

Workshop Manual

Octavia II 2004 ➤

Octavia II 2010 ➤

Brake systems

Edition 11.2017

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List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 45 - Anti-lock brake system
- 46 - Brakes - mechanism
- 47 - Brakes - hydraulics

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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 Brakes

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1.1 Brake variants and their assignment

Engine	1.2 I/77 kW	1.4 I/55 kW	1.4 I/59 kW	1.4 I/90 kW		
Engine code letters:	CBZB	BCA	BUD, CGGA	CAXA		
Master brake cylinder - Ø mm	22.2					
Brake servo unit - Ø Inch	Left-hand drive:			10		
	Right-hand drive:			7"/8" - tandem		
◆ Front disc brake:						
Front brake caliper (type denomination)	FS-III	FS-III	FS-III	FS-III		
Front brake caliper, piston - Ø mm	54.0	54.0	54.0	54.0		
Front brake disc - Ø mm	280.0	280.0	280.0	280.0		
Brake disc, thickness mm	22.0	22.0	22.0	22.0		
Brake disc, minimum thickness mm	19.0	19.0	19.0	19.0		
Pad thickness without supporting plate mm	14.0	14.0	14.0	14.0		
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0		
◆ Rear disc brake:						
Rear brake caliper (type denomination)	CI 38	CI 38	CII 41	CI 38	CII 41 ¹⁾	Bosch BIRIII ²⁾
Rear brake caliper, piston - Ø mm	38.0	38.0	41.0	38.0	41.0	38.0
Rear brake disc - Ø mm	253.0	255.0	260.0	255.0 ³⁾ / 253.0 ⁴⁾	260.0 ³⁾ / 256.0 ⁴⁾	272.0
Brake disc, thickness mm	10.0	10.0	12.0	10.0	12.0	10.0
Brake disc, minimum thickness mm	8.0	8.0	10.0	8.0	10.0	8.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0	2.0	2.0

1) valid for vehicles up to CW 44/2009

2) valid for vehicles as of CW 45/2009

3) valid for vehicles up to 03.2009



4) valid for vehicles as of 04.2009

Engine	1.6 l/75 kW	1.6 ltr./85 kW FSI	1,8 ltr./112 kW TFSI			
Engine code letters:	BGU, BSE, BSF, CCSA, CHGA, CMXA	BLF	CDAB			
Master brake cylinder - mm Ø	22.2					
Brake servo unit - Ø Inch	Left-hand drive:		10			
	Right-hand drive:		7"/8" - tandem			
◆ Front disc brake:						
Front brake caliper (type denomination)	FS-III	FS-III	FN3			
Front brake caliper, mm piston - Ø	54.0	54.0	54.0			
Front brake disc - Ø mm	280.0	280.0	288.0			
Brake disc, thickness mm	22.0	22.0	25.0			
Brake disc, minimum thickness mm	19.0	19.0	22.0			
Pad thickness without supporting plate mm	14.0	14.0	14.0			
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0			
◆ Rear disc brake:						
Rear brake caliper (type denomination)	CI 38	CII 41 ¹⁾	Bosch BIRIII ²⁾	CII 41	CII 41 ¹⁾	Bosch BIRIII ²⁾
Rear brake caliper, piston - Ø mm	38.0	41.0	38.0	41.0	41.0	38.0
Rear brake disc - Ø mm	255.0 ³⁾ / 253.0 ⁴⁾	260.0 ³⁾ / 256.0 ⁴⁾	272.0	260.0	260.0 ³⁾ / 256.0 ⁴⁾	272.0
Brake disc, thickness mm	10.0	12.0	10.0	12.0	12.0	10.0
Brake disc, minimum thickness mm	8.0	10.0	8.0	10.0	10.0	8.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0	2.0	2.0

1) valid for vehicles up to CW 44/2009

2) valid for vehicles as of CW 45/2009

3) valid for vehicles up to 03.2009

4) valid for vehicles as of 04.2009



Engine	1,8 ltr./118 kW TFSI	2.0 ltr./110 kW FSI	2.0 ltr./110 kW FSI with four-wheel drive	2,0 ltr./147 kW TFSI		
Engine code letters:	BZB, CDAA	BLR, BLY, BVZ, BVY	BLX, BVX	BWA, CCZA		
Master brake cylinder - mm Ø	22.2			23.8		
Brake servo unit - Ø Inch	Left-hand drive:			10		
	Right-hand drive:			7"/8" - tandem		
◆ Front disc brake:						
Front brake caliper (type denomination)	FN3	FN3	FN3	FN3		
Front brake caliper, mm piston - Ø	54.0	54.0	54.0	54.0		
Front brake disc - Ø mm	288.0	288.0	288.0	312.0		
Brake disc, thickness mm	25.0	25.0	25.0	25.0		
Brake disc, minimum thickness mm	22.0	22.0	22.0	22.0		
Pad thickness without supporting plate mm	14.0	14.0	14.0	14.0		
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0		
◆ Rear disc brake:						
Rear brake caliper (type denomination)	CII 41 ¹⁾	Bosch BIRIII ²⁾	CII 41	CII 41	CII 41 ¹⁾	Bosch BIR-III ²⁾
Rear brake caliper, piston - Ø mm	41.0	38.0	41.0	41.0	41.0	38.0
Rear brake disc - Ø mm	260.0 ³⁾ / 256.0 ⁴⁾	272.0	260.0	260.0	286.0 ³⁾ / 282.0 ⁴⁾	272.0
Brake disc, thickness mm	12.0	10.0	12.0	12.0	12.0	10.0
Brake disc, minimum thickness mm	10.0	8.0	10.0	10.0	10.0	8.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0	2.0	2.0

1) valid for vehicles up to CW 44/2009

2) valid for vehicles as of CW 45/2009

3) valid for vehicles up to 03.2009

4) valid for vehicles as of 04.2009

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Engine	1.9 ltr./77 kW TDI-PD with four-wheel drive ¹⁾	1.9 ltr./77 kW TDI-PD with front-wheel-drive and automatic gearbox DSG ¹⁾	1.9 ltr./77 kW TDI-PD with front-wheel-drive and manual gearbox ¹⁾	
Engine code letters:	BKC, BXE, BLS	BKC, BXE	BJB, BKC, BXE	
Master brake cylinder - Ø mm	22.2			
Brake servo unit - Ø Inch	Left-hand drive:		10	
	Right-hand drive:		7"/8" - tandem	
◆ Front disc brake:				
Front brake caliper (type denomination)	FN3	FN3	FS-III	
Front brake caliper, piston - Ø mm	54.0	54.0	54.0	
Front brake disc - Ø mm	288.0	288.0	280.0	
Brake disc, thickness mm	25.0	25.0	22.0	
Brake disc, minimum thickness mm	22.0	22.0	19.0	
Pad thickness without supporting plate mm	14.0	14.0	14.0	
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	
◆ Rear disc brake:				
Rear brake caliper (type denomination)	CII 41	CII 41	CI 38	CII 41
Rear brake caliper, piston - Ø mm	41.0	41.0	38.0	41.0
Rear brake disc - Ø mm	260.0	260.0	255.0	260.0
Brake disc, thickness mm	12.0	12.0	10.0	12.0
Brake disc, minimum thickness mm	10.0	10.0	8.0	10.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0

1) valid up to 04.2006

Engine	1.6 ltr./77 kW TDI CR	1.9 ltr./77 kW TDI-PD with four-wheel drive ¹⁾	1.9 ltr./77 kW TDI-PD with front-wheel-drive and automatic gearbox DSG ¹⁾	
Engine code letters:	CAYC	BXE, BLS	BXE, BLS	
Master brake cylinder - Ø mm	22.2			
Brake servo unit - Ø Inch	Left-hand drive:		10	
	Right-hand drive:		7"/8" - tandem	
◆ Front disc brake:				
Front brake caliper (type denomination)	FS-III	FS-III	FS-III	
Front brake caliper, piston - Ø mm	54.0	54.0	54.0	
Front brake disc - Ø mm	280.0	280.0	280.0	
Brake disc, thickness mm	22.0	22.0	22.0	
Brake disc, minimum thickness mm	19.0	19.0	19.0	
Pad thickness without supporting plate mm	14.0	14.0	14.0	



Engine	1.6 ltr./77 kW TDI CR	1.9 ltr./77 kW TDI-PD with four-wheel drive ¹⁾	1.9 ltr./77 kW TDI-PD with front-wheel-drive and automatic gearbox DSG ¹⁾		
Engine code letters:	CAYC	BXE, BLS	BXE, BLS		
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0		
◆ Rear disc brake:					
Rear brake caliper (type denomination)	CII 41 ²⁾	Bosch BIRIII ³⁾	CII 41 ²⁾	Bosch BIRIII ³⁾	CI 38
Rear brake caliper, piston - Ø mm	41.0	38.0	41.0	38.0	38.0
Rear brake disc - Ø mm	256.0	272.0	260.0 ⁴⁾ / 256.0 ⁵⁾	272.0	255.0 ⁴⁾ / 253.0 ⁵⁾
Brake disc, thickness mm	12.0	10.0	12.0	10.0	10.0
Brake disc, minimum thickness mm	10.0	8.0	10.0	8.0	8.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0	2.0

1) valid as of 05.2006

2) valid for vehicles up to CW 44/2009

3) valid for vehicles as of CW 45/2009

4) valid for vehicles up to 03.2009

5) valid for vehicles as of 04.2009

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Engine	1.9 ltr./77 kW TDI-PD with front-wheel-drive and manual gearbox ¹⁾	2.0 ltr./100 kW TDI-PD	2.0 ltr./100 kW TDI-PD with front-wheel-drive and automatic gearbox DSG		
Engine code letters:	BJB, BKC, BXE, BLS	AZV	AZV		
Master brake cylinder - Ø mm	22.2				
Brake servo unit - Ø Inch	Left-hand drive:		10		
	Right-hand drive:		7"/8" - tandem		
◆ Front disc brake:					
Front brake caliper (type denomination)	FS-III	FN3	FN3		
Front brake caliper, piston - Ø mm	54.0	54.0	54.0		
Front brake disc - Ø mm	280.0	288.0	288.0		
Brake disc, thickness mm	22.0	25.0	25.0		
Brake disc, minimum thickness mm	19.0	22.0	22.0		
Pad thickness without supporting plate mm	14.0	14.0	14.0		
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0		
◆ Rear disc brake:					
Rear brake caliper (type denomination)	CI 38	CII 41 ²⁾	Bosch BIRIII ³⁾	CII 41 ²⁾	Bosch BIRIII ³⁾



Engine	1.9 ltr./77 kW TDI-PD with front-wheel-drive and manual gearbox ¹⁾	2.0 ltr./100 kW TDI-PD		2.0 ltr./100 kW TDI-PD with front-wheel-drive and automatic gearbox DSG	
Engine code letters:	BJB, BKC, BXE, BLS	AZV		AZV	
Rear brake caliper, piston - Ø mm	38.0	41.0	38.0	41.0	38.0
Rear brake disc – Ø mm	255.0 ⁴⁾ / 253.0 ⁵⁾	260.0 ⁴⁾ / 256.0 ⁵⁾	272.0	260.0 ⁴⁾ / 256.0 ⁵⁾	272.0
Brake disc, thickness mm	10.0	12.0	10.0	12.0	10.0
Brake disc, minimum thickness mm	8.0	10.0	8.0	10.0	8.0
Pad thickness without supporting plate mm	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness without supporting plate mm	2.0	2.0	2.0	2.0	2.0

1) valid as of 05.2006

2) valid for vehicles up to CW 44/2009

3) valid for vehicles as of CW 45/2009

4) valid for vehicles up to 03.2009

5) valid for vehicles as of 04.2009

Engine	2.0 ltr./103 kW TDI-PD with front-wheel-drive and automatic gearbox DSG		2.0 ltr./103 kW TDI-PD		2.0 ltr./125 kW TDI-PD
Engine code letters:	BKD, BMM		BKD, BMM		BMN
Master brake cylinder - Ø mm	22.2				23.8
Brake servo unit - Ø Inch	Left-hand drive:				10
	Right-hand drive:				7"/8" - tandem
◆ Front disc brake:					
Front brake caliper (type denomination)	FN3		FN3		FN3
Front brake caliper, piston - Ø mm	54.0		54.0		54.0
Front brake disc – Ø mm	288.0		288.0		312.0
Brake disc, thickness mm	25.0		25.0		25.0
Brake disc, minimum thickness mm	22.0		22.0		22.0
Pad thickness without supporting plate mm	14.0		14.0		14.0
Minimum pad thickness without supporting plate mm	2.0		2.0		2.0
◆ Rear disc brake:					
Rear brake caliper (type denomination)	CII 41 ¹⁾	Bosch BIR-III ²⁾	CII 41 ¹⁾	Bosch BIR-III ²⁾	CII 41
Rear brake caliper, piston - Ø mm	41.0	38.0	41.0	38.0	41.0
Rear brake disc – Ø mm	260.0 ³⁾ / 256.0 ⁴⁾	272.0	260.0 ³⁾ / 256.0 ⁴⁾	272.0	286.0
Brake disc, thickness mm	12.0	10.0	12.0	10.0	12.0
Brake disc, minimum thickness mm	10.0	8.0	10.0	8.0	10.0

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Engine	2.0 ltr./103 kW TDI-PD with front-wheel-drive and automatic gearbox DSG		2.0 ltr./103 kW TDI-PD		2.0 ltr./ 125 kW TDI-PD
Engine code letters:	BKD, BMM		BKD, BMM		BMN
Pad thickness without support- ing plate	11.0	11.0	11.0	11.0	11.0
Minimum pad thickness with- out supporting plate	2.0	2.0	2.0	2.0	2.0

- 1) valid for vehicles up to CW 44/2009
- 2) valid for vehicles as of CW 45/2009
- 3) valid for vehicles up to 03.2009
- 4) valid for vehicles as of 04.2009

Engine	2.0 ltr./125 kW TDI CR		2.0 l/103 kW TDI CR	2.0 l/81 kW TDI CR
Engine code letters:	CEGA		CFHC, CLCB	CLCA
Master brake cylinder - Ø	mm	23.8	22.2	22.2
Brake servo unit - Ø	Inch	Left-hand drive: 10		
		Right-hand drive: 7"/8" - tandem		
◆ Front disc brake:				
Front brake caliper (type denomina- tion)		FN3	FN3	FS-III
Front brake caliper, piston - Ø	mm	54.0	54.0	54.0
Front brake disc - Ø	mm	312.0	288.0	280.0
Brake disc, thickness	mm	25.0	25.0	22.0
Brake disc, minimum thickness	mm	22.0	22.0	19.0
Pad thickness without support- ing plate	mm	14.0	14.0	14.0
Minimum pad thickness with- out supporting plate	mm	2.0	2.0	2.0
◆ Rear disc brake:				
Rear brake caliper (type denomina- tion)		CII 41 ¹⁾	Bosch BIRIII ²⁾	Bosch BIRIII
Rear brake caliper, piston - Ø	mm	41.0	38.0	38.0
Rear brake disc - Ø	mm	286.0 ³⁾ / 282.0 ⁴⁾	272.0	272.0
Brake disc, thickness	mm	12.0	10.0	10.0
Brake disc, minimum thickness	mm	10.0	8.0	8.0
Pad thickness without support- ing plate	mm	11.0	11.0	11.0
Minimum pad thickness with- out supporting plate	mm	2.0	2.0	2.0

- 1) valid for vehicles up to CW 44/2009
- 2) valid for vehicles as of CW 45/2009
- 3) valid for vehicles up to 03.2009
- 4) valid for vehicles as of 04.2009



Engine	2.0 I/81 kW TDI CR		
Engine code letters:	CFHF		
Master brake cylinder - Ø mm	22.2		
Brake servo unit - Ø Inch	Left-hand drive:		10
	Right-hand drive:		7"/8" - tandem
◆ Front disc brake:			
Front brake caliper (type denomination)	FS-III		
Front brake caliper, piston - Ø mm	54.0		
Front brake disc - Ø mm	280.0		
Brake disc, thickness mm	22.0		
Brake disc, minimum thickness mm	19.0		
Pad thickness without supporting plate mm	14.0		
Minimum pad thickness without supporting plate mm	2.0		
◆ Rear disc brake:			
Rear brake caliper (type denomination)	CI 38 ¹⁾	Bosch BIRIII ²⁾	
Rear brake caliper, piston - Ø mm	38.0	38.0	
Rear brake disc - Ø mm	253.0	272.0	
Brake disc, thickness mm	10.0	10.0	
Brake disc, minimum thickness mm	8.0	8.0	
Pad thickness without supporting plate mm	11.0	11.0	
Minimum pad thickness without supporting plate mm	2.0	2.0	

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1) valid for vehicles with front-wheel drive

2) valid for vehicles with four-wheel drive

1.2 Brake fluid

Classification	N 052 766.Z0 according to the USA standard FMVSS 571.116 DOT4 and VW standard 501 14
Change	⇒ Maintenance ; Booklet Octavia II

1.3 Brake inspection

General information:

- ◆ The test stand is used as drive.
- ◆ During the testing, the idling speed must be set on vehicles with manual gearbox and the driving position »N« must be engaged on vehicles with automatic gearbox.
- ◆ When conducting the test, observe the specifications provided by the manufacturer of the test rig.



Note

The brake regulation systems do not function when ignition is off.

Test - vehicles with front-wheel-drive

The brake test must be performed on a single-axle roller dynamometer.

The test speed must not exceed 6 km/h.

The test stands approved by Škoda comply with these conditions.

Test - vehicles with four-wheel drive with four-wheel clutch.

The brake inspection must be performed on a contra-rotative single axle roller type test stand for vehicles with four-wheel drive.

Contra-rotative means: The test stand rollers of the single axle roller type test stand rotate forwards on the one side and backwards on the other side.

Thus, a transfer of the braking forces in the drive train is prevented.

The wheel which rotates forwards is measured each time during the test, this requires the need of two braking tests per axle.

The test speed must not exceed 6 km/h.

The test stands approved by Škoda comply with these conditions.

If a test stand is not available for vehicles with four-wheel drive, the brake inspection can also be performed on a standard single axle roller type test stand as follows:

- Drive the vehicle forwards onto the rollers.
- Switch off engine and wait 2 seconds.
- Perform brake inspection at the front.
- Start engine and wait approx. 5 seconds until adequate vacuum has built up.
- Drive the vehicle forwards until the rear wheels are standing on the rollers.
- Switch off engine and wait 2 seconds.
- Perform brake inspection at the rear.
- Start engine and wait approx. 5 seconds until adequate vacuum has built up.

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45 – Anti-lock brake system

1 Antilock braking system (ABS)

General instructions for ABS ⇒ [page 10](#)

Distinguishing features of the ABS systems ⇒ [page 13](#)

Safety precautions, basic information on fault finding and on repairing ⇒ [page 14](#)

Required technical information ⇒ [page 14](#)

1.1 General instructions for ABS

The ABS brake system is split diagonally. The brake servo assistance is provided pneumatically by the vacuum brake servo unit.

Vehicles fitted with ABS do not have a mechanical brake pressure regulator. Specifically matched software in the ABS control unit - J104- regulates the brake pressure distribution on the rear axle.



Note

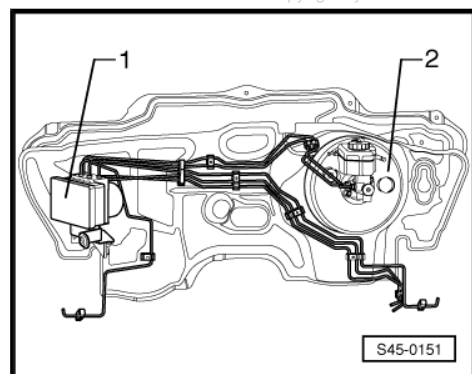
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 42](#) , if required ⇒ [page 61](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.
- ◆ Faults in the ABS do not influence the brake system and servo assistance. The conventional braking system remains fully functional even without ABS. There will be a change in braking behaviour. After the ABS warning lamp comes on, the rear wheels may lock prematurely during braking.

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Arrangement of the ABS, left-hand drive vehicle

1 - ABS hydraulic unit - N55- with ABS control unit - J104-

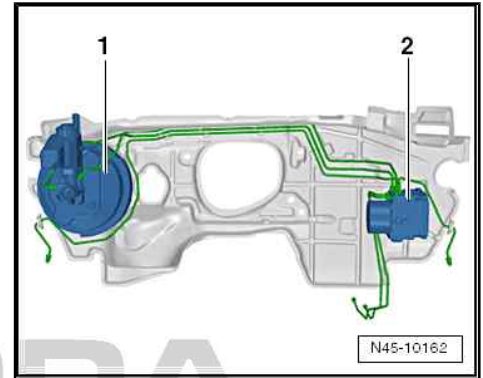
2 - Brake servo



Arrangement of the ABS in right-hand drive vehicles

1 - Brake servo

2 - ABS hydraulic unit - N55- with ABS control unit - J104-



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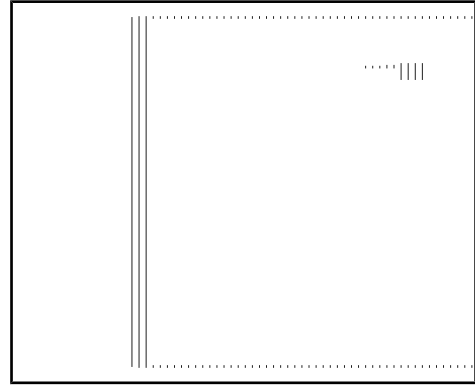
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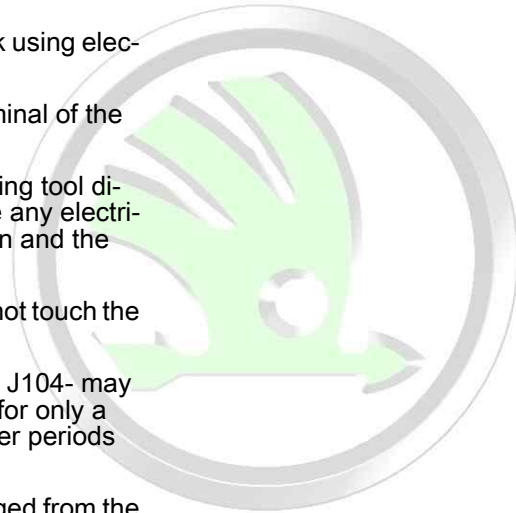
The ABS control unit - J104- -1- and the ABS hydraulic unit - N55- -2- form a single unit. They can only be separated after the complete unit is removed. The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ➔ [page 42](#) , if required ➔ [page 61](#) . The hydraulic pump -3- must not be separated from the ABS hydraulic unit - N55- -2-.

New control units supplied by the spare parts area are not coded. They must be coded after installation ➔ Vehicle diagnostic tester.

- ◆ Before starting work on anti-lock brake systems, query the event memory to check for complaints and conduct guided fault finding ➔ Vehicle diagnostic tester.
- ◆ Do not separate plug connections unless the ignition is switched off.
- ◆ Before commencing work on the ABS systems, switch off the ignition and disconnect the earth strap at the battery ➔ Electrical System; Rep. gr. 27 .
- ◆ If the battery earth strap is disconnected and connected, carry out additional operations ➔ Electrical System; Rep. gr. 27 .
- ◆ Welding work using electric welding equipment may affect the ABS system.
- ◆ Do the following before commencing welding work using electrical welding tool:
 - Disconnect the earth strap from the negative terminal of the battery and cover the negative terminal.
 - Connect the earth connection of the electric welding tool directly to the part to be welded. There must not be any electrically insulated parts between the earth connection and the welding point.
 - Electronic control units and electrical wiring must not touch the earth connection or the welding electrode.
- ◆ During painting operations, the ABS control unit - J104- may be exposed to a maximum temperature of 95 °C for only a short period, and to a maximum of 85 °C for longer periods (approx. 2 hours).
- ◆ Do not drive the vehicle if the connector is unplugged from the ABS control unit - J104- .
- ◆ Absolute cleanliness is required when working on the anti-lock brake system. It is not permitted to use any products which contain mineral oil, such as oils, greases etc.
- ◆ Thoroughly clean connection points and the surrounding area before disconnecting, but do not use any aggressive cleaning agents, such as brake cleaner, petroleum, thinner or similar.
- ◆ Place removed parts on a clean surface and cover.
- ◆ Carefully cover or close opened components if the repair is not completed immediately (use plugs from the repair kit - 1H0 698 311 A-).
- ◆ Only use lint-free cloths.
- ◆ Do not remove spare parts from their wrappings until immediately before installation.
- ◆ Use only genuine wrapped parts.
- ◆ When the system is open, do not work with compressed air and do not move the vehicle.
- ◆ The valve coils in the ABS control unit - J104- must not be calibrated.



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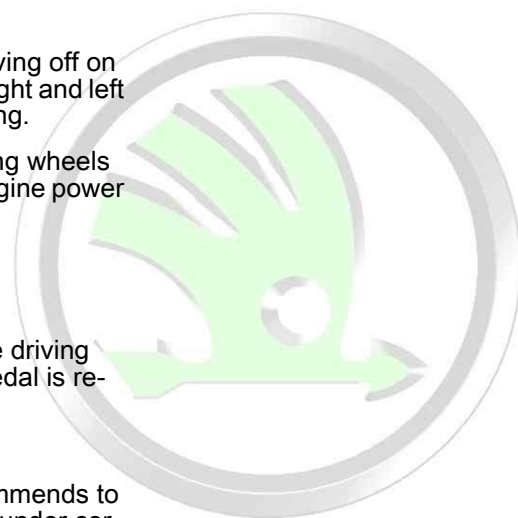


- ◆ The valve coils in the ABS control unit - J104- cannot be replaced.
- ◆ The pressure sensor must not be modified or damaged.
- ◆ The pressure sensor cannot be replaced.
- ◆ The sensor housing must not be subjected to mechanical load.
- ◆ No measurements must be carried out at the contact points of the ABS control unit - J104- .
- ◆ No measurements must be carried out at the contact points of the ABS hydraulic unit - N55- .
- ◆ The valve domes of the ABS hydraulic unit - N55- must not be damaged or bent.
- ◆ The contacts on the ABS control unit - J104- and the ABS hydraulic unit - N55- cannot be replaced.
- ◆ Do not use contact spray.
- ◆ No contamination or foreign object may be located between ABS control unit - J104- and ABS hydraulic unit - N55- .
- ◆ Ensure that no brake fluid enters connectors.
- ◆ Observe the relevant instructions when handling brake fluid.
- ◆ After completing work which involved opening the brake system, bleed the brake system with the brake filling and bleeding device , e. g. -VAS 5234- , => [page 168](#) .
- ◆ During the subsequent road test, ensure that at least one controlled brake application is performed (pulsing must be felt on the brake pedal).

1.2 Distinguishing features of the ABS systems

- ◆ ABS - wheel control system when braking. It prevents the wheels from locking when braking.
- ◆ ESP (ESC) - electronic stability program. It prevents the vehicle from skidding by means of a targeted intervention in the braking and steering process.
- ◆ EDL - electronic differential lock. It enables the driving off on a road with different friction coefficients under the right and left drive wheel by braking of the wheel which is slipping.
- ◆ TCS - traction control system. It prevents the driving wheels from slipping when accelerating by throttling the engine power output.
- ◆ MBA - mechanical brake assistance.
- ◆ HBA - hydraulic brake assistance.
- ◆ EDC - Engine Drag Torque Control. It prevents the driving wheels from locking, if suddenly the accelerator pedal is released or when braking with a gear engaged.
- ◆ EBD - electronic brake pressure distribution.
- ◆ DSR - automatic steering recommendation. Recommends to the driver a change in the steering position, which under certain conditions can increase the efficiency of the ESP (ESC).
- ◆ HHC - Hill Hold Control. Makes it easy to set off on hills without the vehicle rolling back and also without operating the parking brake.
- ◆ RKA (TPM) - Tyre inspection display

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- ◆ XDS - Extension of the electronic differential lock. It reacts when the front inside wheel lifts during fast cornering. XDS intervenes by using braking pressure on the inside wheel, in order to prevent spinning. In doing so, the traction improves and the track stability of the vehicle increases.

1.3 Safety precautions, basic information on fault finding and on repairing

- ◆ ABS is a vehicle security system, in-depth knowledge of the system is required for working on such systems. Testing and replacement or repairs should be carried out by personnel specially trained for ABS.
- ◆ Faults are indicated by the ABS warning light , the red brake system warning light and the warning light for ESP (ESC) . Certain faults are not detected until after a minimum speed of 20 km/h has been exceeded (conduct a road test).
- ◆ If the ABS warning light and the brake system warning light do not light up and if in spite of this the brake system is not fully operational, look for the fault in the conventional brake system ⇒ [page 94](#) and ⇒ [page 153](#) .

1.4 Required technical information

- ◆ ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- ◆ Construction and function of brake systems ⇒ Self-study programme No. 28 ; ESP (ESC) and ⇒ Self-study programme No. 59 ; DSR and HHC
- ◆ Technical Service Handbook
- ◆ Owner's Manual Vehicle diagnosis, measurement and information system - VAS-

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2 Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS)

Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles up to MY 2008 ⇒ [page 15](#)

Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles as of MY 2009 ⇒ [page 17](#)

Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles as of MY 2011 ⇒ [page 19](#)

2.1 Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles up to MY 2008

Note

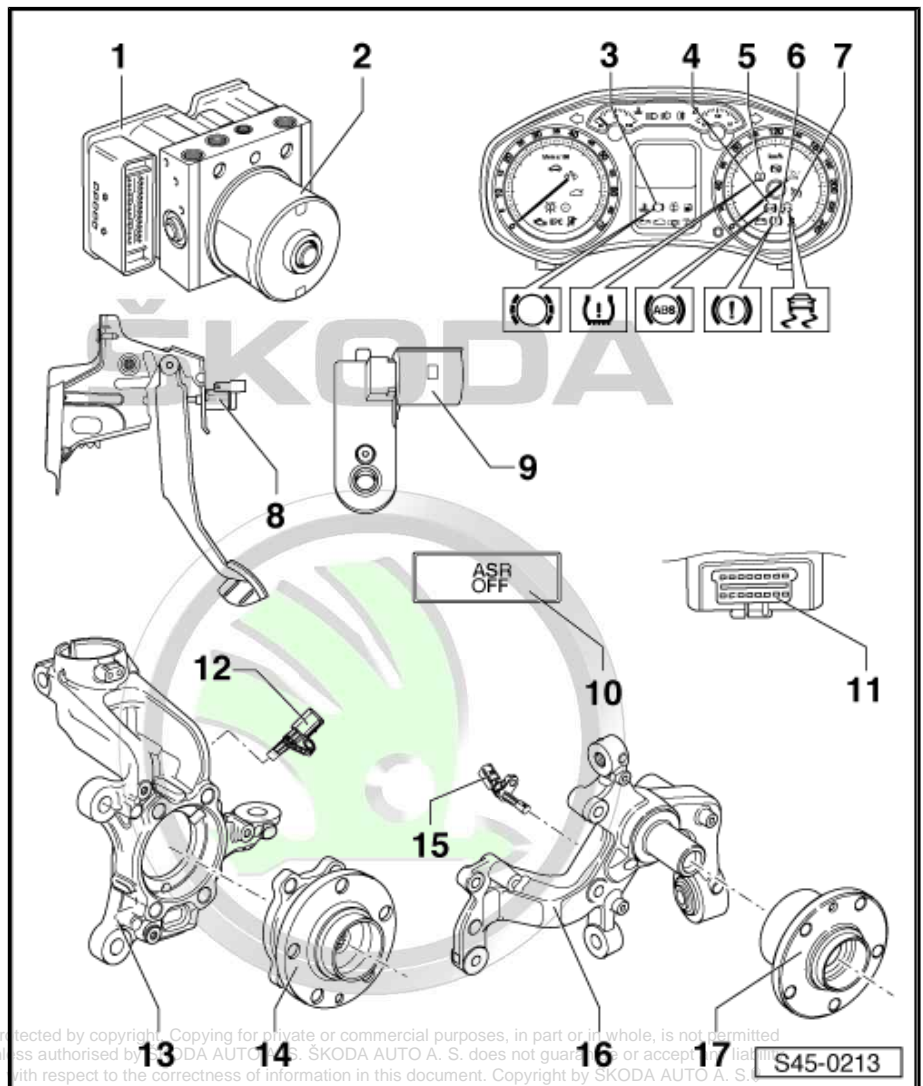
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 42](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- ❑ Fitting location for left-hand drive: at hydraulic unit in right of engine compartment
- ❑ Fitting location for right-hand drive: at hydraulic unit in left of engine compartment
- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- ❑ Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 42](#)
- ❑ Disconnecting the control unit from the hydraulic unit ⇒ [page 42](#)
- ❑ Fitting the control unit to the hydraulic unit ⇒ [page 42](#)

2 - ABS hydraulic unit - N55-

- ❑ Fitting location for left-hand drive: in right of engine compartment
- ❑ Fitting location for right-hand drive: in left of engine compartment





gine compartment

The hydraulic unit consists of these components:

- ABS hydraulic pump - V64-
- Check ⇒ Vehicle diagnostic tester
- Valve block, (includes the inlet and exhaust valves)
- The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other
- Removing and installing ⇒ [page 42](#)

3 - Brake pad warning light - K32-

- Operation: ⇒ [page 29](#)

4 - ABS warning light - K47-

- Operation: ⇒ [page 29](#)

5 - Warning light for tyre pressure display - K220-

- Operation: ⇒ [page 29](#)

6 - Dual circuit and hand brake system warning light - K7-

- Operation: ⇒ [page 29](#)

7 - Warning light for traction control system - K86-

- Operation: ⇒ [page 29](#)

8 - The brake light switch - F- and brake pedal switch - F47-

- installed until 10/05
- Adjust ⇒ [page 138](#)
- Check ⇒ Vehicle diagnostic tester

9 - The brake light switch - F- and brake pedal switch - F47-

- installed from 11/05
- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

10 - Switch for the Traction Control System - E132-

- Fitting location: in the centre console

11 - Diagnostic connection

- Fitting location: Cover in driver's footwell

12 - Front right and left wheel speed sensors - G45- / -G47-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

13 - Wheel-bearing housing - front axle

14 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub

15 - Rear right and left wheel speed sensors - G44- / -G46-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

16 - Wheel-bearing housing - rear axle

17 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub

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2.2 Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles as of MY 2009

Note

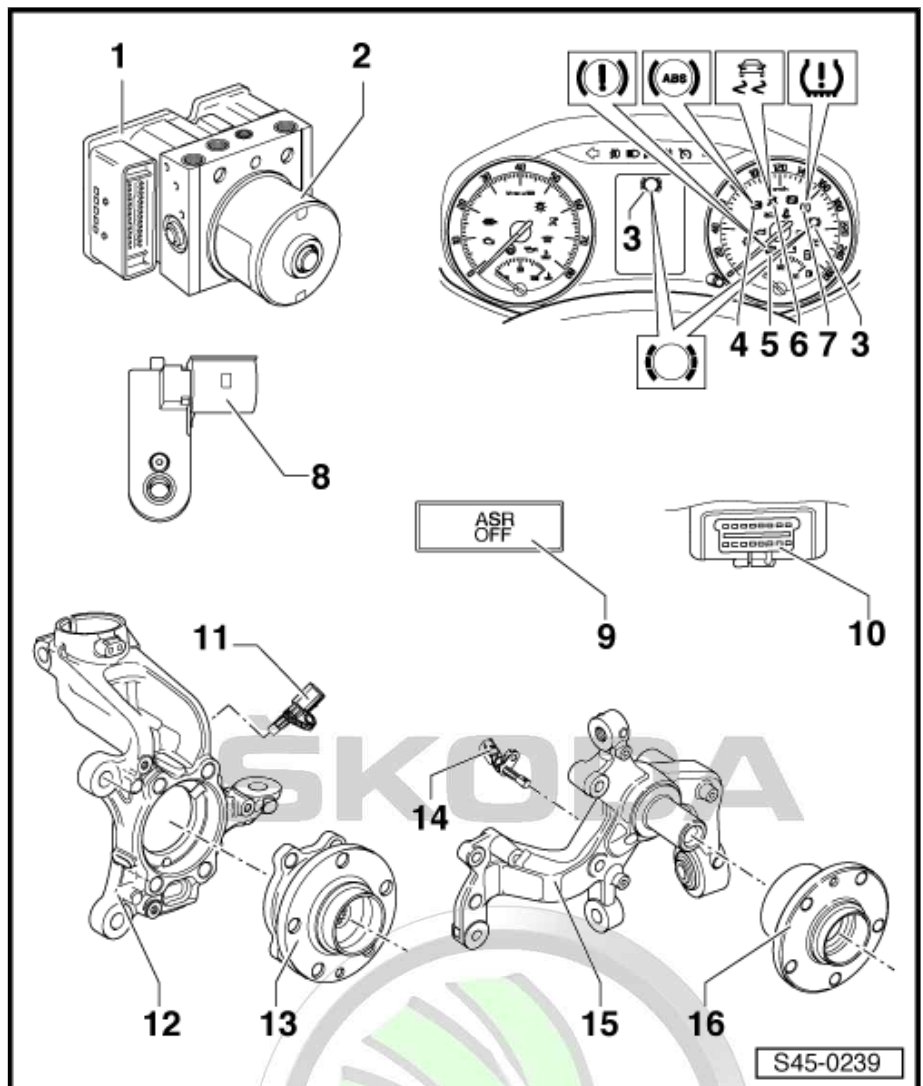
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55-.
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 42](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- Fitting location for left-hand drive: at hydraulic unit in right of engine compartment
- Fitting location for right-hand drive: at hydraulic unit in left of engine compartment
- Check ⇒ Vehicle diagnostic tester
- do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 42](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 42](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 42](#)

2 - ABS hydraulic unit - N55-

- Fitting location for left-hand drive: in right of engine compartment
- Fitting location for right-hand drive: in left of engine compartment



The hydraulic unit consists of these components:

- ABS hydraulic pump - V64-
- Check ⇒ Vehicle diagnostic tester
- Valve block, (includes the inlet and exhaust valves)
- The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other
- Removing and installing ⇒ [page 42](#)

3 - Brake pad warning light - K32-

- Operation: ⇒ [page 29](#)



- 4 - ABS warning light - K47-**
 - Operation: ⇒ [page 29](#)
- 5 - Dual circuit and hand brake system warning light - K7-**
 - Operation: ⇒ [page 29](#)
- 6 - Warning light for traction control system - K86-**
 - Operation: ⇒ [page 29](#)
- 7 - Warning light for tyre pressure display - K220-**
 - Operation: ⇒ [page 29](#)
- 8 - The brake light switch - F- and brake pedal switch - F47-**
 - Fitting location: on master brake cylinder
 - Removing and installing ⇒ [page 149](#)
 - Check ⇒ Vehicle diagnostic tester
- 9 - Switch for the Traction Control System - E132-**
 - Fitting location: in the centre console
- 10 - Diagnostic connection**
 - Fitting location: Cover in driver's footwell
- 11 - Front right and left wheel speed sensors - G45- / -G47-**
 - Check ⇒ Vehicle diagnostic tester
 - Removing and installing ⇒ [page 82](#)
- 12 - Wheel-bearing housing - front axle**
- 13 - Wheel hub with wheel bearing**
 - Sensor ring for ABS is built into the wheel hub
- 14 - Rear right and left wheel speed sensors - G44- / -G46-**
 - Check ⇒ Vehicle diagnostic tester
 - Removing and installing ⇒ [page 82](#)
- 15 - Wheel-bearing housing - rear axle**
- 16 - Wheel hub with wheel bearing**
 - Sensor ring for ABS is built into the wheel hub

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2.3 Electrical/electronic components and fitting locations ABS Mark 70 (ABS/TCS) for vehicles as of MY 2011

Note

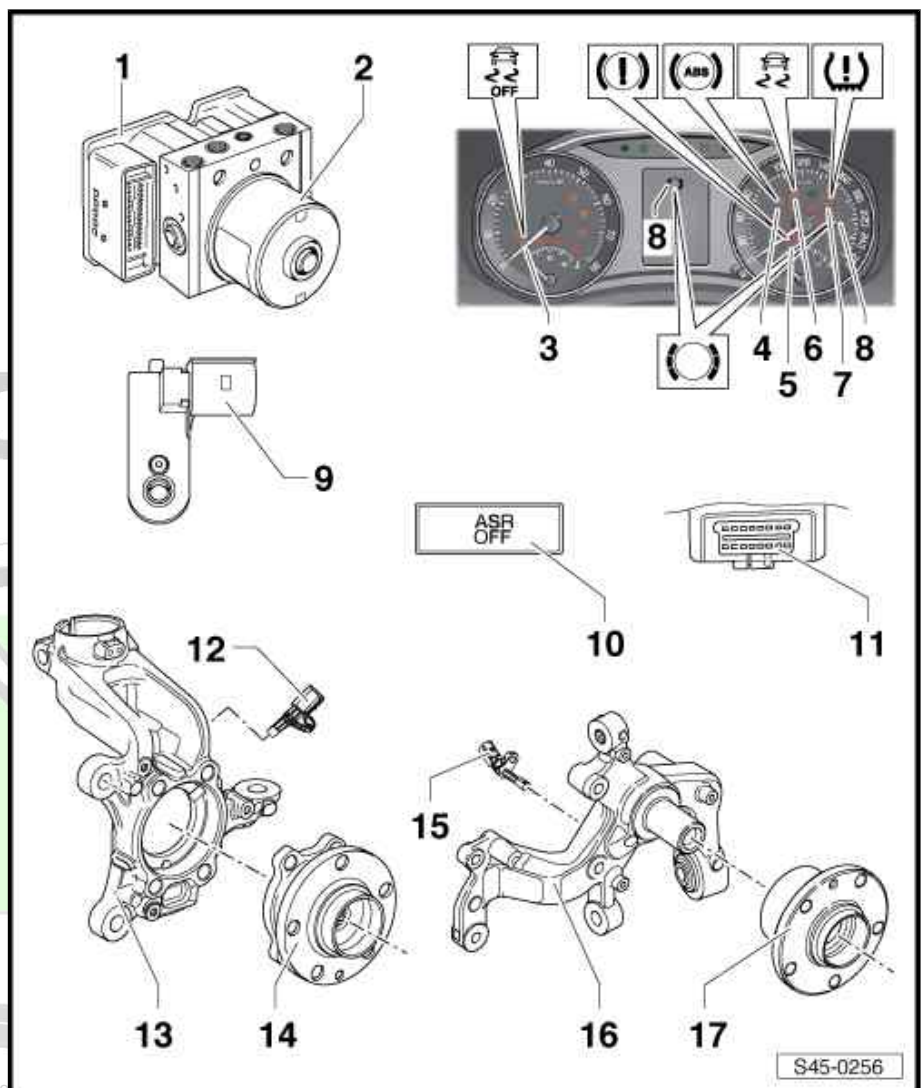
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55-.
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 42](#).
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- ❑ Fitting location for left-hand drive: at hydraulic unit in right of engine compartment
- ❑ Fitting location for right-hand drive: at hydraulic unit in left of engine compartment
- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- ❑ Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 42](#)
- ❑ Disconnecting the control unit from the hydraulic unit ⇒ [page 42](#)
- ❑ Fitting the control unit to the hydraulic unit ⇒ [page 42](#)

2 - ABS hydraulic unit - N55-

- ❑ Fitting location for left-hand drive: in right of engine compartment
- ❑ Fitting location for right-hand drive: in left of engine compartment



The hydraulic unit consists of these components:

- ❑ ABS hydraulic pump - V64-
- ❑ Check ⇒ Vehicle diagnostic tester
- ❑ Valve block, (includes the inlet and exhaust valves)
- ❑ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other
- ❑ Removing and installing ⇒ [page 42](#)

3 - Warning light 2 for ESP (ESC) and TCS - K216-

- ❑ Operation: ⇒ [page 37](#)



4 - ABS warning light - K47-

- Operation: ⇒ [page 29](#)

5 - Dual circuit and hand brake system warning light - K7-

- Operation: ⇒ [page 29](#)

6 - Warning light for traction control system - K86-

- Operation: ⇒ [page 29](#)

7 - Warning light for tyre pressure display - K220-

- Operation: ⇒ [page 29](#)

8 - Brake pad warning light - K32-

- Operation: ⇒ [page 29](#)

9 - The brake light switch - F- and brake pedal switch - F47-

- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

10 - Switch for the Traction Control System - E132-

- Fitting location: in the centre console

11 - Diagnostic connection

- Fitting location: Cover in driver's footwell

12 - Front right and left wheel speed sensors - G45- / -G47-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

13 - Wheel-bearing housing - front axle

14 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub

15 - Rear right and left wheel speed sensors - G44- / -G46-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

16 - Wheel-bearing housing - rear axle

17 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub



3 Electrical/electronic components and fitting locations ABS Mark 60/Mark 60 EC (ABS/EDL/TCS/ESP (ESC))

Electrical/electronic components and fitting locations ABS Mark 60 for vehicles up to MY 2008 ⇒ [page 21](#)

Electrical/electronic components and fitting locations ABS Mark 60 EC for vehicles as of MY 2009 ⇒ [page 24](#)

Electrical/electronic components and fitting locations ABS Mark 60 EC/PYA for vehicles as of MY 2011 ⇒ [page 27](#)

3.1 Electrical/electronic components and fitting locations ABS Mark 60 for vehicles up to MY 2008



Note

- ◆ Vehicles up to CW 21/2008 are fitted with the control unit for ABS Mark 60.
- ◆ Vehicles up to CW 22/2008 are fitted with the control unit for ABS Mark 60 EC. A sensor unit for ESP (ESC) -G419- is integrated in this control unit. Depending on the equipment, the control unit for ABS Mark 60 EC must not be fitted with these senders on vehicles with front-wheel drive.
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 61](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

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1 - ABS control unit - J104-

- Fitting location for left-hand drive: in right of engine compartment
- Fitting location for right-hand drive: in left of engine compartment
- as of CW 22/2008 with integrated sensor unit for ESP (ESC) -G419- - pos. 11
- do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- Check ⇒ Vehicle diagnostic tester
- Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 61](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 61](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 61](#)
- with ABS hydraulic unit - N55-

The hydraulic unit consists of these components:

- ABS hydraulic pump - V64-
- Brake pressure sender 1 - G201-
- Check ⇒ Vehicle diagnostic tester
- Valve block, (includes the inlet and exhaust valves)
- The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other

2 - Brake pad warning light - K32-

- Operation: ⇒ [page 29](#)

3 - ABS warning light - K47-

- Operation: ⇒ [page 29](#)

4 - Warning light for tyre pressure display - K220-

- Operation: ⇒ [page 29](#)

5 - Dual circuit and hand brake system warning light - K7-

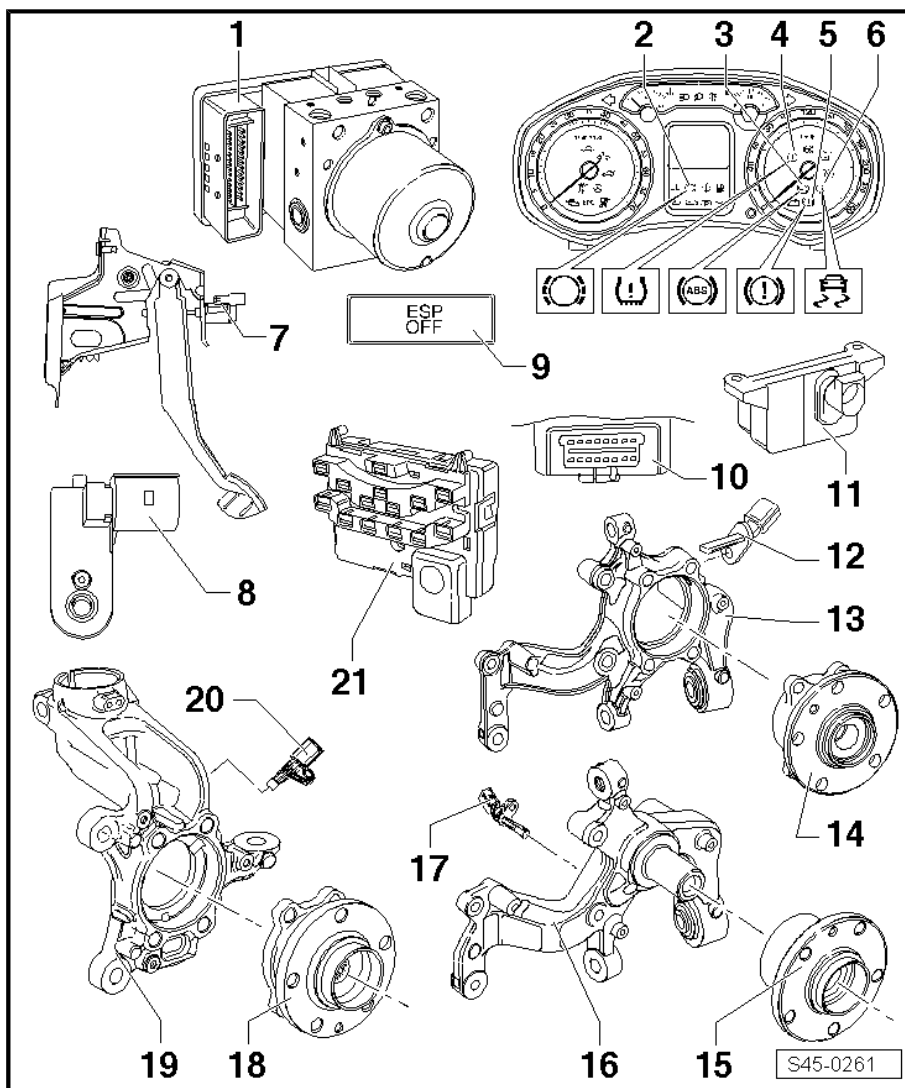
- Operation: ⇒ [page 29](#)

6 - ESP (ESC) and TCS warning lamp - K155-

- Operation: ⇒ [page 29](#)

7 - The brake light switch - F- and brake pedal switch - F47-

- installed until 10/05
- Adjust ⇒ [page 138](#)
- Check ⇒ Vehicle diagnostic tester



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8 - The brake light switch - F- and brake pedal switch - F47-

- installed from 11/05
- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

9 - TCS/ESP (ESC) button - E256-

- Fitting location: in the centre console

10 - Diagnostic connection

- Fitting location: Cover in driver's footwell

11 - Sensor unit for ESP (ESC) - G419-

Vehicles up to CW 21/2008:

- Fitting location: under the right front seat
- combined lateral acceleration sender - G200- , yaw rate sender - G202- and longitudinal acceleration sender - G251-
- integrated in one housing
- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 91](#)

Vehicles from CW 22/2008

- Fitting location: fitted in the ABS control unit - J104-
- combined lateral acceleration sender - G200- , yaw rate sender - G202- and longitudinal acceleration sender - G251-
- Check ⇒ Vehicle diagnostic tester

12 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with four-wheel drive)

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

13 - Wheel-bearing housing - rear axle (vehicles with four-wheel drive)

14 - Wheel hub with wheel bearing (vehicles with four-wheel drive)

- Sensor ring for ABS is built into the wheel hub

15 - Wheel hub with wheel bearing (vehicles with front-wheel drive)

- Sensor ring for ABS is built into the wheel hub

16 - Wheel-bearing housing - rear axle (vehicles with front-wheel drive)

17 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with front-wheel drive)

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

18 - Wheel hub with wheel bearing - front axle

- Sensor ring for ABS is built into the wheel hub

19 - Wheel-bearing housing - front axle

20 - Front right and left wheel speed sensors - G45- / -G47-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

21 - Steering angle sender - G85-

all vehicles (except right-hand drive vehicles as of CW 22/2008)

- Fitting location: on the steering wheel shaft between the steering wheel and the steering column switch
- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ Electrical System; Rep. gr. 94



Right-hand drive as of CW 22/2008

- Fitting location: at power-assisted steering - cannot be replaced individually
- Check ⇒ Vehicle diagnostic tester

3.2 Electrical/electronic components and fitting locations Mark 60 EC for vehicles as of MY 2009



Note

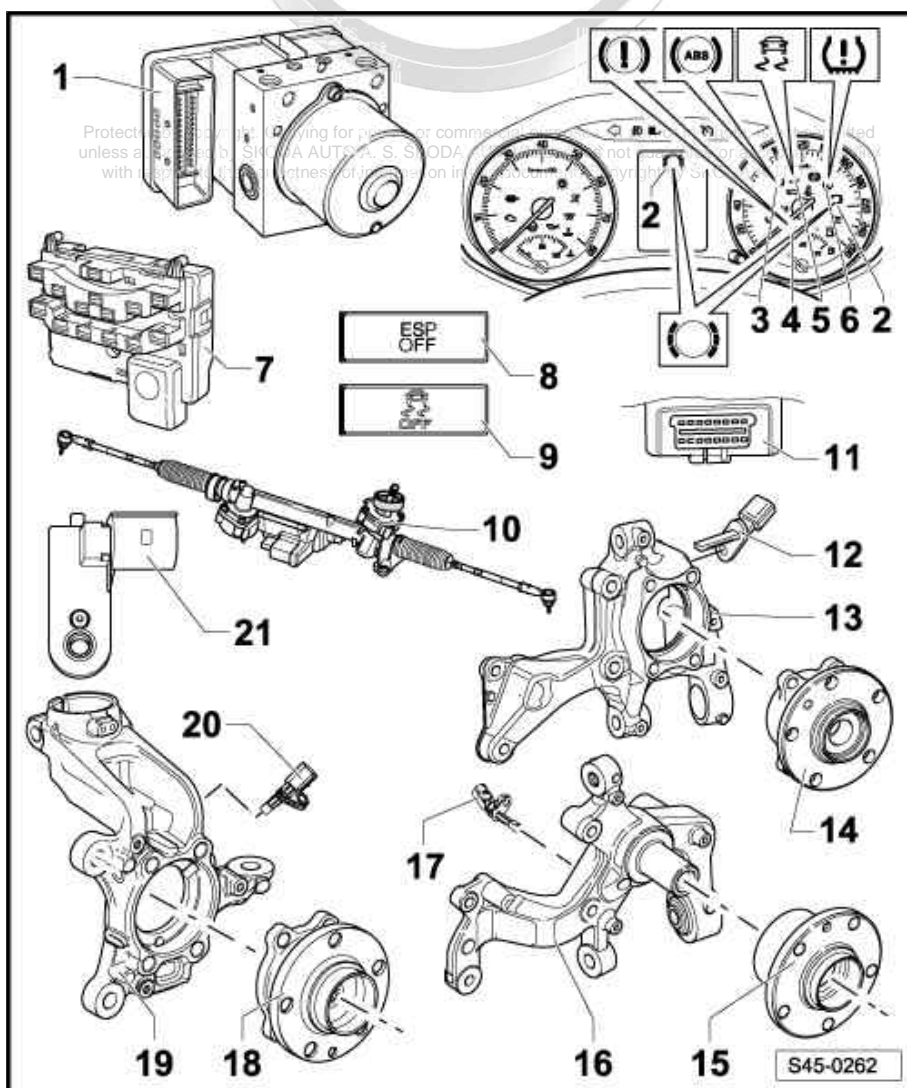
- ◆ Vehicles up to CW 21/2008 are fitted with the control unit for ABS Mark 60.
- ◆ Vehicles up to CW 22/2008 are fitted with the control unit for ABS Mark 60 EC. A sensor unit for ESP (ESC) -G419- is integrated in this control unit. Depending on the equipment, the control unit for ABS Mark 60 EC must not be fitted with these senders on vehicles with front-wheel drive.
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 61](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- Fitting location for left-hand drive: in right of engine compartment
- Fitting location for right-hand drive: in left of engine compartment
- as of CW 22/2008 with integrated sensor unit for ESP (ESC) -G419-
- do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- Check ⇒ Vehicle diagnostic tester
- Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 61](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 61](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 61](#)
- with ABS hydraulic unit - N55-

The hydraulic unit consists of these components:

- ABS hydraulic pump - V64-



- Brake pressure sender 1 - G201-
- Check ⇒ Vehicle diagnostic tester
- Valve block, (includes the inlet and exhaust valves)
- The ABS control unit - J104- and the ABS hydraulic unit - N55- must not be separated from each other
- Do not separate the hydraulic pump - V64- from the valve block.

