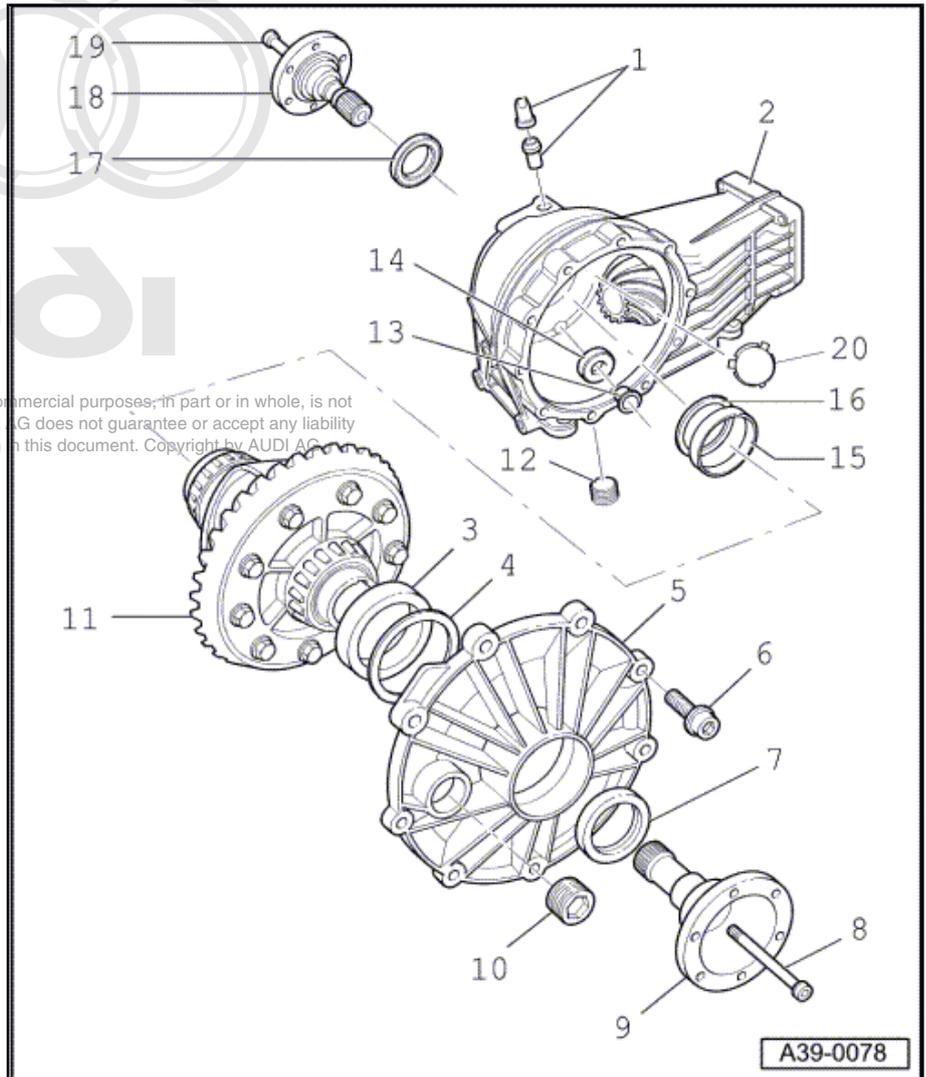
14 - Magnet

15 - Outer race for small tapered roller bearing 1)

- Removing and installing ⇒ [page 99](#)

16 - Shim „S2“

- Note thickness
- Table of adjustments ⇒ [page 117](#)





17 - Oil seal

- For flange shaft (left-side)
- Renewing ⇒ [page 95](#)

18 - Flange shaft (left-side)

- Removing and installing ⇒ [page 95](#)

19 - Bolt

- 25 Nm

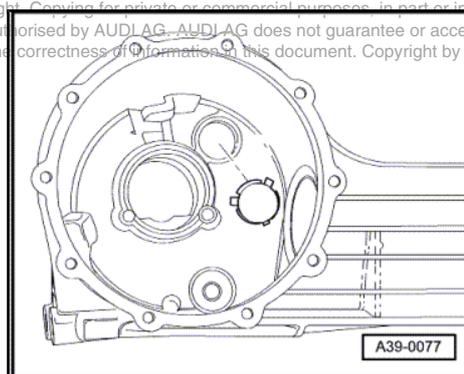
20 - Sealing cap

- Installing ⇒ [page 82](#)



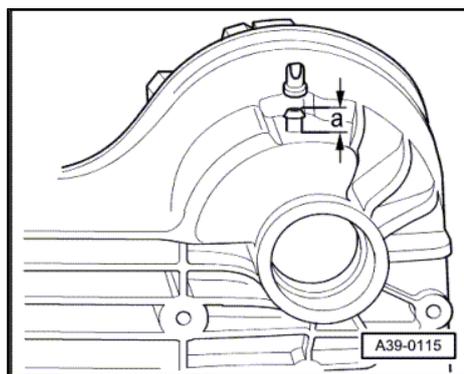
Pushing in sealing cap onto stop

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Installation position of breather sleeve

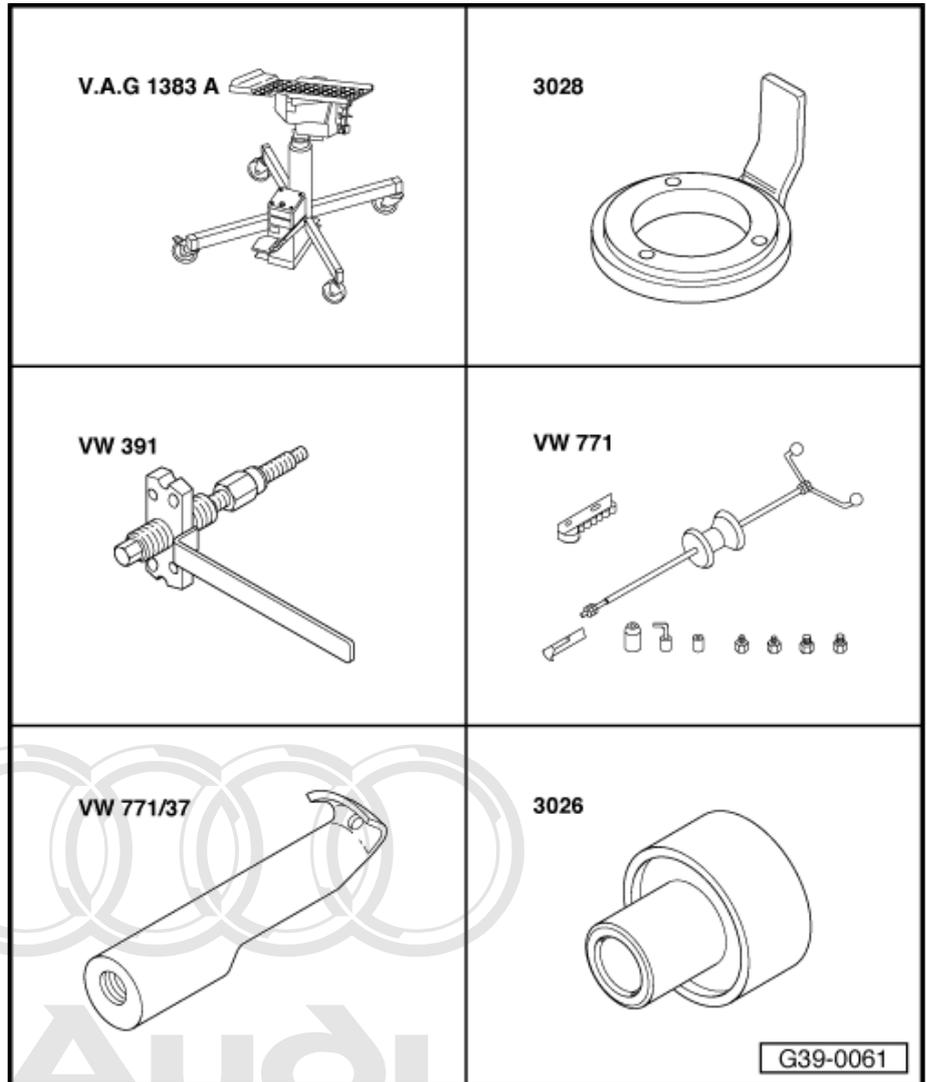
- After pressing it in, the breather sleeve must protrude out of the housing.
- Dimension -a- = 13 mm
- Slot in rubber valve must be aligned in direction of travel.



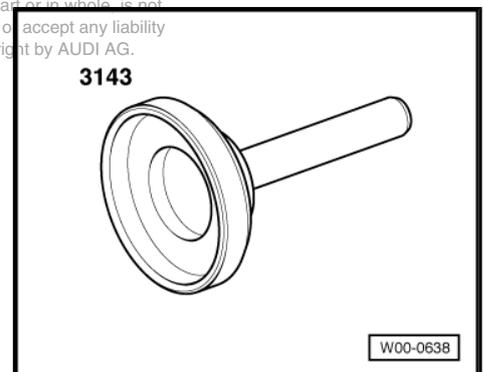
2.1 Renewing oil seal on flange for propshaft

Special tools and workshop equipment required

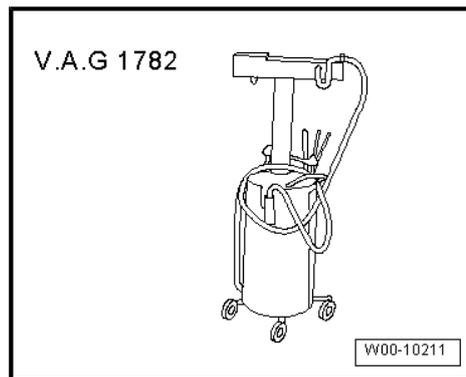
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Counterhold tool -3028-
- ◆ Drive flange installing tool - VW 391-
- ◆ Multi-purpose tool -VW 771-
- ◆ Multi-purpose tool -VW 771/37-
- ◆ Punch -3026-



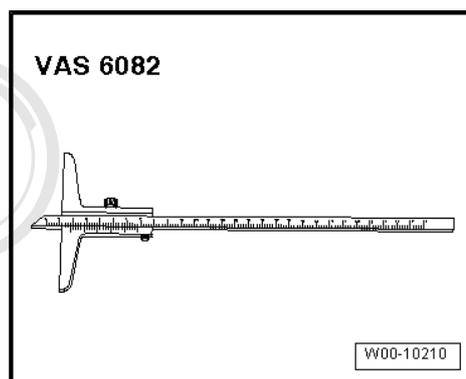
- ◆ Drift sleeve -3143-
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- ◆ Used oil collection and extraction unit -V.A.G 1782-



- ◆ Depth gauge -VAS 6082-



- ◆ Locking fluid -D 000 600-

Procedure

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- Rear final drive installed.
- Tightening torque:

Component	Nm
Cross member to body	25

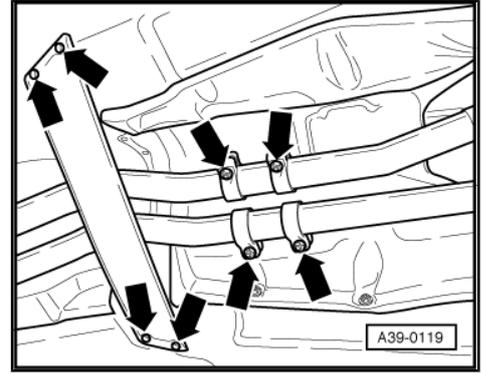
 **Note**

- ◆ *General repair instructions ⇒ [page 14](#) .*
- ◆ *Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#) .*
- ◆ *The oil seal can be renewed with the rear final drive remaining installed. But the final drive must be lowered.*

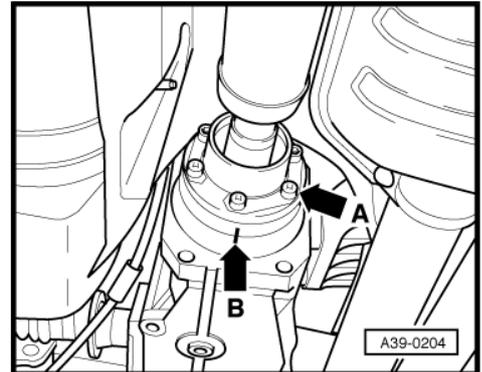
 **Caution**

Contact corrosion! Notes ⇒ [page 14](#) .

- Remove cross member -left arrows-.
- Unfasten clamps -right arrows-, detach rear section of exhaust system and remove.



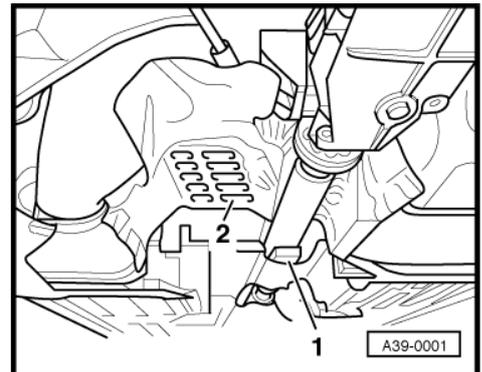
- Check whether there is a factory marking (coloured dot) on the propshaft flange and on the rear final drive flange. If no factory marking is visible, mark the position of the propshaft flange relative to the rear final drive -arrow B-.
- Unbolt propshaft from rear final drive -arrow A-.



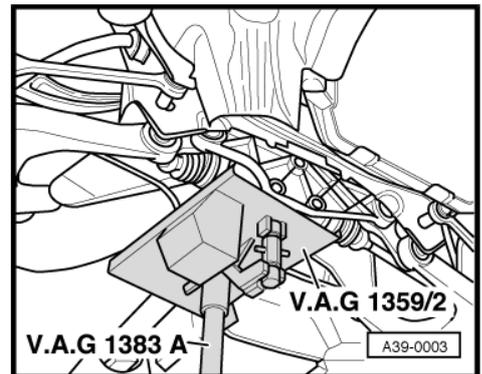
- Support propshaft against heat shield using a wooden wedge -1-.

i Note

-Item 2- can be disregarded.



- Place engine and gearbox jack -V.A.G 1383 A- below rear final drive and take up weight of final drive.



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- Remove securing bolts -arrows- of left support for rear final drive.



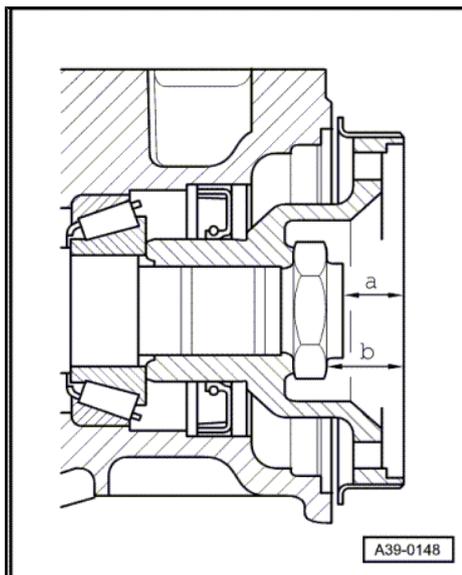
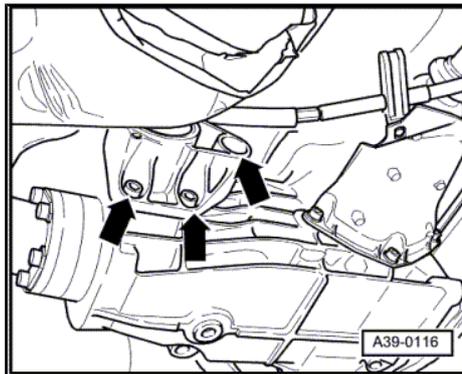
Note

The rear cross member/final drive securing bolts are not slackened.

- Carefully lower rear final drive using engine and gearbox jack -V.A.G 1383 A- until flange for propshaft is accessible.

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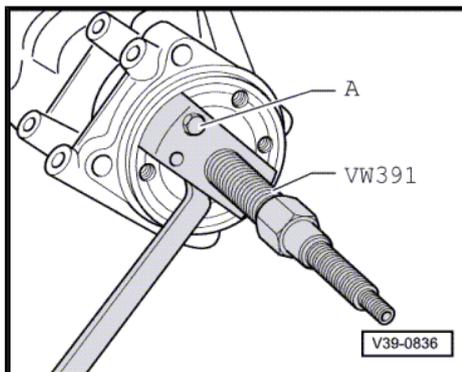
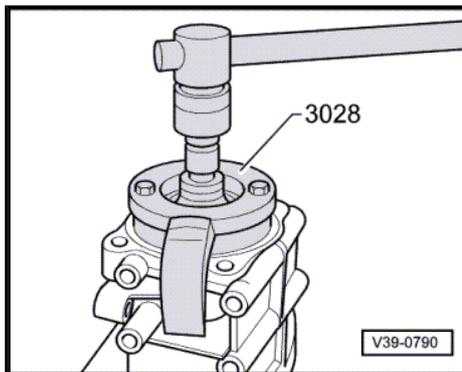
- Mark position of pinion shaft nut with paint.
- To check when assembling, measure the following using depth gauge -VAS 6082- and note the measurements:
 - Dimension -a- = distance from flange for propshaft to pinion shaft.
 - Dimension -b- = distance from flange for propshaft to pinion shaft nut.



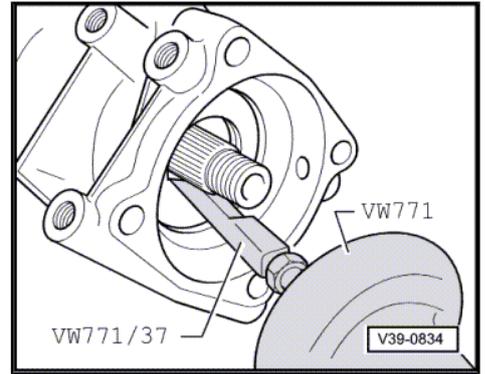
Note

The procedure is shown with the rear final drive removed to give a better illustration.

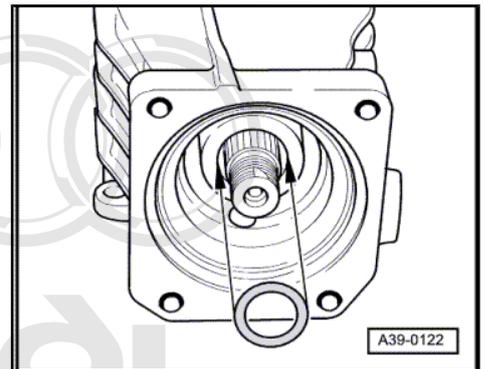
- Fit and secure counter-hold tool -3028- and remove pinion shaft nut.
- Place used oil collection and extraction unit -V.A.G 1782- underneath rear final drive.
- Pull off flange for propshaft using drive flange installing tool -VW 391- ; to do this, screw 2 bolts (M8x30) -item A- into flange.



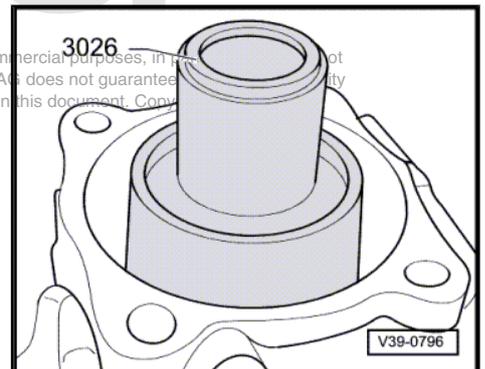
- Pull out oil seal.



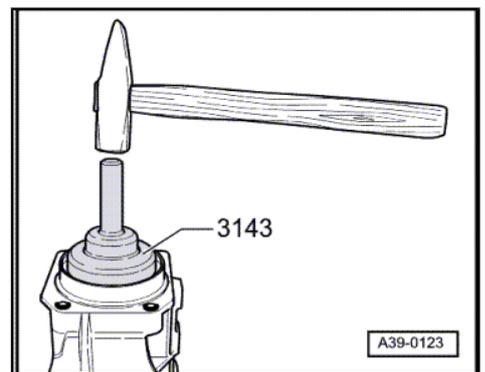
- Renew O-ring between pinion shaft bearing and flange for propshaft.
- Lightly lubricate new O-ring with gear oil.



- Lightly lubricate outer circumference of oil seal with gear oil.
- Pack space between sealing lip and dust lip with sealing grease -G 052 128 A1- .
- Use punch -3026- to drive home oil seal.

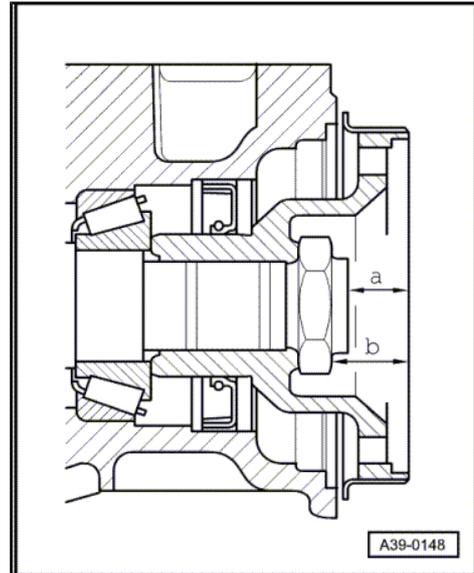


- Drive flange for propshaft onto pinion shaft until securing nut for pinion shaft can be fitted.
- Remove any oil or grease residue from pinion shaft nut and thread of pinion shaft. Apply locking fluid -D 000 600- to thread.
- Make sure to use the "old" hexagon nut to attach the flange to the pinion shaft. Otherwise it will not be possible to re-install components in their original position.





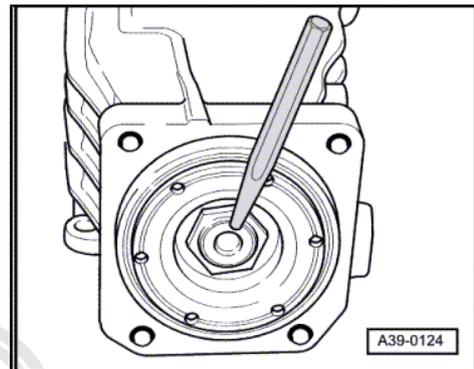
- Tighten pinion shaft nut exactly to previously marked position.
- To ensure that the assembly is correct, check measurements for dimensions -a- and -b-.
- O-ring -1- must be fitted.
- Maximum permissible deviation from original measurements: ± 0.3 mm



- Peen pinion shaft nut with a punch.
- Secure left support to rear final drive.

**Note**

- ◆ *Renew propshaft bolts (self-locking).*
 - ◆ *After detaching the propshaft, it is important to clean out any locking fluid residues from threads of flange for propshaft on rear final drive. Otherwise there is a danger that the new bolts will seize when they are screwed in and then shear off the next time they are removed. The threads can be cleaned with a thread tap.*
 - ◆ *After detaching the propshaft from the rear final drive, the additional balancing washer (thicker washer) that may be fitted between the lock plate and one of the bolt heads must not be reinstalled.*
- If there is a factory marking on the propshaft, measure radial run-out at flange for propshaft ⇒ [page 89](#) and align paint marking on constant velocity joint of propshaft with marking on flange for propshaft.
 - If the factory marking (coloured dot) on the propshaft was no longer visible and the position of the constant velocity joint of the propshaft was therefore marked relative to the flange for the propshaft on the rear final drive prior to removal, refit the propshaft in the same position.
 - Secure propshaft to rear final drive ⇒ [page 152](#) .
 - Fill up gear oil in rear final drive and check oil level ⇒ [page 78](#) .
 - Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .



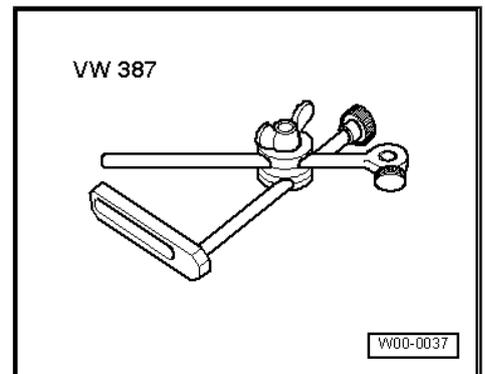
2.2 Measuring and marking radial run-out at flange for propshaft

Note

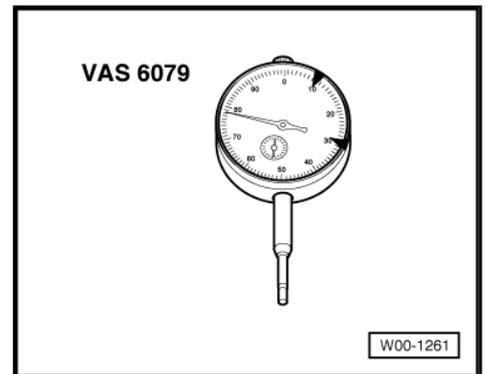
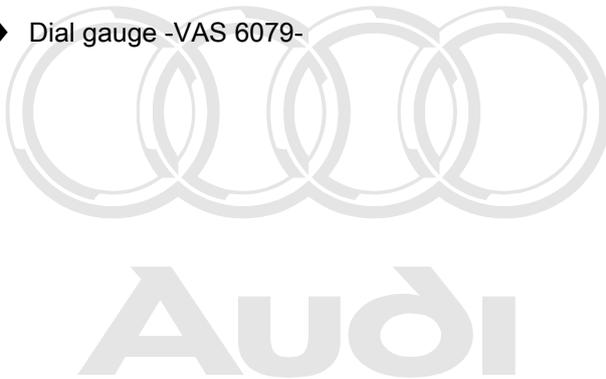
- ◆ *The radial run-out must always be measured when the flange for the propshaft at the rear final drive has been removed.*
- ◆ *If a new propshaft is being installed and the marking on the flange for the propshaft is no longer visible, the point of maximum radial run-out must be measured with a dial gauge and marked with a coloured dot. The coloured dot on the constant velocity joint of the propshaft is then brought into alignment with this marking => [page 90](#).*
- ◆ *The radial run-out can also be measured with the rear final drive in position. This involves detaching the propshaft from the rear final drive. Observe notes => [page 150](#).*

Special tools and workshop equipment required

- ◆ Universal dial gauge bracket -VW 387-



- ◆ Dial gauge -VAS 6079-



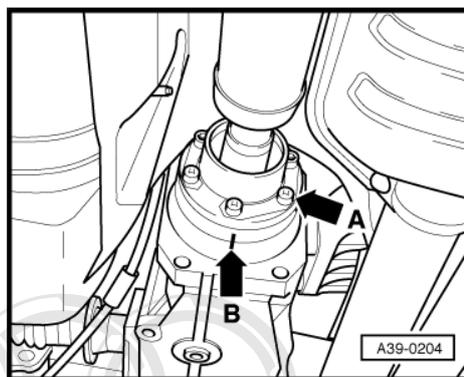
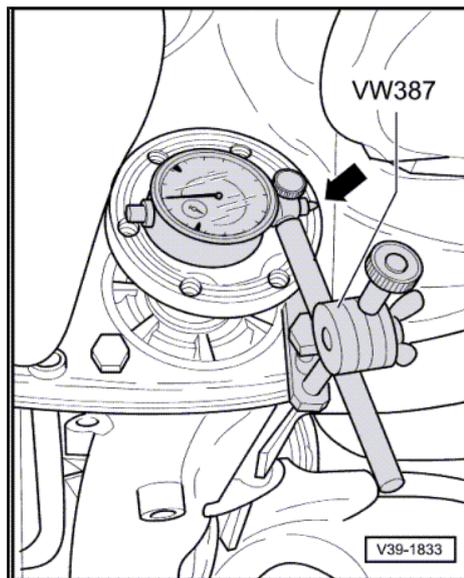
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- ◆ Bolt M10x85



Procedure

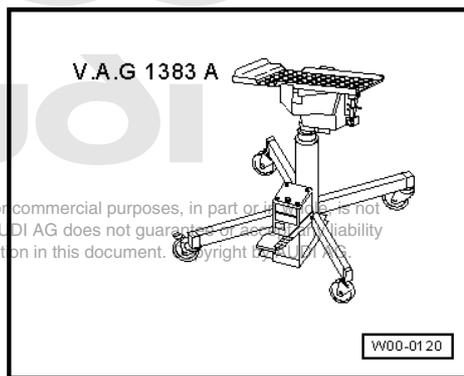
- Attach universal dial gauge bracket -VW 387- with dial gauge to bolt connection between rear cross member and rear final drive, as shown in illustration.
 - Apply dial gauge to machined surface of flange for propshaft -arrow-.
 - Set dial gauge to „0“ with a preload of 1 mm.
 - Rotate the differential by turning the two rear wheels (right and left-hand flange shafts) simultaneously in one direction until flange for propshaft has undergone one complete revolution.
 - Mark the point of maximum radial run-out (corresponding to the maximum distance from the axis of rotation) with coloured dot on exterior of flange for propshaft.
 - Remove old marking from flange for propshaft.
-
- When installing propshaft, marking on constant velocity joint must be aligned with marking on flange for propshaft -arrow B-.
 - Secure propshaft to rear final drive => [page 152](#) .



