Workshop Manual
FABIA 2000 ➢

1.4/55; 1.4/74 Engine - Mechanical Components Edition 08.99									
Engine code	**AUA**	**AUB**	**BBY**	**BBZ**	**BKY**				

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List of Supplements to Workshop Manual

FABIA 2000 ➢

1.4/55; 1.4/74 Engine - Mechanical Components

Edition 08.99

Supplement	Edition	Subject	Article Number
	08.99	Basic Edition	S00.5306.00.20
1	07.00	Supplement to Basic Edition	S00.5306.01.20
2	05.01	Modifications in Rep. Gr. 00, 10, 13, 15, 17 and 19	S00.5306.02.20
3	06.02	Additions to engines with the engine codes BBY, BBZ	S00.5306.03.20
4	09.03	Modifications in Rep. Gr. 00, 10, 13, 15 and 17	S00.5306.04.20
5	05.04	Supplement to engine with the engine codes BBY	S00.5306.05.20
6	05.05	Modifications in the Rep. Gr. 00, 13, 15, 17, 19, 20 and 26	S00.5306.06.20

Table of Contents

00 – Technical Data

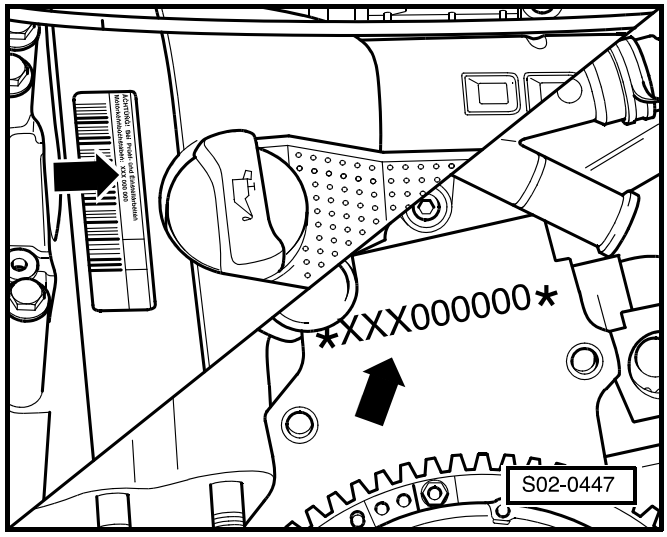
00-1 Technical Data

Engine number

The engine number („engine identification characters“ and „serial number“) is indicated on the end face of the cylinder block at the gearbox side below the coolant thermostat housing.

In addition, a sticker with the „engine identification characters“ and „serial number“ is affixed to the timing belt guard.

The engine identification characters are also indicated on the vehicle data sticker.



Engine characteristics

Engine identification characters		AUA	BBY	BKY	AUB	BBZ
Manufactured		05.00 ➢ 03.02	04.02 ➢ 05.04	05.04 ➢	08.99 ➢ 05.02	05.02 ➢
Displacement	l	1,390	1,390	1,390	1,390	1,390
Valves per cylinder		4	4	4	4	4
Power output	kW at rpm	55/5000	55/5000	55/5000	74/6000	74/6000
Torque	Nm at rpm	126/3800	126/3800	126/3800	126/4400	126/4400
Bore	∅ mm	76,5	76,5	76,5	76,5	76,5
Stroke	mm	75,6	75,6	75,6	75,6	75,6
Compression		10,5	10,5	10,5	10,5	10,5
Fuel - RON	min.	95 unleaded[1)]	95 unleaded[1)]	95 unleaded[1)]	98 unleaded[2)]	98 unleaded[2)]
Ignition system, fuel injection		4LV	4MV	4TV	4LV	4MV
Knock control		yes	yes	yes	yes	yes
Self-diagnosis		yes	yes	yes	yes	yes
Lambda control		2 Lambda probes	2 Lambda probes	2 Lambda probes	2 Lambda probes	2 Lambda probes
Exhaust gas recirculation		yes	yes	yes	yes	yes
Catalytic converter		2 Catalysts	2 Catalysts	2 Catalysts	2 Catalysts	2 Catalysts
Turbocharging		no	no	no	no	no
Exhaust limits conforming to		EU-4, EU-3 DDK, EU-2 DDK	EU-4, EU-3 DDK, EU-2 DDK	EU-4, EU-2 DDK	EU-4, EU-3 DDK, EU-2 DDK	EU-4, EU-2 DDK

1) At least 91 RON in exceptional cases, although engine output is reduced.
2) At least 95 RON in exceptional cases, although engine output is reduced.

10 – Removing and Installing Engine

10-1 Removing and Installing Engine

Removing engine

Special tools, test and measuring equipment and auxiliary items required

- Lifting device, e.g. -MP 9-201-
- Tensioning block -MP 9-101-
- Engine mount -MP 1-202-
- Workshop crane, e.g. - V.A.G 1202 A-
- Catch pan, e.g. -V.A.G 1306 -
- Grease -G 000 100- (for vehicles with gearbox)
- Cable strap

Removing

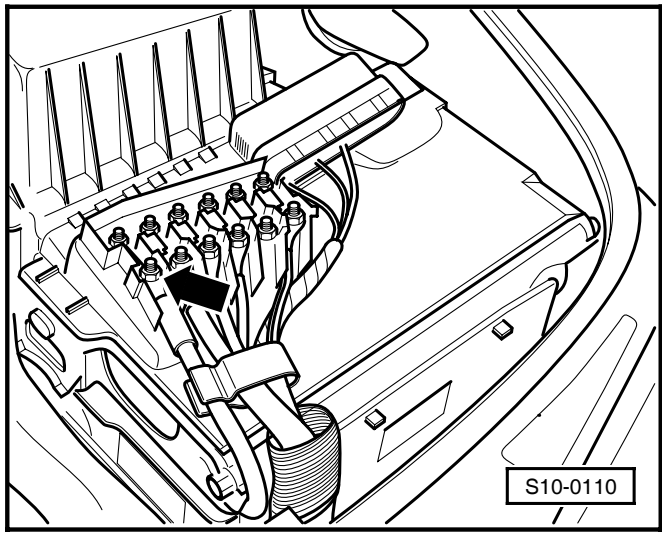
Note

All cable straps that have been loosened or cut open when the engine was removed must be fitted again in the same location when the engine is installed again.

– First check whether a radio set with anti-theft coding has been fitted. If this is the case obtain coding.

– Disconnect the earth strap from the battery with the ignition off.

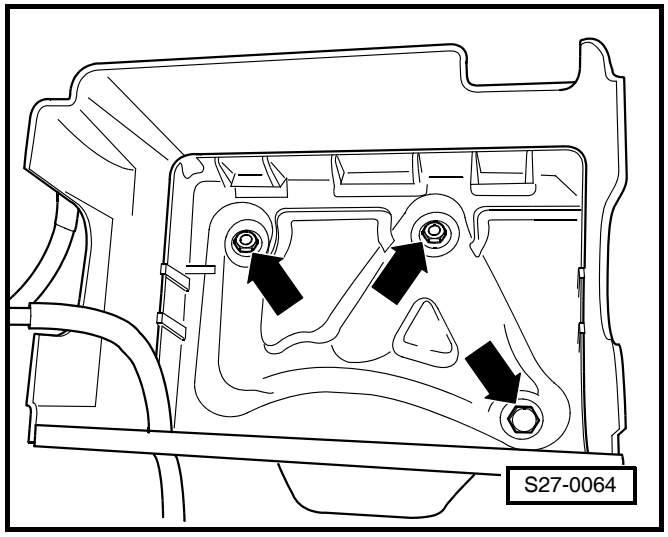
– Disconnect positive cable in fuse holder at battery -arrow-.



– Remove cable from battery to fuse holder at battery and place to the side.

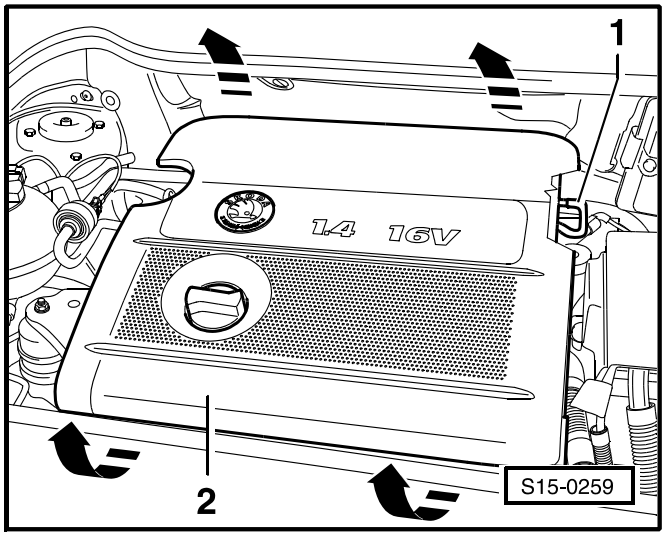
– Remove battery tray and take battery out of battery box.

– Remove battery box -arrows-.

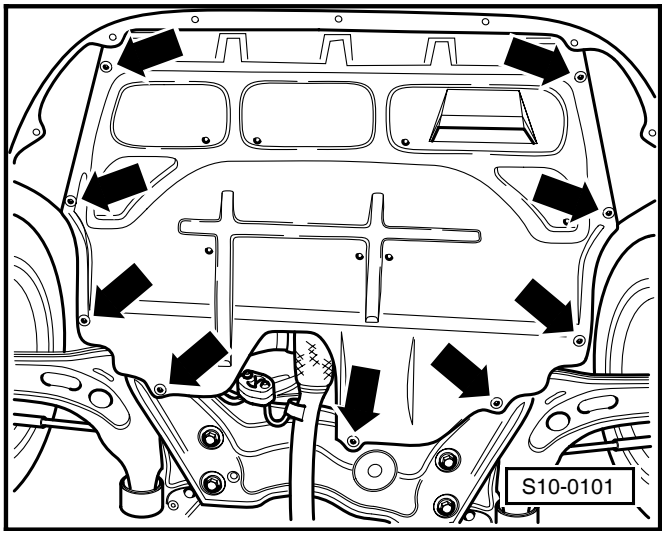


– Disconnect the positive wire from the battery to the starter (is removed together with the engine/gearbox unit).

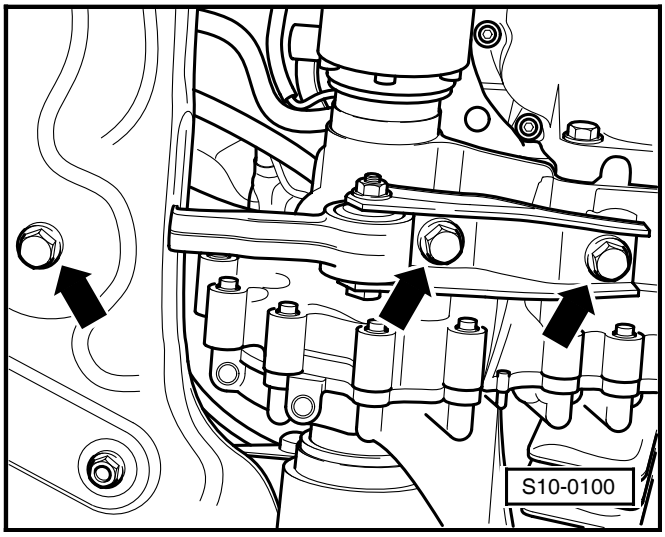
– Pull off hose -1- (for engines as of 04.02) and remove the engine guard -2- with air filter upwards -arrows-.
– Open cap of expansion reservoir to release pressure in the cooling system.



– Release the screws at the bottom of the engine cover -arrows- and remove cover.
– Unscrew front exhaust pipe from the exhaust manifold ⇒ Chapter 26-1 and tie to body member.



– Remove pendulum support -arrows-.
– Unscrew drive shaft to the right and left of the gearbox and tie up ⇒ Body; Rep. Gr. 40.
– Drain coolant ⇒ Chapter 19-1.
– Pull off coolant hose at the top and bottom of the radiator.



Note

When disconnecting hoses the residual coolant flows out! Make sure a catch pan is positioned underneath.

– Disconnect the plug connections on the connector below the starter:

- Plug connection for lambda probe cable
- Plug connection to AC compressor cable
- Plug connection to generator cable

– Disconnect plug connection of the reverse gear switch from the gearbox.
– Remove front bumper ⇒ Body work; Rep. Gr. 63.
– Disconnect the following plug connections:

- Plug connection of the electric wiring to the radiator fans
- Plug connection of the thermo-switch -F18-
- Plug connection of the electric wiring to the main headlights and fog lights

Vehicles with air conditioning

WARNING!

Do not open the refrigerant circuit of the air conditioning system. Therefore, when laying aside the lock carrier pay special attention to the air conditioning hoses, that must not be folded or exposed to stress.

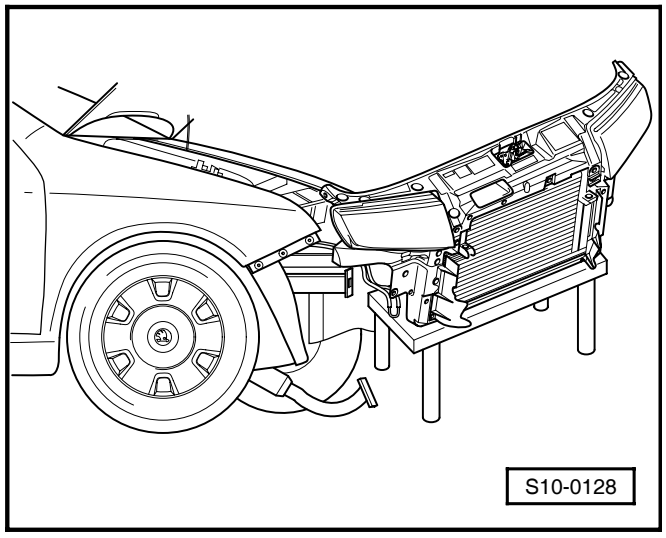
Note

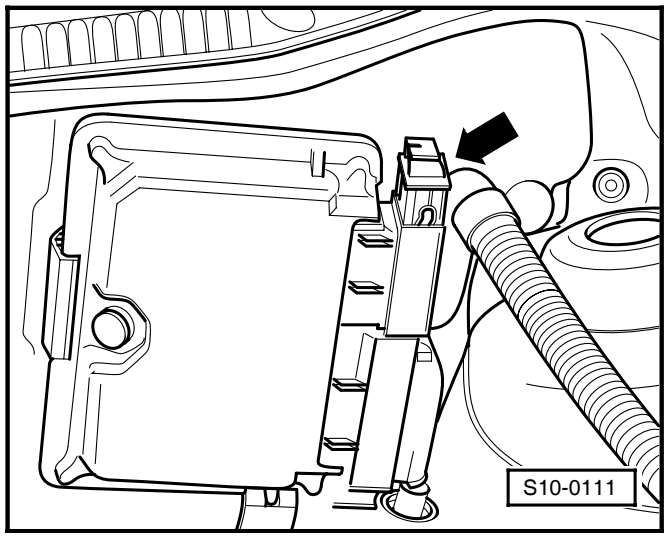
To avoid damaging the condenser, wiring and air conditioning hoses make sure the lines and hoses are not excessively expanded, buckled or bent.

– Release the retaining clips of the AC system line.
– Remove the V-ribbed belt ⇒ Chapter 13-1.
– Remove connector from the AC compressor.
– Remove AC compressor ⇒ Heating, Air Conditioning; Rep. Gr. 87.
– Tie up AC compressor to lock carrier.

Continued for all vehicles

– Removing lock carrier ⇒ Body Work; Rep. Gr. 50 and lay aside. ►
– Disconnect the starter plug connection.
– Disconnect the plug from the engine control unit -arrow-. ►
– Disconnect 10-pin plug connection in left of engine compartment and lay wiring loom aside.





Note

The assembly is removed together with the cable harness.

Vehicles fitted with a manual gearbox

– Remove shift cables of shift mechanism from gearbox and place down to the side ⇒ Manual Gearbox 02T; Rep. Gr. 34.
– Remove clutch cylinder and lay aside ⇒ Gearbox 02T; Rep. Gr. 30.

Note

Clutch pedal must not be depressed.

Vehicles with automatic gearbox

– Remove selector lever tension rod from the gearbox and lay aside ⇒ Automatic Gearbox 001; Rep. Gr. 37.

Continued for all vehicles

– Disconnect earth strap of the gearbox.

– Release spring strap clamps and disconnect hoses of the coolant regulator housing:

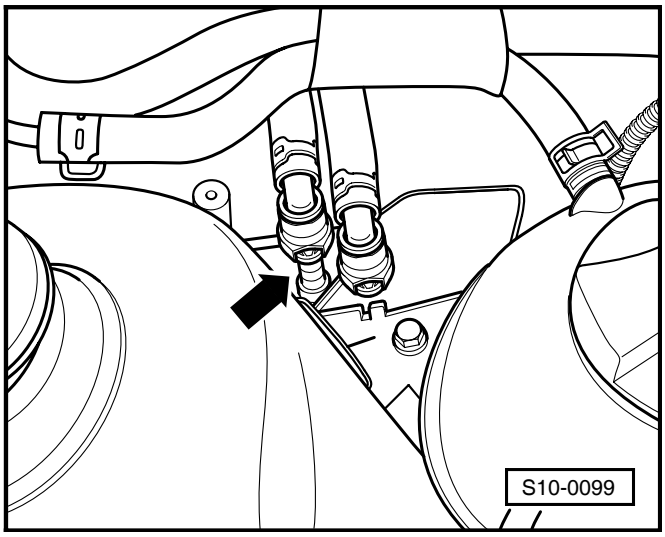
- Heater intake hose
- Hose of the expansion reservoir
- Heater return-flow hose

Note

When disconnecting hoses the residual coolant flows out! Make sure a catch pan is positioned underneath.

– Disconnect the hose of the vent line from the throttle valve.

– Disconnect the fuel feed line from the fuel rail -arrow-. ►



WARNING!

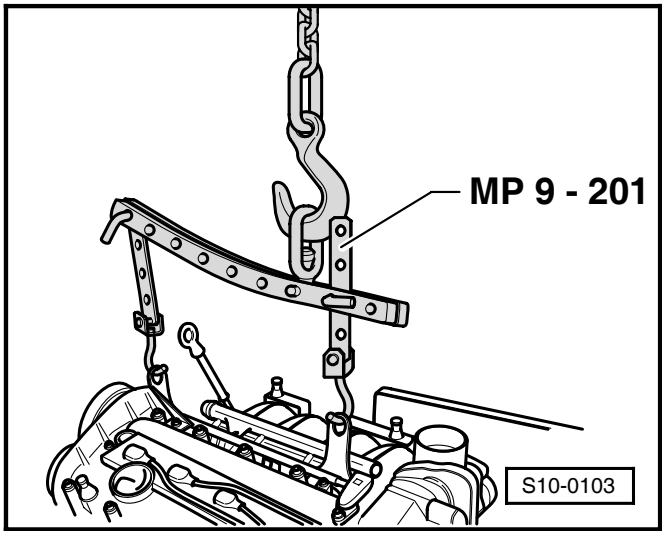
Fuel line is under pressure! Place clean cleaning cloths around the connection point before detaching hose connections. Reduce pressure by carefully removing the hose.

– Disconnect the coolant reservoir ventilation hose from the ventilation tube.

– Remove vacuum hose from the brake servo unit.

– Attach lifting device -MP 9-201- as shown in the figure and raise slightly using the workshop crane. ►

- On the belt pulley side: 4. Hole of vertical perforated bar in position 1.
- On the flywheel side: 2. Hole of vertical perforated bar in position 8.



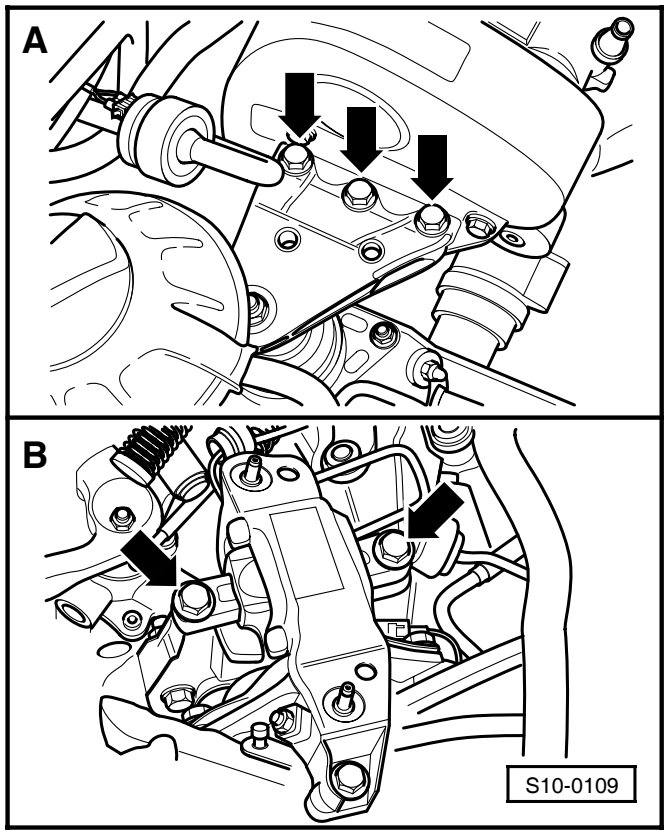
WARNING!

Use securing pins on the hooks and rig pins to prevent release.

Note

- *The hole of supporting bracket -1- points towards the belt pulley.*
- *The holes in the vertical perforated bars are counted from the hook.*

– Release screws -arrows- from engine mounting -A- and from the gearbox mount -B-.
– Lower engine/gearbox unit and push towards the front.



Note

The engine/gearbox unit must be guided carefully so as not to damage the body.

Attaching engine to assembly stand

Secure the engine with engine mount -MP 1-202- on the tensioning block -MP 9-101 - before performing assembly work.

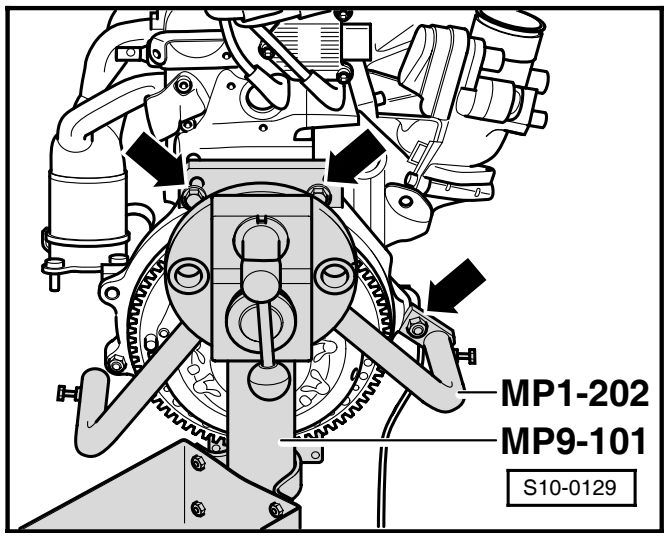
– Unscrew gearbox from engine.

Vehicles with automatic gearbox

– After disconnecting the engine from the gearbox secure torque converter against „dropping out“.

Continued for all vehicles

– Screw engine on engine mount -MP 1-202- -arrows- secured to tensioning block -MP 9-101-.

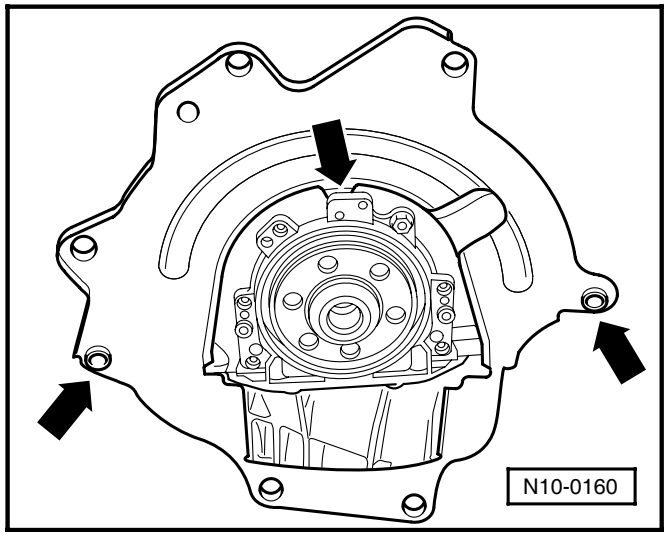


Note

Because of the different bore distances in the engine mount and bores in the engine flange the engine can only be supported in three points.

Installing

– Check whether dowel sleeves for centering have been inserted in the cylinder block, if necessary insert.
– Insert intermediate plate on sealing flange and push onto the dowel sleeves -arrows-.
– Pay attention to correct fit of the intermediate plate.
– Check the centering of the clutch driver disc.
– Inspect clutch release bearing for wear, replace if necessary.
– Slightly grease the clutch release bearing, guide bushing for clutch release bearing and serration of the gearbox drive shaft with grease -G 000 100-.
– Assemble engine with gearbox ⇒ Gearbox 02T; Rep. Gr. 34 or ⇒ Automatic Gearbox 001; Rep. Gr. 37.



– Secure engine/gearbox unit in the engine and gearbox mount -arrows- and tighten the screws to the indicated tightening torque ⇒ **10-1** page 7.

– Position the vent hose for the coolant reservoir on the ventilation tube and draw together with retaining clips.

– Position the vacuum hose of the brake servo unit and draw together with retaining clips.