2 - Brake pad warning light - K32-

- Operation: ⇒ [page 29](#)

3 - ABS warning light - K47-

- Operation: ⇒ [page 29](#)

4 - Dual circuit and hand brake system warning light - K7-

- Operation: ⇒ [page 29](#)

5 - ESP (ESC) and TCS warning lamp - K155-

- Operation: ⇒ [page 29](#)

6 - Warning light for tyre pressure display - K220-

- Operation: ⇒ [page 29](#)

7 - Steering angle sender - G85-

Left-hand drive up to CW 21/2009

- Fitting location: on the steering wheel shaft between the steering wheel and the steering column switch
- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ Electrical System; Rep. gr. 94

Left-hand drive as of CW 22/2009 - Pos. 10

8 - TCS/ESP (ESC) button - E256-

- for vehicles up to CW 44/2009
- Fitting location: in the centre console

9 - TCS/ESP (ESC) button - E256-

- for vehicles as of CW 45/2009
- Fitting location: in the centre console

10 - Steering angle sender - G85-

all vehicles (except left-hand drive vehicles up to CW 21/2009)

- Fitting location: at power-assisted steering - cannot be replaced individually
- Check ⇒ Vehicle diagnostic tester

Left-hand drive up to CW 21/2009 - Pos. 7

11 - Diagnostic connection

- Fitting location: Cover in driver's footwell

12 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with four-wheel drive)

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

13 - Wheel-bearing housing - rear axle (vehicles with four-wheel drive)

14 - Wheel hub with wheel bearing (vehicles with four-wheel drive)

- Sensor ring for ABS is built into the wheel hub

15 - Wheel hub with wheel bearing (vehicles with front-wheel drive)

- Sensor ring for ABS is built into the wheel hub

16 - Wheel-bearing housing - rear axle (vehicles with front-wheel drive)

17 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with front-wheel drive)

- Check ⇒ Vehicle diagnostic tester



- Removing and installing ⇒ [page 82](#)

18 - Wheel hub with wheel bearing - front axle

- Sensor ring for ABS is built into the wheel hub

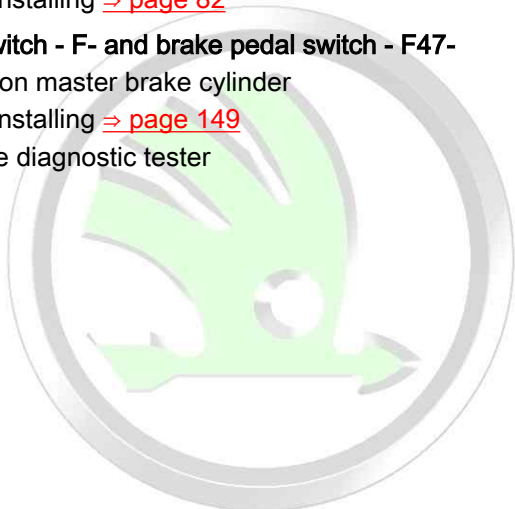
19 - Wheel-bearing housing - front axle

20 - Front right and left wheel speed sensors - G45- / -G47-

- Check ⇒ Vehicle diagnostic tester
- Removing and installing ⇒ [page 82](#)

21 - The brake light switch - F- and brake pedal switch - F47-

- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester



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3.3 Electrical/electronic components and fitting locations ABS Mark 60 EC/PYA for vehicles as of MY 2011

Note

- ◆ A sensor unit for ESP (ESC) -G419- is integrated in the control unit. Depending on the equipment, the control unit must not be fitted with these senders on vehicles with front-wheel drive.
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55-.
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 61](#).
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

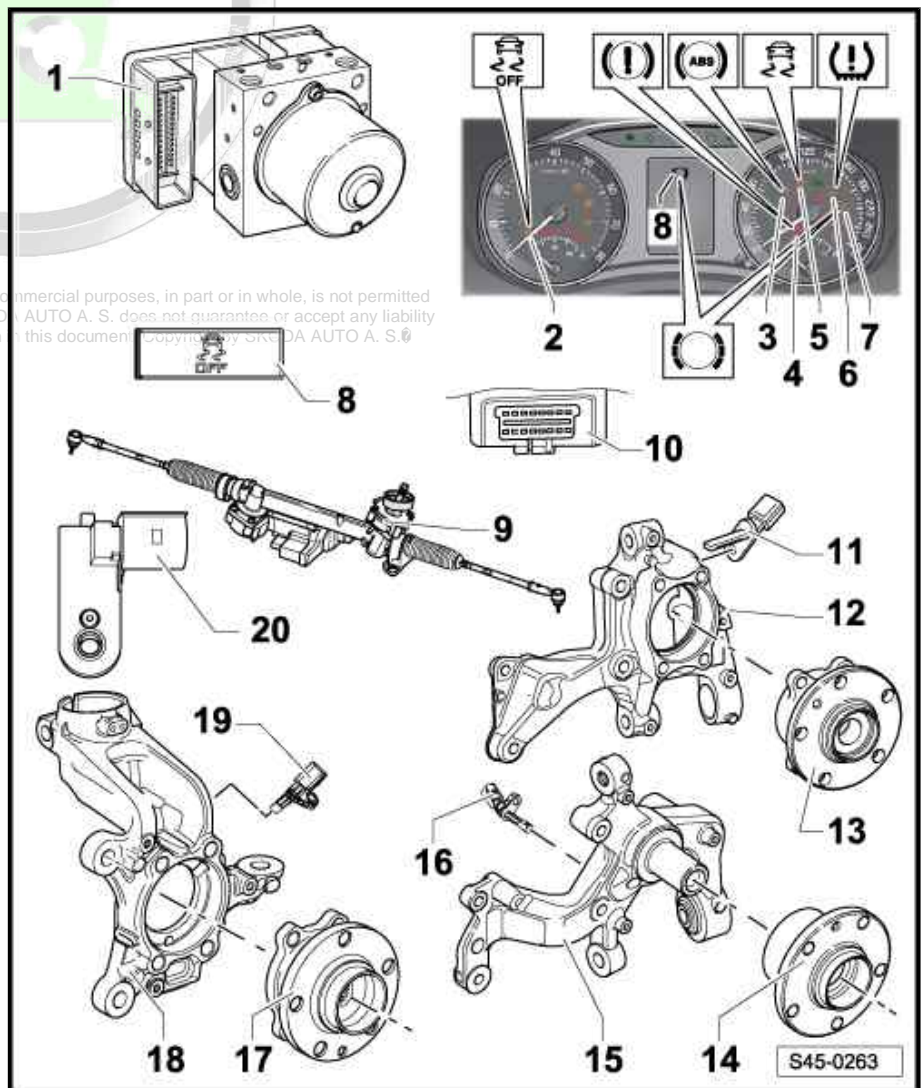
- Fitting location for left-hand drive: in right of engine compartment
- Fitting location for right-hand drive: in left of engine compartment
- with integrated sensor unit for ESP (ESC) - G419-
- do not disconnect the plug connector before the self-diagnosis is complete. Switch off the ignition before disconnecting the plug connection.
- Check ⇒ Vehicle diagnostic tester
- Removing and installing the ABS control unit - J104- with the ABS hydraulic unit - N55- ⇒ [page 61](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 61](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 61](#)
- with ABS hydraulic unit - N55-

The hydraulic unit consists of these components:

- ABS hydraulic pump - V64-
- Brake pressure sender 1 - G201-
- Check ⇒ Vehicle diagnostic tester
- Valve block, (includes the inlet and exhaust valves)
- The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other

2 - Warning light 2 for ESP (ESC) and TCS - K216-

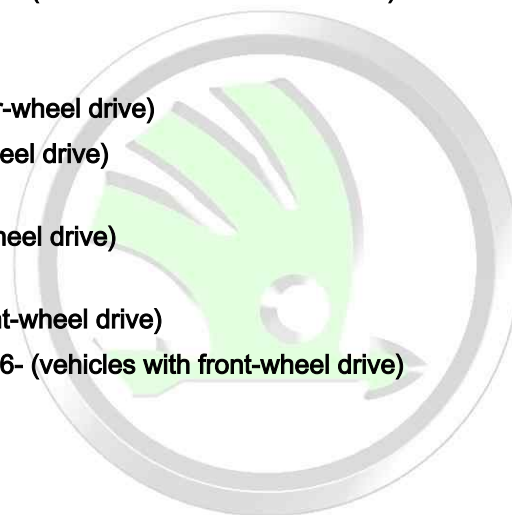
- Operation: ⇒ [page 37](#)





- 3 - ABS warning light - K47-**
 - Operation: ⇒ [page 29](#)
- 4 - Dual circuit and hand brake system warning light - K7-**
 - Operation: ⇒ [page 29](#)
- 5 - ESP (ESC) and TCS warning lamp - K155-**
 - Operation: ⇒ [page 29](#)
- 6 - Warning light for tyre pressure display - K220-**
 - Operation: ⇒ [page 29](#)
- 7 - Brake pad warning light - K32-**
 - Operation: ⇒ [page 29](#)
- 8 - TCS/ESP (ESC) button - E256-**
 - Fitting location: in the centre console
- 9 - Steering angle sender - G85-**
 - Fitting location: at power-assisted steering - cannot be replaced individually
 - Check ⇒ Vehicle diagnostic tester
- 10 - Diagnostic connection**
 - Fitting location: in driver's footwell
- 11 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with four-wheel drive)**
 - Check ⇒ Vehicle diagnostic tester
 - Removing and installing ⇒ [page 82](#)
- 12 - Wheel-bearing housing - rear axle (vehicles with four-wheel drive)**
- 13 - Wheel hub with wheel bearing (vehicles with four-wheel drive)**
 - Sensor ring for ABS is built into the wheel hub
- 14 - Wheel hub with wheel bearing (vehicles with front-wheel drive)**
 - Sensor ring for ABS is built into the wheel hub
- 15 - Wheel-bearing housing - rear axle (vehicles with front-wheel drive)**
- 16 - Rear right and left wheel speed sensors - G44- / -G46- (vehicles with front-wheel drive)**
 - Check ⇒ Vehicle diagnostic tester
 - Removing and installing ⇒ [page 82](#)
- 17 - Wheel hub with wheel bearing - front axle**
 - Sensor ring for ABS is built into the wheel hub
- 18 - Wheel-bearing housing - front axle**
- 19 - Front right and left wheel speed sensors - G45- / -G47-**
 - Check ⇒ Vehicle diagnostic tester
 - Removing and installing ⇒ [page 82](#)
- 20 - The brake light switch - F- and brake pedal switch - F47-**
 - Fitting location: on master brake cylinder
 - Removing and installing ⇒ [page 149](#)
 - Check ⇒ Vehicle diagnostic tester

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4 Indication of faults by means of warning lights

Warning lights - for vehicles up to MY 2008 ⇒ [page 29](#)

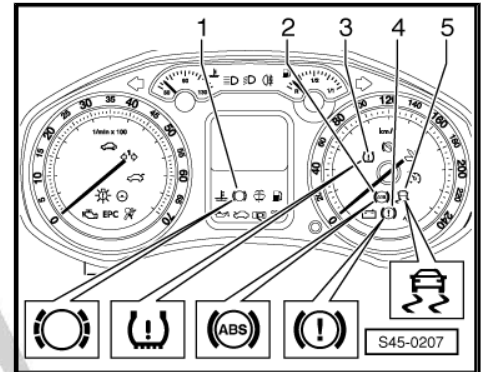
Warning lights - for vehicles as of MY 2009 ⇒ [page 33](#)

Warning lights - for vehicles as of MY 2011 ⇒ [page 37](#)

4.1 Warning lights - for vehicles up to MY 2008

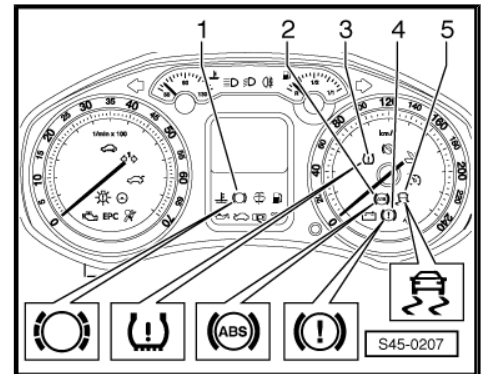
ABS/TCS warning lights

Position	Identification
1	Brake pad warning light - K32-
2	ABS warning light - K47-
3	Warning light for tyre pressure display - K220-
4	Dual circuit and hand brake system warning light - K7-
5	Warning light for traction control system - K86-



ABS/EDL/TCS/ESP (ESC) warning lights

Position	Identification
1	Brake pad warning light - K32-
2	ABS warning light - K47-
3	Warning light for tyre pressure display - K220-
4	Dual circuit and hand brake system warning light - K7-
5	ESP (ESC) and TCS warning lamp - K155-



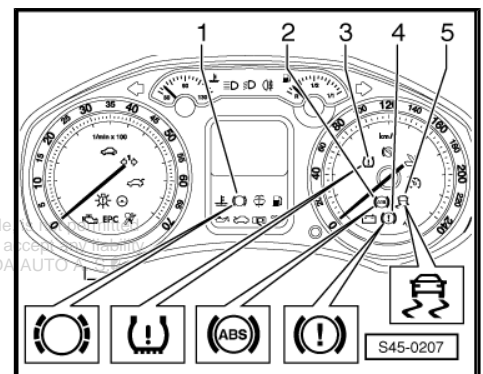
Brake pad warning light - K32-

◆ If the warning light for the brake pad - K32- -1- does not go out 3 seconds after switching the ignition on or glows during the driving operation, the following can be the causes of the fault:

a - the brake pads could be worn down

– Check the brake pads on the front and rear axles. Replace the brake pads if they are worn down.

b - there is a fault in the wiring ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.





ABS warning light - K47-

◆ If the ABS warning light - K47- -2- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

- a - the supply voltage is less than 10 V
- b - an ABS fault is present

! WARNING

If an ABS fault -b- is present, the anti-lock brake system remains switched off while the conventional brake system remains fully operational.

c - a sporadic fault existed on a wheel speed sensor after the last vehicle start

In this case the ABS warning light - K47- goes out automatically after restarting the vehicle and after a speed above 20 km/h is reached.

d - the connection from the dash panel insert to the ABS control unit - J104- is interrupted ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

e - the dash panel insert is defective

ABS warning light - K47- and dual circuit and hand brake system warning light - K7-

◆ If the ABS warning light - K47- -2- goes out or the dual circuit and hand brake system warning light - K7- -4- lights up, the causes of the fault may be:

- a - the hand-brake is still applied
- b - the brake fluid level is too low (warning light flashes)

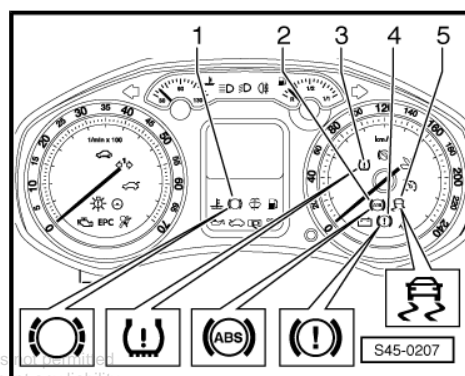
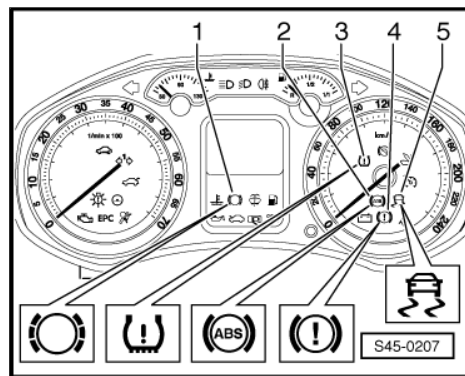
On switching on the ignition three warning tones are audible.

c - There is a fault on the lines to the dual circuit and hand brake system warning light - K7- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

◆ If the ABS warning light - K47- (-2-) and the dual circuit and hand brake system warning light - K7- (-4-) light up, the ABS system is defective. There will be a change in braking behaviour.

! WARNING

Once the ABS warning light - K47- and the dual circuit and hand brake system warning light - K7- have lit up then the rear wheels lock quite early on when braking.



Warning light for traction control system - K86-

- ◆ If the warning light for traction control system - K86- -5- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively affects the TSC. The ABS and EBD safety systems on the vehicle remain fully functional ⇒ Query the fault memory.

- a - Short circuit to positive in traction control system switch - E132-
- b - a fault in the actuation of the warning light for traction control system - K86- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- c - the traction control system was switched off using the traction control system switch - E132- :

If the warning light for traction control system - K86- flashes while driving, the traction control system is operating in regulating mode.

- ◆ If the warning light for traction control system - K86- -5- does not light up during the automatic test sequence, then the following error is present:

- a - the warning light for traction control system - K86- is defective, carry out ⇒ Electrical testing

ESP (ESC) and TCS warning lamp - K155-

- ◆ If the warning light for TCS/ESP (ESC) - K155- -5- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively effects the TCS/ESP (ESC). The ABS/EDL and EBD safety systems on the vehicle remain fully functional ⇒ Query the fault memory.

- a - Short circuit to positive in TCS/ESP (ESC) button - E256-
- b - a fault in the actuation of the TCS/ESP (ESC) warning light - K155- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- c - the ESP (ESC) facility was established by the button for TCS/ESP (ESC) - E256- off

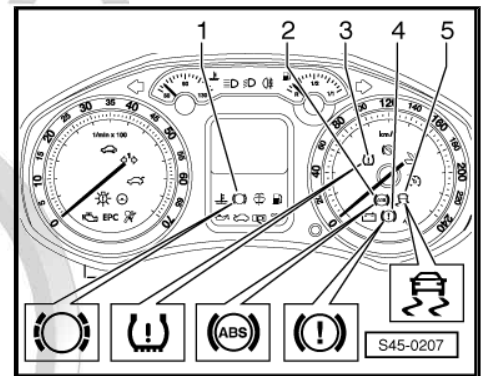
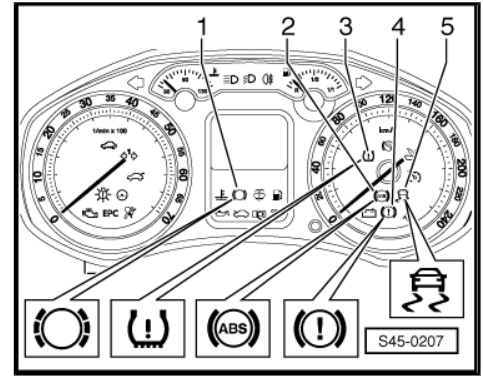
Note

If the ESP (ESC) system is switched off using the TCS/ESP (ESC) button - E256- , only the traction control system is switched off.

If the warning light for TCS/ESP (ESC) - K155- flashes while driving, the traction control system or the ESP system is operating in regulating mode.

- ◆ If the warning light for the TCS/ESP (ESC) - K155- -5- does not light up during the automatic test sequence, then the following error is present:

- a - the warning light for the TCS/ESP - K155- is defective, carry out ⇒ Electrical testing .



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Warning light for tyre pressure display - K220-

◆ Warning light for tyre pressure inspection display - K220- -3- comes on:

- Carry out tyre pressure inspection.
- Correct tyre pressure.
- Perform basic setting.

Initiating basic setting:

- Ignition on

- Press the button for tyre pressure inspection - E226- -arrow- for more than 2 seconds.

When the button for tyre pressure inspection - E226- is pressed the warning light for tyre pressure inspection display - K220- lights up in the dash panel insert.

The basic setting is confirmed with an acoustic signal.

- Switch off ignition.
- After the ignition is switched on again, the warning light for tyre pressure inspection display - K220- does no longer light up.

◆ Warning light for tyre pressure inspection display - K220- flashes:

- Carry out tyre pressure inspection.
- Correct tyre pressure.
- Ignition on
- Press simultaneously the button for tyre pressure inspection - E226- -arrow A- and the traction control system switch - E132- or the TCS/ESP (ESC) button - E256- -arrow B- for more than 2 seconds.

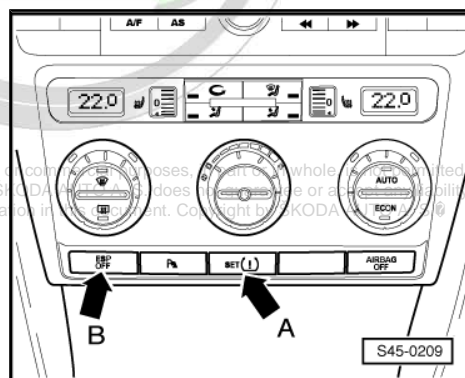
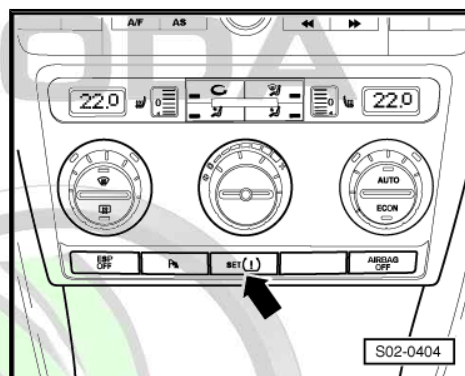
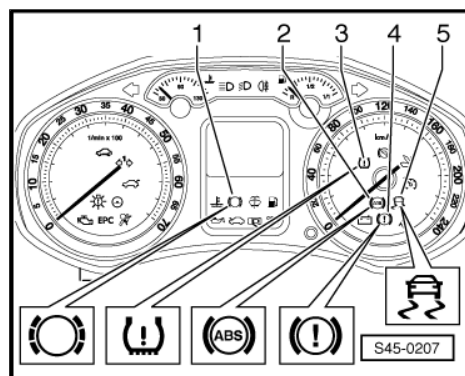


Note

The traction control system switch - E256- may be installed instead of the TCS/ESP (ESC) button - E132- .

If the warning light for tyre pressure inspection display - K220- continues to flash:

- Undertake "Targeted fault finding" ⇒ Vehicle diagnostic tester.

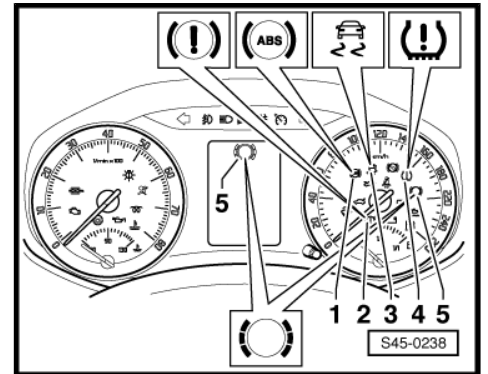




4.2 Warning lights - for vehicles as of MY 2009

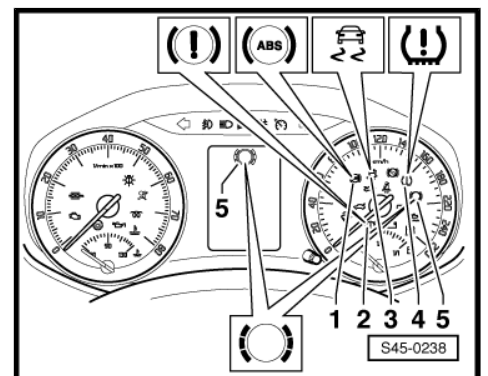
ABS/TCS warning lights

Position	Identification
1	ABS warning light - K47-
2	Dual circuit and hand brake system warning light - K7-
3	Warning light for traction control system - K86-
4	Warning light for tyre pressure display - K220-
5	Brake pad warning light - K32-



ABS/EDL/TCS/ESP (ESC) warning lights

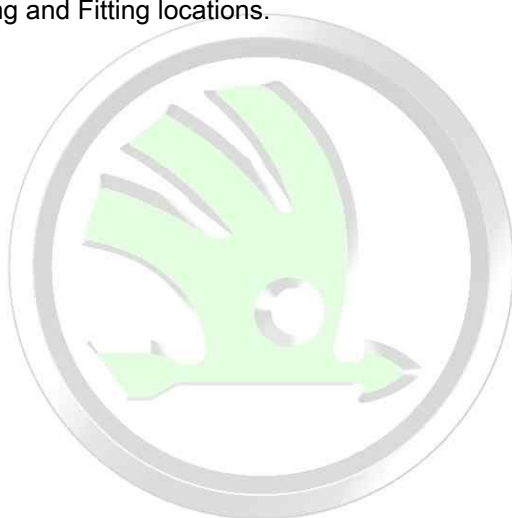
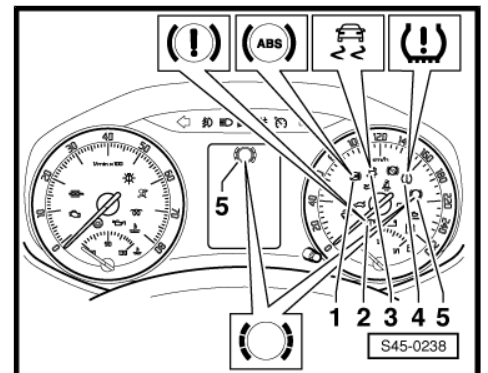
Position	Identification
1	ABS warning light - K47-
2	Dual circuit and hand brake system warning light - K7-
3	ESP (ESC) and TCS warning lamp - K155-
4	Warning light for tyre pressure display - K220-
5	Brake pad warning light - K32-



Brake pad warning light - K32-

◆ If the warning light for the brake pad - K32- -5- does not go out 3 seconds after switching the ignition on or glows during the driving operation, the following can be the causes of the fault:

- a - the brake pads could be worn down
 - Check the brake pads on the front and rear axles. Replace the brake pads if they are worn down.
- b - there is a fault in the wiring ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



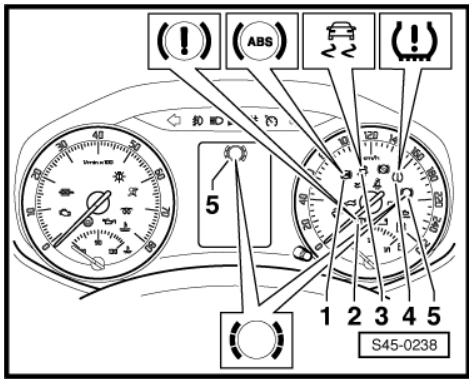


ABS warning light - K47-

- ◆ If the ABS warning light - K47- -1- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:
 - a - the supply voltage is less than 10 V
 - b - an ABS fault is present

WARNING

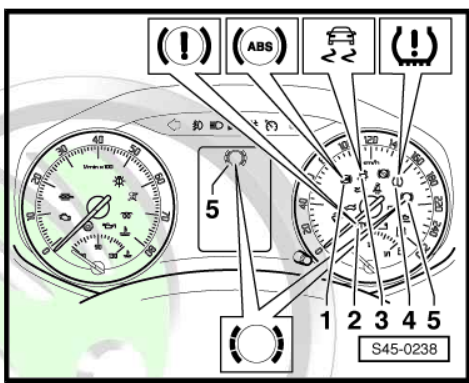
If an ABS fault -b- is present, the anti-lock brake system remains switched off while the conventional brake system remains fully operational.



- c - a sporadic fault existed on a wheel speed sensor after the last vehicle start
- In this case the ABS warning light - K47- goes out automatically after restarting the vehicle and after a speed above 20 km/h is reached.
- d - the connection from the dash panel insert to the ABS control unit - J104- is interrupted ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
 - e - the dash panel insert is defective

ABS warning light - K47- and dual circuit and hand brake system warning light - K7-

- ◆ If the ABS warning light - K47- -1- goes out or the dual circuit and hand brake system warning light - K7- -2- lights up, the causes of the fault may be:
 - a - the hand-brake is still applied
 - b - the brake fluid level is too low (warning light flashes)



- On switching on the ignition three warning tones are audible.
- c - There is a fault on the lines to the dual circuit and hand brake system warning light - K7- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- ◆ If the ABS warning light - K47- (-1-) and the dual circuit brake and hand brake warning light - K7- (-2-) light up, the anti-lock brake system is defective. There will be a change in braking behaviour.

WARNING

Once the ABS warning light - K47- and the dual circuit and hand brake system warning light - K7- have lit up then the rear wheels lock quite early on when braking.

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Warning light for traction control system - K86-

- ◆ If the warning light for traction control system - K86- -3- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively affects the TSC. The ABS and EBD safety systems on the vehicle remain fully functional ⇒ Query the fault memory.

a - Short circuit to positive in traction control system switch - E132-

b - a fault in the actuation of the warning light for traction control system - K86- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

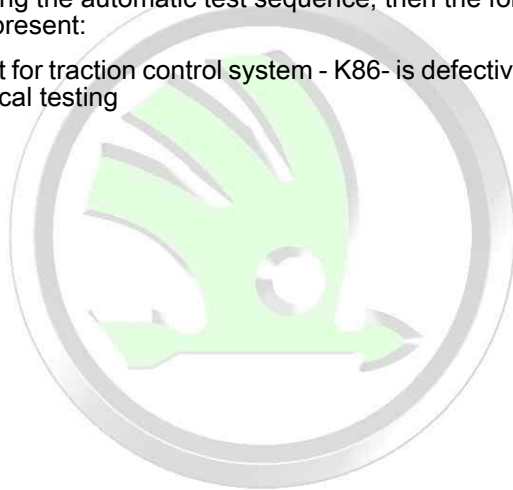
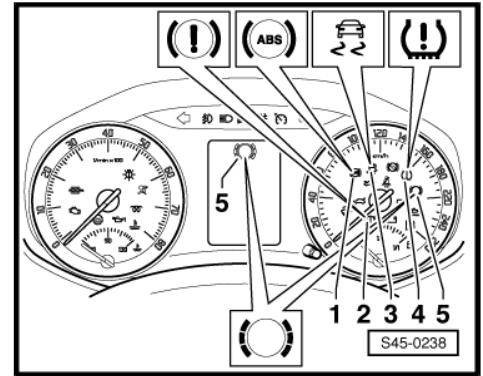
c - the traction control system was switched off using the traction control system switch - E132- :

- on vehicles up to CW 44/2009, the warning light remains lit
- on vehicles as of CW 45/2009, the warning light flashes slowly

If the warning light for traction control system - K86- flashes quickly while driving, the traction control system is operating in regulating mode.

- ◆ If the warning light for traction control system - K86- -3- does not light up during the automatic test sequence, then the following error is present:

a - the warning light for traction control system - K86- is defective, carry out ⇒ Electrical testing





ESP (ESC) and TCS warning lamp - K155-

- ◆ If the warning light for TCS/ ESP (ESC) - K155- -3- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively effects the TCS/ESP (ESC). The ABS/EDL and EBD safety systems on the vehicle remain fully functional → Query the fault memory.

a - Short circuit to positive in TCS/ESP (ESC) button - E256-

b - a fault in the actuation of the TCS/ESP (ESC) warning light - K155- → Current flow diagrams, Electrical fault finding and Fitting locations.

c - The ESP system was switched off using the TCS/ESP (ESC) button - E256- .

- on vehicles up to CW 44/2009, the warning light remains lit
- on vehicles as of CW 45/2009, the warning light flashes slowly



Note

If the ESP (ESC) system is switched off using the TCS/ESP (ESC) button - E256- , only the traction control system is switched off.

If the warning light for TCS/ESP (ESC) - K155- flashes quickly while driving, the traction control system or the ESP (ESC) system is operating in regulating mode.

- ◆ If the warning light for the TCS/ESP (ESC) - K155- -3- does not light up during the automatic test sequence, then the following error is present:

a - the warning light for the TCS/ESP - K155- is defective, carry out ⇒ Electrical testing .

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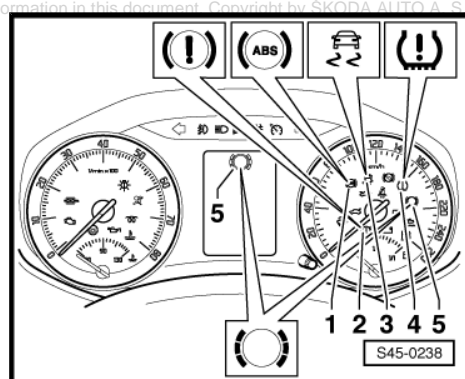
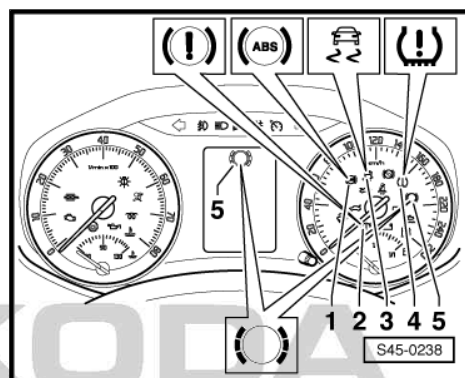
Warning light for tyre pressure display - K220-

- ◆ Warning light for tyre pressure inspection display - K220- -4- comes on:

- Carry out tyre pressure inspection.
- Correct tyre pressure.
- Perform basic setting.

Initiating basic setting:

- Ignition on



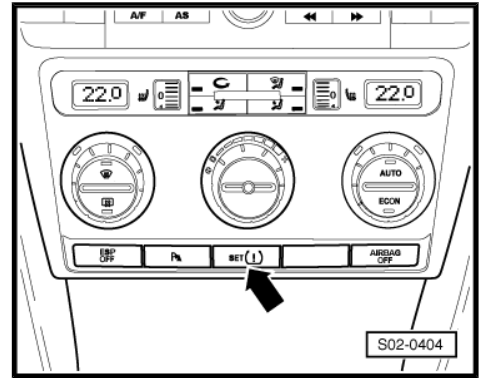


- Press the button for tyre pressure inspection - E226- -arrow for more than 2 seconds.

When the button for tyre pressure inspection - E226- is pressed the warning light for tyre pressure inspection display - K220- lights up in the dash panel insert.

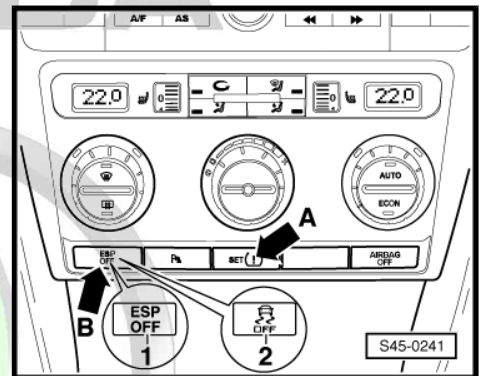
The basic setting is confirmed with an acoustic signal.

- Switch off ignition.
- After the ignition is switched on again, the warning light for tyre pressure inspection display - K220- does no longer light up.
- ◆ Warning light for tyre pressure inspection display - K220- flashes:
 - Carry out tyre pressure inspection.
 - Correct tyre pressure.
 - Ignition on
- Press simultaneously the button for tyre pressure inspection - E226- -arrow A- and the traction control system switch - E132- or the TCS/ESP (ESC) button - E256- -arrow B- for more than 2 seconds.
 - on vehicles up to CW 44/2009, version of the button -1-
 - on vehicles as of CW 45/2009, version of the button -2-



i Note

The traction control system switch - E256- may be installed instead of the TCS/ESP (ESC) button - E132-.



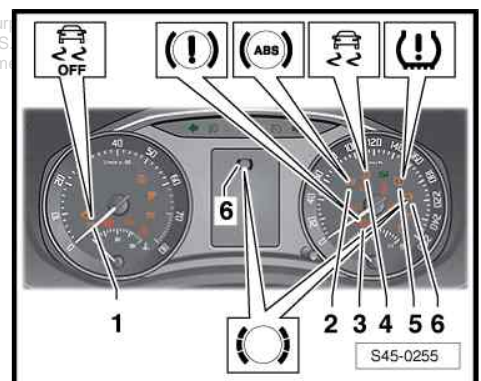
If the warning light for tyre pressure inspection display - K220- continues to flash:

- Undertake “Targeted fault finding” => Vehicle diagnostic tester.

4.3 Warning lights - for vehicles as of MY 2011

ABS/TCS warning lights

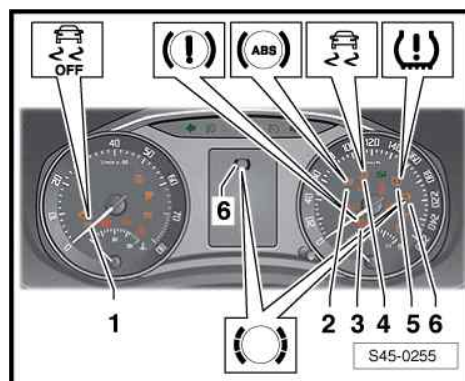
Position	Identification
1	Warning light 2 for ESP (ESC) and TCS - K216-
2	ABS warning light - K47-
3	Dual circuit and hand brake system warning light - K7-
4	Warning light for traction control system - K86-
5	Warning light for tyre pressure display - K220-
6	Brake pad warning light - K32-





ABS/EDL/TCS/ESP (ESC) warning lights

Position	Identification
1	Warning light 2 for ESP (ESC) and TCS - K216-
2	ABS warning light - K47-
3	Dual circuit and hand brake system warning light - K7-
4	ESP (ESC) and TCS warning lamp - K155-
5	Warning light for tyre pressure display - K220-
6	Brake pad warning light - K32-



Warning light 2 for ESP (ESC) and TCS - K216-

If the traction control system is switched off in the centre console using the TCS/ESP (ESC) button - E256- or the traction control system switch - E132- , the warning light 2 for ESP (ESC) and TCS - K216- must light up when the ignition is switched on.

- ◆ If the warning light 2 for ESP (ESC) and TCS - K216- -1- does not light up when the traction control system is switched off in the centre console using the button for TCS/ESP (ESC) - E256- or the traction control system switch - E132- and the ignition is switched on, this may be due to the following cause:

a - the connection of the dash panel to the ABS control unit - J104- is interrupted ⇒ Current flow diagrams, Electrical fault finding and Fitting locations



Note

- ◆ Only the traction control system can be switched off using the button for TCS/ESP (ESC) - E256- .
- ◆ The ESP (ESC) system can not be switched off, i.e. the ESP (ESC) system is always active.

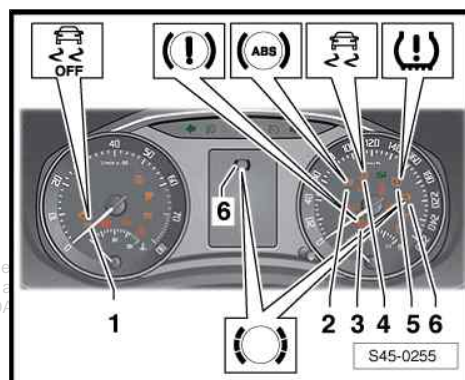
Brake pad warning light - K32-

- ◆ If the warning light for the brake pad - K32- -6- does not go out 3 seconds after switching the ignition on or glows during the driving operation, the following can be the causes of the fault:

a - the brake pads could be worn down

- Check the brake pads on the front and rear axles. Replace the brake pads if they are worn down.


b - there is a fault in the wiring ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



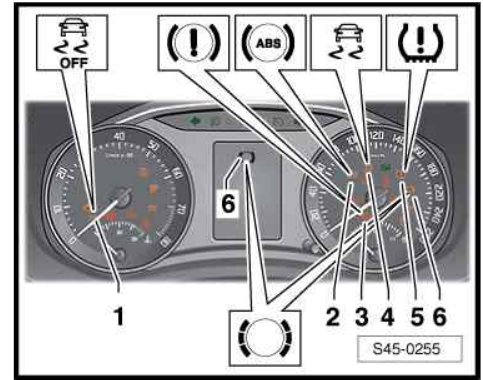
ABS warning light - K47-

◆ If the ABS warning light - K47- -2- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

- a - the supply voltage is less than 10 V
- b - an ABS fault is present

 **WARNING**

If an ABS fault -b- is present, the anti-lock brake system remains switched off while the conventional brake system remains fully operational.



c - a sporadic fault existed on an ABS wheel speed sensor after the last vehicle start

In this case the ABS warning light - K47- goes out automatically after restarting the vehicle and after a speed above 20 km/h is reached.

d - the connection from the dash panel insert to the ABS control unit - J104- is interrupted ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

e - the dash panel insert is defective

ABS warning light - K47- and dual circuit and hand brake system warning light - K7-

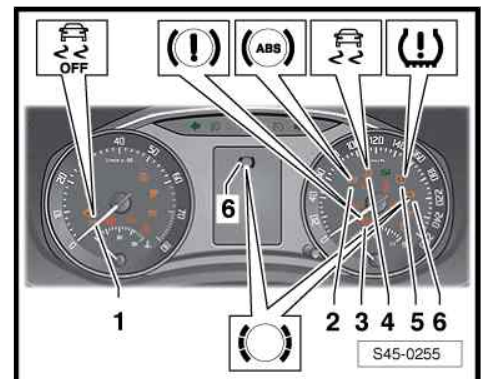
◆ If the ABS warning light - K47- -2- goes out or the dual circuit and hand brake system warning light - K7- -3- lights up, the causes of the fault may be:


- a - the hand-brake is still applied
- b - the brake fluid level is too low (warning light flashes)

On switching on the ignition three warning tones are audible.

c - There is a fault on the lines to the dual circuit and hand brake system warning light - K7- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

◆ If the ABS warning light - K47- (-2-) and the dual circuit and hand brake system warning light - K7- (-3-) light up, the ABS system is defective. There will be a change in braking behaviour.



 **WARNING**

Once the ABS warning light - K47- and the dual circuit and hand brake system warning light - K7- have lit up then the rear wheels lock quite early on when braking.

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Warning light for traction control system - K86-

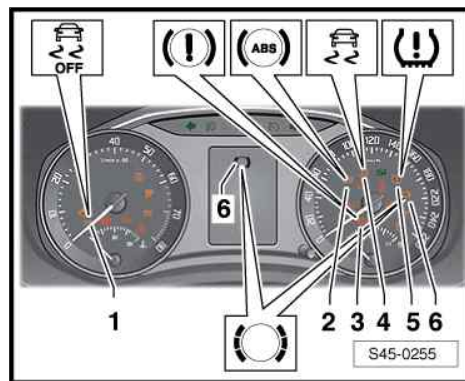
- ◆ If the warning light for traction control system - K86- -4- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively affects the TSC. The ABS and EBD safety systems on the vehicle remain fully functional → Query the fault memory.

- a - Short circuit to positive in traction control system switch - E132-
- b - a fault in the actuation of the warning light for traction control system - K86- → Current flow diagrams, Electrical fault finding and Fitting locations

If the warning light for traction control system - K86- flashes while driving, the traction control system is operating in regulating mode.

- ◆ If the warning light for traction control system - K86- -4- does not light up during the automatic test sequence, then the following error is present:
 - a - the warning light for traction control system - K86- is defective, carry out ⇒ Electrical testing



ESP (ESC) and TCS warning lamp - K155-

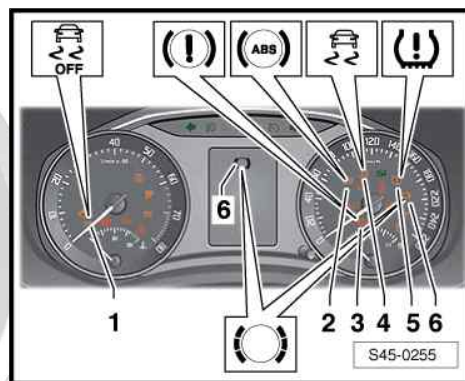
- ◆ If the warning light for TCS/ESP (ESC) - K155- -4- does not go out after the ignition is switched on and after completion of the test sequence, the causes of the fault may be:

There is a fault which exclusively effects the TCS/ESP (ESC). The ABS/EDL and EBD safety systems on the vehicle remain fully functional → Query the fault memory.

- a - Short circuit to positive in TCS/ESP (ESC) button - E256-
- b - a fault in the actuation of the TCS/ESP (ESC) warning light - K155- → Current flow diagrams, Electrical fault finding and Fitting locations.

If the warning light for TCS/ESP (ESC) - K155- flashes while driving, the traction control system or the ESP system is operating in regulating mode.

- ◆ If the warning light for the TCS/ESP (ESC) - K155- -4- does not light up during the automatic test sequence, then the following error is present:
 - a - the warning light for the TCS/ESP - K155- is defective, carry out ⇒ Electrical testing .

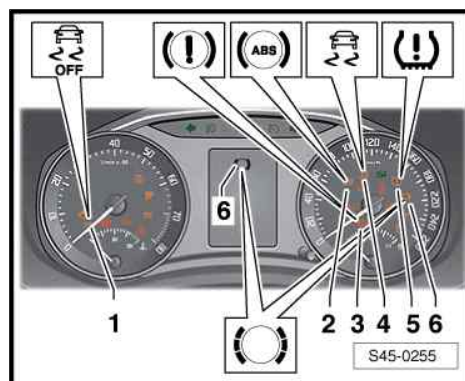


Warning light for tyre pressure display - K220-

- ◆ Warning light for tyre pressure inspection display - K220- -5- comes on:
 - Carry out tyre pressure inspection.
 - Correct tyre pressure.
 - Perform basic setting.

Initiating basic setting:

- Ignition on



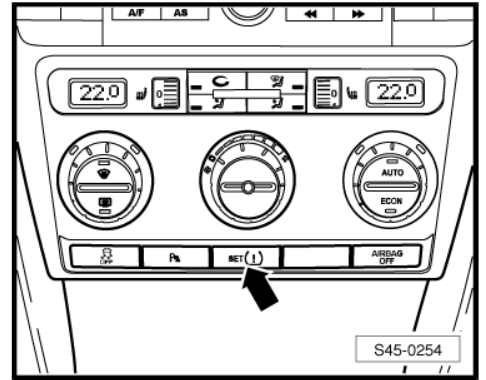


- Press the button for tyre pressure inspection - E226- -arrow- for more than 2 seconds.

When the button for tyre pressure inspection - E226- is pressed the warning light for tyre pressure inspection display - K220- lights up in the dash panel insert.

The basic setting is confirmed with an acoustic signal.

- Switch off ignition.
- After the ignition is switched on again, the warning light for tyre pressure inspection display - K220- does no longer light up.
- ◆ Warning light for tyre pressure inspection display - K220- flashes:
 - Carry out tyre pressure inspection.
 - Correct tyre pressure.
 - Ignition on
- Press simultaneously the button for tyre pressure inspection - E226- -arrow A- and the traction control system switch - E132- or the TCS/ESP (ESC) button - E256- -arrow B- for more than 2 seconds.

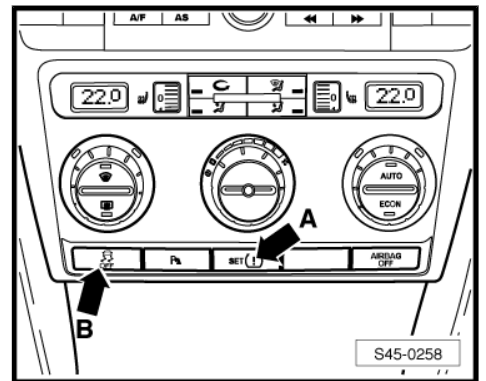


i Note

The traction control system switch - E256- may be installed instead of the TCS/ESP (ESC) button - E132- .

If the warning light for tyre pressure inspection display - K220- continues to flash:

- Undertake “Targeted fault finding” ⇒ Vehicle diagnostic tester.