2.3 Removing and installing rear final drive

Special tools and workshop equipment required

- ◆ Engine and gearbox jack -V.A.G 1383 A-

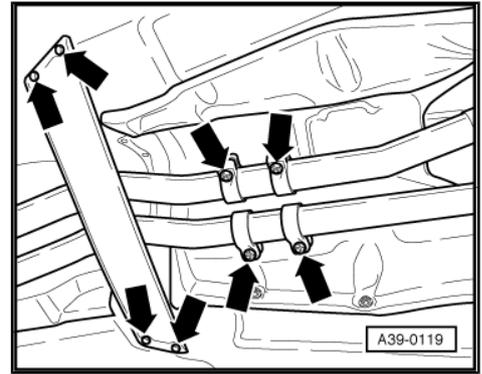


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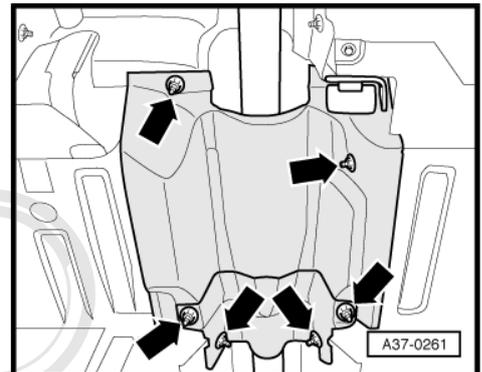
Removing

 **Caution**
Contact corrosion! Notes => page 14 .

- Remove cross member -left arrows-.
- Unfasten clamps -right arrows-, detach rear section of exhaust system and remove.

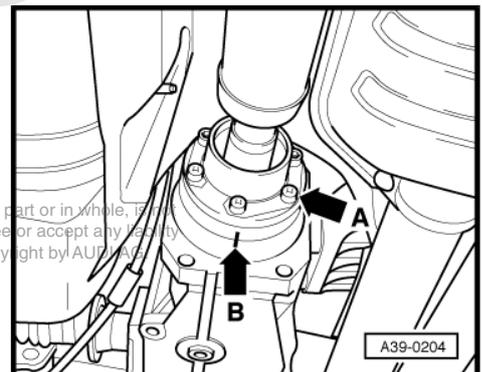


- Remove heat shields above propshaft -arrows-.

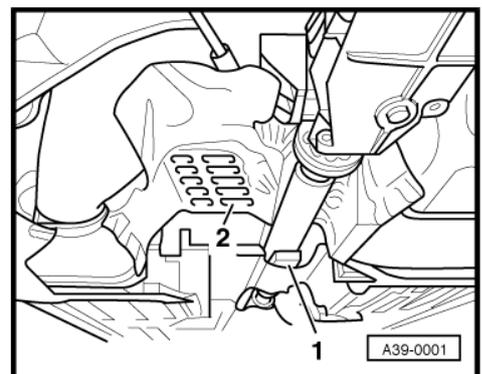


- Check whether there is a factory marking (coloured dot) on the propshaft flange and on the rear final drive flange. If no factory marking is visible, mark the position of the propshaft flange relative to the rear final drive -arrow B-.
- Unbolt propshaft from rear final drive -arrow A-.

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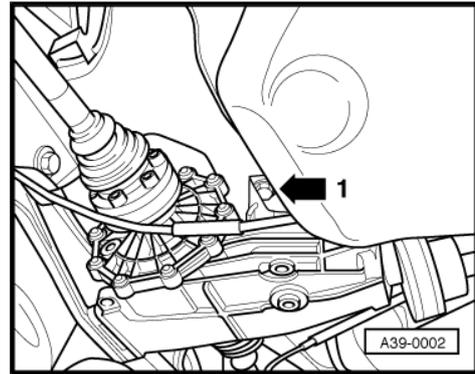


- Support propshaft against heat shield using a wooden wedge -1-.
- Remove heat shield -2-.





- If fitted, detach retainer for handbrake cable -arrow 1-

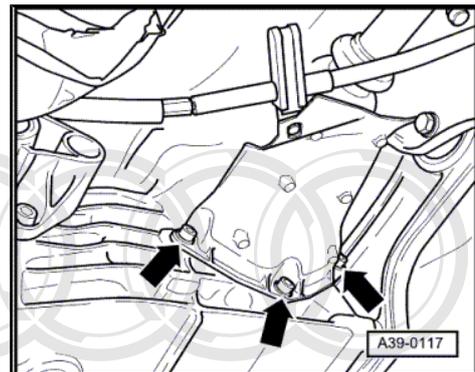


- Unbolt heat shield for left-side drive shaft -arrows-
- Detach drive shafts from flange shafts of rear final drive => Rep. gr. 42 .
- Tie up drive shafts.



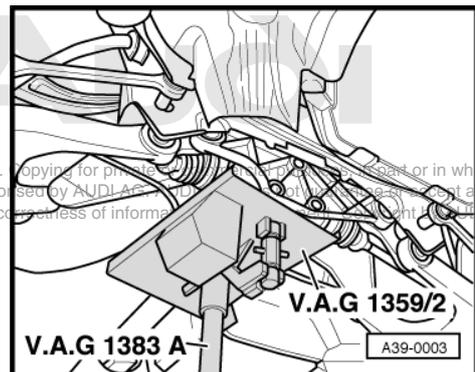
Note

Make sure you do not damage surface coating on drive shafts.

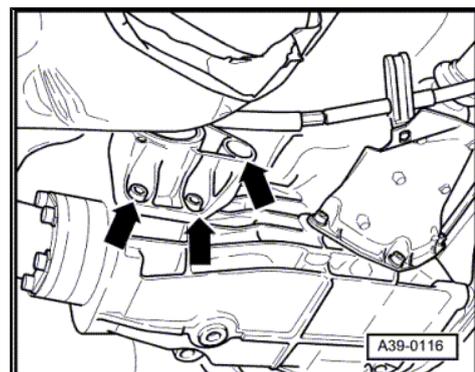


- Place engine and gearbox jack -V.A.G 1383 A- below rear final drive and take up weight of final drive.
- Secure final drive with a strap.

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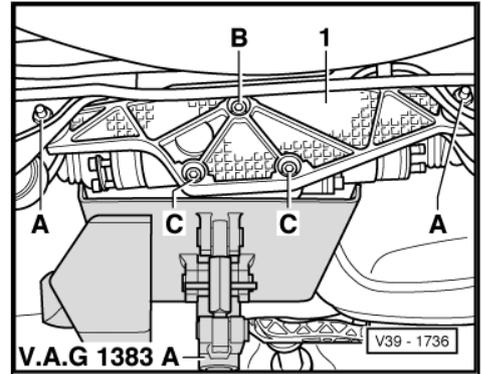
- Remove securing bolts -arrows- of left support for rear final drive.



- Remove bolts -B- and -C- from connection between rear cross member and rear final drive.

i Note

Rear cross member -1- remains in its installation position.

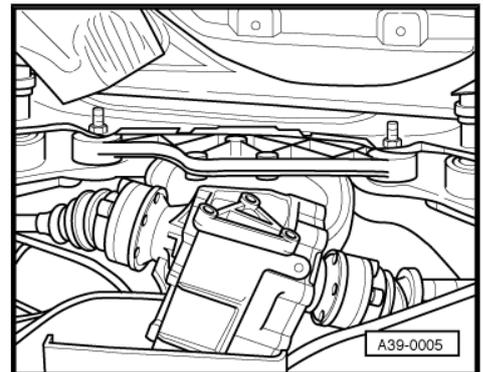


- Slowly lower rear final drive with engine and gearbox jack - V.A.G 1383 A- .

Installing

- Tightening torques:

Component	Nm
Left support to rear final drive	40
Rear final drive to rear cross member	55
Cross member to body	25
Heat shield for drive shaft (left-side) to rear final drive	25
Retainer for handbrake cable	25

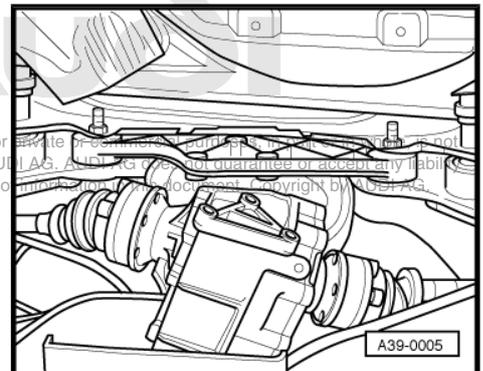


Installation is carried out in reverse sequence; note the following:

i Note

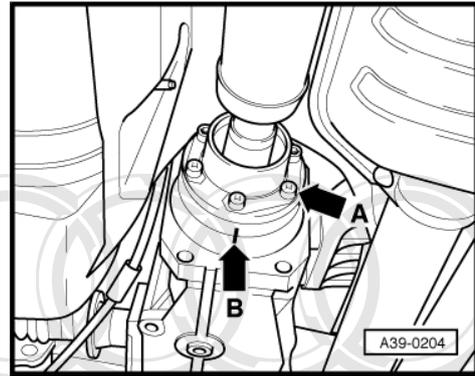
- ◆ Renew self-locking nuts.
- ◆ Renew propshaft bolts (self-locking).
- ◆ After detaching the propshaft, it is important to clean out any locking fluid residues from threads of flange for propshaft on rear final drive. Otherwise there is a danger that the new bolts will seize when they are screwed in and then shear off the next time they are removed. The threads can be cleaned with a thread tap.
- ◆ Renew gasket at flange for propshaft (remove backing and bond self-adhesive side of gasket to flange for propshaft). Bonding surface must be free from grease.

- Raise rear final drive with engine and gearbox jack -V.A.G 1383 A- until both drive shafts can be connected.
- Tighten bolts of drive shafts slightly.
- Raise final drive and bolt to rear cross member.
- Secure left support to rear final drive.



**Note**

- ◆ To prevent imbalance, the propshaft and the flange for the propshaft on the rear final drive must be installed so that the factory markings on the constant velocity joint (or the markings made on removal of the propshaft) are in alignment with the markings on the flange for the propshaft on the rear final drive -arrow B-.
- ◆ After detaching the propshaft from the rear final drive, the additional balancing washer (thicker washer) that may be fitted between the lock plate and one of the bolt heads must not be reinstalled.



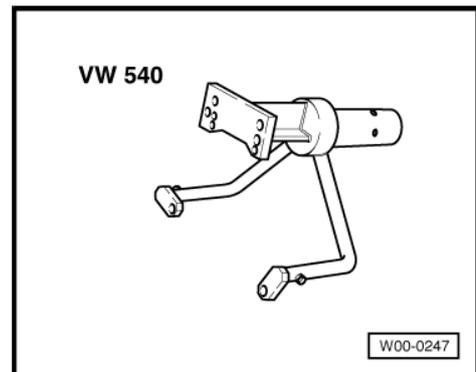
- Secure propshaft to rear final drive ⇒ [page 152](#) .
- Bolt drive shafts to flange shafts of rear final drive ⇒ Rep. gr. 42 .
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .
- Check gear oil level in rear final drive ⇒ [page 78](#) .

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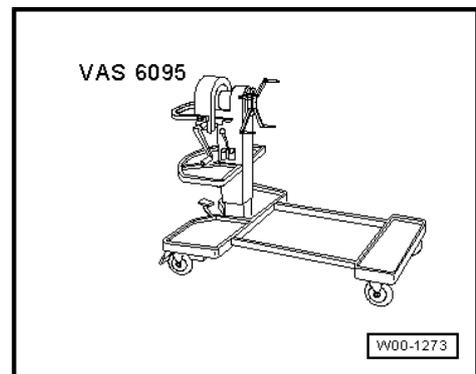
2.4 Securing rear final drive to engine and gearbox support

Special tools and workshop equipment required

- ◆ Engine and gearbox support -VW 540-

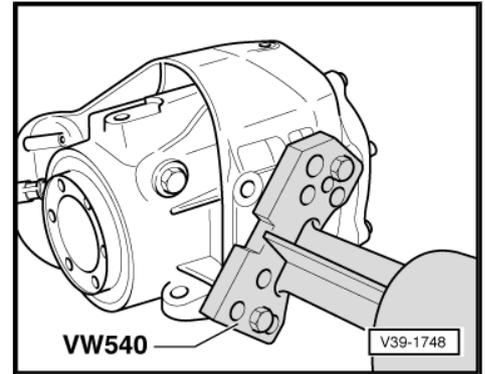


- ◆ Engine and gearbox support -VAS 6095-



Procedure

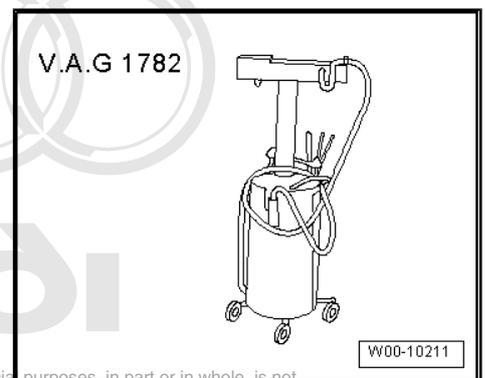
- Rear final drive removed.
- Secure rear final drive with engine and gearbox support - VW 540- to engine and gearbox support -VAS 6095- .



2.5 Removing and installing flange shafts

Special tools and workshop equipment required

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



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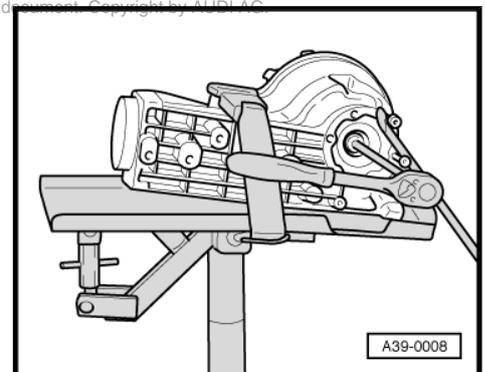
Removing

- Rear final drive removed.



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *The procedure is identical for left and right flange shafts.*
- Place drip tray of used oil collection and extraction unit -V.A.G 1782- underneath.
- Remove bolt securing flange shaft. To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
- Pull out flange shaft using the bolts already screwed in.



Installing

- Tightening torque ⇒ [page 80](#)

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

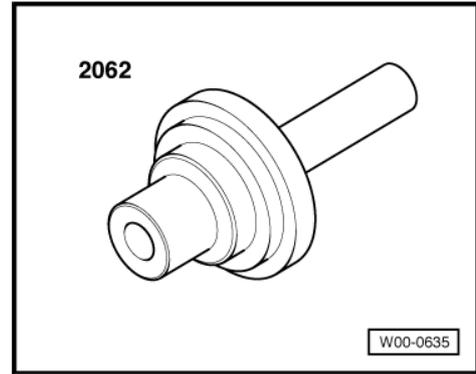
- Install flange shaft and tighten; to do this screw two bolts into the flange and counterhold flange shaft with a suitable lever.
- Fill up gear oil in rear final drive and check oil level ⇒ [page 78](#) .

2.6 Renewing oil seals for flange shafts

Special tools and workshop equipment required



◆ Punch -2062-



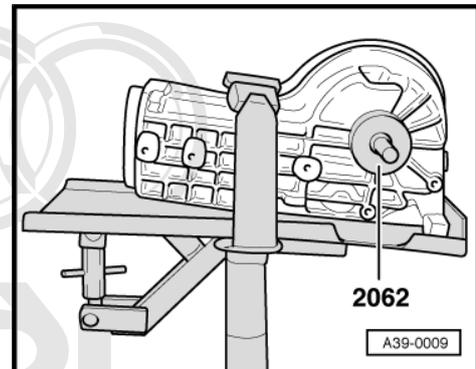
Procedure

- Rear final drive removed



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- ◆ *The procedure is identical for left and right oil seals.*
- Remove flange shaft ⇒ [page 95](#) .
- Pry out oil seal with a suitable lever taking care not to damage seat for oil seal.
- Clean seat for oil seal.
- Lightly lubricate outer circumference of oil seal with gear oil.
- Pack space between sealing lip and dust lip with sealing grease -G 052 128 A1- .
- Drive in oil seal as far as stop using punch -2062- (keep oil seal straight while installing).
- Install flange shaft ⇒ [page 95](#) .



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3 Exploded view - differential

Note

- ◆ General repair instructions ⇒ [page 14](#) .
- ◆ Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#) .
- ◆ Securing rear final drive to engine and gearbox support ⇒ [page 94](#) .
- ◆ Renew both tapered roller bearings for the differential together. Use new bearings from a single manufacturer wherever possible.
- ◆ Adjustment work is required when renewing the parts marked with ¹⁾ ⇒ [page 117](#) .

1 - Cover for final drive ¹⁾

2 - O-ring

- Renewing ⇒ [page 139](#)

3 - Final drive housing ¹⁾

4 - Shim „S2“

- Note thickness
- Table of adjustments
⇒ [page 117](#)

5 - Outer race for small tapered roller bearing ¹⁾

- Driving out ⇒ [page 101](#)
- Pressing in
⇒ [page 101](#)

6 - Inner race for small tapered roller bearing ¹⁾

- Pulling off ⇒ [page 102](#)
- Pressing on
⇒ [page 102](#)

7 - Bolt

- Renew
- For correct version, refer to ⇒ [Electronic parts catalogue](#)
- Tighten until all bolts make contact, then tighten diagonally to correct torque.
- 60 Nm and turn 45° further

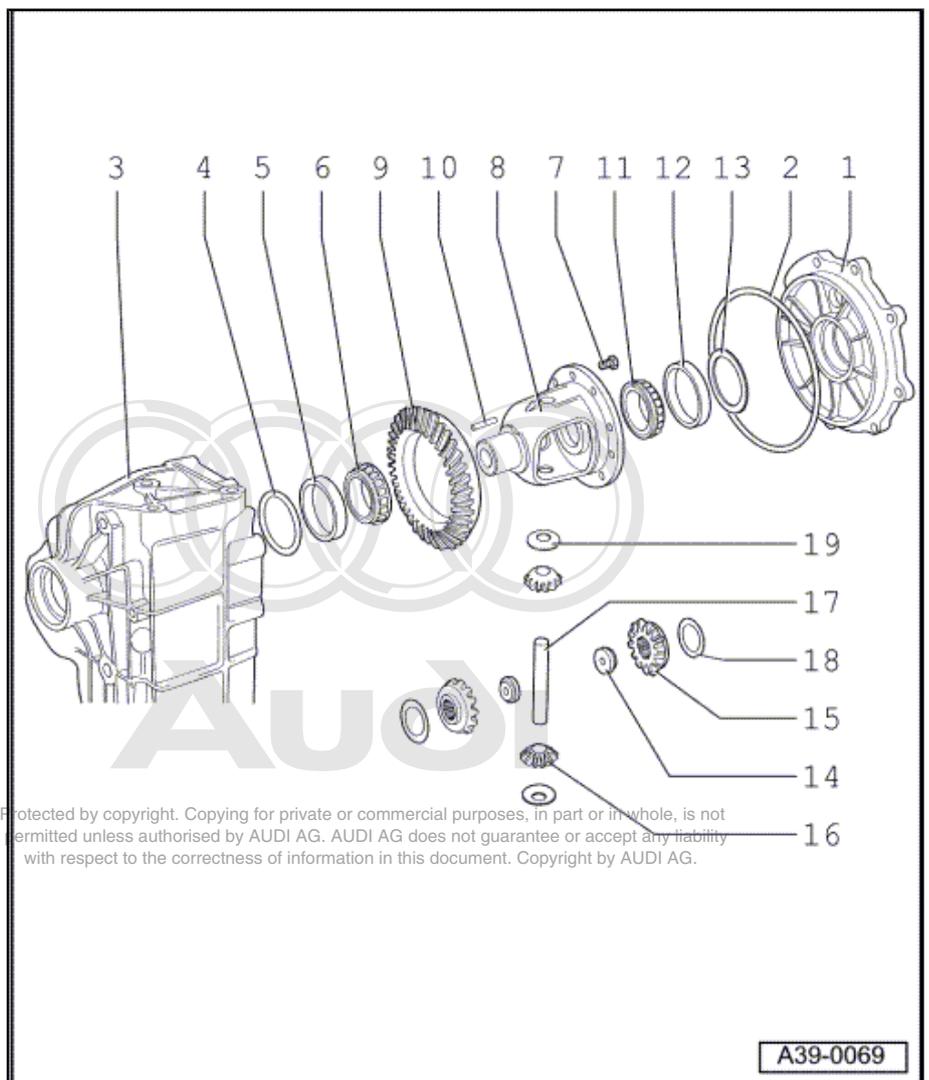
8 - Differential cage¹⁾

9 - Crown wheel¹⁾

- Is paired with pinion shaft (final drive gear set)
- Select correct version according to gearbox code letters ⇒ [Electronic parts catalogue](#)
- Driving crown wheel off differential cage with a drift ⇒ [page 103](#)
- Fitting on differential cage ⇒ [page 104](#)

10 - Spring pin

- For securing differential pinion pin





- Drive in flush

11 - Inner race for large tapered roller bearing ¹⁾

- Pulling off ⇒ [page 102](#)
- Pressing on ⇒ [page 103](#)

12 - Outer race for large tapered roller bearing ¹⁾

- Driving out ⇒ [page 103](#)
- Pressing in ⇒ [page 103](#)

13 - Shim „S1“

- Note thickness
- Table of adjustments ⇒ [page 117](#)

14 - Threaded piece

15 - Sun wheel

- Installing ⇒ [page 104](#)
- Adjusting ⇒ [page 104](#)

16 - Planet pinion

- Installing ⇒ [page 104](#)

17 - Differential pinion pin

- Drive out with drift
- Drive in carefully to prevent damage to thrust washers
- Secure with spring pin ⇒ [Item 10 \(page 97\)](#)

18 - Shim

- Re-determining thickness ⇒ [page 104](#)

19 - Thrust washer

- Check for cracks



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3.1 Removing and installing differential

Removing

- Rear final drive must be removed and secured to engine and gearbox support ⇒ [page 94](#) .
- Remove flange shafts ⇒ [page 95](#) .
- Mark flange shafts (left and right).
- Remove cover for final drive.
- Remove differential.

Installing

- Tightening torque ⇒ [page 97](#)

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



Note

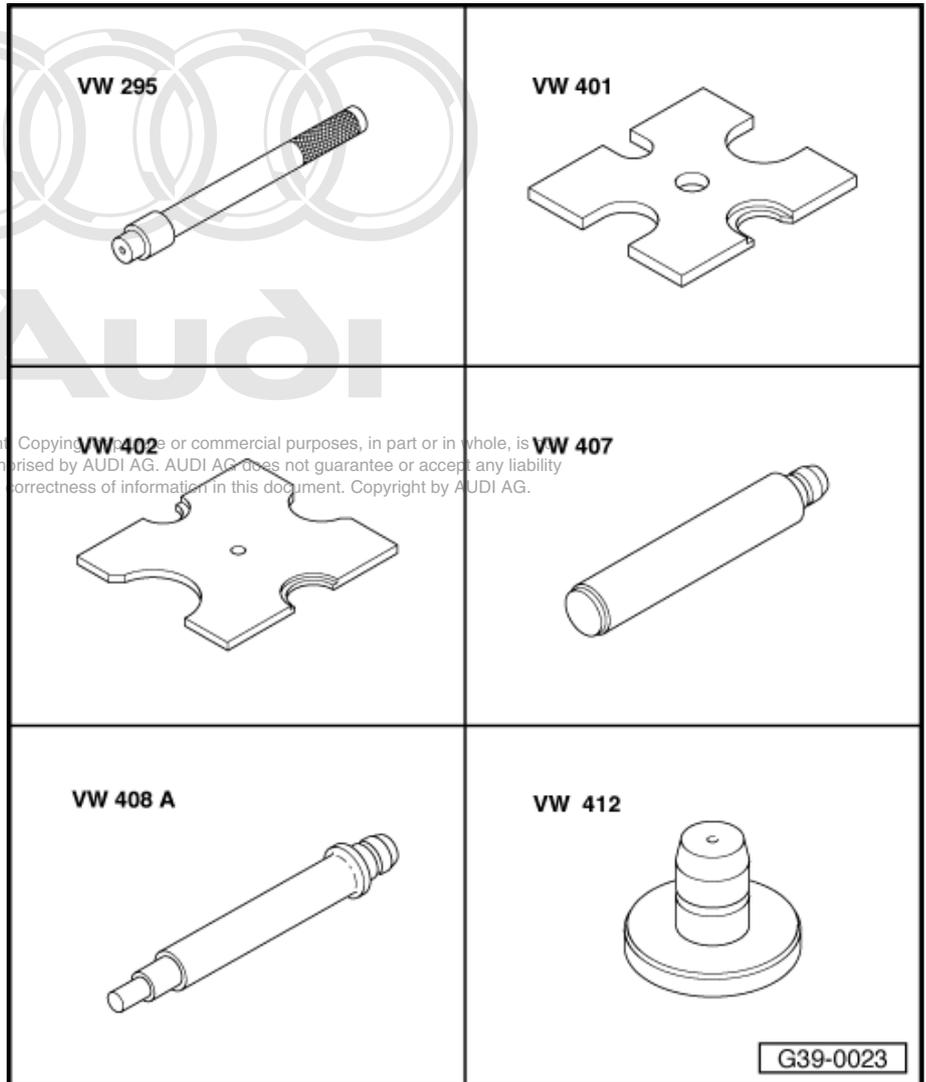
Renew O-ring.