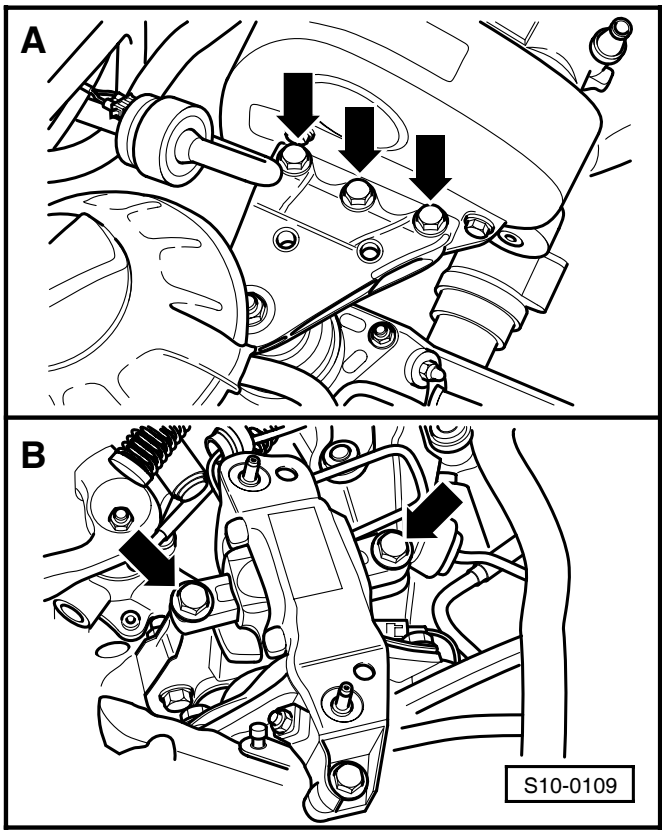
– Connect the fuel feed line to the fuel rail.

– Fit the hose of the vent line to the throttle valve and draw together with retaining clips.

– Connect the hoses to the coolant regulator housing:

- Heater intake hose
- Hose of the expansion reservoir
- Heater return-flow hose

– Screw on earth strap of the gearbox.



Vehicles fitted with a manual gearbox

– Installing the master cylinder ⇒ Gearbox 02T; Rep. Gr. 30.

– Installing the control cables of the gearshift mechanism ⇒ Gearbox 02T; Rep. Gr. 34.

Vehicles with automatic gearbox

– Check attachment of the torque converter.

– Install or adjust selector lever tension rod to the gearbox ⇒ Automatic Gearbox 001; Rep. Gr. 37.

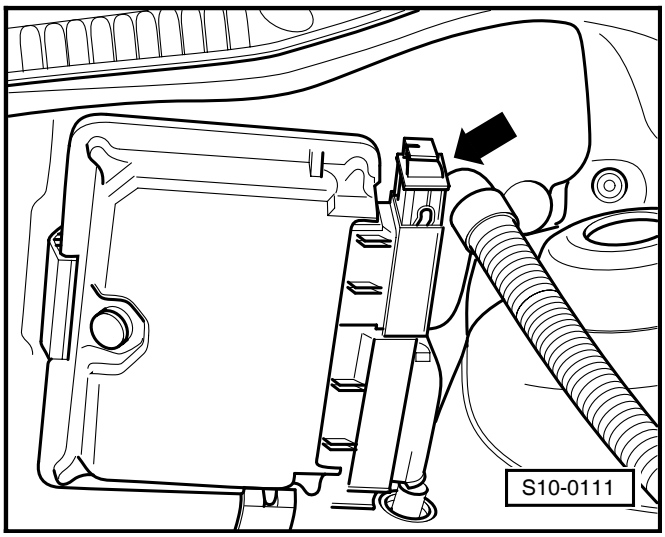
Continued for all vehicles

– Pull in wiring loom and connect the ten-pin plug connection in left of engine compartment.

– Connect the plug connection for the engine control unit.

– Connect the starter plug connection.

– Install the lock carrier ⇒ Body Work; Rep. Gr. 50.



Vehicles with air conditioning

Note

To avoid damaging the condenser, wiring and air conditioning hoses make sure the lines and hoses are not excessively expanded, buckled or bent.

– Install AC compressor ⇒ Heating, Air Conditioning; Rep. Gr. 87.

– Connect the AC compressor plug connection.

– Install the V-ribbed belt ⇒ Chapter 13-1.

Continued for all vehicles

– Connect the following plug connections:

- Plug connection of the electric wiring to the radiator fans
- Plug connection of the thermo-switch -F18-
- Plug connection of the electric wiring to the main headlights and fog lights

– Connect plug connection of the reverse gear switch from the gearbox.

– Connect the plug connections on the connector below the starter:

- Plug connection for lambda probe cable
- Plug connection to AC compressor cable
- Plug connection to generator cable

– Position the coolant hose at the top and bottom of the radiator and draw together with retaining clips.

– Installing the drive shaft right and left of the gearbox ⇒ Running Gear; Rep. Gr. 40.

– Install pendulum support and tighten the screws to the recommended torque ⇒ **10-1** page 7.

– Install front exhaust pipe to exhaust manifold ⇒ Chapter 26-1.

– Install front bumper ⇒ Body work; Rep. Gr. 63.

– Install the noise insulation.

– Top up coolant ⇒ Chapter 19-1.

– Install engine cover with air filter.

– Connect the positive wire in the fuse box to the battery.

– Install battery box.

– Insert battery in battery box and connect.

– Adapt 4AV control unit to throttle valve control unit ⇒ 1.4/55; 1.4/74 Engine, Fuel Injection; Rep. Gr. 24.

– Perform test drive and interrogate fault memory ⇒ 1.4/55, 1.4/74 Engine, Fuel Injection; Rep. Gr. 01.

Note

- *All cable straps that have been loosened or cut open when the engine was removed must be fitted again in the same location when the engine is installed again.*
- *If the battery earth strap is disconnected and connected, carry out additional operations ⇒ Electrical System; Rep. Gr. 27.*

Tightening torques

Note

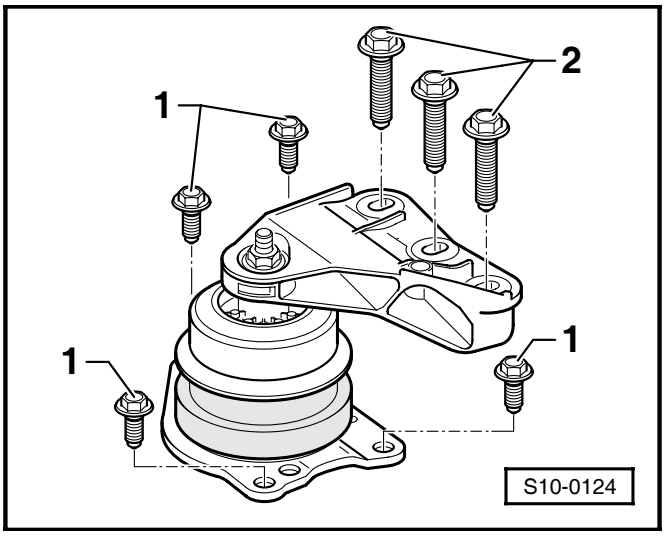
- *Tightening torques apply only for lightly greased, oiled, phosphatized or blackened nuts and screws.*
- *Other lubricants such as engine and gearbox oil are allowed. Do not use Molykote.*

- *Do not use degreased parts.*
- *Unless otherwise indicated the following tightening torques apply:*

Component		Torque
Bolts, nuts	M 6	9 Nm
	M 7	13 Nm
	M 8	20 Nm
	M10	40 Nm
	M 12	70 Nm
deviations:		
Engine to gearbox connecting screws	⇒ Manual gearbox 02T; rep. size 34	
Drive shaft to gearbox mounting flange	⇒ Chassis; rep. size 40	

Assembly bracket

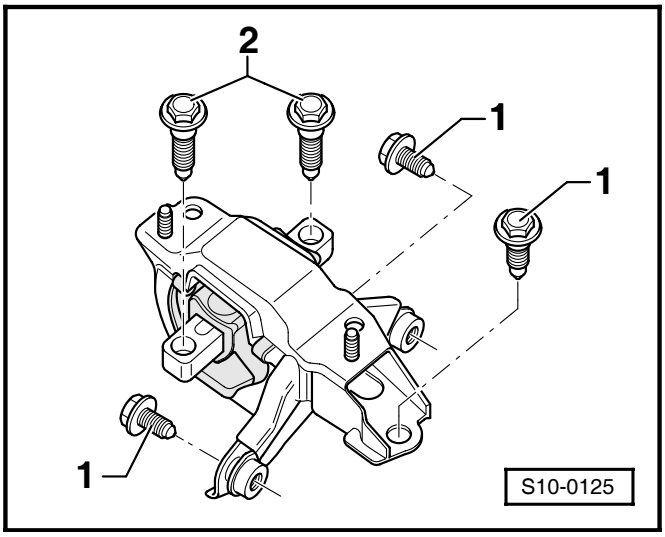
Engine mount:



1 - 20 Nm + 90° ($^1/_4$ turn) - replace

2 - 30 Nm + 90° ($^1/_4$ turn) - replace

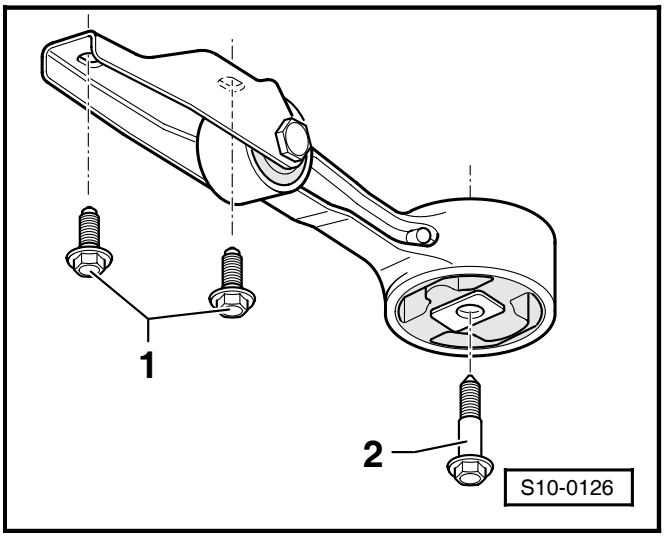
Gearbox mount:



1 - 50 Nm + 90° ($^1/_4$ turn) - replace

2 - 40 Nm + 90° ($^1/_4$ turn) - replace

Pendulum support:



Note

Tighten screws -1- in the elongated holes of the support in such a way that the maximum permissible distance is obtained between the gearbox and the assembly carrier.

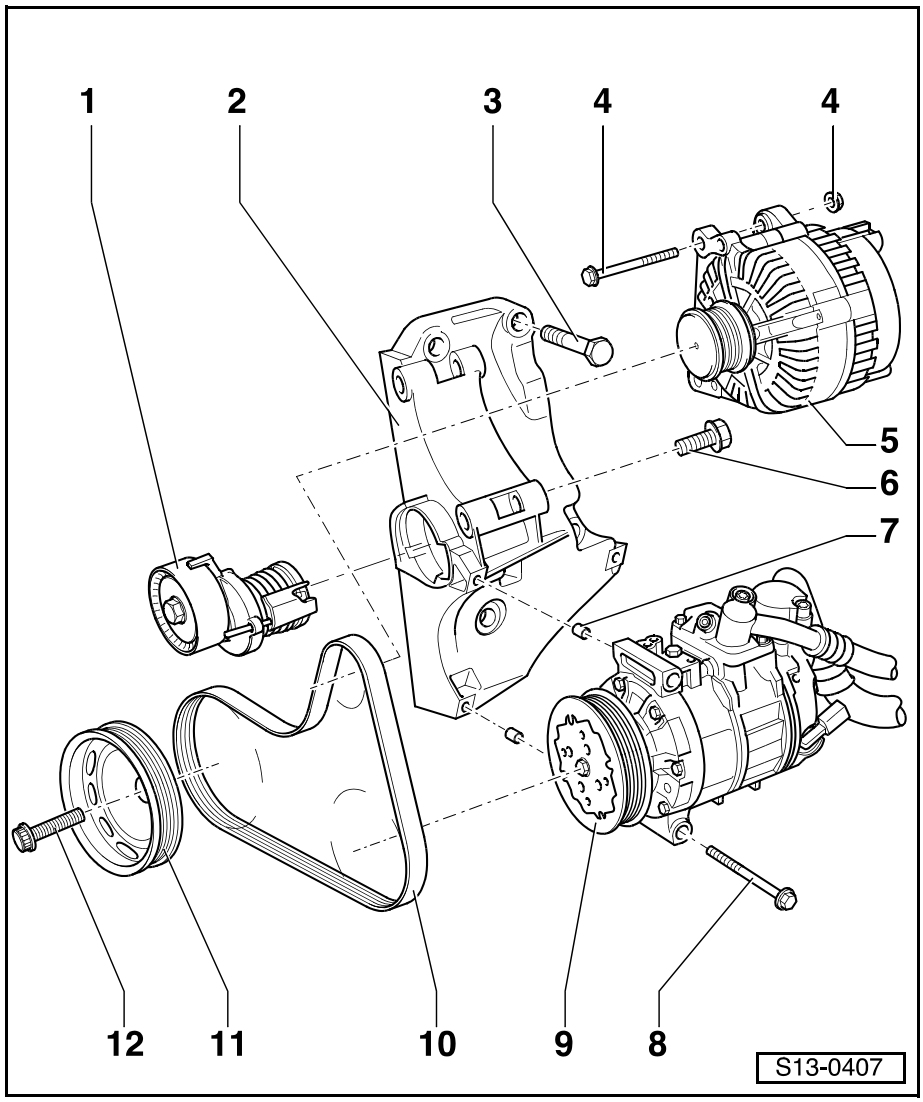
1 - 30 Nm + 90° ($^1/_4$ turn) - replace

2 - 40 Nm + 90° ($^1/_4$ turn) - replace

13 – Crankgear

13-1 Disassembling and assembling engine

Summary of components of ribbed V-belt on vehicles fitted with AC



1 - Tensioning pulley for ribbed V-belt
- ❑ Swing out the tensioning pulley with ring spanner
- ❑ The tensioning pulley can be secured by inserting the socket wrench into the fit hole

2 - Compact holder
- ❑ for AC generator, AC compressor and tensioning pulley for ribbed V-belt

3 - 50 Nm
- ❑ Tightening sequence: first top right bolt, then bottom right bolt, and last the bolts at the left (looking in direction of travel)

4 - 23 Nm

5 - AC generator
- ❑ removing and installing ⇒ Electrical System; Rep. Gr. 27
- ❑ to facilitate the positioning of the AC generator drive the threaded bushings of the screws on the generator slightly backwards

6 - 20 Nm + torque a further $^1/_4$ turn (90 °)

7 - Bushing
- ❑ 2 pieces

8 - 25 Nm

9 - AC compressor
- ❑ removing and installing ⇒ Heating, Air Conditioning; Rep. Gr. 87

10 - V-ribbed belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ removing and installing ⇒ **13-1** page 2
- ❑ Routing of toothed belt ⇒ **13-1** page 2

11 - V-ribbed belt pulley

12 - 90 Nm + torque a further $^1/_4$ turn (90 °)
- ❑ replace
- ❑ tightening may occur in successive stages
- ❑ the torquing angle can be measured with a commercially available angle measuring plate, e.g. -Hazet 6690-

Removing and installing V-ribbed belt

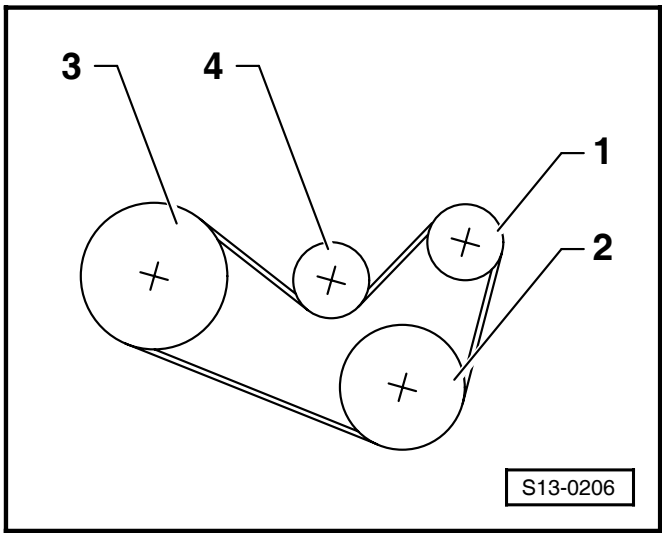
Special tools, test and measuring equipment and auxiliary items required

- Clamping lever -MP 1-203-

Vehicles with air conditioning

Routing of the V-ribbed belt

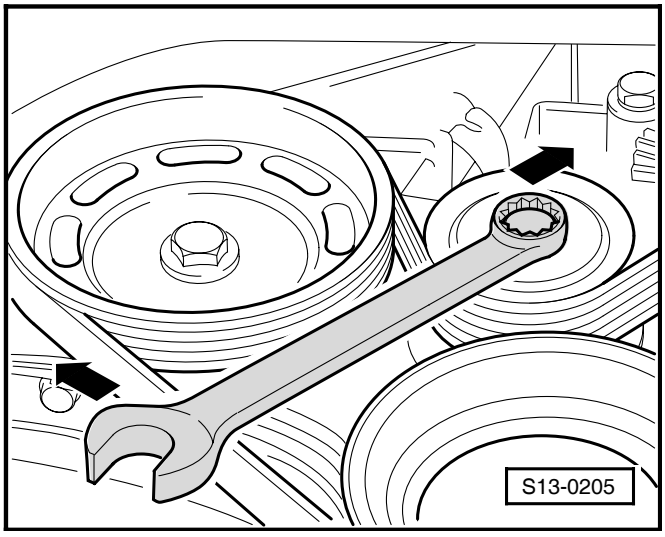
Belt drive with AC compressor:



1 - AC generator - belt pulley
2 - AC compressor - belt pulley
3 - Crankshaft toothed belt sprocket
4 - Tensioning pulley

Removing

– Remove the noise insulation.
– Mark the rotation direction of the V-ribbed belt.
– Swivel out tensioning pulley with a wrench in -direction of arrow-.



– Remove the V-ribbed belt. If necessary the tensioning pulley can be secured by inserting the socket wrench into the lock opening.

Installing

– First lay the V-ribbed belt on the crankshaft timing belt sprockett, then on the AC compressor belt pulley.
– Release tensioning pulley with the wrench and pull the belt over the AC generator - belt pulley.
– Check whether the ribbed V-belt fits correctly in the ribbing of all tensioning pulleys.
– Check belt with the engine running in idle.
– Install the noise insulation.

Note

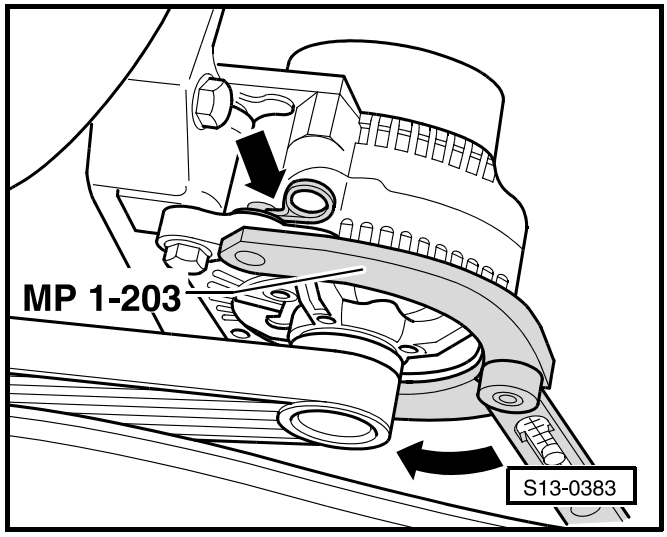
- *Pay attention to the running direction when installing the V-ribbed belt.*
- *Replace damaged V-ribbed belt.*
- *If the belt is considerably worn it must be replaced.*
- *Do not fold or buckle the belt when handling it!*

Vehicles without air conditioning

Removing

– Remove the noise insulation.
– Release fixing screws for AC generator.

– Position clamping lever -MP 1-203-, secure by inserting a pin and and push AC generator towards the crankshaft.



Remove the released ribbed V-belt from the AC generator - belt pulley.

Installing

– Lay the V-ribbed belt on the toothed belt sprocket crankshaft.

– Push AC generator down and fit on belt.

Once the AC generator is released the belt is tensioned to nominal voltage.

– After fitting the ribbed V-belt, crank the engine several times with the starter (about 10 turns) once the AC generator screws are released.

– First tighten the bottom and then the top screw for AC generator to 20 Nm.

– Install the noise insulation.

Summary of components of timing belt

1 - Top toothed belt guard

2 - 20 Nm

3 - Tensioning pulley
- ❑ check ⇒ **13-1** page 4
- ❑ Tensioning toothed belt ⇒ **13-1** page 4

4 - Timing belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ Routing of toothed belt ⇒ Fig. 1 in **13-1** page 4
- ❑ removing and installing, tensioning ⇒ **13-1** page 4

5 - Rear timing belt guard

6 - 10 Nm

7 - Lifting eye

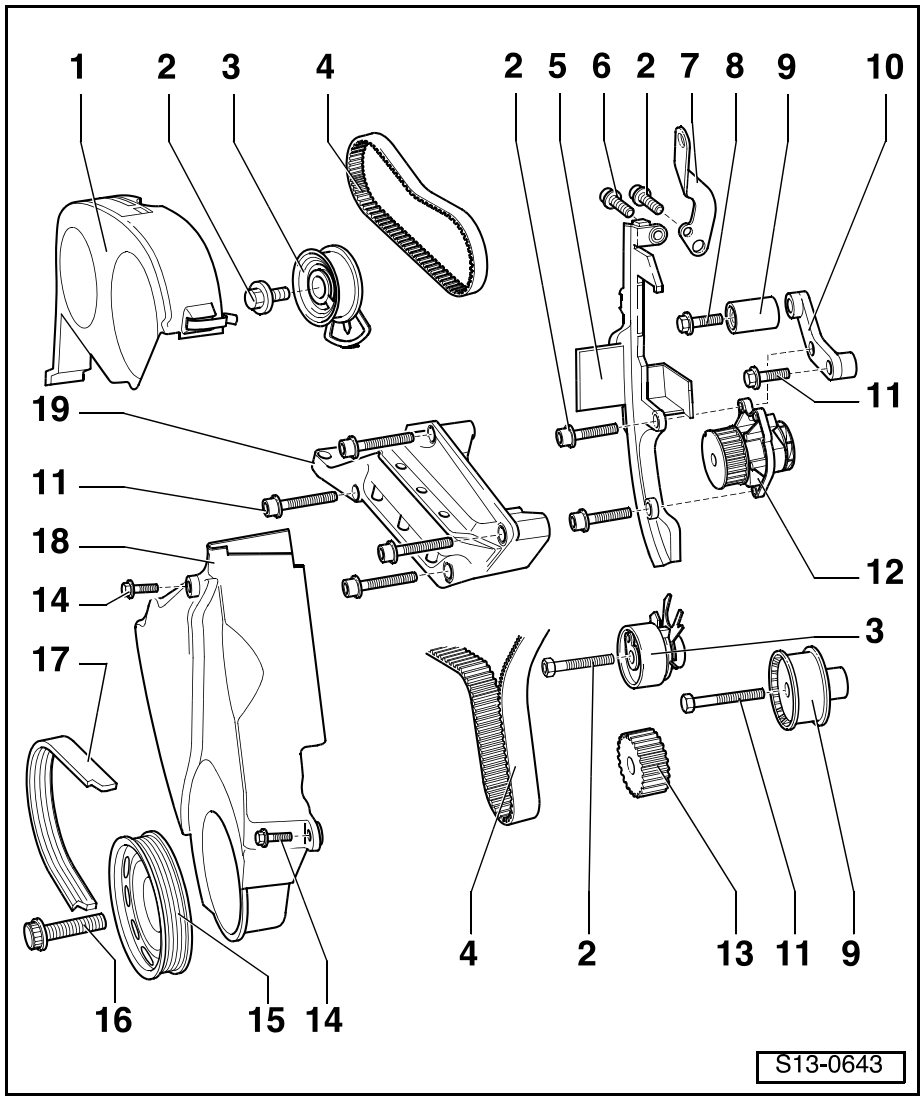
8 - 25 Nm

9 - Guide pulley

10 - Bracket

11 - 50 Nm

12 - Coolant pump
- ❑ with integrated gasket - warning - it must not be removed from the pump, replace completely if leaking or damaged
- ❑ removing and installing ⇒ Chapter 19-1



13 - Crankshaft toothed belt sprocket
- ❑ pay attention to position of toothed belt when installing ⇒ **13-1** page 4

14 - 12 Nm
- ❑ replace

15 - V-ribbed belt pulley
- ❑ pay attention to locating element when installing
- ❑ removing and installing ⇒ **13-1** page 4

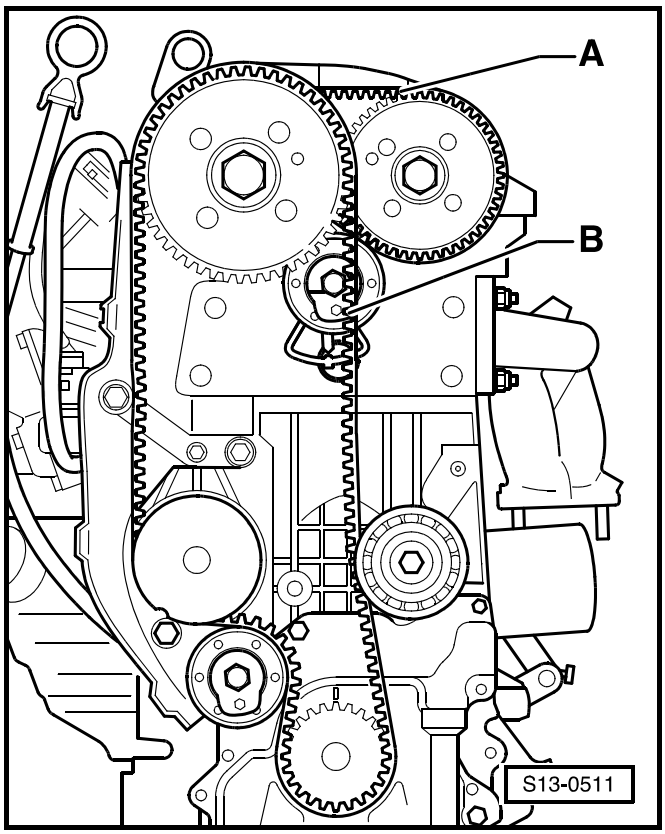
16 - 90 Nm + torque a further $^1/_4$ turn (90 °)
- ❑ replace
- ❑ tightening may occur in successive stages
- ❑ the torquing angle can be measured with a commercially available angle measuring plate, e.g. -Hazet 6690-

17 - V-ribbed belt
- ❑ before removing mark running direction
- ❑ removing and installing ⇒ **13-1** page 2
- ❑ Routing of the ribbed V-belt ⇒ **13-1** page 2

18 - Bottom toothed belt guard

19 - Console

Fig. 1: Routing of toothed belt



A - Coupling drive - Toothed belt

B - Main drive - Toothed belt

Removing, installing and tensioning the toothed belt and inspecting the semi-automatic toothed belt tensioning pulley

Special tools, test and measuring equipment and auxiliary items required

- Supporting device -MP 9-200-
- Pressure pad -T 30004- with replaceable stud -T 30004-
- Camshaft lock -T 10016-

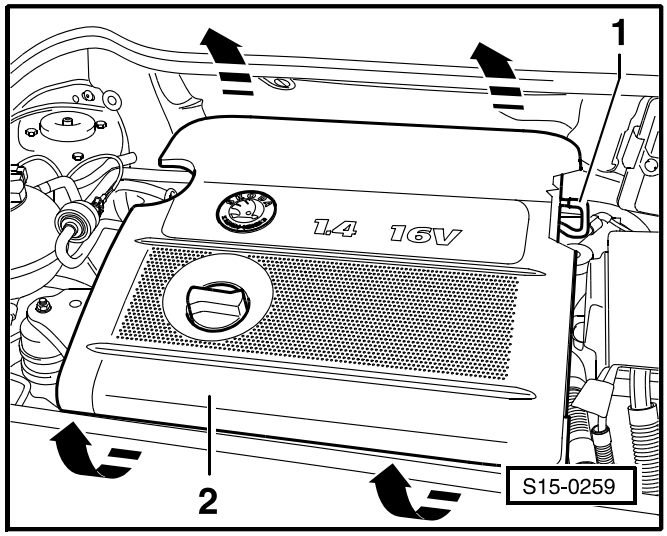
Removing

– Pull off hose -1- (for engines as of 04.02) and remove engine protection -2- with air filter upwards -arrows-.