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5 Hydraulic Control Unit, Brake Servo Unit/Master Brake Cylinder ABS Mark 70 (ABS/TCS)

Summary of components - left-hand drive ⇒ [page 42](#)

Connect the brake lines from the master brake cylinder to the hydraulic unit - left-hand drive ⇒ [page 45](#)

Removing and installing ABS control unit - J104- ABS hydraulic unit - N55- , left -hand drive vehicles ⇒ [page 45](#)

Disconnecting control unit from hydraulic unit - Left-hand drive ⇒ [page 51](#)

Installing control unit to hydraulic unit - Left-hand drive ⇒ [page 52](#)

Summary of components - right-hand drive ⇒ [page 53](#)

Connect the brake lines from the master brake cylinder to the hydraulic unit - right-hand drive ⇒ [page 54](#)

Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55- , right-hand drive vehicles ⇒ [page 55](#)

Separating the control unit from the hydraulic unit - Right-hand drive ⇒ [page 59](#)

Attaching control unit to hydraulic unit - Right-hand drive ⇒ [page 60](#)

5.1 Summary of components - left-hand drive



Note

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- ◆ *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- ◆ *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 51](#) .*
- ◆ *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*

1 - ABS control unit - J104-

- Removing and installing
 ⇒ [page 45](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 51](#)
- Fitting the control unit to the hydraulic unit
 ⇒ [page 52](#)

2 - ABS hydraulic unit - N55-

- Removing and installing
 ⇒ [page 45](#)

3 - Screw, 5.5 Nm

4 - Brake line, 14 Nm

- from master brake cylinder (push rod piston circuit) to ABS hydraulic unit
- Distinguishing feature: pipe screw with thread M12 x 1

5 - Brake line, 14 Nm

- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: pipe screw with thread M12 x 1

6 - Brake line, 14 Nm

- to front left brake caliper
- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M12 x 1
- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M10 x 1

7 - Brake line, 14 Nm

- To front right brake caliper.
- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1
- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

8 - Brake line, 14 Nm

- to rear left brake caliper
- Distinguishing feature: pipe screw with thread M12 x 1

9 - Brake line, 14 Nm

- to rear right brake caliper
- Distinguishing feature: Pipe screw with thread M10 x 1

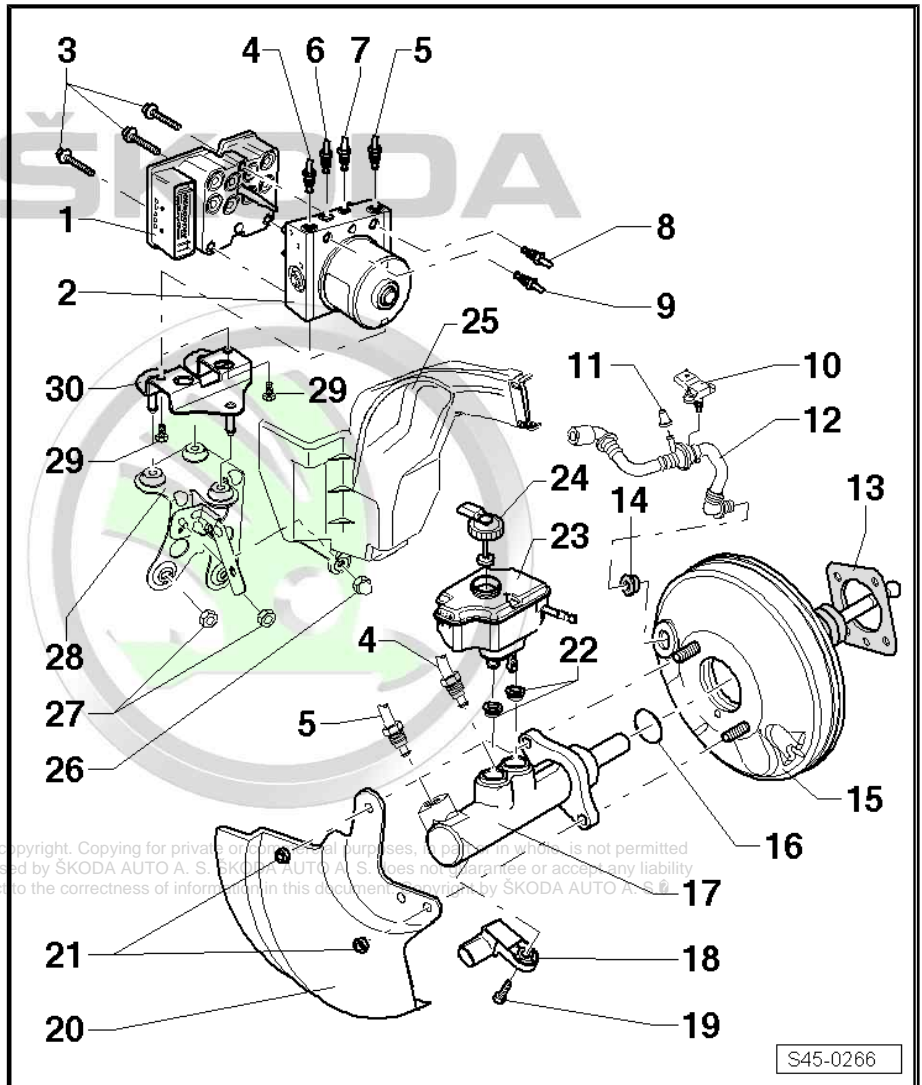
10 - Pressure sensor for the brake servo unit -G294-

- only on vehicles with petrol engines with brake vacuum pump
- Removing and installing ⇒ [page 185](#)
- Check ⇒ Vehicle diagnostic tester

11 - Dummy plug

12 - Vacuum line

- with non-return valve



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13 - Gasket

- for brake servo

14 - Sealing grommet

- for the connection of the vacuum hose

15 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump ⇒ [page 178](#)
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure ⇒ [page 178](#)
- Inspect proper operation:
 - With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).
 - Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.
- if there are faults replace completely
- Summary of components ⇒ [page 173](#)
- Removing and installing ⇒ [page 192](#)

16 - Sealing ring

17 - Master brake cylinder

- cannot be repaired, replace completely in the event of faults
- Summary of components ⇒ [page 173](#)
- Removing and installing ⇒ [page 186](#)

18 - The brake light switch - F- and brake pedal switch - F47-

- installed from 11/05
- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

19 - Screw, 5 Nm

20 - Protection plate

21 - Nut, 25 Nm

- replace after each removal

22 - Sealing grommets

- moisten with brake fluid and press in brake fluid reservoir

23 - Brake fluid reservoir

24 - Screw cap

25 - Heat protection plate

26 - Self-locking nut, 8 Nm

27 - Self-locking nut; 20 Nm

28 - Console

29 - Screw, 8 Nm

30 - Mounting bracket

- Moisten the bolt of the support with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings
- after installing, check for firm seating

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5.2 Connect the brake lines from the master brake cylinder to the hydraulic unit - left-hand drive

Connect brake lines to the master brake cylinder

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature: pipe screw with thread M12 x 1

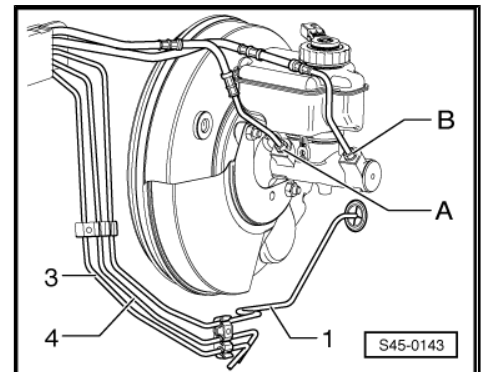
B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: pipe screw with thread M12 x 1

1 - Hydraulic unit to front left brake caliper

3 - hydraulic unit to rear right brake caliper

4 - hydraulic unit to rear left brake caliper



Connect brake lines to the hydraulic unit.

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: pipe screw with thread M12 x 1

1 - Hydraulic unit to front left brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M12 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M10 x 1

2 - Hydraulic unit to front right brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1

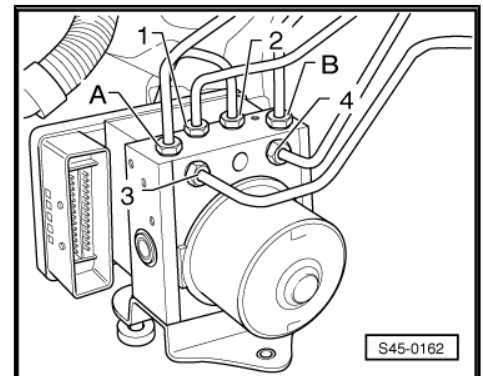
- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

3 - hydraulic unit to rear right brake caliper

- Distinguishing feature: Pipe screw with thread M10 x 1

4 - hydraulic unit to rear left brake caliper

- Distinguishing feature: pipe screw with thread M12 x 1



5.3 Removing and installing ABS control unit - J104- ABS hydraulic unit - N55- - left-hand drive vehicles

Special tools and workshop equipment required

◆ Brake pedal load e.g. -V.A.G 1869/2-

Removing:

Fitting location:



The control unit is bolted to the hydraulic unit and is located on the right of the engine compartment.



WARNING

The brake lines around the hydraulic unit must not be bent!

- Read out and note the actual control unit coding ⇒ Vehicle diagnostic tester.
- Remove battery ⇒ Electrical System; Rep. gr. 27 .
- Remove engine cover.

1.9 ltr. diesel engine:

- Remove connecting hose to inlet connection ⇒ Engine; Rep. gr. 21 .
- Remove intake manifold flap motor - V157- ⇒ Engine; Rep. gr. 23 (except vehicles with engine identification characters BJB).

2.0 ltr. diesel engine:

- Remove bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .
- Remove connection pipe between intake hose and exhaust turbocharger.
- Remove top toothed belt guard.

Diesel engines with the diesel particle filter:

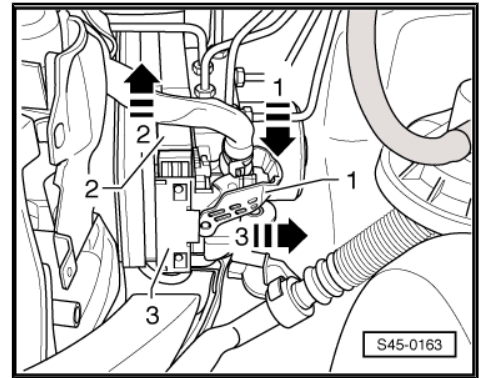
- Remove pre-exhaust pipe with diesel particle filter ⇒ diesel engine; Rep. gr. 26 .

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Continued for all vehicles:

- Release the plug at the control unit, to do so pull the lever -1- downwards in -direction of arrow 1-. The lever -2- is released.
- Pull the lever -2- upwards in -direction of arrow 2-.
- Unplug the connector -3- in -direction of arrow 3- from the control unit.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
- Press down brake pedal with brake pedal load , e.g. - V.A.G 1869/2- , at least 60 mm.
- Close front left and rear left bleeder valves.



i Note

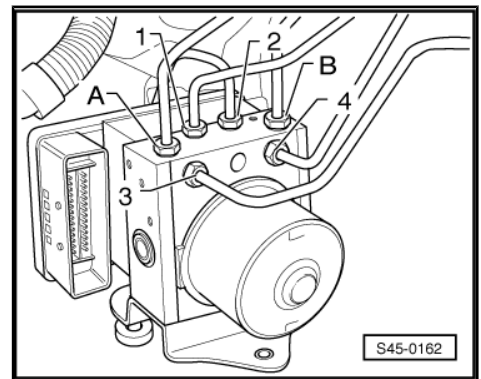
Do not remove brake pedal load , e.g. -V.A.G 1869/2- .

- Place sufficient non-fluffing cloths under the control unit and the hydraulic unit.
- Extract as much brake fluid as possible from the brake fluid reservoir.

i Note

Make sure that no brake fluid gets onto the contacts of the plug connections.

- Mark both brake lines from the master brake cylinder -A- and -B- and unscrew from the hydraulic unit.
- Close the brake lines and threaded holes immediately with plugs from the repair kit -1H0 698 311 A- .
- Mark the brake lines (for brake calipers) -1- to -4-, unscrew and close with plugs from the repair kit -1H0 698 311 A- .





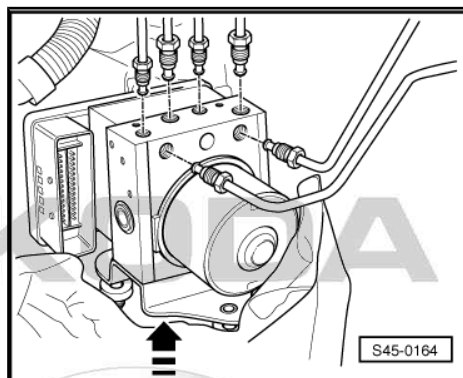
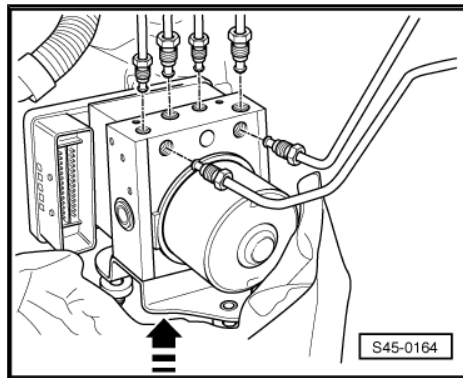
- Pull hydraulic unit with control unit upwards and out of the rubber bearings in -direction of arrow-.
- Unscrew the bracket from the hydraulic unit.

Installing:



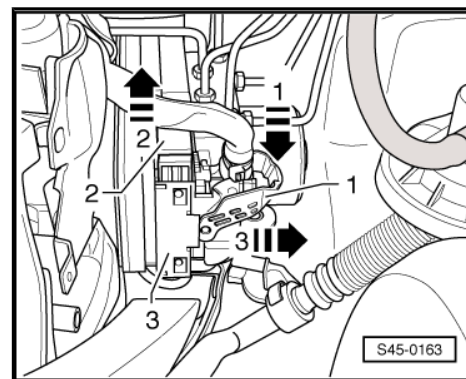
Note

- ◆ *Only remove plugs from the new hydraulic unit if the relevant brake line is installed.*
- ◆ *If the plugs were already removed from the hydraulic unit, then brake fluid may escape and adequate filling and bleeding can no longer be guaranteed.*
- Screw the bracket onto the hydraulic unit and tighten to the recommended tightening torque.
- Moisten the bolt of the support ⇒ [Item 30 \(page 44\)](#) with lubricant, e.g. -D 007 000 A2-, before inserting into the rubber bearings.
- Insert the hydraulic unit with the control unit into the rubber bearings of the console against the -direction of arrow-.
- Remove the plugs consecutively from the brake lines and the ABS hydraulic unit.
- Screw the marked brake lines onto the hydraulic unit.



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- Connect the plug -3- to the control unit against the -direction of arrow 3-.
- Push the lever -2- against the -direction of arrow 2-.
- Lock the plug at the control unit, to do so pull the lever -1- upwards in -direction of arrow 1-. The lever -2- is locked.



Diesel engines with the diesel particle filter:

- Install pre-exhaust pipe with diesel particle filter ⇒ diesel engine; Rep. gr. 26 .

Continued for all vehicles:

1.9 ltr. diesel engine:

- Install intake manifold flap motor - V157- ⇒ Engine; Rep. gr. 23 (except vehicles with engine identification characters BJB).
- Install connecting hose to inlet connection ⇒ Engine; Rep. gr. 21 .

2.0 ltr. diesel engine:

- Install top toothed belt guard.
- Install connection pipe between intake hose and exhaust turbocharger.
- Install the bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .
- Install battery ⇒ Electrical System; Rep. gr. 27 .



Note

If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

- Position engine cover.
- Remove brake pedal load e.g. -V.A.G 1869/2- .
- Bleed brake system ⇒ [page 168](#) .
- Code the control unit - J104- ⇒ Vehicle diagnostic tester.

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Specified torques:

Screw for hydraulic unit to bracket	8 Nm
Brake lines to ABS unit:	
Thread M 10 x 1	14 Nm
Thread M 12 x 1	14 Nm



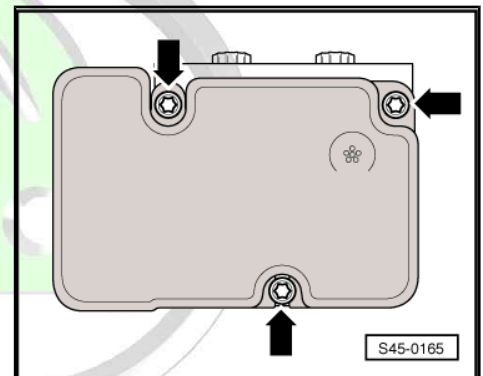
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5.4 Disconnecting control unit from hydraulic unit - Left-hand drive

- ◆ In the case of a malfunction of the ABS control unit - J104- , the control unit must be disconnected from the ABS hydraulic unit - N55- and replaced individually.
- ◆ In the case of a malfunction of the ABS hydraulic unit - N55- , the ABS hydraulic unit - N55- must be completely replaced together with the ABS control unit - J104- .

Note

- ◆ *The hydraulic pump - V64- and ABS hydraulic unit - N55- must not be separated from each other.*
 - ◆ *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*
 - ◆ *No moisture and no dirt particles must penetrate into the interior of the ABS control unit - J104- .*
 - ◆ *Electrostatic charge can cause malfunctions of the ABS control unit - J104- .*
 - ◆ *Before handling the ABS control unit - J104- , the technician must discharge himself electrostatically. The electrostatic discharge is achieved by touching earthed metal parts. Do not grab directly at the plug contacts or electronic components.*
- Remove the ABS hydraulic unit - N55- with the ABS control unit - J104- ⇒ [page 76](#)
 - Place the hydraulic unit with the control unit upwards on a clean and level surface.
 - Remove screws -arrows-.



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- Detach the control unit without tilting from the hydraulic unit -arrow-.
- Carefully pull off all gasket rings from the valve domes of the hydraulic unit.

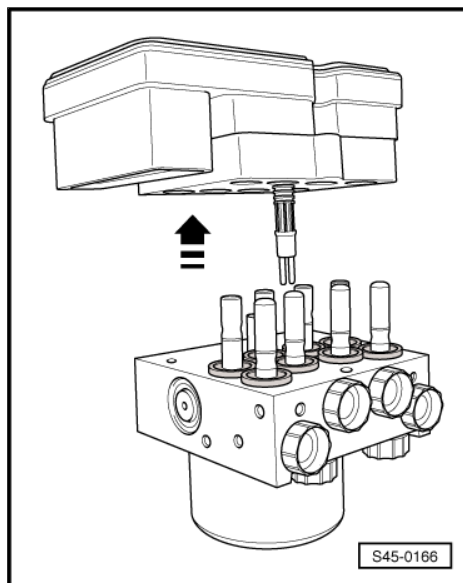


WARNING

- ◆ *On a disconnected control unit, the printed circuit board is exposed.*
- ◆ *No humidity or dirt particles must penetrate into the inside of the control unit.*
- ◆ *The hydraulic pump must not be separated from the hydraulic unit.*

- Cover the solenoid coils of the control unit with a non-fluffing cloth.

After separating from the control unit and hydraulic unit use the transport protection for valve domes.



5.5 Attaching control unit to hydraulic unit - Left-hand drive



WARNING

Strong vibrations (e.g. fall, knock) can destroy the control unit. The control unit must no longer be used.

- The surfaces must be cleaned before assembling.
- Push all the gasket rings -A- a little over the valve domes.
- Position the control unit without tilting it onto the hydraulic unit.

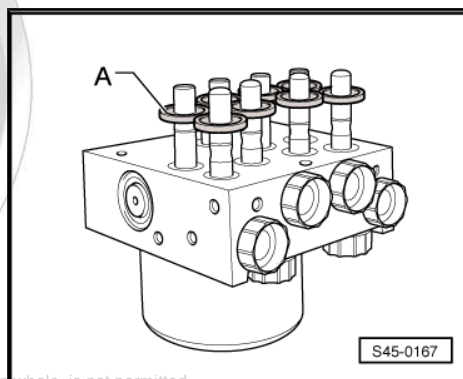
Thus the gasket rings are brought into their end position.

- Screw hydraulic unit and control unit with the enclosed new screws.



Note

- ◆ *A new control unit may only be installed on the same hydraulic unit twice as a maximum to ensure that the elastic seal is still leak-tight.*
- ◆ *A control unit, which was once operational, must not be mounted a second time.*



Specified torques:

Control unit to hydraulic unit	5.5 Nm
--------------------------------	--------

5.6 Summary of components - right-hand drive

Note

- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 59](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - Brake line, 14 Nm

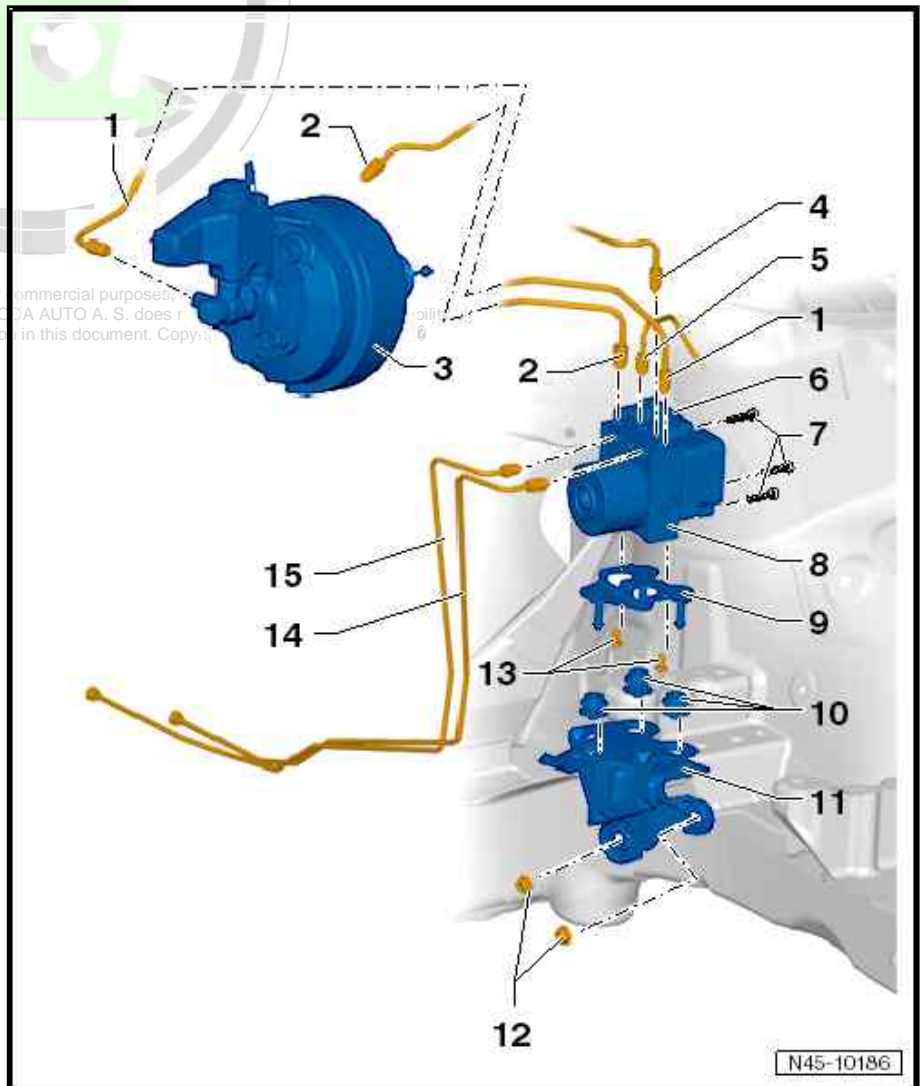
- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: pipe screw with thread M12 x 1

2 - Brake line, 14 Nm

- from master brake cylinder (push rod piston circuit) to ABS hydraulic unit
- Distinguishing feature: pipe screw with thread M12 x 1

3 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump ⇒ [page 178](#)
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure ⇒ [page 178](#)
- Inspect proper operation:
 - With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).



- Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.
- if there are faults replace completely
- Summary of components ⇒ [page 173](#)
- Removing and installing ⇒ [page 195](#)

4 - Brake line, 14 Nm

- To front right brake caliper.
- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1
- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

5 - Brake line, 14 Nm

- to front left brake caliper
- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M12 x 1
- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M10 x 1

6 - ABS control unit - J104-

- Removing and installing ⇒ [page 55](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 59](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 60](#)

7 - Screw, 5.5 Nm

8 - ABS hydraulic unit - N55-

- Removing and installing ⇒ [page 55](#)

9 - Mounting bracket

- Moisten the bolt of the support with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings
- after installing, check for firm seating

10 - Rubber bearing

- make sure that the rubber bearings are not pressed out of the console when installing the bracket

11 - Console

- before installing the rubber bearings ⇒ [Item 10 \(page 54\)](#) , moisten the holes for rubber bearings with lubricant, e.g. -D 007 000 A2-

12 - Nut, 20 Nm

13 - Screw, 8 Nm

14 - Brake line, 14 Nm

- to rear left brake caliper
- Distinguishing feature: pipe screw with thread M12 x 1

15 - Brake line, 14 Nm

- to rear right brake caliper
- Distinguishing feature: Pipe screw with thread M10 x 1

5.7 Connecting the brake lines from the master brake cylinder to the hydraulic unit - right-hand drive

Connect brake lines to the master brake cylinder

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

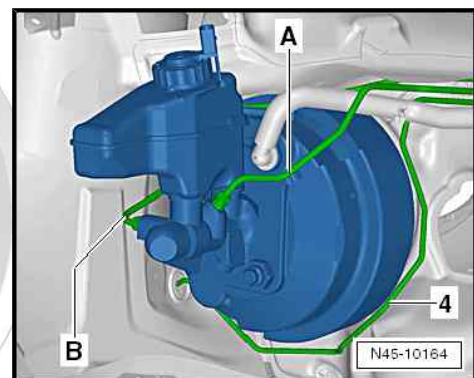
- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: pipe screw with thread M12 x 1

4 - Hydraulic unit to front right brake caliper



Connect brake lines to the hydraulic unit.

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: pipe screw with thread M12 x 1

1 - Hydraulic unit to front left brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M12 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M10 x 1

2 - hydraulic unit to rear left brake caliper

- Distinguishing feature of pipe screw with thread M12 x 1

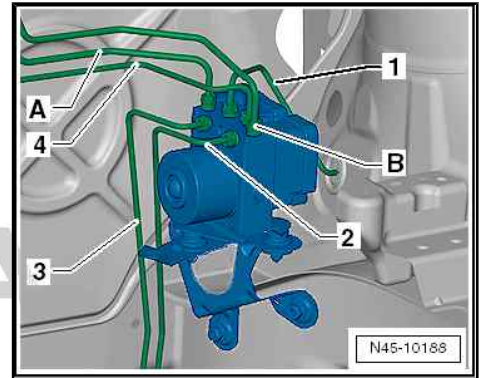
3 - hydraulic unit to rear right brake caliper

- Distinguishing feature: Pipe screw with thread M10 x 1

4 - Hydraulic unit to front right brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: pipe screw with thread M10 x 1

- Distinguishing feature for vehicles as of CW 22/2008: pipe screw with thread M12 x 1



5.8 Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55- - right-hand drive

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-

Removing:

Fitting location:

The control unit is bolted to the hydraulic unit and is located on the left in the engine compartment.



WARNING

The brake lines around the hydraulic unit must not be bent!

- Read out and note the actual control unit coding ⇒ Vehicle diagnostic tester.
- Remove engine cover.
- Remove battery ⇒ Electrical System; Rep. gr. 27 .
- Remove inlet connection and air filter ⇒ Engine; Rep. gr. 23 or ⇒ Engine; Rep. gr. 24 .
- Remove battery ⇒ Electrical System; Rep. gr. 27 .
- Position brake pedal load , e.g. -V.A.G 1869/2- .



- Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
- Press down brake pedal with brake pedal load , e.g. - V.A.G 1869/2- , at least 60 mm.
- Close front left and rear left bleeder valves.



Note

Do not remove brake pedal load , e.g. -V.A.G 1869/2- .

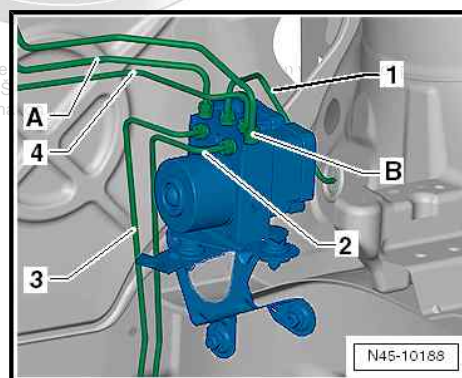
- Place sufficient non-fluffing cloths under the control unit and the hydraulic unit.
- Extract as much brake fluid as possible from the brake fluid reservoir.



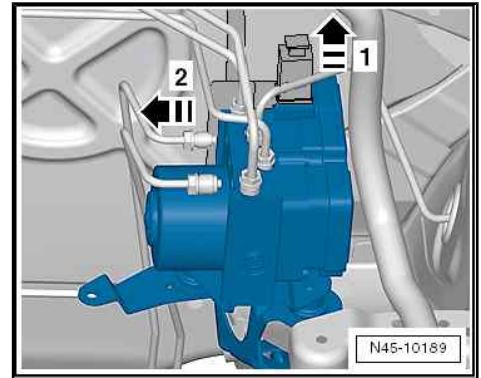
Note

Make sure that no brake fluid gets onto the contacts of the plug connections.

- Mark both brake lines from the master brake cylinder -A- and -B- and unscrew from the hydraulic unit.
- Close the brake lines and threaded holes immediately with plugs from the repair kit -1H0 698 311 A- .
- Mark the brake lines (for brake calipers) -1- to -4-, unscrew and close with plugs from the repair kit -1H0 698 311 A- .



- Unlock plug on control unit, in -direction of arrow 1-.
- Disconnect the plug from the control unit in -direction of arrow 2-.
- Pull hydraulic unit with control unit upwards and out of the rubber bearings. If the rubber bearings are pulled out of the console at the same time, place the bearings in the same position again => [Item 11 \(page 54\)](#) .
- Unscrew the bracket from the ABS hydraulic unit.



Installing:

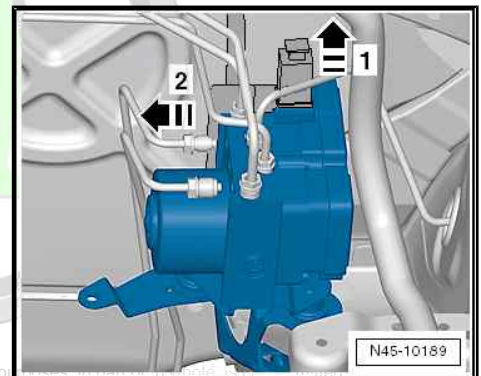


Note

- ◆ *Only remove plugs from the new hydraulic unit if the relevant brake line is installed.*
- ◆ *If the plugs were already removed from the hydraulic unit, then brake fluid may escape and adequate filling and bleeding can no longer be guaranteed.*

- Screw the bracket onto the hydraulic unit and tighten to the recommended tightening torque.
- Moisten the bolt of the support => [Item 9 \(page 54\)](#) with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings.

- Connect the plug to the control unit against the -direction of arrow 2-.
- Lock the plug at the control unit, against the -direction of arrow 1-.
- Insert the hydraulic unit with the control unit and bracket into the rubber bearings of the console.
- Remove the plugs consecutively from the brake lines and the ABS control unit.
- Screw the marked brake lines onto the hydraulic unit.
- Install battery tray => [Electrical System; Rep. gr. 27](#) .
- Install inlet connection and air filter => [Engine; Rep. gr. 23](#) or => [Engine; Rep. gr. 24](#) .
- Install battery => [Electrical System; Rep. gr. 27](#) .



Note

If the battery earth strap is disconnected and connected, carry out certain additional operations => [Electrical System; Rep. gr. 27](#) .

- Position engine cover.
- Remove brake pedal load e.g. -V.A.G 1869/2- .
- Bleed brake system => [page 168](#) .
- Code the control unit - J104- => [Vehicle diagnostic tester](#).

**Specified torques:**

Screw for hydraulic unit to bracket	8 Nm
Brake lines to ABS unit:	
Thread M 10 x 1	14 Nm
Thread M 12 x 1	14 Nm

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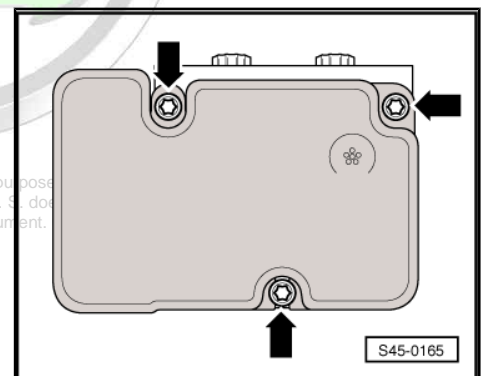
5.9 Separating the control unit from the hydraulic unit - Right-hand drive

- ◆ In the case of a malfunction of the ABS control unit - J104- , the control unit must be disconnected from the ABS hydraulic unit - N55- and replaced individually.
- ◆ In the case of a malfunction of the ABS hydraulic unit - N55- , the ABS hydraulic unit - N55- must be completely replaced together with the ABS control unit - J104- .

Note

- ◆ *The hydraulic pump - V64- and ABS hydraulic unit - N55- must not be separated from each other.*
 - ◆ *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*
 - ◆ *No moisture and no dirt particles must penetrate into the interior of the ABS control unit - J104- .*
 - ◆ *Electrostatic charge can cause malfunctions of the ABS control unit - J104- .*
 - ◆ *Before handling the ABS control unit - J104- , the technician must discharge himself electrostatically. The electrostatic discharge is achieved by touching earthed metal parts. Do not grab directly at the plug contacts or electronic components.*
- Remove the ABS hydraulic unit - N55- with the ABS control unit - J104- ⇒ [page 55](#) .
 - Place the hydraulic unit with the control unit upwards on a clean and level surface.
 - Remove screws -arrows-.

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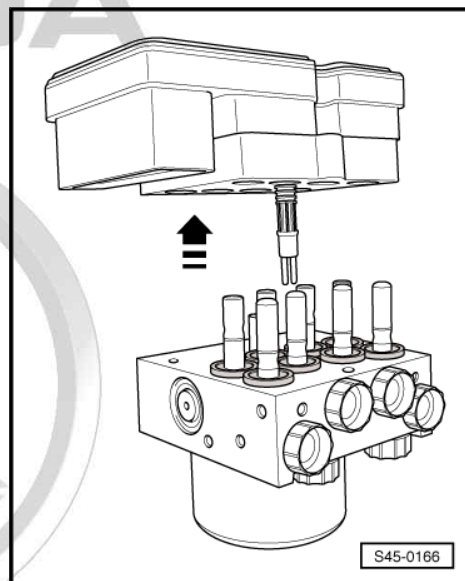
- Detach the control unit without tilting from the hydraulic unit -arrow-.
- Carefully pull off all gasket rings from the valve domes of the hydraulic unit.

**WARNING**

- ◆ *On a disconnected control unit, the printed circuit board is exposed.*
- ◆ *No humidity or dirt particles must penetrate into the inside of the control unit.*
- ◆ *The hydraulic pump must not be separated from the hydraulic unit.*

- Cover the solenoid coils of the control unit with a non-fluffing cloth.

After separating from the control unit and hydraulic unit use the transport protection for valve domes.



5.10 Attaching control unit to hydraulic unit - Right-hand drive

**WARNING**

Strong vibrations (e.g. fall, knock) can destroy the control unit. The control unit must no longer be used.

- The surfaces must be cleaned before assembling.
- Push all the gasket rings -A- a little over the valve domes.
- Position the control unit without tilting it onto the hydraulic unit.

Thus the gasket rings are brought into their end position.

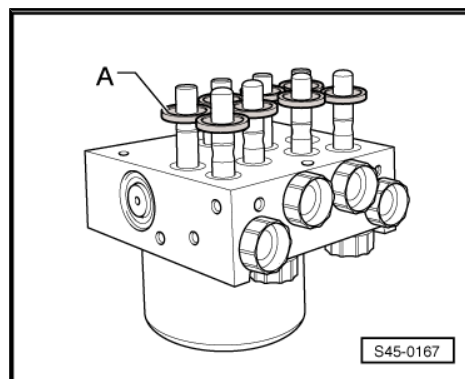
- Screw hydraulic unit and control unit with the enclosed new screws.

**Note**

- ◆ *A new control unit may only be installed on the same hydraulic unit twice as a maximum to ensure that the elastic seal is still leak-tight.*
- ◆ *A control unit, which was once operational, must not be mounted a second time.*

Specified torques:

Control unit to hydraulic unit	5.5 Nm
--------------------------------	--------



6 Hydraulic control unit, brake servo unit/master brake cylinder ABS Mark 60/Mark 60 EC (ABS/EDL/TCS/ESP (ESC))

Summary of components ABS Mark 60 - for left-hand drive up to MY 2008 ⇒ [page 61](#)

Summary of components ABS Mark 60 EC - for left-hand drive as of MY 2009 ⇒ [page 64](#)

Connect the brake lines from the master brake cylinder to the ABS hydraulic unit - left-hand drive ⇒ [page 66](#)

Removing and installing ABS control unit - J104- ABS hydraulic unit - N55- , left -hand drive vehicles ⇒ [page 67](#)

Disconnecting control unit from hydraulic unit - Left-hand drive ⇒ [page 72](#)

Installing control unit to hydraulic unit - Left-hand drive ⇒ [page 73](#)

Summary of components ABS Mark 60 EC (ABS/EDL/TCS/ESP (ESC)) - right-hand drive ⇒ [page 73](#)

Connect the brake lines from the master brake cylinder to the ABS hydraulic unit - right-hand drive ⇒ [page 75](#)

Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55- , right-hand drive vehicles ⇒ [page 76](#)

Separating the control unit from the hydraulic unit - Right-hand drive ⇒ [page 79](#)

Attaching the control unit to the hydraulic unit - Right-hand drive ⇒ [page 80](#)

6.1 Summary of components ABS Mark 60 - for left-hand drive up to MY 2008



Note

- ◆ Vehicles up to CW 21/2008 are fitted with the control unit for ABS Mark 60.
- ◆ Vehicles up to CW 22/2008 are fitted with the control unit for ABS Mark 60 EC. A sensor unit for ESP (ESC) -G419- is integrated in this control unit. Depending on the equipment, the control unit for ABS Mark 60 EC must not be fitted with these senders on vehicles with front-wheel drive.
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 72](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- with ABS hydraulic unit - N55-
- The ABS control unit - J104- and the ABS hydraulic unit - N55- must not be separated on vehicles with brake assistance or on vehicles as of CW 22/2008
- Removing and installing ⇒ [page 67](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 72](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 73](#)

2 - Brake line, 14 Nm

- from master brake cylinder (push rod piston circuit) to ABS hydraulic unit
- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

3 - Brake line, 14 Nm

- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

4 - Brake line, 14 Nm

- to front left brake caliper
- Distinguishing feature: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

5 - Brake line, 14 Nm

- To front right brake caliper.
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M10 x 1

6 - Brake line, 14 Nm

- to rear left brake caliper
- Distinguishing feature: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

7 - Brake line, 14 Nm

- to rear right brake caliper
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M10 x 1

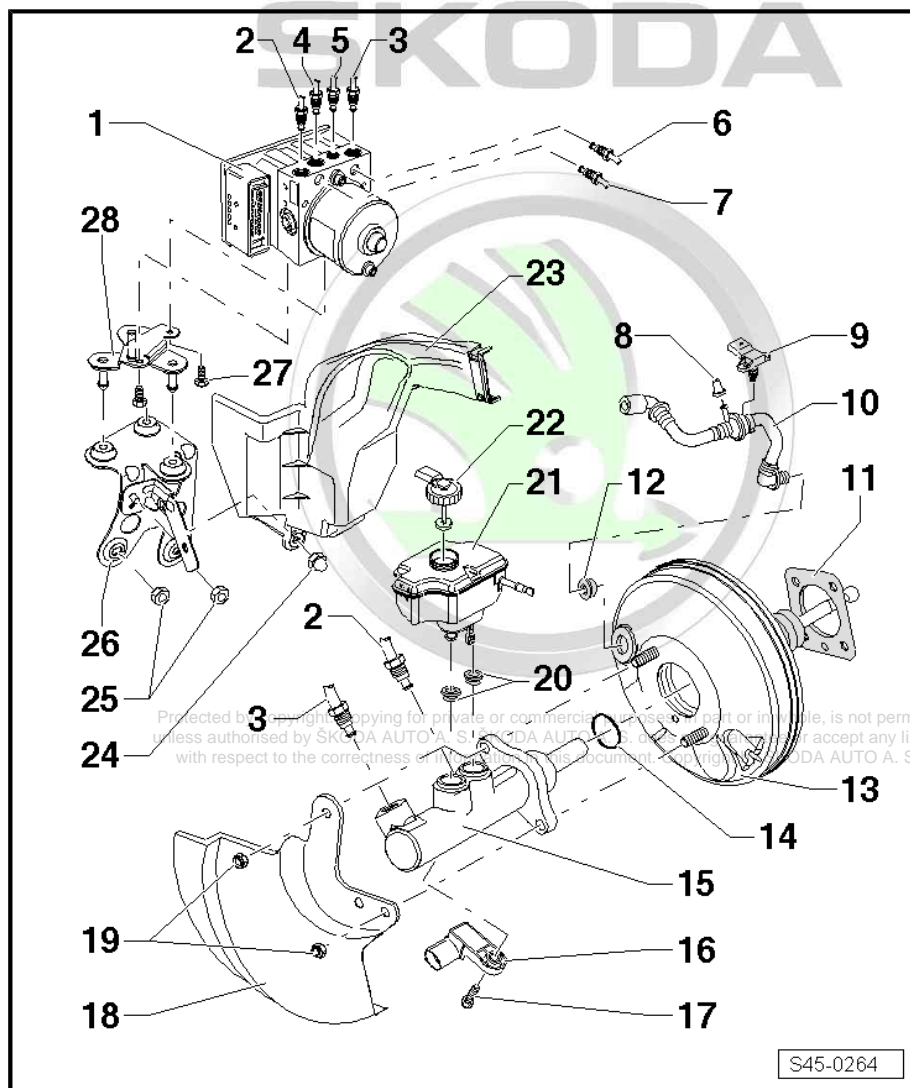
8 - Dummy plug

9 - Pressure sensor for the brake servo unit -G294-

- only on vehicles with petrol engines with brake vacuum pump
- Removing and installing ⇒ [page 185](#)
- Check ⇒ Vehicle diagnostic tester

10 - Vacuum line

- with non-return valve





11 - Gasket

- for brake servo

12 - Sealing grommet

- for the connection of the vacuum hose

13 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump ⇒ [page 178](#)
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure ⇒ [page 178](#)
- Inspect proper operation:
 - With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).
 - Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.
- if there are faults replace completely
- Removing and installing ⇒ [page 192](#)

14 - Sealing ring

15 - Master brake cylinder

- cannot be repaired, replace completely in the event of faults
- Removing and installing ⇒ [page 186](#)

16 - The brake light switch - F- and brake pedal switch - F47-

- as of 11.05 mounted onto the master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

17 - Screw, 5 Nm

18 - Protection plate

19 - Nut, 25 Nm

- replace after each removal

20 - Sealing grommets

- moisten with brake fluid and press in brake fluid reservoir

21 - Brake fluid reservoir

22 - Screw cap

23 - Heat protection plate

24 - Self-locking nut, 8 Nm

25 - Self-locking nut, 20 Nm

26 - Console

27 - Screw, 8 Nm

28 - Mounting bracket



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6.2 Summary of components ABS Mark 60 EC - for left-hand drive as of MY 2009

Note

- ◆ Vehicles up to CW 21/2008 are fitted with the control unit for ABS Mark 60.
- ◆ Vehicles up to CW 22/2008 are fitted with the control unit for ABS Mark 60 EC. A sensor unit for ESP (ESC) -G419- is integrated in this control unit. Depending on the equipment, the control unit for ABS Mark 60 EC must not be fitted with these senders on vehicles with front-wheel drive.
- ◆ If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .
- ◆ The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- ⇒ [page 72](#) .
- ◆ The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

1 - ABS control unit - J104-

- with ABS hydraulic unit - N55-
- with integrated sensor unit for ESP (ESC) - G419-
- The ABS control unit - J104- and the ABS hydraulic unit - N55- must not be separated from each other
- Removing and installing ⇒ [page 67](#)
- Disconnecting the control unit from the hydraulic unit ⇒ [page 72](#)
- Fitting the control unit to the hydraulic unit ⇒ [page 73](#)

2 - Brake line, 14 Nm

- from master brake cylinder (push rod piston circuit) to hydraulic unit
- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

3 - Brake line, 14 Nm

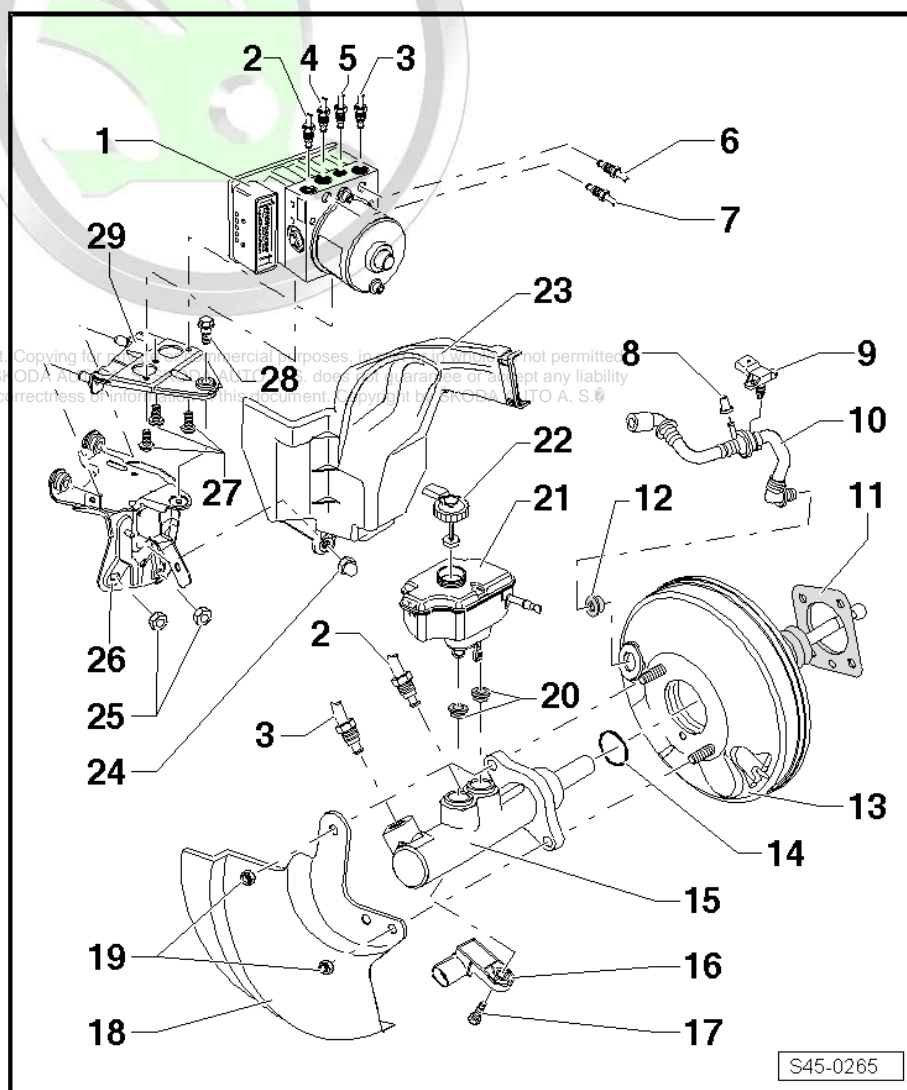
- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

4 - Brake line, 14 Nm

- to front left brake caliper
- Distinguishing feature: \varnothing 5.25 mm and pipe screw with short thread M10 x 1

5 - Brake line, 14 Nm

- To front right brake caliper.



- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M12 x 1

6 - Brake line, 14 Nm

- to rear left brake caliper
- Distinguishing feature: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

7 - Brake line, 14 Nm

- to rear right brake caliper
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M10 x 1

8 - Dummy plug

9 - Pressure sensor for the brake servo unit -G294-

- only on vehicles with petrol engines with brake vacuum pump
- Removing and installing \Rightarrow [page 185](#)
- Check \Rightarrow Vehicle diagnostic tester

10 - Vacuum line

- with non-return valve

11 - Gasket

- for brake servo

12 - Sealing grommet

- for the connection of the vacuum hose

13 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump \Rightarrow [page 178](#)
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure \Rightarrow [page 178](#)
- Inspect proper operation:
 - With the engine off **press down brake pedal repeatedly with force (this reduces the pressure already present in the device).**
 - Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.
- if there are faults replace completely
- Removing and installing \Rightarrow [page 192](#)

14 - Sealing ring

15 - Master brake cylinder

- cannot be repaired, replace completely in the event of faults
- Removing and installing \Rightarrow [page 186](#)

16 - The brake light switch - F- and brake pedal switch - F47-

- as of 11.05 mounted onto the master brake cylinder
- Removing and installing \Rightarrow [page 149](#)
- Check \Rightarrow Vehicle diagnostic tester

17 - Screw, 5 Nm

18 - Protection plate

19 - Nut, 25 Nm

- replace after each removal

20 - Sealing grommets

- moisten with brake fluid and press in brake fluid reservoir



- 21 - Brake fluid reservoir
- 22 - Screw cap
- 23 - Heat protection plate
- 24 - Self-locking nut, 8 Nm
- 25 - Self-locking nut; 20 Nm
- 26 - Console
- 27 - Screw, 8 Nm
- 28 - Screw, 8 Nm
 - to bracket on console
- 29 - Mounting bracket

6.3 Connecting the brake lines from the master brake cylinder to the ABS hydraulic unit - left-hand drive

Connect brake lines to the master brake cylinder

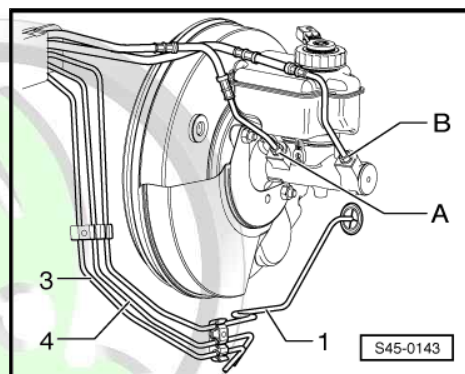
A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M12 x 1

- 1 - Hydraulic unit to front left brake caliper
- 3 - hydraulic unit to rear right brake caliper
- 4 - hydraulic unit to rear left brake caliper



Connect brake lines to the hydraulic unit.

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6.5 mm and pipe screw with long thread M12 x 1

1 - Hydraulic unit to front left brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M10 x 1

2 - Hydraulic unit to front right brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with thread M10 x 1

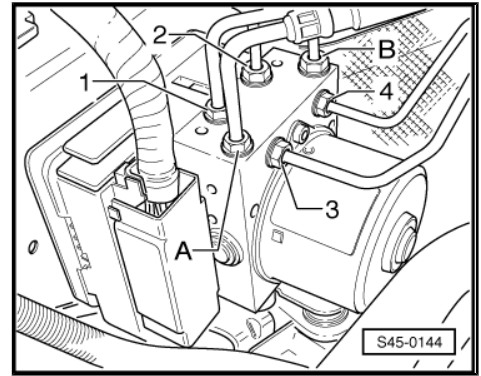
- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

3 - hydraulic unit to rear right brake caliper

- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M10 x 1

4 - hydraulic unit to rear left brake caliper

- Distinguishing feature: \varnothing 5.25 mm and pipe screw with short thread M12 x 1



6.4 Removing and installing ABS control unit - J104- ABS hydraulic unit - N55- - left-hand drive vehicles

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-

Removing:

Fitting location:

The control unit with the hydraulic unit is located on the right in the engine compartment.



WARNING

The brake lines around the hydraulic unit must not be bent!

- Read out and note the actual control unit coding \Rightarrow Vehicle diagnostic tester.
- Remove battery \Rightarrow Electrical System; Rep. gr. 27 .
- Remove engine cover.

1.9 ltr. diesel engine:

- Remove connecting hose to inlet connection \Rightarrow Engine; Rep. gr. 21 .



- Remove intake manifold flap motor - V157- ⇒ Engine; Rep. gr. 23 (except vehicles with engine identification characters BJB).

2.0 ltr. diesel engine:

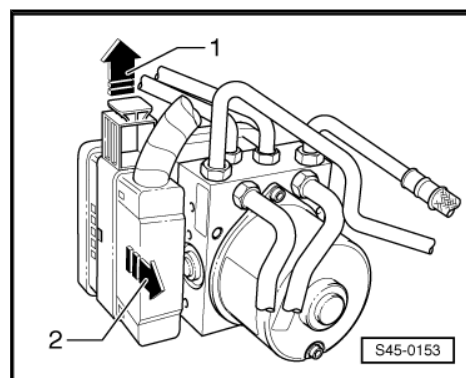
- Remove bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .
- Remove connection pipe between intake hose and exhaust turbocharger.
- Remove top toothed belt guard.

Diesel engines with the diesel particle filter:

- Remove pre-exhaust pipe with diesel particle filter ⇒ diesel engine; Rep. gr. 26 .

Continued for all vehicles:

- Release the in the -direction of arrow 1- and pull it off the control unit in the -direction of arrow 2-.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
- Press down brake pedal with brake pedal load , e.g. - V.A.G 1869/2- , at least 60 mm.
- Close front left and rear left bleeder valves.
- Do not remove brake pedal load , e.g. -V.A.G 1869/2- .
- Place sufficient non-fluffing cloths under the control unit and the hydraulic unit.

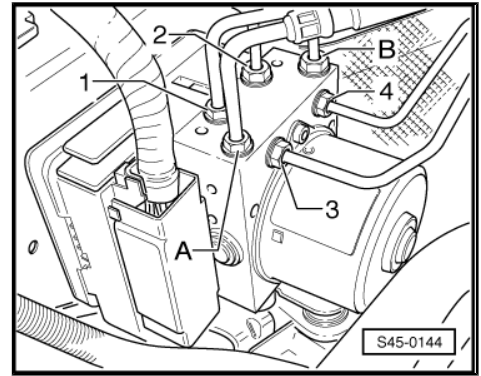


Note

Make sure that no brake fluid gets onto the contacts of the plug connections.



- Mark both brake lines from the master brake cylinder -A- and -B- and unscrew from the hydraulic unit.
- Close the brake lines and threaded holes immediately with plugs from the repair kit -1H0 698 311 A- .
- Mark the brake lines (for brake caliper) -1- to -4-, unscrew and close.
- Pull ABS hydraulic unit upwards and out of the rubber bearings.



WARNING

The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

Installing:



Note

- ◆ *Only remove plugs from the new hydraulic unit if the relevant brake line is installed.*
- ◆ *If the plugs were already removed from the hydraulic unit, then brake fluid may escape and adequate filling and bleeding can no longer be guaranteed.*

Screw the bracket for the ABS control unit onto the ABS control unit and tighten to the recommended tightening torque.

Moisten the bolt of the support => [Item 29 \(page 66\)](#) with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings.

Insert the ABS control unit with bracket into the rubber bearings of the console.



WARNING

Make sure that the rubber bearings are not pressed out of the console when installing the bracket. After installing, check the ABS control unit for tight fit, otherwise failure may be caused by a malfunctioning.

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- Connect the plug to the control unit against the -direction of arrow 2- and lock.
- Remove the plugs consecutively from the brake lines and the ABS control unit.
- Screw the marked brake lines onto the ABS control unit.

Diesel engines with the diesel particle filter:

- Install pre-exhaust pipe with diesel particle filter ⇒ diesel engine; Rep. gr. 26 .

1.9 ltr. diesel engine:

- Install intake manifold flap motor - V157- ⇒ Engine; Rep. gr. 23 (except vehicles with engine identification characters BJB).
- Install connecting hose to inlet connection ⇒ Engine; Rep. gr. 21 .

2.0 ltr. diesel engine:

- Install top toothed belt guard.
- Install connection pipe between intake hose and exhaust turbocharger.
- Install the bulkhead plenum chamber ⇒ Body Work; Rep. gr. 66 .

Continued for all vehicles:

- Install battery ⇒ Electrical System; Rep. gr. 27 .