- Fit differential.
- Install O-ring ⇒ [page 139](#) .
- Renew oil seals for flange shafts ⇒ [page 95](#) .

3.2 Dismantling and assembling differential

Special tools and workshop equipment required

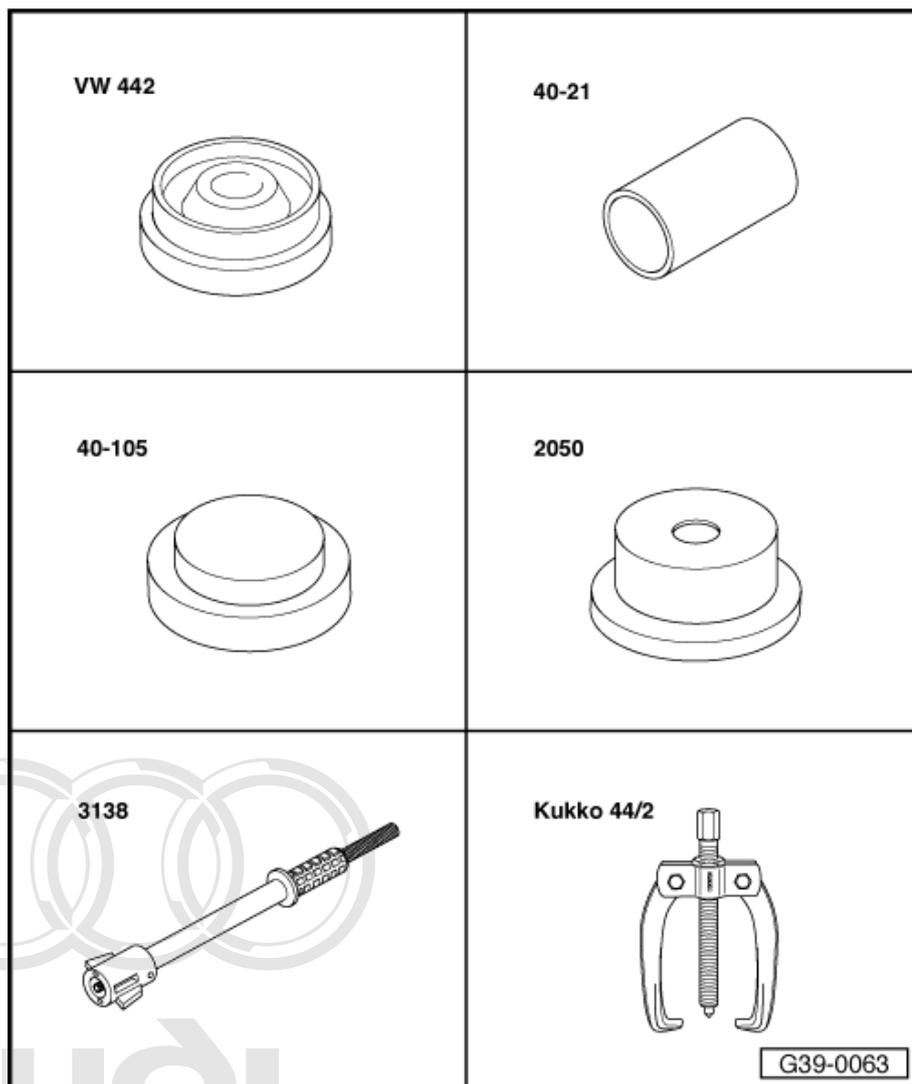
- ◆ Drift -VW 295-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 412-



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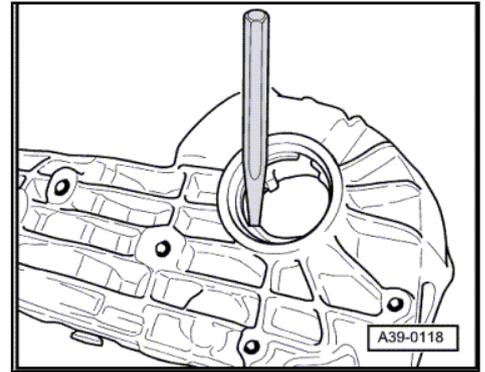
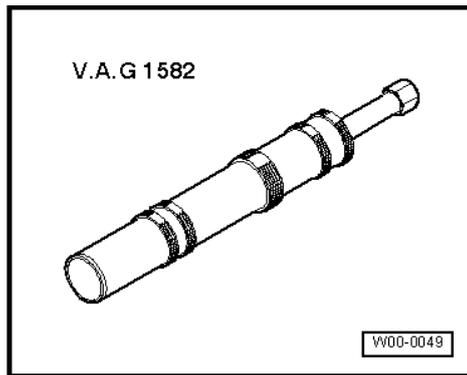


- ◆ Press tool -VW 442-
- ◆ Press tool -40 - 21-
- ◆ Thrust plate -40 - 105-
- ◆ Thrust piece -2050-
- ◆ Drift -3138-
- ◆ Two-arm puller Kukko 44/2

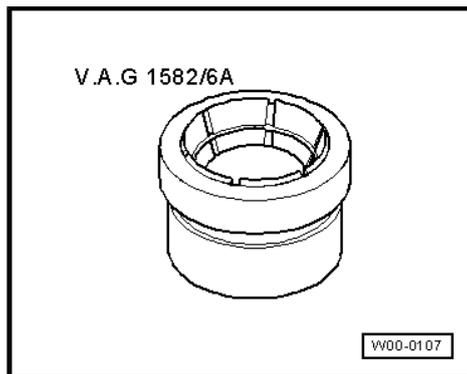


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- ◆ Tapered roller bearing puller -V.A.G 1582-



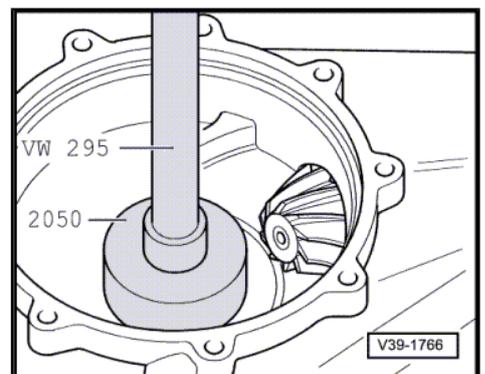
- ◆ Adapter -V.A.G 1582/6A-



Driving outer race for small tapered roller bearing out of final drive housing

- After removing check shims for damage.

Pressing outer race for small tapered roller bearing into final drive housing as far as stop

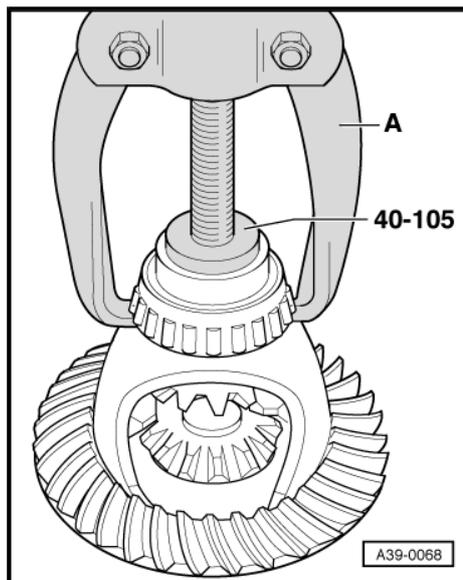


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Pulling off inner race for small tapered roller bearing

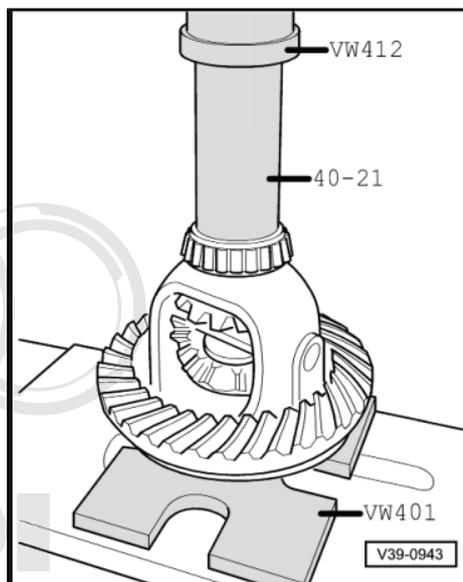
A - Two-arm puller Kukko 44/2



Pressing on inner race for small tapered roller bearing

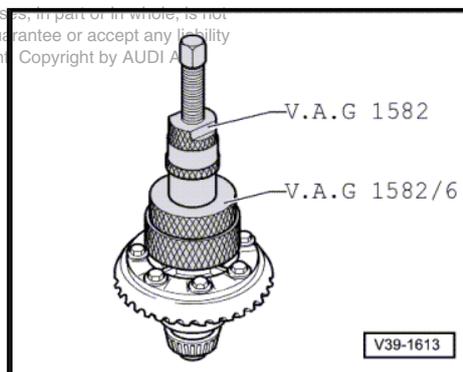
	WARNING
<i>Wear protective gloves.</i>	

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



Pulling off inner race for large tapered roller bearing

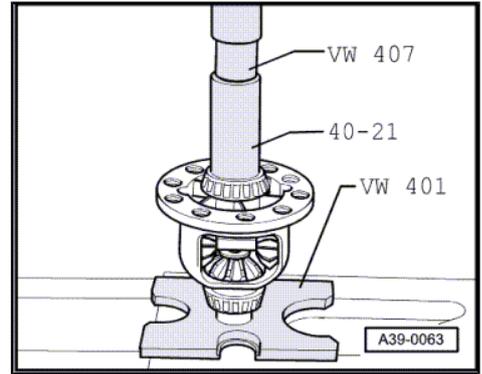
- Position thrust plate -40 - 105- before applying puller.



Pressing on inner race for large tapered roller bearing

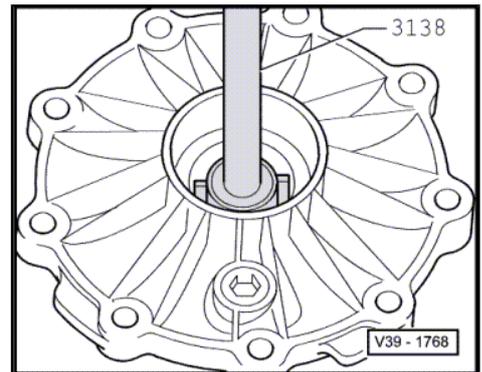
 **WARNING**
Wear protective gloves.

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

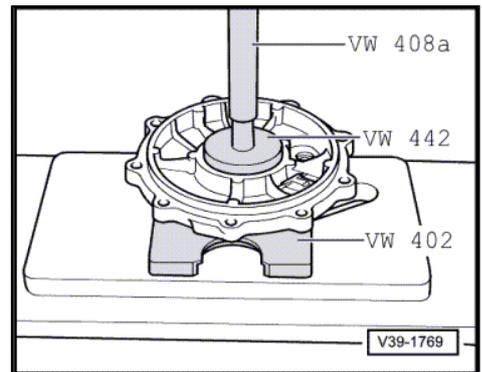


Driving outer race for large tapered roller bearing out of final drive cover

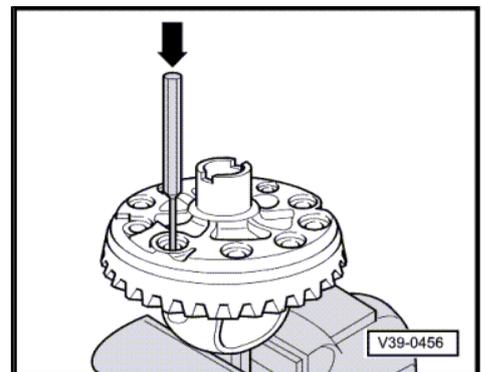
- After removing check shims for damage.



Pressing outer race for large tapered roller bearing into final drive cover



Driving crown wheel off differential cage



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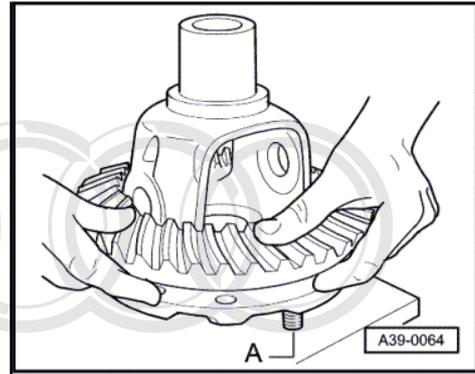
Fitting crown wheel onto differential cage

- Use 2 centring pins -A- (shop-made tool) as a guide.

WARNING

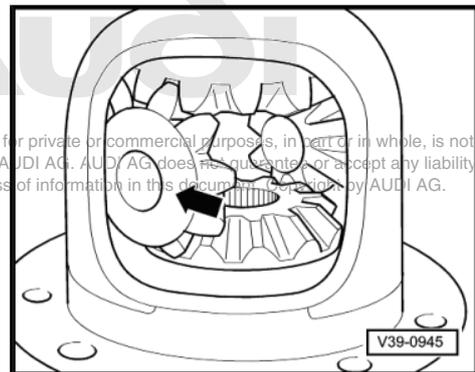
Wear protective gloves.

- Heat crown wheel to approx. 100°C and install.



Installing bevel gears

- Shim thicknesses must be re-determined if sun wheels have been renewed ⇒ [page 104](#) .
- Insert sun wheels with the measured shims. Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for the correctness of information in this document, provided by AUDI AG.
- Insert planet pinions (180° apart) and pivot into position -arrow-.
- Fit and align thrust washers.
- Insert threaded pieces.
- Drive differential pinion pin into final position and secure.



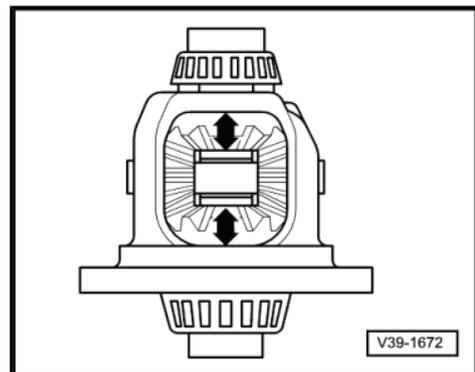
Adjusting differential bevel gears

- Insert sun wheels with thinnest shims (0.5 mm).
- Insert planet pinions with thrust washers spaced 180° apart.

Note

Ensure that bevel gears and thrust washers are not interchanged from this point onwards.

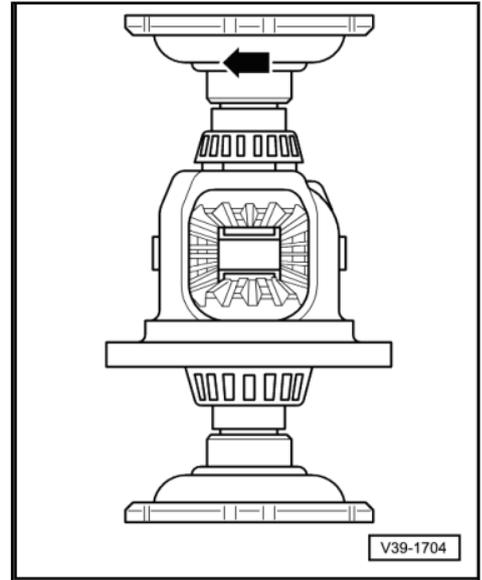
- Drive in differential pinion pin.
- Press planet pinions outwards.
- Press sun wheels in direction of -arrows- and check the amount of play.
- Determine the thickest shim that can still be fitted for the sun wheels on each side.
- Select shims of equal thickness.
- Select a shim of the required thickness from the table. For Part Nos. refer to ⇒ Electronic parts catalogue .



Available shims - Thickness of shims in mm		
0.50	0.70	0.90
0.60	0.80	1.00

 Note

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



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4 Exploded view - pinion shaft



Note

- ◆ General repair instructions ⇒ [page 14](#) .
- ◆ Rules for cleanliness when working on the automatic gearbox ⇒ [page 17](#) .
- ◆ Securing rear final drive to engine and gearbox support ⇒ [page 94](#) .
- ◆ Renew both tapered roller bearings for the differential together. Use new bearings from a single manufacturer wherever possible.
- ◆ Adjustment work is required when renewing the parts marked with ¹⁾ ⇒ [page 117](#) .

1 - Nut

- Removing ⇒ [page 110](#)
- Installing ⇒ [page 114](#)
- Measuring friction torque ⇒ [page 114](#)
- Securing ⇒ [page 114](#)

2 - Flange for propshaft

- Pulling off ⇒ [page 111](#)
- Installing ⇒ [page 114](#)

3 - Oil seal

- Pulling out ⇒ [page 111](#)
- Driving in ⇒ [page 113](#)

4 - O-ring

- Renew
- Lubricate with gear oil when installing ⇒ [page 113](#)

5 - Inner race for small tapered roller bearing ¹⁾

- Pressing out pinion shaft ⇒ [page 111](#)
- Pressing on ⇒ [page 113](#)
- Low-friction bearing; do not oil bearing when measuring friction torque

6 - Outer race for small tapered roller bearing ¹⁾

- Pulling out ⇒ [page 111](#)
- Pressing in ⇒ [page 113](#)
- Low-friction bearing; do not oil bearing when measuring friction torque

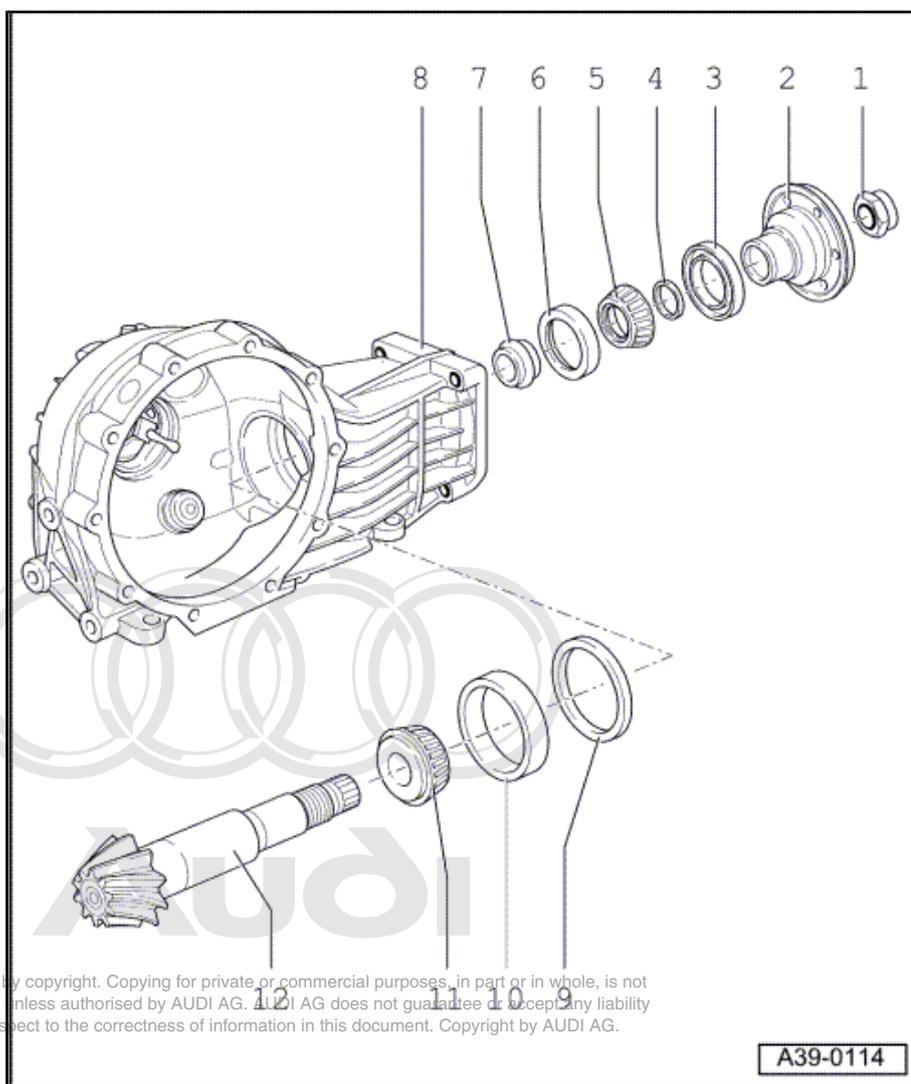
7 - Spacer sleeve ¹⁾

- Renew

8 - Final drive housing ¹⁾

9 - Shim „S3“

- Note thickness



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A39-0114

- Table of adjustments ⇒ [page 117](#)

10 - Outer race for large tapered roller bearing ¹⁾

- Driving out ⇒ [page 112](#)
- Drawing in ⇒ [page 112](#)
- Low-friction bearing; do not oil bearing when measuring friction torque

11 - Inner race for large tapered roller bearing ¹⁾

- Pressing off ⇒ [page 112](#)
- Pressing on ⇒ [page 112](#)
- Low-friction bearing; do not oil bearing when measuring friction torque

12 - Pinion shaft ¹⁾

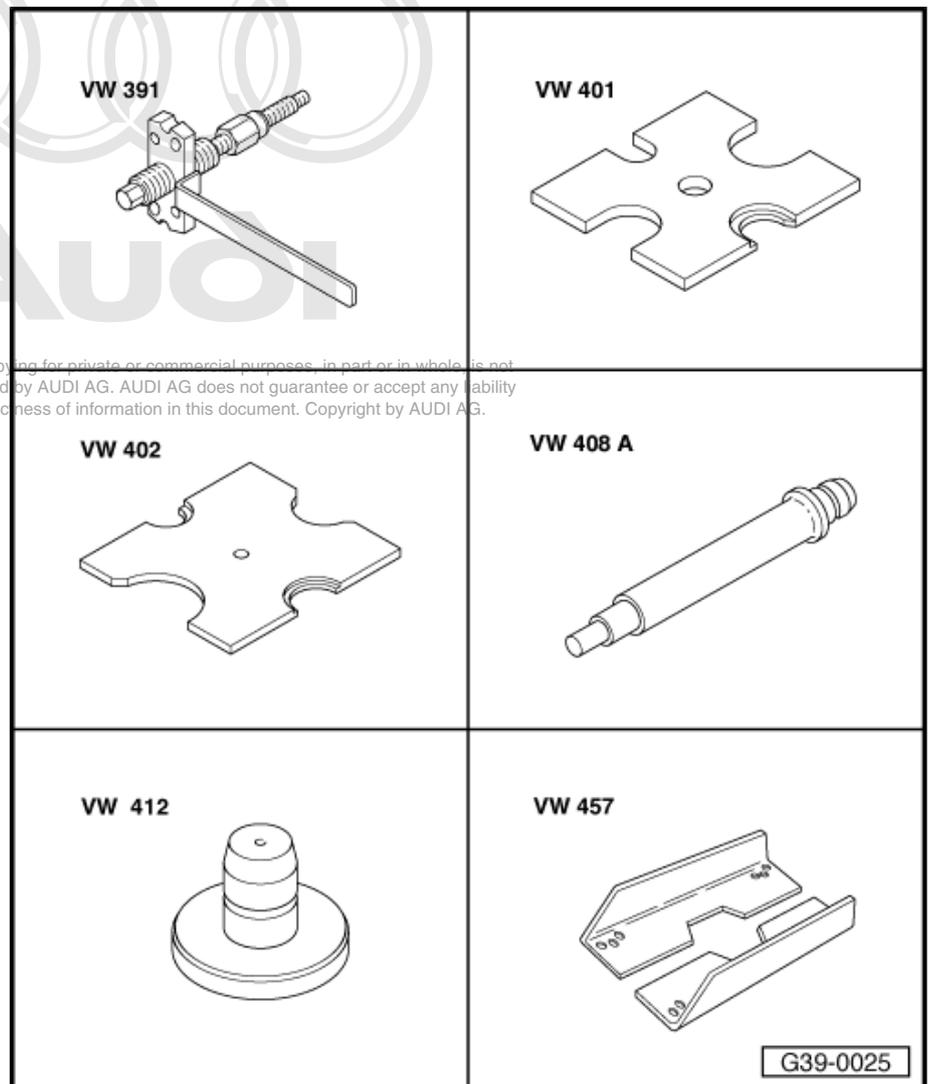
- Is mated with crown wheel, always renew together as a set

4.1 Dismantling and assembling pinion shaft

Special tools and workshop equipment required

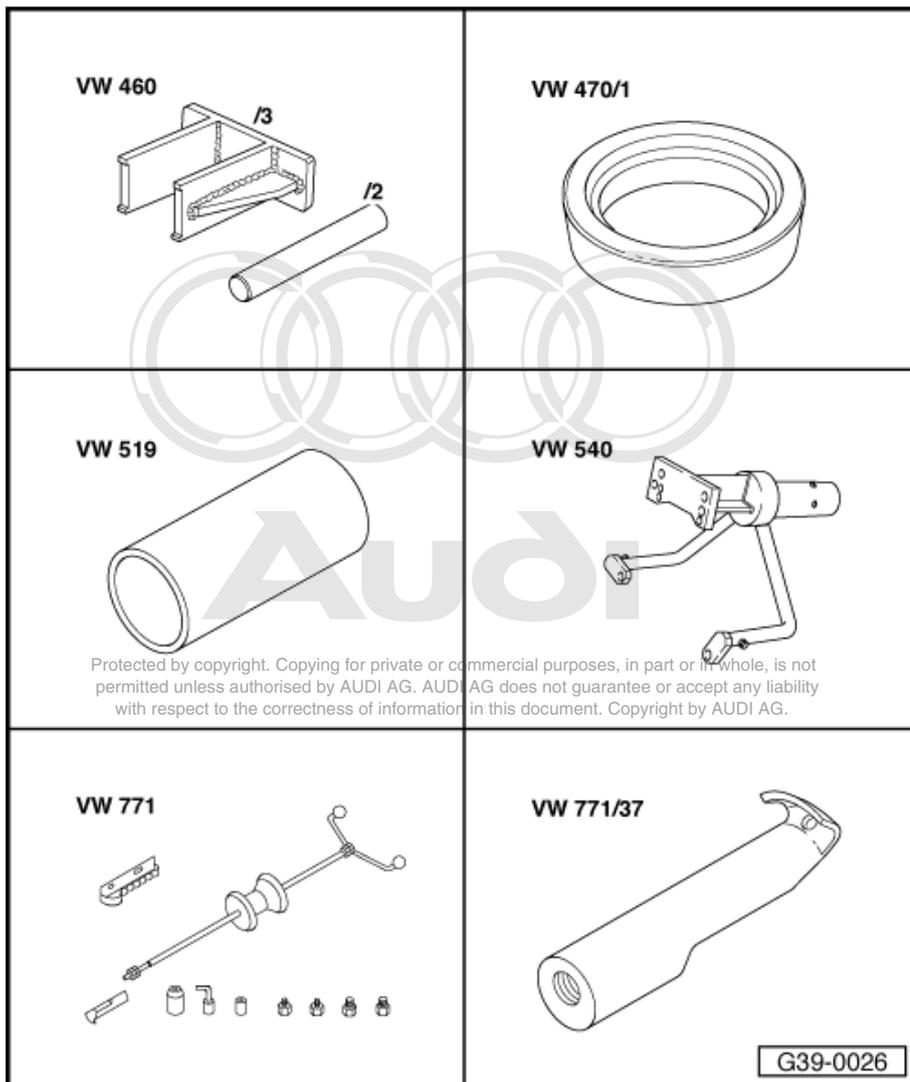
- ◆ Drive flange installing tool - VW 391-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 412-
- ◆ Support rails -VW 457-