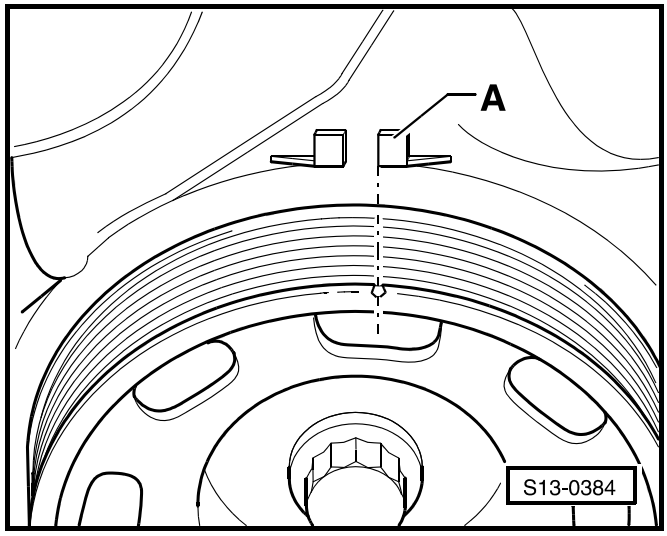
– Remove V-ribbed belt ⇒ **13-1** page 2.

– Remove top toothed belt guard.

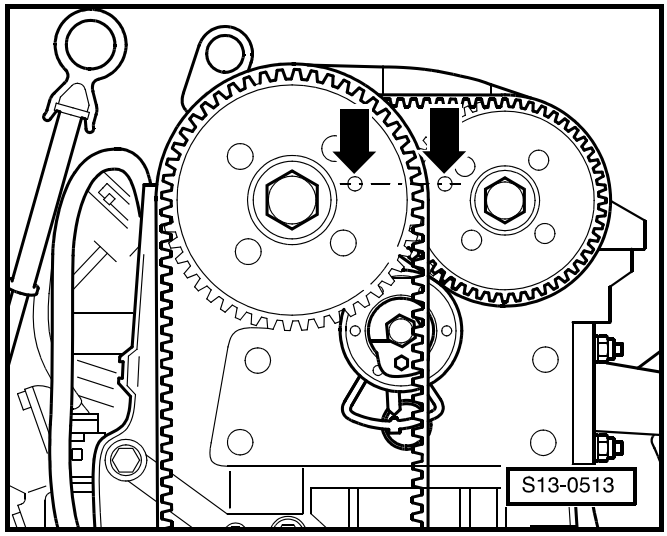
– Remove the front right wheelhouse liner ⇒ Body work; Repair Group 66.



– Position crankshaft on TDC cylinder 1. The notch on the belt pulley must be aligned with the edge of the marking -A-.



– The locating holes in the camshaft sprockets must be aligned with the fit holes in the cylinder head cover -arrows-.

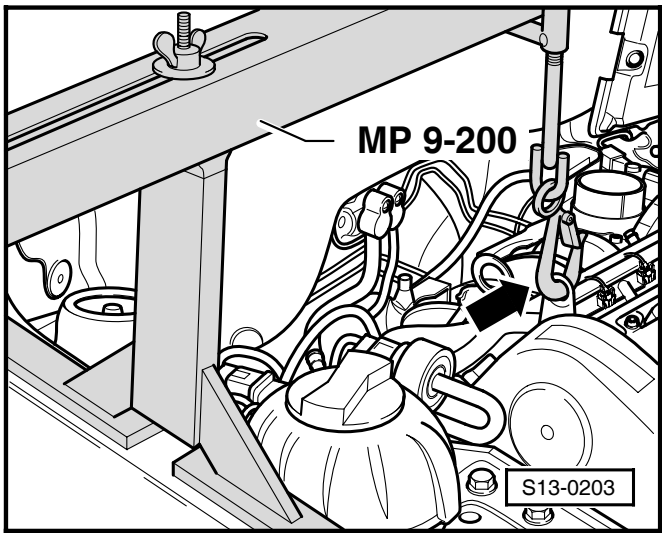


Note

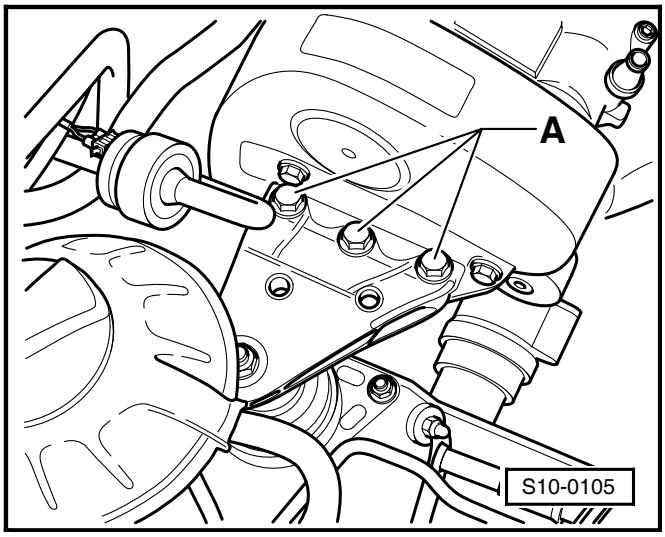
If the locating holes are positioned on the opposite side of the toothed belt sprockets, it will be necessary to rotate the crankshaft a further revolution.

The engine must be lowered as described below in order to be able to remove the belt pulley of the crankshaft:

– Install supporting device -MP 9-200- according to the illustration.
– Remove the top securing screw from the bottom toothed belt guard below the engine mount.
– Release the coolant expansion reservoir and lay aside.

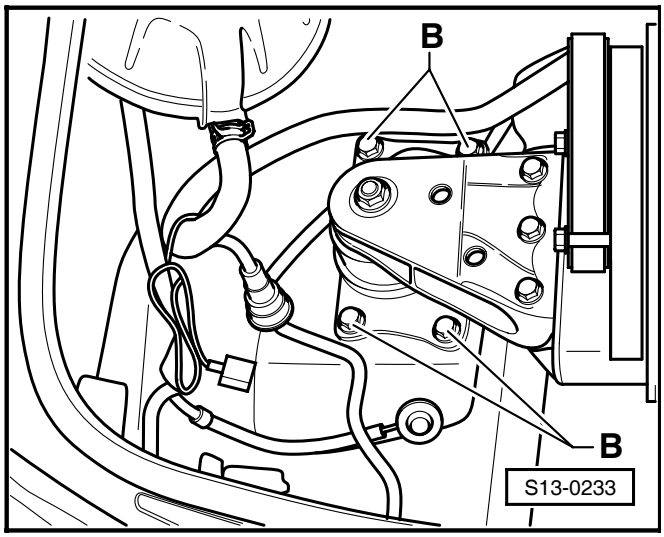


– Take up the weight of the engine and remove the fixing screws -A- of the engine console on the support of the cylinder head.

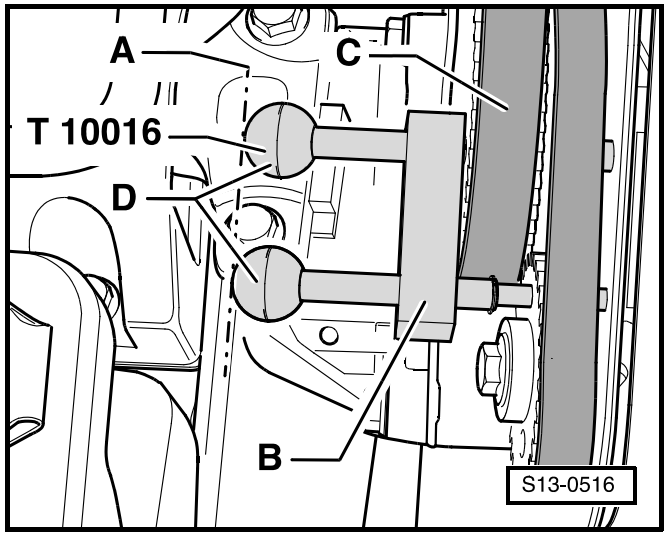


– Remove the fixing screws -B- of the engine console on the body and remove console.
– Remove the engine mount on the cylinder head.
– Lower engine in such a way that the fixing screws for belt pulley are accessible.

Fix the two camshaft sprockets with camshaft lock -T 10016- as follows:



– Insert the two fixing pins through the locating holes of the camshaft sprockets up to the stop in the fit holes in the cylinder head cover.

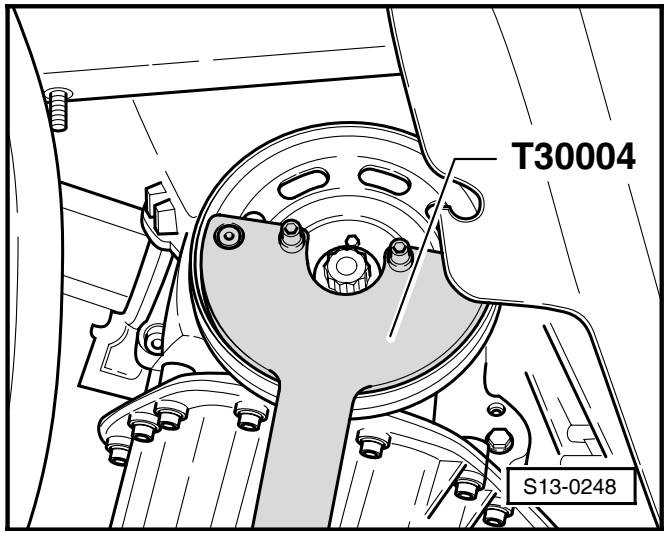


Note

The two fixing pins are correctly inserted if the end parts -D- are flush with line -A-.

– Slide the support -B- up to the stop on the camshaft timing gear -C-.

– Counterhold V-ribbed belt pulley with counterholder -T 30004- with inserted replaceable stu -T 30004/1- and release the fixing screw for V-ribbed belt pulley and toothed belt gear.



– Remove belt pulley. Screw in the fixing screw with two washers to secure the crankshaft.

– For vehicles with air conditioning system remove the ribbed V-belt tensioning pulley.

– Remove bottom timing belt guard.

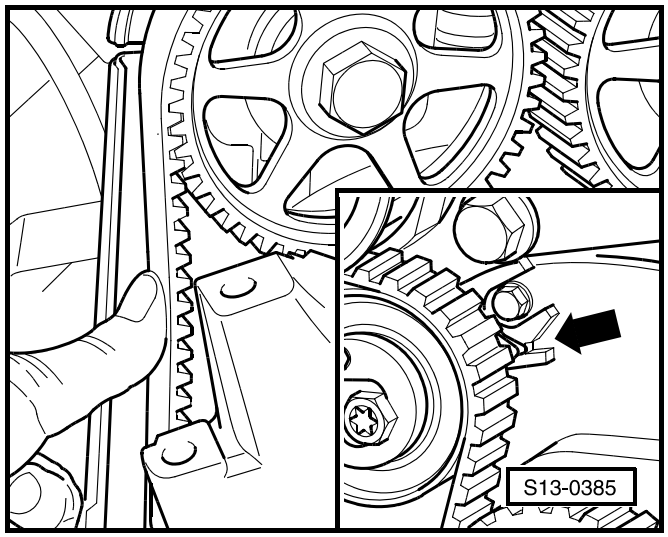
– Mark the rotation direction of the two toothed belts.

Note

The camshaft sprockets must not be fixed when inspecting the tensioning pulleys.

Inspecting main drive-tensioning pulley

– Mark the pointer position of the tensioning pulley -arrow-. Load timing belt by firmly pressing down with thumb. The pointer must move.



– Relieve the toothed belt again.

– Turn the crankshaft two turns in the running direction of the engine.

– Check pointer position. The pointer must return to its initial position.

If the pointer does not return to its initial position:

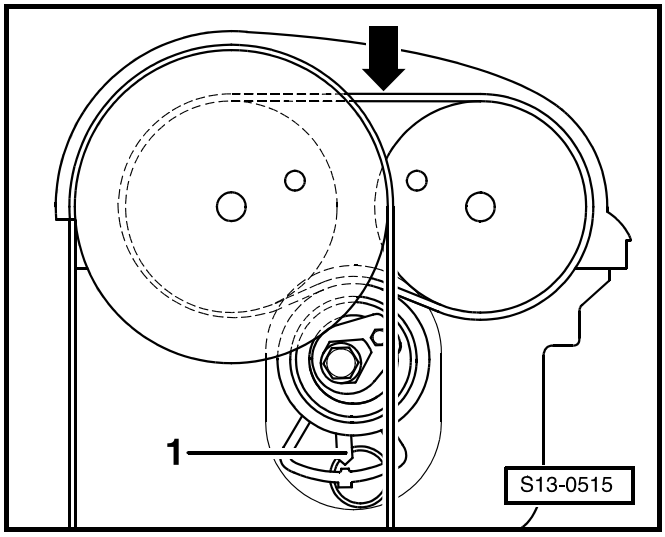
– Replace tensioning pulley.

Inspecting coupling drive-tensioning pulley

– Mark the pointer position of the tensioning pulley -1-. Load timing belt by firmly pressing down with thumb -arrows-. The pointer must move.
– Relieve the toothed belt again.
– Turn the crankshaft two turns in the running direction of the engine.
– Check pointer position. The pointer must return to its initial position.

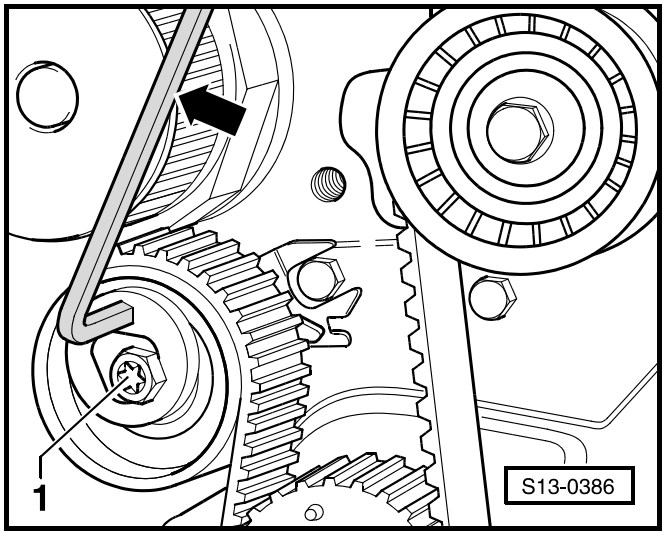
If the pointer does not return to its initial position:

– Replace tensioning pulley.



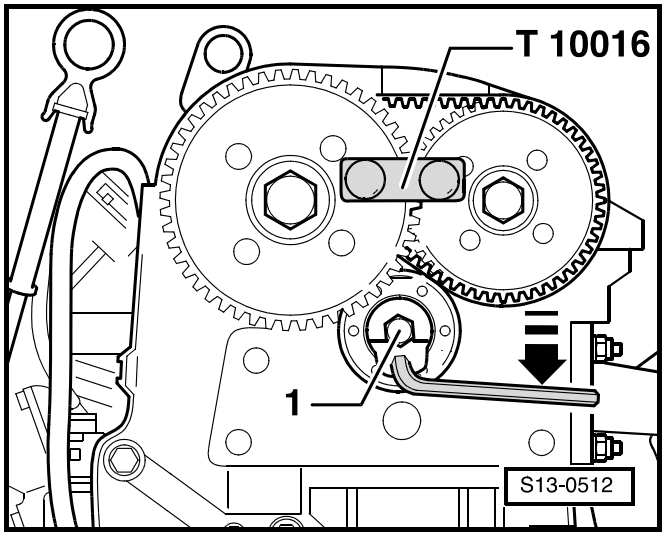
Remove main drive toothed belt:

– Release the fixing screw of the main drive tensioning pulley -1- and release the toothed belt by turning the tensioning pulley in the -direction of arrow-.
– Remove tensioning pulley.
– Remove camshaft lock -T 10016-.
– Remove timing belt.
– Fix the two camshaft sprockets with camshaft lock -T 10016-.



Remove coupling drive - toothed belt

– Release the fixing screw of the coupling drive-tensioning pulley -1- and release the toothed belt by turning the tensioning pulley in the -direction of the arrow-.
– Remove coupling drive-tensioning pulley.
– Remove timing belt.



Installing

When installing, pay attention to the following points:

- The toothed belt gear of the crankshaft is secured to the crankshaft with a screw and two washers.
- Lock the camshaft sprockets with camshaft lock -T 10016- in the fit holes in the cylinder head cover and secure them against turning.

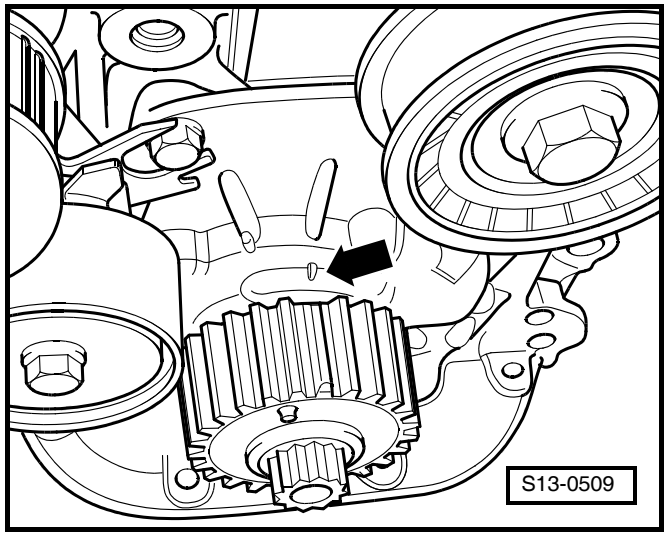
Note

When turning the camshaft the valves may touch the piston in TDC.

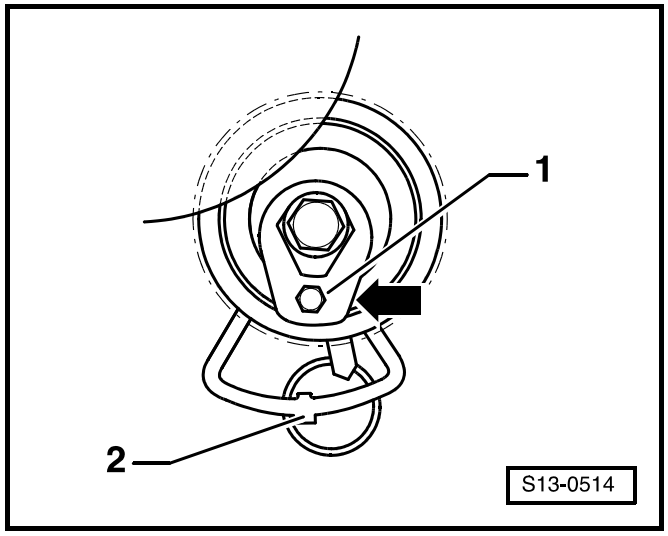
Procedure

– Position crankshaft on TDC cylinder 1. The chamfered tooth must correspond with the marking on the sealing flange -arrow-.
– Fit the coupling drive - toothed belt. If the toothed belt has been used pay attention to the rotation direction.

Install the coupling drive-tensioning pulley as follows:

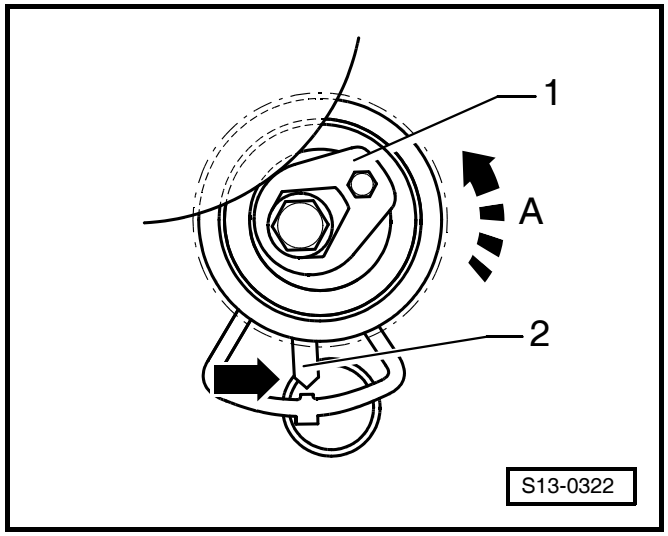


– Turn the coupling drive-tensioning pulley with Allen screw -1- clockwise in the direction of the marking window -arrow- (tensioning pulley in released position).
– Push the bottom part of the coupling drive-toothed belt upwards using the tensioning pulley and screw in the fixing screw of the tensioning pulley.
– Tighten fixing screw manually. The peg of the base plate -2- must engage in the bore on the cylinder head.

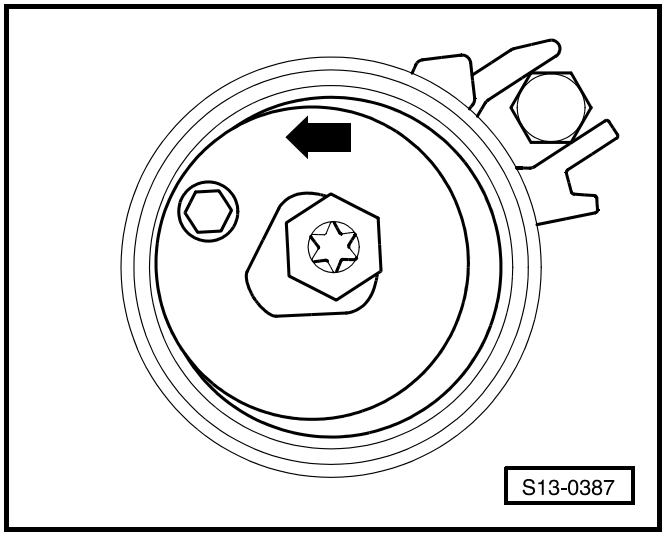


– Subsequently tension the toothed belt by turning the tensioning pulley with an Allan key pos. -1- in -direction of arrow A- until the pointer -2- is positioned over the peg in the base plate in the marking window -arrow-.
– Tighten fixing screw of the tensioning pulley to 20 Nm.
– Remove camshaft lock -T 10016-.
– Turn the crankshaft or toothed belt gear from TDC half a tooth anti-clockwise (approx 1.5 mm).
– Fit the main drive - toothed belt.
– Fix the two camshaft sprockets with camshaft lock -T 10016-.

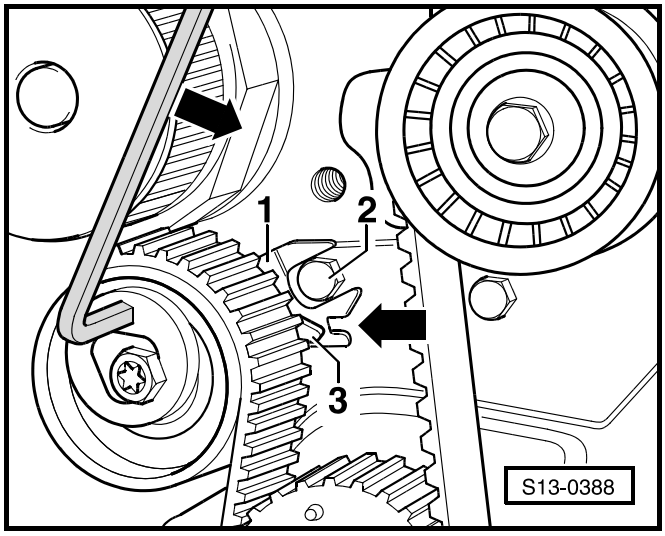
Fitting main drive-tensioning pulley:



– Loosely fit the tensioning pulley with the fixing screw and turn with the Allan screw in the -direction of the arrow-.



– Tighten fixing screw manually. The recess of the base plate -1- must be positioned on the screw head -2- in the cylinder block.
– Subsequently tension the toothed belt in the direction of the arrow by turning the tensioning pulley until the pointer -3- is positioned over the notch in the base plate -arrow-.
– Tighten the fixing screw of the tensioning pulley. Tightening torque: 20 Nm.
– Remove camshaft lock -T 10016-.