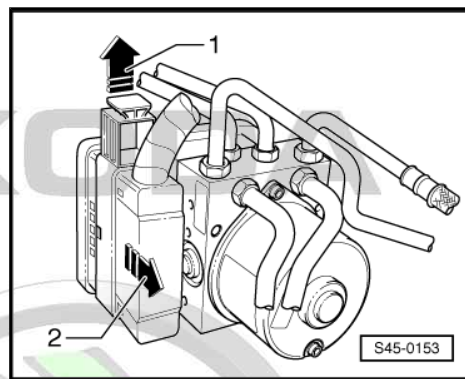


Note

If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

- Position engine cover.
- Remove brake pedal load e.g. -V.A.G 1869/2- .
- Bleed brake system ⇒ [page 168](#) .
- Code the control unit - J104- ⇒ Vehicle diagnostic tester.

While doing so, a basic setting of the steering angle sender - G85- , the lateral acceleration sender - G200- and of the brake pressure sender 1 - G201- must be performed ⇒ Vehicle diagnostic tester



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Specified torques:

Screw for hydraulic unit to bracket	8 Nm
Brake lines to ABS unit:	
Thread M 10 x 1	14 Nm
Thread M 12 x 1	14 Nm

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6.5 Disconnecting control unit from hydraulic unit - Left-hand drive

- ◆ In the case of a malfunction of the ABS control unit - J104- , the control unit must be disconnected from the ABS hydraulic unit - N55- and replaced individually.
- ◆ In the case of a malfunction of the ABS hydraulic unit - N55- , the ABS hydraulic unit - N55- must be completely replaced together with the ABS control unit - J104- .



Note

- ◆ *The hydraulic pump - V64- and ABS hydraulic unit - N55- must not be separated from each other.*
 - ◆ *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*
 - ◆ *No moisture and no dirt particles must penetrate into the interior of the ABS control unit - J104- .*
 - ◆ *Electrostatic charge can cause malfunctions of the ABS control unit - J104- .*
 - ◆ *Before handling the ABS control unit - J104- , the technician must discharge himself electrostatically. The electrostatic discharge is achieved by touching earthed metal parts. Do not grab directly at the plug contacts or electronic components.*
- Remove the ABS hydraulic unit - N55- with the ABS control unit - J104- ➔ [page 67](#) .
 - Place the hydraulic unit with the control unit upwards on a clean and level surface.
 - Removing the screw of the control unit.
 - Detach the control unit without tilting from the hydraulic unit -arrow-.
 - Carefully pull off all gasket rings from the valve domes of the hydraulic unit.

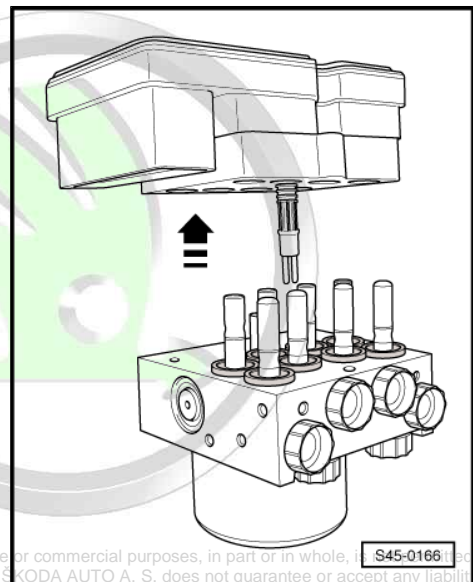


WARNING

- ◆ *On a disconnected control unit, the printed circuit board is exposed.*
- ◆ *No humidity or dirt particles must penetrate into the inside of the control unit.*
- ◆ *The hydraulic pump must not be separated from the hydraulic unit.*

- Cover the solenoid coils of the control unit with a non-fluffing cloth.

After separating from the control unit and hydraulic unit use the transport protection for valve domes.



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6.6 Attaching control unit to hydraulic unit - Left-hand drive



WARNING

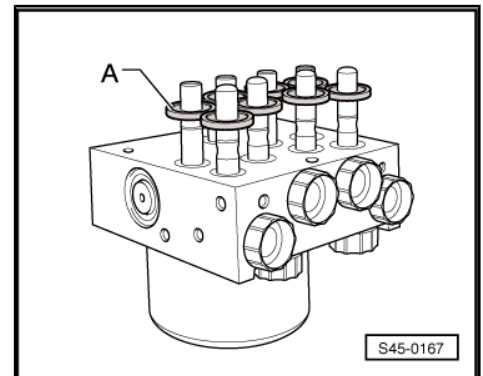
*Strong vibrations (e.g. fall, knock) can destroy the control unit.
The control unit must no longer be used.*

- The surfaces must be cleaned before assembling.
- Push all the gasket rings -A- a little over the valve domes.
- Position the control unit without tilting it onto the hydraulic unit. Thus the gasket rings are brought into their end position.
- Screw hydraulic unit and control unit with the enclosed new screws.



Note

- ◆ *A new control unit may only be installed on the same hydraulic unit twice as a maximum to ensure that the elastic seal is still leak-tight.*
- ◆ *A control unit, which was once operational, must not be mounted a second time.*



Specified torques:

Control unit to hydraulic unit	2 Nm + 0.8 Nm
--------------------------------	---------------

6.7 Summary of components ABS Mark 60 EC (ABS/EDL/TCS/ESP) - right-hand drive



Note

- ◆ *If the ABS hydraulic unit - N55- is damaged, the ABS control unit - J104- must be fully replaced with the ABS hydraulic unit - N55- .*
- ◆ *The ABS control unit - J104- can be separated from the ABS hydraulic unit - N55- => [page 79](#) .*
- ◆ *The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.*



1 - Brake line

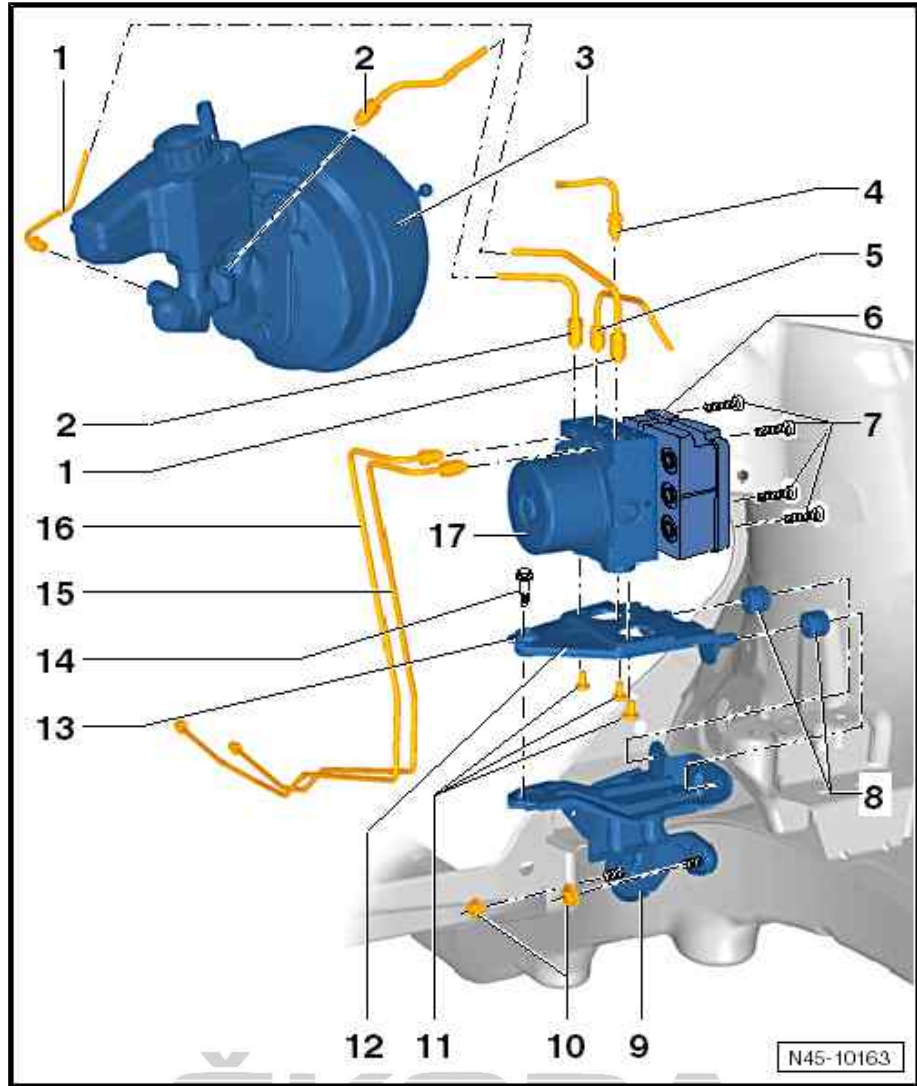
- from master brake cylinder (floating piston circuit) to ABS hydraulic unit
- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 x 1

2 - Brake line

- from master brake cylinder (push rod piston circuit) to ABS hydraulic unit
- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 x 1

3 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump \Rightarrow [page 178](#)
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure \Rightarrow [page 178](#)
- Inspect proper operation:
 - With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).



- Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.

- if there are faults replace completely
- Removing and installing \Rightarrow [page 195](#)

4 - Brake line

- to front right brake caliper
- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with thread M10 x 1
- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

5 - Brake line

- to front left brake caliper
- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1
- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M10 x 1

6 - ABS control unit - J104-

- The ABS control unit - J104- and the ABS hydraulic unit - N55- must not be separated from each other
- Removing and installing \Rightarrow [page 76](#)
- Disconnecting the control unit from the hydraulic unit \Rightarrow [page 79](#)

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- Fitting the control unit to the hydraulic unit => [page 80](#)

7 - Screw, 2 Nm + 0.8 Nm

- Replacing

8 - Rubber bearing

- make sure that the rubber bearings are not pressed out of the console when installing the bracket

9 - Console

- before installing the rubber bearings => [Item 8 \(page 75\)](#) , moisten the holes for rubber bearings with lubricant, e.g. -D 007 000 A2-

10 - Nut, 20 Nm

11 - Screw, 8 Nm

12 - Mounting bracket

- Moisten the bolt of the support with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings
- after installing, check for firm seating

13 - Rubber bearing

14 - Screw, 8 Nm

15 - Brake line

- to rear left brake caliper
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M 12 \times 1

16 - Brake line

- to rear right brake caliper
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M 10 \times 1

17 - ABS hydraulic unit - N55-

- Removing and installing => [page 76](#)

6.8 Connecting the brake lines from the master brake cylinder to the ABS hydraulic unit - right-hand drive

Connect brake lines to the master brake cylinder

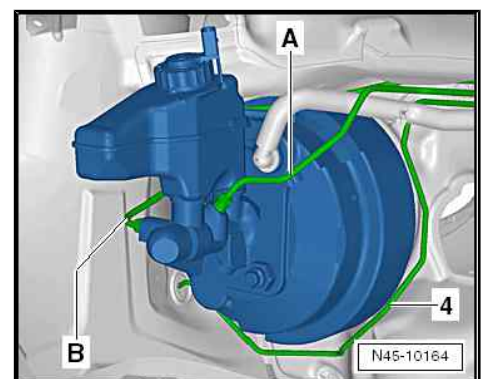
A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 \times 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 \times 1

4 - from the hydraulic unit to the front right brake caliper



Connect brake lines to the ABS hydraulic unit

A - from master brake cylinder (push rod piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 x 1

B - from master brake cylinder (floating piston circuit) to ABS hydraulic unit

- Distinguishing feature: \varnothing 6,5 mm and pipe screw with thread M 12 x 1

1 - from hydraulic unit to front left brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1

- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M10 x 1

2 - from the hydraulic unit to the rear left brake caliper

- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M 12 x 1

3 - from the hydraulic unit to the rear right brake caliper

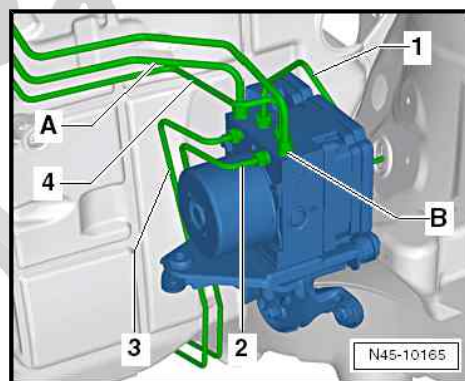
- Distinguishing feature: \varnothing 5,25 mm and pipe screw with thread M 10 x 1

4 - from the hydraulic unit to the front right brake caliper

- Hydraulic unit to front right brake caliper

- Distinguishing feature for vehicles up to CW 21/2008: \varnothing 5.25 mm and pipe screw with thread M10 x 1

- Distinguishing feature for vehicles as of CW 22/2008: \varnothing 5.25 mm and pipe screw with short thread M12 x 1



6.9 Removing and installing ABS control unit - J104- / ABS hydraulic unit - N55- - right-hand drive

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-
- ◆ Plugs from repair kit -1H0 698 311 A-

Removing

Fitting location:

The ABS control unit is located on the left in the engine compartment.



WARNING

The brake lines around the hydraulic unit must not be bent!

- Read out and note the actual control unit coding \Rightarrow Vehicle diagnostic tester.
- Remove engine cover.
- Remove battery \Rightarrow Electrical System; Rep. gr. 27 .
- Remove inlet connection and air filter \Rightarrow Engine; Rep. gr. 23 or \Rightarrow Engine; Rep. gr. 24 .

- Remove battery ⇒ Electrical System; Rep. gr. 27 .
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Attach the bleeder hose of the bleeding bottle onto the vent valves of the front left and rear left brake caliper and open vent valves.
- Press down brake pedal with brake pedal load , e.g. - V.A.G 1869/2- , at least 60 mm.
- Close front left and rear left bleeder valves.

i Note

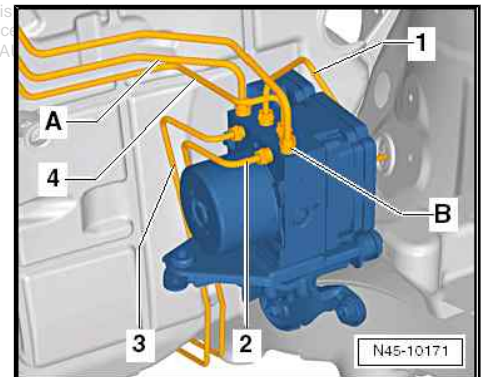
Do not remove brake pedal load , e.g. -V.A.G 1869/2- .

- Place sufficient non-fluffing cloths under the control unit and the hydraulic unit.
- Extract as much brake fluid as possible from the brake fluid reservoir.

i Note

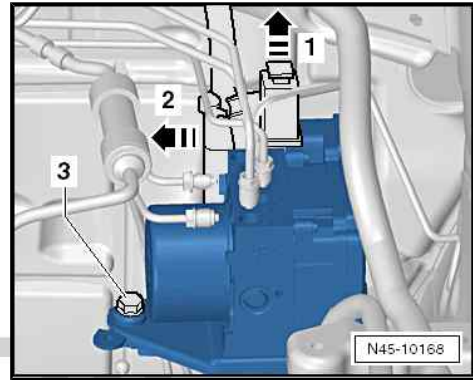
Make sure that no brake fluid gets onto the contacts of the plug connections.

- Mark both brake lines from the master brake cylinder -A- and -B- and unscrew from the hydraulic unit.
- Close the brake lines and threaded holes immediately with plugs from the repair kit -1H0 698 311 A- .
- Mark the brake lines (for brake calipers) -1- to -4-, unscrew and close with plugs from the repair kit -1H0 698 311 A- .





- Release the plug at the ABS control unit
-in direction of arrow 1-
- Disconnect the plug from the control unit in
-direction of arrow 2-
- Release screw -3-
- Pull the ABS control unit with bracket out of the rubber bear-
ings in the console in -direction of arrow 2-
- Remove the ABS control unit and unscrew the bracket from
the ABS control unit.



Note

If the rubber bearings are pulled out of the console at the same time, place the bearings in the same position again
 => [Item 9 \(page 75\)](#) .



WARNING

The hydraulic pump and the ABS hydraulic unit - N55- must not be separated from each other.

Installing



Note

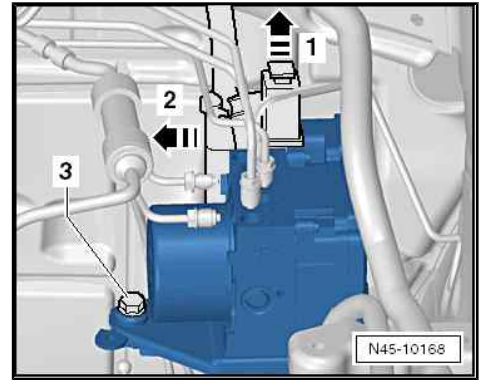
- ◆ *Only remove plugs from the new hydraulic unit if the relevant brake line is installed.*
- ◆ *If the plugs were already removed from the hydraulic unit, then brake fluid may escape and adequate filling and bleeding can no longer be guaranteed.*
- Screw the bracket for the ABS control unit onto the ABS control unit and tighten to the recommended tightening torque.
- Moisten the bolt of the support => [Item 12 \(page 75\)](#) with lubricant, e.g. -D 007 000 A2- , before inserting into the rubber bearings.
- Insert the ABS control unit with bracket into the rubber bearings of the console.



WARNING

Make sure that the rubber bearings are not pressed out of the console when installing the bracket. After installing, check the ABS control unit for tight fit, otherwise failure may be caused by a malfunctioning.

- Screw in screw -3- and tighten to the recommended tightening torque.
- Connect the plug to the control unit against the -direction of arrow 2- and lock.
- Remove the plugs consecutively from the brake lines and the ABS control unit.
- Screw the marked brake lines onto the ABS control unit.
- Install battery tray ⇒ Electrical System; Rep. gr. 27 .
- Install inlet connection and air filter ⇒ Engine; Rep. gr. 23 or ⇒ Engine; Rep. gr. 24 .
- Install battery ⇒ Electrical System; Rep. gr. 27 .



i Note

If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

- Position engine cover.
- Remove brake pedal load e.g. -V.A.G 1869/2- .
- Bleed brake system ⇒ [page 168](#) .
- Code the control unit - J104- ⇒ Vehicle diagnostic tester.

While doing so, a basic setting of the steering angle sender - G85- , the lateral acceleration sender - G200- and of the brake pressure sender 1 - G201- must be performed ⇒ Vehicle diagnostic tester.

Specified torques:	
Bracket to ABS control unit	8 Nm
Screw for bracket to console	8 Nm
Brake lines to ABS unit:	
Thread M 10 x 1	14 Nm
Thread M 12 x 1	14 Nm

6.10 Separating the control unit from the hydraulic unit - Right-hand drive

- ◆ In the case of a malfunction of the ABS control unit - J104- , the control unit must be disconnected from the ABS hydraulic unit - N55- and replaced individually.
- ◆ In the case of a malfunction of the ABS hydraulic unit - N55- , the ABS hydraulic unit - N55- must be completely replaced together with the ABS control unit - J104- .


Note

- ◆ *The hydraulic pump - V64- and ABS hydraulic unit - N55- must not be separated from each other.*
 - ◆ *On a disconnected ABS control unit - J104- , the printed circuit board is exposed.*
 - ◆ *No moisture and no dirt particles must penetrate into the interior of the ABS control unit - J104- .*
 - ◆ *Electrostatic charge can cause malfunctions of the ABS control unit - J104- .*
 - ◆ *Before handling the ABS control unit - J104- , the technician must discharge himself electrostatically. The electrostatic discharge is achieved by touching earthed metal parts. Do not grab directly at the plug contacts or electronic components.*
- Remove the ABS hydraulic unit - N55- with the ABS control unit - J104- ⇒ [page 67](#) .
 - Place the hydraulic unit with the control unit upwards on a clean and level surface.
 - Removing the screw of the control unit.
 - Detach the control unit without tilting from the hydraulic unit -arrow-.
 - Carefully pull off all gasket rings from the valve domes of the hydraulic unit.


WARNING

- ◆ *On a disconnected control unit, the printed circuit board is exposed.*
- ◆ *No humidity or dirt particles must penetrate into the inside of the control unit.*
- ◆ *The hydraulic pump must not be separated from the hydraulic unit.*

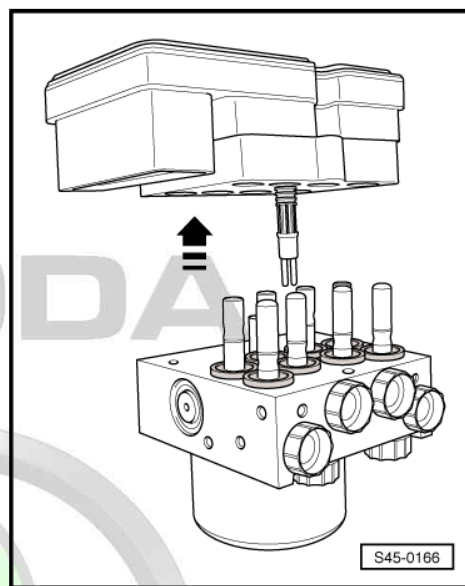
- Cover the solenoid coils of the control unit with a non-fluffing cloth.

After separating from the control unit and hydraulic unit use the transport protection for valve domes.

6.11 Attaching control unit to hydraulic unit - Right-hand drive


WARNING

Strong vibrations (e.g. fall, knock) can destroy the control unit. The control unit must no longer be used.



- The surfaces must be cleaned before assembling.
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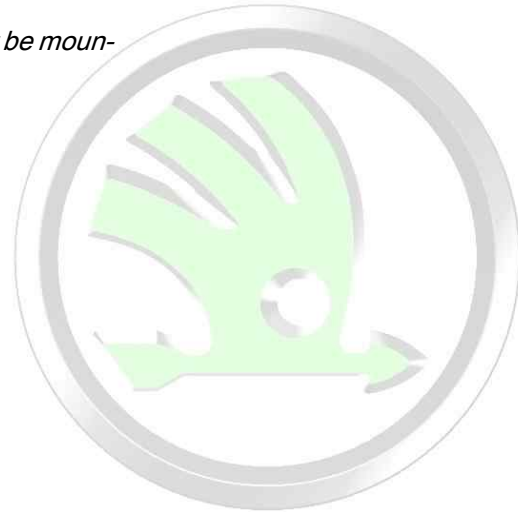
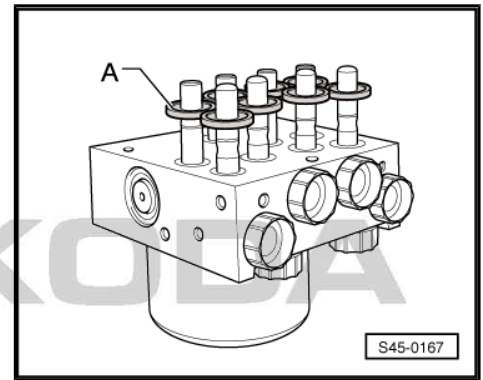
- Push all the gasket rings -A- a little over the valve domes.
 - Position the control unit without tilting it onto the hydraulic unit.
- Thus the gasket rings are brought into their end position.
- Screw hydraulic unit and control unit with the enclosed new screws.

 **Note**

- ◆ *A new control unit may only be installed on the same hydraulic unit twice as a maximum to ensure that the elastic seal is still leak-tight.*
- ◆ *A control unit, which was once operational, must not be mounted a second time.*

Specified torques:

Control unit to hydraulic unit	2 Nm + 0.8 Nm
--------------------------------	---------------



7 Removing and Installing parts of the ABS System on the front and rear axle

Remove and install parts of the ABS system on the front axle
⇒ [page 82](#)

Remove and install parts of the ABS system on the rear axle
(front-wheel drive) ⇒ [page 85](#)

Remove and install parts of the ABS system on the rear axle (four-wheel drive) ⇒ [page 88](#)

7.1 Removing and installing parts of the ABS system on the front axle

1 - ABS wheel speed sensor

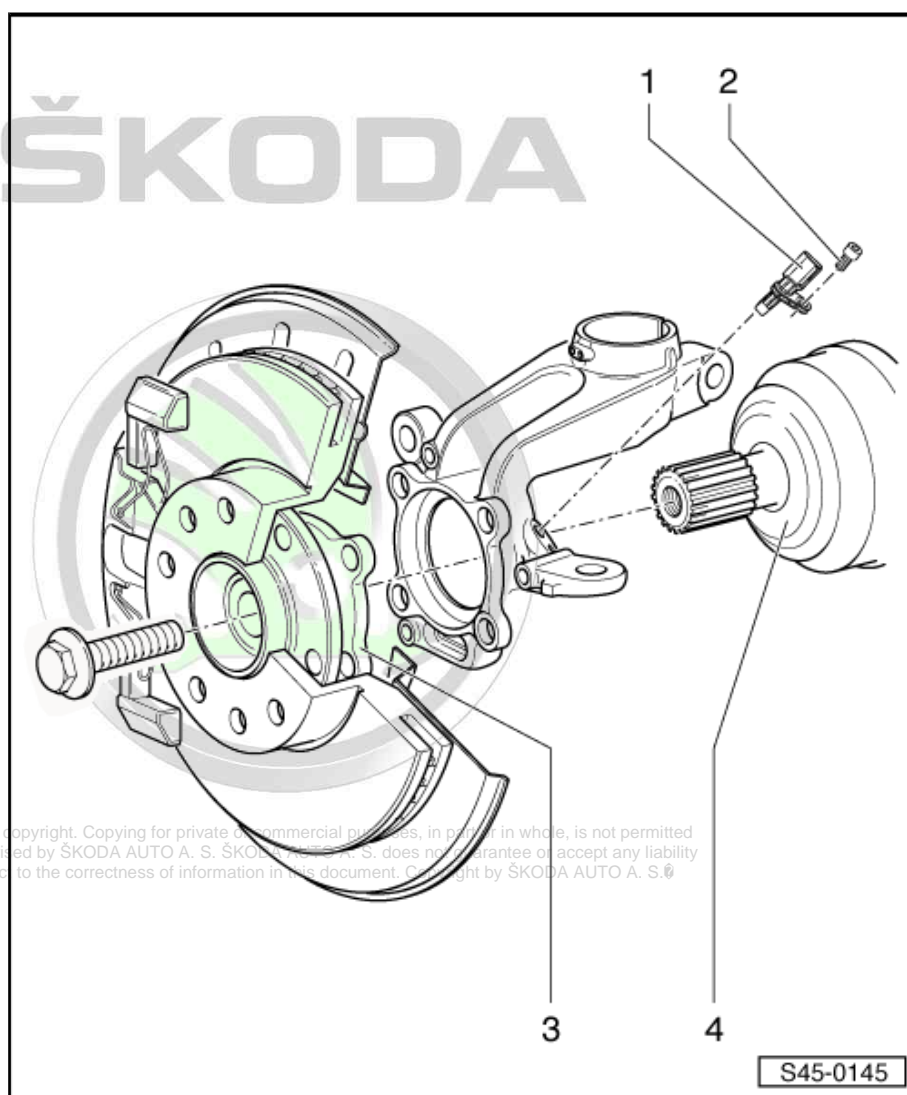
- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3 - .
- Replace ⇒ [page 82](#)

2 - Screw, 8 Nm

3 - Wheel hub with wheel bearing

- Sensor ring for ABS built into the wheel bearing

4 - Drive shaft



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7.1.1 Removing and installing the ABS speed sensor on the front axle

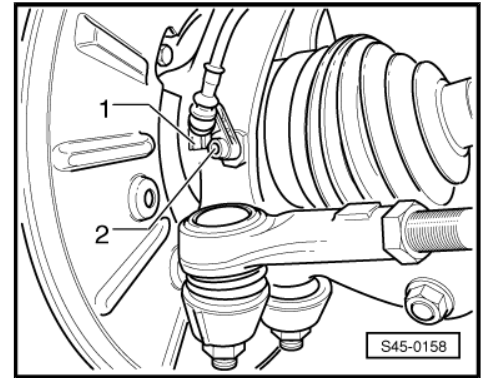
Removing:

- Raise vehicle.

- Separate plug connection -1- of ABS speed sensor/wheel speed sensor cable.
- Release screw -2- from the wheel-bearing housing.
- Take the ABS-speed sensor out of the wheel bearing housing.

Installing:

- Clean the inner surface of the hole before inserting the ABS speed sensor and brush over the ABS speed sensor with a hot screw paste - G 052 112 A3- .
- Insert the ABS speed sensor in the bore of the wheel-bearing housing and tighten the screw.
- Connect the plug connection on the ABS speed sensor.



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Tightening torque:

ABS speed sensor in wheel-bearing housing	8 Nm
---	------

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7.2 Removing and installing parts of the ABS system on the rear axle (front-wheel drive)

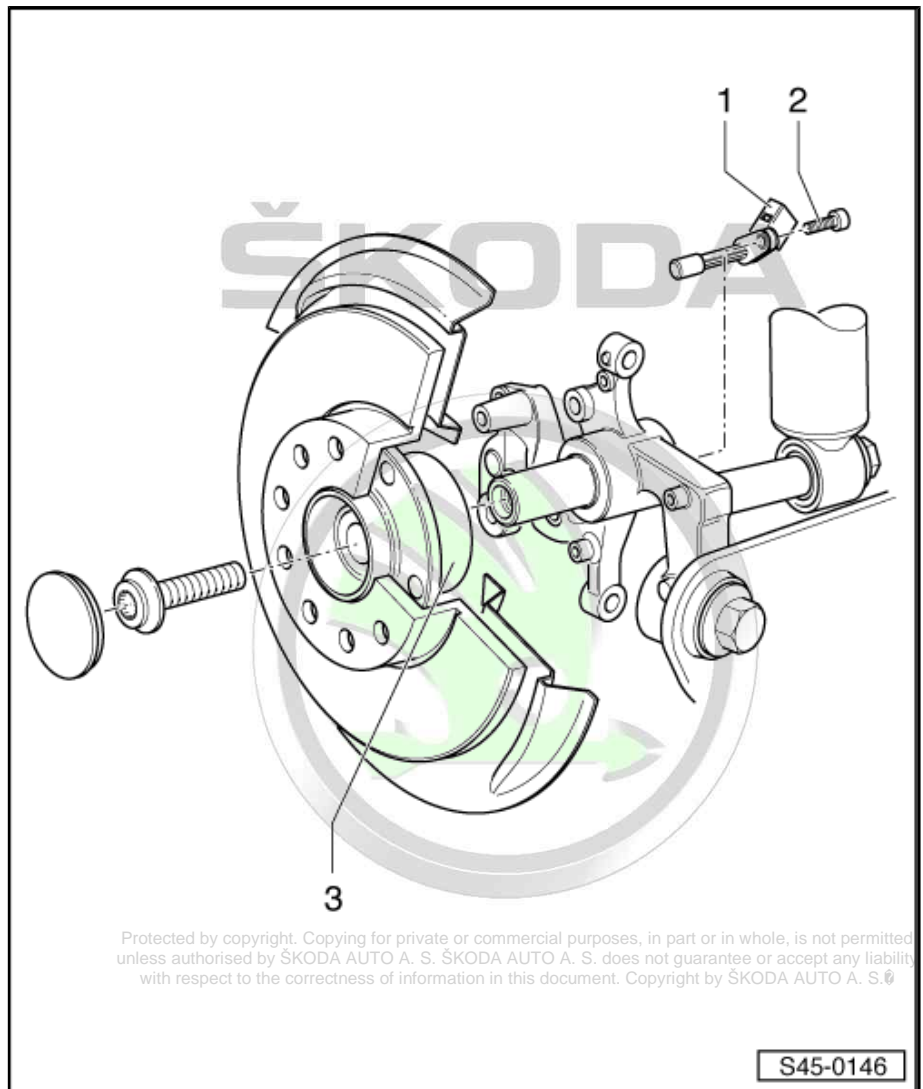
1 - ABS wheel speed sensor

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3 - .
- Removing and installing ⇒ [page 85](#)

2 - Screw, 8 Nm

3 - Wheel hub with wheel bearing

- Sensor ring for ABS built into the wheel bearing



7.2.1 Removing and installing the ABS speed sensor on the rear axle

Removing:

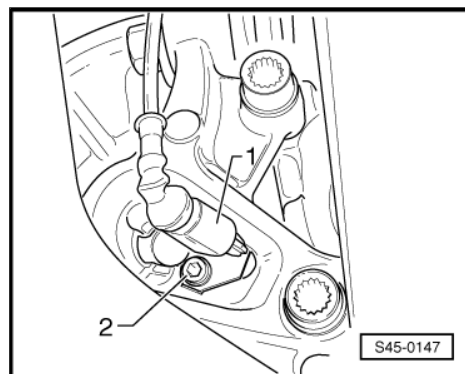
- Raise vehicle.



- Separate plug connection -1- of ABS speed sensor/wheel speed sensor cable.
- Release screw -2- from the wheel-bearing housing.
- Take the ABS-speed sensor out of the wheel bearing housing.

Installing:

- Clean the inner surface of the hole before inserting the ABS speed sensor and brush over the ABS speed sensor with a hot screw paste - G 052 112 A3- .
- Insert the ABS speed sensor in the bore of the wheel-bearing housing and tighten the screw.
- Connect the plug connection on the ABS speed sensor.



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Tightening torque:

ABS speed sensor in wheel-bearing housing	8 Nm
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7.3 Removing and installing parts of the ABS system on the rear axle (four-wheel drive)

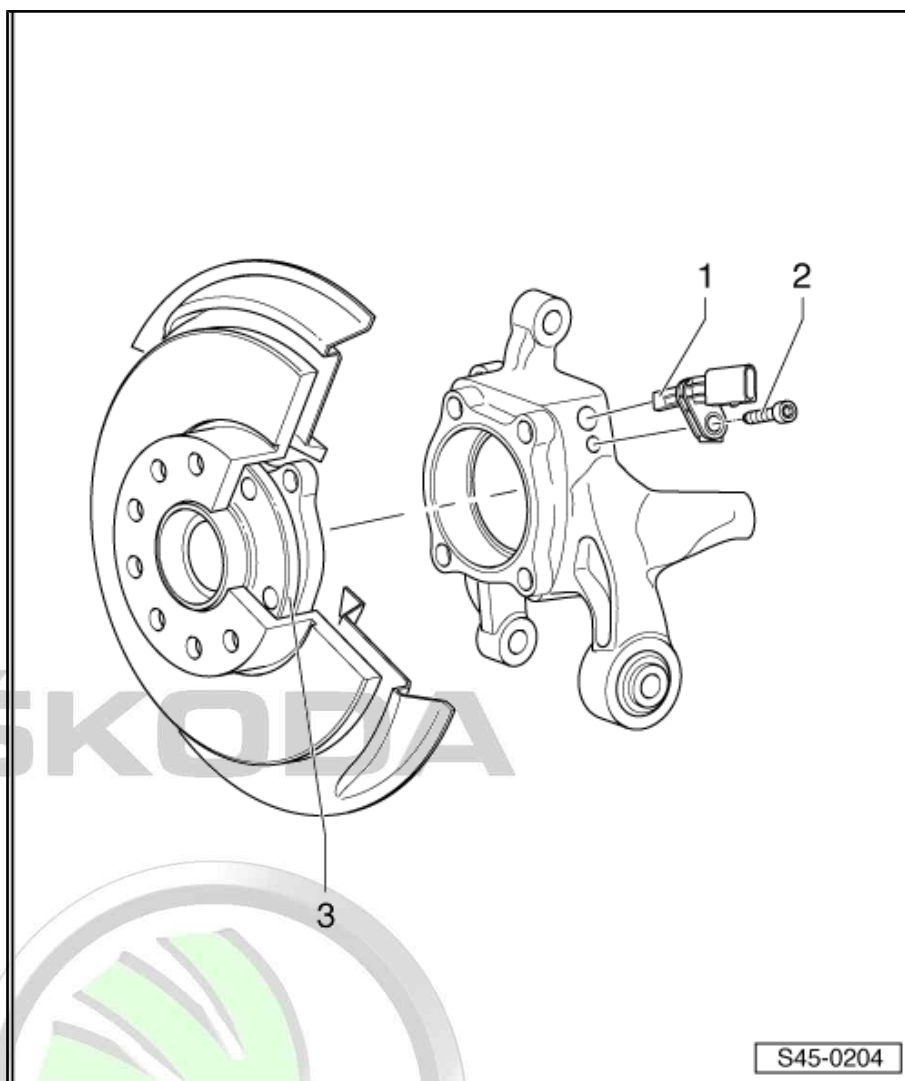
1 - ABS wheel speed sensor

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3 - .
- Removing and installing ⇒ [page 88](#)

2 - Screw, 8 Nm

3 - Wheel hub with wheel bearing

- Sensor ring for ABS built into the wheel bearing



7.3.1 Removing and installing the ABS speed sensor on the rear axle

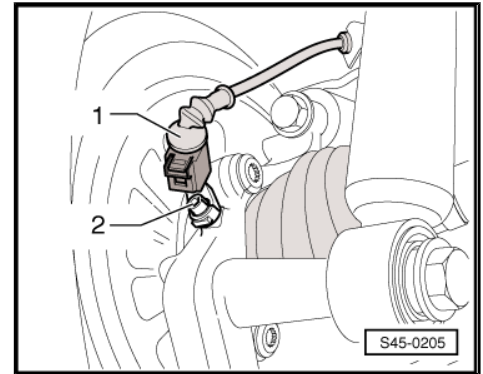
Removing:

- Raise vehicle.

- Separate plug connection -1- of ABS speed sensor/wheel speed sensor cable.
- Release screw -2- from the wheel-bearing housing.
- Take the ABS-speed sensor out of the wheel bearing housing.

Installing:

- Clean the inner surface of the hole before inserting the ABS speed sensor and brush over the ABS speed sensor with a hot screw paste - G 052 112 A3- .
- Insert the ABS speed sensor in the bore of the wheel-bearing housing and tighten the screw.
- Connect the plug connection on the ABS speed sensor.



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Tightening torque:

ABS speed sensor in wheel-bearing housing	8 Nm
---	------

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8 Removing and installing parts of the ESP (ESC) system

Remove and install sensor unit for ESP (ESC) - G419-
⇒ [page 91](#)

Removing and installing steering angle sender - G85-
⇒ [page 93](#)

8.1 Removing and installing sensor unit for ESP (ESC) - G419-

For vehicles up to CW 21/2008:

Up to CW 21/2008 the sensor unit for ESP (ESC) -G419- (includes: lateral acceleration sender - G200- , yaw rate sender - G202- and longitudinal acceleration sender - G251-) is fitted under the right front seat.

After replacing the ESP (ESC) sensor unit -G419- , a basic setting of the lateral acceleration sender -G200- must be performed. On vehicles with four-wheel drive and on vehicles with HHC system, perform the setting of the longitudinal acceleration sender as well -G251- ⇒ Vehicle diagnostic tester.



WARNING

Strong vibrations (e.g. fall, knock) can destroy the sensor unit for ESP (ESC) - G419-. The sensor unit for ESP (ESC) - G419- must no longer be used.

Removing:

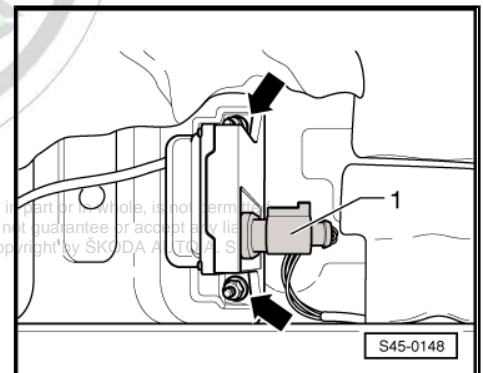
- Remove the right front seat ⇒ Body Work; Rep. gr. 72 .
- Remove the sill panel ⇒ Body Work; Rep. gr. 68 and lift up the carpet.
- Unplug plug -1- from the sensor unit for ESP - G419- .
- Unscrew the two securing nuts -arrows-.
- Remove the ESP (ESC) sensor unit - G419- .

Installing:

- Installation is carried out in the reverse order.

Pay attention to the fitting position of the ESP (ESC) sensor unit ⇒ Fig. S45-0148.

When installing the ESP (ESC) sensor unit, the correct and stress-free position on the fixture must be ensured.



Note

Never fit the ESP (ESC) sensor unit into position using fixing nuts.

- Tighten fixing nuts.
- Perform basic setting of lateral acceleration sender - G200- ⇒ Vehicle diagnostic tester. On vehicles with four-wheel drive and on vehicles with HHC system, perform the setting of the longitudinal acceleration sender as well -G251- ⇒ Vehicle diagnostic tester



Tightening torque:

Fixing nuts ESP (ESC) sensor unit - G419-	9 Nm
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For vehicles as of CW 22/2008:

As of CW 22/2008 the sensor unit for ESP (ESC) -G419- (includes: lateral acceleration sender - G200- , yaw rate sender - G202- and longitudinal acceleration sender - G251-) is integrated in the ABS control unit -J104- => [page 21](#) .

8.2 Removing and installing steering angle sender - G85-

For right-hand drive up to CW 21/2008 and left-hand drive up to CW 21/2009:

The steering angle sender is installed between the steering wheel and the steering-column control.

Removing and installing

=> Electrical System; Rep. gr. 94 .

- Then the basic setting of the steering angle sender - G85- must be performed => Vehicle diagnostic tester.

For right-hand drive as of CW 22/2008 and left-hand drive as of CW 22/2009:

Right-hand drive as of CW 22/2008 and left-hand drive as of CW 22/2009 - the steering angle sender - G85- is integrated in the steering gear.



46 – Brakes - mechanism

1 Repairing front wheel brake

Changing the brake pads of the front brake - Mounting instructions ⇒ [page 94](#)

Repairing front wheel brake, floating caliper disc brake FS-III ⇒ [page 95](#)

Removing and installing brake pads, floating caliper disc brake FS-III ⇒ [page 96](#)

Removing and installing brake caliper, floating caliper disc brake FS-III ⇒ [page 100](#)

Repairing front wheel brake, brake caliper FN3 ⇒ [page 103](#)

Removing and installing brake pads, brake caliper FN3 ⇒ [page 104](#)

Removing and installing brake caliper, brake caliper FN3 ⇒ [page 108](#)

1.1 Changing the brake pads of the front brake - Mounting instructions

When changing the pads, pay attention to the following points:

- Check protective collar of brake calliper piston.

Replace protective cap if damaged.

When replacing the protective cap:

- Check the contact surfaces of the brake piston and the brake caliper for any dirt (oxidation).

Carefully clean the piston as well as the brake caliper if dirty and replace the sealing cap.

- Check the brake piston and the brake caliper (corrosion, grooves on the outside of the cylinder surface), replace the brake caliper completely if damaged.

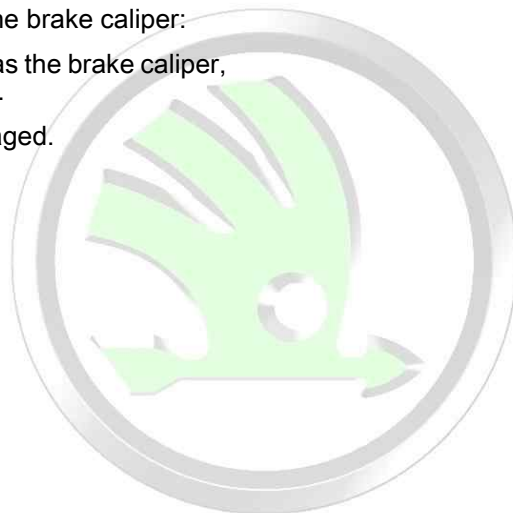
For brake caliper piston, press into the initial position:

- Check if the piston can be slightly pressed into the brake caliper.

If the piston cannot be slightly pressed into the brake caliper:

- Check and clean the brake piston as well as the brake caliper, replace sealing sleeve and protective cap.

Replace the brake caliper completely if damaged.



1.2 Repairing front wheel brake, floating caliper disc brake FS-III



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 94](#)*
- ◆ *Brake inspection ⇒ [page 8](#) .*
- ◆ *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- ◆ *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- ◆ *Use brake pedal loader , e.g. -V.A.G 1869/2- before removing a brake caliper or separating a brake hose from the brake caliper*

1 - Screw, 12 Nm

2 - Brake disc

- internally ventilated
- Assignment, dimensions and wear limit ⇒ [page 1](#)
- always replace axle-wise
- unscrew the brake caliper before removing

3 - Screw, 4 Nm

4 - Brake pads

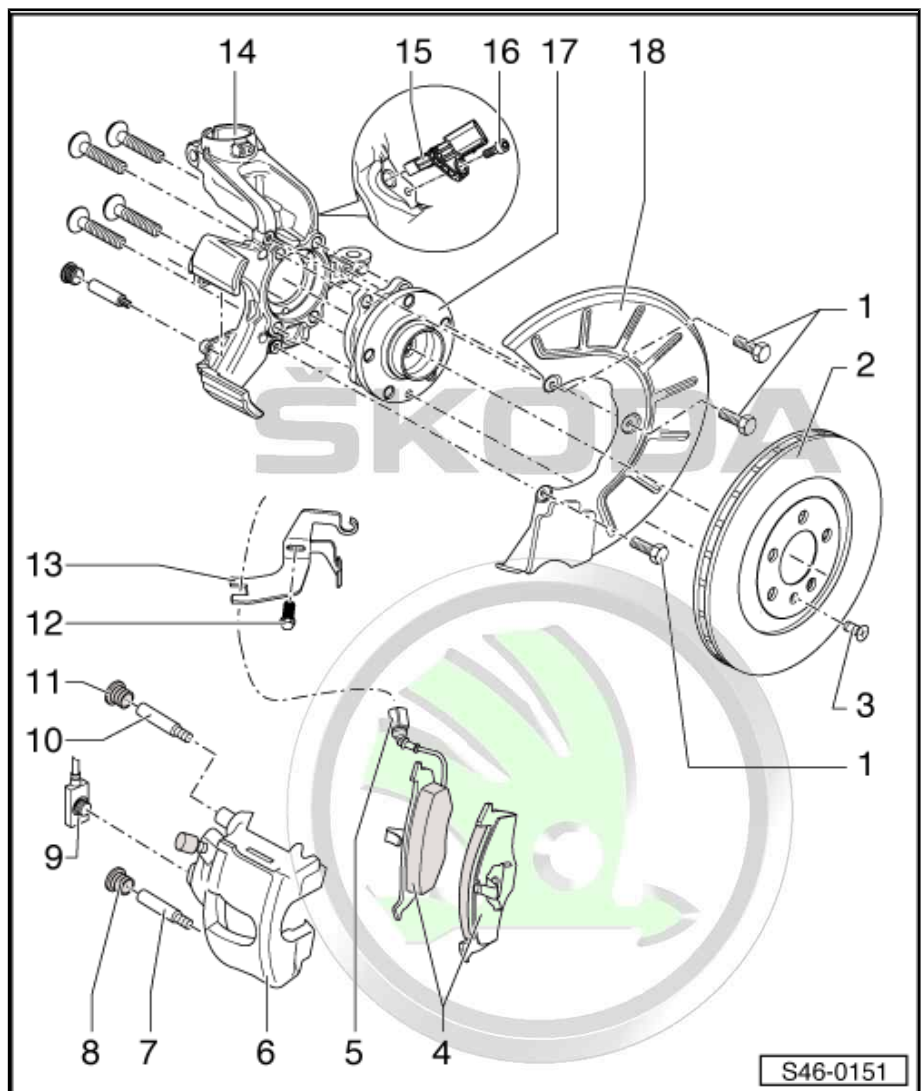
- Assignment, dimensions and wear limit ⇒ [page 1](#)
- with wear indicator (on the left side of the vehicle)
- if worn (pad thickness without supporting plate approx 4 mm) the brake pad warning light - K32- lights up in the dash panel insert
- always replace axle-wise
- Removing and installing ⇒ [page 96](#)
- Observe the instructions for changing the pad ⇒ [page 94](#)

5 - Connector

- for brake pad wear indicator

6 - Brake caliper

- do not unscrew the brake hose when replacing the brake pad
- Removing and installing ⇒ [page 100](#)
- repairing ⇒ [page 153](#)
- Observe the instructions for changing the pad ⇒ [page 94](#)



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7 - Guide bolt, 30 Nm

8 - Cap

- remove

9 - Brake hose with banjo union and hollow screw, 35 Nm

10 - Guide bolt, 30 Nm

11 - Cap

- remove

12 - Screw, 15 Nm

13 - Mounting bracket

14 - Wheel bearing housing

- with integrated brake carrier
- Version of wheel-bearing housing with three or four connecting screws ⇒ chassis, axles, steering; Rep. gr. 40

15 - ABS wheel speed sensor

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .

16 - Screw, 8 Nm

17 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub
- Version of wheel-bearing housing with three or four connecting screws ⇒ chassis, axles, steering; Rep. gr. 40

18 - Protection plate

1.3 Removing and installing brake pads, floating caliper disc brake FS-III

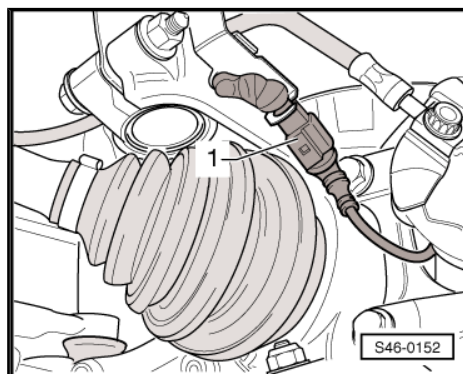
Special tools and workshop equipment required

- ◆ Piston jig - T10145-

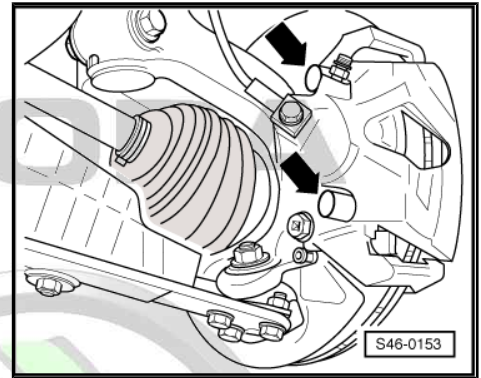
Removing:

Mark brake pads/linings when removing if they are to be reused.
Fit in same position when installing, or braking will be uneven!

- Remove wheels.
- Disconnect the plug connection -1- for the brake pad wear indicator.



- Remove caps -arrows-.



- Loosen and remove the two guide bolts -arrows- from the brake caliper.
- Remove brake caliper and secure with wire so that weight of brake caliper does not strain or damage brake hose.
- Take the brake pads out of the brake caliper.
- Clean brake caliper.

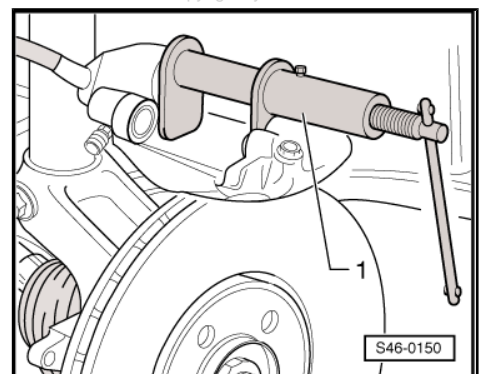
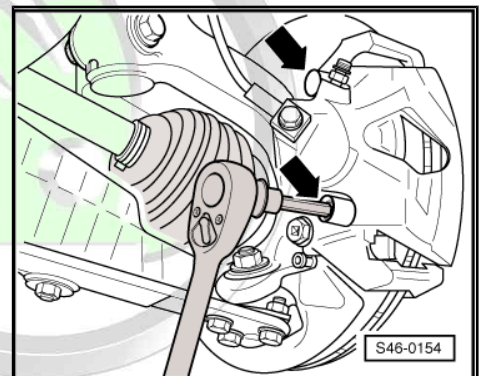
Only use alcohol to clean the brake caliper housing.

Installing:

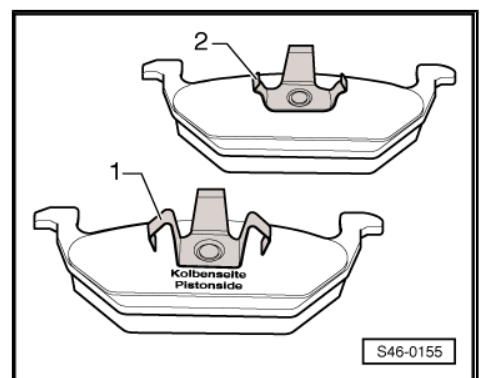
Drain the brake fluid from the brake fluid reservoir before the piston is pushed with the piston jig into the cylinder. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

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- Push piston back with piston jig - T10145- -1-.

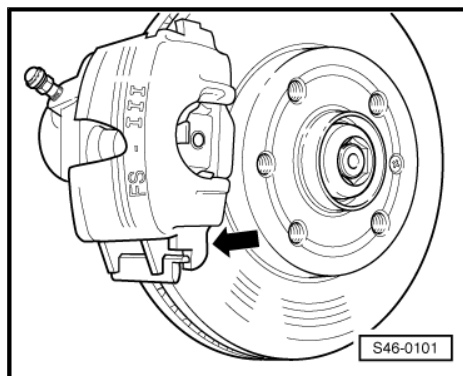


- Insert inside brake pad (piston side) -1- and outside brake pad -2- with retaining springs into the brake caliper.
- ◆ Inside brake pad (piston side) with large 3-finger clip -1-.
- ◆ Outside brake pad with small 3-finger clip -2- (black in colour).