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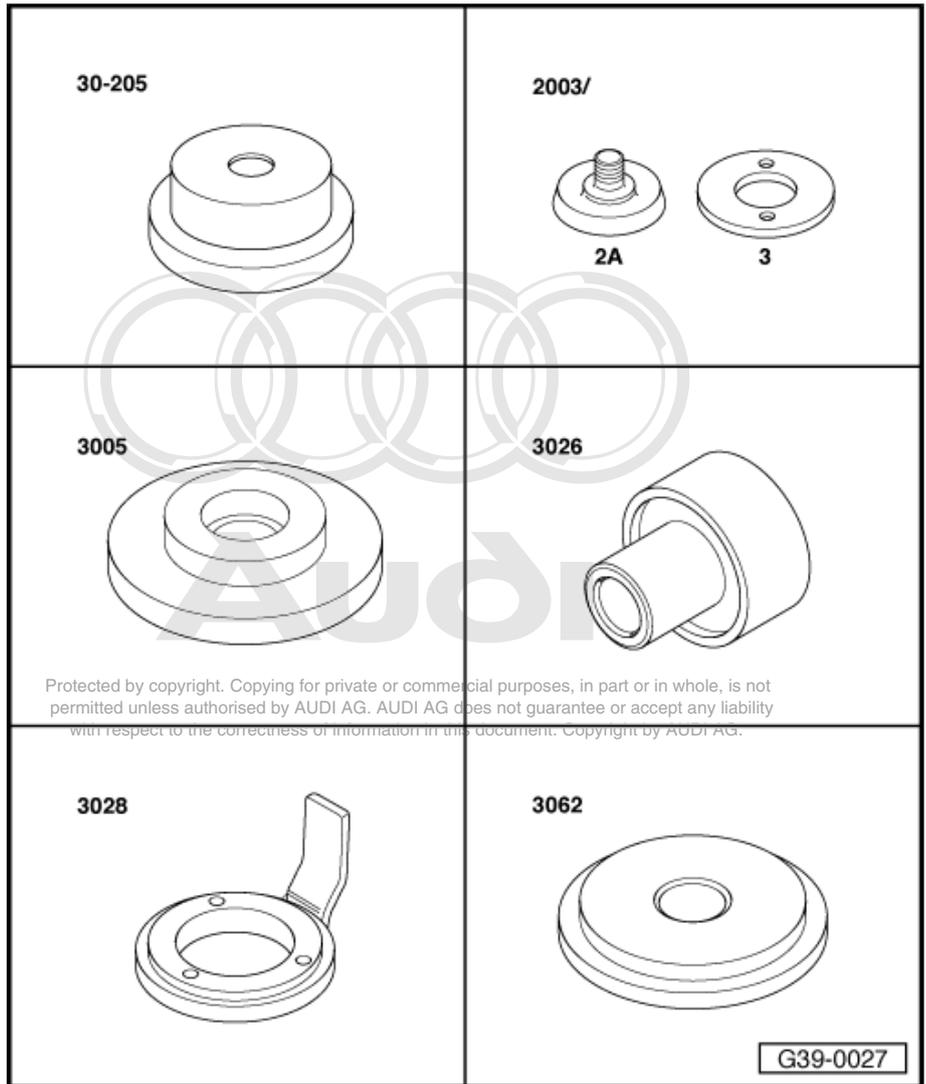




- ◆ Removing tool -VW 460-
- ◆ Thrust piece for pinion shaft bearing -VW 470/1-
- ◆ Tube -VW 519-
- ◆ Engine and gearbox support -VW 540-
- ◆ Multi-purpose tool -VW 771-
- ◆ Multi-purpose tool -VW 771/37-

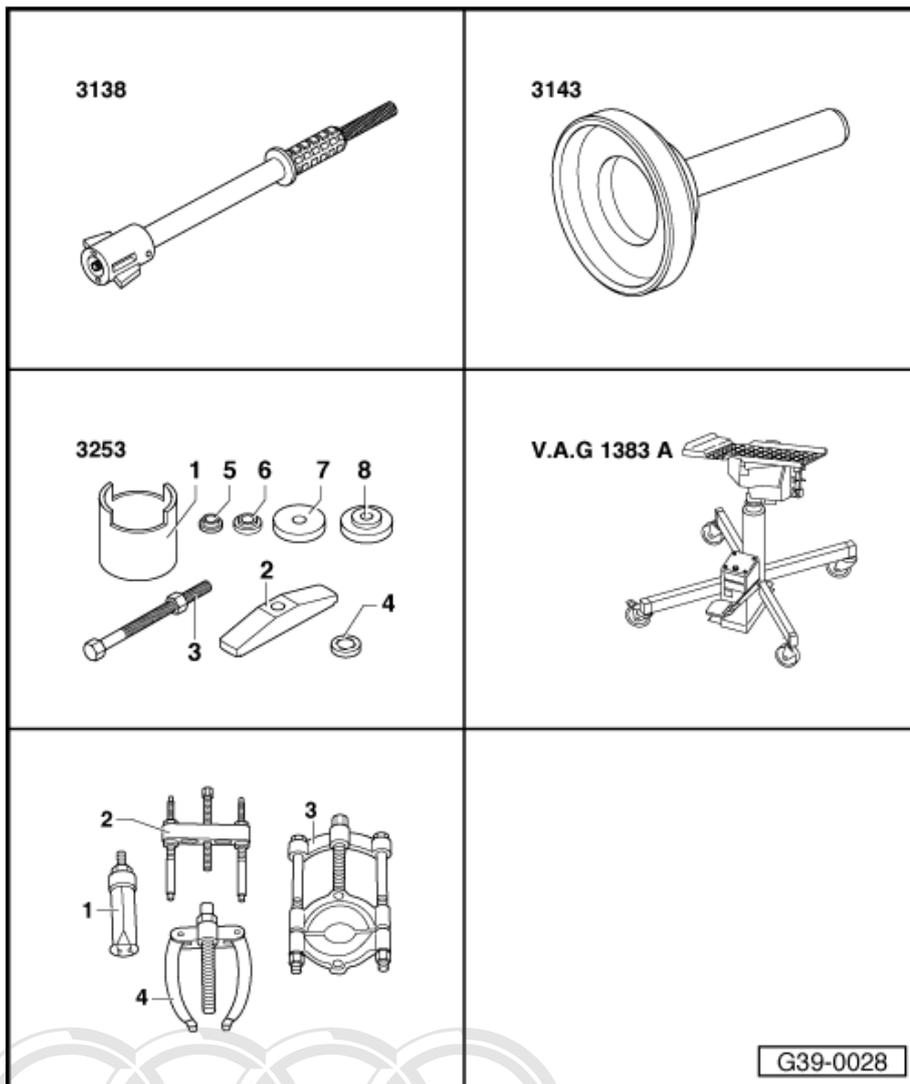


- ◆ Thrust plate -30 - 205-
- ◆ Installing ring -2003/3-
- ◆ Thrust plate -3005-
- ◆ Punch -3026-
- ◆ Counterhold tool -3028-
- ◆ Thrust pad -3062-





- ◆ Drift -3138-
- ◆ Drift sleeve -3143-
- ◆ Assembly tool -3253-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ -1- Splitter 22 ... 115 mm, Kukko 17/2
- ◆ -3- Internal puller 46 ... 58 mm Kukko 21/7
- ◆ -4- Kukko 22/2 counter-support
- ◆ Torque gauge 0 ... 600 Ncm
- ◆ Socket attachment (long), 36 mm



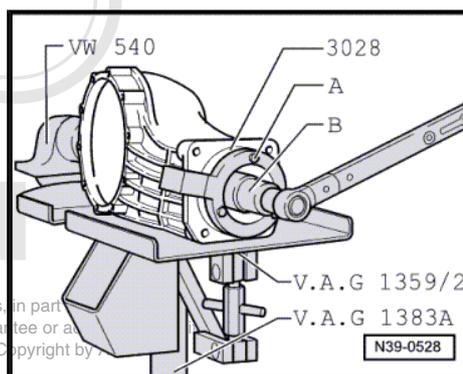
Removing nut for pinion shaft

- Secure counterhold tool -3028- using 2 bolts (M8x30) -item A-
- B - Socket attachment (long), 36 mm



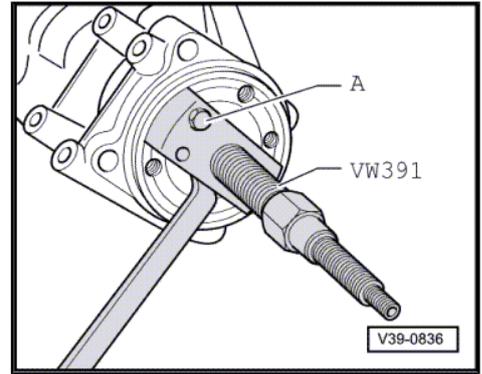
Note

The rear final drive must be supported when loosening the pinion shaft nut (e.g. using engine and gearbox jack -V.A.G 1383 A-).

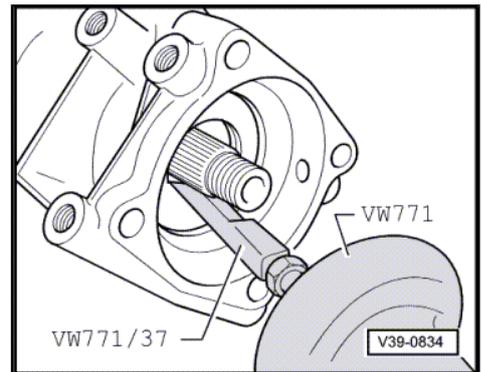


Pulling flange for propshaft off pinion shaft

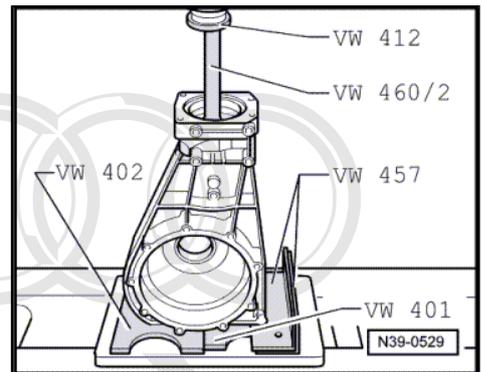
- To pull off, screw two bolts (M8x30) -item A- into flange for propshaft.



Pulling out oil seal (for flange for propshaft)



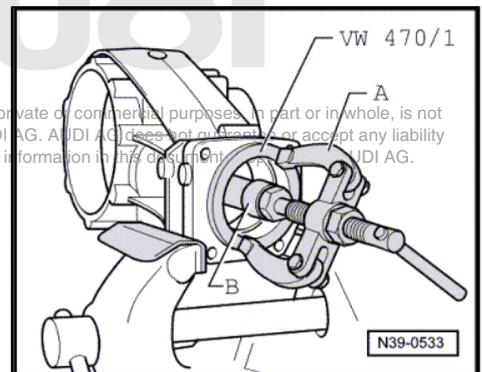
Pressing pinion shaft out of inner race for small tapered roller bearing



Pulling out outer race for small tapered roller bearing

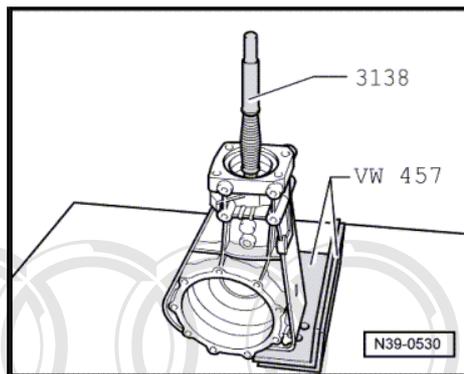
- A - Counter-support Kukko 22/2
- B - Internal puller 46 ... 58 mm Kukko 21/7

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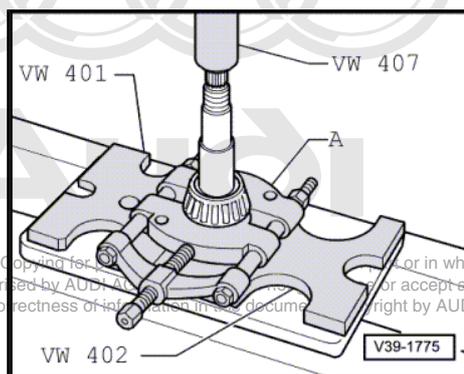
Driving out outer race for large tapered roller bearing

- After removing check shims for damage.



Pressing inner race for large tapered roller bearing off pinion shaft

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



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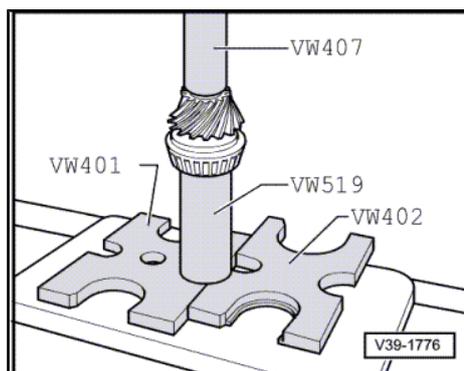
Pressing inner race for large tapered roller bearing onto pinion shaft



WARNING

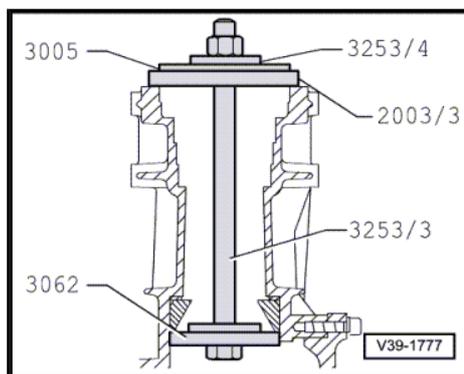
Wear protective gloves.

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



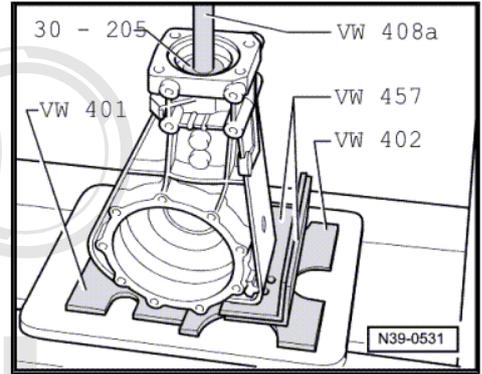
Pulling in outer race for large tapered roller bearing

- Lightly oil bearing seat in final drive housing.
- Insert previously determined shim „S3“ for pinion shaft
 => [page 118](#) .
- Lettering „oben“ (top) on thrust plate -3253/4- faces nut of puller.



Pressing in outer race for small tapered roller bearing

- Lightly oil bearing seat in final drive housing.
- Use press tool -VW 408 A- and thrust plate -30-205- to press in outer race.



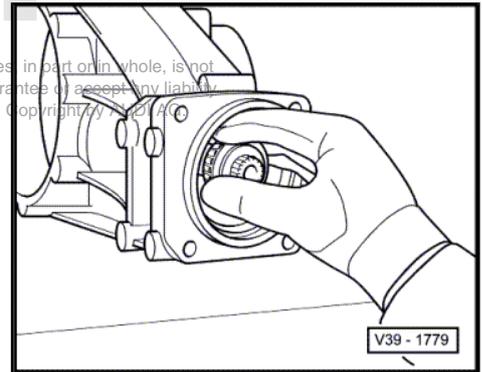
Pressing on inner race for small tapered roller bearing

- Insert pinion shaft with new spacer sleeve

 **WARNING**

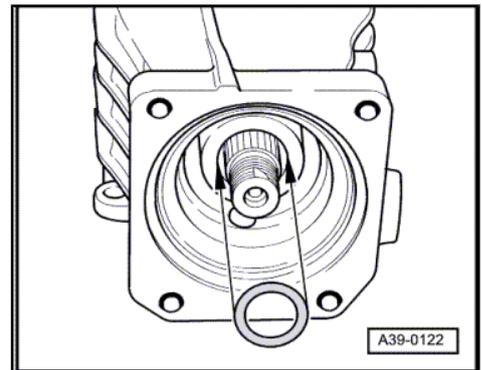
Wear protective gloves.

- Heat inner race for small tapered roller bearing to approx. 100 °C and fit onto pinion shaft.
- Press up pinion shaft and insert bearing using press tool -40-21- up to stop.



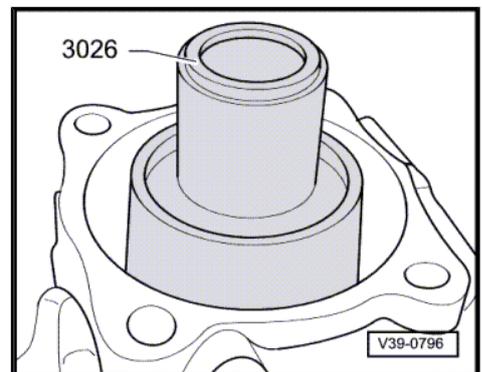
Fitting O-ring

- Lightly lubricate new O-ring with gear oil.



Driving in oil seal (for flange for propshaft)

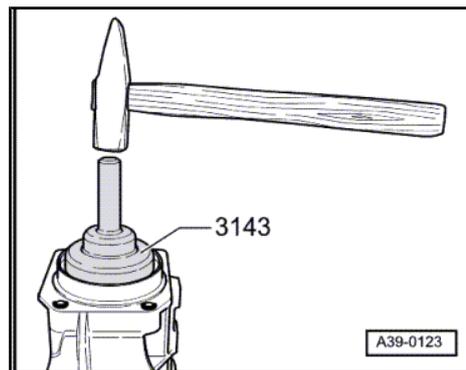
- Lightly lubricate outer circumference of oil seal with gear oil.
- Pack space between sealing lip and dust lip with sealing grease -G 052 128 A1- .
- Use punch -3026- to drive home oil seal.





Installing flange

- Drive propshaft flange onto pinion shaft until the securing nut can be fitted.



Tightening nut for pinion shaft and setting friction torque

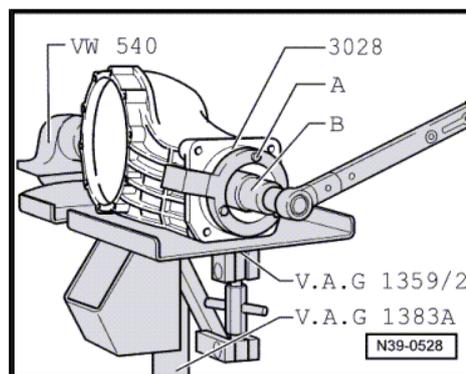
- Secure counterhold tool -3028- using 2 bolts (M8x30) -item A-

B - Socket attachment (long), 36 mm



Note

- ◆ *Fit a new pinion shaft nut.*
- ◆ *The rear final drive must be supported when tightening the pinion shaft nut (e.g. using engine and gearbox jack -V.A.G 1383 A-).*
- ◆ *Only increase tightening torque slowly. Stop and check friction torque several times. If the specified friction torque is exceeded, the spacer sleeve must be renewed and the adjustment procedure repeated. A spacer sleeve which has been compressed too much cannot be re-used.*

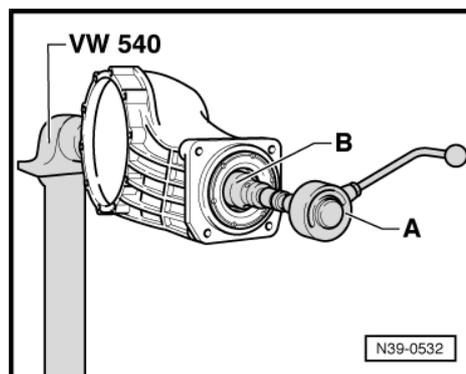


Measuring friction torque

A - Torque gauge 0 ... 600 Ncm

B - Socket attachment, 36 mm

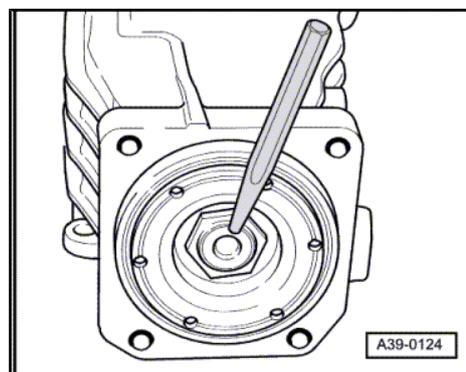
- Set following friction torque:
- New bearings: 200 ... 250 Ncm.
- Used bearings: 30 ... 60 Ncm (used for min. 50 km).



Securing nut for pinion shaft

- Peen pinion shaft nut with a punch.
- After securing the nut for the pinion shaft, measure the radial run-out at the flange for the propshaft, and mark accordingly → [page 89](#).

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5 Adjusting pinion shaft and crown wheel

Note

- ◆ *Careful adjustment of the crown wheel and pinion shaft is essential to ensure that the final drive gives long service and runs silently. For this reason, the pinion shaft and crown wheel are matched together during manufacture, and checked to ensure a good mesh pattern and quiet running in both directions of rotation. The position of quietest running is found by moving the pinion shaft in an axial direction and at the same time lifting the crown wheel out of the zero-play mesh position by the amount necessary to maintain the backlash within the specified tolerance.*
- ◆ *The object of the adjustment is to reproduce the setting for quietest possible running, as obtained on the test machine in production.*
- ◆ *The allowance „r“ in relation to the master gauge „Ro“ is measured for the final drive gear sets supplied as replacement parts and marked on the outer circumference of the crown wheel. The final drive set (pinion shaft and crown wheel) may only be renewed together as a matched pair.*
- ◆ *Observe the general repair instructions for tapered roller bearings and shims.*
- ◆ *For good results, maximum care and cleanliness are very important when performing repairs and taking measurements.*

Adjustment and marking of final drive gear set



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1 - Identification „0937“ denotes an Oerlikon gear set with a ratio of 37 : 9.

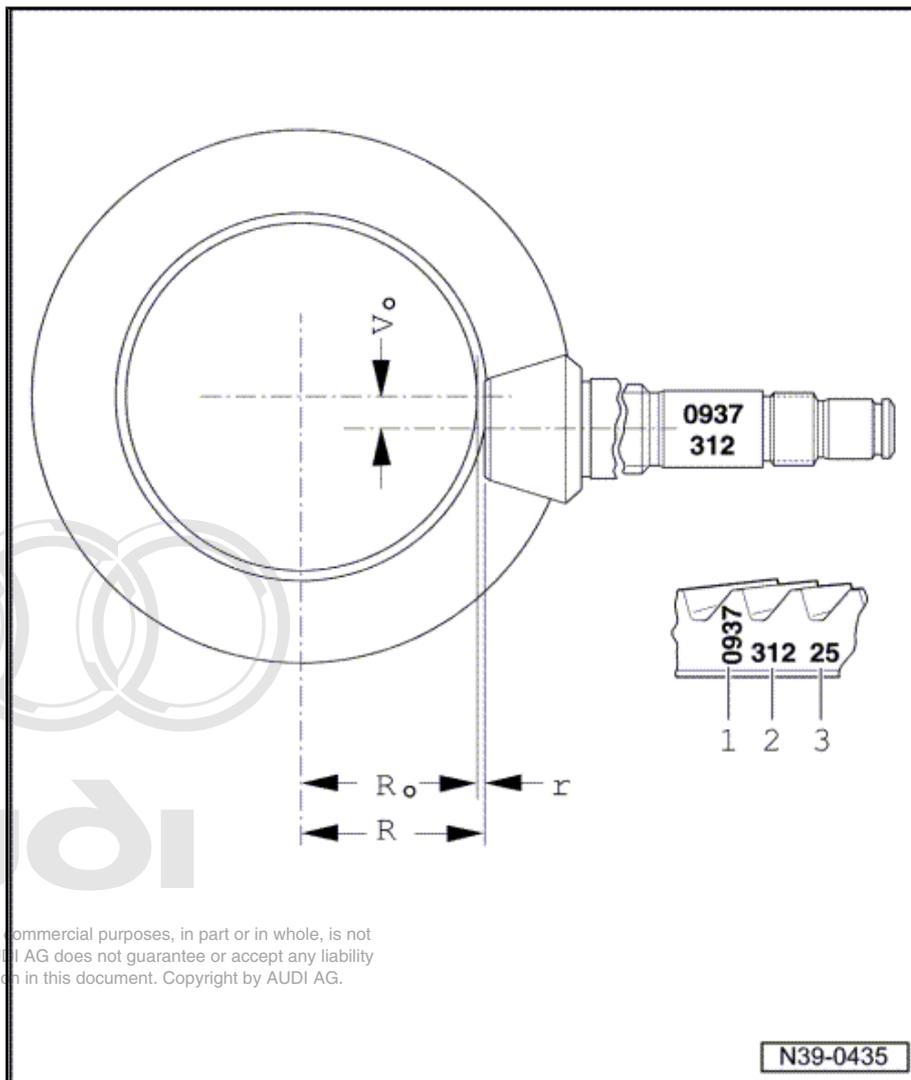
2 - Identification number of matched pair of gears (312).

3 - Allowance „r“ is based on the master gauge used on the test machine in production. The allowance „r“ is always given in 1/100 mm. For example: „25“ indicates $r = 0.25$ mm

R_o - Length of master gauge used on test machine „ R_o “.

R - Actual distance between centre axis of crown wheel and face of pinion shaft at point with quietest running for this gear set. $R = R_o + r$

V_o - Hypoid offset



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N39-0435

Re-adjustment sequence for final drive gear set

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

1. Determine total shim thickness „ S_{total} “ for „ S_1 “ + „ S_2 “ to give specified preload for tapered roller bearings for differential.
2. Determine shim thickness „ S_3 “ to reproduce the installation position for the pinion shaft determined on the test machine in production.
3. Distribute total shim thickness „ S_{total} “ for „ S_1 “ + „ S_2 “ so that the specified backlash between crown wheel and pinion shaft is maintained.



Note

Installation position of shims [⇒ page 117](#).

Table of adjustments

 **Note**

When performing assembly work, re-adjustment of the pinion shaft or final drive gear set is only necessary if replacing components directly affecting the setting of the final drive. Refer to the following table to avoid unnecessary adjustment work:

Component renewed	Components requiring adjustment:		
	Crown wheel „S1“+„S2“ ¹⁾ ⇒ page 123	Pinion shaft „S3“ ¹⁾ via allowance „r“ ⇒ page 118	Checking backlash ⇒ page 127
Final drive housing	X	X	X
Differential cage	X		X
Tapered roller bearings for pinion shaft		X	X
Tapered roller bearings for differential	X		X
Final drive gear set ²⁾	X	X	X
Cover for final drive	X		X
<ul style="list-style-type: none"> • ¹⁾ Installation position of shims ⇒ page 117 . • ²⁾ Pinion shaft and crown wheel; only renew together. 			