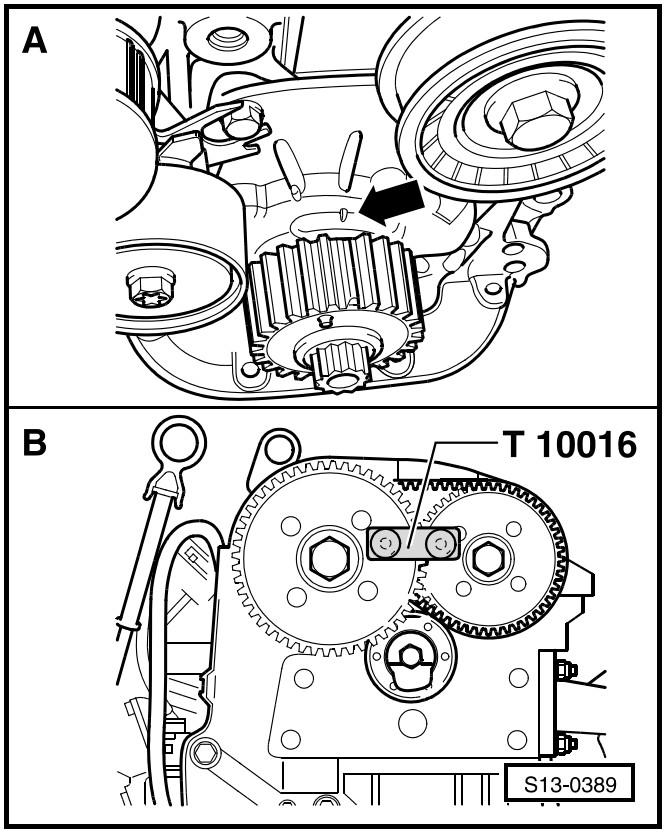


– Now rotate crankshaft two revolutions in direction of rotation of engine until it is again positioned at TDC of cylinder 1. The chamfered tooth must correspond with the marking on the sealing flange -arrow- in the fig. -A-.

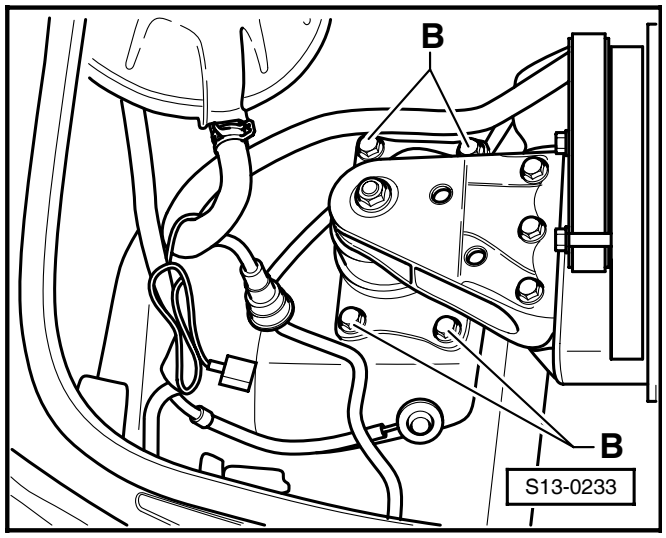
In this position both camshaft sprockets must lock with camshaft lock -T 10016- fig. -B-.

– Then inspect the toothed belt setting and tensioning pulley setting again, if necessary repeat tensioning of the two toothed belts.
– Install timing belt guard.
– Installing the V-ribbed belt pulley. Pay attention to the following:

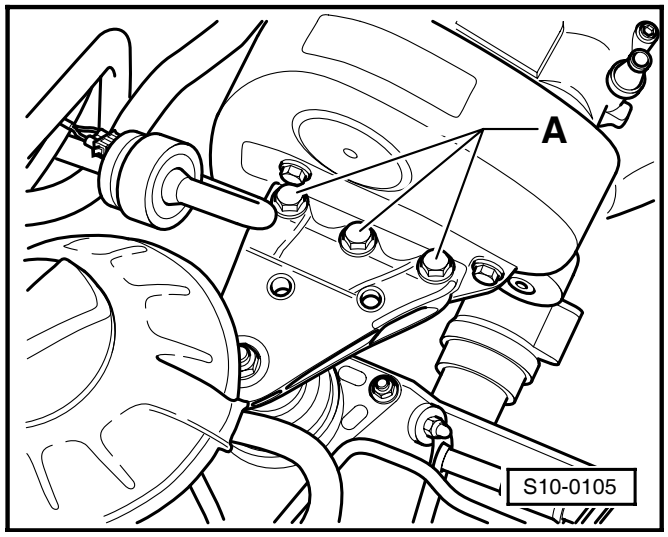
- The fixing screws for the V-ribbed belt pulley and crankshaft toothed belt gear must be replaced.
- Pay attention to the crankshaft toothed belt sprocket attachment when installing the V-ribbed belt pulley.
- Tightening process for the new oiled screw: 90 Nm + torque a further $^1/_4$ turn (90°)



– Attach engine mount to cylinder block. Tightening torque 50 Nm.
– Screw the engine console to the body with screws -B-. ►



– Secure the engine console to the engine mount on the cylinder block with screws -A-. ►
– Tightening torques of the assembly bracket ⇒ Chap. 10-1.
– Install coolant expansion reservoir.
– Install the V-ribbed belt ⇒ **13-1** page 2.



Note

Pay attention to the correct position of the V-ribbed belt in the belt pulley when installing it.

– Install engine cover with air filter.
– Interrogate fault memory ⇒ 1.4/55, 1.4/74 Engine, Fuel Injection; Rep. Gr. 01.

13-2 Removing and installing cylinder block

Aluminium cylinder block

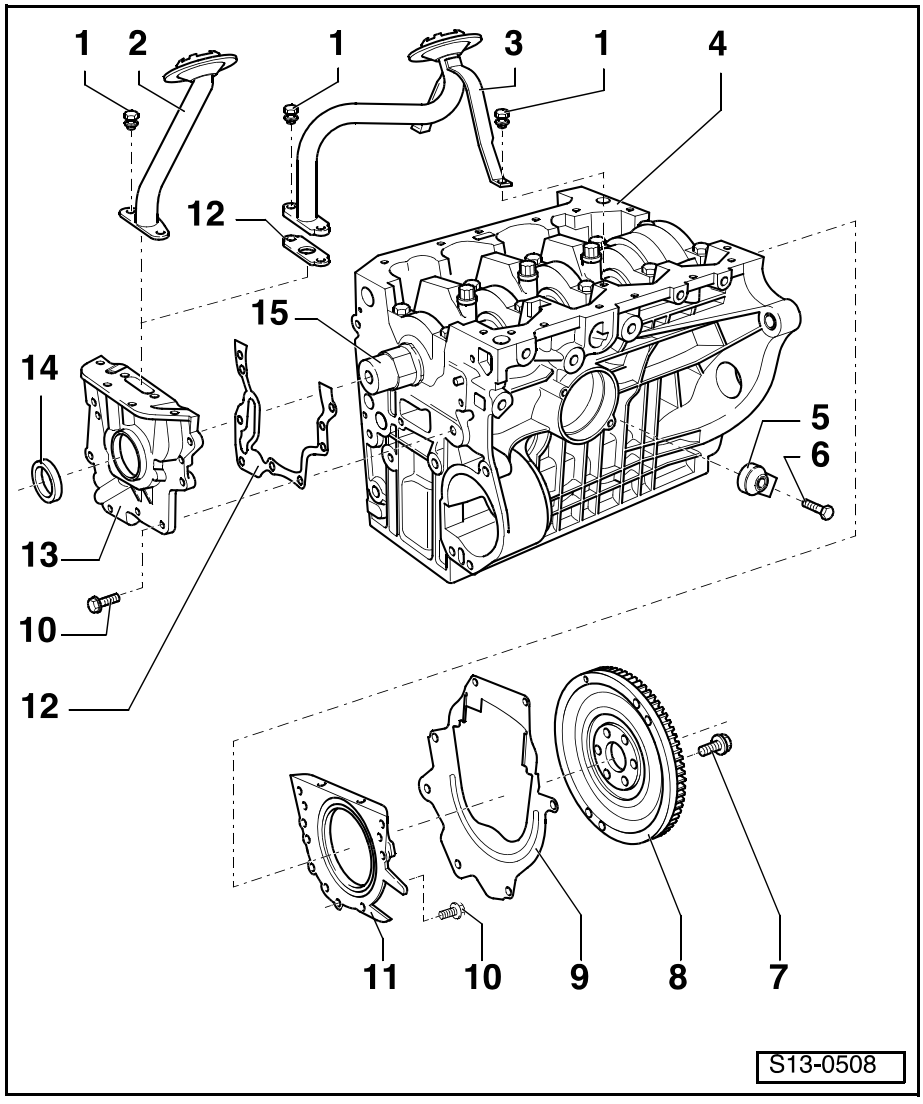
WARNING!

The crankshaft must not be removed. Merely releasing the crankshaft bearing cover will result in deformations of the bearing seats of the cylinder block.

If the bearing cover screws have been released, replace the complete cylinder block together with the crankshaft.

Note

Repairing the clutch ⇒ Gearbox 02T; Rep. Gr. 30



- **1 - 10 Nm**
- **2 - Suction line**
  - ❑ out of plastic
  - ❑ as of 06.04 for vehicles with a manual gearbox
- **3 - Suction line**
  - ❑ out of metal
  - ❑ as of 06.04 only for vehicles with an automatic gearbox
- **4 - Cylinder block**
- **5 - Knock sensor**
- **6 - 20 Nm**
  - ❑ The tightening torque influences the knock sensor function
- **7 - 60 Nm + torque a further $^1/_4$ turn (90°)**
  - ❑ replace
- **8 - Flywheel/driver plate**
  - ❑ for removing and installing the flywheel use the counterholder -MP 1-223-
  - ❑ removing and installing drive plate ⇒ **13-2** page 3
- **9 - Intermediate plate**
  - ❑ must be positioned on dowel sleeves
  - ❑ do not damage/bend during assembly work
- **10 - 12 Nm**
  - ❑ replace
- **11 - Sealing flange with rotor and gasket ring**
  - ❑ always replace complete with gasket ring and rotor
  - ❑ removing and installing sealing flange ⇒ **13-2** page 4

12 - Gasket
- ❑ replace

13 - Oil pump
- ❑ must be replaced completely
- ❑ when fitting pay attention to the driver on the crankshaft ⇒ item 15
- ❑ must be positioned on dowel sleeves
- ❑ removing and installing ⇒ Chapter 17-1

14 - Gasket ring
- ❑ replace ⇒ **13-2** page 2

15 - Driver
- ❑ coat with oil before installing the oil pump

Replacing gasket ring for crankshaft -on the belt pulley side-

Special tools, test and measuring equipment and auxiliary items required

- Gasket ring extractor -T 30003-
- Bushing -T 10022-
- Pressure plate -T 10022/1-
- Spindle -T 10022/2-

Removing

– Removing the main drive - toothed belt ⇒ Chapter 13-1.

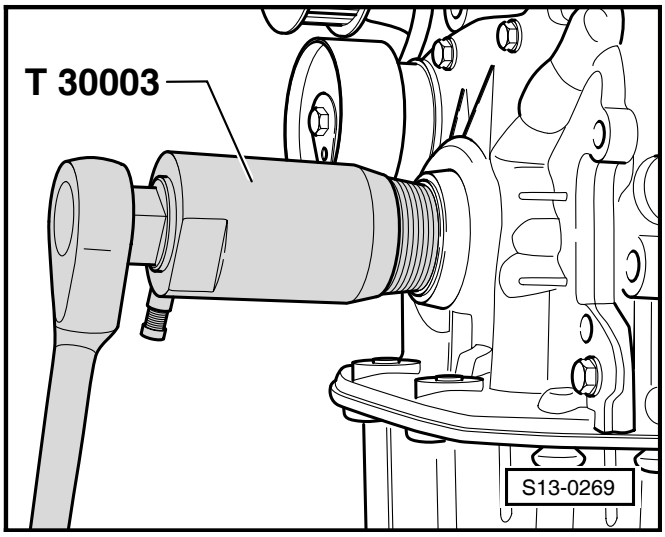
– Remove crankshaft toothed belt sprocket.

– To guide the gasket ring extractor screw in fixing screw for crankshaft toothed belt sprocket in the crankshaft up to the stop.

– Turn inner part of gasket ring extractor -T 30003- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.

– Oil the thread head of the gasket ring extractor, position and forcely screw into the gasket ring as far as possible. ►

– Release knurled screw and turn the inner side against the crankshaft until the gasket ring is pulled out.

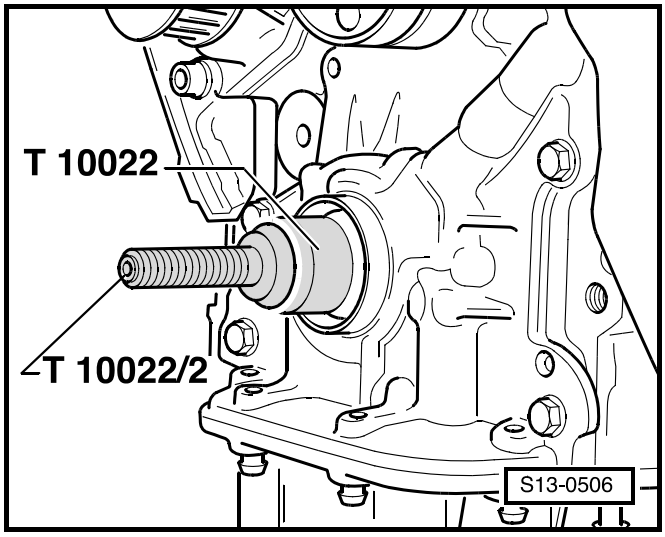


Installing

– Lightly oil the sealing lip of the gasket ring.

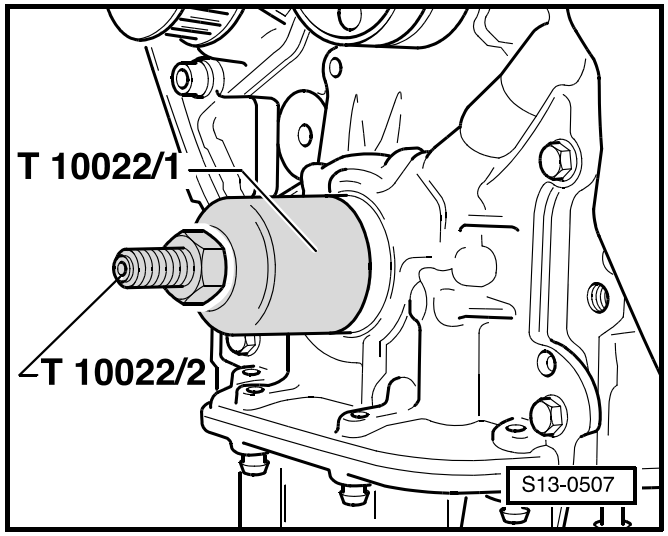
– Position the bushing -T 10022- on the crankshaft stub and screw in with spindle -T 10022/2- up to the stop. ►

– Slide gasket ring over the guide bushing -T 10022-.



– Press in gasket ring with pressure plate -T 10022/1- up to the stop.

– Installing the main drive - toothed belt ⇒ Chap. 13-1.



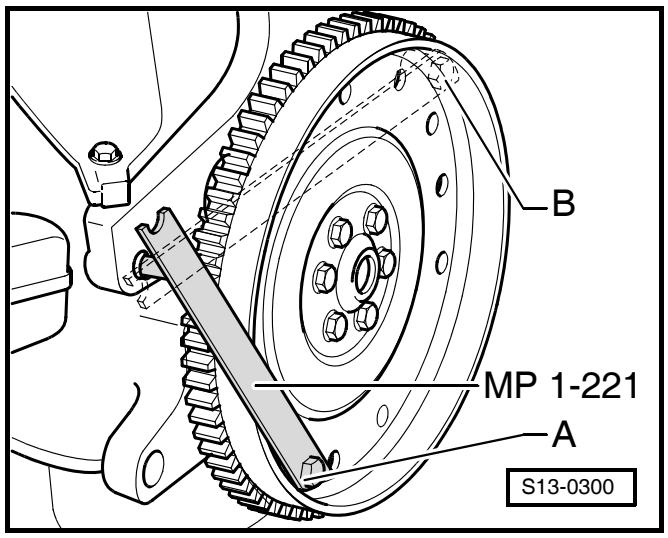
Removing and installing drive plate

Special tools, test and measuring equipment and auxiliary items required

- Pressure pad -MP 1-221-
- Hexagon screw M8x45 and two nuts M10
- Depth gauge

Releasing and tightening the drive plate

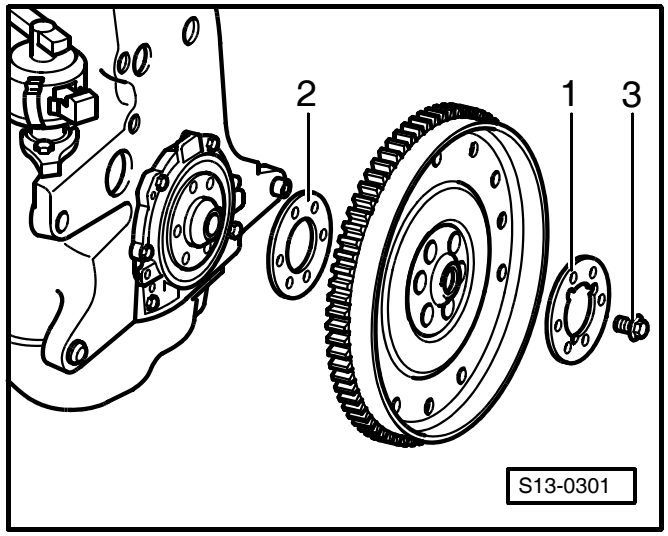
– Attach counterholder -MP 1-221- with M8x45 bolt to the drive plate. Place two M10 nuts between the counterholder and the driver disc. Fitting position of the counterholder: A - to release, B - to tighten.



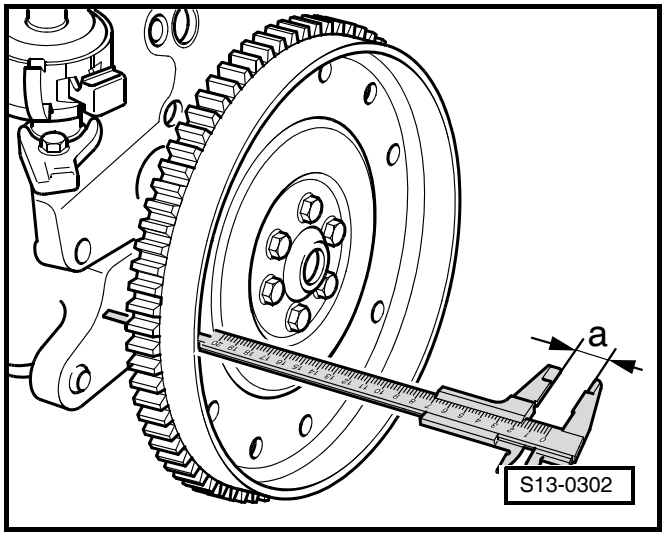
Installing the drive plate

– Insert the drive plate using the washer with recesses -1-.

– Insert new bolts -3- and tighten to 30 Nm.



– Check dimension -a- in three points and determine mean value. Specified value: 19.7...21.3 mm.

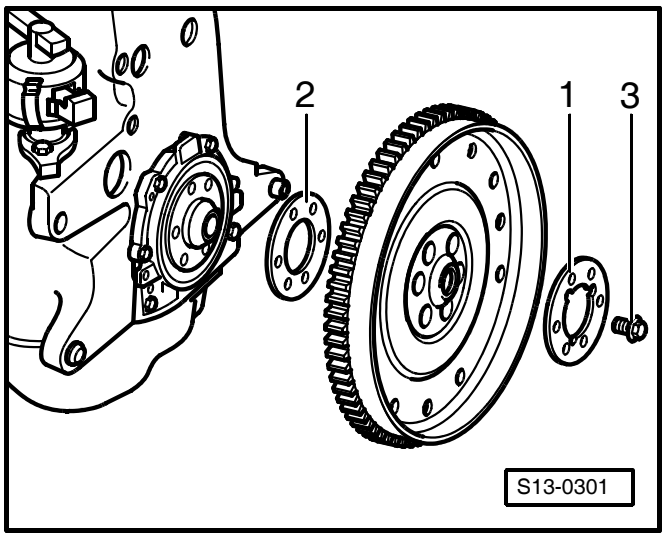


Note

The measurement is made through the hole of the drive plate to the milled surface of the cylinder block.

If the specified value is not reached:

– Remove driver disc and use compensating washer -2-. Tighten screws -3- again to 30 Nm and again check the dimension -a-.



If the specified value is reached:

– Tighten screws -3- to 60 Nm and torque a further $^1/_4$ turn (90°) (the tightening may occur in several stages).

Replacing the sealing flange for crankshaft - flywheel side

Special tools, test and measuring equipment and auxiliary items required

- Assembly fixture -T 10017- or -T10134-
- 3 Hexagon screws M6×35 mm
- Feeler gauge
- Steel straightedge
- Torque wrench

Removing sealing flange with rotor

Note

These work sequences with the engine removed are shown for purposes of clear presentation. The work sequences are identical with the engine installed and gearbox removed.

– Remove flywheel or driver disc ⇒ **13-2** page 3.

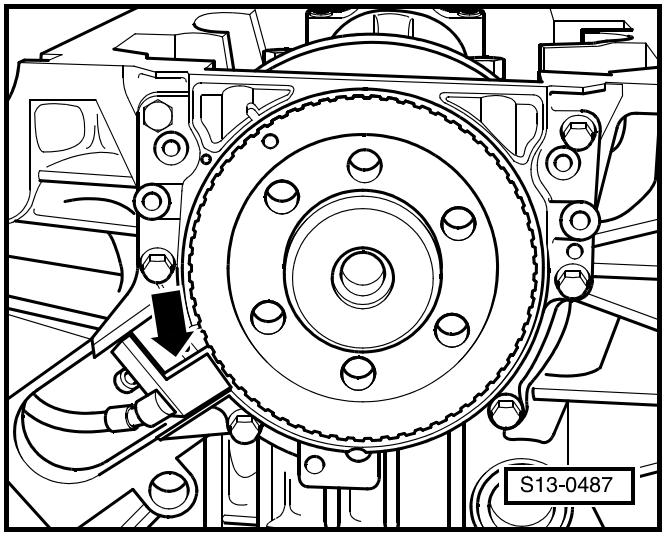
– Remove intermediate plate.

– Position engine to TDC of cylinder 1 ⇒ Chapter 13-1.

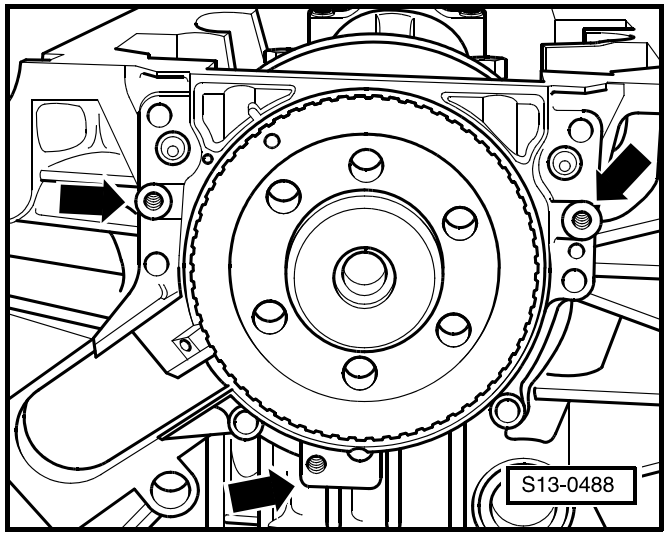
– Removing oil pan ⇒ Chapter 17-1.

– Remove engine speed sender -arrow-.

– Release the fixing screws of the sealing flange.



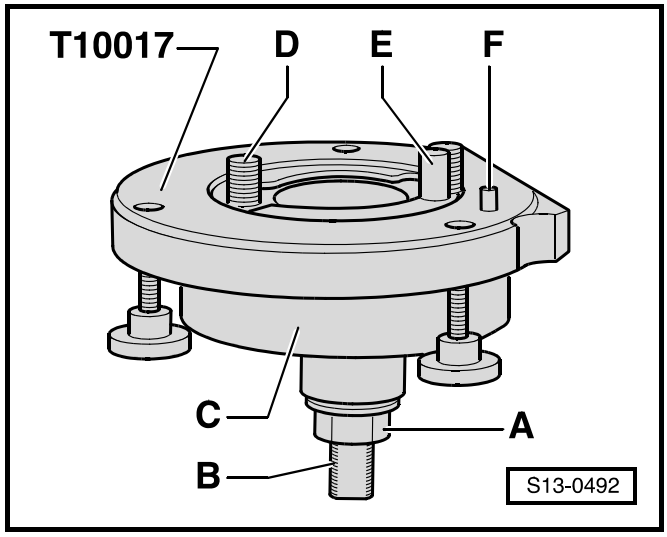
– Screw 3 screws M6x35 into the threaded bores of the sealing flange -arrows-.
– Press out sealing flange together with rotor from the crankshaft by alternately screwing the screws into the sealing flange.