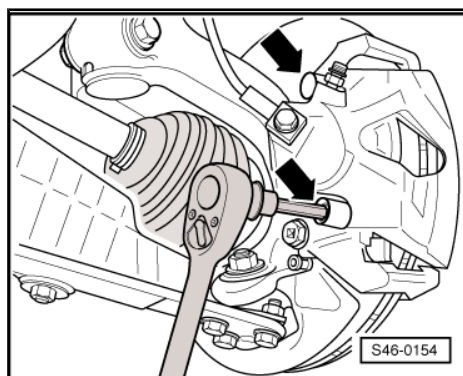




- First, position the brake caliper with the brake pads at the bottom -arrow- of the brake carrier.



- Screw the brake caliper with both guide bolts to the brake carrier.
- The bolt of the brake caliper must be located behind the guide of the brake carrier!
- Insert both caps.
- Mount the plug connection of the brake pad wear indicator.
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad => [page 94](#)*
- ◆ *After each brake pad replacement, forcefully apply the brake pedal repeatedly to ensure the brake pads go into their normal operating position.*
- ◆ *Check brake fluid level after changing brake pads.*

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Specified torques:

Guide bolt on brake carrier	30 Nm
Wheel bolts	120 Nm



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1.4 Removing and installing brake caliper, floating caliper disc brake FS-III

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-

Removing:

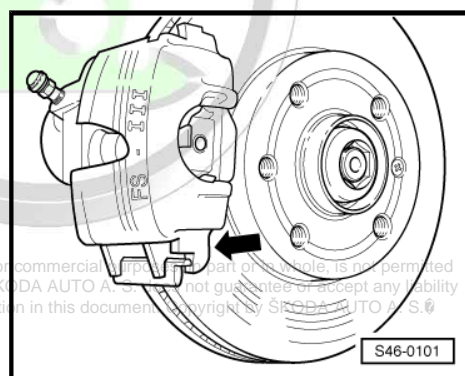
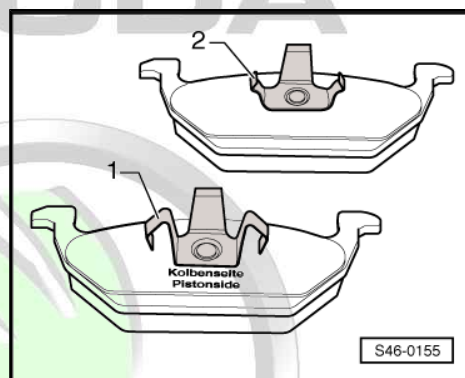
This procedure applies only to exchanging or the following repair work on the brake caliper.

- Remove wheels.
- Disconnect the connector for the brake pad wear indicator.
- Attach the bleeder hose of the bleeding bottle onto the vent valve of the brake caliper and then open then bleeder valve.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Close the vent valve and remove the bleeding bottle.
- Unscrew brake hose.
- Remove both caps out of the bushings of the brake caliper.
- Loosen and remove the two guide bolts from the brake caliper.
- Remove brake caliper from brake carrier
- Take out the brake pads from the brake caliper.

Installing:

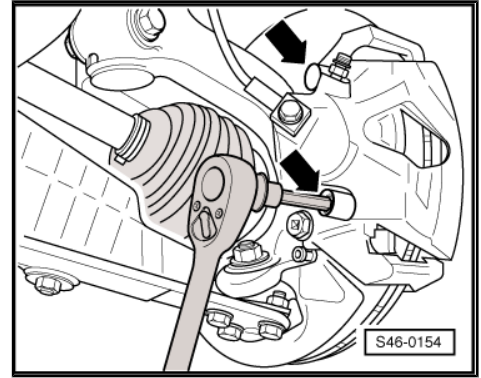
- The piston is pushed back.
- Insert inside brake pad (piston side) -1- and outside brake pad -2- with retaining springs into the brake caliper.
- ◆ Inside brake pad (piston side) with large 3-finger clip -1-.
- ◆ Outside brake pad with small 3-finger clip -2- (black in colour).

- First, position the brake caliper with the brake pads at the bottom -arrow- of the brake carrier.



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- Screw the brake caliper with both guide bolts to the brake carrier.
- The bolt of the brake caliper must be located behind the guide of the brake carrier!
- Insert both caps.
- Bolt brake hose to brake caliper.
- Remove brake pedal load , e.g. -V.A.G 1869/2- .
- Mount the plug connection of the brake pad wear indicator.
- Bleed brake system ⇒ [page 168](#) .
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 94](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*

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**Specified torques:**

Guide bolt on brake carrier	30 Nm
Brake hose to brake caliper	35 Nm
Wheel bolts	120 Nm

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1.5 Repairing front wheel brake, brake caliper FN3



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 94](#)*
- ◆ *Brake inspection ⇒ [page 8](#)*
- ◆ *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- ◆ *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- ◆ *Use brake pedal loader , e.g. -V.A.G 1869/2- before removing a brake caliper or separating a brake hose from the brake caliper*

1 - Screw, 4 Nm

2 - Brake disc

- internally ventilated
- Assignment, dimensions and wear limit ⇒ [page 1](#)
- always replace axle-wise
- unscrew the brake caliper before removing

3 - Brake pads

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- with wear indicator (on the left side of the vehicle)
- if worn (pad thickness without supporting plate approx 4 mm) the brake pad warning light - K32- lights up in the dash panel insert
- always replace axle-wise
- Removing and installing ⇒ [page 104](#)
- Observe the instructions for changing the pad ⇒ [page 94](#)

4 - Spring

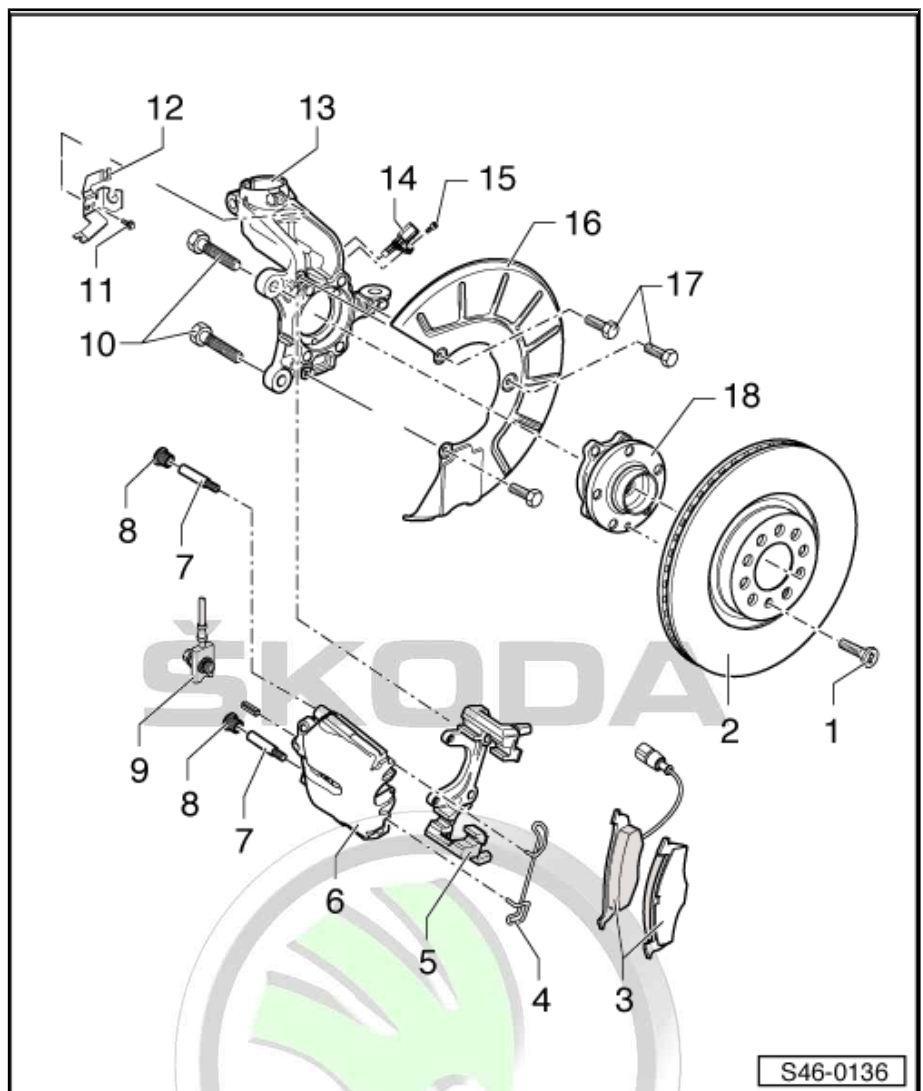
- inserted into both bore holes of the brake caliper

5 - Brake carrier

- screwed onto the wheel-bearing housing

6 - Brake caliper

- Observe the instructions for changing the pad ⇒ [page 94](#)
- do not unscrew the brake hose when replacing the brake pad
- Removing and installing ⇒ [page 108](#)





- repairing ⇒ [page 155](#)

7 - Guide bolt, 30 Nm

8 - Cap

- remove

9 - Brake hose with banjo union and hollow screw, 35 Nm

10 - Screw, 190 Nm

- clean when using again

11 - Screw, 15 Nm

12 - Mounting bracket

13 - Wheel bearing housing

- with bolted brake carrier

14 - ABS wheel speed sensor

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .

15 - Screw, 8 Nm

16 - Protection plate

17 - Screw 12 Nm

18 - Wheel hub with wheel bearing

- Sensor ring for ABS is built into the wheel hub

1.6 Removing and installing brake pads, brake calliper FN3

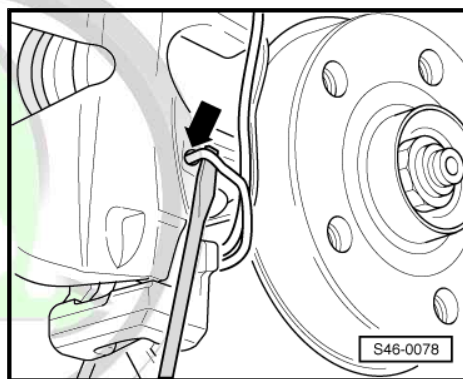
Special tools and workshop equipment required

- ◆ Piston jig - T10145-

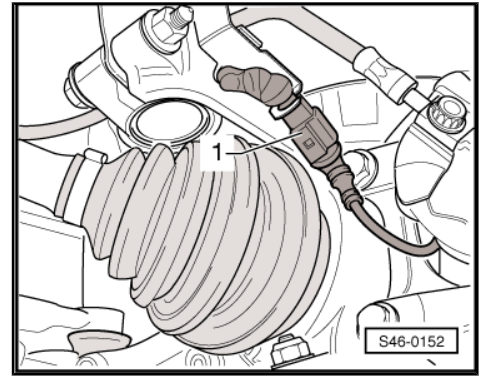
Removing:

Mark brake pads/linings when removing if they are to be reused.
 Fit in same position when installing, or braking will be uneven!

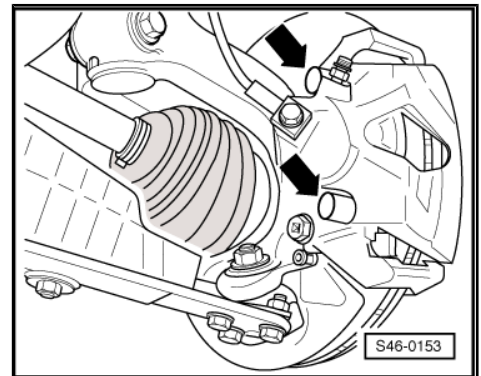
- Remove wheels.
- Lever up the retaining spring of the brake pads out of the brake caliper -arrow- using a screwdriver and remove.



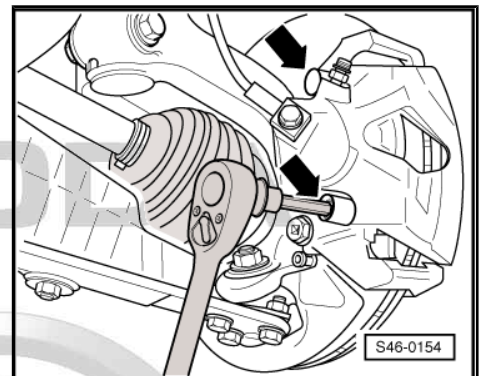
- Disconnect the plug connection -1- for the brake pad wear indicator.



- Remove caps -arrows-.



- Loosen and remove the two guide bolts -arrows- from the brake caliper.
- Remove brake caliper and secure with wire so that weight of brake caliper does not strain or damage brake hose.
- Take out the brake pads from the brake caliper or from the brake carrier.
- Clean the brake caliper, in particular the adhesive surface for the brake pad must be free from glue residues and grease.



Only use alcohol to clean the brake caliper housing.

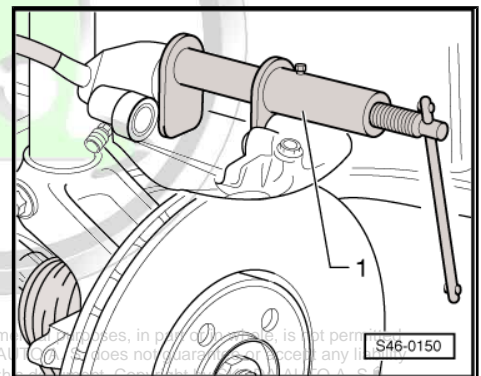
Installing:

Drain the brake fluid from the brake fluid reservoir before the piston is pushed with the piston jig into the cylinder. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

- Push piston back with piston jig - T10145- -1-.
- Remove the protective foil from the supporting plate of the outer brake pad.
- Place the outer brake pad on the brake carrier.
- Insert the inner brake pad with retaining spring into the brake caliper (piston).

When installing the brake caliper make sure that the brake pad does not stick to the brake caliper before reaching its correct installed position.

Do not damage the surface to be glued.



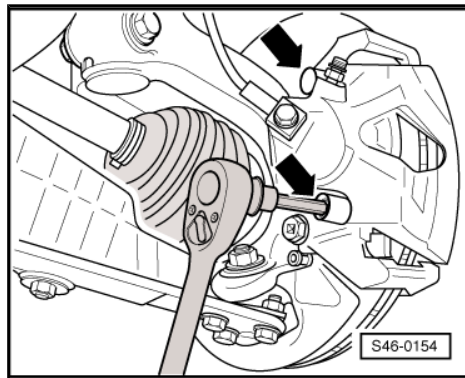


- Screw the brake caliper with both guide bolts to the brake carrier.
- Insert both caps.
- Insert retaining spring in brake caliper.
- Mount the plug connection of the brake pad wear indicator.
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 94](#)*
- ◆ *After each brake pad replacement, forcefully apply the brake pedal repeatedly to ensure the brake pads go into their normal operating position.*
- ◆ *Check brake fluid level after changing brake pads.*



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Specified torques:

Guide bolt on brake carrier	30 Nm
Brake hose to brake caliper	35 Nm
Wheel bolts	120 Nm

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1.7 Removing and installing brake caliper, brake caliper FN3

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-

Removing:



Note

This procedure applies only to exchanging or the following repair work on the brake caliper.

- Remove wheels.
- Lever up the retaining spring of the brake pads out of the brake caliper using a screwdriver and remove.
- Disconnect the connector for the brake pad wear indicator.
- Attach the bleeder hose of the bleeding bottle onto the vent valve of the brake caliper and then open then bleeder valve.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Close the vent valve and remove the bleeding bottle.
- Unscrew brake hose.
- Remove both caps out of the bushings of the brake caliper.
- Loosen and remove the two guide bolts from the brake caliper.
- Remove brake caliper from brake carrier
- Take out the brake pads from the brake caliper.

Installing:

- The piston is pushed back.
- The outside brake pad is fitted on the brake carrier.
- Insert the inner brake pad with retaining spring into the brake caliper (piston).

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When installing the brake caliper make sure that the brake pad does not stick to the brake caliper before reaching its correct installed position.

Do not damage the surface to be glued.

- Screw the brake caliper with both guide bolts to the brake carrier.
- Insert both caps.
- Bolt brake hose to brake caliper.
- Remove brake pedal load , e.g. -V.A.G 1869/2- .
- Insert retaining spring in brake caliper.
- Mount the plug connection of the brake pad wear indicator.
- Bleed brake system ⇒ [page 168](#) .
- Attach the wheels.

 Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 94](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*

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**Specified torques:**

Guide bolt on brake carrier	30 Nm
Brake hose to brake caliper	35 Nm
Wheel bolts	120 Nm

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2 Repairing rear brake

Changing the brake pads of the rear brake - Mounting instructions
⇒ [page 111](#)

Repairing rear brake CII 41 (vehicles with front and four-wheel drive) ⇒ [page 112](#)

Removing and installing brake pads CII 41 ⇒ [page 114](#)

Removing and installing brake pad CII 41 ⇒ [page 117](#)

Repairing rear brake CI 38 (vehicles with front-wheel drive)
⇒ [page 119](#)

Removing and installing brake pads CI 38 ⇒ [page 120](#)

Removing and installing brake caliper CI 38 ⇒ [page 123](#)

Repairing rear brake Bosch BIRIII (vehicles with front and four-wheel drive) ⇒ [page 125](#)

Removing and installing brake pads Bosch BIRIII ⇒ [page 126](#)

Removing and installing brake caliper Bosch BIRIII ⇒ [page 130](#)

2.1 Changing the brake pads of the rear brake - Mounting instructions

When changing the pads, pay attention to the following points:

- Check protective collar of brake calliper piston.

Replace protective cap if damaged.

When replacing the protective cap:

- Check the contact surfaces of the brake piston and the brake caliper for any dirt (oxidation).

Carefully clean the piston as well as the brake caliper if dirty and replace the sealing cap.

- Check the brake piston and the brake caliper (corrosion, grooves on the outside of the cylinder surface), replace the brake caliper completely if damaged.

For brake caliper piston, press into the initial position:

- Check if the piston can be slightly pressed into the brake caliper.

If the piston cannot be slightly pressed into the brake caliper:

- Check and clean the brake piston as well as the brake caliper, replace sealing sleeve and protective cap.

Replace the brake caliper completely if damaged.



2.2 Repairing rear brake CII 41 (vehicles with front and four-wheel drive)



Note

- ◆ Observe the instructions for changing the pad ⇒ [page 111](#)
- ◆ Brake inspection ⇒ [page 8](#).
- ◆ After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.
- ◆ Use the brake filling and bleeding device, e.g. -VAS 5234-, to drain the brake fluid from the brake fluid reservoir.
- ◆ Use brake pedal loader, e.g. -V.A.G 1869/2- before removing a brake caliper or separating a brake hose from the brake caliper

1 - ABS speed sensor (vehicles with front-wheel drive)

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3-.

2 - Screw, 8 Nm

3 - Screw, 90 Nm + 90°

- replace after each removal

4 - Wheel-bearing housing (vehicles with front-wheel drive)

5 - Protection plate

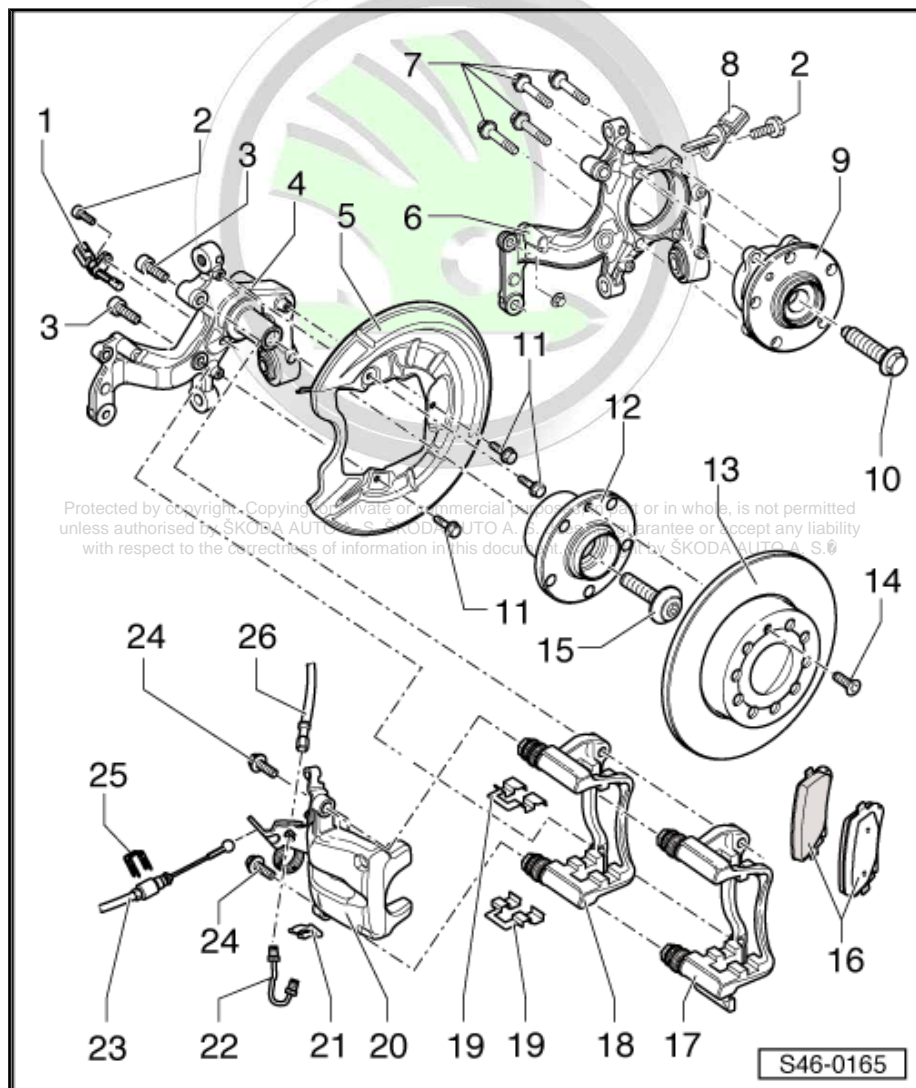
- up to 05/2007 for wheel bearing housing in steel casting with 3 holes
- as of 06/2007 for aluminium wheel bearing housing with 4 holes
- Assignment ⇒ Electronic Catalogue of Original parts

6 - Wheel-bearing housing (vehicles with four-wheel drive)

- different versions
- up to 05/2007 steel casting version
- as of 06/2007 aluminium version
- Assignment ⇒ Electronic Catalogue of Original parts

7 - Tighten screw 70 Nm + 90° (vehicles with four-wheel drive)

- replace after each removal



S46-0165

8 - ABS speed sensor (vehicles with four-wheel drive)

9 - Wheel hub with wheel bearing (vehicles with four-wheel drive)

10 - Screw (vehicles with four-wheel drive)

- Hexagon screw = 180 Nm + torque a further 180° ⇒ chassis, axles, steering; Rep. gr. 42
- Twelve-sided bolt = 70 Nm + torque a further 90° ⇒ chassis, axles, steering; Rep. gr. 42
- replace after each removal

11 - Screw, 12 Nm

- up to 05/2007 wheel bearing housing in steel casting and 3 screws
- as of 06/2007 aluminium wheel bearing housing and 4 screws
- Assignment ⇒ Electronic Catalogue of Original parts

12 - Wheel hub with wheel bearing (vehicles with front-wheel drive)

13 - Brake disc

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- if worn replace axle-wise
- unscrew the brake caliper before removing

14 - Screw, 4 Nm

15 - Tighten screw 180 Nm + 180° (vehicles with front-wheel drive)

- replace after each removal

⇒ Chassis, axles, steering; Rep. gr. 42

16 - Brake pads

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- always replace axle-wise
- Removing and installing ⇒ [page 114](#)
- Observe the instructions for changing the pad ⇒ [page 111](#)

17 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part
- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts



Note

When installing make sure that the weight points downwards.

- Assignment ⇒ Electronic Catalogue of Original parts

18 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part
- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts
- Assignment ⇒ Electronic Catalogue of Original Parts

19 - Pad retaining plate

- always replace when changing the brake pads

20 - Brake caliper

- do not unscrew the brake hose when replacing the brake pad
- Removing and installing ⇒ [page 117](#)
- repairing ⇒ [page 159](#)
- One must first adjust the hand-brake cable after undertaking repair or replacement work
- Setting the hand-brake ⇒ [page 132](#)
- Observe the instructions for changing the pad ⇒ [page 111](#)



21 - Hose clamp

22 - Brake line, 14 Nm

23 - Hand-brake cable

- Setting the hand-brake ⇒ [page 132](#)

24 - Self-locking screw, 35 Nm

- replace after each removal

25 - Spring strap clamp

- only fitted on certain versions

26 - Brake hose

2.3 Removing and installing brake pads CII 41

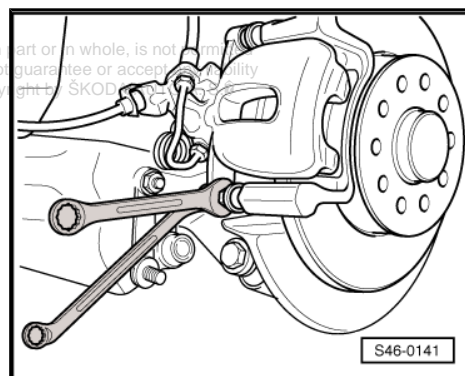
Special tools and workshop equipment required

- ◆ Resetting tool - T10165-

Removing:

**When removing mark the brake pads you intend to keep using.
Fit in same position when installing, or braking will be uneven!**

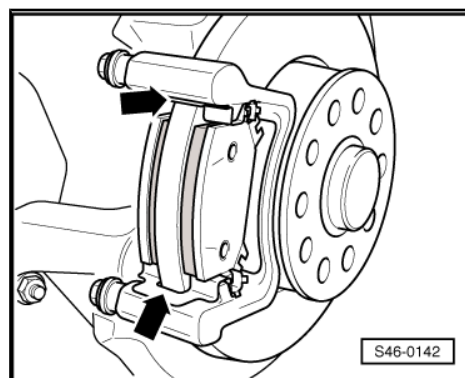
- Remove wheels.
- Unscrew the fixing screws of the brake carrier while counter-holding the guide bolts.
- Remove the brake caliper and e.g. secure with wire in such a way that the weight of the brake caliper does not burden or damage the brake hose.



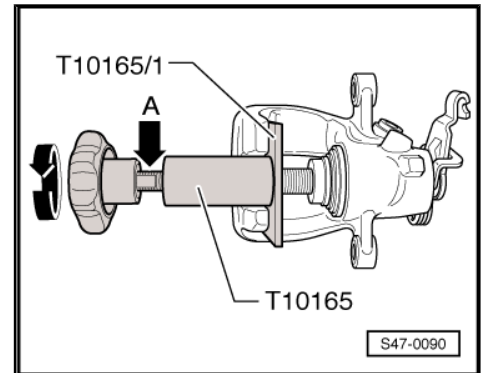
- Remove the brake pads and pad retaining plates -arrows-.

Installing:

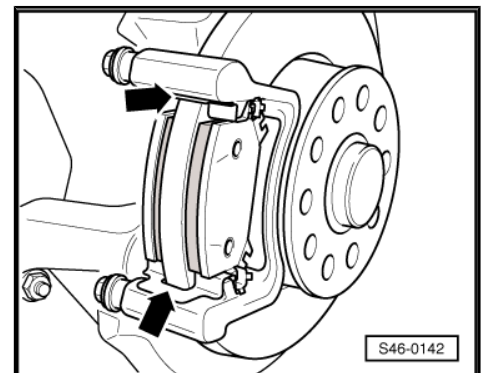
Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.



- Screw in the piston by turning the knurled wheel clockwise on the resetting tool - T10165- , during this procedure do not damage the protective cap.
- To insert use the special tool -T10165/1- .
- ◆ Use open-jawed spanner on a provided spanner surface -arrow A- if the piston is difficult to move.

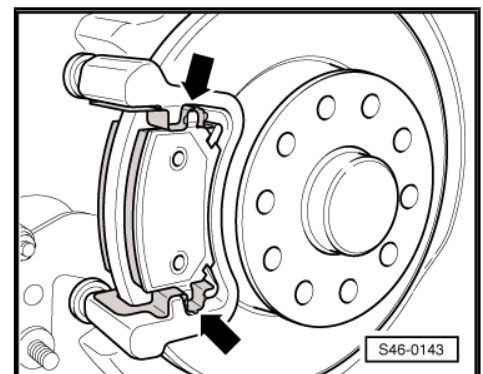


- Insert the new pad retaining plates -arrows- and brake pads in the brake carrier.



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- Make sure that the brake pads are located in the pad retaining plates -arrows-.
- Secure the brake caliper using new self-locking screws.
- ◆ There are four self-locking screws in the repair set, which must be fitted.
- Attach the wheels.



i Note

- ◆ *Observe the instructions for changing the pad => [page 111](#)*
- ◆ *After each brake pad replacement, forcefully apply the brake pedal repeatedly to ensure the brake pads go into their normal operating position.*
- ◆ *Check brake fluid level after changing brake pads.*

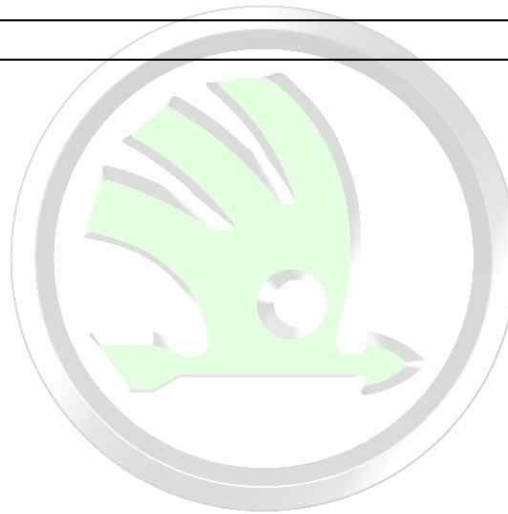
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Specified torques:

Brake calliper to brake carrier ◆ Use new self-locking screws!	35 Nm
Wheel bolts	120 Nm



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2.4 Removing and installing brake caliper CII 41

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-

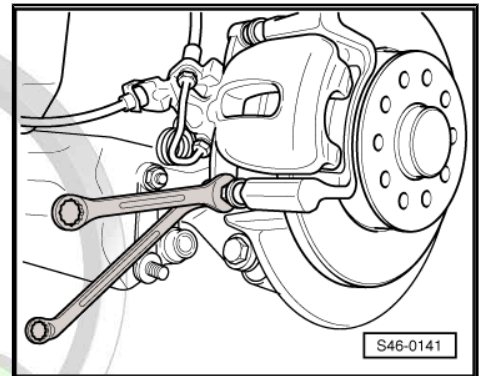
Removing:

This procedure applies only to exchanging or the following repair work on the brake caliper.

- Remove wheels.
- Detach the hand brake cable from the lever on the brake caliper.
- If necessary, remove spring clip and pull hand brake cable out of the brake caliper holder.
- Attach the bleeder hose of the bleeding bottle onto the vent valve of the brake caliper and open bleeder valve.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Close the vent valve and remove the bleeding bottle.
- Unscrew the brake line.
- Unscrew both fixing screws from the brake caliper while counterholding the guide bolt.
- Remove brake caliper from brake carrier

Installing:

- The piston is pushed back.
- The brake pads are fitted in the retaining springs on the brake caliper.
- Secure the brake caliper to the brake carrier using new self-locking screws.
- Screw the brake line onto the brake caliper.
- Bleed brake system ⇒ [page 168](#) .
- Install the hand brake cable and attach with spring clips to the support.
- Adjust handbrake ⇒ [page 132](#) .
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 111](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*

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**Specified torques:**

Brake calliper to brake carrier ◆ Use new self-locking screws!	35 Nm
Brake line to brake calliper	12 Nm
Wheel bolts	120 Nm

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2.5 Repairing rear brake CI 38 (vehicles with front-wheel drive)

Note

- ◆ *Brake inspection ⇒ [page 8](#) .*
- ◆ *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- ◆ *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- ◆ *Use brake pedal loader , e.g. -V.A.G 1869/2- before removing a brake caliper or separating a brake hose from the brake caliper*

1 - ABS wheel speed sensor

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .

2 - Screw, 8 Nm

3 - Screw, 90 Nm + 90°

- replace after each removal

4 - Wheel bearing housing

5 - Protection plate

6 - Screw, 12 Nm

7 - Wheel hub with wheel bearing

8 - Screw, 180 Nm + 180°

- replace after each removal

9 - Dust cap

10 - Brake disc

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- if worn replace axle-wise
- unscrew the brake caliper before removing

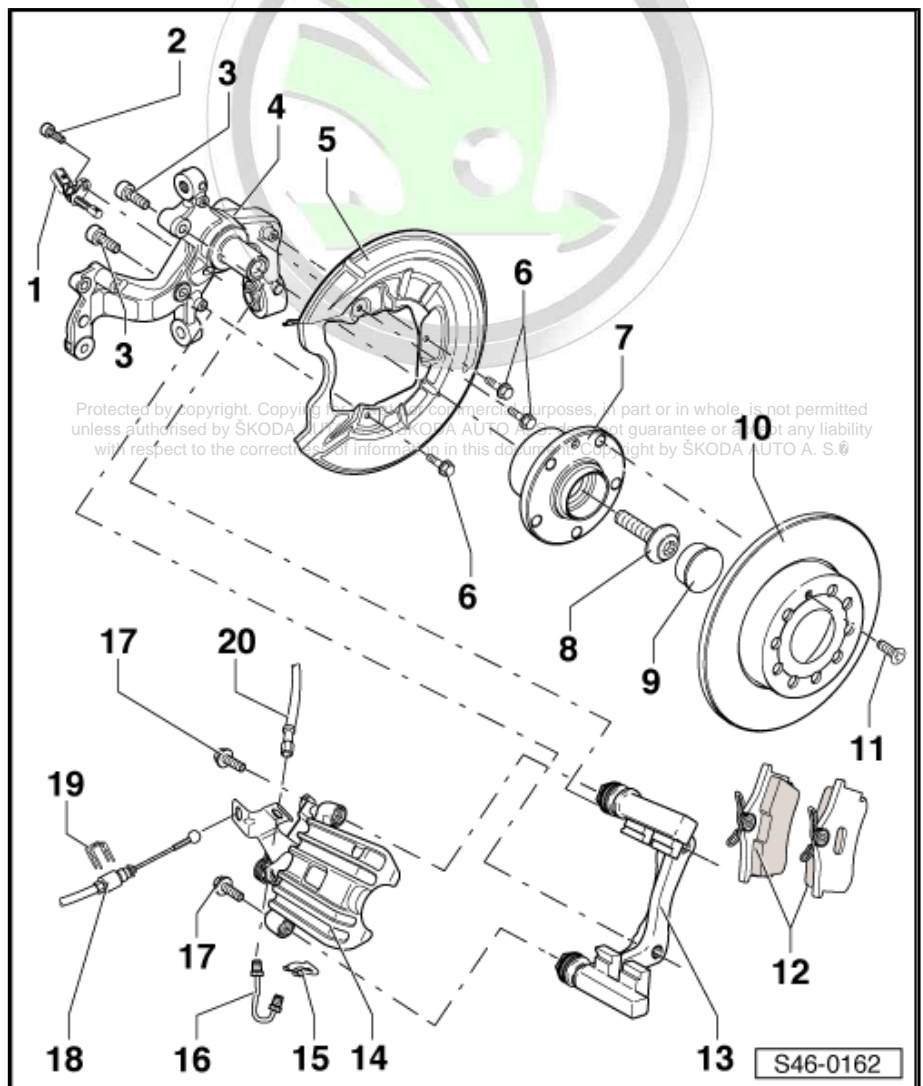
11 - Screw, 4 Nm

12 - Brake pads

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- always replace axle-wise
- Removing and installing ⇒ [page 120](#)
- Observe the instructions for changing the pad ⇒ [page 111](#)

13 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part
- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts





14 - Brake caliper

- do not unscrew the brake hose when replacing the brake pad
- Removing and installing ⇒ [page 123](#)
- repairing ⇒ [page 159](#)
- One must first adjust the hand-brake cable after undertaking repair or replacement work
- Setting the hand-brake ⇒ [page 132](#)
- Observe the instructions for changing the pad ⇒ [page 111](#)

15 - Hose clamp

16 - Brake line, 14 Nm

17 - Self-locking screw, 35 Nm

- replace after each removal

18 - Hand-brake cable

- Setting the hand-brake ⇒ [page 132](#)

19 - Spring strap clamp

- only fitted on certain versions

20 - Brake hose

2.6 Removing and installing brake pads CI 38

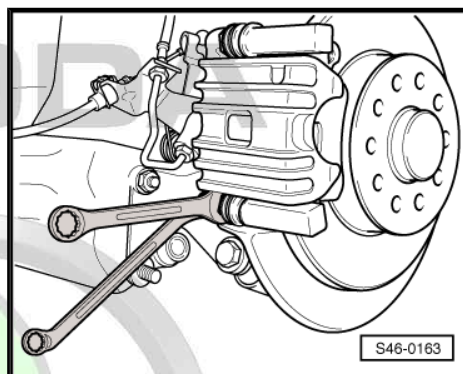
Special tools and workshop equipment required

- ◆ Resetting tool - T10165-

Removing:

When removing mark the brake pads you intend to keep using. Fit in same position when installing, or braking will be uneven!

- Remove wheels.
- Unscrew the fixing screws of the brake caliper while counter-holding the guide bolts.
- Remove the brake caliper and e.g. secure with wire in such a way that the weight of the brake caliper does not burden or damage the brake hose.
- Take out the brake pads.
- Clean the brake caliper, in particular the adhesive surface for the brake pad must be free from glue residues and grease.



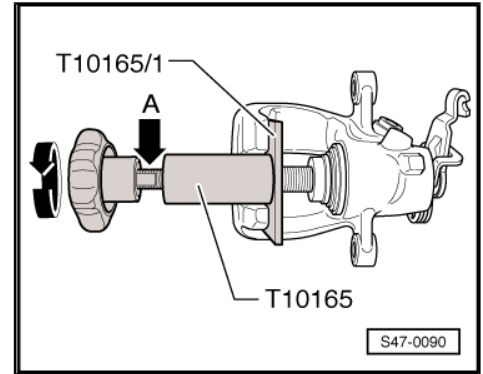
Note

Only use alcohol to clean the brake caliper housing.

Installing:

Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.

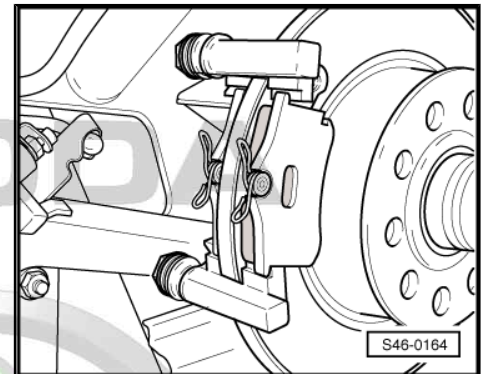
- Screw in the piston by turning the knurled wheel clockwise on the resetting tool - T10165- , during this procedure do not damage the protective cap.
- To insert use the special tool -T10165/1- .
- ◆ Use open-jawed spanner on a provided spanner surface -arrow A- if the piston is difficult to move.
- Remove the protective foils from the supporting plates of the new brake pad.



- Insert the brake pads into the brake carrier.

When installing the brake caliper make sure that the brake pads does not stick to the brake caliper before reaching its correct installed position.

- Secure the brake caliper using new self-locking screws.
- ◆ There are four self-locking screws in the repair set, which must be fitted.
- Attach the wheels.



i Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 111](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*

**Specified torques:**

Brake calliper to brake carrier ◆ Use new self-locking screws!	35 Nm
Wheel bolts	120 Nm

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2.7 Removing and installing brake caliper CI 38

Special tools and workshop equipment required

- ◆ Brake pedal load e.g. -V.A.G 1869/2-
- ◆ Bleeding bottle (commercially available)

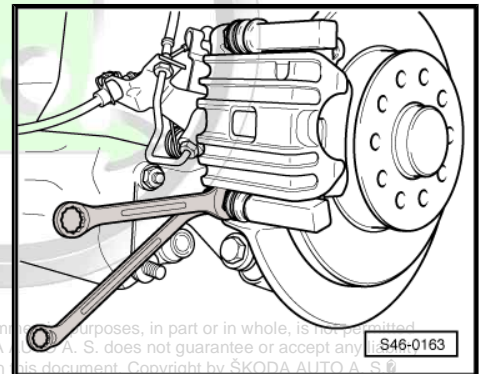
Removing:

This procedure applies only to exchanging or the following repair work on the brake caliper.

- Remove wheels.
- Detach the hand brake cable from the lever on the brake caliper.
- If necessary, remove spring clip and pull hand brake cable out of the brake line holder.
- Attach the bleeder hose of the bleeding bottle onto the vent valve of the brake caliper and then open then bleeder valve.
- Position brake pedal load , e.g. -V.A.G 1869/2- .
- Close the vent valve and remove the bleeding bottle.
- Unscrew the brake line.
- Unscrew both fixing screws from the brake caliper while counterholding the guide bolt.
- Pull off brake caliper from brake carrier.

Installing:

- The piston is pushed back.
- The brake pads are fitted on the brake carrier.
- Secure the brake caliper to the brake carrier using new self-locking screws.
- Screw the brake line onto the brake caliper.
- Bleed brake system ⇒ [page 168](#) .
- Install the hand brake cable and if necessary attach with spring clips to the support.
- Adjust handbrake ⇒ [page 132](#) .
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 111](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*

**Specified torques:**

Brake calliper to brake carrier ◆ Use new self-locking screws!	35 Nm
Brake line to brake calliper	12 Nm
Wheel bolts	120 Nm

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2.8 Repairing rear brake Bosch BIRIII (vehicles with front and four-wheel drive)

Note

- ◆ *Brake inspection ⇒ page 8 .*
- ◆ *After replacing the brake pads, depress brake pedal firmly several times when the vehicle is stationary to ensure the brake pads are properly seated in their normal operating position.*
- ◆ *Use the brake filling and bleeding device , e.g. -VAS 5234- , to drain the brake fluid from the brake fluid reservoir.*
- ◆ *The brake pedal load , e.g. -V.A.G 1869/2- , must be inserted before removing a brake caliper or separating a brake hose from the brake caliper.*

1 - Screw, 70 Nm + 90°

- replace after each removal

2 - ABS speed sensor (vehicles with four-wheel drive)

- clean the inner surface of the hole before inserting the sensor and brush over with a hot bolt paste - G 052 112 A3- .

3 - Screw, 8 Nm

4 - ABS speed sensor (vehicles with front-wheel drive)

5 - Wheel-bearing housing (vehicles with front-wheel drive)

- Assignment ⇒ Electronic Catalogue of Original parts

6 - Wheel hub with wheel bearing (vehicles with front-wheel drive)

- Assignment ⇒ Electronic Catalogue of Original parts

7 - Tighten screw 180 Nm + 180° (vehicles with front-wheel drive)

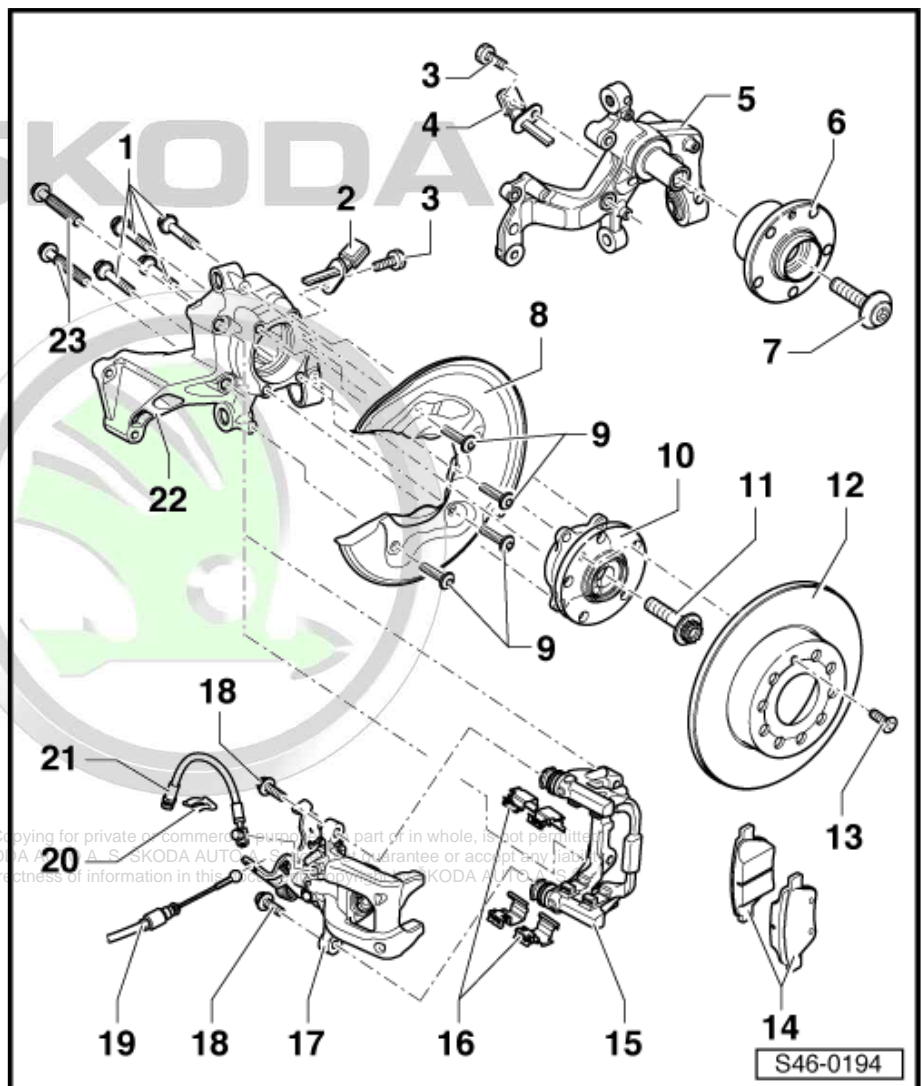
- replace after each removal
- removing and installing ⇒ chassis, axles, steering; Rep. gr. 42

8 - Protection plate

- for vehicles with front-wheel drive, 3 holes
- for vehicles with four-wheel drive, 4 holes
- Assignment ⇒ Electronic Catalogue of Original parts

9 - Screw, 12 Nm

- for vehicles with front-wheel drive, 3 screws
- for vehicles with four-wheel drive, 4 screws
- Assignment ⇒ Electronic Catalogue of Original parts





10 - Wheel hub with wheel bearing (vehicles with four-wheel drive)

- Assignment ⇒ Electronic Catalogue of Original parts

11 - Tighten screw 70 Nm + 90° (vehicles with four-wheel drive)

- replace after each removal
- removing and installing ⇒ chassis, axles, steering; Rep. gr. 42

12 - Brake disc

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- if worn replace axle-wise
- unscrew the brake caliper before removing
- Assignment ⇒ Electronic Catalogue of Original Parts

13 - Screw, 4 Nm

14 - Brake pads

- Assignment, dimensions and wear limit ⇒ [page 1](#)
- always replace axle-wise
- Removing and installing ⇒ [page 126](#)
- Observe the instructions for changing the pad ⇒ [page 111](#)

15 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part
- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts
- Assignment ⇒ Electronic Catalogue of Original Parts

16 - Pad retaining plate

- always replace when changing the brake pads

17 - Brake caliper

- Observe the instructions for changing the pad ⇒ [page 111](#)
- do not unscrew the brake hose when replacing the brake pad
- Removing and installing ⇒ [page 130](#)
- repairing ⇒ [page 163](#)
- One must first adjust the hand-brake cable after undertaking repair or replacement work
- Setting the hand-brake ⇒ [page 132](#)

18 - Self-locking screw, 35 Nm

- replace after each removal

19 - Hand-brake cable

- Setting the hand-brake ⇒ [page 132](#)

20 - Retaining clip for brake line

21 - Brake hose with banjo union and hollow screw, 35 Nm

22 - Wheel-bearing housing (vehicles with four-wheel drive)

- Assignment ⇒ Electronic Catalogue of Original parts

23 - Screw, 90 Nm + 90°

- replace after each removal

2.9 Removing and installing brake pads Bosch BIRIII

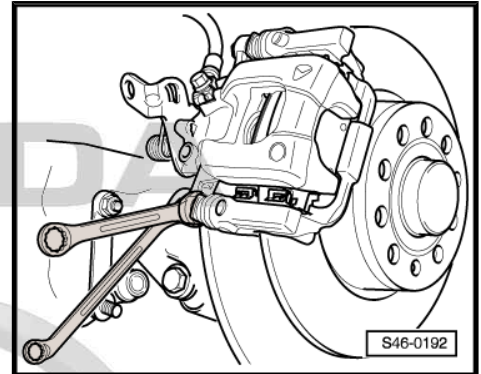
Special tools and workshop equipment required

- ◆ Resetting tool - T10165-

Removing:

When removing mark the brake pads you intend to keep using. Fit in same position when installing, or braking will be uneven!

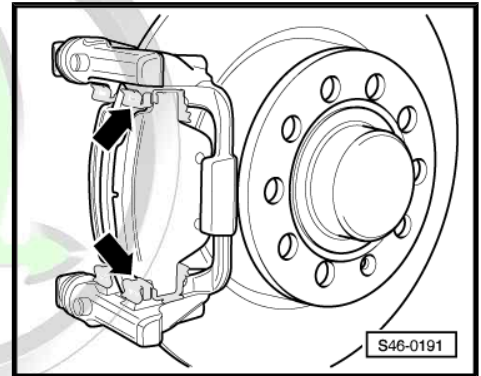
- Remove wheels.
- Unscrew the fixing screws of the brake carrier while counter-holding the guide bolts.
- Remove the brake caliper and e.g. secure with wire in such a way that the weight of the brake caliper does not burden or damage the brake hose.



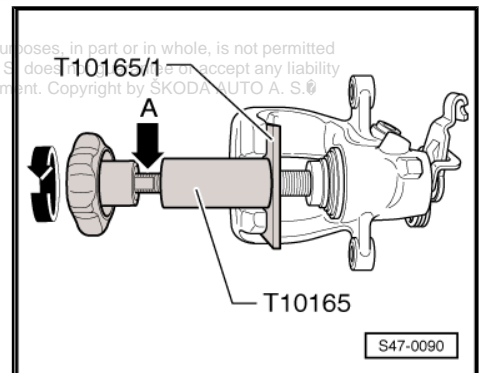
- Remove the brake pads and pad retaining plates -arrows-.

Installing:

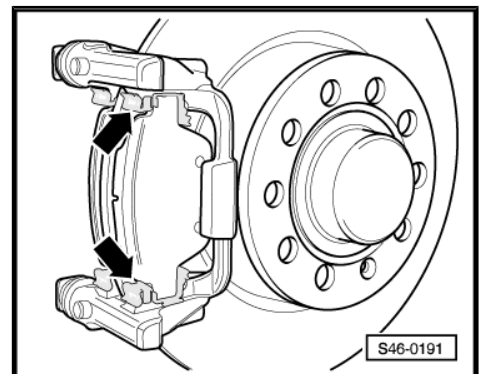
Drain the brake fluid from the brake fluid reservoir using a ventilation bottle before resetting the piston. Otherwise, particularly if reservoir has been topped up, fluid will overflow and cause damage.



- Screw in the piston by turning the knurled wheel clockwise on the resetting tool - T10165-, during this procedure do not damage the protective cap.
- To insert use the special tool -T10165/1- .
- ◆ Use open-jawed spanner on a provided spanner surface -arrow A- if the piston is difficult to move.



- Insert the new pad retaining plates -arrows- and brake pads in the brake carrier.



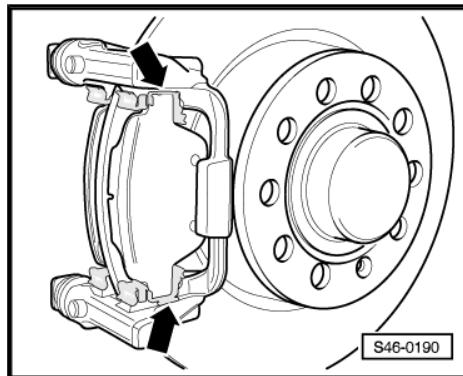


- Make sure that the brake pads are located in the pad retaining plates -arrows-.
- Secure the brake caliper using new self-locking screws.
- ◆ There are four self-locking screws in the repair set, which must be fitted.
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 111](#)*
- ◆ *After each brake pad replacement, forcefully apply the brake pedal repeatedly to ensure the brake pads go into their normal operating position.*
- ◆ *Check brake fluid level after changing brake pads.*



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Specified torques:

Brake calliper to brake carrier ◆ Use new self-locking screws!	35 Nm
Wheel bolts	120 Nm



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2.10 Removing and installing brake caliper Bosch BIRIII

Special tools and workshop equipment required

- ◆ Brake pedal load , e.g. -V.A.G 1869/2-

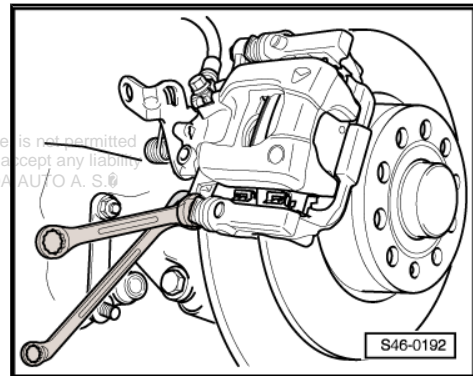
Removing:

This procedure applies only to exchanging or the following repair work on the brake caliper.