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Shims; installation position

 **Note**

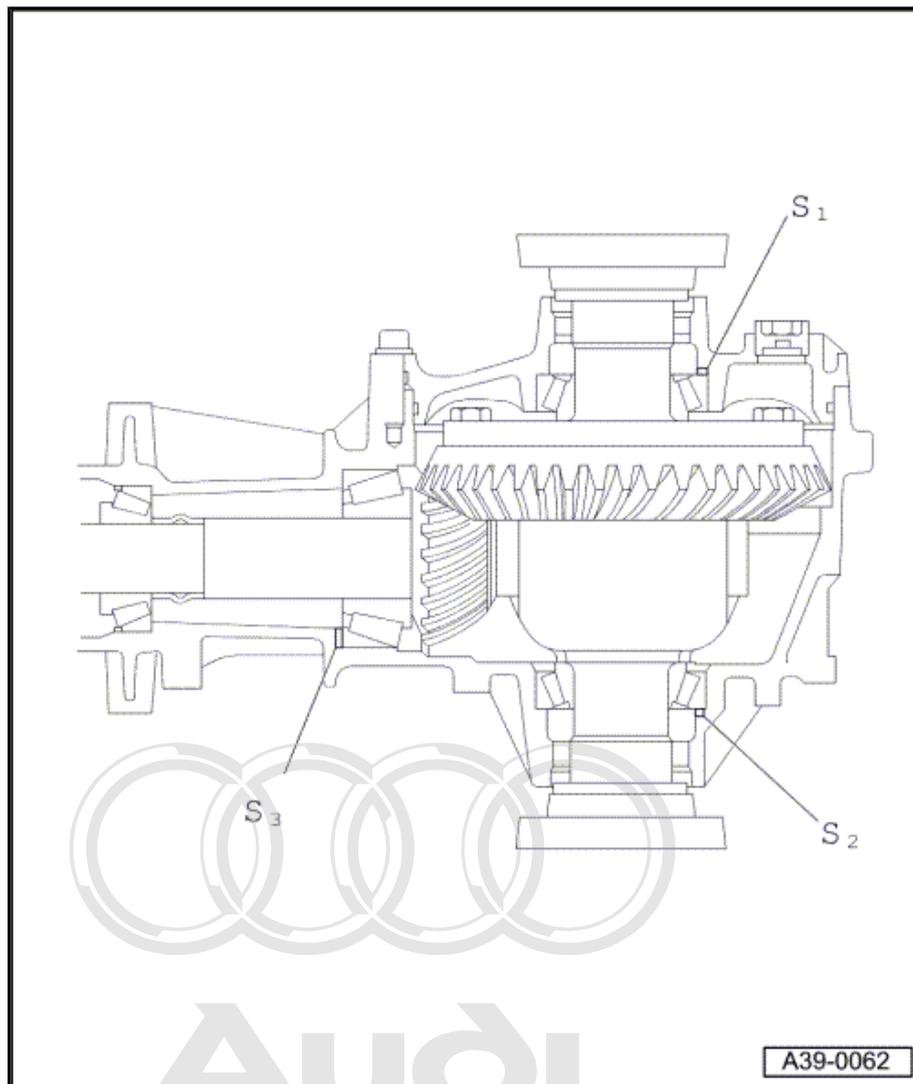
Table of adjustments when renewing individual components of rear final drive ⇒ [page 117](#) .



S1 - Shim for crown wheel in cover for final drive

S2 - Shim for crown wheel in final drive housing

S3 - Shim for pinion shaft in final drive housing



5.1 Adjusting pinion shaft

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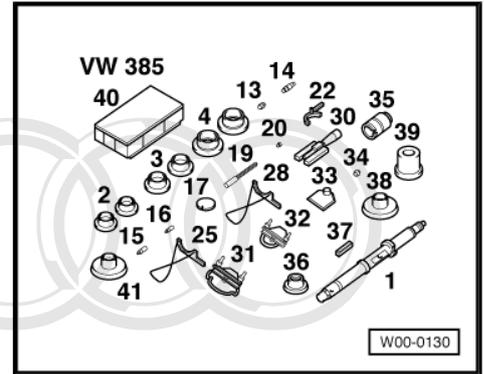
It is only necessary to readjust the pinion shaft when the following components have been renewed:

- ◆ Final drive gear set
- ◆ Tapered roller bearings for pinion shaft
- ◆ Final drive housing

Table of adjustments ⇒ [page 117](#)

Special tools and workshop equipment required

- ◆ Universal measuring tool -VW 385-



Determining thickness of shim „S3“

(Setting preload of tapered roller bearings for pinion shaft)



Note

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Before adjusting pinion shaft, adjust crown wheel (determine total shim thickness „S_{total}“ for shims „S1“ + „S2“) ⇒ [page 123](#).

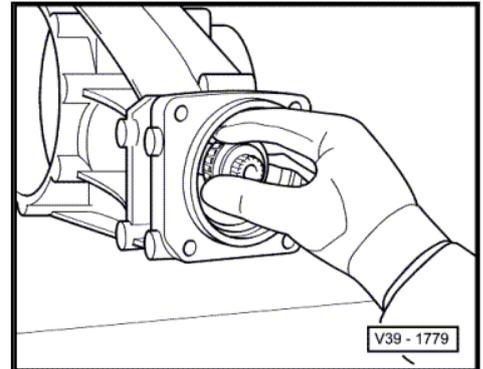
- Secure rear final drive to engine and gearbox support ⇒ [page 94](#).
- Pull outer races of both tapered roller bearings into final drive housing (without shims) ⇒ [page 112](#) and ⇒ [page 113](#).
- Insert pinion shaft without spacer sleeve.



WARNING

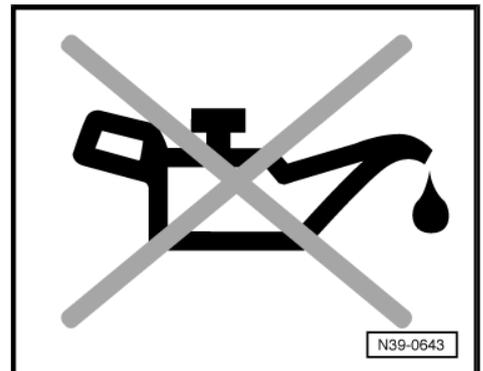
Wear protective gloves.

- Heat inner race for tapered roller bearing to approx. 100 °C and fit onto pinion shaft.



Note

- ◆ *Only install spacer sleeve for final friction torque measurement (after determining shim „S3“).*
- ◆ *Do not use additional lubricant on new tapered roller bearings for friction torque measurement. The bearings have already been treated with special oil by the manufacturer.*





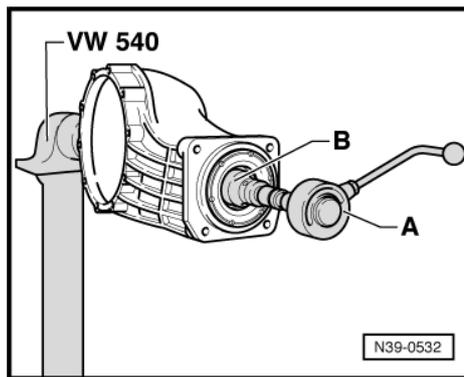
- Fit flange for propshaft and set friction torque => [page 114](#) .

A - Torque gauge 0 ... 600 Ncm, commercially available

B - Socket attachment, 36 mm

- Tighten pinion shaft nut until the following friction torque is obtained:

- New bearings: 200 ... 250 Ncm.
- Used bearings: 30 ... 60 Ncm (used for min. 50 km).

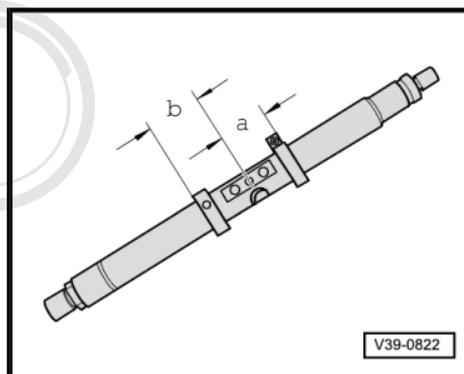


- Set adjustment ring of universal measuring tool -VW 385/1- as follows:

• Dimension -a- = 60 mm

- Set moveable adjustment ring as follows:

• Dimension -b- = 55 mm.



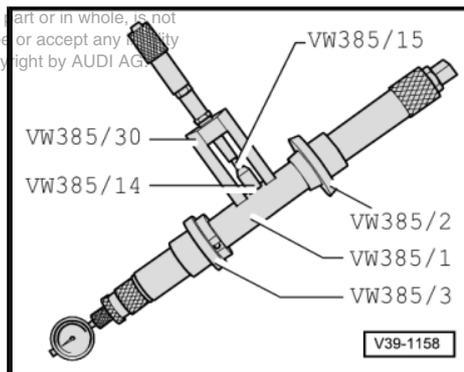
- Assemble universal measuring tool with dial gauge extension -VW 385/15-, length 9 mm as shown in illustration.

- Set universal master gauge -VW 385/30- as follows:

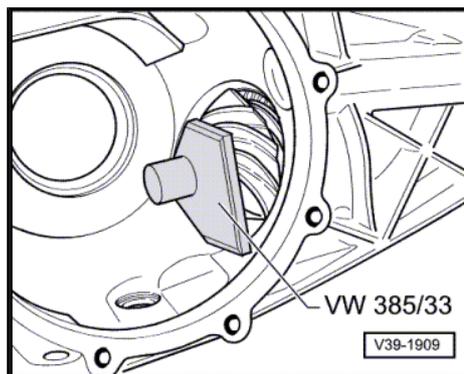
• $R_o = 57.50$ mm.

- Set dial gauge (3 mm measuring range) to „0“ with a preload of 2 mm.

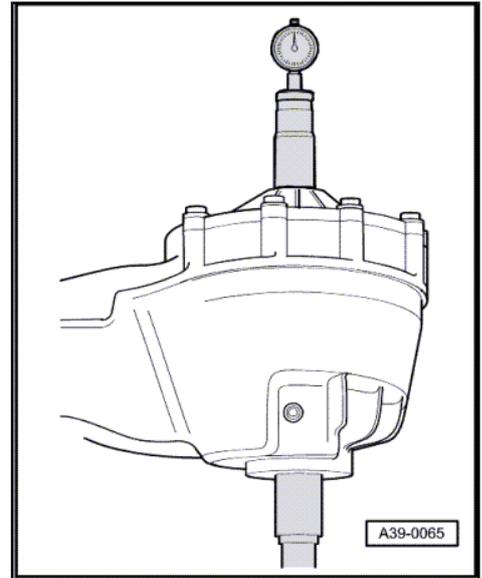
- Turn pinion shaft eight turns in both directions so that the tapered roller bearings settle.



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



- Remove master gauge and insert measuring tool into final drive housing.
- The centring disc -VW 385/3- faces towards cover for final drive.
- Fit cover for final drive and tighten 4 bolts to 25 Nm.
- Using the moveable adjustment ring, pull 2nd centring disc out as far as possible so that the measuring tool can still just be turned by hand.



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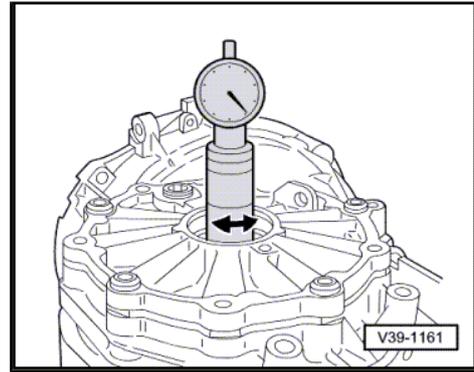
**Determining dimension „e“**

- Turn measuring tool until tip of dial gauge contacts end measuring plate on pinion shaft head and gauge indicates maximum deflection (return point). The measured value is dimension „e“ (in red scale).
- Measurement in following example: „e“ = 1.60 mm.

**Note**

Dimension „e“ is required to determine thickness of shim „S3“.

- After removing universal measuring tool, check once again that the dial gauge reads „0“ with 2 mm preload when master gauge -VW 385/30- is in place - otherwise repeat the measurement.

**Determining shim thickness „S3“**

Formula: „S3“ = „e“ – „r“

e - Measured value

r - Allowance (indicated on crown wheel in ¹/100 mm)

Example:

Measured value „e“	1.60 mm
Allowance „r“	– 0.42 mm
Thickness of shim „S3“	= 1.18 mm

- Select thickness of required shim(s) as accurately as possible from following table. For Part Nos. refer to ⇒ Electronic parts catalogue .

Available shims - Thickness of shims in mm ¹⁾		
0.95	1.20	1.45
1.00	1.25	1.50
1.05	1.30	1.55
1.10	1.35	
1.15	1.40	

• ¹⁾ Different shim thicknesses make it possible to obtain the exact shim thickness required, if necessary, fit two shims.

- Remove universal measuring tool.
- Remove pinion shaft and outer race of large tapered roller bearing and install together with measured shims „S3“ and spacer sleeve ⇒ [page 110](#) .
- Install inner race of small tapered roller bearing and tighten nut for pinion shaft until specified friction torque is obtained ⇒ [page 114](#) .

i Note

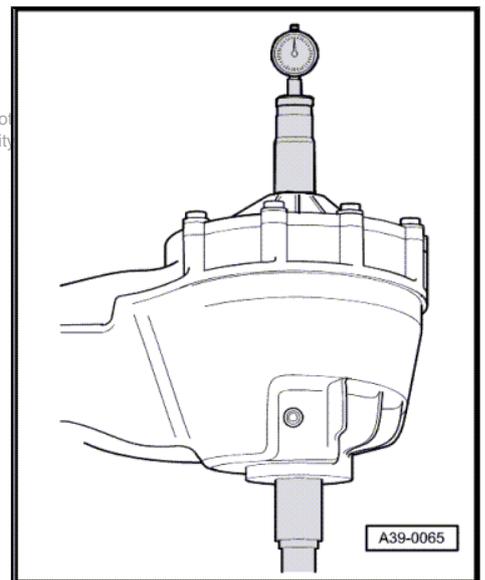
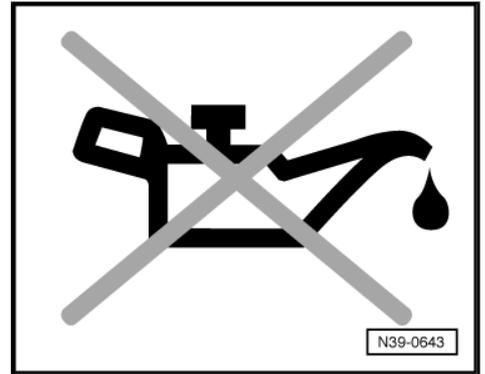
- ◆ Do not use additional lubricant on new tapered roller bearings for friction torque measurement. The bearings have already been treated with special oil by the manufacturer.
- ◆ Only increase tightening torque slowly. Stop and check friction torque several times. If the specified friction torque is exceeded, the spacer sleeve must be renewed and the adjustment procedure repeated. A spacer sleeve which has been compressed too much cannot be re-used.

– Set following friction torque:

- New bearings: 200 ... 250 Ncm.
- Used bearings: 30 ... 60 Ncm (used for min. 50 km).

Checking dimension „r“

- Turn pinion shaft eight turns in both directions so that the tapered roller bearings settle.
- **Insert universal measuring tool and check measurement.**
- If the correct shims have been selected, the dial gauge (reading anti-clockwise in the red range), should now show the allowance „r“ within a tolerance of ± 0.04 mm
- Peen pinion shaft nut with a punch.
- Measure and mark radial run-out at flange for propshaft
⇒ [page 89](#) .



5.2 Adjusting crown wheel

(Adjusting differential)

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

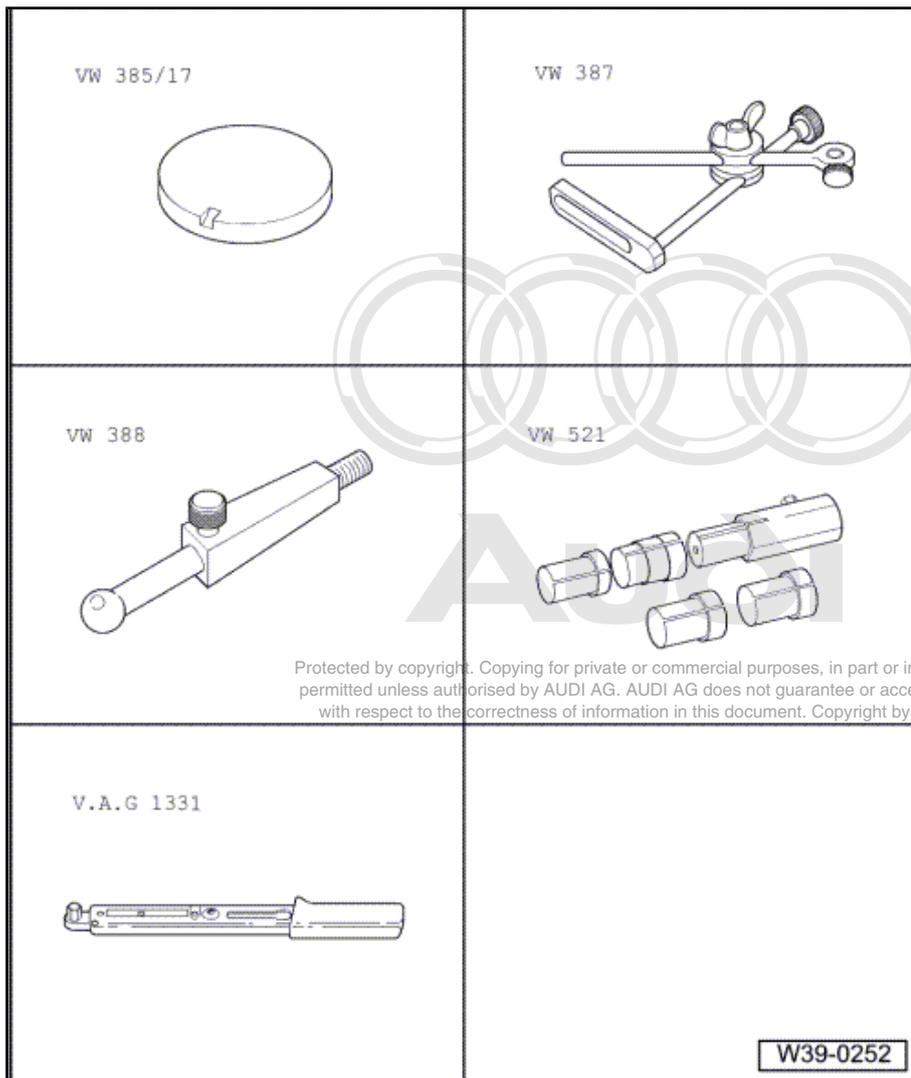
- ◆ Final drive housing
- ◆ Cover for final drive
- ◆ Tapered roller bearings for differential
- ◆ Differential cage
- ◆ Final drive gear set

Table of adjustments ⇒ [page 117](#)



Special tools and workshop equipment required

- ◆ Measuring plate - VW 385/17-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Adjustable measuring lever -VW 388-
- ◆ Crown wheel adjusting tool -VW 521-
- ◆ Dial gauge extension, 30 mm
- ◆ Dial gauge
- ◆ Torque gauge 0 ... 600 Ncm, commercially available



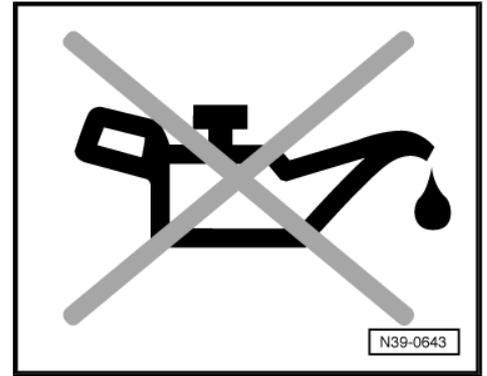
Determining total shim thickness „S_{total}“ for shims „S1“ + „S2“

(Setting preload of tapered roller bearings for differential)

- Pinion shaft removed.

i Note

- ◆ *If only the tapered roller bearings for the differential are being renewed, the crown wheel can be removed from the differential cage. The pinion shaft then does not have to be removed.*
- ◆ *The tapered roller bearings for the differential are low-friction bearings. The friction torque therefore only has limited use as a means of checking the adjustment. Correct adjustment can only be obtained by determining the total shim thickness „S_{total}“.*
- ◆ *Do not use additional lubricant on new tapered roller bearings for friction torque measurement. The bearings have already been treated with special oil by the manufacturer.*

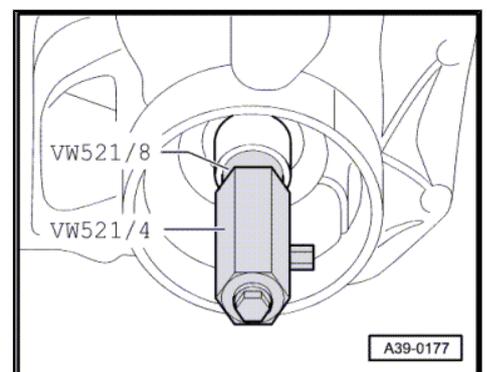


- Lever out flange shaft oil seal using an assembly lever.
- Remove tapered roller bearing outer races for differential and take out shims ⇒ [page 101](#) and ⇒ [page 103](#) .
- Press outer race of left-hand tapered roller bearing for differential (housing side) with shim „S2“ into final drive housing ⇒ [page 101](#) . To perform the measurement, use a shim „S2*“ with a thickness of 1.00 mm (one 0.80 mm shim and one 0.20 mm shim).

i Note

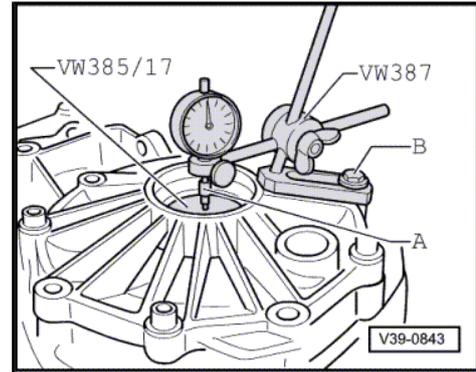
For measurement purposes a shim „S2“ with a thickness of 1.00 mm is fitted provisionally. It is referred to below as „S2“ . After determining the backlash „S2*“ will be replaced with the correct „S2“ .*

- Knock in outer race of right-hand tapered roller bearing for differential (final drive cover side) without shims as far as stop ⇒ [page 103](#) .
- Insert differential into final drive housing.
 - The crown wheel is located on the right side (cover side).
- Fit cover for final drive and tighten bolts to 25 Nm.
- Fit crown wheel adjusting tool -VW 521/4- and -VW 521/8- onto housing side in differential cage.
- Turn cover side of final drive housing upwards.
- Turn differential eight turns in both directions so that the tapered roller bearings settle.





- Place measuring plate -VW 385/17- onto differential.
 - Fit measuring tools as shown in the illustration.
- A - Dial gauge extension (approx. 30 mm long)
B - Hexagon bolt M8 x 45
- Place dial gauge extension on centre of measuring plate - VW 385/17- .



- Set dial gauge (3 mm measuring range) to „0“ with a preload of 2 mm.
- Raise differential without turning, read clearance off dial gauge and note down.
- Measurement in following example: 0.50 mm.

**Note**

If the measurement has to be repeated, the differential must again first be turned 8 turns in each direction to settle the tapered roller bearings.

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

Example:

Shim(s) installed „S ₂ “	1.00 mm
Measured value	+ 0.50 mm
Bearing preload (constant value)	+ 0.30 mm
Total shim thickness „S _{total} “ for shims „S ₁ “ + „S ₂ “	= 1.80 mm

Determining thickness of shim „S₁“**Note**

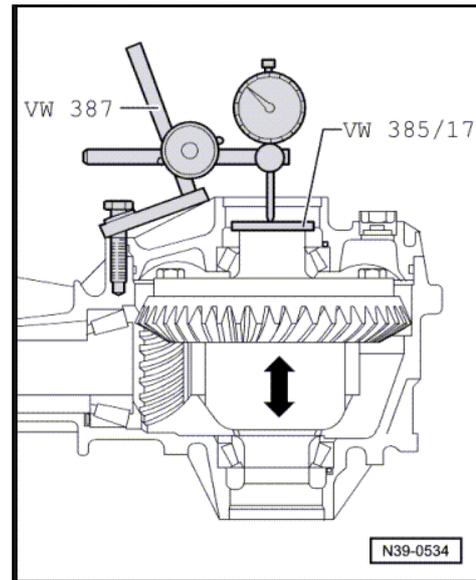
- ◆ The provisional shim „S₁“ will be replaced with the final shim „S₁“ after determining the backlash.
- ◆ Total shim thickness "S_{total}" remains unchanged.

Formula: „S₁“ = „S_{total}“ – „S₂“

Example:

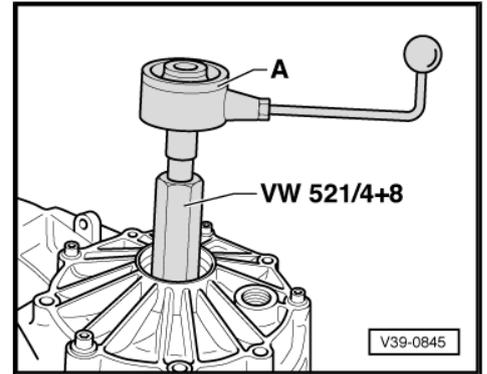
Total shim thickness „S _{total} “ for shims „S ₁ “ + „S ₂ “	1.80 mm
Shim(s) installed „S ₂ “	– 1.00 mm
Thickness of shim „S ₁ “	= 0.80 mm

- Determine shim(s) as accurately as possible according to table ⇒ [page 129](#) .



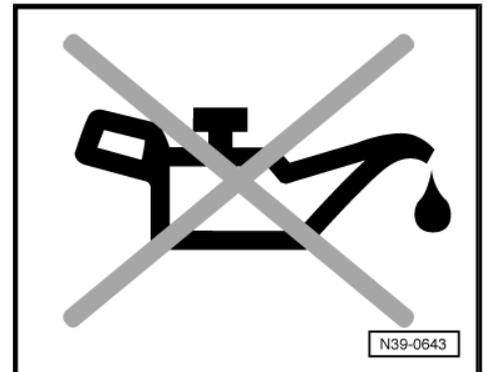
Measuring friction torque (for checking adjustment)

- Pinion shaft removed.
- Differential fitted with shims „S1*“ and „S2*“.
- Fit torque gauge 0 ... 600 Ncm -item A- onto differential.
- Read off friction torque. Specifications:
 - New bearings: 150 ... 300 Ncm.
 - Used bearings: 30 ... 60 Ncm (used for min. 50 km).