Note

- *For 1.4/55 kW engine with engine identification characters BKY in combination with manual gearbox, the assembly device -T10134- is used for installing the sealing flange. In all other cases use the assembly device -T 10017-.*
- *New sealing flange is supplied from the spare parts catalogue with two gasket ring versions. Old versions of engines use elastomer gasket ring with spring and new engines use PTFE gasket ring.*
- *The sealing flange with PTFE gasket ring is provided with sealing lip supporting ring. This supporting ring is intended as an assembly sleeve and must not be removed before installing.*
- *Do not separate or turn the sealing flange and rotor after removing them from the spare part package.*
- *The rotor is given its fitting location by positioning the assembly device -T 10017- or -T10134- to the positioning pin.*
- *The rotor has an elastomer layer on its sealing surface with the crankshaft. This layer must not be brought into contact with dirt or grease.*
- *The sealing flange and gasket ring form one unit and must be replaced together with the rotor.*
- *The assembly device -T 10017- or -T10134- is given its fitting location to the crankshaft by means of a guide bolt, which is guided into the threaded bore of the crankshaft.*

A - Mounting the sealing flange with rotor on the assembly device -T 10017- or -T10134-

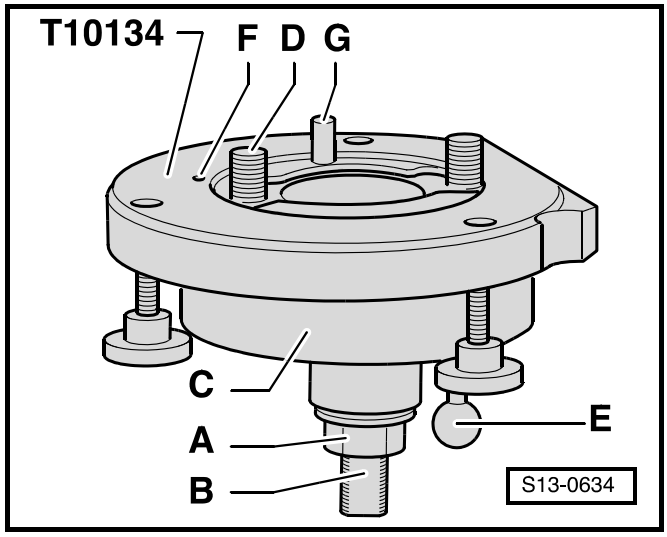


A - Hexagon nut

B - Clamping surface

C - Assembly cup

D - Allan screw



E - Guide bolts (for assembly device -T 10134- with black handle - for fuel engine)

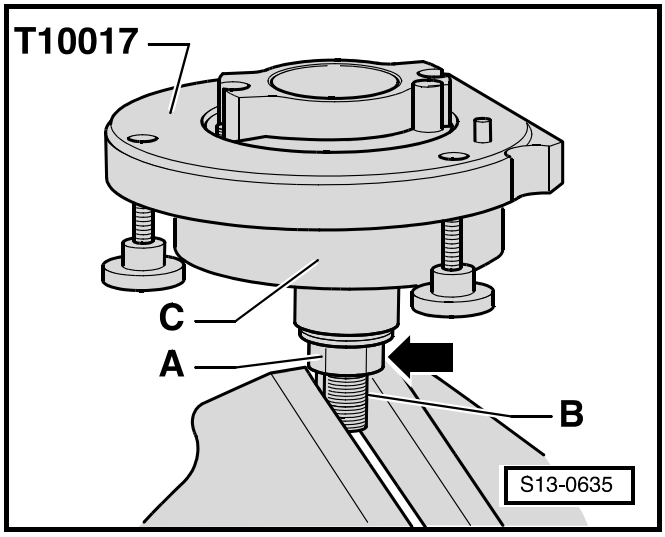
F - Positioning pin

E - Guide bolts (for assembly device - T 10134- with red handle - for diesel engine)

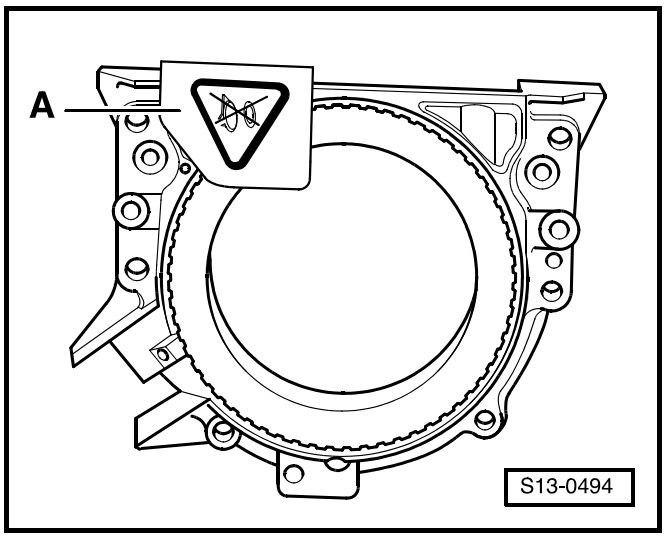
Note

Unless otherwise indicated, the method for the assembly device -T 10017- and -T10134- is identical.

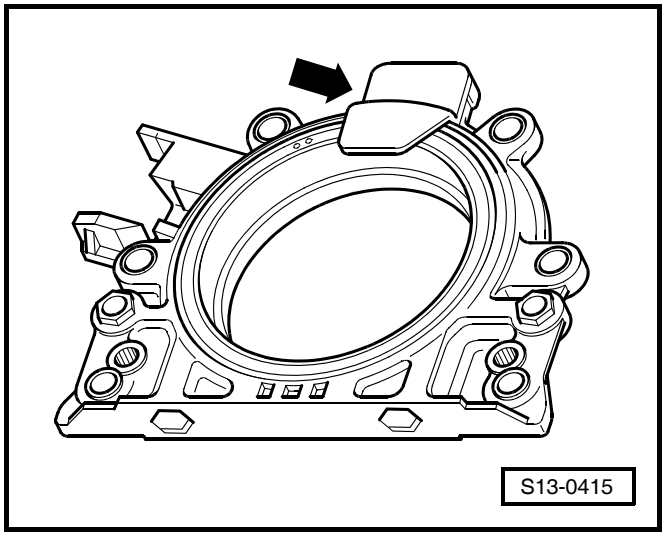
– Grip assembly device -T 10017- or -T 10134- on clamping surface -B- of the threaded spindle in a vice.



– Securing clip -A- from the new sealing flange (flange for assembly device -T 10017-)



.... or remove from new sealing flange -arrow- for assembly device -T 10134-.



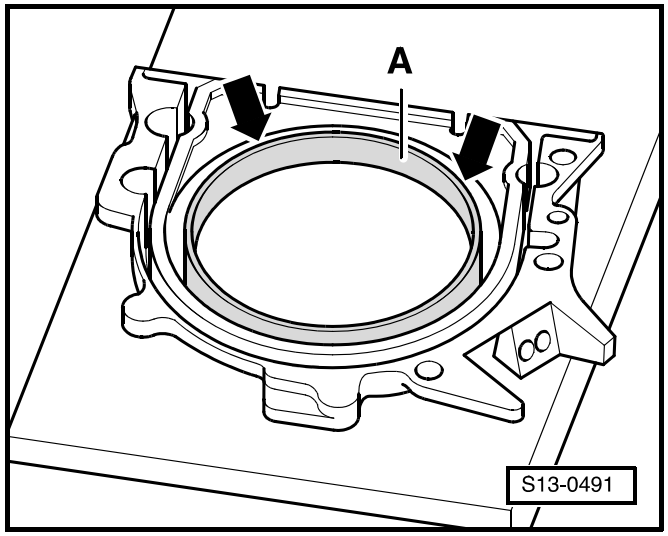
Note

Do not remove or turn the rotor from the sealing flange.

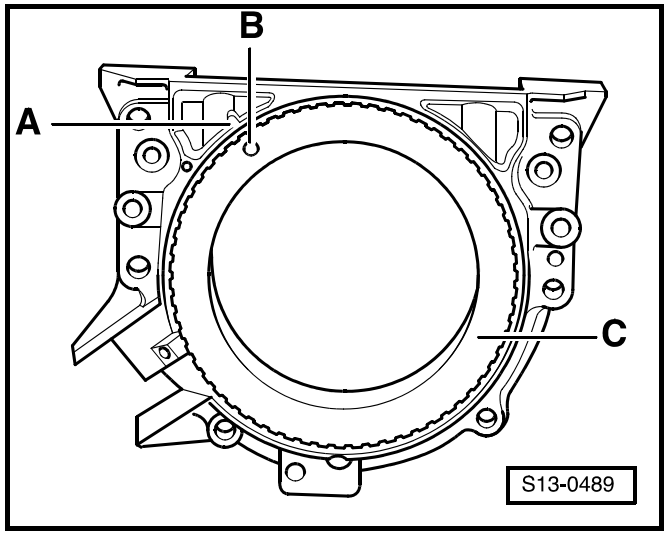
– Lay the front side of the sealing flange on a clean and level surface.
– Press the rotor -A- -arrows-, until it rests on the level surface.

Note

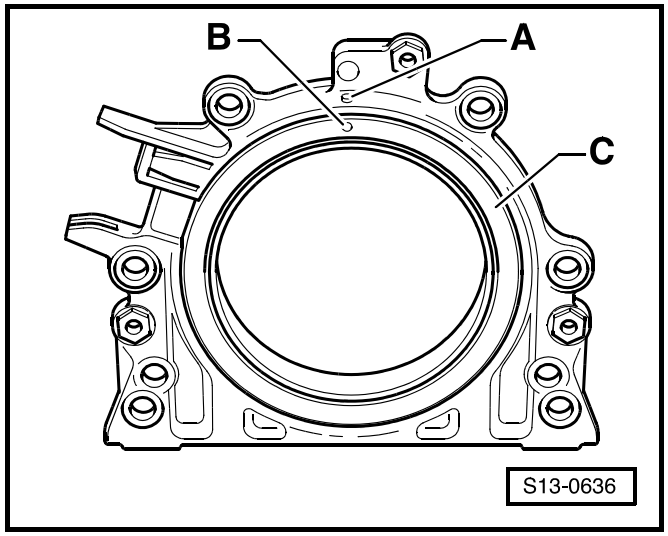
The top side of the rotor and the front side of the sealing flange must be flush.



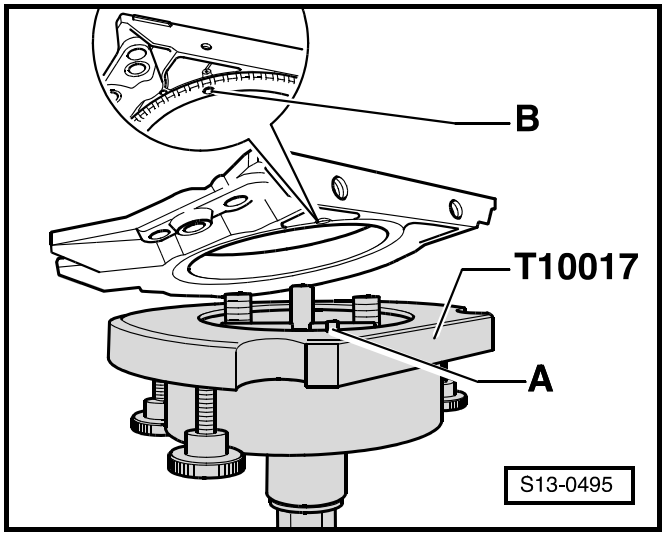
The locating hole -B- on the rotor -C- must be flush with the marking -A- on the sealing flange (flange for assembly device -T 10017-)



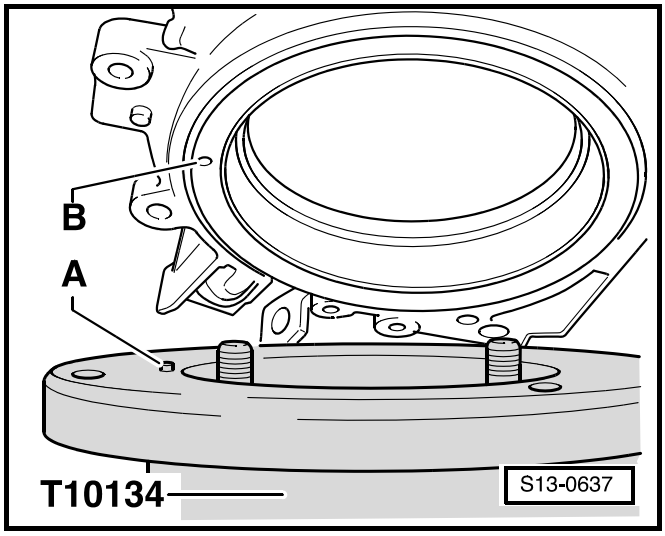
.... or on the sealing flange for the assembly device -T 10134-.



– Lay the sealing flange with the front side on theassembly device -T 10017- in such a way that the positioning pin -A- sinks into the hole -B- of the rotor.



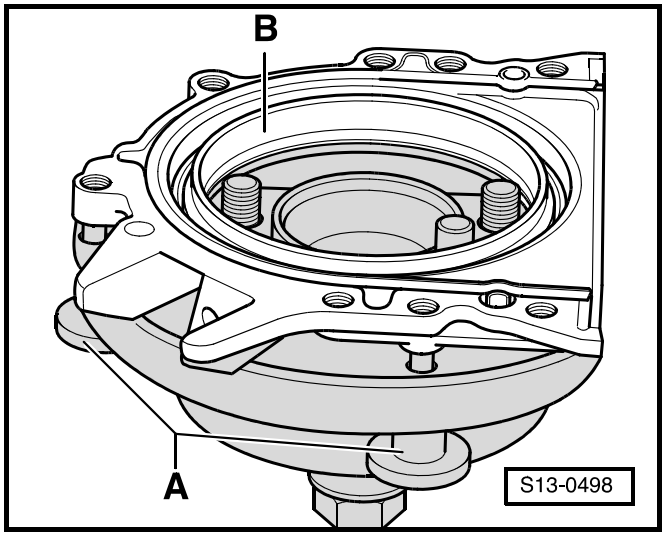
.... or on the assembly device -T10134-.



Note

Make sure the sealing flange lies flat on the assembly device.

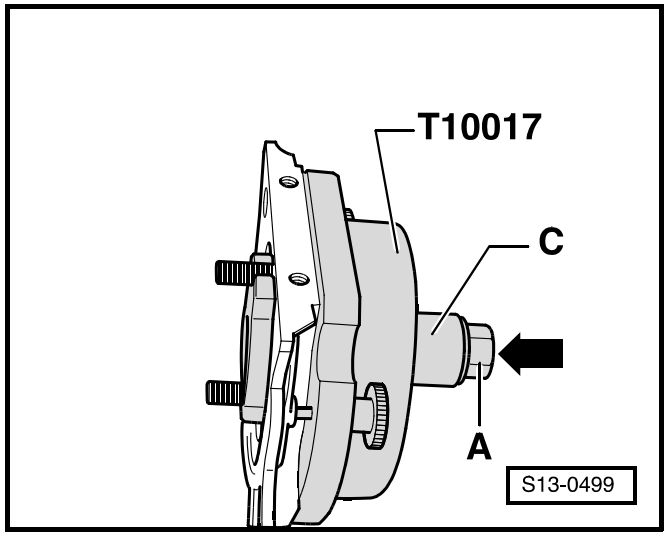
– When tightening the knurled screws -A- press the rotor -B- on the surface of the assembly device in such a way that the positioning pin cannot slide out of the rotor hole.



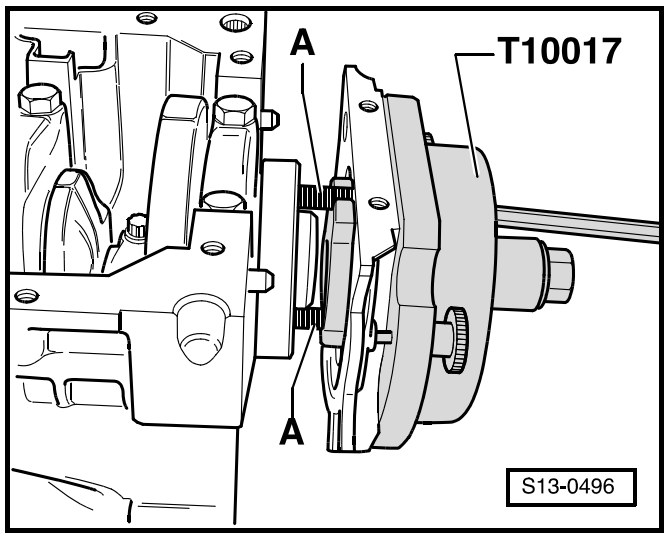
B - Mounting the assembly device -T 10017 - or -T 10134- with sealing flange on the crankshaft flange

- The crankshaft flange must be free of grease and oil
- The engine is in TDC for cylinder 1

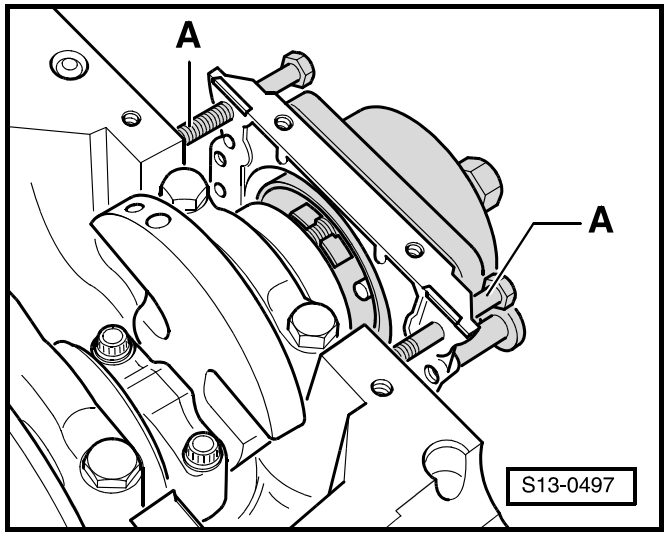
– Unscrew hexagon nut -A- up to the end of the threaded spindle. ►



– Screw assembly device with Allan screws -A- up to the stop onto the crankshaft flange. ►

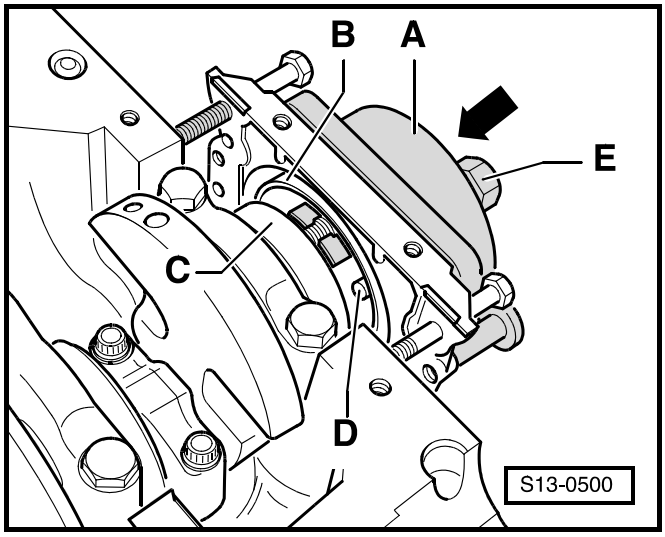


– Screw in two M6x35 mm screws -A- by about 3 turns for sealing flange guide into the cylinder block. ►



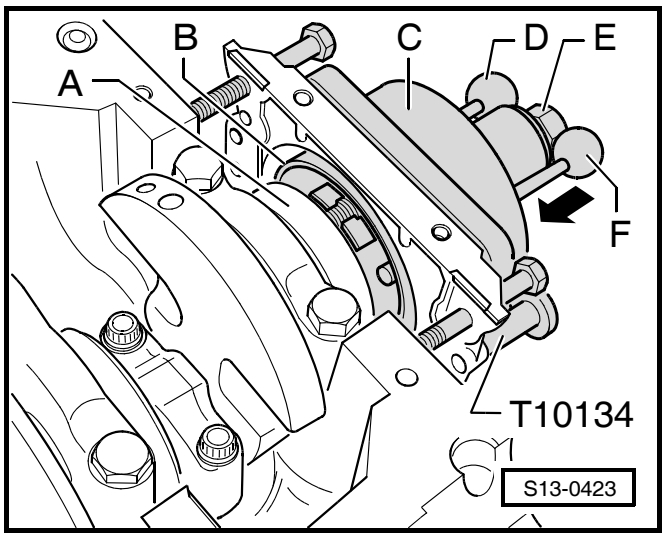
For assembly device T 10017:

– Move the assembly cup -A- by hand in the -direction of the arrow- until the rotor -B- rests on the crankshaft flange -C-. Guide bolts -D- on assembly device -T 10017- must at the same time sink into the threaded bore of the crankshaft. This gives the rotor its final fitting location.



For assembly device T 10134:

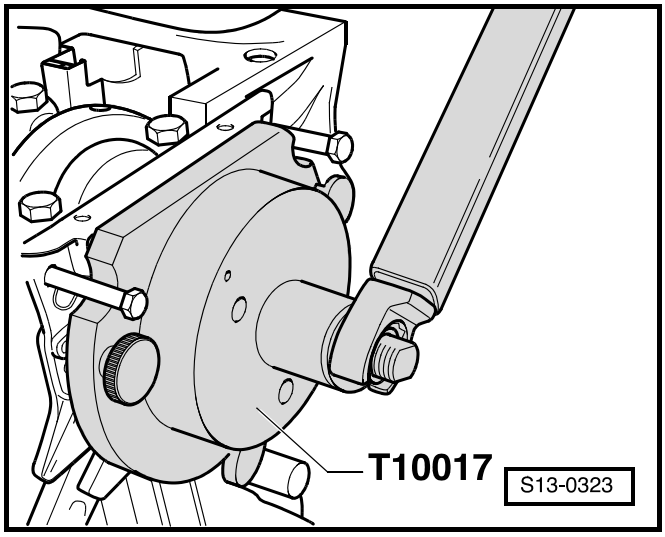
– Move the assembly cup -C- by hand in the -direction of the arrow- until the rotor -B- rests on the crankshaft flange -A-. Subsequently insert the guide bolt with black ball -F- fully into the threaded bore of the crankshaft. If the guide bolt is correctly positioned, then the ball has a distance of approx. 10 mm from the assembly cup -C-. This gives the rotor its final fitting location.



C - Pressing the rotor with assembly device -T 10017- or -T 10134- onto the crankshaft flange

– Screw in hexagon nut by hand onto the threaded spindle until it rests against the assembly cup.

– Tighten the hexagon nut of the assembly device using a torque wrench with adapter. Tightening torque: 35 Nm.



Note

After tightening the hexagon nut there must still be a narrow air gap between the cylinder block and the sealing flange.

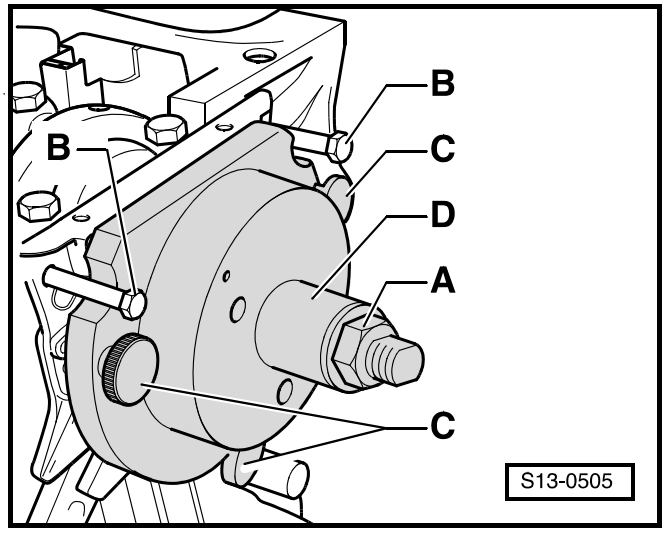
D - Inspecting the fitting position of the rotor on the crankshaft

– Unscrew hexagon nut -A- up to the end of the threaded spindle.

– Unscrew two M6x35 mm screws -B- from the cylinder block.

– Unscrew three knurled screws -C- from the sealing flange.

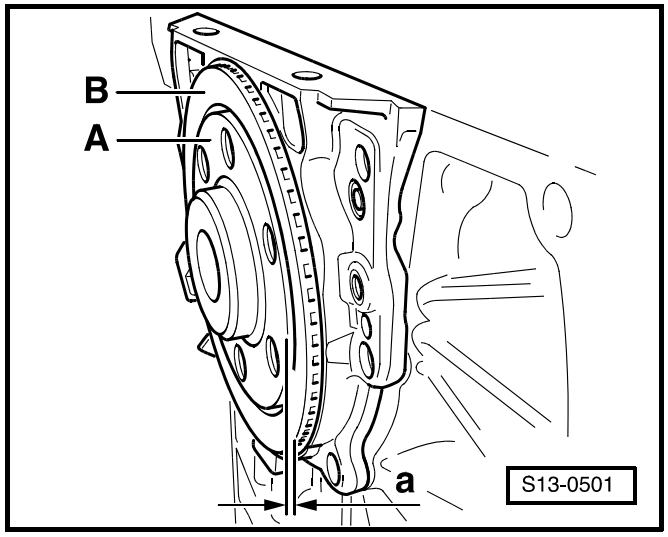
– Unscrew two Allen screws and remove assembly device -T 10017- or -T 10134-.



Note

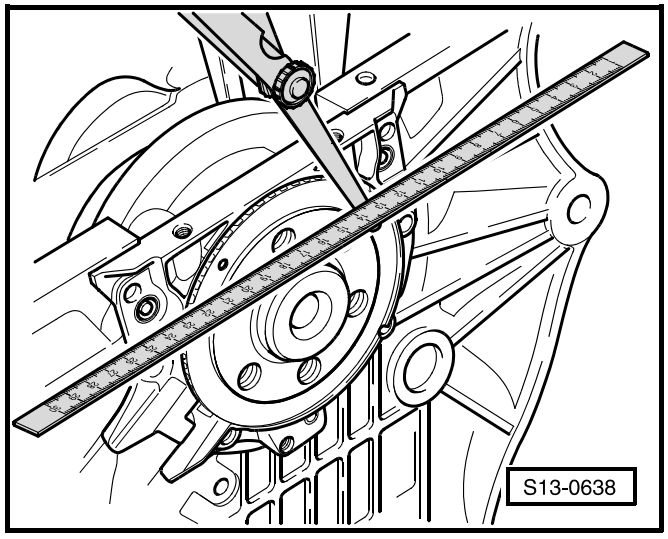
On sealing flange with PTFE gasket ring remove the sealing lip supporting ring.

The fitting position of the rotor on the crankshaft is accurate if there is a distance -a- of 0.5 mm between the crankshaft flange -A- and the rotor -B-.



– Position the steel striaghtedge onto the crankshaft flange.

– Measure the distance between the steel striaghtedge and the rotor with a feeler gauge.