- Remove wheels.
- Detach the hand brake cable from the lever on the brake caliper.
- Remove spring clip and pull hand brake cable out of the brake caliper holder.
- Attach the bleeder hose of the bleeding bottle onto the vent valve of the brake caliper and open bleeder valve.
- Brake pedal load e.g. -V.A.G 1869/2-
- Close the vent valve and remove the bleeding bottle.
- Unscrew brake hose.
- Unscrew the fixing screws of the brake carrier while counter-holding the guide bolts.
- Remove brake caliper from brake carrier

Installing:

- The piston is pushed back.
- The brake pads are fitted in the retaining springs on the brake caliper.
- Secure the brake caliper to the brake carrier using new self-locking screws.
- Bolt brake hose to brake caliper.
- Bleed brake system ⇒ [page 168](#) .
- Install the hand brake cable and attach with spring clips to the support.
- Adjust handbrake ⇒ [page 132](#) .
- Attach the wheels.



Note

- ◆ *Observe the instructions for changing the pad ⇒ [page 111](#)*
- ◆ *Firmly depress brake pedal several times with vehicle stationary so that the brake pads are properly seated in their normal operating position.*
- ◆ *Check brake fluid level.*



Specified torques:

Brake calliper to brake carrier ♦ Use new self-locking screws!	35 Nm
Hollow screw for brake line to brake caliper	35 Nm
Wheel bolts	120 Nm

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3 Handbrake

Handbrake lever - Summary of components ⇒ [page 132](#)

Setting the hand-brake ⇒ [page 132](#)

Removing and installing the hand-brake cable ⇒ [page 133](#)

3.1 Handbrake lever - Summary of components

1 - Handbrake lever

- Remove the centre console before removal

2 - Nut, 15 Nm

3 - Control cable

4 - Compensating clamp

5 - Adjusting nut

- Setting the hand-brake ⇒ [page 132](#)

6 - Hand-brake cable

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

7 - Switch for hand-brake control

8 - Adapter, 15 Nm

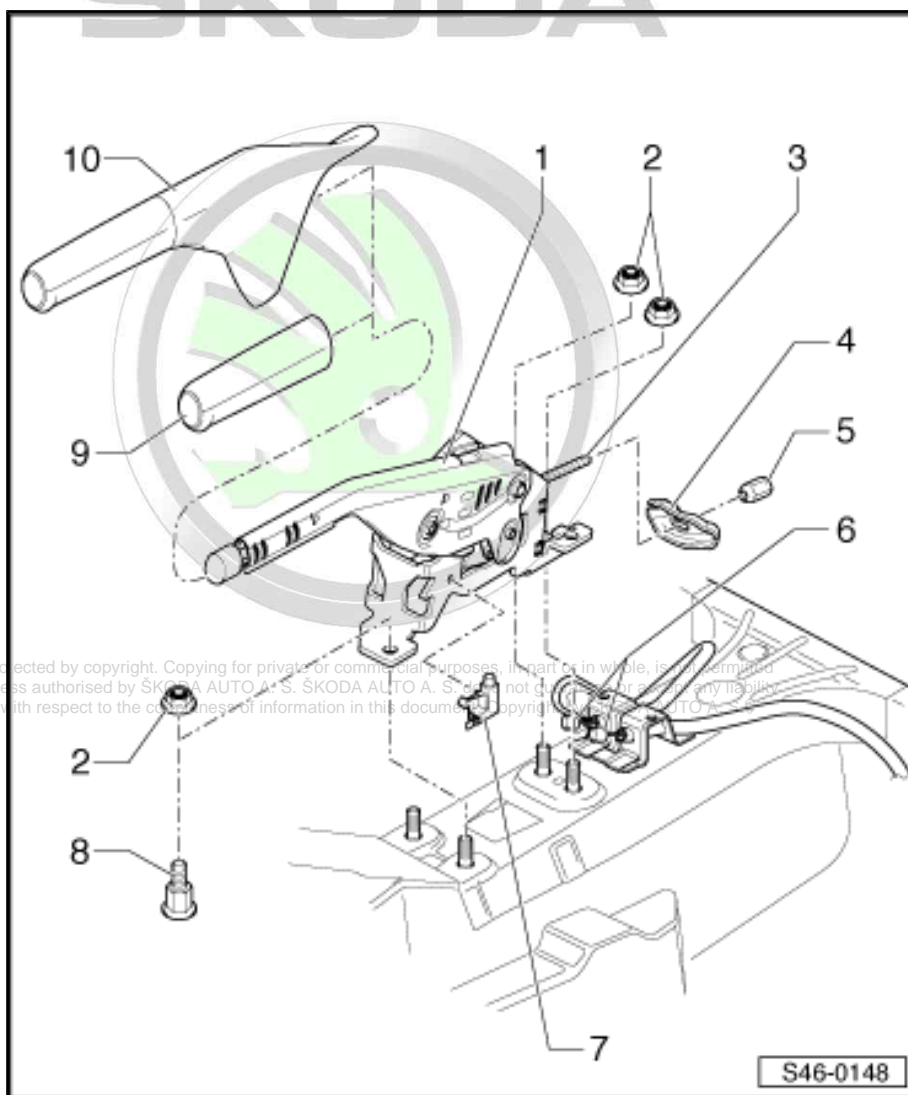
- for vehicles with high centre console

9 - Covering for the hand brake lever

- for vehicles with high centre console

10 - Covering for the hand brake lever

- for vehicles with flat centre console

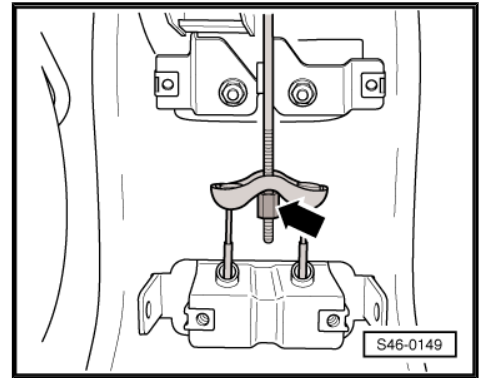


3.2 Setting the hand-brake

Resetting is only required after replacing the hand-brake cable, the brake carrier or after replacing the brake discs.

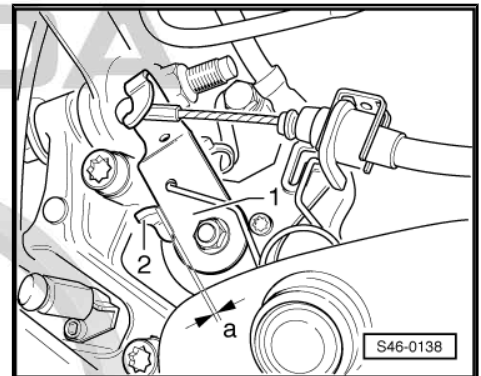
- Depending on the equipment fitted, remove the storage compartment at the rear, the ashtray or the centre console ⇒ Bodywork - assembly work; Rep. gr. 68 .
- Forcefully apply the brake pedal (at least 3 times).
- Pull the handbrake on and release it three times.
- Put the hand brake lever in its rest position.

- Tighten adjusting nut -arrow-, ...



- ... So that the levers -1- rise from the stop -2- on the brake calipers.
- The distance -a- to the stop -2- on the left and right brake caliper must together not exceed 1.5 mm.
- Check whether both wheels rotate freely.

Once reset, no resetting of the hand brake is necessary due to automatic adjustment of the brakes on the rear wheels.

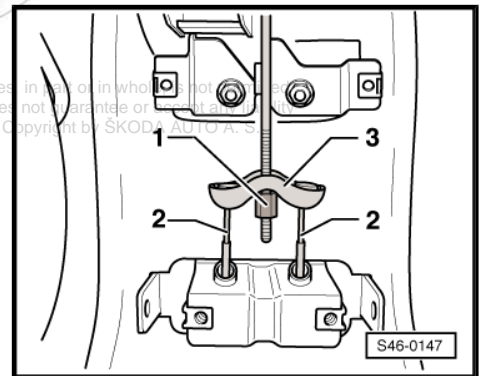


3.3 Removing and installing the hand-brake cable

Removing:

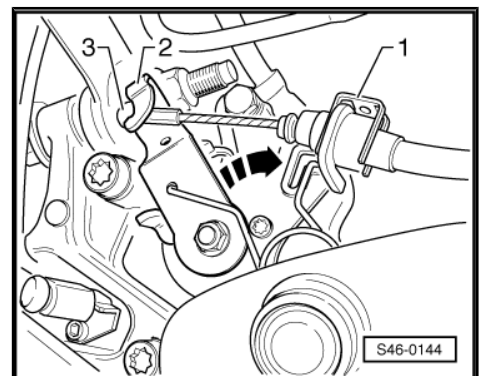
- Put hand-brake back.
- Remove the centre console => Body Work; Rep. gr. 68 .
- Release the adjusting nut -1- so far until the respective hand-brake cable -2- can be unhooked from the compensating clamp -3-.

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For the version with the spring clip

- Lever off spring clip -1-.



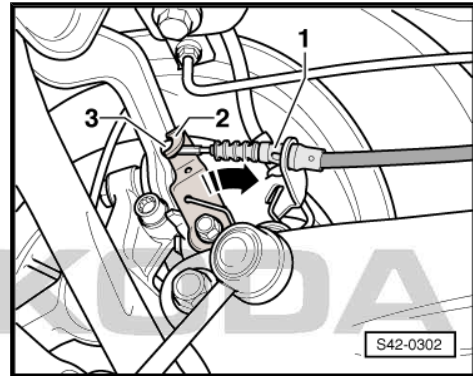


For the version with the spring bushing

- Slacken the spring bushing -1- for the hand-brake cable from the bracket on the brake caliper.

Continued for all versions

- Press the lever at brake caliper -2- in the -direction of the arrow- and unhook the hand-brake cable -3-.
- Unscrew screw for hand brake cable from trailing arm.
- Unhook hand-brake cable from the bracket and pull out of the guide tube.



Installing:

- Push the hand-brake cable into the guide tube and attach it to the bracket.
- Press the lever at brake caliper -2- in the direction of the arrow and hook on the hand-brake cable -3-.

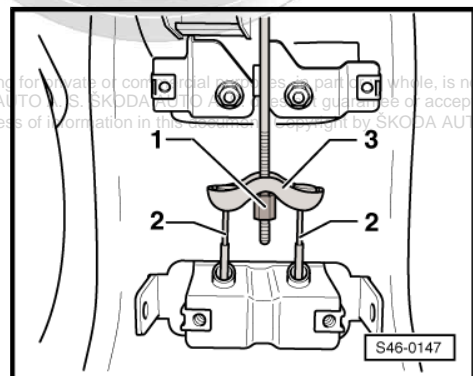
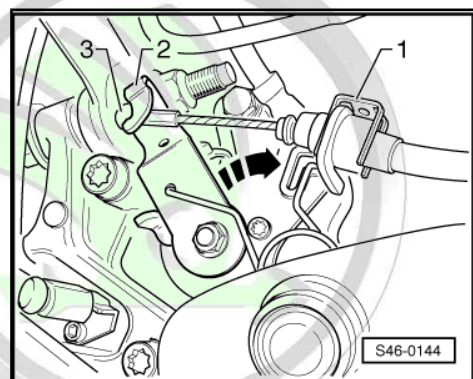
For the version with the spring clip

- Press the spring clip -1- onto the hand-brake cable.

Continued for all versions

The hand-brake cable must be fitted free of stress between the brake caliper support and the retaining clip.

- Screw the retaining clip to the trailing arm.
- Hook the hand-brake cable -2- into the compensating clamp -3-.
- Tension the hand-brake cable with the adjusting nut -1-.
- Adjust handbrake ⇒ [page 132](#) .



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4 Brake pedal - left-hand drive

Summary of components of brake pedal ⇒ [page 135](#)

Separating the brake pedal from the brake servo unit and clipping onto the brake servo unit ⇒ [page 137](#)

Removing and installing brake pedal ⇒ [page 137](#)

Removing and installing bracket ⇒ [page 138](#)

Setting, removing and installing the brake light switch - F- and brake pedal switch - F47- to 10/05 ⇒ [page 138](#)

Removing and installing brake light switch -F- and brake pedal switch -F47- as of 11.05 ⇒ [page 139](#)

4.1 Summary of components of brake pedal



WARNING

The brake pedal travel must not be restricted by additional floor coverings.

Grease all bearing surfaces with polycarbamide grease - G 052 142 A2- before assembly.



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1 - Bearing bracket

- Removing and installing
⇒ [page 138](#)
- up to 05/2007
- Assignment ⇒ Electronic Catalogue of Original parts

2 - Self-locking nut, 25 Nm

3 - The brake light switch - F- and brake pedal switch - F47-



Note

*Mounted on vehicles until 10.05.
From 11/05, the brake light switch - F- and the brake pedal switch - F47- are mounted onto the master brake cylinder ⇒ [page 139](#)*

- before assembling the brake light switch, clip the brake pedal to the pressure rod of the brake servo unit
⇒ [page 137](#)
- Grease tappet head with polycarbamide grease - G 052 142 A2- .
- Setting the brake light switch ⇒ [page 138](#)

4 - Bearing bracket

- Removing and installing
⇒ [page 138](#)
- as of 06/2007
- Assignment ⇒ Electronic Catalogue of Original parts

5 - Self-locking nut, 25 Nm

6 - Brake pedal

7 - Cap

8 - Bearing shell

9 - Support

- for ball head of pressure rod of brake servo unit

10 - Screw

11 - Bushing

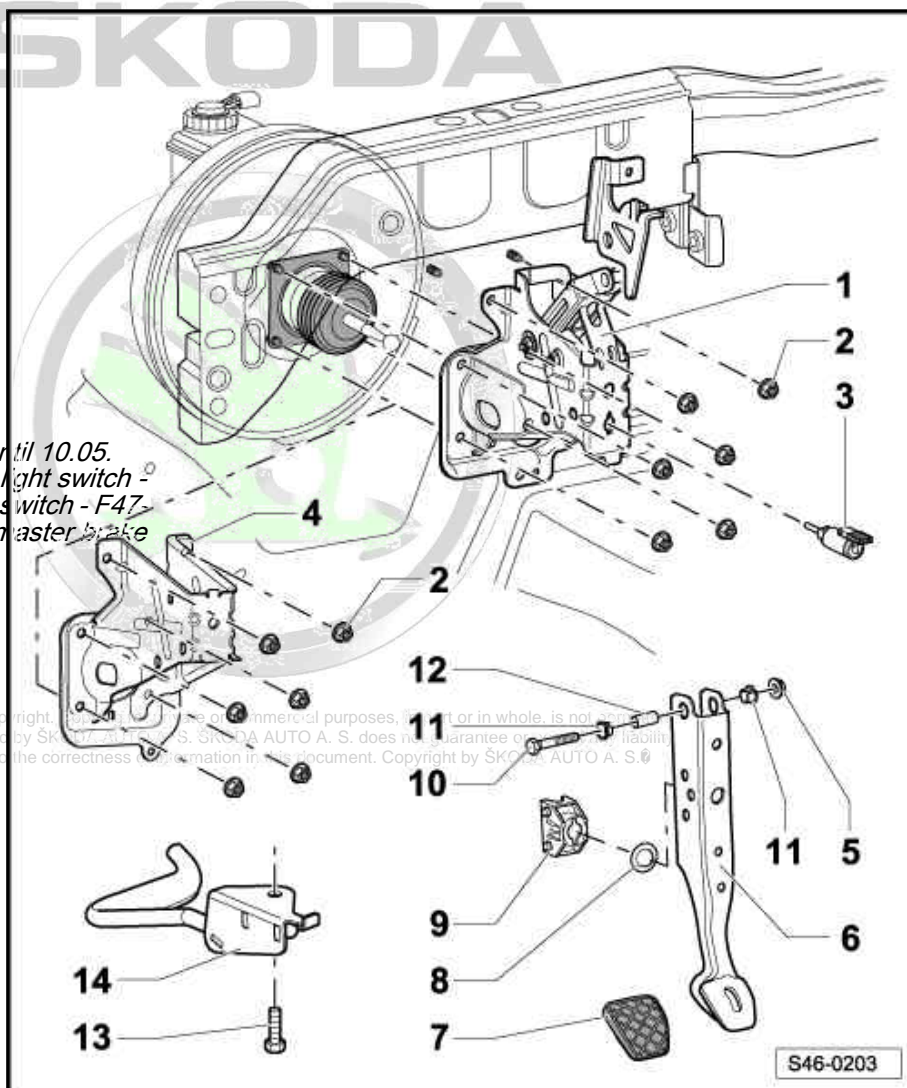
12 - Bearing shaft

13 - Screw, 20 Nm

- Assignment ⇒ Electronic Catalogue of Original parts

14 - Crash bar

- as of 06/2007
- Assignment ⇒ Electronic Catalogue of Original parts



4.2 Separating the brake pedal from the brake servo unit and clipping onto brake servo unit

Special tools and workshop equipment required

- ◆ Release tool - T10159A-

Separate:

- Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .

For vehicles up to 10.2005

- Unplug connector from brake light switch.
- Remove brake light switch by turning 45° to the left.

For all vehicles

- Press the brake pedal towards the brake servo unit and hold it in position.
- Insert release tool - T10159A- and pull it in the direction of the driver's seat while counterholding the brake pedal (the pedal must not move backwards during this operation). This pushes the retaining lugs -3- of the mount off the ball head of the push rod -2-.

The figure shows the separation of the brake pedal from the brake servo unit with the foot controls removed for clarity.

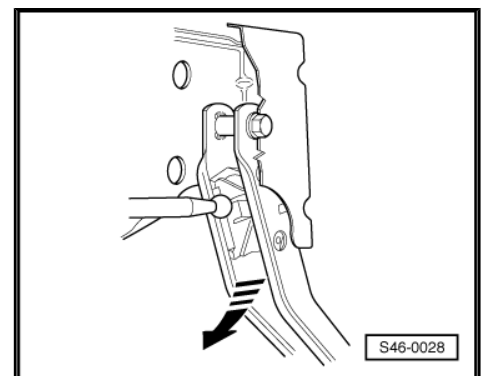
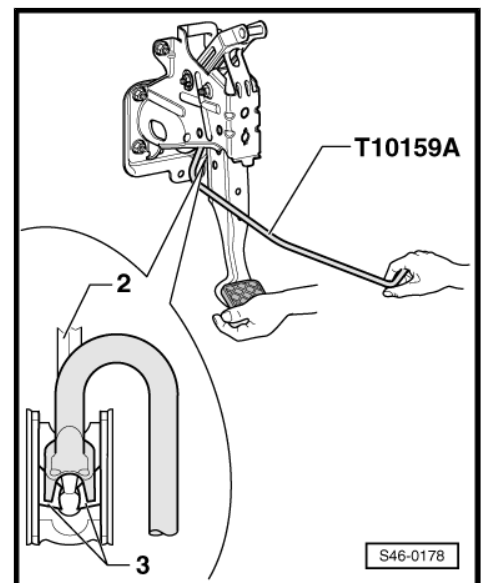
- Pull release tool - T10159A- and brake pedal together towards driver seat. (This causes the brake pedal to be drawn off the ball head of the push rod).

Clipping:

- Hold ball head of push rod in front of mount and push brake pedal in direction of brake servo, so that the ball head clicks into place.

Further installation occurs in reverse order.

- Setting the brake light switch ⇒ [page 138](#) .



4.3 Removing and installing brake pedal

Removing

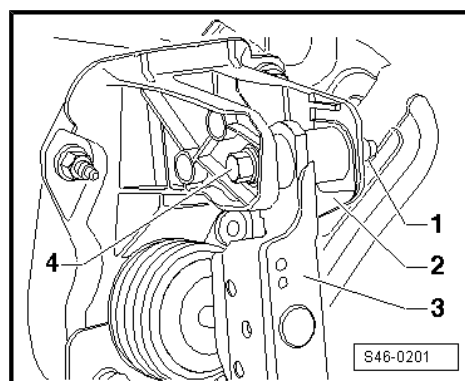
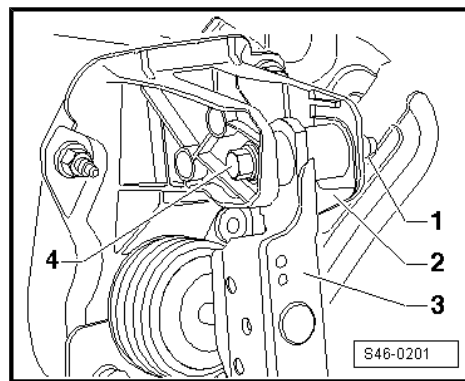
- Separating the brake pedal from the brake servo unit ⇒ [page 137](#) .

- Slacken the 4 screws from the steering column and with the assistance of a second mechanic push the steering column out of the bearing and hold ⇒ Chassis; Rep. gr. 48 .

- Unscrew the nut -1-, while doing so counterhold the screw of the brake pedal -4-.
- Remove the screw of the brake pedal -4- towards the left.
- Take the brake pedal -3- out of the bearing bracket -2-.
- Push the steering column back into the bearing and tighten the 4 fixing screws by hand.
- Remove brake pedal.

Installing

- Slacken the 4 screws from the steering column and with the assistance of a second mechanic push the steering column out of the bearing and hold.
- Insert the brake pedal -3- into the bearing bracket -2-.
- Insert the screw of the brake pedal -4- from the left.
- Push the steering column into the bearing and tighten the 4 fixing screws by hand ⇒ Chassis; Rep. gr. 48 .
- Screw on the new nut -1- and tighten together with the screw -4- ⇒ [Item 10 \(page 136\)](#) .
- Clip the brake pedal onto the brake servo ⇒ [page 137](#) .



Specified torques:	
Brake pedal to bracket ◆ Use new nut!	25 Nm

4.4 Removing and installing bearing bracket

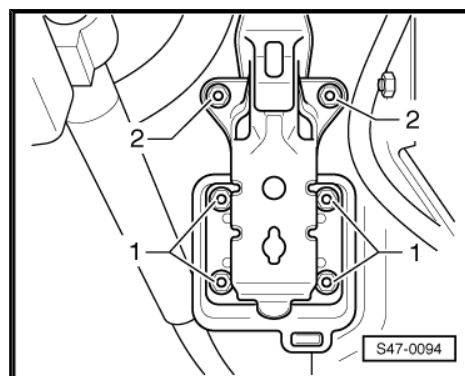
Removing

- Remove brake pedal ⇒ [page 137](#) .
- Unscrew nuts -1- from brake servo unit.
- Unscrew the nuts -2- for attaching the bracket to the front wall.
- Remove bracket.

Installing

- Installation is carried out in the reverse order.

Specified torques:	
Brake servo unit to bracket/front wall ◆ Use new screws!	25 Nm
Mounting bracket on bulkhead ◆ Use new nut or screw!	25 Nm



4.5 Setting, removing and installing the brake light switch - F- and brake pedal switch - F47- up to MY 10.2005



Note

Switch ⇒ [Item 3 \(page 136\)](#) (left-hand drive) and
⇒ [Item 6 \(page 144\)](#) (right-hand drive) mounted up to 10/2005.

The removal and installation of the brake light switch must only be performed when the tappet is pressed otherwise the locking mechanism of the brake light switch will be damaged.

The brake light switch must be removed for setting.

Removing:

- Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .



- Remove air guide -3-.
- Unplug connector -1- from the brake light switch.
- Remove brake light switch -2- by turning 45° to the left.

Installing and setting:

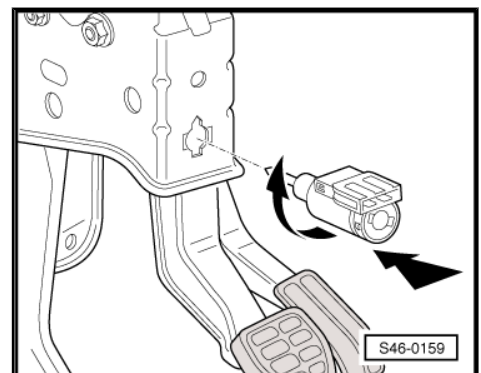
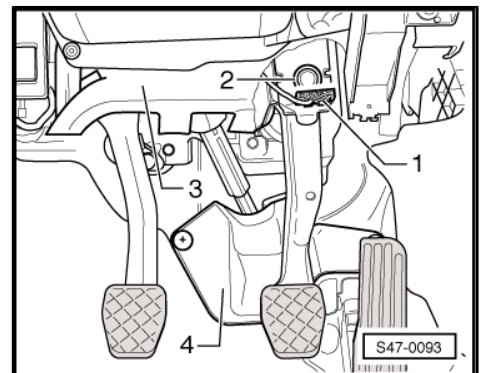
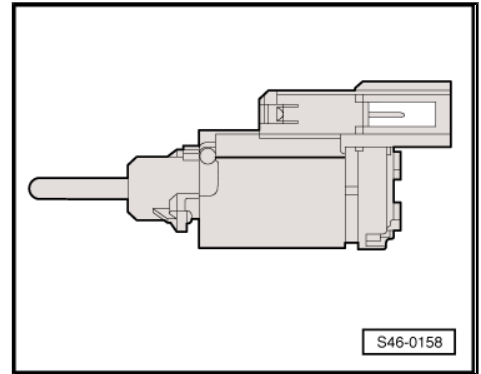
The brake light switch may only be installed once to ensure that it has an adequately tight fit.

- Pull the tappet out completely before assembly.
- Guide the switch through the assembly opening, press against the pedal and attach by turning it 45° to the right.
- The brake pedal always remains in the off position in this case (do not depress!).
- Insert the plug for the brake light switch.

Inspecting proper operation of the brake light.

After setting up the brake light switch, check whether brake pedal is in the end position (release position).

- Install air guide duct.
- Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .



4.6 Removing and installing brake light switch -F- and brake pedal switch -F47- as of 11/2005

Removing:

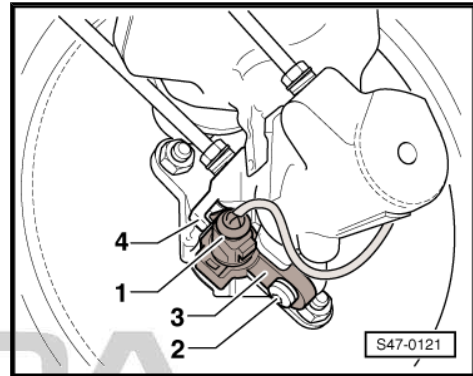
- Remove air filter ⇒ Relevant Engine; Rep. gr. 24 or ⇒ Rep. gr. 21 .
- Remove battery and battery tray ⇒ Electrical System; Rep. gr. 27 .



- Disconnect plug connection -1- from brake pedal switch -F47- -3-.
- Unscrew the screw -2- from the master brake cylinder.
- Take switch -3- out of the lock -4-.

Installing:

Installation is carried out in the reverse order.



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Tightening torque:

Brake light switch -F- and brake pedal switch -F47- to brake cylinder	5 Nm
---	------



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Inspection:

⇒ Vehicle diagnostic tester

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5 Brake pedal - right-hand drive

Summary of components of brake pedal ⇒ [page 143](#)

Separating the brake pedal from the brake servo unit and clipping onto the brake servo unit ⇒ [page 145](#)

Removing and installing brake pedal ⇒ [page 146](#)

Removing and installing bracket ⇒ [page 147](#)

Setting, removing and installing the brake light switch - F- and brake pedal switch - F47- to 10/05 ⇒ [page 149](#)

Removing and installing brake light switch -F- and brake pedal switch -F47- as of 11/05 ⇒ [page 149](#)

5.1 Summary of components of brake pedal



WARNING

The brake pedal travel must not be restricted by additional floor coverings.

Summary of components of brake pedal up to 01/2007 (with brake light switch - F- and brake pedal switch - F47- at bracket)

Grease all bearing surfaces with polycarbamide grease - G 052 in whole, is not permitted 142 A2- before assembly. SKODA AUTO A. S. SKODA AUTO A. S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SKODA AUTO A. S. ©

1 - Brake servo

- Assignment ⇒ Electronic Catalogue of Original Parts

2 - Screw

- up to 01.2007

3 - Cable support

- up to 01.2007

4 - Nut, 12 Nm

- up to 01.2007

5 - Screw, 25 Nm

6 - The brake light switch - F- and brake pedal switch - F47-



Note

Mounted on vehicles until 10/2005. From 11/2005 the brake light switch - F- and the brake pedal switch - F47- are mounted onto the master brake cylinder ⇒ [page 149](#).

- before assembling the brake light switch, clip the brake pedal to the pressure rod of the brake servo unit ⇒ [page 145](#)
- Grease tappet head with polycarbamide grease - G 052 142 A2-.
- Setting the brake light switch ⇒ [page 138](#)

7 - Nut, 25 Nm

8 - Bearing bracket

- To 10/2005, mounted together with brake light switch - F- and brake pedal switch - F47-
- further mounted to 01.2007 without brake light switch - F- and brake pedal switch - F47-
- Assignment ⇒ Electronic Catalogue of Original parts

9 - Self-locking nut, 25 Nm

10 - Brake pedal

11 - Cap

12 - Bearing shell

13 - Support

- for ball head of pressure rod of brake servo unit

14 - Screw

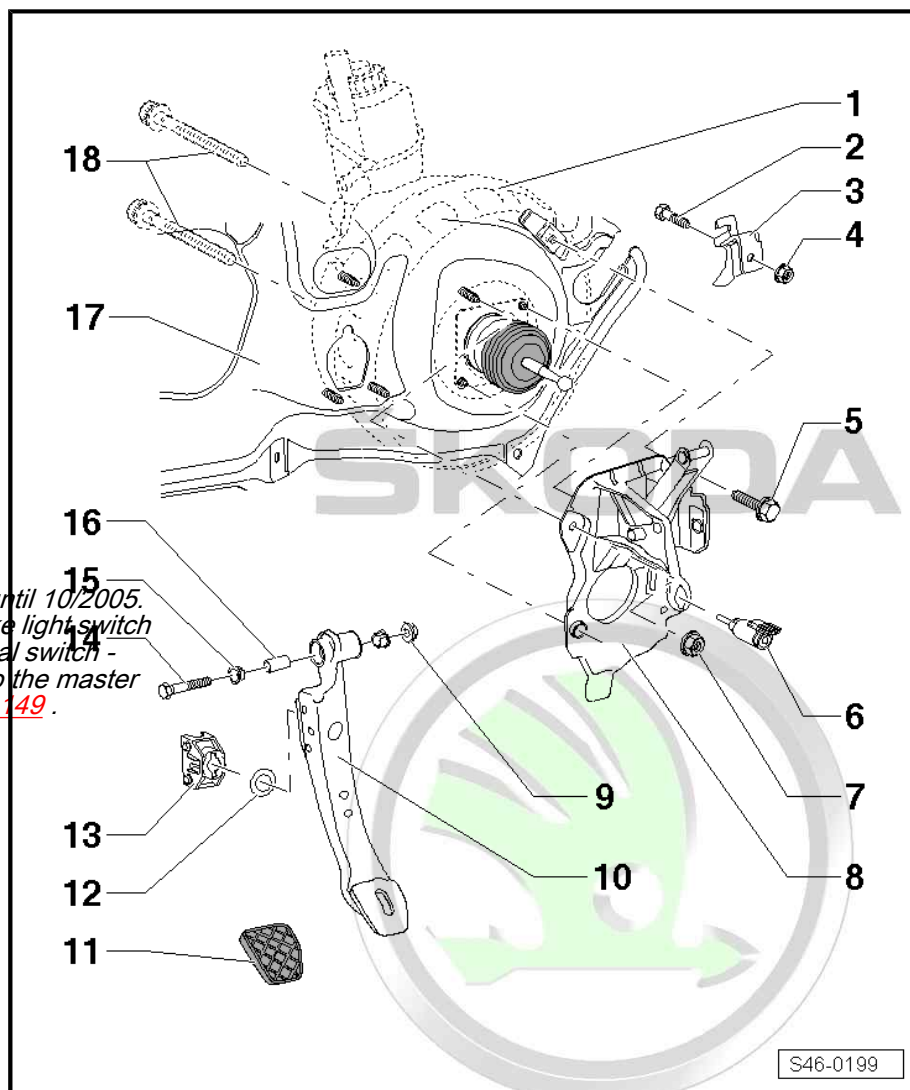
15 - Bushing

16 - Bearing shaft

17 - Front wall

18 - Screw, 25 Nm

- serves, at the same time, to secure the brake master cylinder and the brake servo unit.



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For all vehicles

- Press the brake pedal towards the brake servo unit and hold it in position.
- Insert release tool - T10159A- and pull it in the direction of the driver's seat while counterholding the brake pedal (the pedal must not move backwards during this operation). This pushes the retaining lugs -3- of the mount off the ball head of the push rod -2-.

The figure shows the separation of the brake pedal from the brake servo unit with the foot controls removed for clarity.

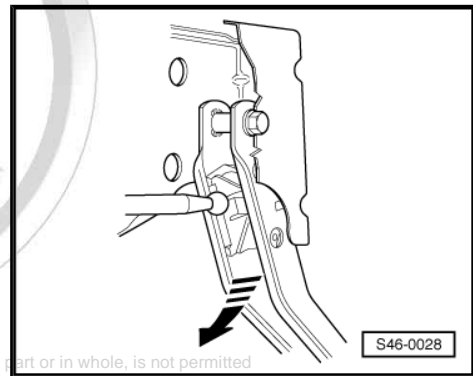
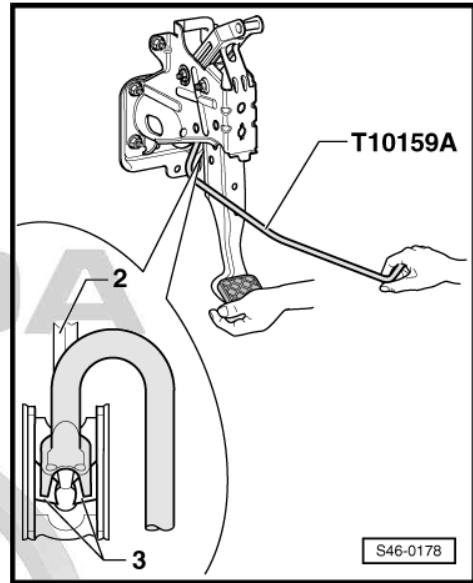
- Pull release tool - T10159A- and brake pedal together towards driver seat. (This causes the brake pedal to be drawn off the ball head of the push rod).

Clipping:

- Hold ball head of push rod in front of mount and push brake pedal in direction of brake servo, so that the ball head clicks into place.

Further installation occurs in reverse order.

- Setting the brake light switch => [page 138](#) .



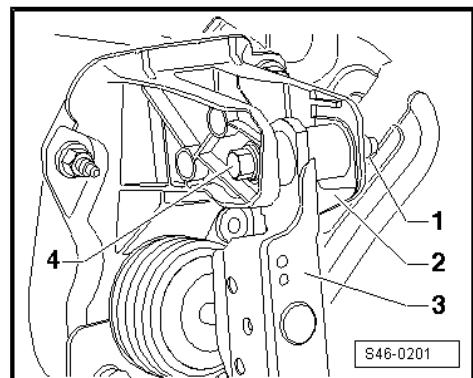
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5.3 Removing and installing brake pedal

Removing

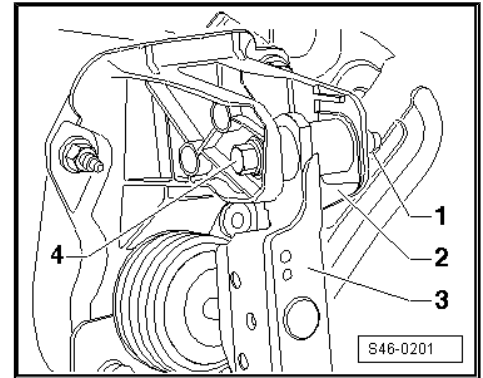
- Separating the brake pedal from the brake servo unit => [page 145](#) .
- Unscrew the nut -1-, while doing so counterhold the screw of the brake pedal -4-.
- Remove the screw of the brake pedal -4- towards the left.
- Take the brake pedal -3- out of the bearing bracket -2-.

Installing



- Insert the brake pedal -3- into the bearing bracket -2-.
- Insert the screw of the brake pedal -4- from the left.
- Screw on the new nut -1- and tighten together with the screw -4- ⇒ [Item 5 \(page 145\)](#) .
- Clip the brake pedal onto the brake servo ⇒ [page 145](#) .

Specified torques:	
Brake pedal to bracket ◆ Use new nut!	25 Nm



5.4 Removing and installing bearing bracket

Removing

- Remove engine cover ⇒ Engine.; Rep. gr. 13

Vehicles with diesel engines TDI PD:

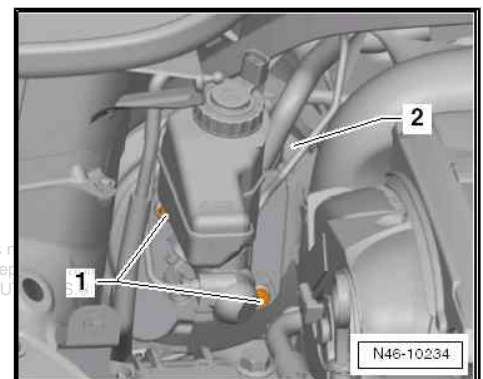
- Remove connecting hose to intake manifold flap ⇒ Engine; Rep. gr. 21 .
- Slacken the fuel lines at the engine head ⇒ Relevant engine; Rep. gr. 21 .
- Remove top cover for timing chain ⇒ Engine; Rep. gr. 13 .

Vehicles with diesel engines TDI CR:

- Remove filler neck for washer-fluid reservoir and lay it to one side.
- Remove the coolant expansion bottle and lay it to one side.
- Slacken the fuel feed and fuel return line from the plastic clip.
- Separate the plug connection from the solenoid valve of the diesel particle filter.
- Unscrew the bracket for the solenoid valve and lay it to one side.

Continued for all vehicles:

- Remove brake pedal ⇒ [page 146](#) .
- Unscrew the screws -1- of the brake servo unit -2-.
- Slacken the electrical lines from the pedal housing.

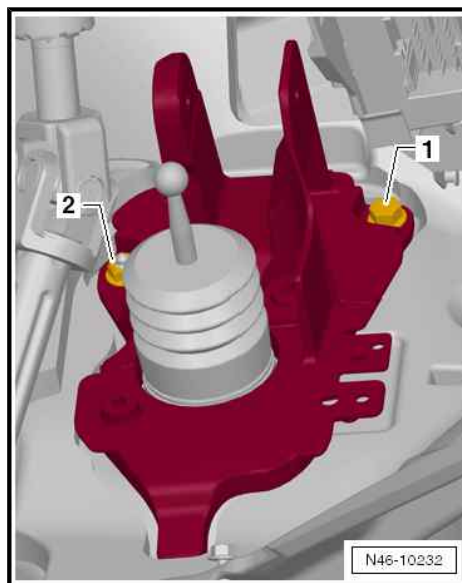


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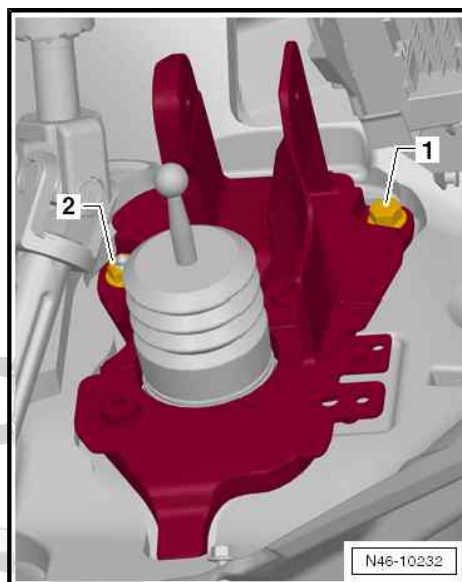
- Unscrew screws -1- from the right bracket.
- Unscrew nut -2- from the left bracket.
- Remove bracket.

Installing

- Insert bracket.

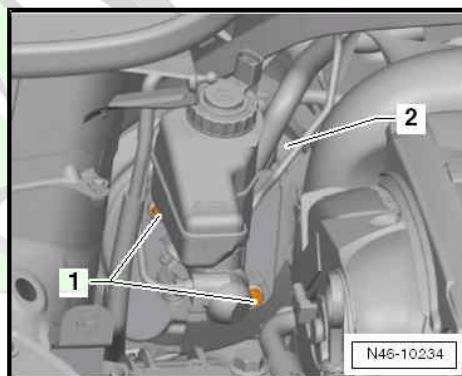


- Screw on nut -2- for the left bracket and tighten to tightening torque.
- Screw in screw -1- for the right bracket and tighten to tightening torque.



- Screw in screws -1- for the brake servo unit -2- and tighten to tightening torque.
- Further installation occurs in reverse order.

Specified torques:	
Brake servo unit to bracket/front wall ◆ Use new screws!	25 Nm
Mounting bracket on bulkhead ◆ Use new nut or screw!	25 Nm



5.5 Setting, removing and installing the brake light switch - F- and brake pedal switch - F47- up to MY 10.2005



Note

Switch ⇒ [Item 6 \(page 144\)](#) mounted up to 10/2005.

The removal and installation of the brake light switch must only be performed when the tappet is pressed otherwise the locking mechanism of the brake light switch will be damaged.

The brake light switch must be removed for setting.

Removing:

– Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .

– Remove air guide -3-.

– Unplug connector -1- from the brake light switch.

– Remove brake light switch -2- by turning 45° to the left.

Installing and setting:

The brake light switch may only be installed once to ensure that it has an adequately tight fit.

– Pull the tappet out completely before assembly.

– Guide the switch through the assembly opening, press against the pedal and attach by turning it 45° to the right.

– The brake pedal always remains in the off position in this case (do not depress!).

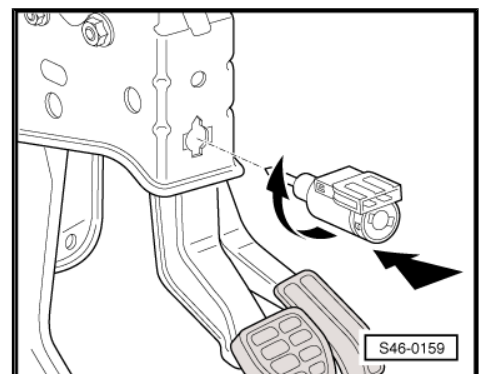
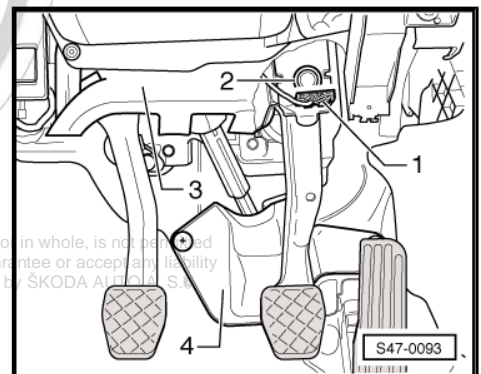
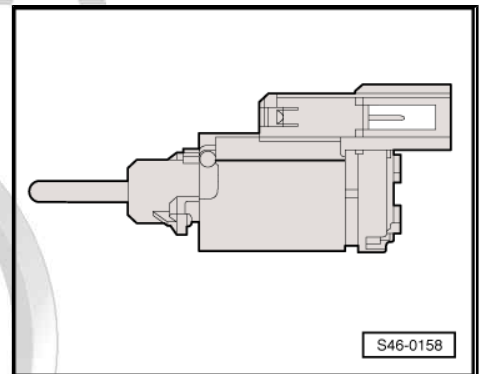
– Insert the plug for the brake light switch.

– Inspecting proper operation of the brake light.

After setting up the brake light switch, check whether brake pedal is in the end position (release position).

– Install air guide duct.

– Installing driver side trim panel ⇒ Body Work; Rep. gr. 70 .



5.6 Removing and installing brake light switch -F- and brake pedal switch -F47- as of 11/2005

Special tools and workshop equipment required

◆ Brake filling and bleeding device , e.g. -VAS 5234- .

Removing:

For engines TDI PD and TDI CR:

– Remove master brake cylinder ⇒ [page 189](#)

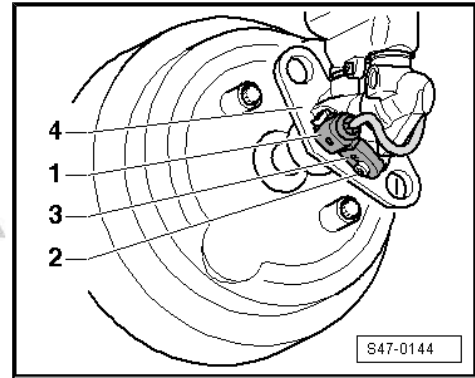


- Unscrew the screw -2- from the master brake cylinder.
- Take switch -3- out of the lock -4-.

Installing:

Installation is carried out in the reverse order.

- After completing work which involved opening the brake system, bleed brake system with brake filling and bleeding device, e.g. -VAS 5234-



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Tightening torque:

Brake light switch -F- and brake pedal switch -F47- to brake cylinder	5 Nm
---	------

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Inspection:

⇒ Vehicle diagnostic tester

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47 – Brakes - hydraulics

1 Repairing front brake caliper

Repairing the brake caliper FS-III ⇒ [page 153](#)

Removing and installing the piston of the brake caliper for the FS-III brake ⇒ [page 154](#)

Repairing brake caliper FN3 ⇒ [page 155](#)

Removing and installing piston of brake caliper FN3 ⇒ [page 156](#)

1.1 Repairing the brake caliper FS-III

- ◆ Brake inspection ⇒ [page 8](#) .
- ◆ Install the complete repair set when undertaking repairs.
- ◆ Use only methylated spirits for cleaning the brake.
- ◆ Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .

1 - Dust cap

- place on the vent valve

2 - Vent valve, 10 Nm

- thinly coat thread with lithium grease - G 052 150 A2- before screwing in

3 - Bushing

- insert into the brake caliper housing

4 - Guide bolt, 30 Nm

5 - Cover caps

- insert in bushing

6 - Brake caliper

7 - Sealing ring

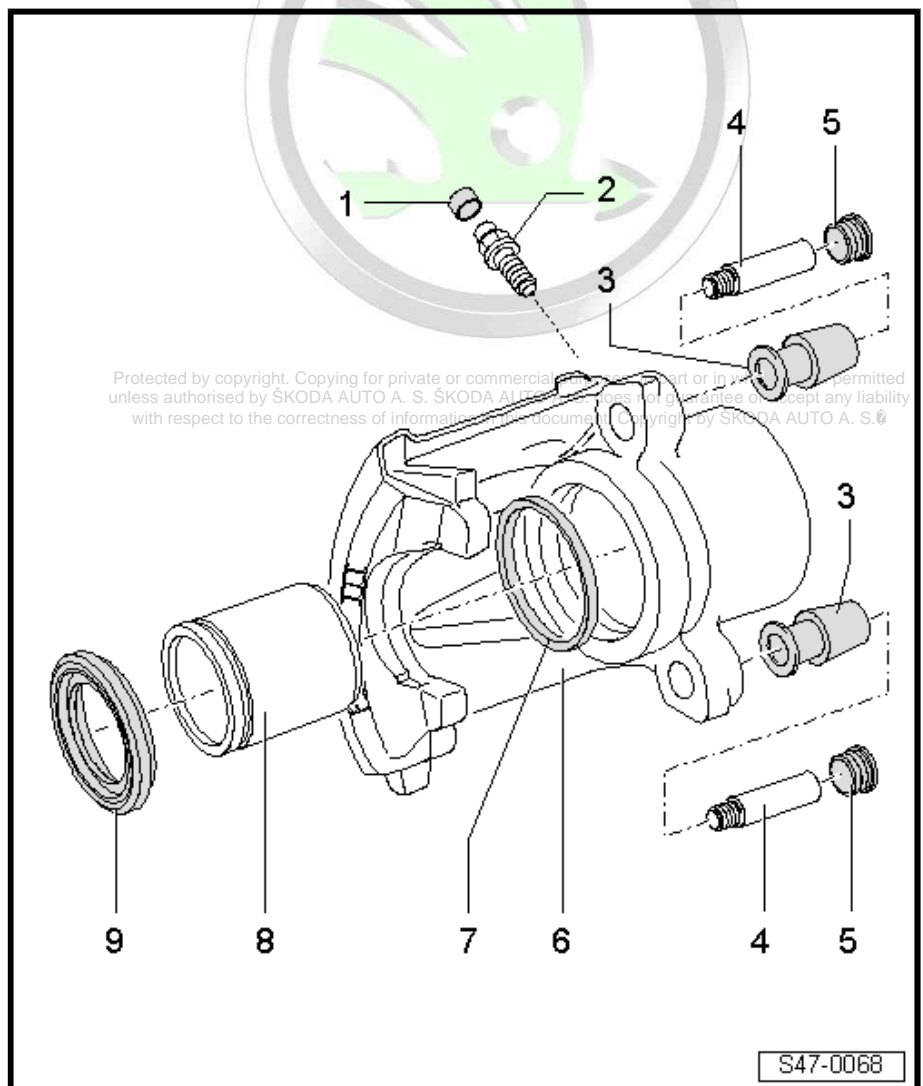
- Removing and installing ⇒ [page 154](#)

8 - Piston

- Removing and installing ⇒ [page 154](#)
- First thinly coat piston with lithium grease - G 052 150 A2-

9 - Boot

- Removing and installing ⇒ [page 154](#)
- do not damage when inserting the piston



S47-0068

1.2 Removing and installing the piston of the brake caliper of the FS-III brake

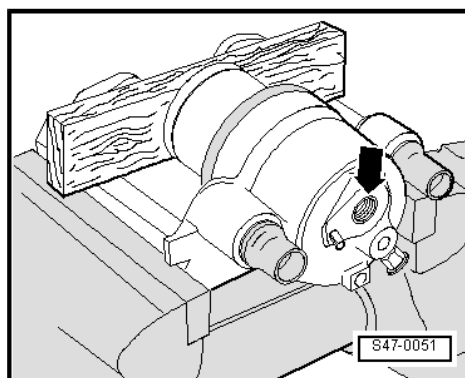
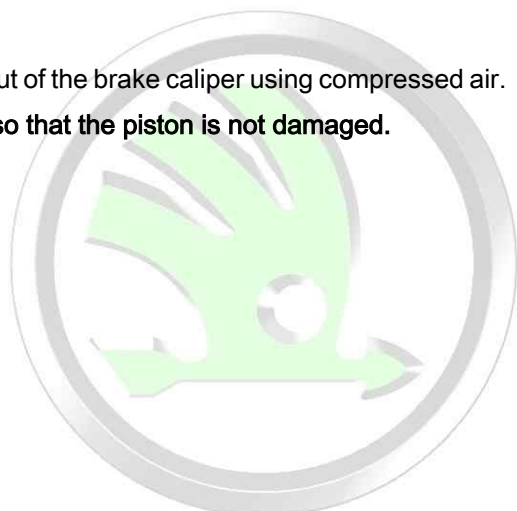
Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-
- ◆ Piston jig - T10145-

Removing:

- Press the piston out of the brake caliper using compressed air.

Insert wooden plate so that the piston is not damaged.

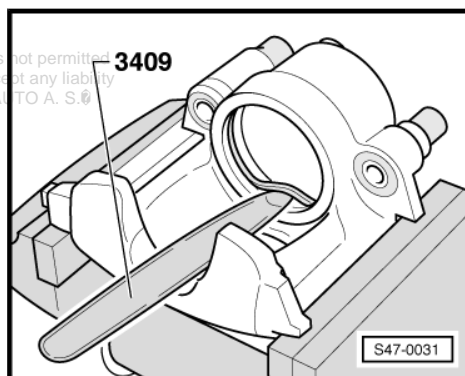


- Remove gasket ring with disassembly wedge - 3409- .

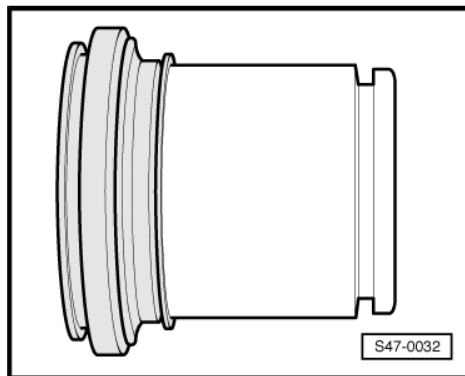
When removing, make sure that the cylinder surface is not damaged.

Installing:

- Clean piston and gasket ring with white spirits and dry off.
- Before inserting the piston and gasket ring, thinly coat with lithium grease - G 052 150 A2- .
- Insert sealing ring into the brake caliper.

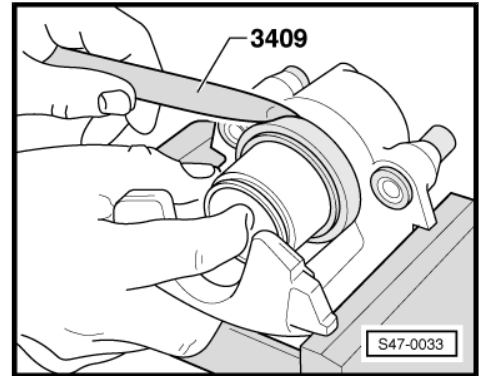


- Position the new protective cap with the outer sealing lip on the piston.