Note

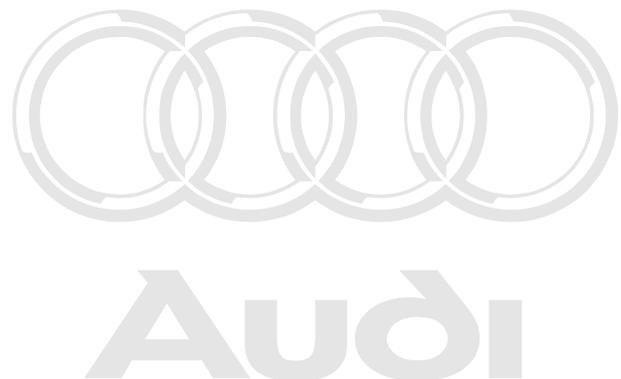
- ◆ *The tapered roller bearings for the differential are low-friction bearings. The friction torque therefore only has limited use as a means of checking the adjustment. Correct adjustment can only be obtained by determining the total shim thickness „Stotal“.*
- ◆ *Do not use additional lubricant on new tapered roller bearings for friction torque measurement. The bearings have already been treated with special oil by the manufacturer.*
- ◆ *If the final drive set (pinion shaft and crown wheel) is being re-adjusted, the adjustment of the pinion shaft should be performed now, and the adjustment checked => [page 118](#).*



Adjusting backlash

(Positioning crown wheel in final drive housing)

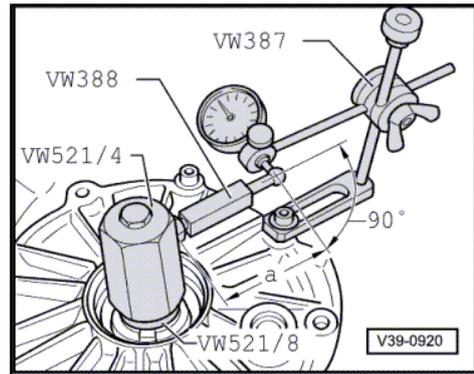
- Pinion shaft with shim „S3“ installed.
- Differential with shims „S1*“ + „S2*“ installed.
- Insert differential into final drive housing, fit final drive cover and tighten all bolts to 25 Nm.



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- Turn differential five turns in both directions so that the tapered roller bearings settle.
- Fit measuring tools with dial gauge extension -VW 382/10- (6 mm, flat) as shown in the illustration.
- Adjust measuring lever -VW 388- .
- Dimension -a- = 60 mm
- Measure backlash between faces of gear teeth as follows:
 - Turn crown wheel until it makes contact with the face of one tooth (end of backlash travel).
 - Set dial gauge to „0“ with a preload of 1 mm.
 - Turn back crown wheel until it makes contact with opposite face (backlash).
 - Read off backlash and note reading.
 - Turn crown wheel through 90° and repeat measurement 3 times.

**Note**

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

Determining average backlash**Example:**

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

Result: the average backlash is $1.16 \text{ mm} : 4 = 0.29 \text{ mm}$.

Determining thickness of shim „S2“

Formula: „S2“ = „S2*“ – average backlash + lift

Example:

Inserted shim „S2*“	1.00 mm
Average backlash	- 0.29 mm
Lift (constant value)	+ 0.15 mm
Thickness of shim „S2“	= 0.86 mm

- Select thickness of required shim(s) as accurately as possible from following table. For Part Nos. refer to ⇒ Electronic parts catalogue .

Available shims - Thickness of shims in mm ¹⁾		
0.15	0.50	1.50
0.20	0.80	
0.25	1.00	
<ul style="list-style-type: none"> • ¹⁾ Different shim thicknesses make it possible to obtain the exact shim thickness required, if necessary, fit 2 shims. 		

Determining thickness of shim „S1“

Formula: „S1“ = „S_{total}“ – „S2“

Example:

Total shim thickness „S _{total} “ for shims „S1“ + „S2“	1.80 mm
Thickness of shim „S2“	– 0.86 mm
Thickness of shim „S1“	= 0.94 mm

- Select thickness of required shim(s) as accurately as possible from following table. For Part Nos. refer to ⇒ Electronic parts catalogue .

Available shims - Thickness of shims in mm ¹⁾		
0.15	0.50	0.90
0.20	0.60	1.00
0.30	0.70	1.20
0.40	0.80	

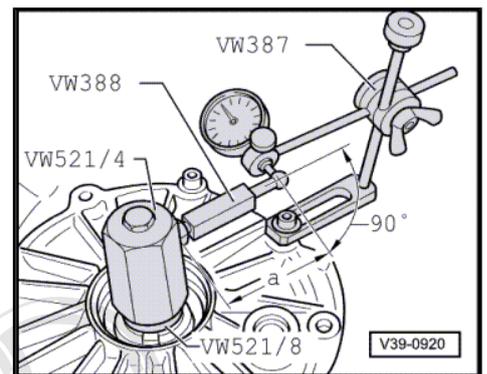
• ¹⁾ Different shim thicknesses make it possible to obtain the exact shim thickness required, if necessary, fit 2 shims.

Checking adjustment

- Pinion shaft with shim „S3“ installed.
- Differential with shims „S1“ + „S2“ installed.
- Turn differential five turns in both directions so that the tapered roller bearings settle.
- Measure backlash four times on circumference.
- Specification: 0.12 ... 0.22 mm

Note

- ◆ *Adjustment must be repeated if backlash is outside tolerance. The total shim thickness „S_{total}“ must remain unchanged.*
- ◆ *The discrepancy between individual measured values must not exceed 0.06 mm.*



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39 – Final drive - front differential

1 Overview - gear oil in front final drive

Plug for oil filler hole

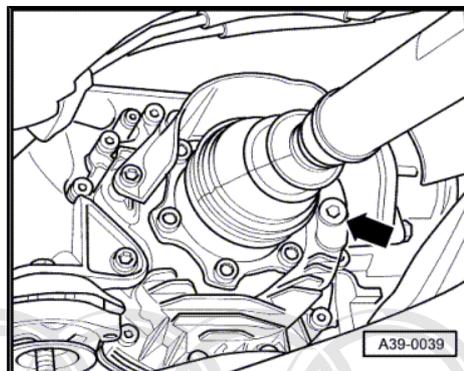


Note

The screw plug with seal must be renewed.

Pfeil - Screw plug

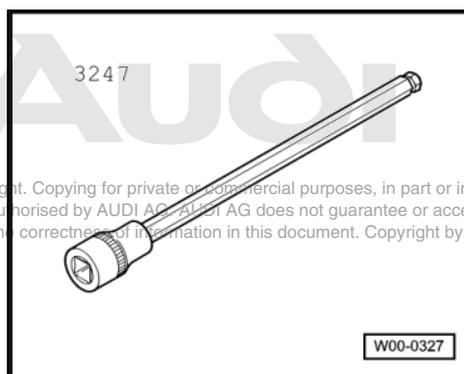
- Renew
- Tightening torque: 35 Nm.



1.1 Checking and topping up gear oil in front final drive

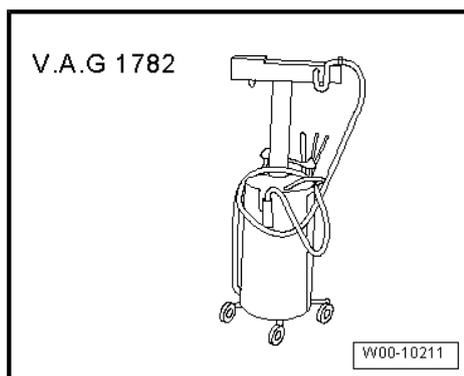
Special tools and workshop equipment required

- ◆ Hexagon key extension, 8 mm -3247-



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



- ◆ Allen key (8 mm)
- ◆ Safety goggles

Test condition

- Gear oil temperature approx. 60 °C (perform road test if necessary).

Test sequence

Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Drive vehicle onto a four-column lifting platform or over an inspection pit in order for it to be absolutely horizontal.
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



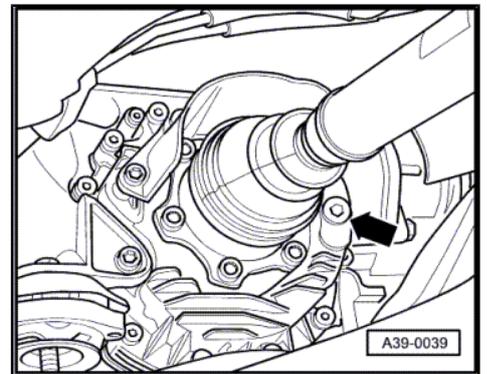
WARNING

Wear safety goggles.

- Remove screw plug for oil filler hole -arrow- using an Allen key (8 mm).

Note

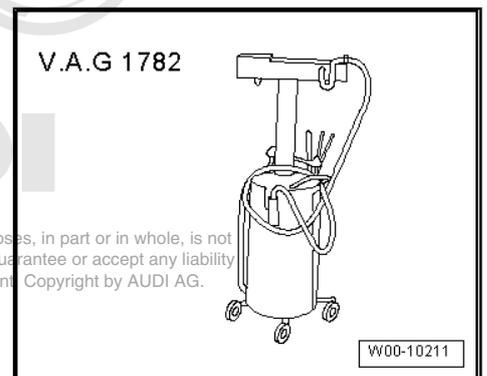
- ◆ *Use only an Allen key to unscrew screw plug (do not use hexagon key extension, 8 mm -3247-).*
- ◆ *If access to screw plug is restricted, detach heat shield and, if necessary, remove drive shaft from gearbox and move clear to one side .*
- ◆ *The screw plug with seal must be renewed.*
- Specification: gear oil level up to bottom lip of filler hole.
- Top up or allow excess gear oil to drain off; specification ⇒ Electronic parts catalogue .
- Tighten new screw plug for oil filler hole using hexagon key extension (8 mm) -3247- .
- Tightening torque ⇒ [page 130](#)



1.2 Filling up gear oil in front final drive after repairs

Special tools and workshop equipment required

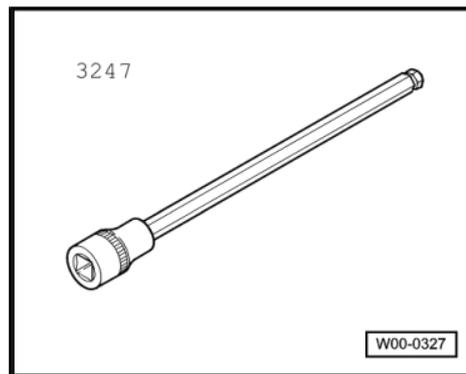
- ◆ Used oil collection and extraction unit -V.A.G 1782-



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- ◆ Hexagon key extension, 8 mm -3247-



- ◆ Allen key (8 mm)
- ◆ Safety goggles

Filling



Note

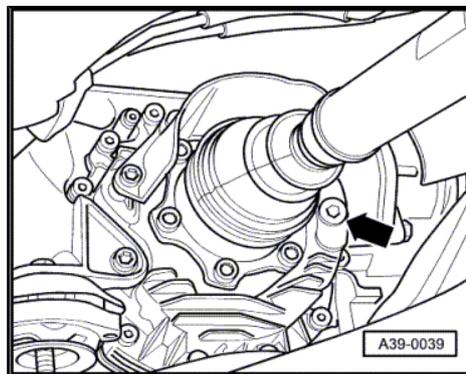
- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Tightening torque ⇒ [page 130](#)
- Drive vehicle onto a four-column lifting platform or over an inspection pit in order for it to be absolutely horizontal.
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.
- Remove screw plug for oil filler hole -arrow- using an Allen key (8 mm).



Note

Use only an Allen key (8 mm) to loosen plug (do not use hexagon key extension, 8 mm -3247-).

- Fill front final drive slowly and at a constant rate for a period of at least 5 minutes until gear oil (capacity and specification ⇒ [page 9](#)) comes out at lower edge of oil filler hole.



Note

The fill-up period of at least 5 minutes is necessary so that the internal oil level can be balanced out between the differential and the baffle chamber.

- Re-install used screw plug.
- Road test vehicle until gear oil reaches a temperature of approx. 60 °C.
- Check oil level in front final drive ⇒ [page 130](#) .
- Tighten new screw plug for oil filler hole using hexagon key extension (8 mm) -3247-

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2 Exploded view - front final drive

Note

- ◆ *General repair instructions* ⇒ [page 14](#).
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#).
- ◆ *The components shown in the following illustration can be removed with the gearbox in the vehicle.*

1 - Shim

- Behind bearing race
- Specially calibrated; must not be replaced with a non-calibrated shim

2 - Bearing race

- Remove and install by hand

3 - Seal

- Not available separately

4 - Oil filler plug

- Renew
- 35 Nm

5 - Bolt

- Conical head
- 25 Nm

6 - Flange shaft (right-side)

- Removing and installing ⇒ [page 137](#)

7 - Oil seal

- For flange shaft (right-side)
- Renewing ⇒ [page 139](#)

8 - Bolt

- Tightening torque and sequence ⇒ [page 135](#)

9 - Cover for final drive

- Renewing ⇒ [page 139](#)

10 - Shim

- Behind bearing race
- Specially calibrated; must not be replaced with a non-calibrated shim

11 - Bearing race

- Remove and install by hand

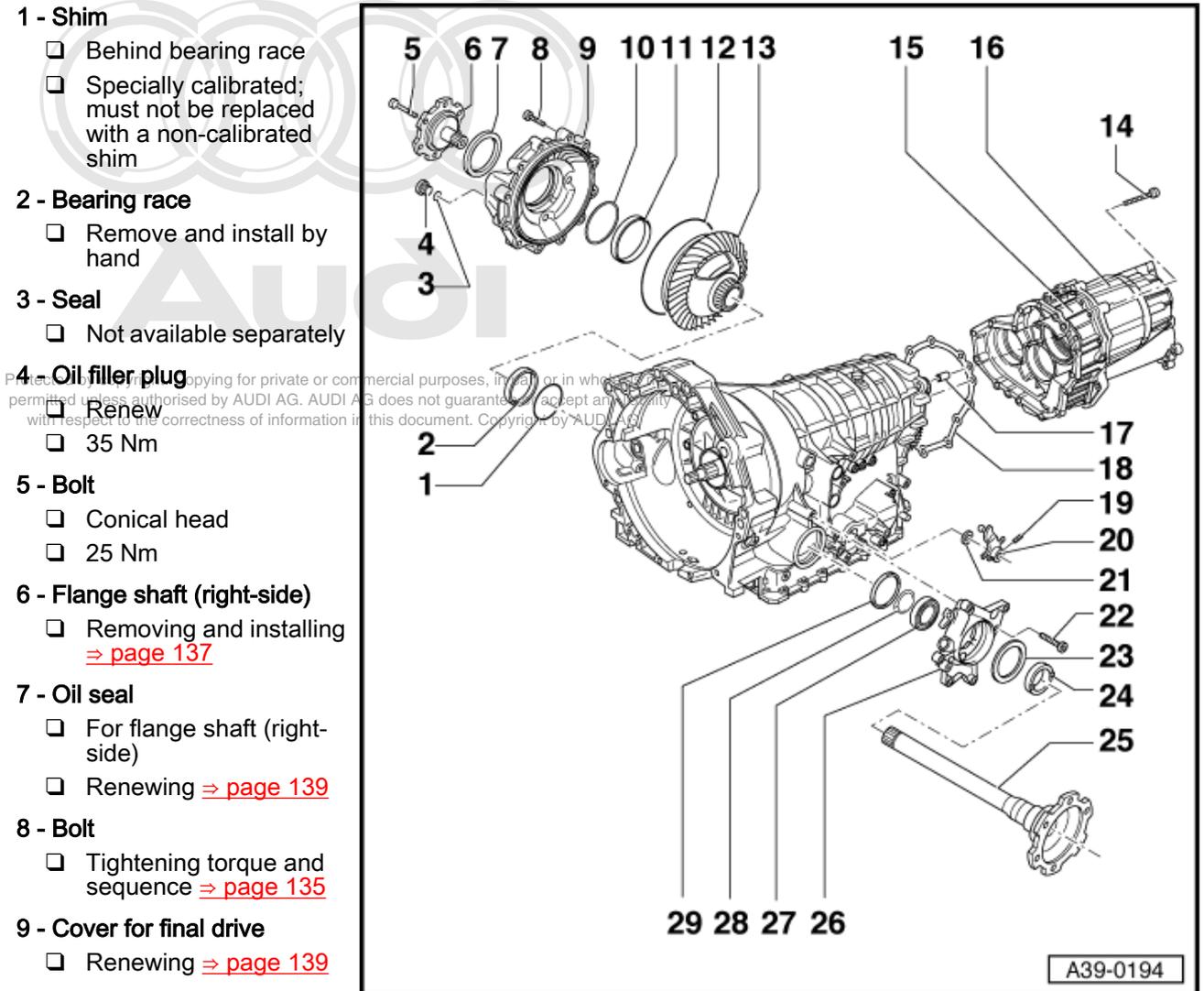
12 - O-ring

- Renewing ⇒ [page 139](#)

13 - Differential

14 - Bolt

- Tightening torque ⇒ [page 146](#)





15 - Intermediate flange for front axle drive

- ❑ ⇒ „4.4 Removing and installing intermediate flange for front axle drive“, page 148

16 - Transfer box

- ❑ Exploded view ⇒ page 144
- ❑ Removing and installing ⇒ page 148

17 - Dowel sleeve

18 - Gasket

- ❑ Renewing ⇒ page 148

19 - Spring pin

- ❑ For gearbox selector lever
- ❑ When installing, drive into gearbox selector lever from rear towards front

20 - Selector shaft lever

21 - Oil seal

- ❑ For selector shaft
- ❑ Renewing ⇒ page 76

22 - Bolt

- ❑ 23 Nm

23 - Oil seal

- ❑ For flange shaft (left-side)
- ❑ Renewing ⇒ page 137

24 - Drive wheel

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- ❑ For speedometer sender -G22-
- ❑ Removing and installing ⇒ page 137

25 - Flange shaft (left-side)

- ❑ Removing and installing ⇒ page 135

26 - Mounting bracket for flange shaft (left-side)

27 - Ball bearing for flange shaft (left-side)

- ❑ Renewing ⇒ page 137

28 - Circlip

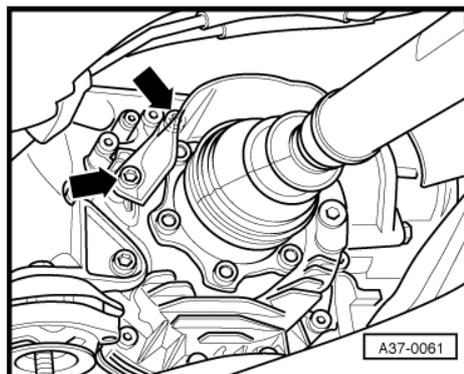
- ❑ For ball bearing

29 - O-ring for flange shaft (left-side)

- ❑ Square cross-section
- ❑ For renewing ⇒ „2.1 Removing and installing flange shaft (left-side)“, page 135

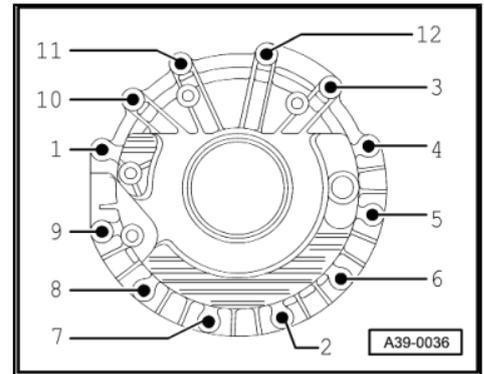
Heat shield for drive shaft - tightening torque

- Tighten bolts -arrows- for heat shield to 23 Nm.



Cover for final drive - tightening torque and sequence

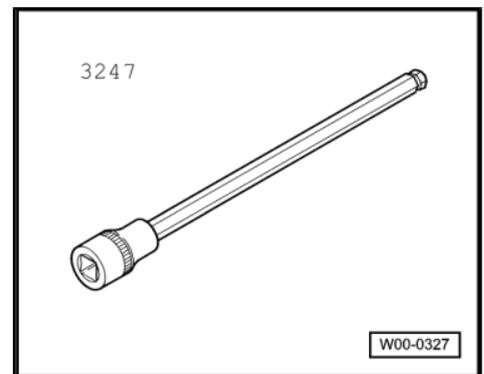
- Tighten bolts on cover for final drive in two stages as follows:
 1. Screw in bolts -1 ... 3- onto stop by hand.
 2. Tighten bolts to 23 Nm in sequence -1 ... 12-.



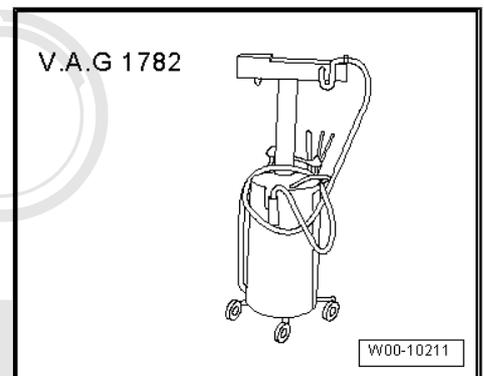
2.1 Removing and installing flange shaft (left-side)

Special tools and workshop equipment required

- ◆ Hexagon key extension, 8 mm -3247-



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



- ◆ Allen key (8 mm)

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Removing



Note

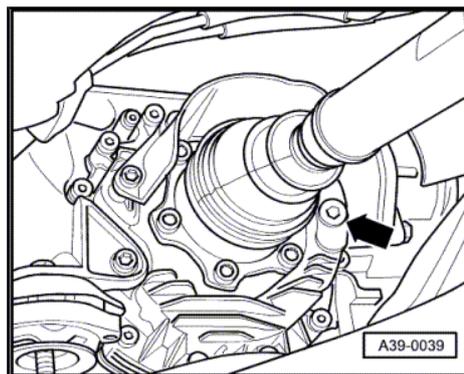
- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Loosen drive shaft/wheel hub bolt with vehicle standing on its wheels ⇒ Rep. gr. 40 .
- Remove front left wheel.



Note

Use only an Allen key (8 mm) to loosen plug (do not use hexagon key extension, 8 mm -3247-).

- Unscrew oil filler plug -arrow- using hexagon key extension, 8 mm -3247- .
- Extract at least 0.5 litre gear oil from final drive using used oil collection and extraction unit -V.A.G 1782- .

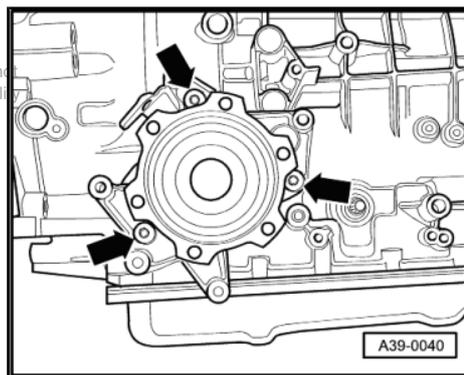


Note

It is essential to extract oil from the final drive as there is otherwise a danger of mixing gear oil with ATF.

- Remove heat shield for drive shaft (left-side).
- Remove drive shaft (left-side) => Rep. gr. 40 .
- Remove speedometer sender -G22- => [page 74](#) .
- Unbolt retainer for electrical connector from mounting bracket for flange shaft.
- Unbolt flange shaft mounting bracket -arrows-.
- Pull out flange shaft (left-side).

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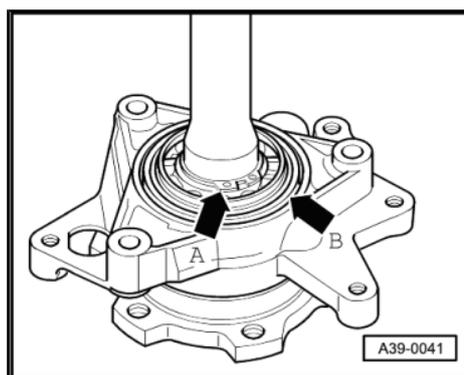


Note

When the gearbox is in the vehicle it is possible to pull out the flange shaft (left-side) between the body and the subframe by rotating the mounting bracket for the flange shaft approx. 60° to the right away from the installation position.

Installing

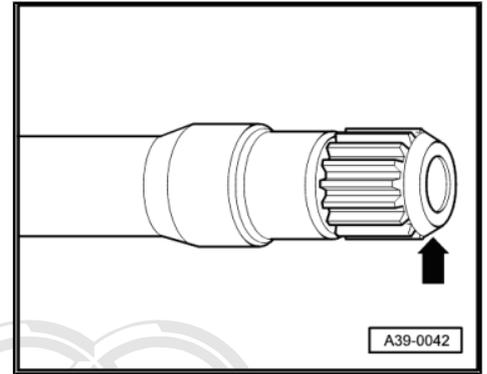
- Tightening torque => [page 133](#)
- Renew O-ring -arrow B- in mounting bracket for flange shaft (left-side).



- Check that there are no sharp edges on gearbox end of flange shaft -arrow-; deburr edges if necessary.
- Insert flange shaft (left-side) into the gearbox.

i Note

While pushing in the flange shaft (left-side), it must be guided carefully by hand to avoid damaging the twin-lip oil seal in the gearbox.



- Install speedometer sender -G22- ⇒ [page 74](#) .
- Install drive shaft (left-side) ⇒ Rep. gr. 40 .
- Install heat shield for drive shaft ⇒ [page 134](#) .
- Fill front final drive with gear oil and check oil level ⇒ [page 130](#) .

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

Procedure

- Remove flange shaft (left-side) ⇒ [page 135](#) .
- Renew oil seal for flange shaft (left-side) ⇒ [Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39](#) .
- Install flange shaft (left-side) ⇒ [page 135](#) .
- Fill front final drive with gear oil and check oil level ⇒ [page 130](#) .

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

Procedure

- Remove flange shaft (left-side) ⇒ [page 135](#) .
- Removing and installing drive wheel for speedometer sender -G22- ⇒ [Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39](#) .
- Install flange shaft (left-side) ⇒ [page 135](#) .
- Fill front final drive with gear oil and check oil level ⇒ [page 130](#) .

2.4 Renewing ball bearing for flange shaft (left-side)

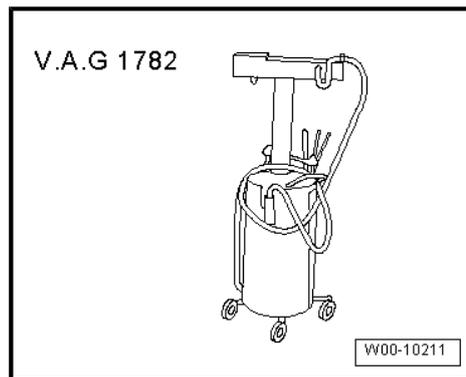
Procedure

- Remove flange shaft (left-side) ⇒ [page 135](#) .
- Renew ball bearing for flange shaft (left-side) ⇒ [Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39](#) .
- Install flange shaft (left-side) ⇒ [page 135](#) .
- Check oil level in front final drive ⇒ [page 130](#) .

2.5 Removing and installing flange shaft (right-side)

Special tools and workshop equipment required

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

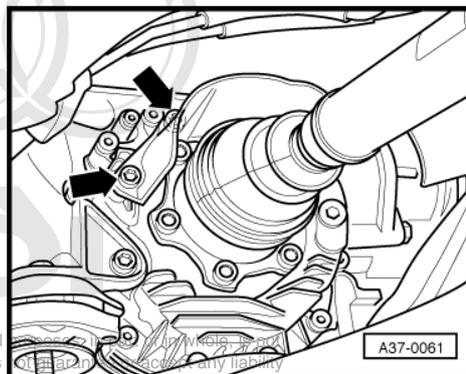


Removing



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Loosen drive shaft/wheel hub bolt with vehicle standing on its wheels ⇒ Rep. gr. 40 .
- Remove front right wheel.
- Remove heat shield for drive shaft (right-side) -arrows-.
- Remove drive shaft (right-side) ⇒ Rep. gr. 40 .