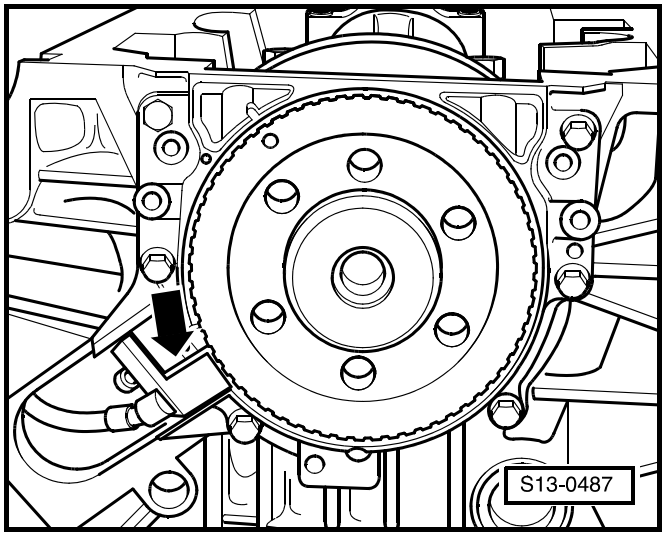


If the measured distance is less than 5 mm:

– Press down rotor ⇒ **13-2** page 12.

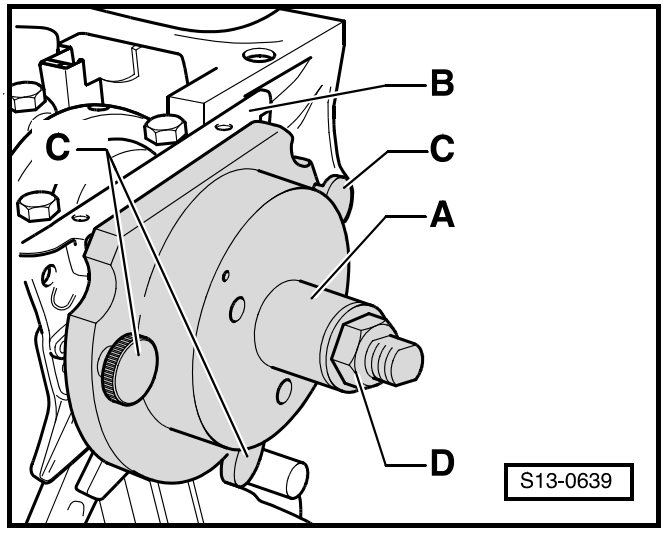
If the dimension is correct:

– Tighten the new fixing screws of the sealing flange crosswise. Tightening torque: 12 Nm.
– Install engine speed sender -arrow-. Tightening torque: 5 Nm.
– Installing oil pan ⇒ Chapter 17-1.
– Fit the intermediate plate.
– Install the flywheel or driver disc with new screws ⇒ **13-2** page 3.



E - Pressing down the rotor

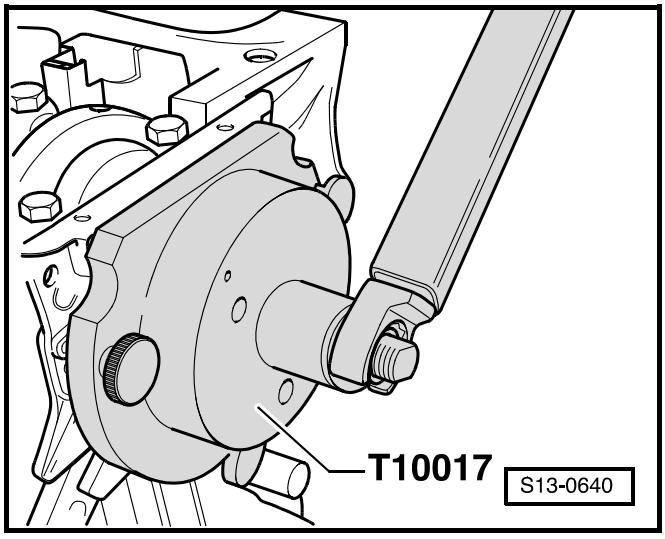
– Screw assembly device -T 10017- or -T 10134- with Allan screws up to the stop onto the crankshaft flange.
– Screw in three knurled screws -C- into the flange.
– Screw in hexagon nut -D- by hand onto the threaded spindle until it rests against the assembly cup -A-.



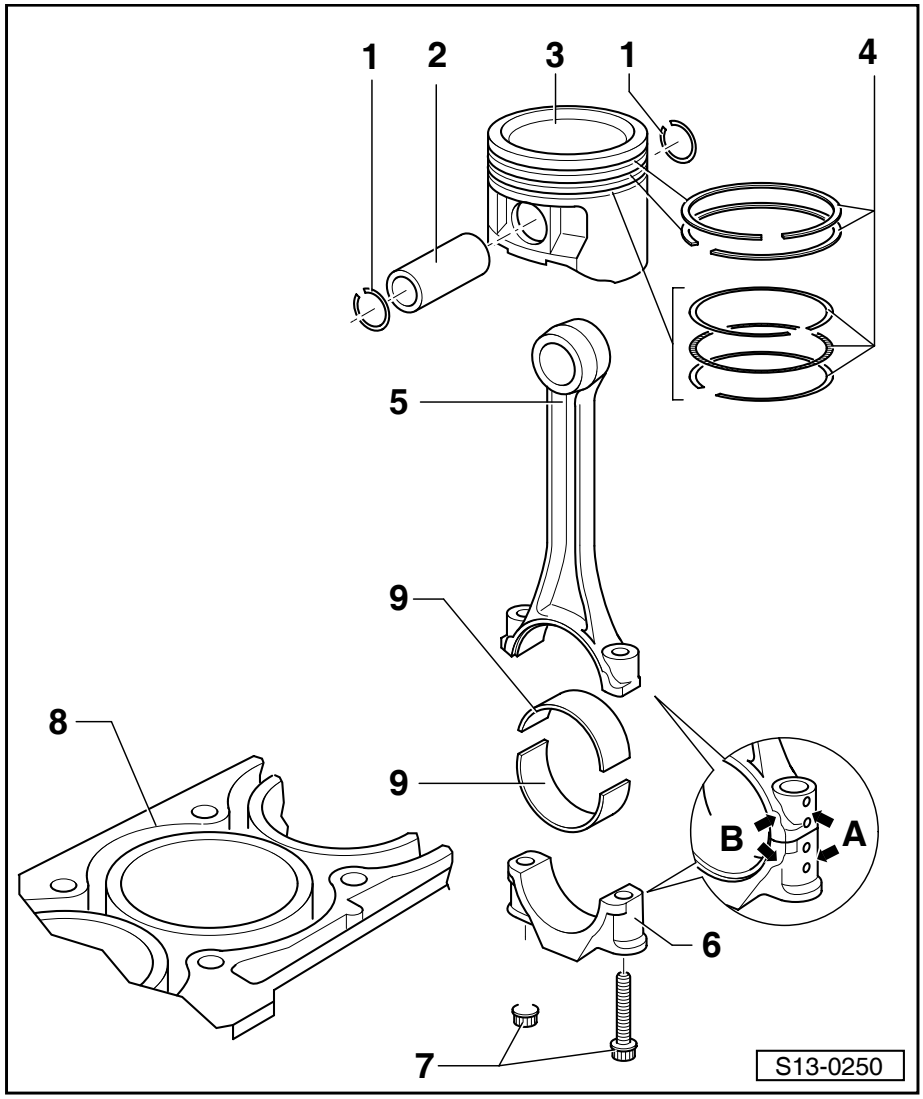
– Tighten the hexagon nut of the assembly device using a torque wrench with adapter. Tightening torque: 40 Nm.
– Again inspect the fitting position of the rotor on the crankshaft ⇒ **13-2** page 11.

If the dimension -a- is again too small:

– Tighten the hexagon nut of the assembly device to 45 Nm.
– Again inspect the fitting position of the rotor on the crankshaft ⇒ **13-2** page 11.



13-3 Disassembling and assembling piston and conrod



1 - Circlip

2 - Piston pin
- ❑ if stiff, heat piston to approx. 60°C
- ❑ removing and installing with driver -MP 1-304-

3 - Piston
- ❑ check ⇒ Fig. 3 in **13-3** page 2
- ❑ mark installation position and matching cylinder
- ❑ arrow on piston crown faces towards the belt pulley side
- ❑ piston = ∅ 76.47 mm

4 - Piston rings
- ❑ Offset joint 120 °
- ❑ use piston ring pliers for removing and installing
- ❑ remove and install 3-part oil scraper rings by hand
- ❑ marking -TOP- must face towards piston crown
- ❑ inspect gap clearance ⇒ Fig. 1 in **13-3** page 2
- ❑ inspect end clearance ⇒ Fig. 2 in **13-3** page 2

5 - Conrod
- ❑ always replace as a set only
- ❑ mark matching cylinder -A-
- ❑ Fitting position: Markings -B- point towards the belt pulley side
- ❑ located axially by pistons

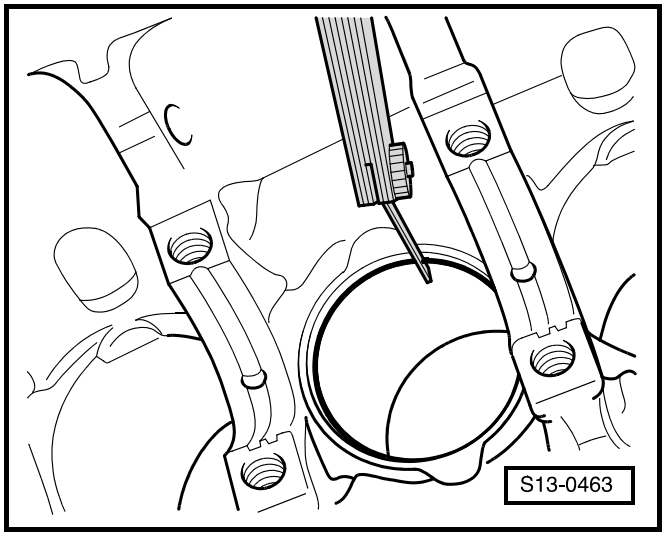
6 - Conrod cap
- ❑ as a result of the conrod separated in the cracking process, the cover fits only in one position and only to the relevant conrod

7 - 20 Nm + torque a further $^{1}/_{4}$ turn (90 °)
- ❑ replace
- ❑ oil thread and head contact surface

8 - Cylinder block
- ❑ inspect cylinder bore ⇒ Fig. 4 in **13-3** page 3
- ❑ Cylinder = ∅ 76.51 mm

9 - Bearing shell
- ❑ do not mix up used bearing shells (mark)
- ❑ insert bearing shells in the centre
- ❑ Axial clearance: new: 0.10...0.35 mm, wear limit: 0.40 mm

Fig. 1: Inspecting piston ring gap clearance

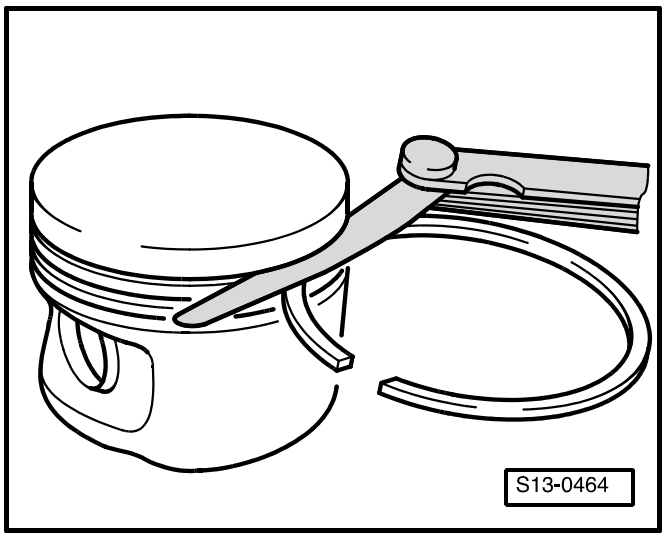


– Push in ring at right angles to the cylinder wall from the top through to the bottom cylinder opening, about 15 mm from the cylinder edge.

Piston ring dimensions in mm	new	Wear limit
1. Compression ring	0,20...0,50	1,0
2. Compression ring	0,40...0,70	1,0
Oil scraper ring	0,40...1,40	—[1]

[1] no specification possible for wear limit

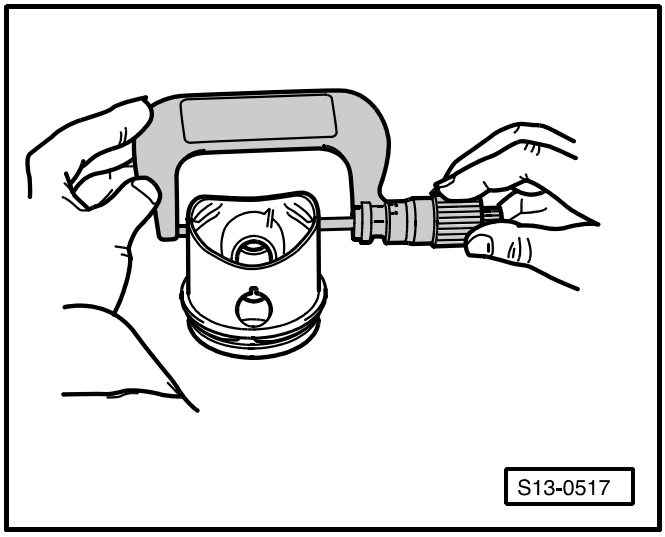
Fig. 2: Inspect piston ring end clearance



– Clean annular groove before measurement is taken.

Piston ring dimensions in mm	new	Wear limit
1. Compression ring	0,04...0,08	0,15
2. Compression ring	0,04...0,08	0,15
Oil scraper ring	cannot be measured	

Fig. 3: Inspecting pistons



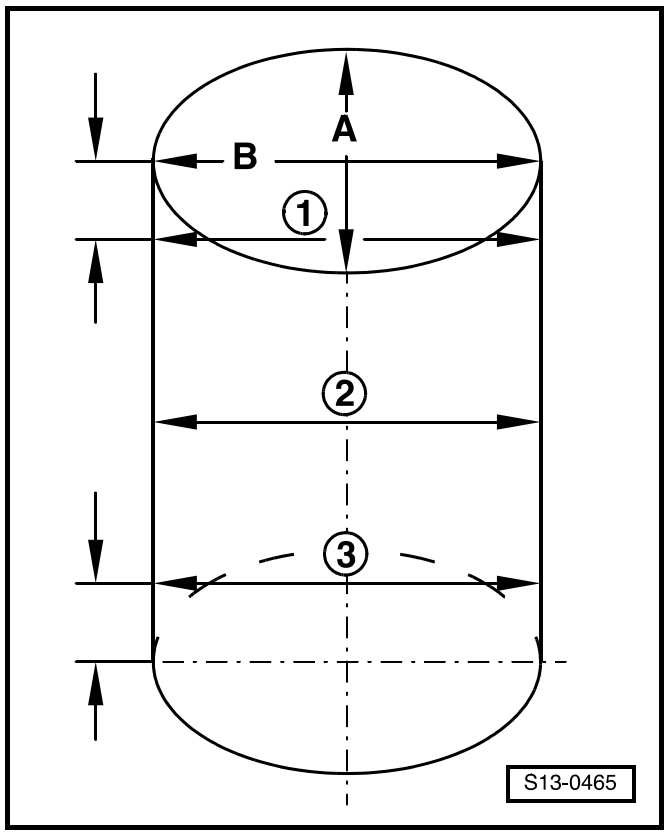
Special tools, test and measuring equipment and auxiliary items required

- External micrometer 75...100 mm

– Measure about 10 mm from the lower edge, offset at right angles to the piston pin shaft.

- Variation compared to nominal diameter max. 0.04 mm

Fig. 4: Inspecting cylinder bore



Special tools, test and measuring equipment and auxiliary items required

- Internal precision measuring instrument 50...100 mm

– Measure at three points crosswise in a transverse direction -A- and lengthwise -B-.

- Variations compared to nominal dimension max. 0.08 mm

Note

Do not measure the cylinder bore if the cylinder block is fixed to the assembly stand with the engine mount -MP 1-202-, as this may result in incorrect measurements.

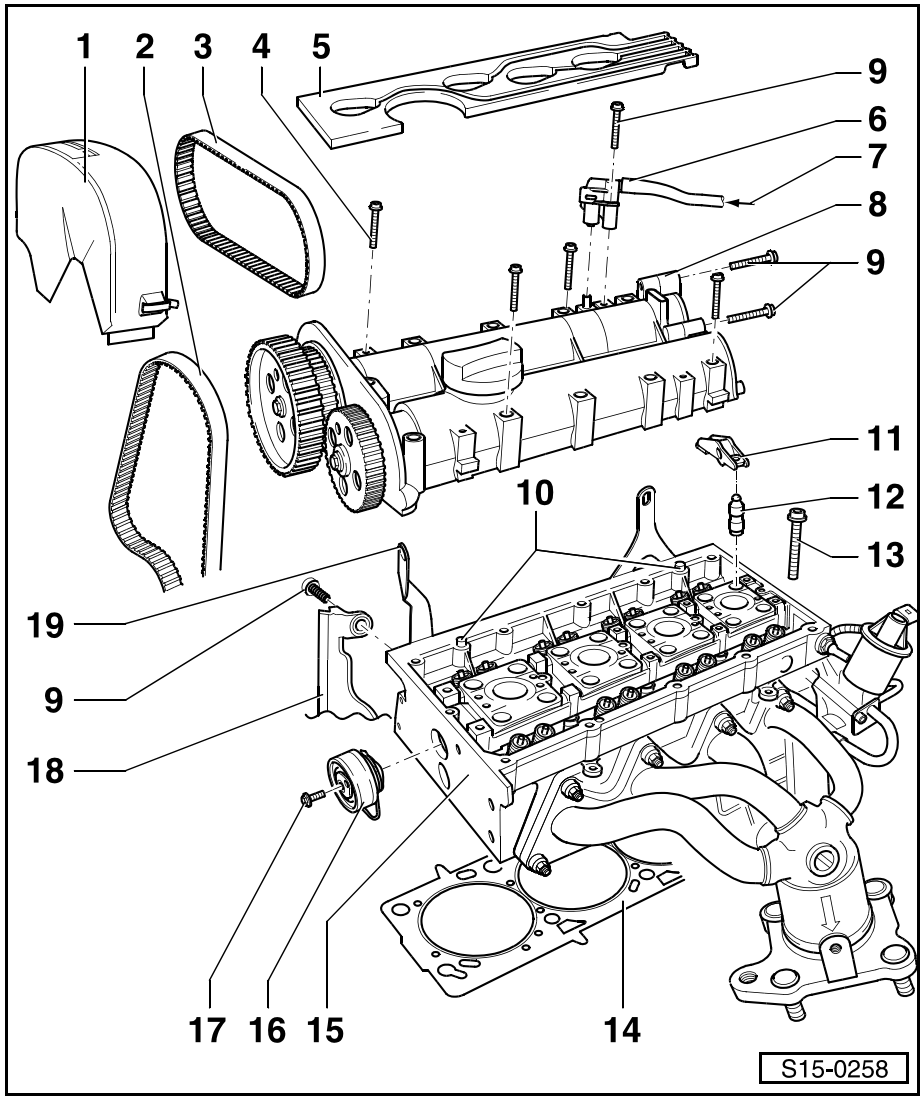
15 – Cylinder Head, Valve Gear

15-1 Removing and installing cylinder head

Note

- *When installing a replacement cylinder head, all the contact surfaces between the hydraulic supporting elements, roller rocker arms and the cams must be oiled before installing the cylinder head cover.*
- *Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.*
- *After replacing the cylinder head, all the coolant must be replaced ⇒ Chapter 19-1.*

Engines with engine identification characters AUA, AUB, BBY, BBZ.



1 - Top toothed belt guard

2 - Main drive-toothed belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ removing and installing, tensioning ⇒ Chapter 13-1

3 - Coupling drive-toothed belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ removing and installing, tensioning ⇒ Chapter 13-1

4 - 10 Nm + torque a further $^1/_4$ turn (90 °)
- ❑ replace
- ❑ Tighten crosswise from the middle outwards

5 - Ignition lead guide
- ❑ for engines with the engine codes AUA, AUB

6 - Non-return valve
- ❑ only engines BBY, BBZ

7 - From air filter
- ❑ only engines BBY, BBZ

8 - Cylinder head cover
- ❑ removing and installing ⇒ **15-1** page 4

9 - 10 Nm

10 - Fit pin

11 - Roller rocker arm
- ❑ inspect roller bearings of roller for smooth operation
- ❑ oil contact surfaces

- ❑ for installing, clip onto hydraulic supporting element with locking clip

12 - Hydraulic supporting element

- ❑ do not interchange
- ❑ before installing, inspect axial play of the camshafts ⇒ Chapter 15-2
- ❑ oil contact surfaces

13 - Cylinder head bolt

- ❑ replace
- ❑ observe the mounting instructions and sequence for loosening and tightening ⇒ **15-1** page 7

14 - Cylinder head gasket

- ❑ replace
- ❑ metal gasket

15 - Cylinder head

- ❑ removing and installing ⇒ **15-1** page 7
- ❑ check for distortion ⇒ Fig. 1 in **15-1** page 2
- ❑ Clean and de-grease the contact surfaces with the cylinder head cover
- ❑ after replacing fill entire system with fresh coolant

16 - Coupling drive-tensioning pulley

- ❑ inspect ⇒ Chapter 13-1
- ❑ Tension the toothed belt ⇒ Chapter 13-1

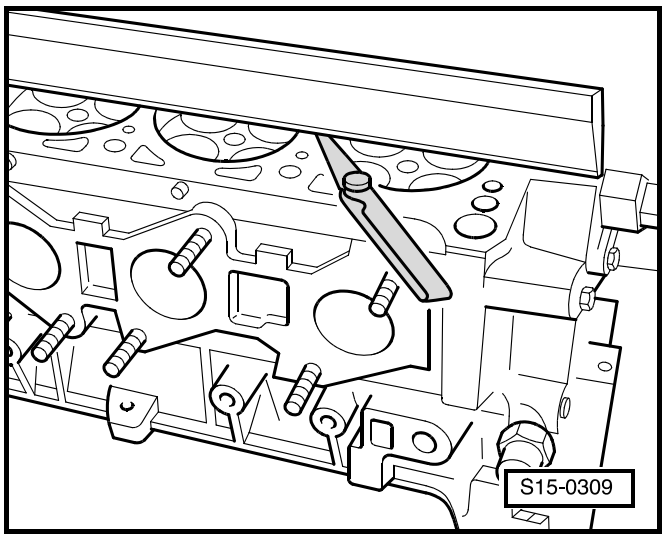
17 - 20 Nm

18 - Rear timing belt guard

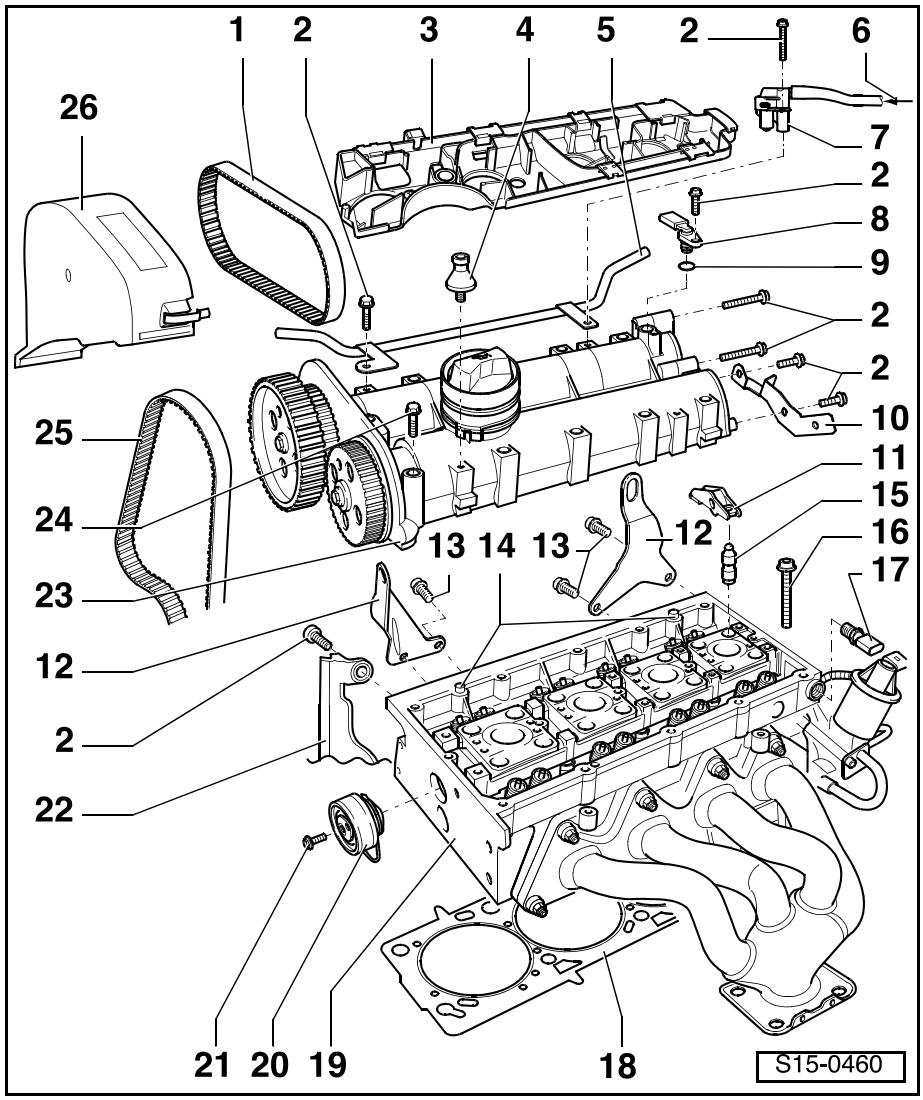
19 - Lifting eye

Fig. 1: Inspecting the cylinder head for distortion ►

Max. permissible distortion: 0.05 mm



Engines with engine identification letters BKY



- **1 - Coupling drive-toothed belt**
  - ❑ before removing mark running direction
  - ❑ check for wear
  - ❑ do not kink
  - ❑ removing and installing, tensioning ⇒ Chapter 13-1
- **2 - 10 Nm**
- **3 - Cable guide**
  - ❑ Tighten at cylinder head cover to 8 Nm
- **4 - Spacer, 6 Nm**
  - ❑ for air filter housing
- **5 - Coolant pipe**
- **6 - From air filter**
- **7 - Non-return valve**
- **8 - Hall sender -G40-**
- **9 - O-ring**
  - ❑ replace
- **10 - Bracket**
- **11 - Roller rocker arm**
  - ❑ inspect roller bearings of roller for smooth operation
  - ❑ oil contact surfaces
  - ❑ for installing, clip onto hydraulic supporting element with locking clip
- **12 - Lifting eye**
- **13 - 20 Nm**
- **14 - Dowel pins**
- **15 - Hydraulic supporting element**
  - ❑ do not interchange
  - ❑ oil contact surfaces
  - ❑ before installing, inspect axial play of the camshafts ⇒ Chapter 15-2
- **16 - Cylinder head bolt**
  - ❑ replace
  - ❑ observe the mounting instructions and sequence for loosening and tightening ⇒ **15-1** page 7
- **17 - Oil pressure switch 0.03 ... 0.07 MPa (0.3 ... 0.7 bar) -F1-, 25 Nm**
  - ❑ inspect ⇒ Chapter 17-1
  - ❑ Cut open gasket ring if leaking and replace
- **18 - Cylinder head gasket**
  - ❑ replace
  - ❑ metal gasket
- **19 - Cylinder head**
  - ❑ removing and installing ⇒ **15-1** page 7
  - ❑ check for distortion ⇒ Fig. 1 in **15-1** page 2
  - ❑ Sealing surfaces on the cylinder head cover must be free of oil and grease.
  - ❑ after replacing fill entire system with fresh coolant
- **20 - Coupling drive-tensioning pulley**
  - ❑ inspect ⇒ Chapter 13-1
  - ❑ Tension the toothed belt ⇒ Chapter 13-1
- **21 - 20 Nm**

22 - Rear timing belt guard

23 - Cylinder head cover

- ❑ removing and installing ⇒ **15-1** page 4

24 - 10 Nm + torque a further $^1/_4$ turn (90 °)

- ❑ replace
- ❑ Tighten crosswise from the middle outwards

25 - Main drive-toothed belt

- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ Toothed belt routing ⇒ Chapter 13-1
- ❑ removing and installing, tensioning ⇒ Chapter 13-1

26 - Top toothed belt guard

removing and installing cylinder head cover

Special tools, test and measuring equipment and auxiliary items required

- Supporting device -MP 9-200-
- Pressure pad -T 30004- with replaceable stud -T 30004/1-
- Camshaft lock -T 10016-
- Extractor -T 10094-
- Sealant -D 188 003 A1-
- Gasket remover Gasket Stripper (storage code GST, storage article no. R 34402), manufacturer Retech s.r.o.
- Cleaning agent and grease remover e.g. -D 000 401 04-

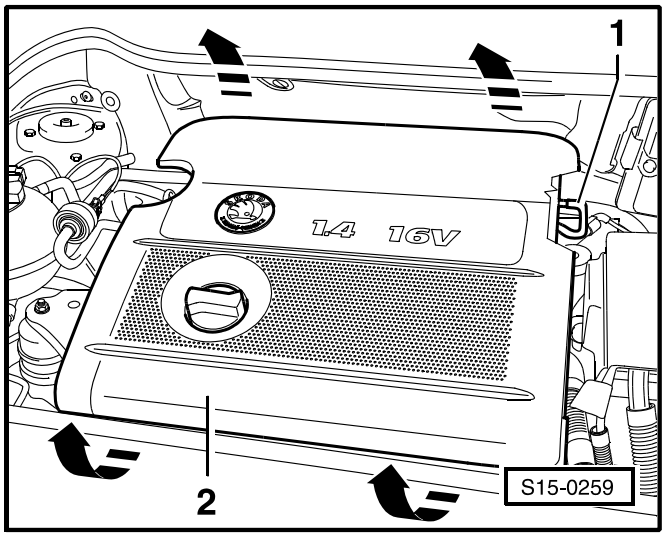
Removing

– First check whether a radio set with anti-theft coding has been fitted. If this is the case obtain coding.