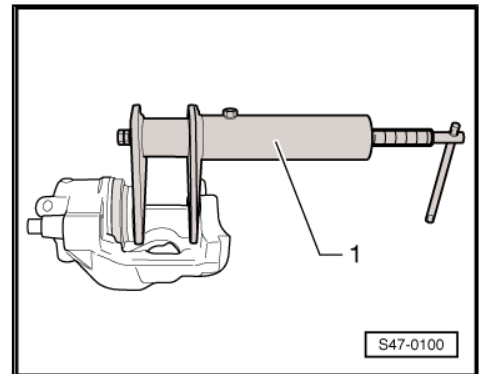
- Insert inner sealing lip of the protective cap with disassembly wedge - 3409- in the groove of the cylinder.

To do so hold the piston in front of the brake caliper.



- Press the piston with the piston jig - T 10145- -1- into the brake caliper.

The outer sealing lip of the protective cap will clip into the piston groove.



1.3 Repairing brake caliper FN3

- ◆ Brake inspection ⇒ [page 8](#) .
- ◆ Install the complete repair set when undertaking repairs.
- ◆ Use only methylated spirits for cleaning the brake.
- ◆ Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .



1 - Cover caps

- insert in bushing

2 - Guide bolt, 30 Nm

3 - Bushing

- insert into the brake caliper housing

4 - Dust cap

- place on the vent valve

5 - Vent valve, 10 Nm

- thinly coat thread with lithium grease - G 052 150 A2- before screwing in

6 - Brake caliper

7 - Brake carrier

- crewed to the brake caliper

8 - Spring

- insert with both ends into the bores in the brake caliper

9 - Sealing ring

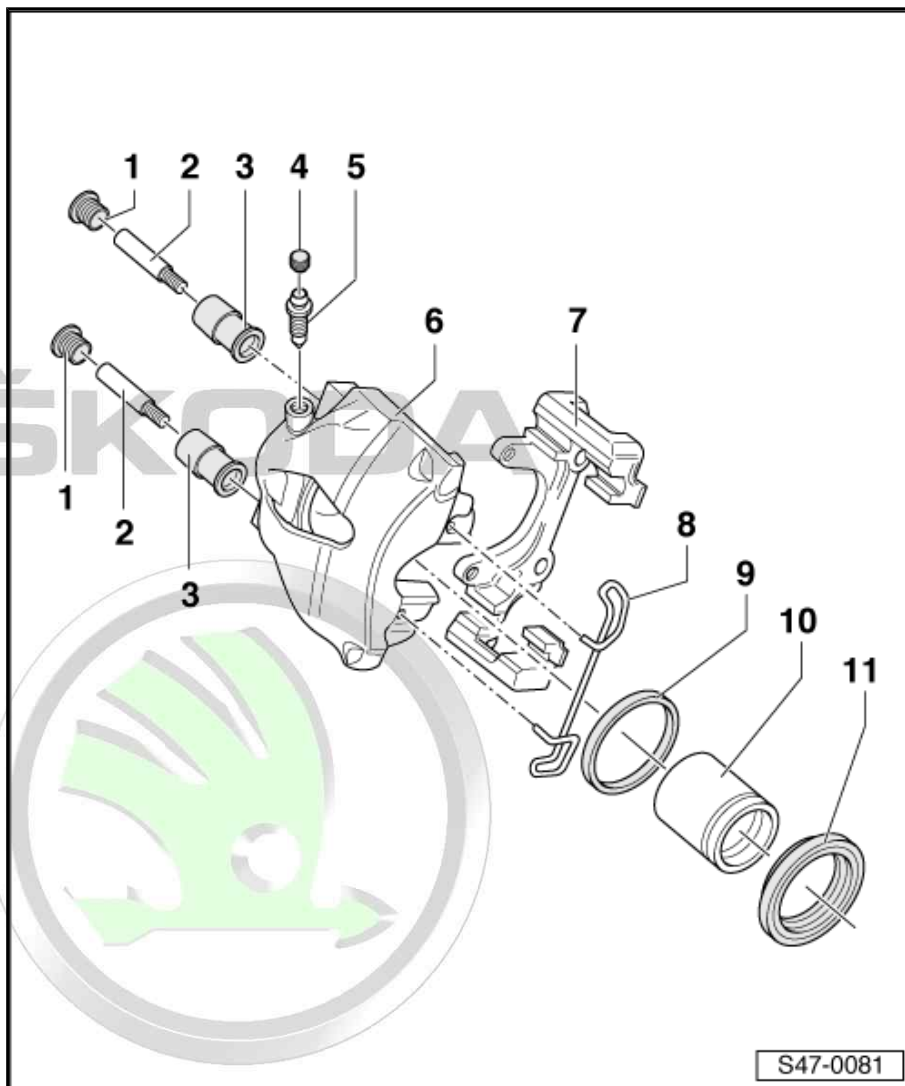
- Removing and installing ⇒ [page 156](#)

10 - Piston

- Removing and installing ⇒ [page 156](#)
- First thinly coat piston with lithium grease - G 052 150 A2-

11 - Boot

- Removing and installing ⇒ [page 156](#)
- do not damage when inserting the piston



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1.4 Removing and installing piston of brake caliper FN3

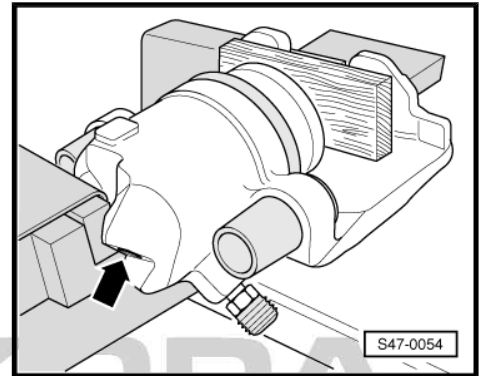
Special tools and workshop equipment required

- ◆ Disassembly wedge - 3409-
- ◆ Piston jig - T10145-
- ◆ Assembly tool - T10146/6-

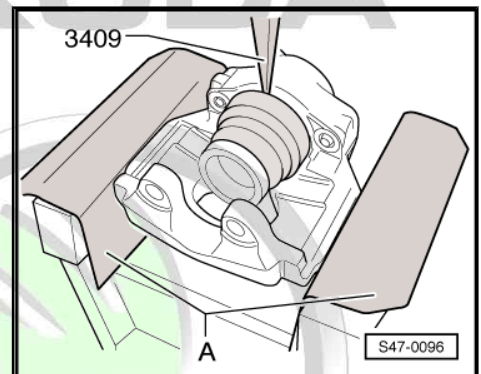
Removing:

- Press the piston out of the brake caliper using compressed air.

- Insert wooden plate so that the piston is not damaged.



- Lever off protective cap with disassembly wedge - 3409- from the brake caliper.



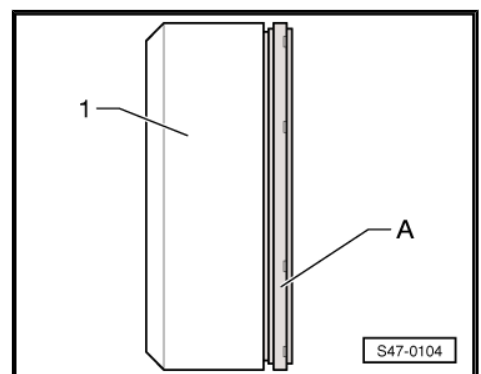
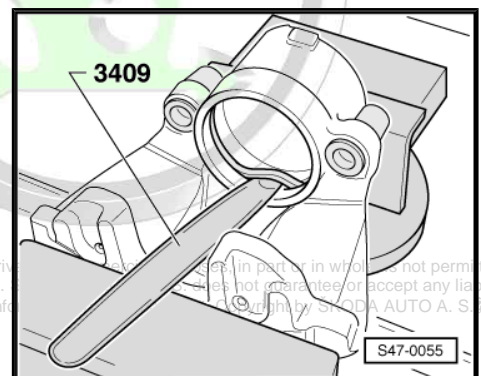
- Remove gasket ring with disassembly wedge - 3409- .

i Note

When removing, make sure that the cylinder surface is not damaged.

Installing:

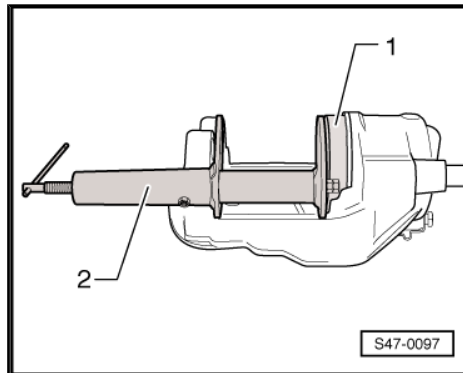
- Clean piston and gasket ring with white spirits and dry off.
- Before inserting the piston and gasket ring, thinly coat with lithium grease - G 052 150 A2- .
- Insert sealing ring into the brake caliper.
- Position the protective cap -A- on the assembly tool - T10146/6- -1-.



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- Press the protective cap with the assembly tool -1- and the piston jig -2- onto the brake caliper in such a way that it is resting all around the brake caliper.

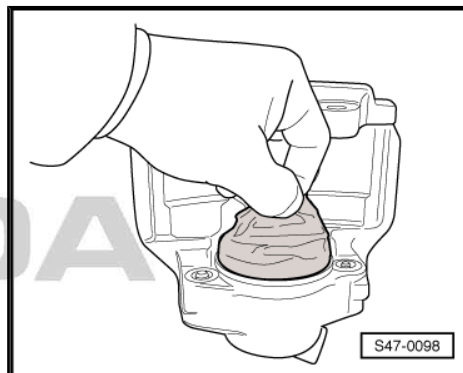


- Check fitting of the protective cap.



Note

The protective cap should no longer be removable by hand from the brake caliper.

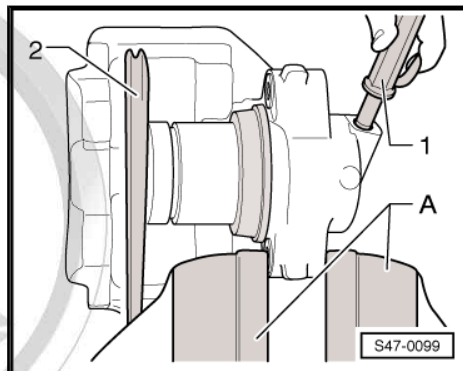


- Lightly press the piston onto the protective cap and interlock in this position, e.g. with the disassembly wedge -2-.



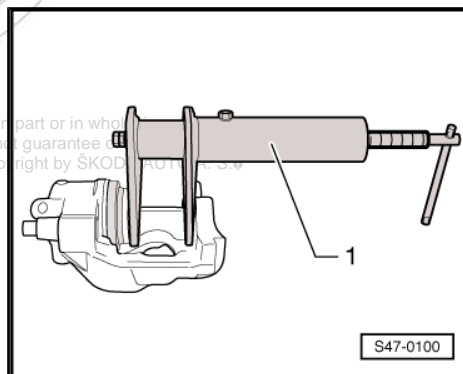
Note

Do not tilt the piston, in order to avoid damage to the protective cap.



- Blow up the protective cap with compressed air (max. 0.3 MPa) -1-. At the same time the protective cap jumps onto the piston.

- Press the piston with the piston jig -1- into the brake caliper.
The outer sealing lip of the protective cap will clip into the piston groove.



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2 Repairing rear brake caliper

Repairing brake caliper CII 41 ⇒ [page 159](#)

Repairing brake caliper CI 38 ⇒ [page 161](#)

Removing and installing the brake caliper piston CII 41 or CI 38
⇒ [page 162](#)

Repairing the brake caliper Bosch BIRIII ⇒ [page 163](#)

Removing and installing the brake caliper piston Bosch BIRIII
⇒ [page 164](#)

Pre-bleeding the brake caliper ⇒ [page 166](#)

2.1 Repairing brake caliper CII 41



Note

- ◆ *Brake inspection ⇒ [page 8](#) .*
- ◆ *Install the complete repair set when undertaking repairs.*
- ◆ *Use only methylated spirits for cleaning the brake.*
- ◆ *Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .*
- ◆ *The brake calipers must absolutely be pre-bled before installing them in the vehicle (without brake pads) in case of a repair or when replacing them with new brake calipers ⇒ [page 166](#) .*

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1 - Brake caliper with lever for the handbrake cable

- replace brake caliper if the lever for the handbrake cable is not sealed
- pre-bleed brake caliper after undertaking replacement => [page 166](#)

2 - Dust cap

3 - Vent valve, 10 Nm

- thinly coat thread with lithium grease - G 052 150 A2- before screwing in

4 - Self-locking screw, 35 Nm

- Replacing
- counterhold on the guide bolt when releasing and tightening

5 - Guide bolt

- grease before fitting protective cap

6 - Boot

- pull onto brake carrier and guide bolt

7 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part

- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts

- Assignment => Electronic Catalogue of Original Parts

8 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part
- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts



Note

When installing make sure that the weight points downwards.

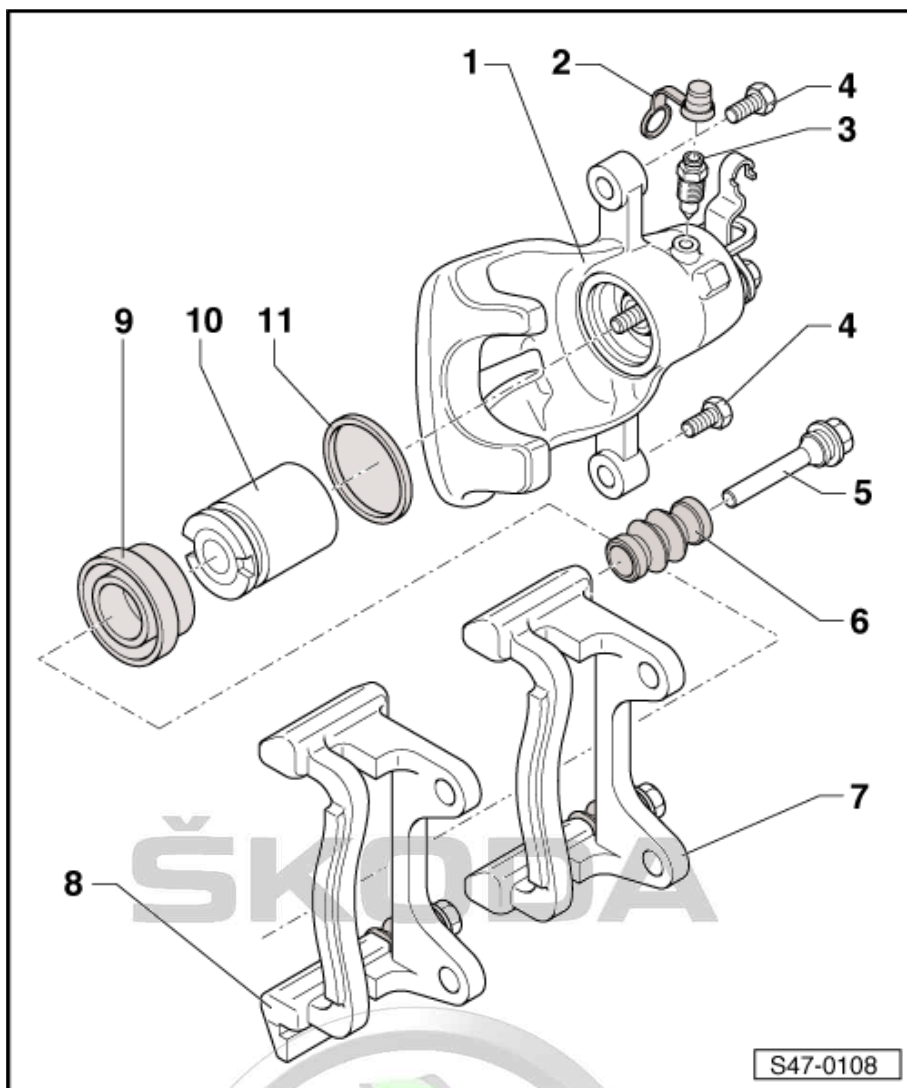
- Assignment => Electronic Catalogue of Original parts

9 - Boot

- pull with outer sealing lip onto the piston
- Removing and installing => [page 162](#)

10 - Piston with automatic adjusting device

- Removing and installing => [page 162](#)
- thinly coat piston with assembly paste - G 052 150 A2- before fitting



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11 - Sealing ring

- Removing and installing ⇒ [page 162](#)

2.2 Repairing brake caliper CI 38



Note

- ◆ *Brake inspection ⇒ [page 8](#).*
- ◆ *Install the complete repair set when undertaking repairs.*
- ◆ *Use only methylated spirits for cleaning the brake.*
- ◆ *Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2-.*
- ◆ *The brake calipers must absolutely be pre-bled before installing them in the vehicle (without brake pads) in case of a repair or when replacing them with new brake calipers ⇒ [page 166](#).*

1 - Brake caliper with lever for the handbrake cable

- replace brake caliper if the lever for the handbrake cable is not sealed
- pre-bleed brake caliper after undertaking replacement ⇒ [page 166](#)

2 - Dust cap

3 - Vent valve, 10 Nm

- thinly coat thread with lithium grease - G 052 150 A2- before screwing in

4 - Self-locking screw, 35 Nm

- replace after each removal
- counterhold on the guide bolt when releasing and tightening

5 - Guide bolt

- grease before fitting protective cap

6 - Boot

- pull onto brake carrier and guide bolt

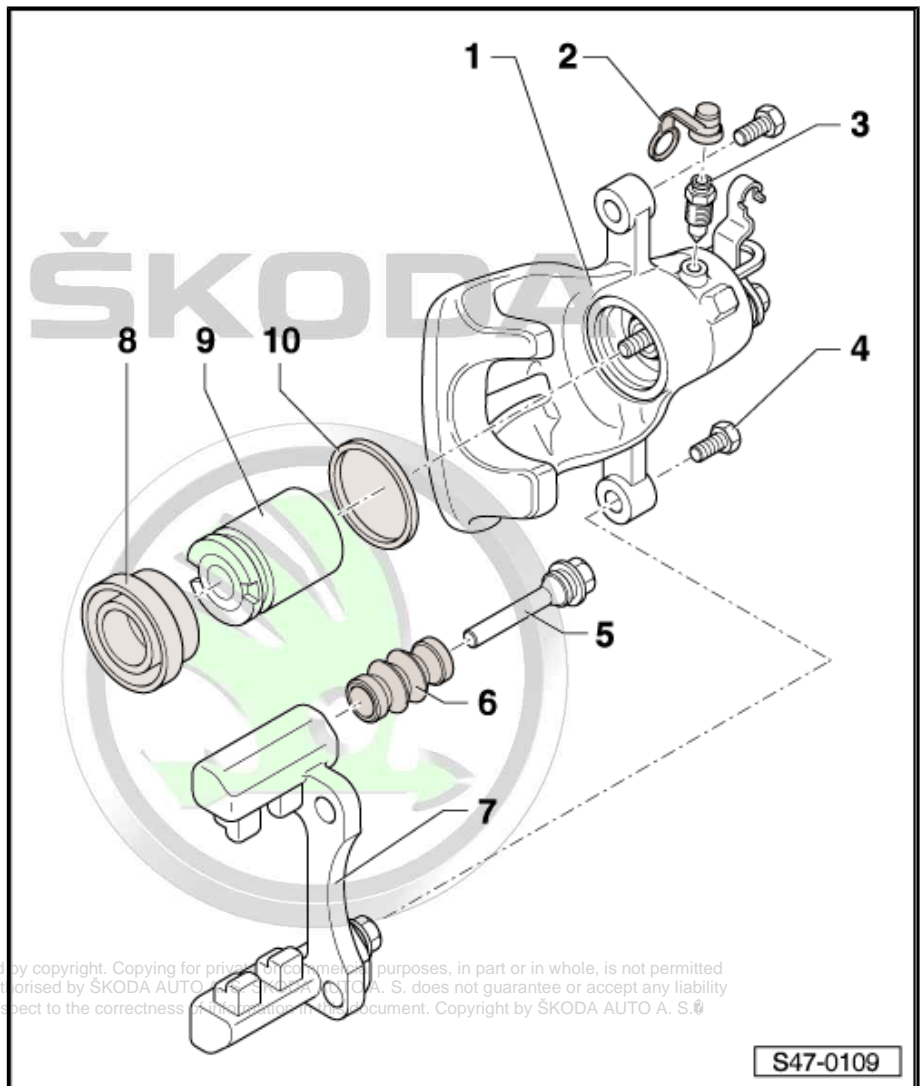
7 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part

- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts

8 - Boot

- pull with outer sealing lip onto the piston



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- ❑ Removing and installing ⇒ [page 162](#)

9 - Piston with automatic adjusting device

- ❑ Removing and installing ⇒ [page 162](#)
- ❑ thinly coat piston with assembly paste - G 052 150 A2- before fitting

10 - Sealing ring

- ❑ Removing and installing ⇒ [page 162](#)

2.3 Removing and installing the brake caliper piston CII 41 or CI 38

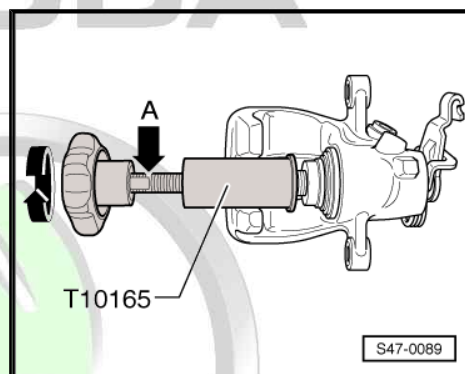
Special tools and workshop equipment required

- ◆ Resetting tool - T10165-
- ◆ Disassembly wedge - 3409-

Removing:

Insert the resetting tool - T10165- in such a way that the collar is resting on the piston.

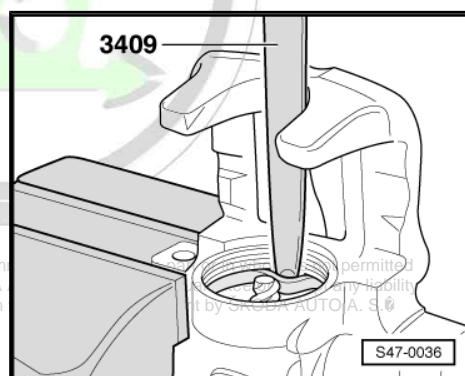
- Release the piston by turning the knurled wheel of the resetting tool - T10165- to the left.
- ◆ Use open-jawed spanner on a provided spanner surface -arrow A- if the piston is difficult to move.



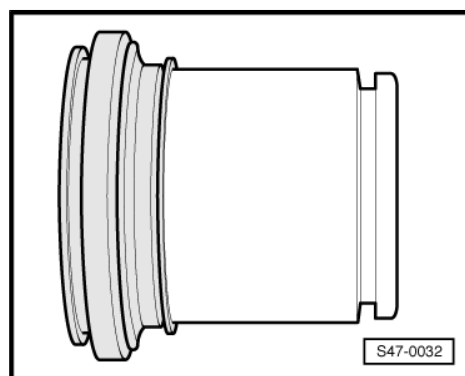
- Remove gasket ring with disassembly wedge - 3409- .

Installing:

- Clean piston and gasket ring with white spirits and dry off.
- Before installing the piston and gasket ring thinly coat with lithium grease - G 052 150 A2- .



- Position the protective cap with the outer sealing lip on the piston.
- Insert inner sealing lip of the protective cap with disassembly wedge - 3409- in the groove of the cylinder.



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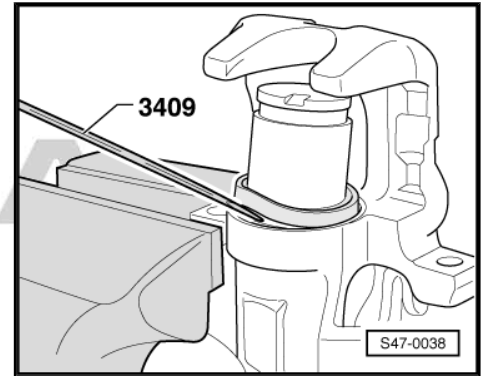
To do so hold the piston in front of the brake caliper.



Caution

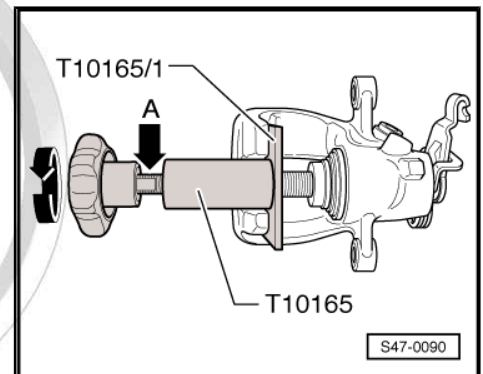
Use the resetting tool - T10165- to adjust the piston.

The automatic adjustment in the brake caliper is destroyed when adjusting the piston with a resetting tool e.g. -T10165- or by actuating the brake pedal.



Insert the resetting tool - T10165- in such a way that the collar is resting on the brake caliper.

- Screw the piston by turning the knurled wheel of the resetting tool - T10165- to the right into the brake caliper.



2.4 Repairing the brake caliper Bosch BIRIII

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Note

- ◆ *Brake inspection => [page 8](#) .*
- ◆ *Install the complete repair set when undertaking repairs.*
- ◆ *Use only methylated spirits for cleaning the brake.*
- ◆ *Thinly coat brake cylinder, piston and gasket ring with lithium grease - G 052 150 A2- .*
- ◆ *The brake calipers must absolutely be pre-bled before installing them in the vehicle (without brake pads) in case of a repair or when replacing them with new brake calipers => [page 166](#) .*



1 - Brake caliper with lever for the handbrake cable

- replace brake caliper if the lever for the handbrake cable is not sealed
- pre-bleed brake caliper after undertaking replacement ⇒ [page 166](#)

2 - Dust cap

3 - Vent valve, 10 Nm

- thinly coat thread with lithium grease - G 052 150 A2- before screwing in

4 - Self-locking screw, 35 Nm

- Replacing
- counterhold on the guide bolt when releasing and tightening

5 - Guide bolt

- grease before fitting protective cap

6 - Boot

- pull onto brake carrier and guide bolt

7 - Brake carrier with guide bolts and boots

- must be assembled with sufficient grease on the guide bolt, supplied as a spare part

- fit a repair set if there is any damage to the protective caps or guide bolts, use the enclosed grease packing to lubricate the guide bolts

- Assignment ⇒ Electronic Catalogue of Original Parts

8 - Boot

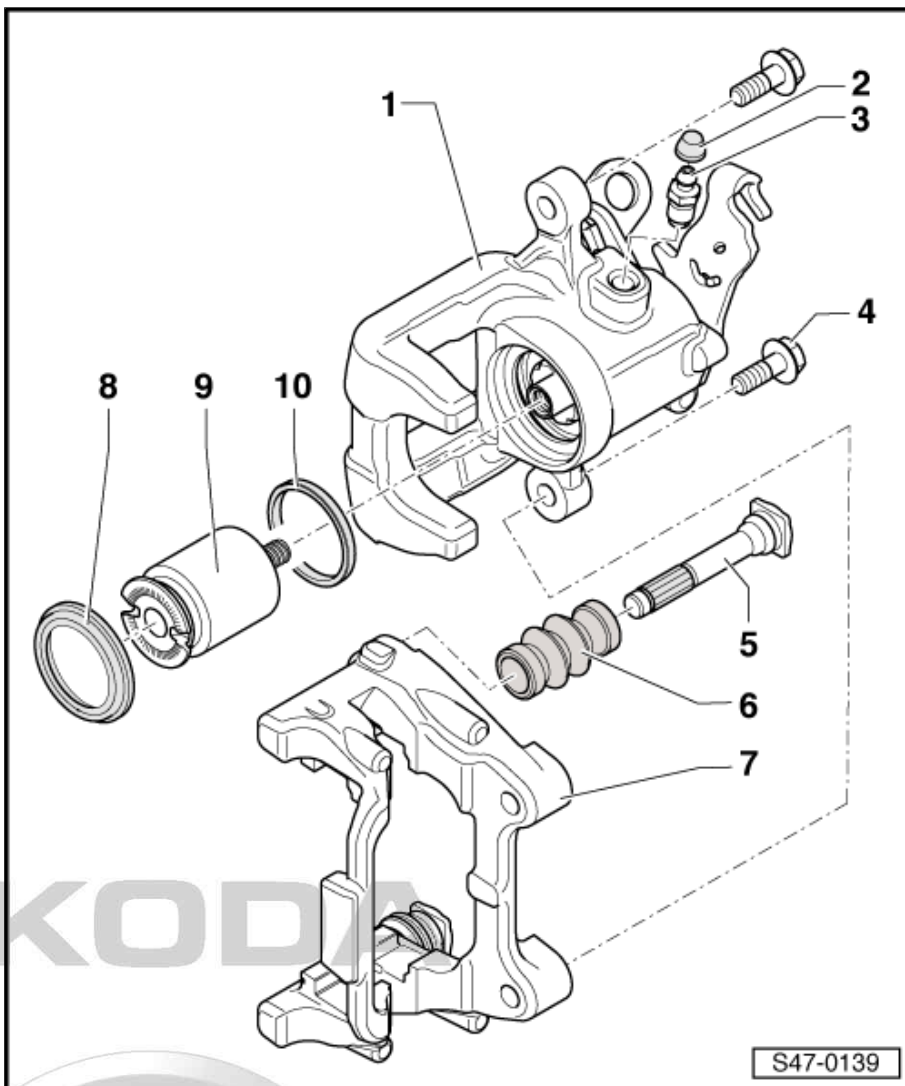
- pull with inner sealing lip onto the piston
- Removing and installing ⇒ [page 164](#)

9 - Piston with automatic adjusting device

- Removing and installing ⇒ [page 164](#)
- thinly coat piston with assembly paste - G 052 150 A2- before fitting

10 - Sealing ring

- Removing and installing ⇒ [page 164](#)



2.5 Removing and installing the brake caliper piston Bosch BIRIII

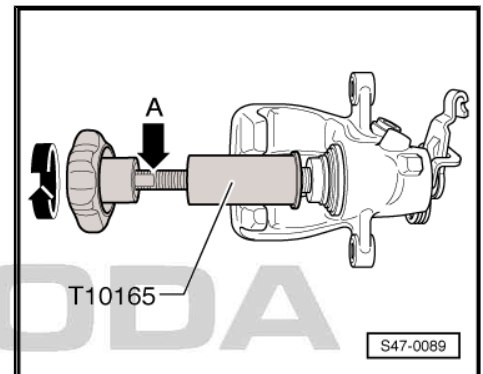
Special tools and workshop equipment required

- ◆ Resetting tool - T10165-
- ◆ Disassembly wedge - 3409-

Removing:

Insert the resetting tool - T10165- in such a way that the collar is resting on the piston.

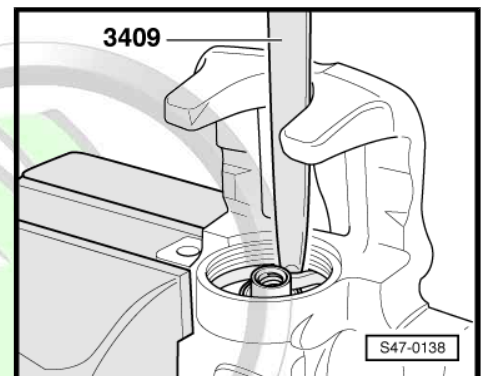
- Release the piston by turning the knurled wheel of the resetting tool - T10165- to the left.
- ◆ Use open-jawed spanner on a provided spanner surface -arrow A- if the piston is difficult to move.



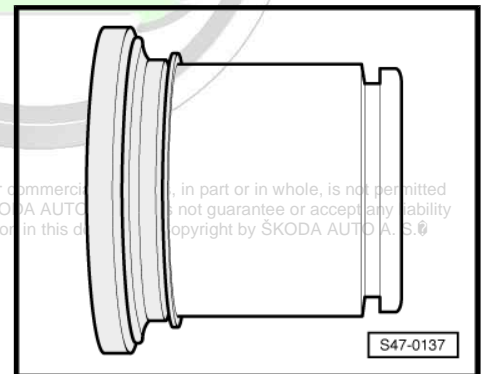
- Remove protective cap and gasket ring with disassembly wedge - 3409- .

Installing:

- Clean piston and gasket ring with white spirits and dry off.
- Before installing the piston and gasket ring thinly coat with lithium grease - G 052 150 A2- .



- Position the new protective cap with the inner sealing lip on the piston.
- Insert outer sealing lip of the protective cap with the disassembly wedge - 3409- in the shoulder on the brake caliper.
- Carefully press on the protective cap up to the stop using the disassembly wedge - 3409- .



Note

- ◆ Pay attention to the correct position of the protective cap in the brake caliper.
- ◆ Do not damage the protective cap when pressing it on.



Caution

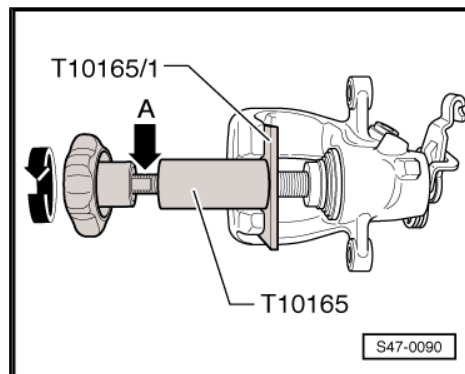
Use the resetting tool - T10165- to adjust the piston.

The automatic adjustment in the brake caliper is destroyed when adjusting the piston with a resetting tool e.g. -T10165- or by actuating the brake pedal.



Insert the resetting tool - T10165- in such a way that the collar is resting on the brake caliper.

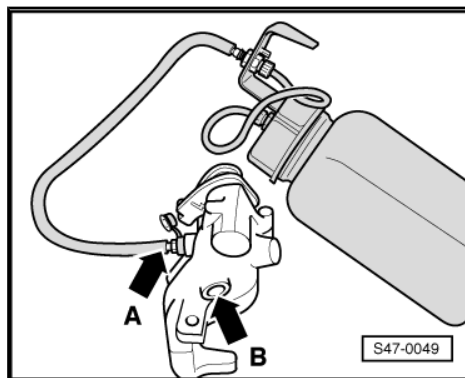
- Screw the piston by turning the knurled wheel of the resetting tool - T10165- to the right into the brake caliper.
- Check the correct position of the protective cap in the shoulder on the piston, if necessary correct the position using the dis-assembly wedge - 3409- .



2.6 Pre-bleeding the brake caliper

Set up brake caliper for pre-bleeding as shown in the fig.

- Open vent valve -arrow A-.
- Using a commercially available ventilation reservoir pour in brake fluid until bubble-free brake fluid drips out of the threaded bore (brake hose connection) -arrow B-.
- Close vent valve.



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3 Checking the master brake cylinder for tightness

Special tools and workshop equipment required

- ◆ Brake system tester e. g. -V.A.G 1310 A-
- ◆ Adapter M 10 e.g. -V.A.G 1310/6-

Test requirements:

- Function and tightness of the brake system (brake lines, brake hoses, brake calipers, hydraulic unit) O.K.
- Unscrew and remove the bleeder screw on one of the front brake calipers.
- Connect the brake system tester e.g. - V.A.G 1310 A- to the brake caliper and bleed.
- Push down brake pedal until the pressure gauge indicates 5 MPa (50 bar). Throughout the test which lasts 45 s the pressure loss must not exceed 0.4 MPa (4 bar). If the loss of pressure is higher, replace the master brake cylinder.
- Separate brake system tester e.g. - V.A.G 1310 A- .
- Screw the bleeder screw into the caliper and bleed the brake caliper.



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4 Bleeding brake system

Bleeding the brake system with the brake filling and bleeding device ⇒ [page 168](#)

Bleeding the brake system without using the brake filling and bleeding device ⇒ [page 171](#)

Change brake fluid ⇒ [page 172](#)

4.1 Bleeding the brake system of air with the brake filling and bleeding device

Special tools and workshop equipment required

- ◆ Brake filling and bleeding device , e. g. -VAS 5234-
- ◆ Brake fluid ⇒ [page 8](#)



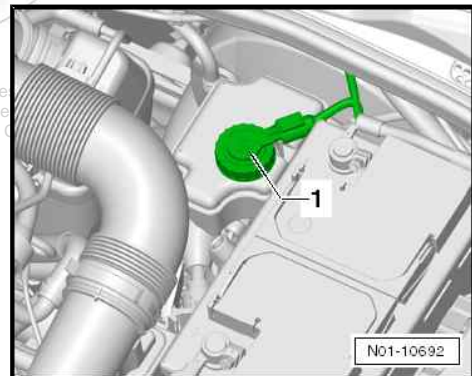
WARNING

- ◆ *The brake fluid is hygroscopic, i.e. it retains humidity from the ambient air, and must therefore always be stored in airtight containers.*
- ◆ *Brake fluid must never come into contact with fluids containing mineral oils (oil, petrol, cleaning agent). Mineral oils damage the plugs and boots of the brake system.*
- ◆ *Drained (used) brake fluid must never be used again.*
- ◆ *The brake fluid is toxic, avoid skin contact.*
- ◆ *Because of its caustic effect, the brake fluid must not come into contact with paint.*
- ◆ *Rinse off spilled brake fluid using plenty of water.*
- ◆ *Dispose of brake fluid in compliance with the applicable waste disposal and environmental regulations.*
- ◆ *Bleeding brake system on vehicles with ABS or TCS/ESP (ESC), as for vehicles without ABS.*
- ◆ *Only use new brake fluid in accordance with the specification ⇒ [page 8](#) .*

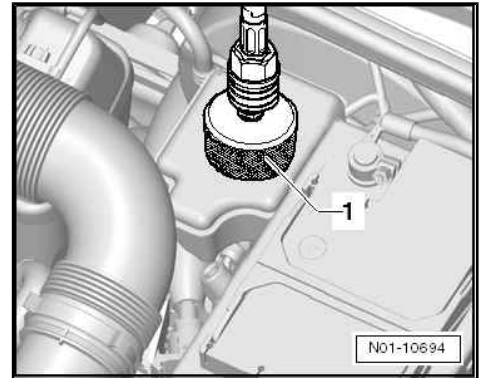
A pre-pressure of 0,2 MPa (2 bar) is required to bleed the brake system.

- Unscrew cap -1- from the brake fluid reservoir.

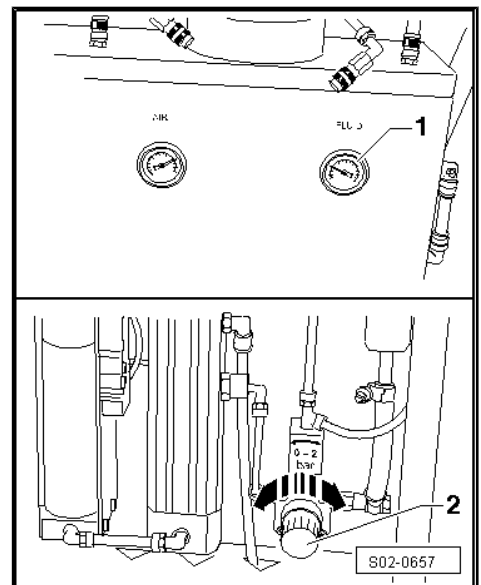
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- Connect the thread plug -1- of the brake filling and bleeding device e.g. -VAS 5234- to the brake fluid reservoir.
- Switch on the brake filling and bleeding device e.g. -VAS 5234- and activate the system with a brake fluid pressure of 0.2 MPa => Operating instruction of the brake filling and bleeding device .

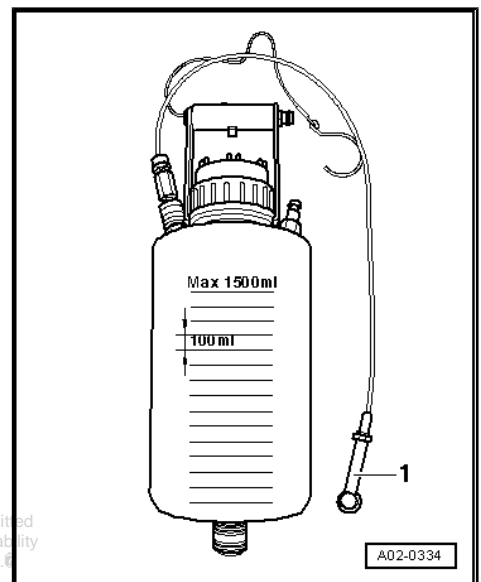
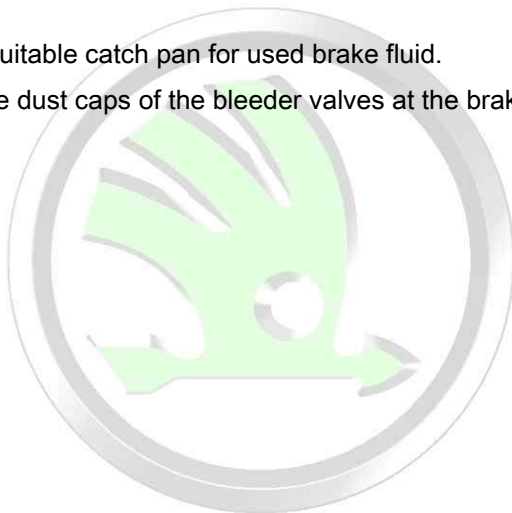


- Set the pressure e.g. by turning the regulating valve -2-.



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- Provide a suitable catch pan for used brake fluid.
- Remove the dust caps of the bleeder valves at the brake calipers.



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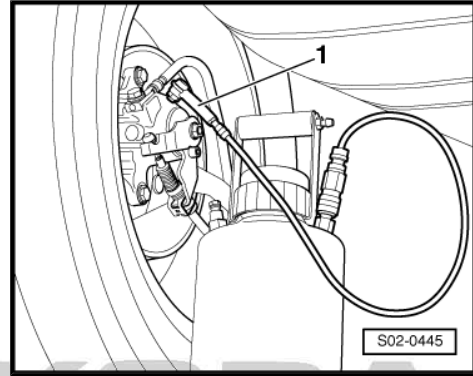


- Fit the hose of the bleeding bottle -1- onto the vent valve.



Note

- ◆ Use the tool set for brake bleeding - VAS 6564- to loosen and tighten. While doing so, pull the bleeder hose through the socket insert with a corresponding hollow adapter piece from this set.
 - ◆ Fit a torque wrench on the socket insert with a corresponding hollow adapter piece for tightening the vent valve.
 - ◆ In view of the different versions of the wheels and the brake calipers, tightening the bleeder valves using the set of tools for brake bleeding - VAS 6564- (with the torque wrench inserted) cannot always be performed due to lack of space.
 - ◆ In this case, the corresponding wheels must be removed from the vehicle. Do not exchange the wheels and mark their position to the wheel hub.
- Loosen bleeder valve.
 - Extract as much brake fluid as possible until even the smallest air bubbles have escaped.
 - Close vent valve.
 - Tighten vent valve to corresponding tightening torque
 ⇒ [page 153](#)
 - Repeat this procedure for all brake calipers in the prescribed sequence until the brake system is fully bled.



Bleeding sequence

1. Rear right brake caliper
 2. Rear left brake caliper
 3. Front right brake caliper
 4. Front left brake caliper
- Inspect pedal position and idle travel at brake pedal. Idle travel: max. 1/3 of pedal travel.
 - Repeat the whole procedure if necessary (several times), until perfect bleeding is achieved.

Vehicles with ABS

- Perform basic setting of the ABS control unit using the diagnostic unit - VAS- ⇒ Vehicle diagnostic tester.
- Proceed by referring to the read-out on the display of the diagnostic unit.



Caution

Before the basic setting of the ABS control unit is performed, first of all the brake system must be fully bled until even the smallest air bubbles have escaped from the system.

The air bubbles would penetrate into the ABS hydraulic unit when performing the basic setting of the ABS control unit.

It is very difficult to remove these air bubbles from the ABS hydraulic unit.

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Continued for all vehicles

- Disconnect the brake filling and bleeding device .
- Disconnect the brake filling and bleeding device from the brake fluid reservoir.
- After bleeding close the relevant vent valve and fit dust cap.
- If necessary, correct the brake fluid level in the brake fluid reservoir.
- Perform a test drive. While doing so, at least one ABS adjustment must be carried out on vehicles with ABS!

4.2 Bleeding the brake system of air without using the brake filling and bleeding device

Special tools and workshop equipment required

- ◆ Bleeding bottle (commercially available)
- ◆ Brake fluid ⇒ [page 8](#)



WARNING

- ◆ *The brake fluid is hygroscopic, i.e. it retains humidity from the ambient air, and must therefore always be stored in airtight containers.*
- ◆ *Brake fluid must never come into contact with fluids containing mineral oils (oil, petrol, cleaning agent). Mineral oils damage the plugs and boots of the brake system.*
- ◆ *Drained (used) brake fluid must never be used again.*
- ◆ *The brake fluid is toxic, avoid skin contact.*
- ◆ *Because of its caustic effect, the brake fluid must not come into contact with paint.*
- ◆ *Rinse off spilled brake fluid using plenty of water.*
- ◆ *Dispose of brake fluid in compliance with the applicable waste disposal and environmental regulations.*
- ◆ *Bleeding brake system on vehicles with ABS or TCS/ESP (ESC), as for vehicles without ABS.*
- ◆ *Only use new brake fluid in accordance with the specification ⇒ [page 8](#) .*
- ◆ *While bleeding continuously check the brake fluid level in the brake fluid reservoir and top up brake fluid if necessary up to the "MAX" marking.*

- Remove the dust caps of the bleeder valves at the brake calipers.
- Provide a suitable catch pan for used brake fluid.
- Build up pressure in the brake system by pumping repeatedly the brake pedal.



- Fit the hose of the bleeding bottle -1- onto the corresponding bleeder valve.
- Press brake pedal and then loosen the bleeder valve.

By doing so, the procedure for bleeding the brakes is performed.

- Tighten the bleeder valve with the brake pedal pressed down.
- Release brake pedal.
- Repeat this procedure until even the smallest air bubbles have escaped from the system.
- Close the relevant bleeder valve and fit on dust cap.
- Repeat this procedure for all brake calipers in the prescribed sequence until the brake system is fully bled.

Bleeding sequence

1. Rear right brake caliper
 2. Rear left brake caliper
 3. Front right brake caliper
 4. Front left brake caliper
- Inspect pedal position and idle travel at brake pedal. Idle travel: max. 1/3 of pedal travel.
 - Repeat the whole procedure if necessary (several times), until perfect bleeding is achieved.

Vehicles with ABS



Caution

Before the basic setting of the ABS control unit is performed, first of all the brake system must be fully bled until even the smallest air bubbles have escaped from the system.

The air bubbles would penetrate into the ABS hydraulic unit when performing the basic setting of the ABS control unit.

It is very difficult to remove these air bubbles from the ABS hydraulic unit.

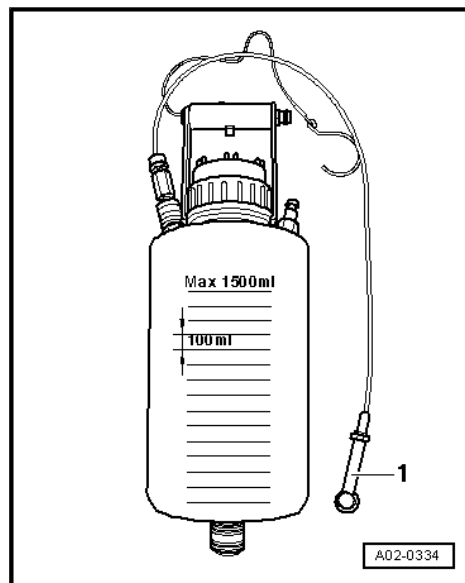
- Perform basic setting of the ABS control unit using the diagnostic unit - VAS- ⇒ Vehicle diagnostic tester.

Continued for all vehicles

- Perform a test drive. While doing so, at least one ABS adjustment must be carried out on vehicles with ABS!

4.3 Change brake fluid

⇒ Maintenance ; Booklet Octavia II



5 Summary of Components: brake servo unit/master brake cylinder

Summary of components - left-hand drive ⇒ [page 173](#)

Summary of components - right-hand drive ⇒ [page 176](#)

Fitting position of the cap from the brake fluid reservoir
⇒ [page 177](#)

Vacuum pump for brake servo unit (vehicles with diesel engines)
⇒ [page 178](#)

Brake vacuum pump - V192- (vehicles with petrol engines)
⇒ [page 178](#)

Checking the non-return valve ⇒ [page 181](#)

Checking vacuum system ⇒ [page 181](#)

Removing and installing the pressure sensor for the brake servo unit -G294- ⇒ [page 185](#)

5.1 Summary of components - left-hand drive



Note

The master brake cylinder and the brake servo unit can be replaced independently of one another.

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1 - Foot controls

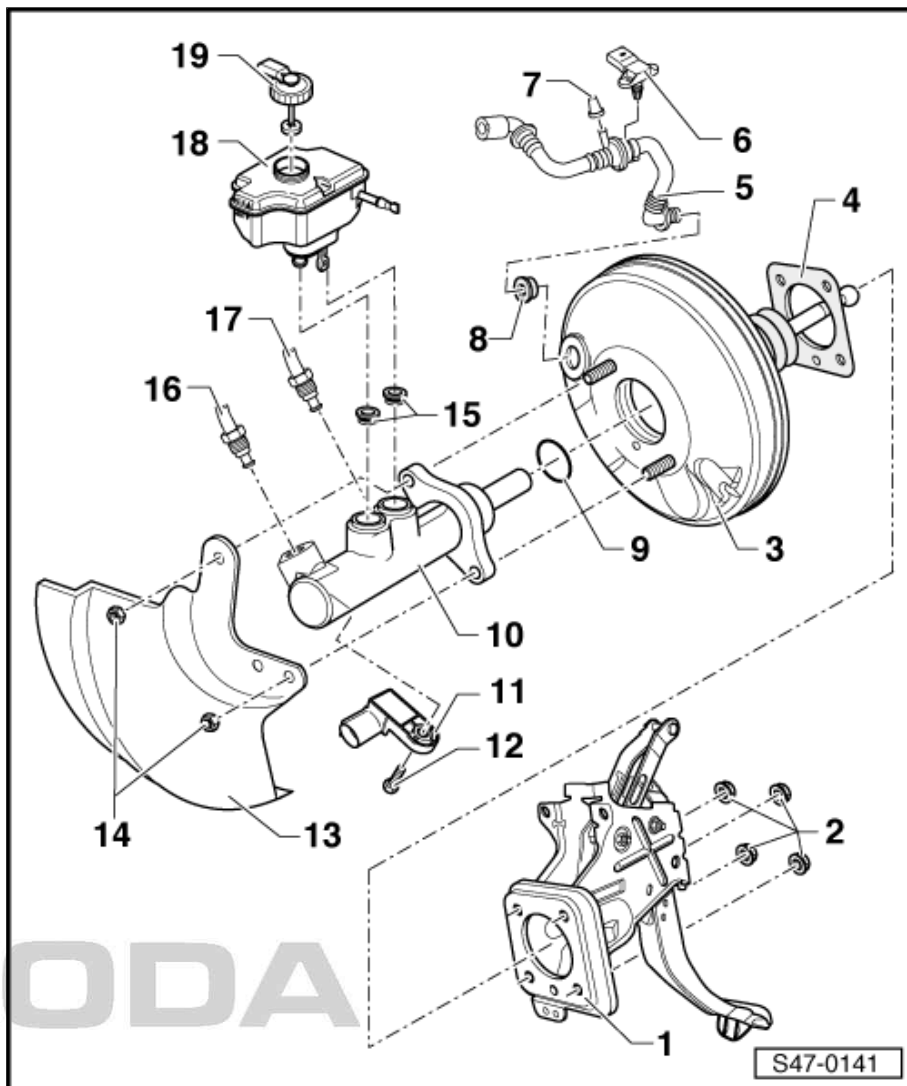
- different versions
- Assignment => Electronic Catalogue of Original parts

2 - Self-locking nut, 25 Nm

- replace after each removal

3 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump
- Vehicles fitted with petrol engines and automatic gearbox are equipped with a brake vacuum pump - V192- => [page 178](#) .
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure => [page 178](#)
- Inspect proper operation:
 - With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).



- Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.