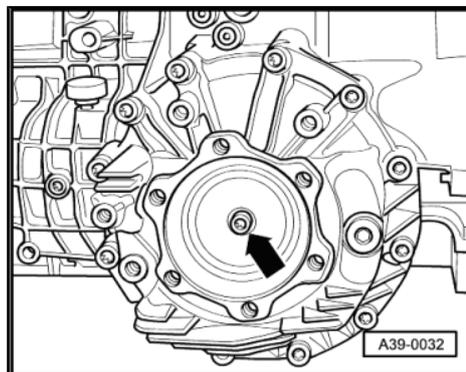
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- Remove bolt -arrow- for flange shaft (counterhold flange shaft with drift).
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.
- Pull out flange shaft (right-side).

Installing

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

- Tightening torque ⇒ [page 133](#)
- Tighten bolt -arrow- for flange shaft (counterhold flange shaft with drift).
- Install drive shaft (right-side) ⇒ Rep. gr. 40 .
- Install heat shield for drive shaft ⇒ [page 134](#) .
- Fill front final drive with gear oil and check oil level ⇒ [page 130](#) .



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

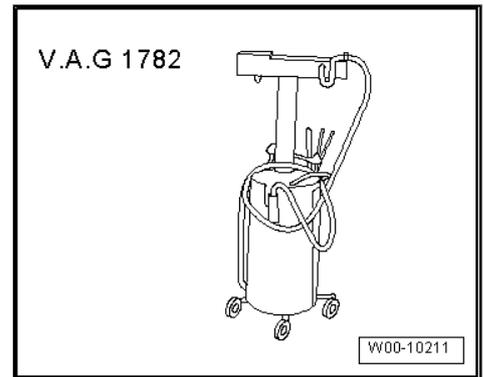
Procedure

- Remove flange shaft (right-side) ⇒ [page 137](#) .
- Renew oil seal for flange shaft (right-side) ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Install flange shaft (right-side) ⇒ [page 137](#) .
- Check oil level in front final drive ⇒ [page 130](#) .

2.7 Renewing O-ring on cover for final drive

Special tools and workshop equipment required

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

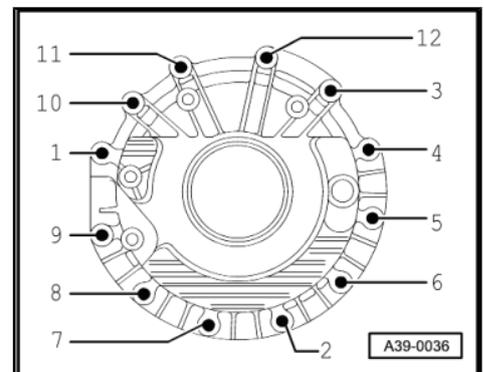


Procedure

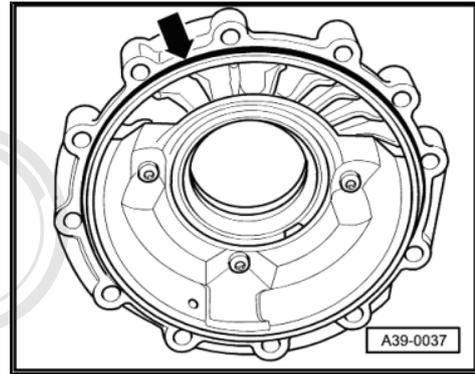


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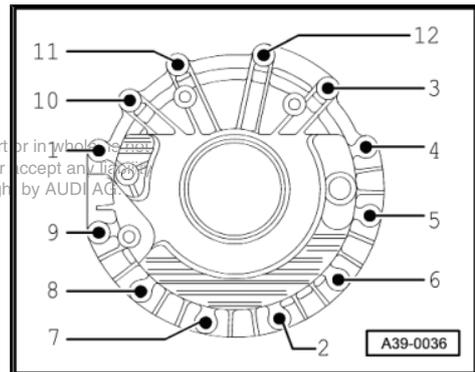
- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Remove flange shaft (right-side) ⇒ [page 137](#) .
- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Remove gearbox support (right-side) ⇒ [page 55](#) .
- Unscrew bolts of cover for final drive in the reverse sequence to the tightening sequence shown and remove cover.



- Renew O-ring -arrow-.



- Fit cover for final drive and tighten bolts ⇒ [page 135](#) .
- Install gearbox support (right-side) ⇒ [page 55](#) .
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .
- Install flange shaft (right-side) ⇒ [page 137](#) .
- Fill up gear oil in front final drive after repairs ⇒ [page 131](#) .



3 Overview - oil drain plug and inspection plug for gear oil in transfer box

Note

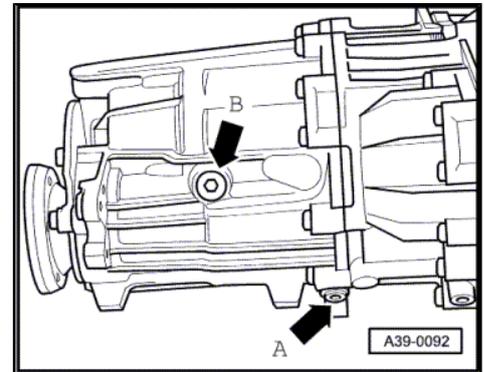
Both plugs must be renewed together with the seals after they have been removed.

A - Oil drain plug

- Renew
- Tightening torque: 20 Nm.

B - Oil inspection plug

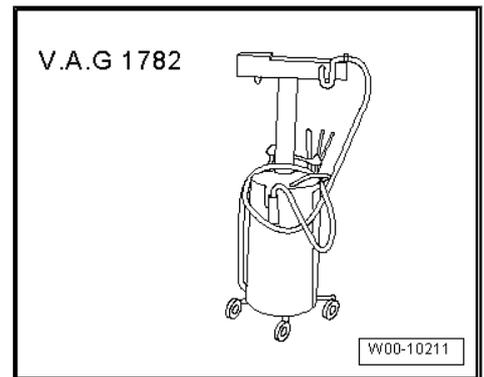
- Renew
- Tightening torque: 35 Nm.



3.1 Checking gear oil level in transfer box and topping up

Special tools and workshop equipment required

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



- ◆ Safety goggles

Procedure

- Tightening torque ⇒ [page 141](#)



Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



WARNING

Wear safety goggles.

- Unscrew oil inspection plug -arrow B-.
- Specification: gear oil level up to bottom lip of filler hole.
- Top up or allow excess gear oil to drain off; specification ⇒ Electronic parts catalogue .



Note

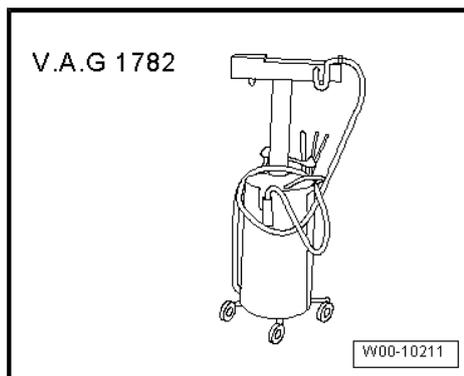
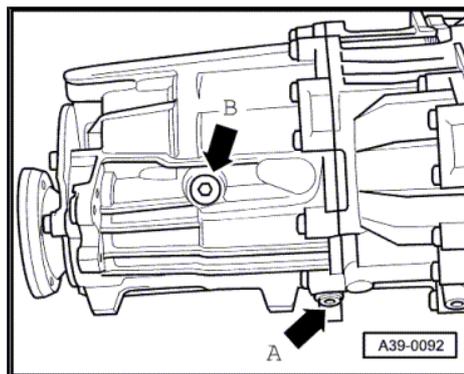
The oil inspection plug must be renewed together with the seal.

- Screw in new oil inspection plug.
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .

3.2 Changing gear oil in transfer box and filling up after repairs

Special tools and workshop equipment required

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



- ◆ Safety goggles

Draining gear oil

- Tightening torques ⇒ [page 141](#)

Note

- ◆ *General repair instructions* ⇒ [page 14](#) .
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#) .
- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.

 **WARNING**
Wear safety goggles.

- Remove oil drain plug -arrow A- and drain gear oil.

Note

The oil drain plug with seal must be renewed.

- Tighten new drain plug.

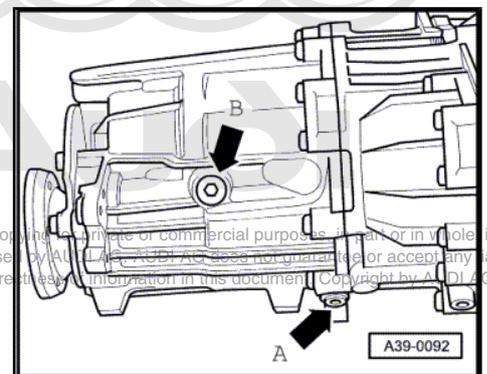
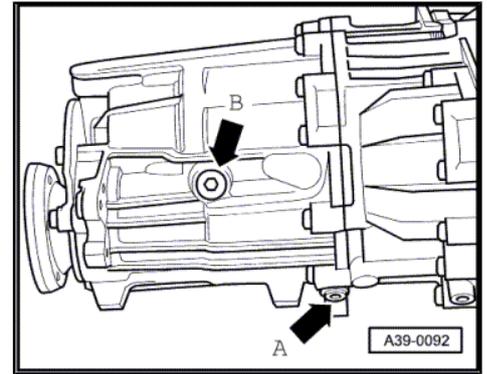
Filling up gear oil

- Unscrew oil inspection plug -arrow B-.
- Fill gear oil up to bottom lip of oil filler hole; capacities ⇒ [page 9](#) , specification ⇒ Electronic parts catalogue .
- Screw in old oil inspection plug.
- Road-test vehicle briefly.

Note

During the road test the gear oil will enter the output cup and the self-locking centre differential; the oil level in the transfer box housing will drop accordingly.

- Check axle oil in transfer box and top up ⇒ [page 141](#) .



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4 Exploded view - transfer box



Note

- ◆ *General repair instructions* ⇒ [page 14](#).
- ◆ *Rules for cleanliness when working on the automatic gearbox* ⇒ [page 17](#).
- ◆ *The components shown in the following illustration can also be removed with the gearbox in the vehicle.*

1 - Bolt

- 25 Nm

2 - Flange shaft (rear)

- ⇒ [„4.1 Removing and installing flange shaft \(rear\)“](#), [page 147](#)

3 - Oil seal

- For flange shaft (rear)
- Renewing ⇒ [page 148](#)

4 - Bolt

- For housing cover
- 4x
- 23 Nm

5 - Housing cover

6 - O-ring

- Lubricate with gear oil

7 - Circlip

- For ball bearing on spur gear 1

8 - Ball bearing

- For spur gear 1

9 - Spur gear 1

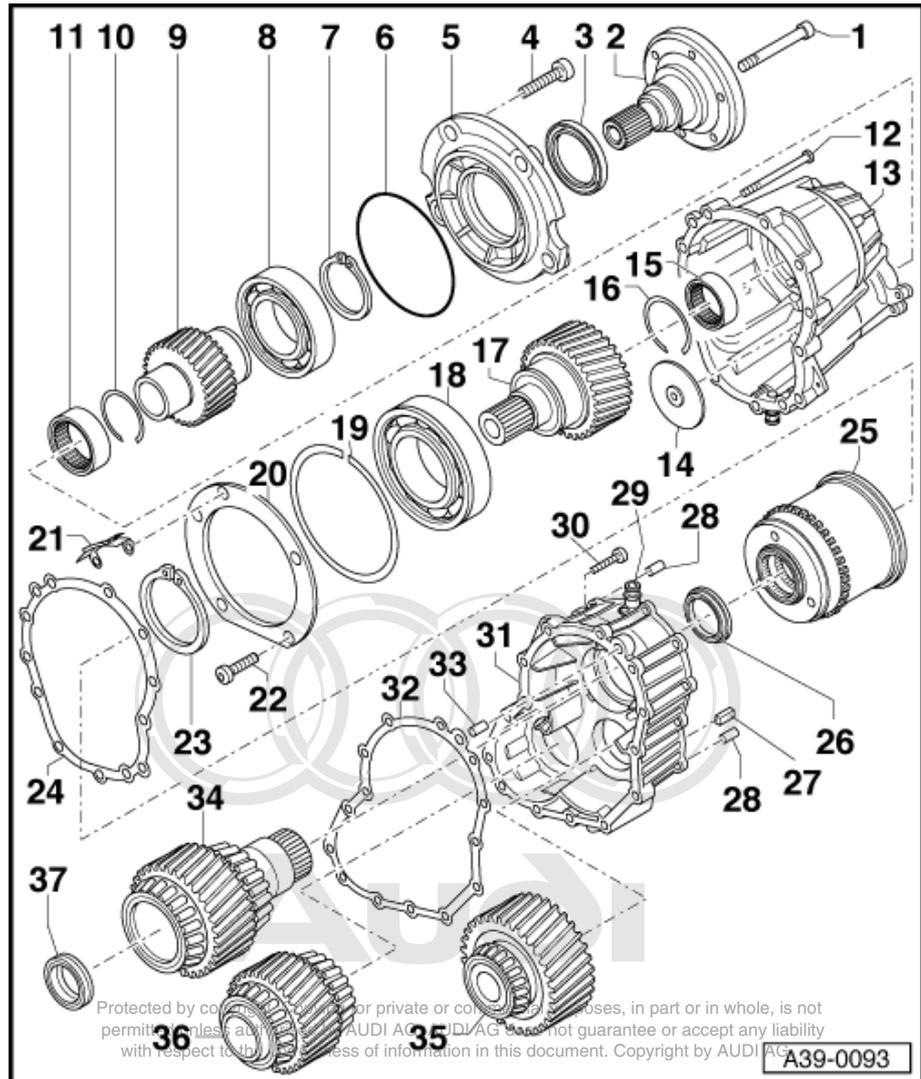
- For rear axle drive
- If damaged, always renew together with spur gear 2
- To remove and install, pull out of transfer box housing ⇒ [Item 13 \(page 145\)](#) towards the rear, together with ⇒ [Item 7 \(page 144\)](#) and ⇒ [Item 8 \(page 144\)](#)

10 - Circlip

- For needle bearing

11 - Needle bearing

- For spur gear 1
- Only remove in order to renew
- To renew, heat transfer box housing to approx. 100 °C and drive out needle bearing to rear with suitable drift (Warning: wear protective gloves)
- Drive in onto stop using sleeve -30 - 21-



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12 - Bolt

- Loosen in diagonal sequence
- Tightening torque and sequence ⇒ [page 146](#)

13 - Transfer box housing

- Can be renewed if damaged

14 - Tensioning nut

- For flange shaft (rear)

15 - Needle bearing

- For spur gear 2
- Only remove in order to renew
- Renewing ⇒ [page 149](#)

16 - Circlip

- Secures needle bearing in transfer box housing

17 - Spur gear 2

- For rear axle drive
- If damaged, always renew together with spur gear 1
- To remove and install, remove transfer box housing ⇒ [page 148](#) and pull out together with ⇒ [Item 18 \(page 145\)](#) , ⇒ [Item 19 \(page 145\)](#) and ⇒ [Item 23 \(page 145\)](#)

18 - Ball bearing

- For spur gear 2

19 - Circlip

- Secures ball bearing in transfer box housing

20 - Securing plate

- For ball bearing
- Before installing, clip alignment plate onto securing plate

21 - Alignment plate

- Clip onto securing plate

22 - Bolt

- For securing plate
- 8 Nm

23 - Circlip

- Secures ball bearing on spur gear 2

24 - Gasket

- Renewing ⇒ [page 148](#)

25 - Self-locking centre differential (PAT)

- Renew as complete unit if damaged
- Removing and installing ⇒ [page 148](#)

26 - Twin-lip oil seal

- Renewing ⇒ [page 149](#)

27 - Magnet

- Removing and installing ⇒ [page 148](#)

28 - Dowel sleeve

- 2x

29 - Breather

- For transfer box
- With fitted cap



- ❑ Installation position: breather without cap must project 10 ... 11 mm from housing

30 - Bolt

- ❑ Loosen in diagonal sequence
- ❑ Tightening torque and sequence ⇒ [page 146](#)

31 - Intermediate flange for front axle drive

- ❑ ⇒ „4.4 Removing and installing intermediate flange for front axle drive“, [page 148](#)

32 - Gasket

- ❑ Renewing ⇒ [page 148](#)

33 - Dowel sleeve

34 - Input pinion

- ❑ For front axle drive
- ❑ Removing and installing ⇒ [page 149](#)

35 - Intermediate pinion

- ❑ For front axle drive
- ❑ Installation position: gear identification faces towards transfer box

36 - Output pinion

- ❑ For front axle drive
- ❑ Installation position: gear identification faces towards transfer box

37 - Twin-lip oil seal

- ❑ In input pinion
- ❑ Renewing ⇒ [page 149](#)

Transfer box - tightening torque and sequence

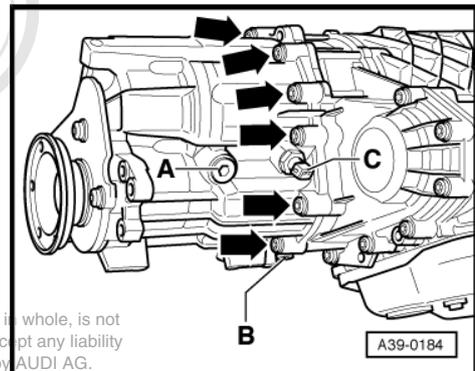
- Tighten bolts -arrows- for transfer box diagonally in stages to 23 Nm.



Note

When first tightening the bolts by hand, ensure that the gap between the transfer box and the gearbox housing is reduced by the same amount all the way round.

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Intermediate flange for front axle drive - tightening torque

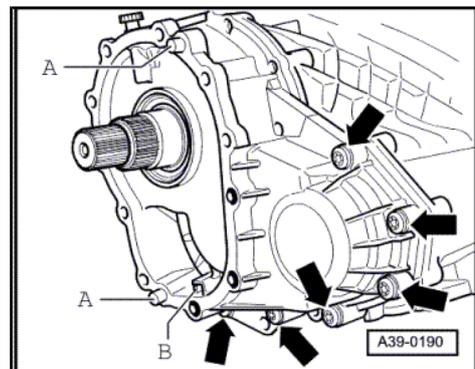
- Tighten bolts -arrows- on intermediate flange for front axle drive in two stages as follows:

1. Screw in bolts onto stop by hand.
2. Tighten bolts to 23 Nm.



Note

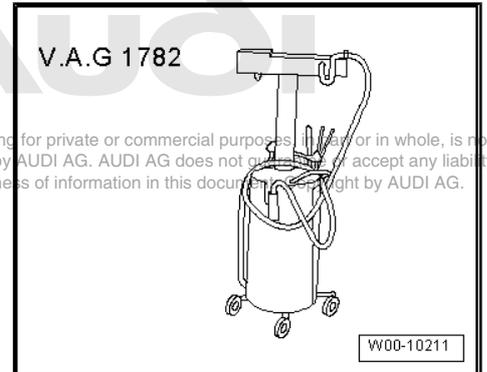
- ◆ *When screwing in the bolts hand-tight, ensure that the gap between the intermediate flange for the front axle drive and the gearbox housing is reduced uniformly all round.*
- ◆ *Ignore -item A- and -item B-.*



4.1 Removing and installing flange shaft (rear)

Special tools and workshop equipment required

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

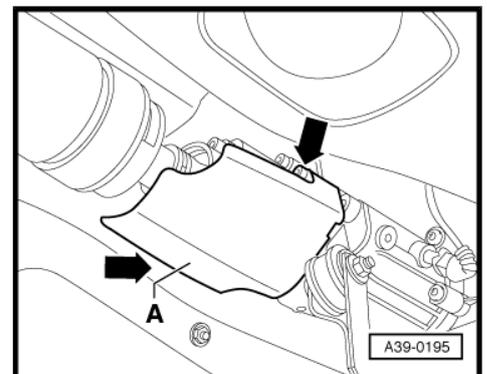


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- ◆ Safety goggles

Removing

- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Remove rear section of exhaust system if necessary.
- Unbolt heat shield -A- for propshaft -arrows-.
- Remove bolts from propshaft at transfer box; for description refer to
⇒ „5.1 Removing and installing propshaft“, page 152 .
- Slide propshaft together towards rear final drive. The constant velocity joints can be moved axially.
- Tie up or support propshaft.
- Drain gear oil from transfer box ⇒ page 142 .
- Remove bolt securing flange shaft. To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
- Pull out flange shaft using the bolts already screwed in; loosen with two levers if necessary.



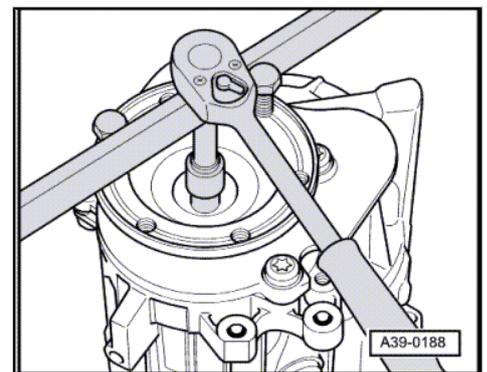
Note

Take care not to damage the flange on the gearbox housing when levering out the flange shaft.

Installing

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

- Tightening torque ⇒ page 144
- Secure flange shaft (rear).
- Bolt propshaft to transfer box
⇒ „5.1 Removing and installing propshaft“, page 152 .
- Install heat shield for propshaft ⇒ page 152 .
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .
- Fill up gear oil in transfer box ⇒ page 142



4.2 Renewing oil seal for flange shaft (rear)

Procedure

- Remove flange shaft (rear) ⇒ [page 147](#) .
- Renew oil seal for flange shaft (rear) ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Install flange shaft (rear) ⇒ [page 147](#) .

4.3 Removing and installing transfer box

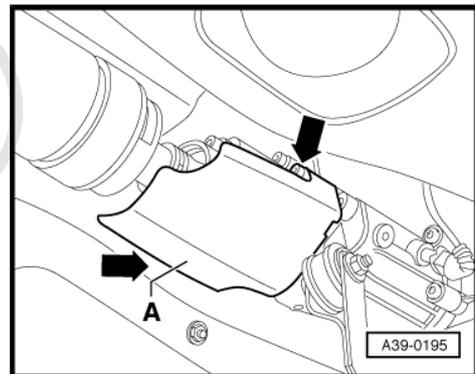
Removing

- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Remove rear section of exhaust system if necessary.
- Unbolt heat shield -A- for propshaft -arrows-.
- Remove bolts from propshaft at transfer box.
- Slide propshaft together towards rear final drive. The constant velocity joints can be moved axially.
- Tie up or support propshaft.
- Remove transfer box ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .

Installing

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

- Install transfer box ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Bolt propshaft to transfer box ⇒ „5.1 Removing and installing propshaft“, [page 152](#) .
- Install heat shield for propshaft ⇒ [page 152](#) .
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .
- Fill up gear oil in transfer box ⇒ [page 142](#) .



4.4 Removing and installing intermediate flange for front axle drive

Procedure

- Tightening torque ⇒ [page 144](#)
- Remove transfer box ⇒ [page 148](#) .
- Removing and installing intermediate flange for front axle drive ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39
- Install transfer box ⇒ [page 148](#) .
- Check and top up ATF level in planetary gearbox ⇒ [page 59](#) .

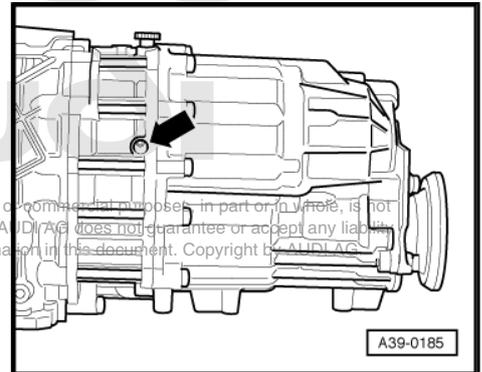
4.5 Renewing twin-lip oil seal in intermediate flange for front axle drive

Note

- ◆ An inspection drilling -arrow- is provided on the left side of the intermediate flange to check for oil leaks at the twin-lip oil seals in the input pinion and in the intermediate flange.
- ◆ If oil comes out of this inspection drilling renew the twin-lip oil seal.

Procedure

- Remove transfer box ⇒ [page 148](#) .
- Renew twin-lip oil seal in intermediate flange for front axle drive ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Install transfer box ⇒ [page 148](#) .



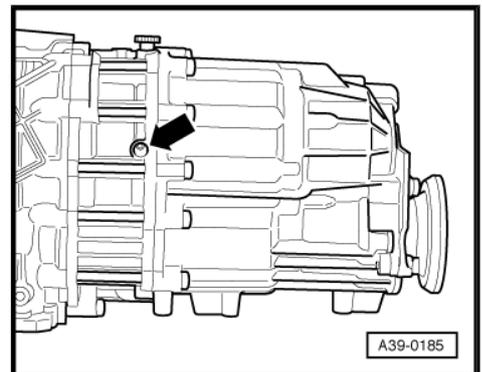
4.6 Renewing twin-lip oil seal in input pinion

Note

- ◆ An inspection drilling -arrow- is provided on the left side of the intermediate flange to check for oil leaks at the twin-lip oil seals in the input pinion and in the intermediate flange.
- ◆ If oil comes out at this inspection drilling this oil seal must be renewed.

Procedure

- Remove transfer box ⇒ [page 148](#) .
- Renew twin-lip oil seal in input pinion ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Install transfer box ⇒ [page 148](#) .



4.7 Renewing needle bearing for spur gear 2

Procedure

- Remove transfer box ⇒ [page 148](#) .
- Renew needle bearing for spur gear 2 ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. gr. 39 .
- Install transfer box ⇒ [page 148](#) .