– Disconnect the battery-earth strap with the ignition off.

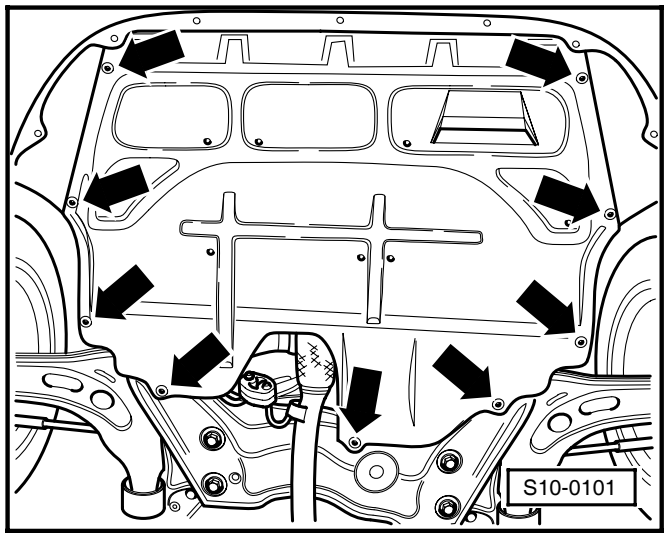
– Pull off hose -1- (for engines as of 04.02) and remove engine protection -2- with air filter upwards -arrows-. ►

– Remove the V-ribbed belt ⇒ Chapter 13-1.



– Release the screws at the noise insulation -arrows- and remove noise insulation.

– Removing the two toothed belts ⇒ Chapter 13-1.



Note

- *The camshafts are located in the cylinder head cover. This is why the cylinder head cover must only be removed once the two toothed belts have been removed.*
- *Removing and installing camshaft ⇒ Chapter 15-2.*

Engines AUA, AUB

– Remove spark plug connector together with ignition cable guide.

– Disconnect the 4 pin plug connection from the ignition transformer.

Engines BBY, BBZ, BKY

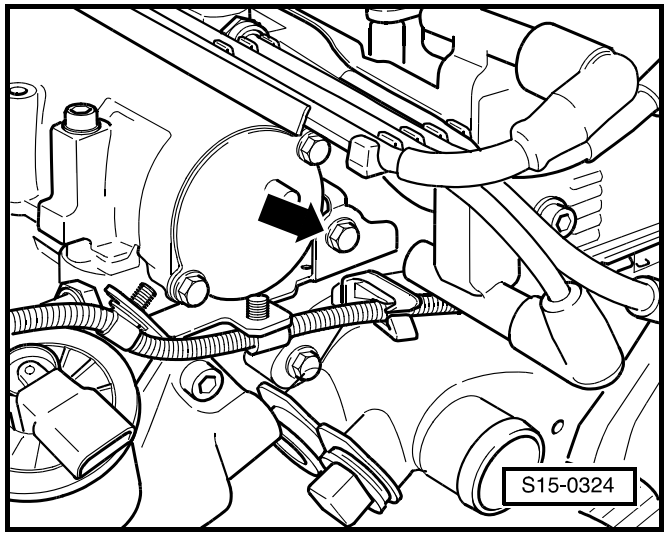
– Unplug the 4 pin plug connection from ignition coils.

– Remove ignition coils with extractor -T10094-.

– Remove cable guide from cylinder head cover.

Continued for all vehicles

– Unscrew the fixing screw -arrow- at the cable guide holder.



– Remove coolant ventilation pipe from cylinder head cover.

– Disconnect the 3 pin plug connection from the hall sender.

– If necessary remove non-return valve.

– Release the fixing screw for the rear toothed belt guard near the right lifting eye.

– Slacken the bolts of the cylinder head cover crosswise from outside to inside and then unscrew.

– Carefully remove the cylinder head cover.

– Remove the roller rocker arm together with the hydraulic supporting elements and lay aside on a clean surface. Make sure the roller rocker arm and the hydraulic supporting elements are not interchanged.

Installing

- The toothed belt gear of the crankshaft is secured to the crankshaft with one fixing screw and two washers.
- The pistons must not be in TDC.
- Lock the camshaft sprockets with -T 10016- in the fit holes in the cylinder head cover and secure against turning.

Note

When turning the camshaft the valves may touch the piston in TDC.

WARNING!

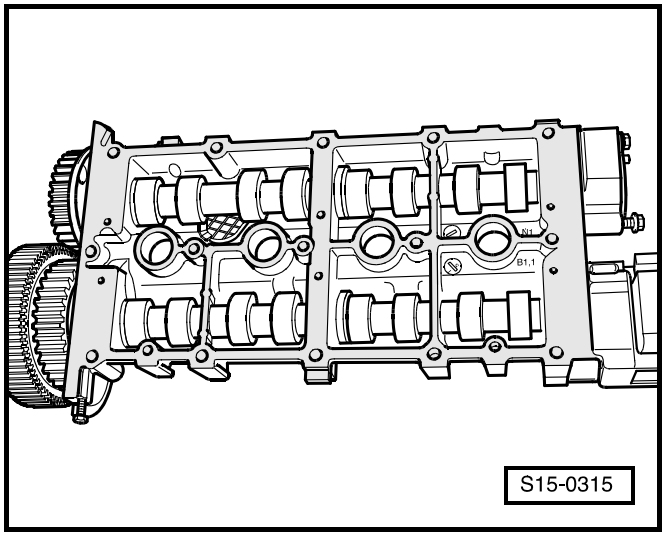
Wear protective gloves when working with sealant and grease remover!

– Clean sealing surface on cylinder head and cylinder cover and remove sealant residues with chemical gasket remover.

– Ensure that no dirt and sealant residues get into the cylinder head.

– Degrease the sealing surfaces.

– Apply a thin coating of sealant -D 188 003 A1- uniformly on the clean sealing surface of the cylinder head cover (see grid surface in the illustration).

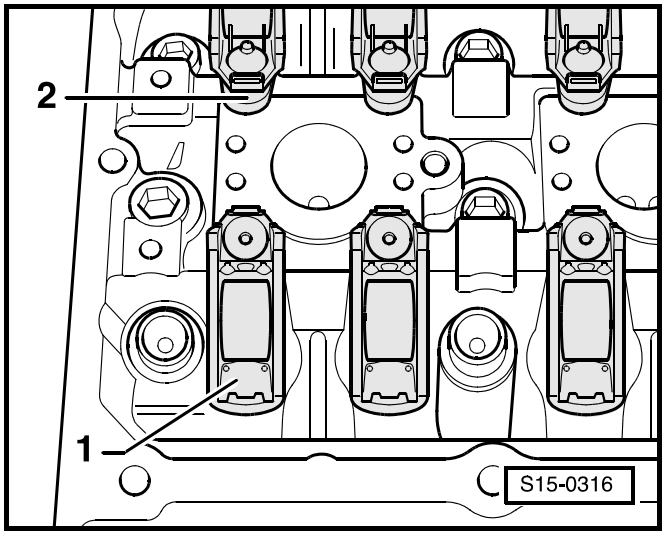


Note

The sealant must not be applied too thickly, as otherwise excess sealant may penetrate into the oil bores and possibly cause engine damage.

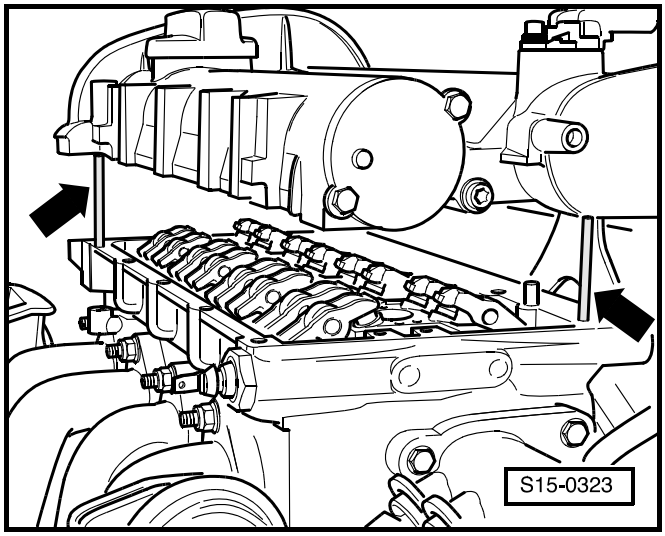
– Make sure all roller rocker arms are correctly positioned on the end of valve stems -1- and on the relevant hydraulic supporting elements -2- and secured with clamps .

– Before installing the cylinder head cover, screw two stud bolts (M6 x 70 mm) into the cylinder head.



– Carefully place the cylinder head cover at right angles to the cylinder wall onto the cylinder head stud bolts -arrows- and dowel pins.

– Tighten the new fixing screws of the cylinder head cover diagonally and evenly from the inside to the outside. Tightening torque 10 Nm + torque a further $^{1}/_{4}$ turn (90°)



WARNING!

Do not tilt the cylinder head cover!

Note

- *After installing the cylinder head cover, allow the sealant to dry for about 30 minutes.*
- *Do not rework the sealing surface of the cylinder head cover.*
- *After installing new hydraulic supporting elements, the engine must not be started for about 30 minutes. The hydraulic supporting elements must „settle“ (otherwise valves would strike the pistons).*
- *If the battery earth strap is disconnected and connected, carry out a few additional operations ⇒ Electrical System; Rep. Gr. 27.*

Further installation occurs in a similar way in reverse order to removal.

Removing and installing cylinder head

Special tools, test and measuring equipment and auxiliary items required

- Supporting device -MP 9-200-
- Pressure pad -T 30004- with replaceable stud -T 30004/1-
- Bracket -T 10014-
- Camshaft lock -T 10016-
- Catch pan, e.g. -V.A.G 1306-
- Sealant -D 188 003 A1-
- Gasket remover Gasket Stripper (storage code GST, storage article no. R 34402), manufacturer Retech s.r.o.

Requirements

- The engine must not exceed the temperature of 35°C, because the cylinder head could twist when loosening the screws.
- The pistons must not be in TDC.

Removing

– Remove cylinder head cover ⇒ **15-1** page 4.

– Open and close the cap of the expansion reservoir to reduce the pressure in the cooling system.

– Drain coolant ⇒ Chapter 19-1.

– Release spring strap clamps and disconnect the coolant hoses of the coolant regulator housing.

Note

When separating the hoses the residual coolant flows out! Make sure a catch pan is positioned underneath.

– Unscrew the front exhaust pipe from the exhaust manifold and hook up ⇒ Chapter 26-1.

– Remove the top fixing screw of the guide pipe for the oil dipstick.

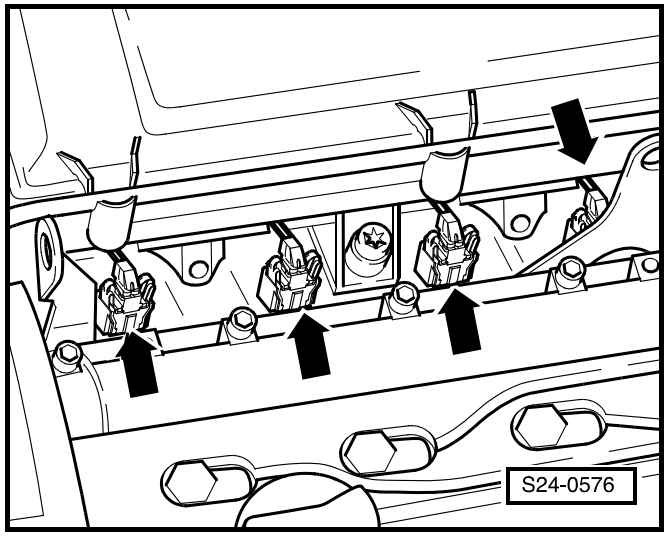
– Disconnect the connectors of the injection valves -arrows-. ►

– Remove the fuel rail with injection valves and lay aside.

– Remove exhaust manifold from cylinder head.

– Release or disconnect the following components:

- Hose from the crankcase ventilation
- Hose from the activated charcoal filter system to the intake manifold

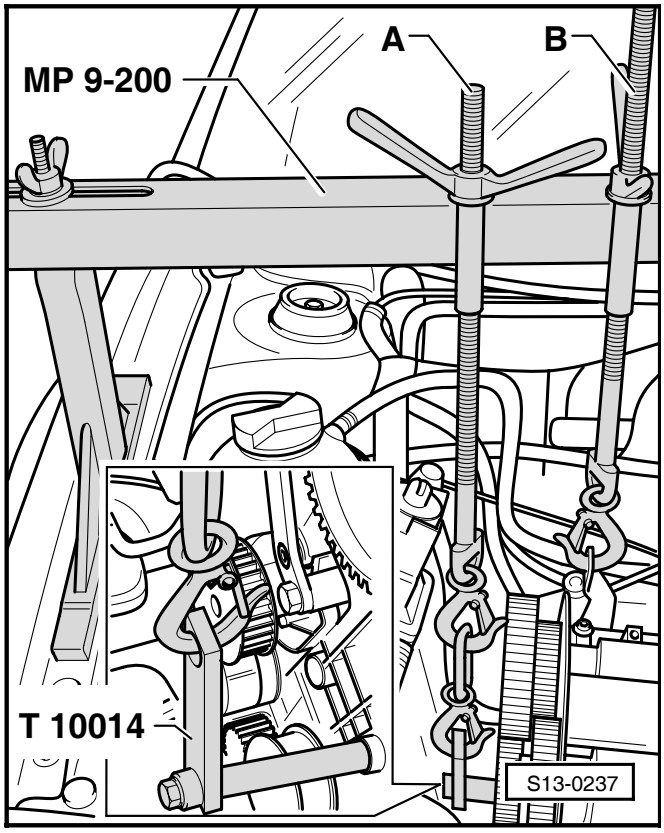


- Vacuum hose from the brake servo unit to the intake manifold
- 4 pin plug connection from the intake manifold pressure sender under the intake manifold at front right and 2 pin plug connection from the knock sensor
- Release the plug connection from the engine speed sender below the bracket of the oil dipstick guide pipe and remove the plug from the holder
- Plug of the ignition transformer, hall sender and thottle valve control unit
- Plug of the coolant temperature sender and the exhaust gas recirculation valve

Both lifting eyes are located on the cylinder head, this is why an additional holder must be fitted on the engine block to support the engine.

– Remove guide pulley of toothed belt .

– Raise engine with spindle -B-.



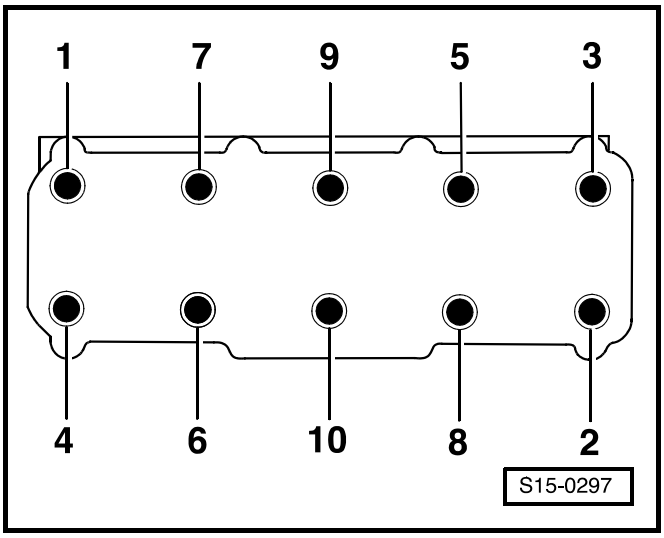
– Screw in bracket -T 10014- in the location of the removed guide pulley.

– Raise engine with spindle -A- until spindle B is relieved.

– Release spindle -B- and take out of the cylinder head holder.

– Remove the retaining clip on the coolant regulator housing, which secures the coolant pipe to the coolant pump.

– Remove the cylinder head bolts in the recommended sequence.



– Carefully remove the cylinder head.

Installing

Note

- *Remove cylinder head gasket from its wrapping immediately before fitting.*
- *Treat the new gasket with the utmost care. Any damage will result in leaks.*

WARNING!

Wear protective gloves when working with sealant and grease remover!

– Clean sealant residues of contact surfaces of cylinder head/cylinder block with a chemical gasket remover.

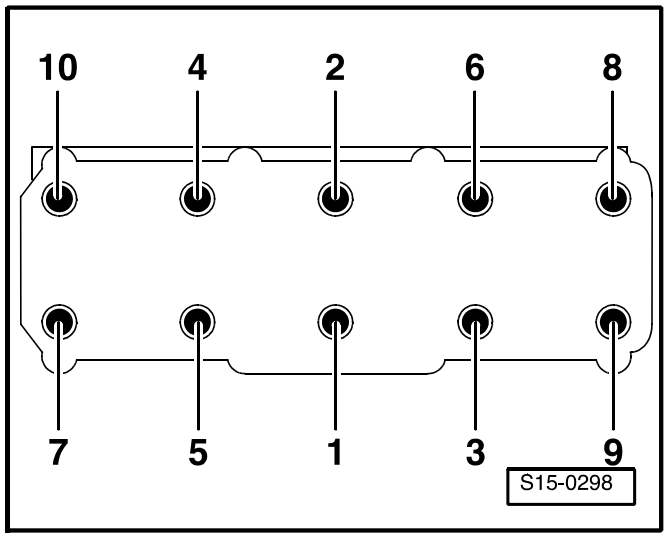
– Make sure that when cleaning the cylinder head and cylinder block no impurities can get into the cylinder or into the oil and coolant galleries.

– Position piston of cylinder 1 in TDC ⇒ Chap. 13-1.

– Lock the camshaft sprockets with -T 10016-.

– Position the new cylinder heads. The legend (spare part no.) must be legible.

– Insert the cylinder head. Pay attention to the dowel pins in the cylinder block.
– Insert new cylinder head bolts and tighten by hand.
– Tighten the cylinder head bolts in the order shown as follows:



– Tighten up all bolts to 30 Nm.
– Torque all bolts further to $^1/_4$ turn (90°) with a rigid wrench.
– Then, torque all bolts once again further to $^1/_4$ turn (90 °) with a rigid wrench.
– Insert the hydraulic supporting elements in the cylinder head and position the relevant roller rocker arm on the valve stem ends.
– Install cylinder head cover ⇒ **15-1** page 5.
– Connect or switch on the following components:

- Plug of the coolant temperature sender and the exhaust gas recirculation valve
- Plug of the ignition transformer, hall sender and thottle valve control unit
- Plug of the engine speed sender below the bracket of the oil dipstick guide tube
- Vacuum hose from the brake servo unit to the intake manifold
- Hose from the activated charcoal filter system to the intake manifold

– Attach exhaust manifold to cylinder head.
– Install fuel rail with injection valves.
– Connect the plug for the injection valves.
– Remove the fixing screw of the oil dipstick guide tube.
– Connect the coolant hoses to the coolant regulator housing.
– Top up coolant ⇒ Chapter 19-1.
– Screw on front exhaust pipe to exhaust manifold ⇒ Chapter 26-1.
– Installing the two toothed belts ⇒ Chapter 13-1.
– Install the V-ribbed belt ⇒ Chapter 13-1.
– Install engine cover with air filter.
– Connect the battery-earth strap with the ignition off.

Note

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

Testing the compression

Special tools, test and measuring equipment and auxiliary items required

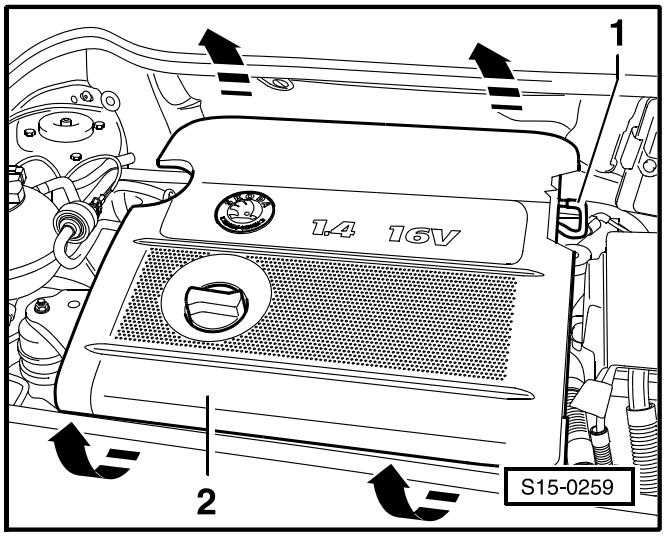
- Spark plug wrench, e.g. -3122 B-
- Compression tester, e. g. -V.A.G 1763-
- Extractor -T 10094-

Test condition

- Engine oil temperature at least 30 °C.

Test sequence

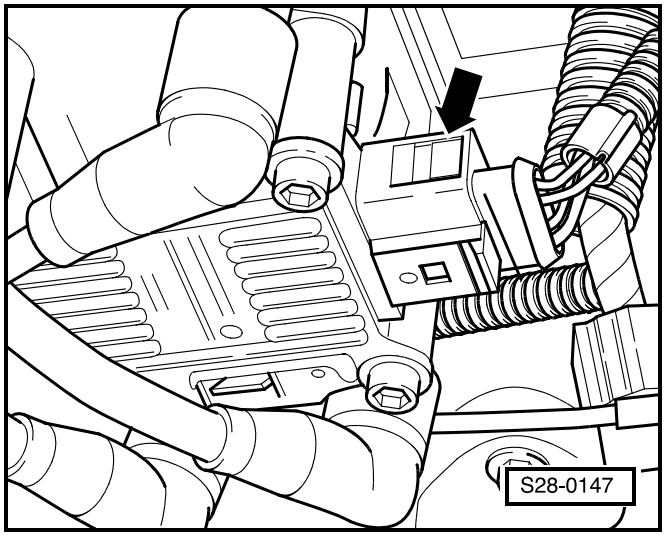
– Pull off hose -1- (for engines as of 04.02) and remove engine protection -2- with air filter upwards -arrows-.



Engines with the engine codes AUA, AUB

– Remove the spark plug connector and remove the ignition cable guide.

– Disconnect the 4-pin plug from the ignition transformer -arrow-.



Engines with the engine codes BBY, BBZ, BKY

– Remove all 4-pin plugs from the ignition coils.

– Pull out all ignition coils using the extractor -T 10094-.

– Remove cable guide from cylinder head cover.

Continued for all vehicles

– Unscrew the spark plugs.

– Remove fuse no. 35 from the fuse holder.

Note

Removing fuse no. 35 interrupts the voltage supply of the injectors.

– Press down the accelerator pedal fully (assistance of second mechanic required).

– Test compression with compression tester, e.g.-V.A.G 1763-.