- if there are faults replace completely
- Removing and installing => [page 192](#)

4 - Gasket

- for brake servo
- Assignment => Electronic Catalogue of Original parts

5 - Vacuum line

- with non-return valve

6 - Pressure sensor for the brake servo unit -G294-

- only on vehicles with petrol engines with brake vacuum pump
- Removing and installing => [page 185](#)
- Check => Vehicle diagnostic tester

7 - Dummy plug

8 - Sealing grommet

- for the connection of the vacuum hose

9 - Sealing ring

10 - Master brake cylinder

- cannot be repaired



- if there are faults replace completely
- Removing and installing ⇒ [page 186](#)
- Assignment ⇒ Electronic Catalogue of Original Parts

11 - Brake light switch -F- and brake pedal switch -F47-

- installed from 11/05
- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 139](#)
- Check ⇒ Vehicle diagnostic tester

12 - Screw, 5 Nm

13 - Protection plate

- Assignment ⇒ Electronic Catalogue of Original Parts

14 - Self-locking nut, 25 Nm

- replace after each removal

15 - Sealing grommets

- moisten with brake fluid and press in brake fluid reservoir

16 - Brake line, 14 Nm

- Master brake cylinder/push rod piston circuit to hydraulic unit

17 - Brake line, 14 Nm

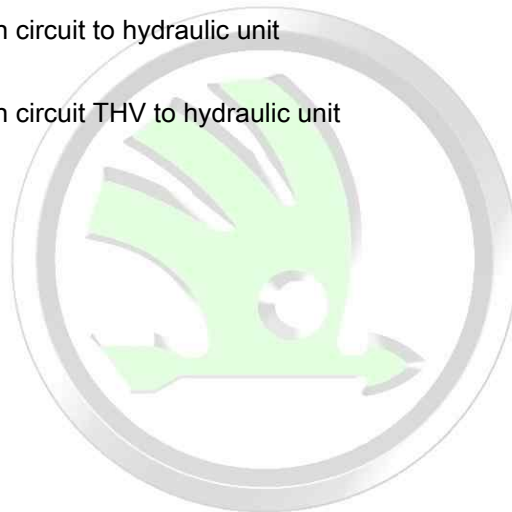
- Master brake cylinder/push rod piston circuit THV to hydraulic unit

18 - Brake fluid reservoir

19 - Screw cap

- Check fitting position ⇒ [page 177](#)

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5.2 Summary of components - right-hand drive



Note

The master brake cylinder and the brake servo unit can be replaced independently of one another.

1 - Screw cap

- Check fitting position
⇒ [page 177](#)

2 - Brake fluid reservoir

3 - Sealing grommets

- moisten with brake fluid and press in brake fluid reservoir

4 - Vacuum hose

- positioned in the brake servo unit

5 - Brake servo

- on petrol engines, the required negative pressure is drawn from the intake manifold or it is generated with a vacuum pump
- Vehicles fitted with petrol engines and automatic gearbox are equipped with a brake vacuum pump - V192- ⇒ [page 178](#) .
- vehicles using a diesel engine are fitted with a vacuum pump for generating a low pressure ⇒ [page 178](#)
- Inspect proper operation:

- With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).

- Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.

- if there are faults replace completely
- Removing and installing ⇒ [page 192](#)

6 - Gasket

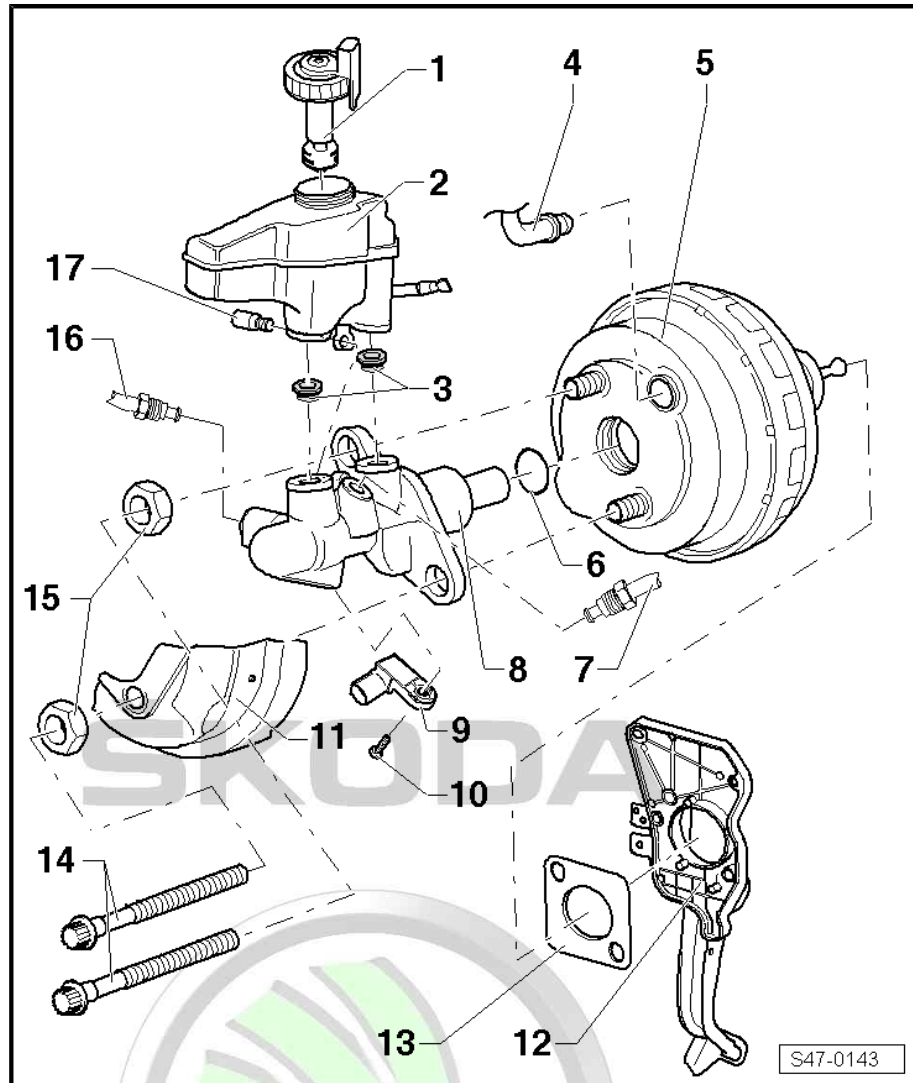
- for brake servo

7 - Brake line, 14 Nm

- Master brake cylinder/push rod piston circuit THV to hydraulic unit

8 - Master brake cylinder

- cannot be repaired
- if there are faults replace completely
- Removing and installing ⇒ [page 186](#)



- Assignment ⇒ Electronic Catalogue of Original Parts

9 - Brake light switch -F- and brake pedal switch -F47-

- mounted as of 11.2005
- Fitting location: on master brake cylinder
- Removing and installing ⇒ [page 149](#)
- Check ⇒ Vehicle diagnostic tester

10 - Screw, 5 Nm

11 - Protection plate

- Assignment ⇒ Electronic Catalogue of Original Parts

12 - Foot controls

- different versions
- Assignment ⇒ Electronic Catalogue of Original parts

13 - Gasket

- Assignment ⇒ Electronic Catalogue of Original parts

14 - Screw, 25 Nm

- serves, at the same time, to secure the brake master cylinder and the brake servo unit.

15 - Nut, 50 Nm

- replace after each removal

16 - Brake line, 14 Nm

- Master brake cylinder/push rod piston circuit to hydraulic unit

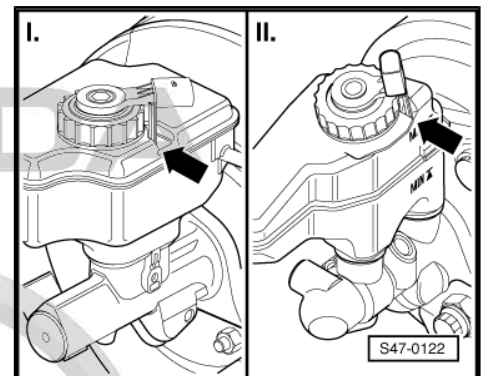
17 - Screw, 3.5 Nm

5.3 Fitting position of the cap from the brake fluid reservoir

The rig pin of the cap from the brake fluid reservoir must always point to the recesses in the reservoir -arrow-.

I - Left-hand drive

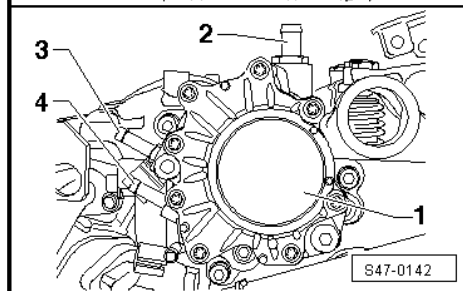
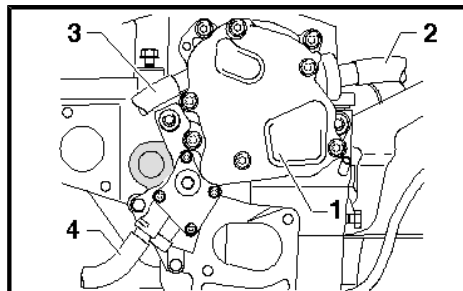
II - Right-hand drive



5.4 Vacuum pump for brake servo unit (vehicles with diesel engines)

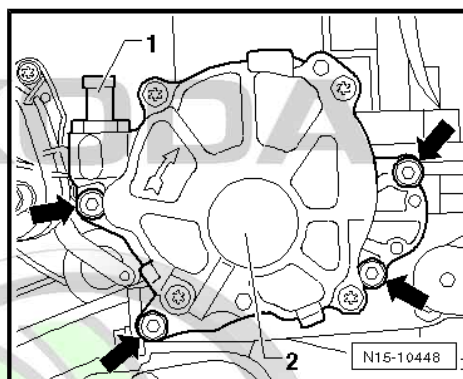
Vacuum pump for engines TDI PD:

- 1 - Tandem pump (vacuum pump and fuel pump)
- 2 - Vacuum hose with non-return valve (to brake servo unit)
- 3 - Fuel line
- 4 - Fuel line
- Removing and installing the tandem pump ⇒ Engine; Rep. gr. 20 .



Vacuum pump for engines TDI CR:

- 1 - Vacuum line to brake booster
- 2 - Vacuum pump
- Removing and installing vacuum pump ⇒ Engine; Rep. gr. 15 .



5.5 Brake vacuum pump - V192- (vehicles with petrol engines)

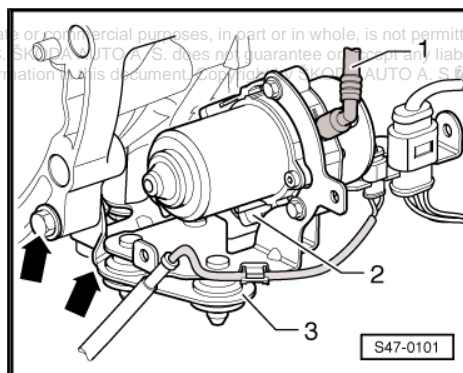
The brake vacuum pump - V192- is located at the front of the gearbox.

No provision is made for repairing the brake vacuum pump - V192- . The brake vacuum pump - V192- must be replaced if a fault arises.

Check ⇒ Vehicle diagnostic tester

Removing:

- Remove the vacuum hose -1- from the brake vacuum pump - V192- .
- Disconnect the plug connection -2- of the brake vacuum pump - V192- .
- Remove all the plug connections and cables from the support -3-.
- Unscrew bracket -3- with brake vacuum pump - V192- -arrows-.

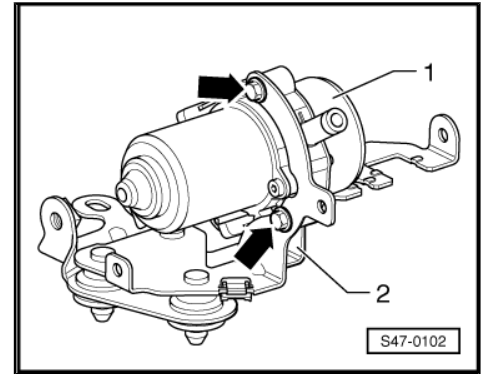




- Unscrew brake vacuum pump - V192- -1- from bracket -2- -arrows-.

Installing:

Installation is carried out in the reverse order.



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**Specified torques:**

Brake vacuum pump - V192- to support	8 Nm
Support to automatic gearbox	25 Nm

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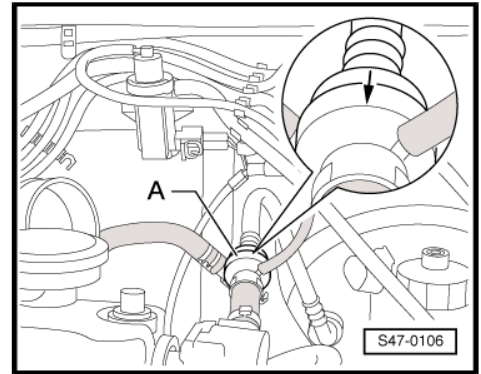


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5.6 Checking the non-return valve

- ◆ The non-return valve must let the air pass through in the direction of the arrow -A-.
- ◆ Non-return valve must remain closed in opposite direction.

Pay attention to correct installation position!



5.7 Checking vacuum system

The following instructions are intended to help you find the causes of problems effectively and objectively in the event of complaints about the brake servo or in the event of a so-called »»hard brake pedal««.

This check relates to the following components:

- ◆ Brake booster.
- ◆ Oil seal between brake master cylinder and brake servo.
- ◆ Non-return valve.
- ◆ Vacuum hoses with connectors.
- ◆ Vacuum pump (if included).

The measuring results will be influenced by the geographical location. The higher the location is above sea level, the lower the air pressure will be.

Take note of the following test requirements:

- ◆ Visual inspection of all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached
- ◆ Ensure cleanliness when working on vacuum system.
- ◆ Before starting work, clean engine compartment if necessary.

Special tools and workshop equipment required

- ◆ Vacuum gauge for brake servo - VAS 6721-

5.7.1 Connecting vacuum gauge for brake servo - VAS 6721-

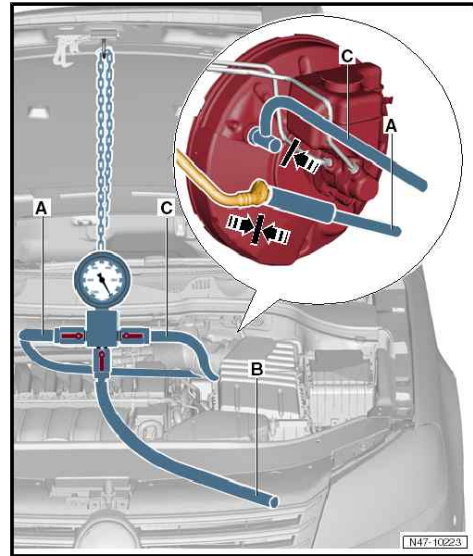
- Pull vacuum hose out of brake servo.

First press the brake pedal several times in order to facilitate removal of the vacuum hose.

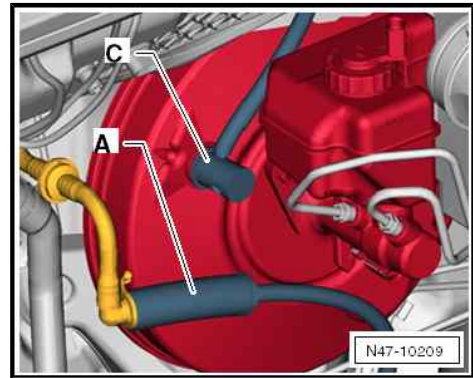


- Place brake servo vacuum gauge - VAS 6721- between them -see following illustrations-.

Position	Component	Meaning
A	Cut-off valve	In direction of vacuum hose, non-return valve and, if included, vacuum pump
B	Cut-off valve	<ul style="list-style-type: none"> ◆ Open to facilitate removal of brake servo vacuum gauge - VAS 6721- ◆ Open to simulate a fault source ◆ Connection of manual vacuum pump - VAS 6213-
C	Cut-off valve	In direction of brake servo



- Push hose -A- of brake servo vacuum gauge - VAS 6721- onto vacuum hose and press adapter -C- into brake servo.



5.7.2 Checking vacuum generation

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Note

- ◆ *The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1,000 m altitude). Local and time variations also influence the vacuum generation.*
- ◆ *A cold engine, a switched-on air-conditioning system as well as engine idling have an adverse influence on generation of a vacuum.*
- Before starting work, check all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached
- Place vacuum gauge for brake servo - VAS 6721- in between ⇒ [page 181](#) .

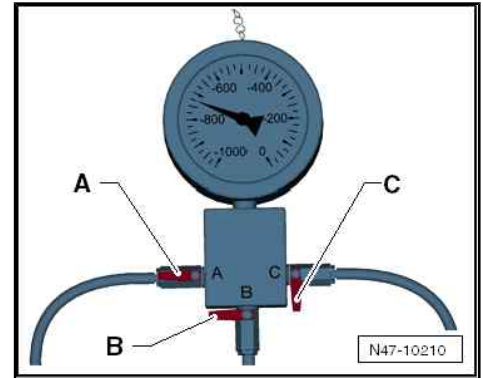
- Open locking valve -A-.
- Close cut-off valves -B+C-.
- Start warm engine (> 60°C), press accelerator briefly (engine speed greater than 2000/min).
- Read indicated measured value.

Normally (see notes), the vacuum that is generated should be between 700 and 950 mbar (depending on engine size).

If the measured value is not reached even through the preconditions (see notes) have been met, the vacuum system must first be checked for tightness.

- For comparison purposes, generate the vacuum with the manual vacuum pump - VAS 6213- → [page 184](#) .

Open cut-off valve -B- to facilitate removal of hose connections and adapter.



5.7.3 Checking for leaks

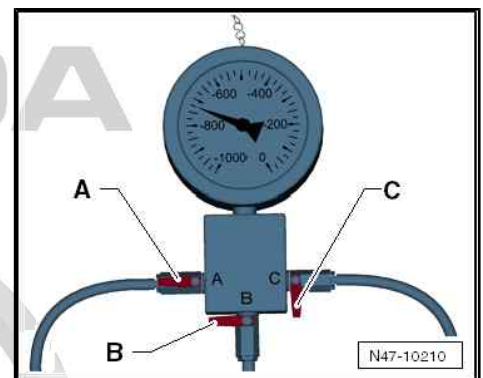


Note

- ◆ *The average air pressure of the earth's atmosphere at sea level is 1013 mbar and decreases steeply as the altitude increases (approx. 100 mbar/1,000 m altitude). Local and time variations also influence the vacuum generation.*
- ◆ *A cold engine, a switched-on air-conditioning system as well as engine idling have an adverse influence on generation of a vacuum.*

- Before starting work, check all vacuum hoses for damage (e.g. cracks or marten bite) and to check that they are correctly and firmly attached
- Place vacuum gauge for brake servo - VAS 6721- in between → [page 181](#) .
- Open locking valve -A-.
- Close cut-off valves -B+C-.
- Start warm engine (> 60°C), press accelerator briefly (engine speed greater than 2000/min).

Normally (see notes), the vacuum that is generated should be between 700 and 950 mbar (depending on engine size).



- Open cut-off valve -C- to evacuate brake servo.
- Switch off engine.
- Read and make a note of measured value shown.

A vacuum decrease of 400 mbar in 12 hours is permissible.

If the vacuum decrease is greater, then check for leaks in the vicinity of ...

1 - Brake servo

or

2 - Non-return valve, vacuum hoses with connectors and vacuum pump/intake manifold.

If there are large leaks, the vacuum decreases steeply within a few seconds.

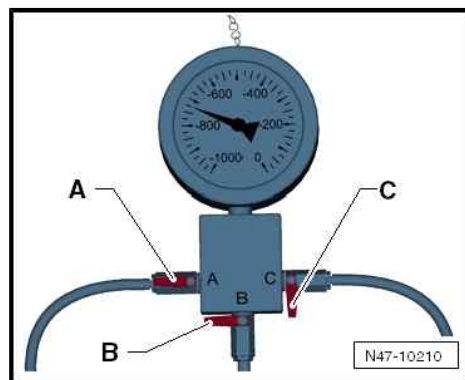
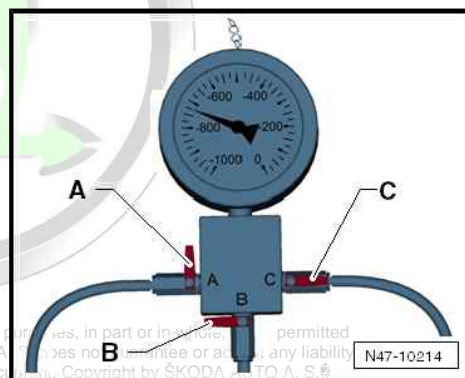
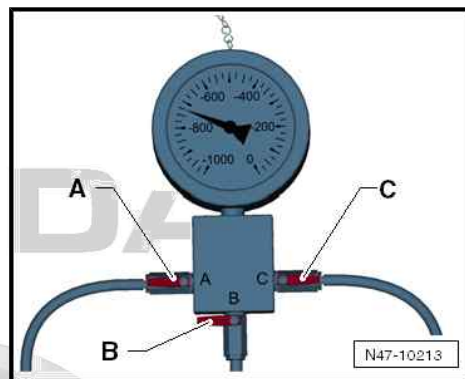
Vacuum check in vicinity of brake servo:

- After generation of vacuum, close cut-off valve -A- in order to check brake servo vacuum system.

Vacuum check in vicinity of non-return valve, vacuum hoses with connectors and vacuum pump/intake manifold:

- Once vacuum has been generated, close the shut-off valve -C- in order to check the vacuum system of the brake servo vacuum gauge - VAS 6721- up to the intake manifold or the vacuum pump.

Open cut-off valve -B- to facilitate removal of hose connections and adapter.



5.7.4 Vacuum generation with manual vacuum pump - VAS 6213-

Instead of vacuum generation by means of engine or vacuum pump, the vacuum can be generated with the manual vacuum pump - VAS 6213- in certain cases.

- Connect manual vacuum pump - VAS 6213- to vacuum hose from connection -B- on brake servo vacuum gauge - VAS 6721- .
- Open cut-off valve -B-.
- Generate vacuum with hand vacuum pump - VAS 6213- until between 600 and 950 mbar is shown on brake servo vacuum gauge - VAS 6721- .
- Subsequently, carry out the corresponding checks.

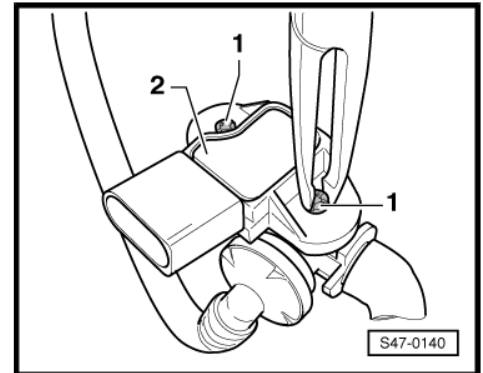
5.8 Removing and installing the pressure sensor for the brake servo unit -G294-

Removing:

- Disconnect the plug from the pressure sensor for the brake servo unit -G294- .
- Pull the vacuum line with the pressure sensor for the brake servo unit -G294- out of the brake servo unit.
- Unlatch clamps -1- e.g. with pliers.
- Carefully lever off the pressure sensor for the brake servo unit -G294- -2- from the vacuum line.

Installing:

Installation is carried out in the reverse order.



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6 Master brake cylinder

Remove and install master brake cylinder - left-hand drive
⇒ [page 186](#)

Remove and install master brake cylinder - right-hand drive
⇒ [page 189](#)

6.1 Removing and installing master brake cylinder - left-hand drive

Special tools and workshop equipment required

- ◆ Repair kit - 1H0 698 311 A-
- ◆ Brake filling and bleeding device , e. g. -VAS 5234-

Removing:

- On models fitted with a coded radio, pay attention to the coding, determine if necessary.
- Remove battery ⇒ Electrical System; Rep. gr. 27 .
- Remove inlet connection and air filter ⇒ Engine; Rep. gr. 23 or ⇒ Engine; Rep. gr. 24 .
- Remove battery ⇒ Electrical System; Rep. gr. 27 .

Vehicles with turbocharger engines

- Disconnect the plug of the air mass meter G70.
- Remove suction hose between air filter and exhaust gas turbocharger ⇒ Engine; Rep. gr. 23 or ⇒ Engine; Rep. gr. 21 .
- Remove the connecting hose between the filler tube and the exhaust gas turbocharger (if necessary remove the whole filler tube) ⇒ Engine; Rep. gr. 21 .

Continued for all vehicles

- Lay sufficient non-fluffing cloths around the engine and gearbox.
- Extract as much brake fluid as possible from the brake fluid reservoir.

For vehicles with manual gearbox

- Detach the return hose -B- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.

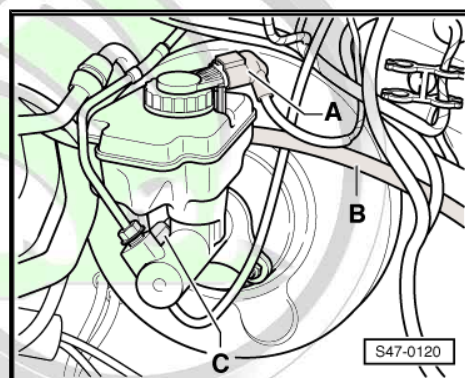
Continued for all vehicles

- Disconnect plug -A- from brake fluid level warning contact .
- Remove the brake fluid reservoir, to this end press the latches at the reservoir outwards and at the same time pull the brake fluid reservoir out of the sealing plugs.

on vehicles as of 11/2005

- Disconnect plug connection -C- from brake light switch - F- (on vehicles with the brake light switch - F- on the master brake cylinder).

Continued for all vehicles

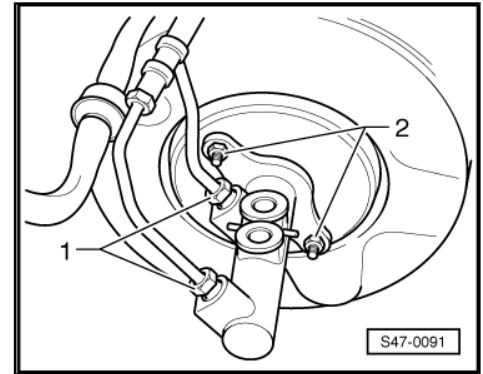


- Unscrew the brake lines -1- at the master brake cylinder, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
- Unscrew nuts -2- from brake master cylinder.
- If present, remove the protection plate.
- Carefully remove brake master cylinder from brake servo.

Installing:

- Installation is carried out in the reverse order.

When installing, pay particular attention to the following points:



Note

If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

- When installing the master brake cylinder with the brake servo unit pay attention to the correct positioning of the pressure rod in the master brake cylinder.

After installing, it is necessary to:

- Bleed brake system ⇒ [page 168](#) .
- Bleed clutch ⇒ Gearbox; Rep. gr. 30 .

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**Specified torques:**

Brake master cylinder to brake servo ◆ Use new nuts!	25 Nm
Brake lines to master brake cylinder	14 Nm

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6.2 Removing and installing master brake cylinder - right-hand drive

Special tools and workshop equipment required

- ◆ Repair kit - 1H0 698 311 A-
- ◆ Brake filling and bleeding device , e. g. -VAS 5234-

Removing:

- Remove engine cover ⇒ Engine.; Rep. gr. 13

Vehicles with diesel engines TDI PD without DPF

- Remove connecting hose to intake manifold flap ⇒ Engine; Rep. gr. 21 .
- Slacken the fuel lines at the engine head ⇒ Relevant engine; Rep. gr. 21 .
- Remove top cover for timing chain ⇒ Engine; Rep. gr. 13 .

Vehicles with diesel engines TDI PD with DPF

Remove diesel particle filter ⇒ Engine; Rep. gr. 26 .

Vehicles with diesel engines TDI CR

Remove diesel particle filter ⇒ Engine; Rep. gr. 26 .

- Lay sufficient non-fluffing cloths around the engine and gear-box.
- Extract as much brake fluid as possible from the brake fluid reservoir.
- Remove filler neck for washer-fluid reservoir and lay it to one side.
- Remove the coolant expansion bottle and lay it to one side.
- Slacken the fuel feed and fuel return line from the plastic clip.
- Separate the plug connection from the solenoid valve of the diesel particle filter.
- Unscrew the bracket for the solenoid valve and lay it to one side.

Continued for all vehicles

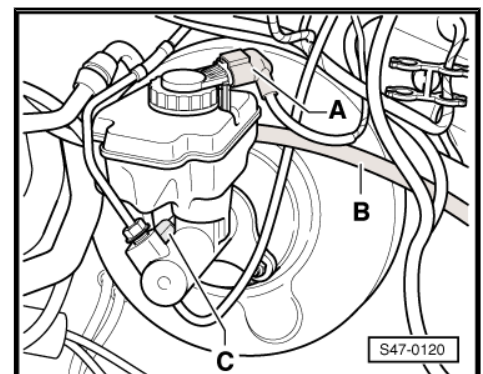
- Lay sufficient non-fluffing cloths around the engine and gear-box.
- Extract as much brake fluid as possible from the brake fluid reservoir.

For vehicles with manual gearbox

- Detach the return hose -B- of the clutch master cylinder from the brake fluid reservoir and attach it slightly higher.

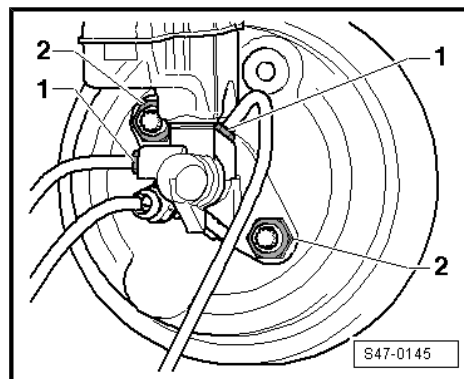
Continued for all vehicles

- Disconnect plug -A- from brake fluid level warning contact .





- Unscrew the brake lines -1- at the master brake cylinder, close the brake lines with the screw plugs from the repair kit - 1H0 698 311 A- .
- Unscrew nuts -2- from brake master cylinder.
- If present, remove the protection plate.



- Slightly pull off the master brake cylinder from the brake servo unit.

on vehicles as of 11/2005

- Disconnect plug connection -1- from brake light switch - F- (on vehicles with the brake light switch - F- on the master brake cylinder).

Continued for all vehicles

- Carefully remove the master brake cylinder -4-.

Installing:

- Installation is carried out in the reverse order.

When installing, pay particular attention to the following points:

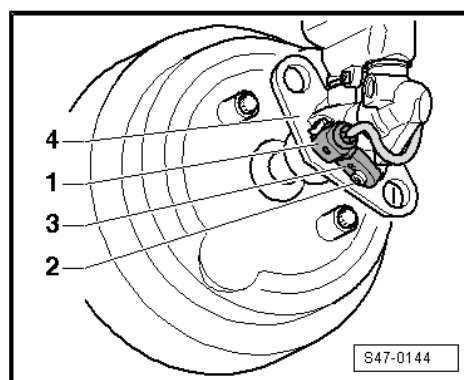
i Note

If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

- When installing the master brake cylinder with the brake servo unit pay attention to the correct positioning of the pressure rod in the master brake cylinder.

After installing, it is necessary to:

- Bleed brake system ⇒ [page 168](#) .
- Bleed clutch ⇒ Gearbox; Rep. gr. 30 .





Specified torques:

Brake master cylinder to brake servo ◆ Use new nuts!	50 Nm
Brake lines to master brake cylinder	14 Nm

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7 Brake servo

Functional test ⇒ [page 192](#) .

Remove and install brake servo unit - left-hand drive
⇒ [page 192](#)

Remove and install brake servo unit - right-hand drive
⇒ [page 195](#)

7.1 Check function

- With the engine off press down brake pedal repeatedly with force (this reduces the pressure already present in the device).
- Now step on and hold brake pedal with medium pressure and start engine. If the brake servo is functioning properly, the brake pedal will be felt to go down as the servo takes effect.

7.2 Removing and installing brake servo unit - left-hand drive

Special tools and workshop equipment required

- ◆ Brake filling and bleeding device , e. g. -VAS 5234-

Removing:

- Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .

Vehicles up to 11/2005

- Unplug connector -1- from the brake light switch (if present).
- Remove brake light switch -2- (if present) by turning 45° to the left.

Continued for all vehicles

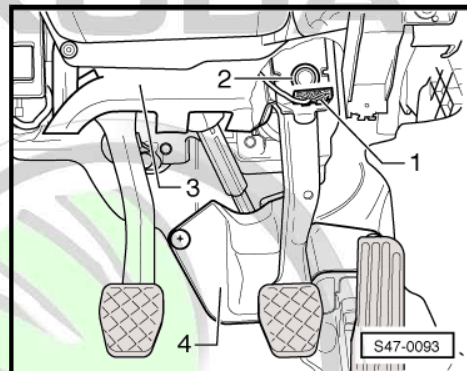
- Separating the brake pedal from the brake servo unit
⇒ [page 137](#) .
- Remove master brake cylinder ⇒ [page 186](#) .

Vehicles with LPG drive

- Unscrew the evaporator from the evaporator holder and lay it to one side ⇒ 1.6/72 kW; 75 kW engine; Rep. gr. 24 .
- Remove evaporator holder ⇒ 1.6/72 kW; 75 kW engine; Rep. gr. 24 .

Continued for all vehicles

- Remove vacuum hose from the brake servo unit.



- Unscrew nuts -1- from brake servo unit.
- Carefully remove the brake servo unit from the vehicle.

Installing:

- Installation is carried out in the reverse order.

 **Note**

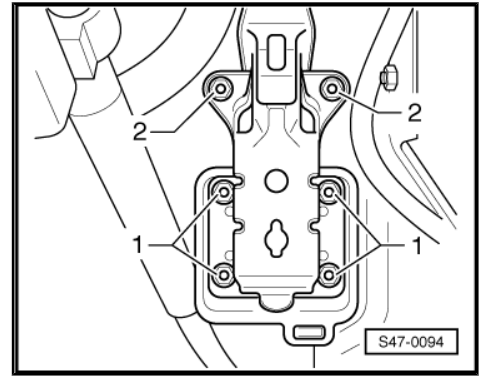
If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

After installing, it is necessary to:

- Bleed brake system ⇒ [page 168](#) .
- Bleed clutch ⇒ Gearbox; Rep. gr. 30 .

Vehicles up to 11/2005

- Setting the brake light switch ⇒ [page 138](#) .



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**Specified torques:**

Brake servo unit to foot controls ◆ Use new nuts!	25 Nm
Brake master cylinder to brake servo ◆ Use new nuts!	25 Nm
Brake lines to master brake cylinder	14 Nm

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7.3 Removing and installing brake servo unit - right-hand drive

Special tools and workshop equipment required

- ◆ Brake filling and bleeding device , e. g. -VAS 5234-
- ◆ Screw plug set for engine - VAS 6122/40-
- ◆ Supporting device - T30099-
- ◆ Supporting plate - T30099/1-
- ◆ Hook - MP9-200/3-

Removing:

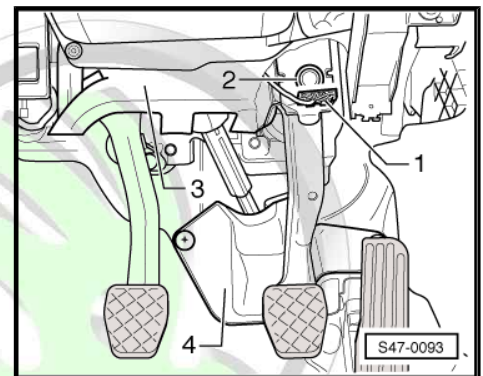
- Removing driver side trim panel ⇒ Body Work; Rep. gr. 70 .

Vehicles up to 11/2005

- Unplug connector -1- from the brake light switch (if present).
- Remove brake light switch -2- (if present) by turning 45° to the left.

Continued for all vehicles

- Separating the brake pedal from the brake servo unit
⇒ [page 145](#) .



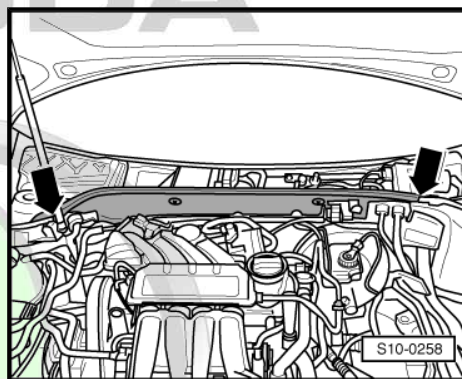


- Remove bulkhead plenum chamber ⇒ Body; Rep. gr. 66 .
- Remove vacuum hose from the brake servo unit.

Vehicles with diesel engines TDI PD with DPF

Remove diesel particle filter ⇒ Engine; Rep. gr. 26

- Remove master brake cylinder ⇒ [page 189](#) .
- Remove the connecting hose between the intake manifold flap and the compressed air cooler ⇒ Engine; Rep. gr. 21 .
- Remove suction hose between exhaust gas turbocharger and air filter ⇒ Engine; Rep. gr. 23
- Close the exhaust gas turbocharger e.g. with plugs from the plug set for engine - VAS 6122/40- .
- Unscrew the screws for the connection pipe of the exhaust gas recirculation from the exhaust pipe ⇒ Engine; Rep. gr. 21 .
- Remove inlet connection with mechanical exhaust gas recirculation valve and intake manifold flap ⇒ Engine; Rep. gr. 23 .
- Remove intake manifold ⇒ Engine; Rep. gr. 23 .



Vehicles with diesel engines TDI PD without DPF

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- Remove master brake cylinder ⇒ [page 189](#) .
- Remove the connecting hose between the intake manifold flap and the compressed air cooler ⇒ Engine; Rep. gr. 21 .
- Remove suction hose between exhaust gas turbocharger and air filter ⇒ Engine; Rep. gr. 23
- Close the exhaust gas turbocharger e.g. with plugs from the plug set for engine - VAS 6122/40- .
- Unscrew the screws for the connection pipe of the exhaust gas recirculation from the exhaust pipe ⇒ Engine; Rep. gr. 21 .
- Remove inlet connection with mechanical exhaust gas recirculation valve and intake manifold flap ⇒ Engine; Rep. gr. 23 .
- Remove intake manifold ⇒ Engine; Rep. gr. 23 .

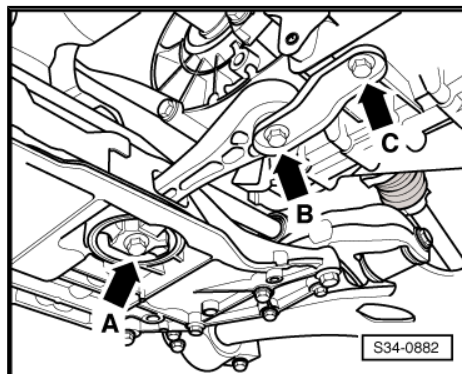
Vehicles with diesel engines TDI CR

Remove diesel particle filter ⇒ Engine; Rep. gr. 26 .

- Remove master brake cylinder ⇒ [page 189](#) .

Continued for all vehicles

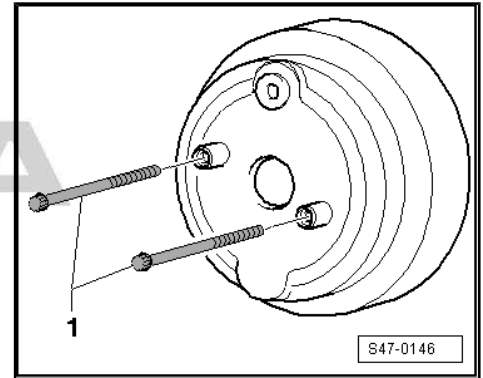
- Unscrew screws of pendulum support -arrow B- and -arrow C-.



- Unscrew the screws -1- of the brake servo unit and remove.

Vehicles with diesel engines TDI CR

- Remove cover for timing belt.
- Attach the engine on the right to the supporting device - T30099- .
- Partially lower the engine on the right vehicle side by approx. 60 to 70 mm ⇒ Engine; Rep. gr. 10 or ⇒ Engine; Rep. gr. 13 , while doing so pay attention to all the lines.
- Slightly pull the engine towards the front with the assistance of a second mechanic.
- Swivel the brake servo unit with a pressure rod via the camshaft belt pulley.



Vehicles with diesel engines TDI PD

- Swivel the brake servo unit in the space above the exhaust gas turbocharger.
- Slightly tilt the engine forward.

Continued for all vehicles

- Remove the brake servo unit from the vehicle.

Installing:

- Installation is carried out in the reverse order.



Note

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If the battery earth strap is disconnected and connected, carry out certain additional operations ⇒ Electrical System; Rep. gr. 27 .

After installing, it is necessary to:

- Bleed brake system ⇒ [page 168](#) .
- Bleed clutch ⇒ Gearbox; Rep. gr. 30 .

Vehicles up to 11/2005

- Setting the brake light switch ⇒ [page 149](#) .

**Specified torques:**

Brake master cylinder to brake servo ◆ Use new nuts!	50 Nm
Screw for brake servo unit to foot controls	25 Nm
Brake lines to master brake cylinder	14 Nm



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8 Brake line

Repairing brake line ⇒ [page 199](#)

Flaring tool - Summary of components ⇒ [page 201](#)

Work instruction ⇒ [page 201](#)

8.1 Repairing brake lines

Using the brake line flaring tool - VAS 6056- , the brake lines can be crimped with a pipe outside diameter of 5 mm, without damaging the coating. So that in certain cases parts of the brake lines can be replaced cheaply.



Note

- ◆ *Brake lines must only be bent max. 90°, otherwise they kink or present deformations, which constrain the line cross-section in an unauthorized manner.*
- ◆ *Preferably separate brake lines at underbody.*
- ◆ *The positions of the intermediate pieces must be selected so that they cannot chafe on moving parts.*
- ◆ *Do not grease spindle and only clean with methylated spirits.*

Special tools and workshop equipment required

- ◆ Brake line flaring tool - VAS 6056-
- ◆ Brake filling and bleeding device , e. g. -VAS 5234-

List of individual tools:

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1 - Flaring tool - VAS 6056/1-

- ❑ The flaring chucks - VAS 6056/6- are included in the flaring tool - VAS 6056/1-

2 - Pipe cutter - VAS 6056/2-

3 - Brake line-peeler - VAS 6056/3 -

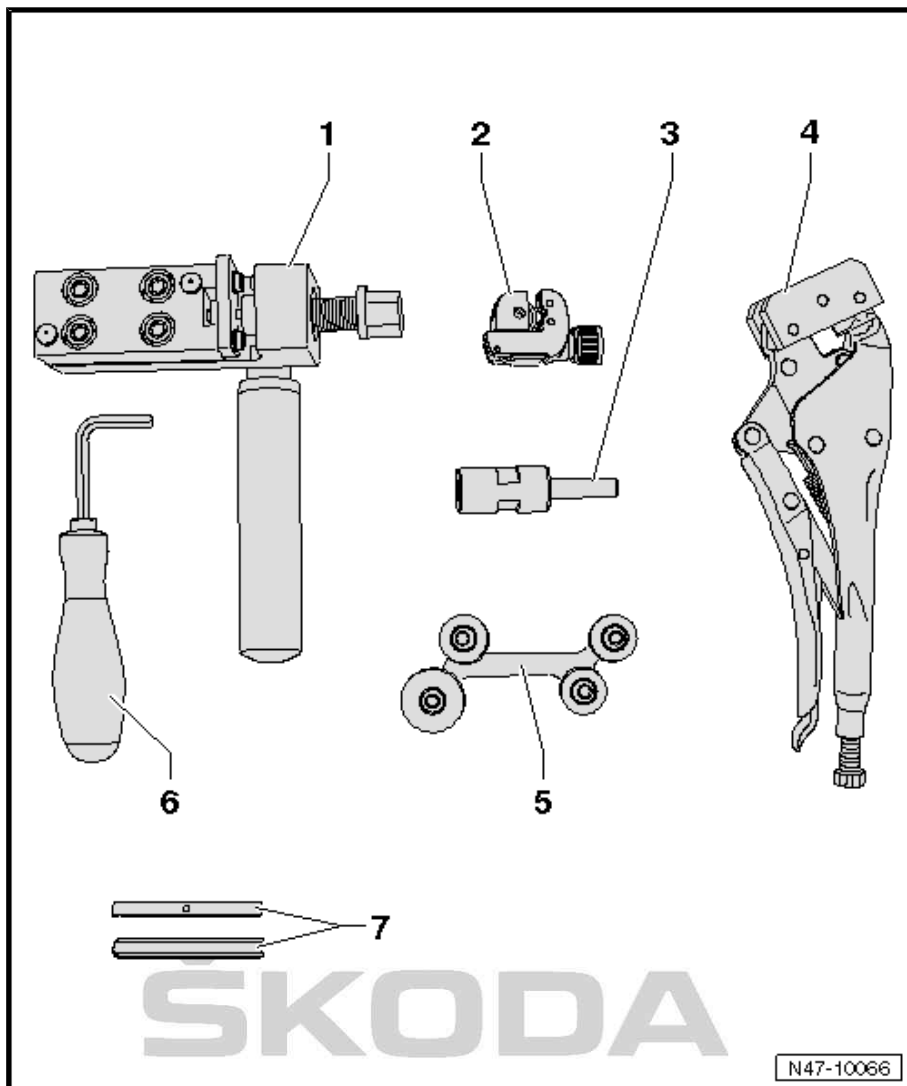
- ❑ The grub screws (in the shank and sideways) are adjusted and must not be altered!

4 - Gripping pliers with plastic chuck jaws - VAS 6056/4 -

5 - Pipe bending tool - VAS 6056/5-

6 - Offset screwdriver SW6

7 - Flaring chucks - VAS 6056/7-



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8.2 Flaring tool - summary of components

1 - Flaring tool upper part

- unscrew for changing the flaring chucks

2 - Attachment for door handle

- must be unscrewed to access securing bolt for upper part

3 - Fixing screw

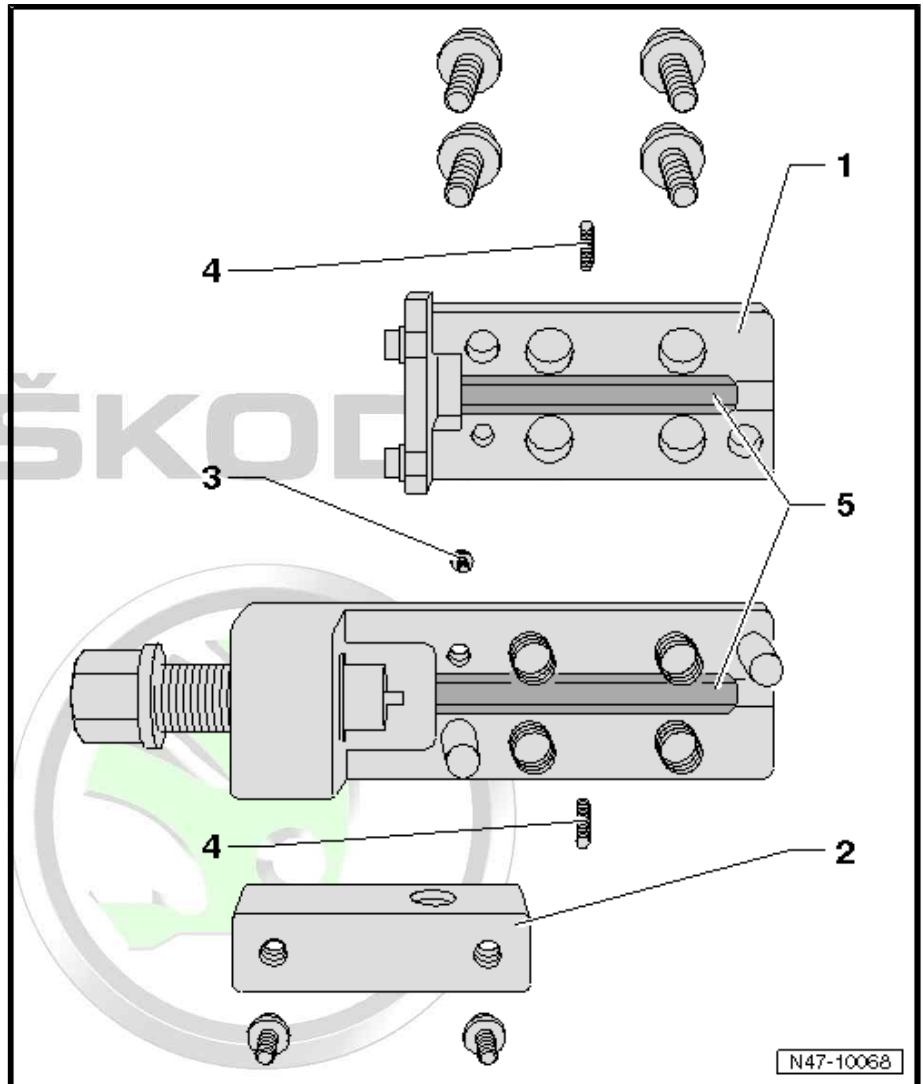
- For flanging tool upper part

4 - Grub screws for flaring chucks

- For centring and holding the flaring chucks
- 2 mm hexagon socket

5 - Flaring chucks

- Various
- Assembly instructions
 => [page 201](#)



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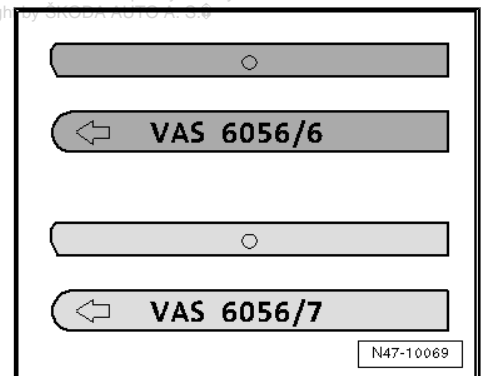
Mounting instruction for flaring chucks:

- ◆ VAS 6056/6 (dark) for black brake lines
- ◆ VAS 6056/7 (bright) for green brake lines



Note

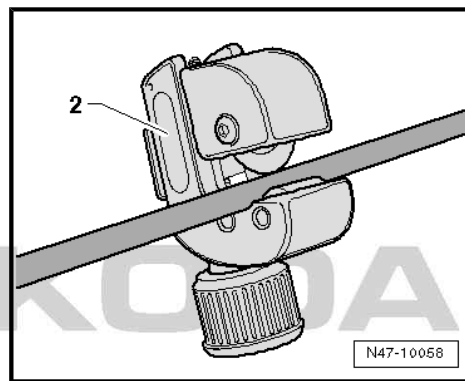
The arrow, on the rounded side of the flaring chucks, must point to the housing edge and the straight side of the flaring chucks must be installed to the spindle, otherwise the flaring head is not properly formed.



8.3 Work instruction

- Unscrew the affected brake line on the brake caliper or wheel-brake cylinder, while doing so collect escaping brake fluid and dispose according to the specifications.

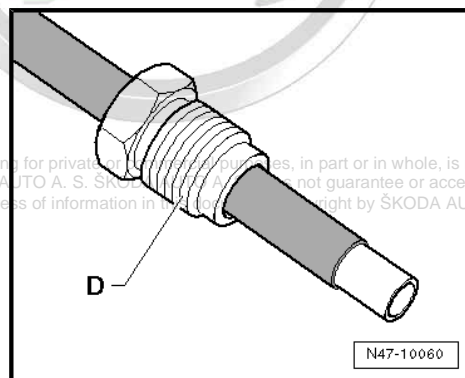
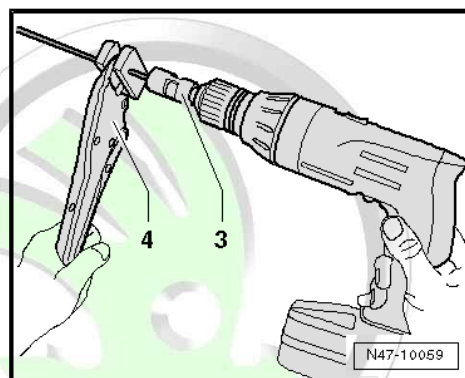
- Cut through the brake line in a suitable location (straight, freely accessible piece) with the pipe cutter -2-.
- Remove the part to be replaced.
- Degrease the surface of the brake line.



- Clamp the brake line in the gripping pliers -4- tight enough, so that it protrudes approx. 50 mm out of the plastic chuck jaws.
- Tension the peeler -3- in a boring machine and place it onto the brake line.
- Peel off the coating of the brake line using the slower speed of the boring machine and by exerting a slight pressure against the brake line.

The length of the peeling is determined by the stop in the peeler.

- Separate the peeler from the brake line and remove peel residues.
- Remove the gripping pliers and push the pipe screw -D- onto the brake line.



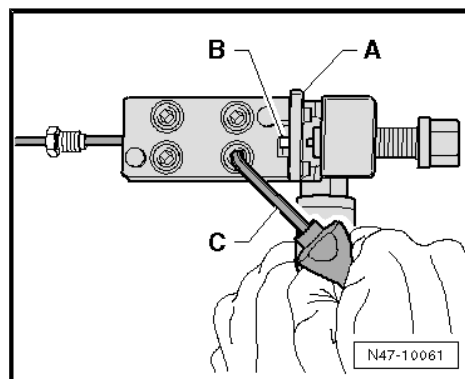
- Push the brake line -B- against the stop -A- in the flaring tool.



Note

When tightening the Allen screws the brake line must lie against the stop, otherwise the flaring head does not function properly.

- Pre-tension the brake line in the flaring tool so that the brake line can no longer be moved. Fold up the stop -A- and then tighten the Allen screws crosswise completely with the offset screwdriver -C-.



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- Turn the spindle in the flaring tool up to the stop.
- Turn back the spindle once again.
- Loosen the Allan screws crosswise.
- Take the brake line out of the flaring tool, clean and check the brake line as well as the flaring head.

Briefly flush the part of the brake line still in the vehicle:

- Connect brake filling and bleeding device , e. g. -VAS 5234- .
- Fit the hose of the bleeding bottle onto the flaring head of the brake line and allow the brake filling and bleeding device e.g. -VAS 5234- to run briefly, until some brake fluid has passed through.
- Purge the brake line that you will be fitting with compressed air.
- Assemble the brake lines together with the connecting piece -E-.
- Install brake line.
- Bleed brake system ⇒ [page 168](#) .