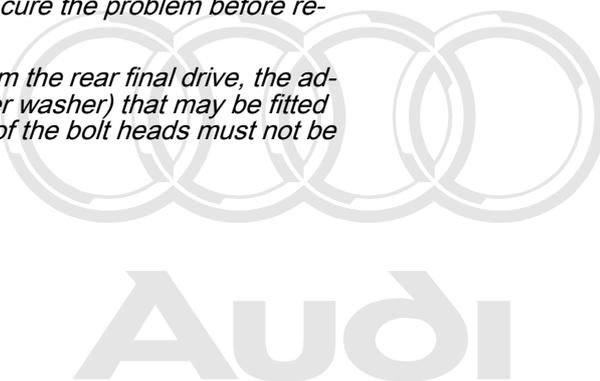


5 Exploded view - servicing propshaft



Note

- ◆ *General repair instructions ⇒ [page 14](#).*
- ◆ *Do not bend propshaft further than 25°. The universal joint can otherwise become damaged.*
- ◆ *The propshaft must be kept straight when it is stored or transported.*
- ◆ *No repair work can be carried out on the propshaft with the exception of removing, installing and adjusting.*
- ◆ *If the propshaft is detached only at the gearbox or at the rear final drive, it must be tied up or supported at the constant velocity joints.*
- ◆ *Before removing, mark the positions of all parts in relation to each other. Reinstall in the same position to avoid excessive imbalance, resulting in bearing damage and rumbling noise.*
- ◆ *In the event of complaints (noise, vibration), always check whether precise adjustment can cure the problem before renewing the propshaft.*
- ◆ *After detaching the propshaft from the rear final drive, the additional balancing washer (thicker washer) that may be fitted between the lock plate and one of the bolt heads must not be reinstalled.*



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1 - Rear final drive

2 - Gasket

- Renew
- Detach protective foil and stick self-adhesive side of the gasket onto flange for propshaft. Bonding surface must be free from grease

3 - Constant velocity joint

- With balance marking (white dot)
- Max. permissible bending angle 8°

4 - Lock plate

5 - Bolt

- Self-locking
- Renew
- Tapped holes for bolts in flange shafts must be cleaned (e.g. with a thread cutter)
- 55 Nm

6 - Universal joint

- Max. permissible bending angle 25°

7 - Shims

- Determining thickness
⇒ [page 159](#)

8 - Bolt

- 23 Nm

9 - Centre propshaft bearing

10 - Propshaft

- Removing and installing ⇒ [page 152](#)
- Adjusting ⇒ [page 156](#)

11 - Bolt

- Self-locking
- Renew
- Tapped holes for bolts in flange shafts must be cleaned (e.g. with a thread cutter)
- 55 Nm

12 - Lock plate

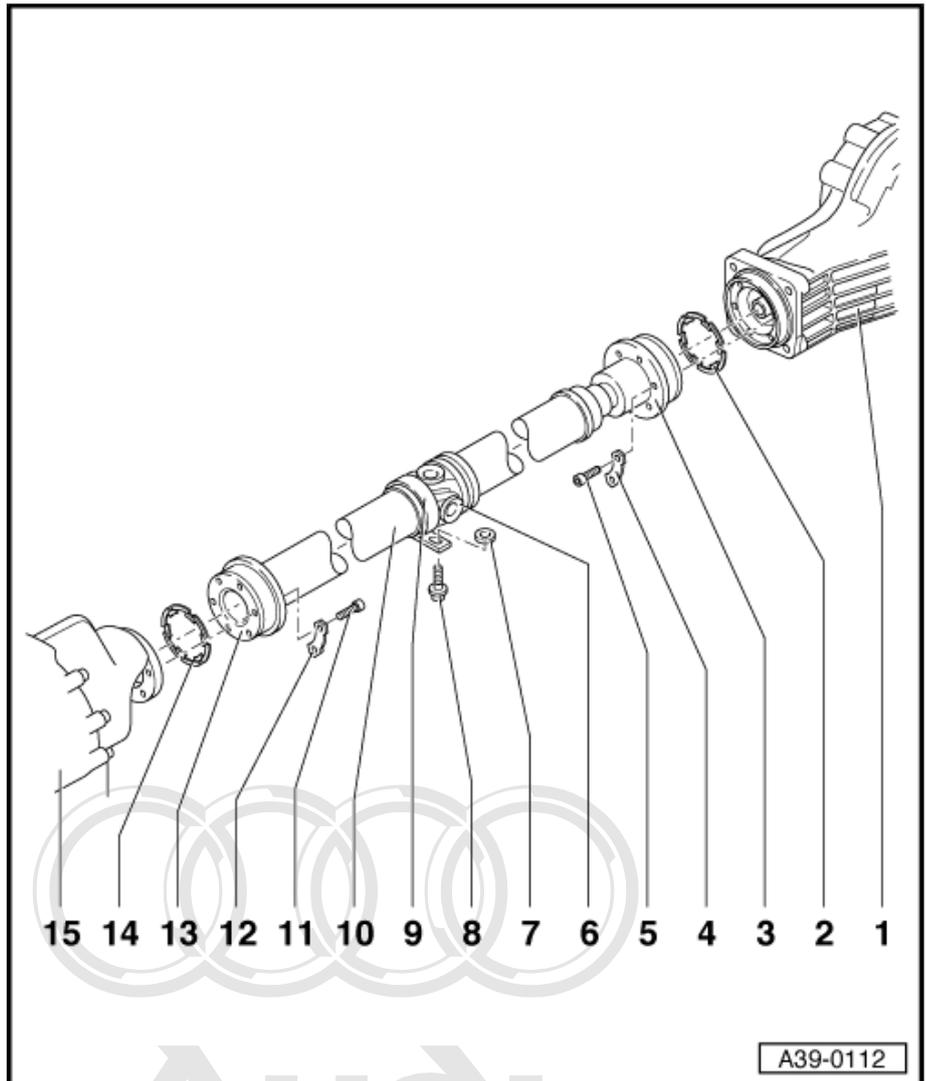
13 - Constant velocity joint

- Max. permissible bending angle 8°

14 - Gasket

- Renew
- Detach protective foil and stick self-adhesive side of the gasket onto flange for propshaft. Bonding surface must be free from grease

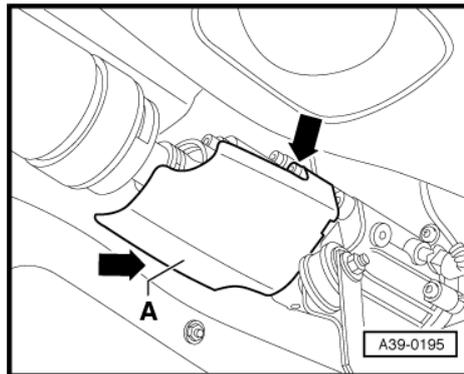
15 - Transfer box



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Heat shield for propshaft - tightening torque

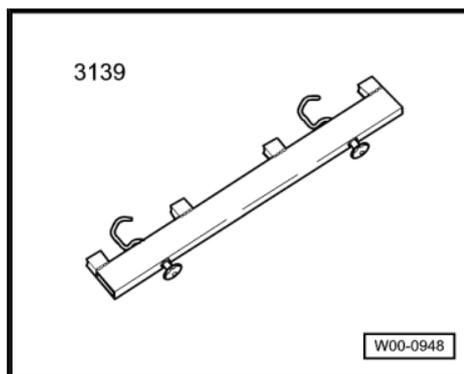
- Tighten bolts -arrows- for heat shield -A- to 23 Nm.



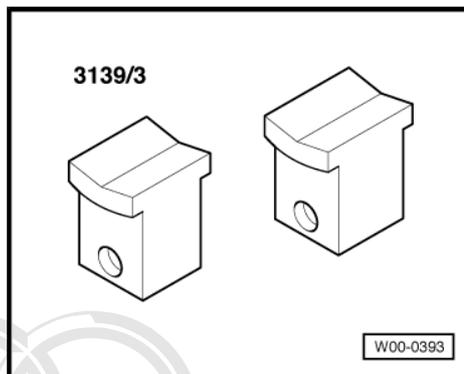
5.1 Removing and installing propshaft

Special tools and workshop equipment required

- ◆ Assembly tool -3139-



- ◆ Spacers -3139/3-



Removing



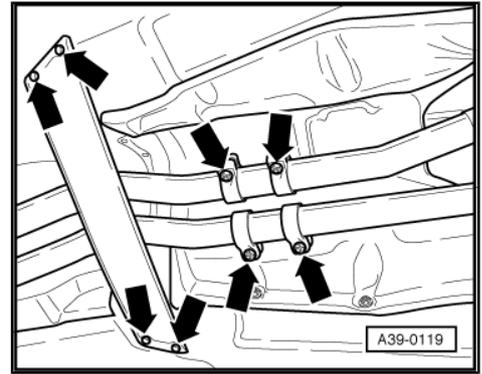
Caution

Contact corrosion! Notes ⇒ [page 14](#) .

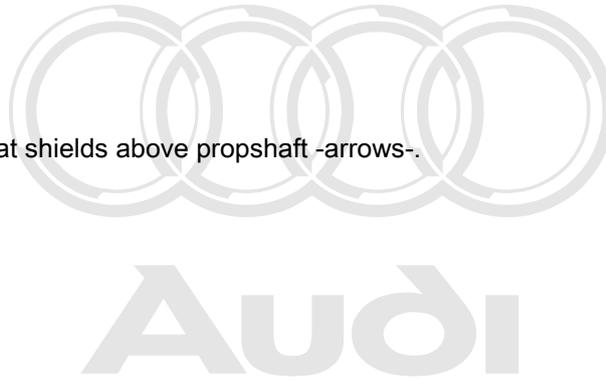
- Observe notes ⇒ [page 150](#) .
- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .

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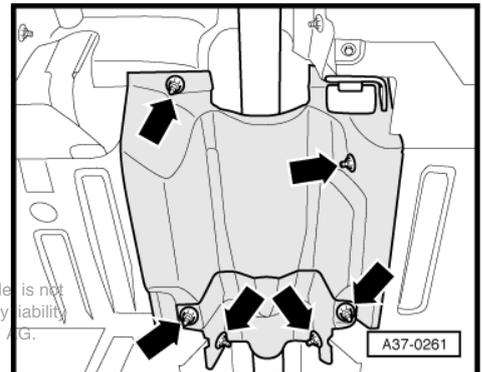
- Remove cross member -left arrows-.
- Unfasten clamps -right arrows-, detach rear section of exhaust system and remove.



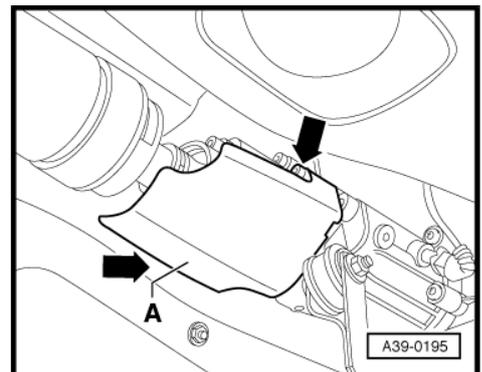
- Remove heat shields above propshaft -arrows-.



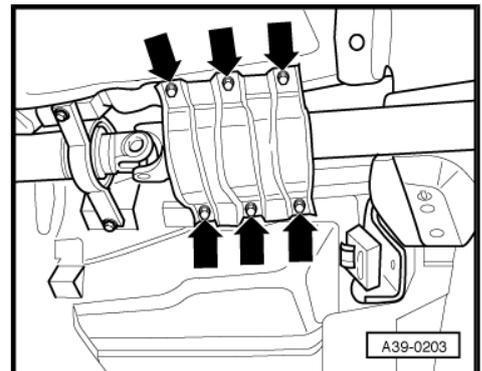
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- Unbolt heat shield -A- for propshaft -arrows-.



- Remove tunnel support -arrows-.





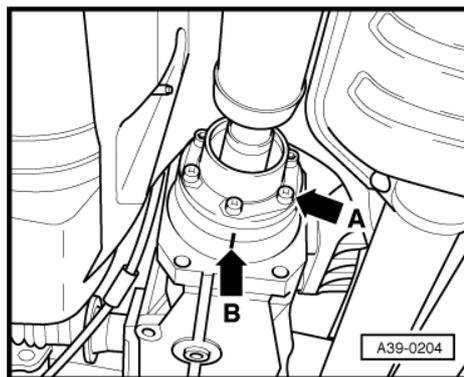
- Check whether there is a factory marking (coloured dot) on the propshaft flange and on the rear final drive flange. If no factory marking is visible, mark the position of the propshaft flange relative to the rear final drive -arrow B-.



Note

Only mark if same propshaft is to be re-used.

- Slacken bolts securing propshaft at transfer box and at rear final drive -arrow A- but do not remove.
- Slacken bolts securing centre propshaft bearing but do not remove.

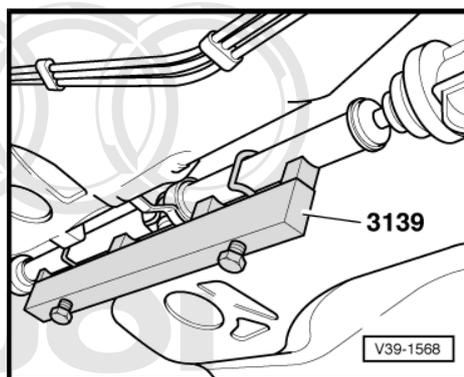


Audi A8:



Note

- ◆ On the short propshaft the diameters of the front and the rear parts of the propshaft are equal (\varnothing 60 mm).
- ◆ Do not fit assembly tool onto balance plates.
- Attach assembly tool -3139- and tighten plastic nuts.



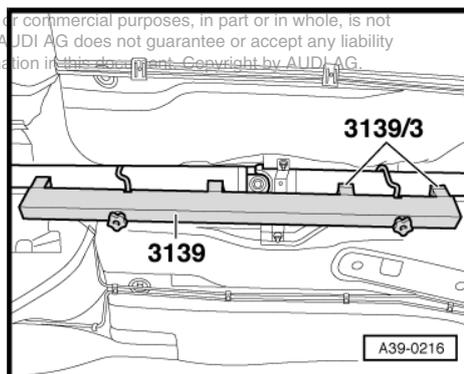
Audi A8 long-wheelbase version:

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Note

- ◆ On the long propshaft the front and rear parts of the propshaft have different diameters (front: \varnothing 60 mm, rear: \varnothing 70 mm).
- ◆ Do not fit assembly tool onto balance plates.
- Attach assembly tool -3139- with spacers -3139/3- and tighten plastic nuts.

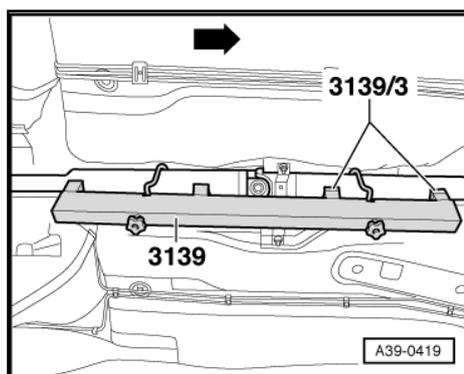


Audi A8 USA:



Note

- ◆ On the USA-version propshaft (with cover tube), the front and the rear parts of the propshaft have different diameters (front: \varnothing 60 mm, rear: \varnothing 70 mm).
- ◆ -Arrow- points in direction of travel.
- ◆ Do not fit assembly tool onto balance plates.
- ◆ Take care not to damage surface of propshaft.
- Attach assembly tool -3139- with spacers -3139/3- and tighten plastic nuts.

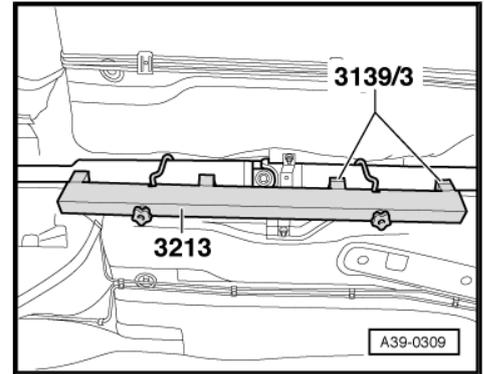


i Note

On vehicles with the short USA propshaft, the assembly tool -3213- with spacers -3139/3- can also be used.

Continued for all vehicles:

- Remove bolts from propshaft at transfer box and at rear final drive.
- Slide propshaft together towards rear final drive. The constant velocity joints can be moved axially.
- Guide out propshaft with assembly tool at gearbox flange.



i Note

The propshaft must be kept straight when it is stored or transported.

Installing

- Tightening torques ⇒ [page 150](#)
- Additional tightening torques:

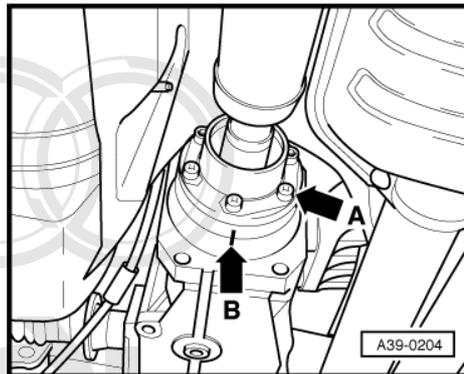
Component	Nm
Front cross member under exhaust system to body	25
Tunnel support to body	25

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

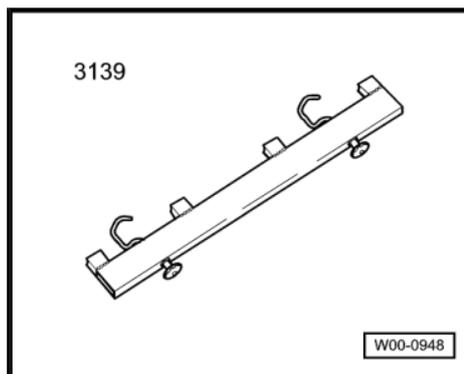
- ◆ To prevent imbalance, the flanges on the propshaft and on the rear final drive must be installed so that the factory markings (or the markings made on removal) are in alignment -arrow B-.
 - ◆ If you are installing a new propshaft and the factory marking on the rear final drive flange is no longer visible, you must measure the radial run-out at the flange for the propshaft => page 89, and the coloured marking on the new propshaft must be aligned with the new marking on the flange.
 - ◆ Renew gaskets on flange shafts (pull off protective foil and stick gasket onto flange shaft).
 - ◆ After detaching the propshaft from the rear final drive, the additional balancing washer (thicker washer) that may be fitted between the lock plate and one of the bolt heads must not be reinstalled.
 - ◆ After detaching propshaft, it is important to clean out any locking fluid residues from threads in flange shafts on gearbox and in flange for propshaft on rear final drive. Otherwise there is a danger that the new bolts will seize when they are screwed in and then shear off the next time they are removed. The threads can be cleaned with a thread tap.
 - ◆ Renew propshaft bolts (self-locking).
- Adjust propshaft after installation => page 156 .
 - Install heat shield for propshaft => page 152 .
 - Install exhaust system and perform stress-free alignment => Rep. gr. 26 .



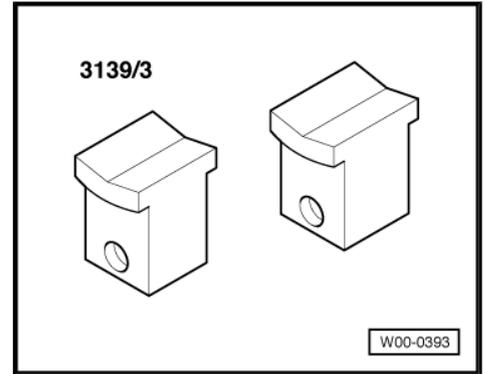
5.2 Adjusting propshaft

Special tools and workshop equipment required

- ◆ Assembly tool -3139-



◆ Spacers -3139/3-



Procedure

- Tightening torque ⇒ [page 150](#)
- Additional tightening torques:

Component	Nm
Front cross member under exhaust system to body	25
Tunnel support to body	25

Caution
Contact corrosion! Notes ⇒ [page 14](#) .

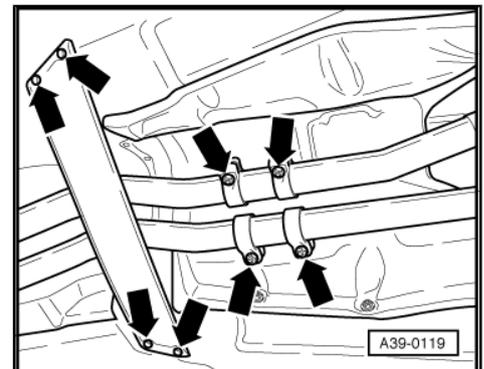
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- Observe notes ⇒ [page 150](#) .

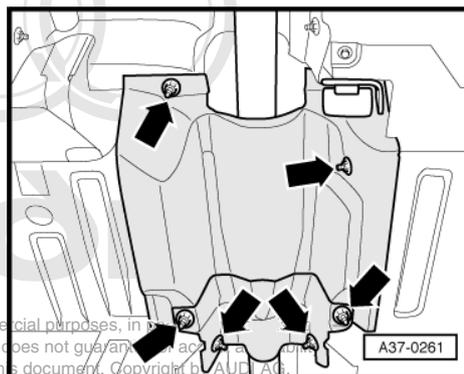
Note

Adjustments must be carried out with the greatest possible care since a poorly adjusted propshaft is often the cause of vibration and droning.

- Partially remove front section of exhaust system ⇒ Rep. gr. 26 .
- Remove cross member -left arrows-.
- Unfasten clamps -right arrows-, detach rear section of exhaust system and remove.

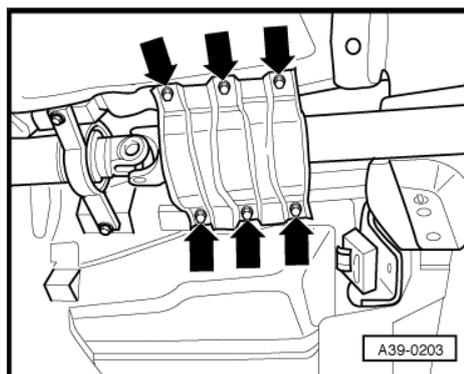


- Remove heat shields above propshaft -arrows-.



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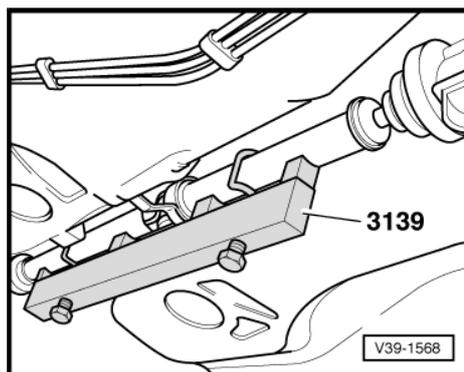
- Remove tunnel support -arrows-.



Audi A8:

 **Note**

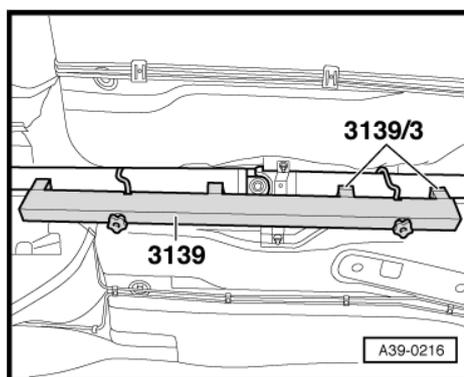
- ◆ *On the short propshaft the diameters of the front and the rear part of the propshaft are equal (Ø 60 mm).*
- ◆ *Do not fit assembly tool onto balance plates.*
- Attach assembly tool -3139- and tighten plastic nuts.



Audi A8 long-wheelbase version:

 **Note**

- ◆ *On the long propshaft the diameters of the front and the rear part of the propshaft are different (front: Ø 60 mm, rear: Ø 70 mm).*
- ◆ *Do not fit assembly tool onto balance plates.*
- Attach assembly tool -3139- with spacers -3139/3- and tighten plastic nuts.

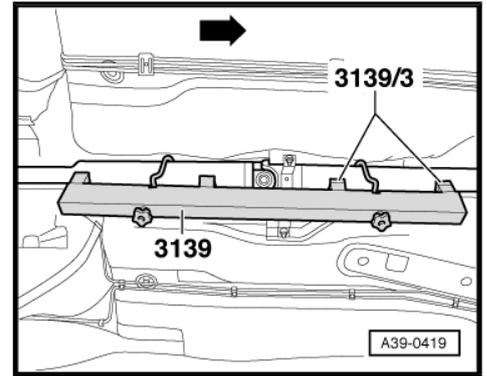


Audi A8 USA:

Note

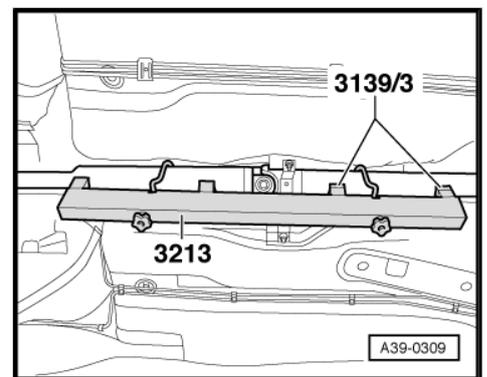
- ◆ On the USA-version propshaft (with cover tube), the diameters of the front and the rear parts of the propshaft are different (front: \varnothing 60 mm, rear: \varnothing 70 mm).
- ◆ -Arrow- points in direction of travel.
- ◆ Do not fit assembly tool onto balance plates.
- ◆ Take care not to damage surface of propshaft.

- Attach assembly tool -3139- with spacers -3139/3- and tighten plastic nuts.



Note

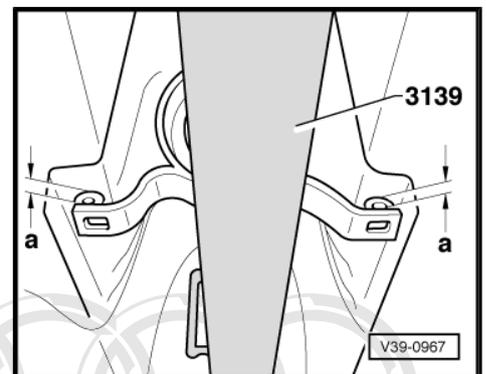
On vehicles with the short USA propshaft, the assembly tool -3213- with spacers -3139/3- can also be used.



Continued for all vehicles:

- Unscrew bolts for centre bearing and remove shims.
- Align centre propshaft bearing so that gap -a- is the same on both sides.
- Measure gaps -a-.
- Determine shim(s) according to following table: for part numbers refer to \Rightarrow Electronic parts catalogue

Distance -a- in mm	Thickness of shims in mm
0 ... 3.0	-
3.1 ... 5.0	2
5.1 ... 7.0	4
7.1 ... 9.0	6
9.1 ... 11.0	8
11.1 ... 13.0	10



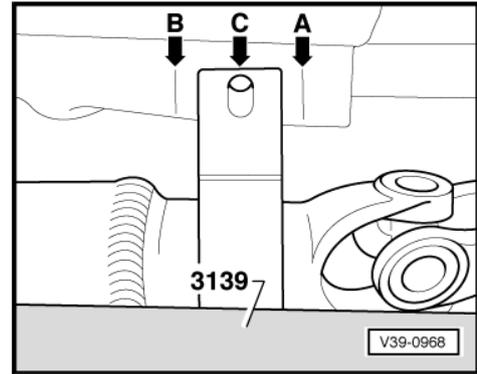
- Fit selected shims on left and right.

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Axial alignment of propshaft:

- Push propshaft with assembly tool towards the rear as far as it will go.
- Mark position of centre propshaft bearing in relation to body -arrow A-.
- Then slide propshaft with assembly tool forwards as far as it will go.
- Mark position of centre propshaft bearing in relation to body -arrow B-.
- Align propshaft at centre -arrow C-:
- The centre propshaft bearing must be aligned centrally between the markings -arrow A- and -arrow B-.
- Fit selected shims and tighten bolts of centre propshaft bearing.



Assembling

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

- Remove the assembly tool.
- Install exhaust system and perform stress-free alignment ⇒ Rep. gr. 26 .



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