Note

The use of the tester is described in the relevant operating instructions.

– Operate starter until the tester no longer indicates a pressure rise.

Compression readings:

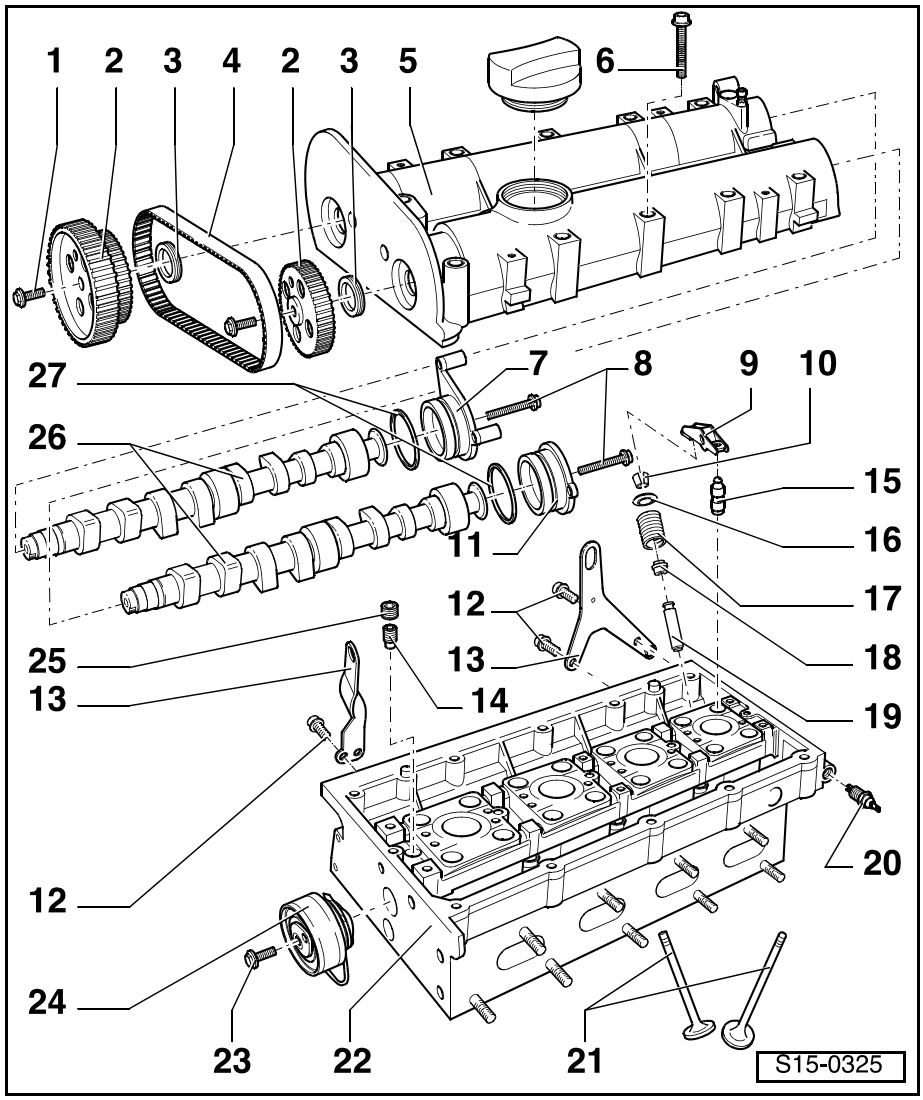
New engine	Wear limit	Difference between cylinders
10…15 bar (1…1.5 MPa)	7 bar (0.7 MPa)	3 bar (0.3 MPa)

– Install the spark plugs again and then tighten fully to 30 Nm.

The further assembly is carried out in reverse order to disassembly.

– Interrogate the fault memory ⇒ Vehicle Diagnosis, Measuring and Information System VAS 5051; .

15-2 Repairing Valve Gear



1 - 20 Nm + torque a further 1/4 turn (90 °)
- ❑ replace
- ❑ to release and tighten use tool -T 10016- ⇒ Fig. 1 in **15-2** page 2

2 - Camshaft sprocket
- ❑ Pay attention to position the timing belt when installing ⇒ Chapter 13-1

3 - Gasket ring
- ❑ Lightly oil sealing lip
- ❑ only replace with the camshaft installed
- ❑ replace ⇒ **15-2** page 6

4 - Coupling drive-toothed belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ removing and installing, tensioning ⇒ Chapter 13-1

5 - Cylinder head cover
- ❑ removing and installing ⇒ Chapter 15-1

6 - 10 Nm + torque a further 1/4 turn (90 °)
- ❑ replace
- ❑ Tighten crosswise from the middle outwards

7 - Cap
- ❑ Holder for ignition transformer for engines with engine identification letters AUA, AUB

8 - 10 Nm

9 - Roller rocker arm
- ❑ inspect roller bearings of roller for smooth operation
- ❑ oil contact surfaces
- ❑ for installing, clip onto hydraulic supporting element with locking clip

10 - Collets

11 - Cap

12 - 20 Nm

13 - Lifting eye

14 - Non-return valve, 6 Nm
- ❑ Clean thread and secure with tool -D 154 102 A1-
- ❑ do not tighten excessively, the valve can get stuck

15 - Hydraulic supporting element
- ❑ do not interchange
- ❑ before installing check axial play of the camshafts ⇒ Fig. 2 in **15-2** page 3
- ❑ oil contact surfaces

16 - Valve spring retainer

17 - Valve spring
- ❑ removing and installing with tool -MP 1-229- ⇒ **15-2** page 8

18 - Valve stem seal
- ❑ replace ⇒ **15-2** page 8

19 - Valve guide
- ❑ check ⇒ **15-2** page 7

20 - Oil pressure switch 0.03 ... 0.07 MPa (0.3 ... 0.7 bar) -F1-, 25 Nm
- ❑ inspect ⇒ Chapter 17-1
- ❑ Cut open gasket ring if leaking and replace

21 - Valves
- ❑ Valve dimensions ⇒ Fig. 4 in **15-2** page 3

22 - Cylinder head
- ❑ reworking valve seats ⇒ **15-2** page 4
- ❑ reworking sealing surface ⇒ Fig. 5 in **15-2** page 4

23 - 20 Nm

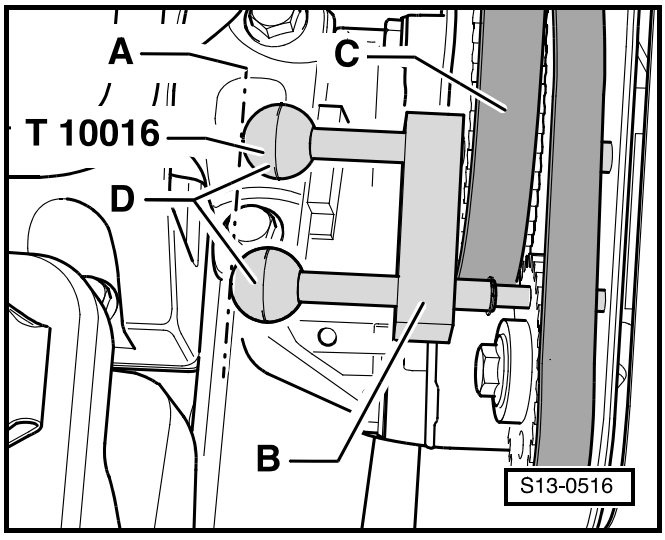
24 - Tensioning pulley
- ❑ for coupling drive-toothed belt
- ❑ inspect ⇒ Chapter 13-1
- ❑ Tension the toothed belt ⇒ Chapter 13-1

25 - Screw plug, 45 Nm
- ❑ Use tool -D 154 102 A1-
- ❑ must not be screwed in too deep
- ❑ maximum permissible recess of the cylinder head cover contact surface 2 mm

26 - Camshaft
- ❑ inspecting axial play ⇒ Fig. 2 in **15-2** page 3
- ❑ oil axial bearing collar before installing
- ❑ Identification ⇒ Fig. 3 in **15-2** page 3
- ❑ after installation replace gasket ring
- ❑ Replace gasket rings ⇒ **15-2** page 6

27 - O-ring
- ❑ replace
- ❑ moisten with oil before inserting

Fig. 1: Locking both camshaft sprockets with the camshaft lock -T 10016- ►



– Insert the two locking pins through the locating holes of the camshaft sprockets up to the stop in the fit holes in the cylinder head cover.

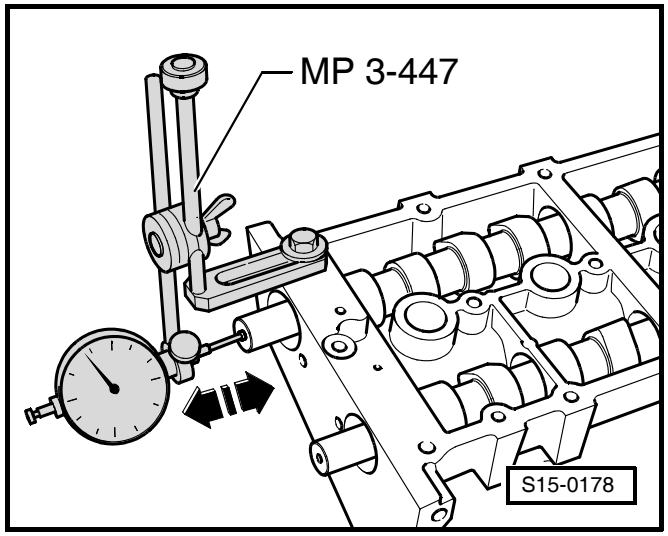
Note

The two locking pins are correctly inserted if the end parts -D- are flush with line -A-.

– Slide the support -B- up to the stop on the inlet camshaft timing gear -C-.

– If both camshaft sprockets are locked in the fit holes, it is possible to slacken or screw on the camshaft sprockets.

Fig. 2: Checking the axial play of the camshafts



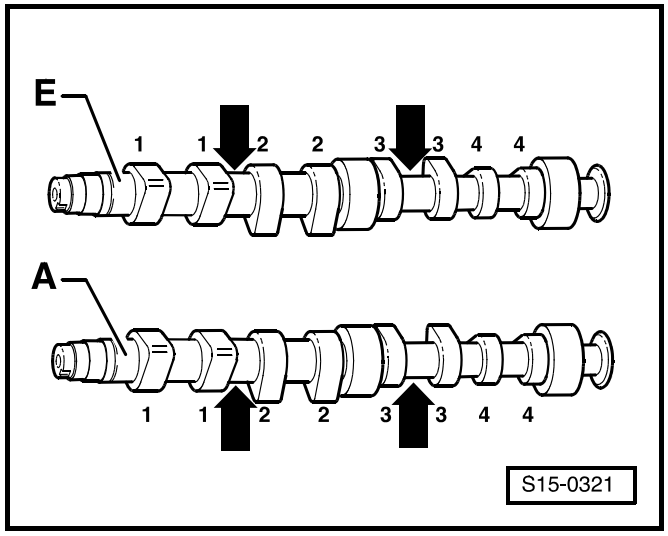
Special tools, test and measuring equipment and auxiliary items required

- Universal dial gauge holder -MP 3-447-
- Dial gauge

Carry out measurement with the cylinder head cover removed and the end covers installed ⇒ item 7 in **15-2** page 1 and ⇒ item 11 in **15-2** page 1.

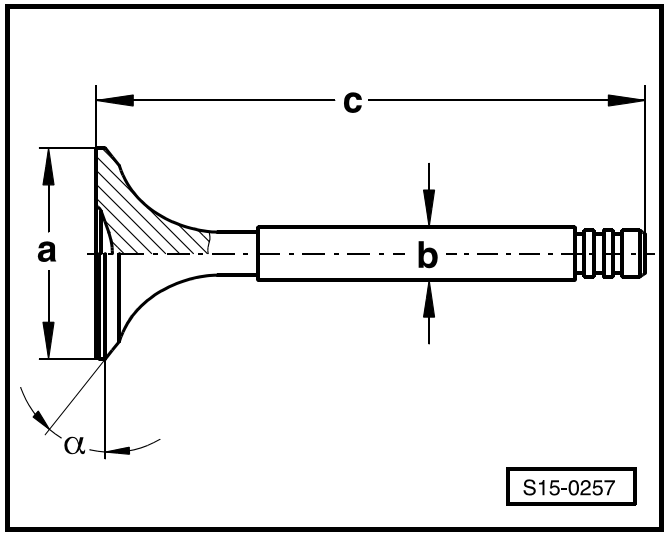
Wear limit: max. 0.15 mm.

Fig. 3: Camshaft identification



Engine identification characters	AUA, BBY, BKY	AUB, BBZ
Identification between cams	**Cylinder 1 and 2**	**Cylinder 1 and 2**
Inlet shaft -E-	„036DG“	„036DH“
Outlet shaft -A-	„036DE“	„036AG“

Fig. 4: Valve dimensions

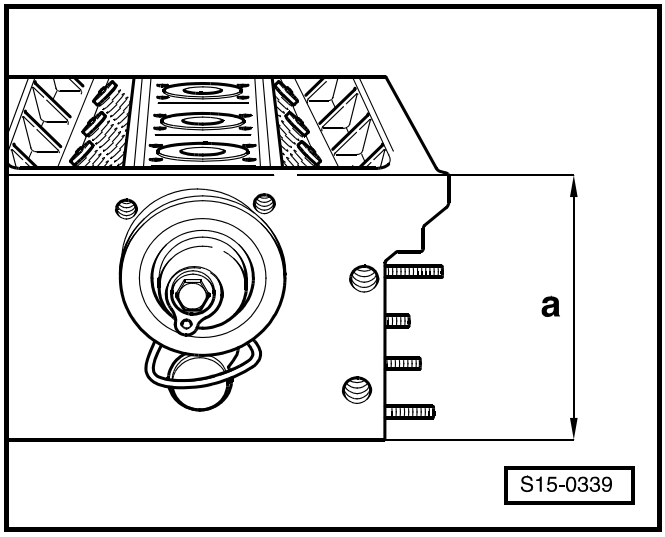


Note

Valves must not be reworked. Only grinding in with grinding paste in the valve seat is permissible.

Dimension		Inlet valve	Exhaust valve
∅ a	mm	29,5	26,0
∅ b	mm	5,973	5,953
c	mm	100,9	100,5
α	∠°	45	45

Fig. 5: Reworking lower cylinder head sealing surface



Permissible reworking dimension of cylinder head: a = at least 108.25 mm.

Reworking valve seats

Special tools, test and measuring equipment and auxiliary items required

- Depth gauge
- NAC milling cutter for reworking valve seats

Note

- *When carrying out repairs on engines with leaking valves, it is not sufficient to machine or replace the valve seats and valves. It is also necessary to inspect the valve guides for wear, particularly on engines with a high mileage ⇒ **15-2** page 7.*
- *Rework valve seats only sufficiently in order to obtain a proper contact pattern. Calculate the maximum permissible reworking dimension before commencing. If the reworking dimension is exceeded, the proper operation of the hydraulic valve clearance compensation is no longer ensured. If this is the case replace the cylinder head.*

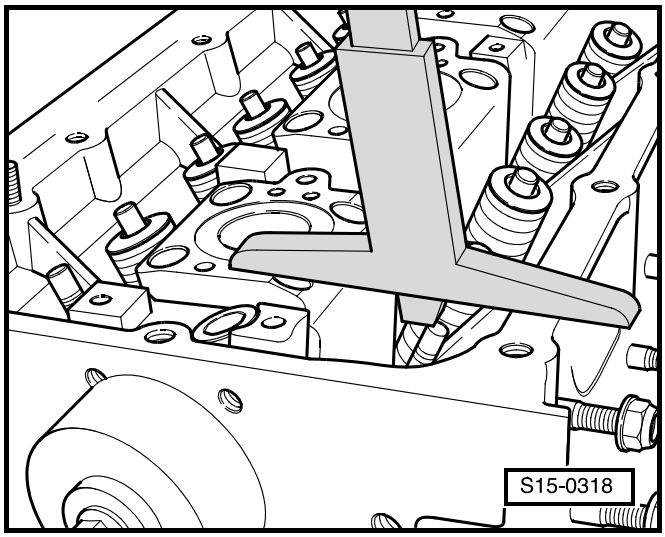
Calculating maximum permissible reworking dimension

– Insert valve into the guide and press firmly against the valve seat.

Note

If the valve is replaced when carrying out repair work, use a new valve for the measurement.

– Measure distance between the valve stem end and the upper face of the cylinder head.



– Calculate max. permissible reworking dimension from the distance measured and the minimum dimension.

Minimum dimension: Inlet valve	7.6 mm
Minimum dimension: Exhaust valve	7.6 mm

„Measured distance“ - „minimum dimension“ = „max. permissible reworking dimension“.

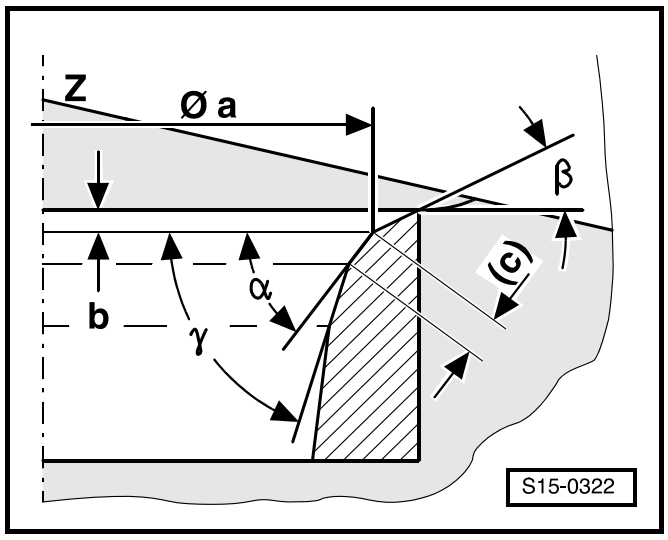
Example:

Measured distance	8.0 mm
- Minimum dimension	7.6 mm
= max. permissible reworking dimension [1)]	0.4 mm

[1] The max. permissible reworking dimension is shown in the figures for reworking the valve seats as dimension „b“.

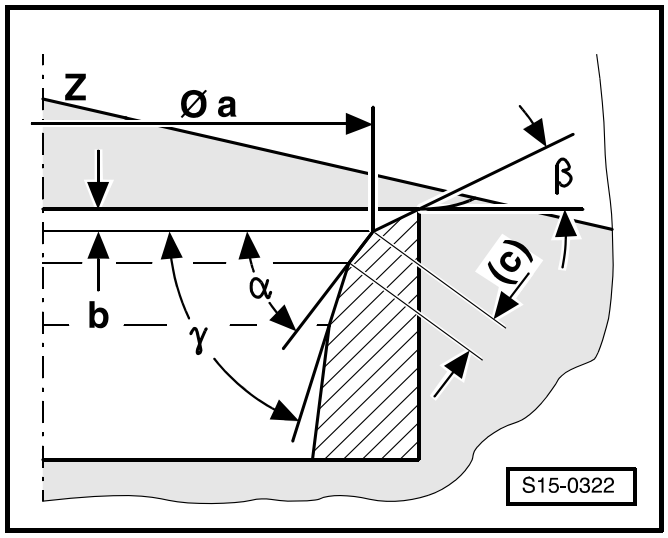
Reworking valve seats

Reworking inlet valve seat



a = ∅ 28.7 mm
b = max. permissible reworking dimension
c = 1,5 … 1.8 mm
Z = Bottom edge of cylinder head
α = 45° valve seat angle
β = 30° top correction angle
γ = 60° bottom correction angle

Reworking exhaust valve seat



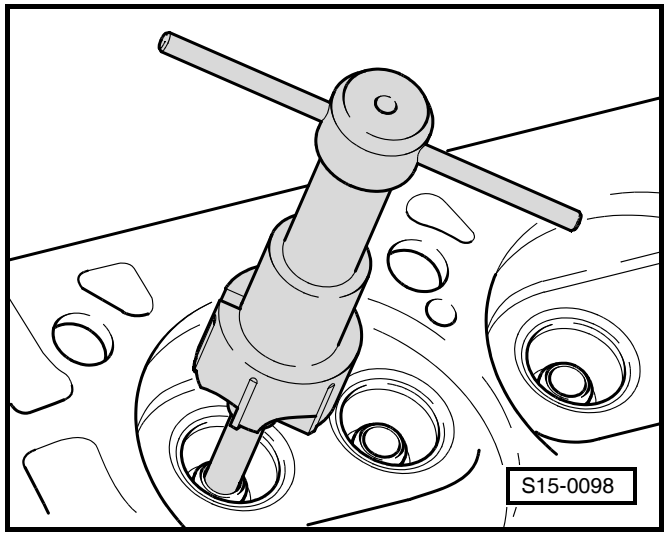
a = ∅ 25.0 mm
b = max. permissible reworking dimension
c = approx. 1.8 mm
Z = Bottom edge of cylinder head
α = 45° valve seat angle
β = 30° top correction angle
γ = 60° bottom correction angle

Procedure

Reworking can be carried out by hand while complying with the following conditions:

- Wear limit of valve guides must not exceed the permissible dimension ⇒ **15-2** page 4.
- Use NAC milling cutter with carbide metal tips (min. 90 HRC).
- Mill with the milling cutter using slight pressure in such a way that an even removal of swarfs is ensured over the whole working surface.

Reworking valve seats with NAC milling cutter

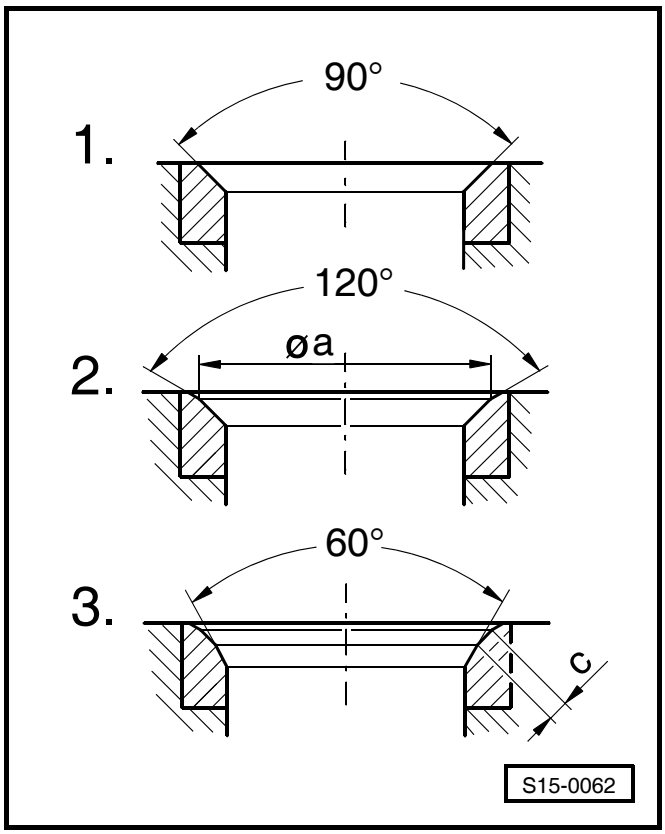


– Place cylinder head on a felt base and secure to prevent it from turning.
– Match diameter of guide drift to diameter of valve guide.

Valve guide	∅ Guide drift in mm
Inlet valve	6,0 $^{-0,01}$
Exhaust valve	

– Match diameter of milling cutter to diameter of valve seat.

Valve seat	∅ Milling cutter 90° mm	∅ Milling cutter 120° mm	∅ Milling cutter 60° mm
Inlet valve	32	32	21/34
Exhaust valve	30	30	21/34

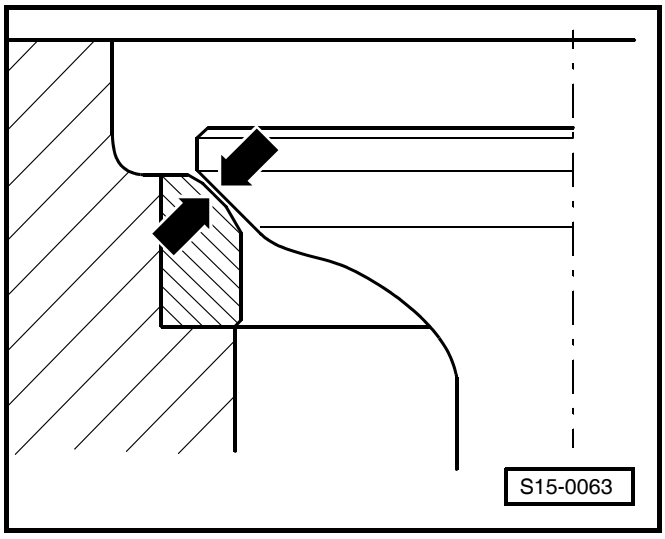


Milling sequence

1 - Machine valve seat with 90° milling tool until until a perfect contact pattern is achieved. (Do not exceed maximum permissible reworking dimension!)

2 - Chamfer top correction angle with 120° milling cutter until the valve seat diameter -a- (⇒ **15-2** page 5) is achieved.

3 - Mill bottom correction angle with 60° milling cutter until valve seat width -c- (⇒ **15-2** page 5) is achieved.



– Grind in valve/valve seat -arrows- with fine grinding paste so as to achieve a perfect contact pattern.

– Check contact pattern e.g. with water colour (perfect contact pattern over entire circumference).

– Install valve springs.

– Check valves for tightness.

The tightness of the valves can be checked by filling petrol into the inlet and outlet canal (no petrol must flow out at the valve seat)

After completing the repair measure once again the distances between the valve stem ends and the upper face of the cylinder head and calculate the maximum permissible reworking dimension ⇒ **15-2** page 4.

Note

If the maximum permissible reworking dimension is exceeded, proper operation of the valve gear is no longer assured and the cylinder head must be replaced.

Replacing camshaft gasket rings

Special tools, test and measuring equipment and auxiliary items required

- Supporting device -MP 9-200-
- Pressure pad -T 30004- with replaceable stud -T 30004/1-
- Inserting device -T 10015-
- Camshaft lock -T 10016-
- Gasket ring extractor -T 10018-

Removing

– Removing the two toothed belts ⇒ Chapter 13-1.

– Turn crankshaft slightly back.

Note

Camshaft sprockets must be interlocked with -T 10016- in the fit holes in the cylinder head cover.

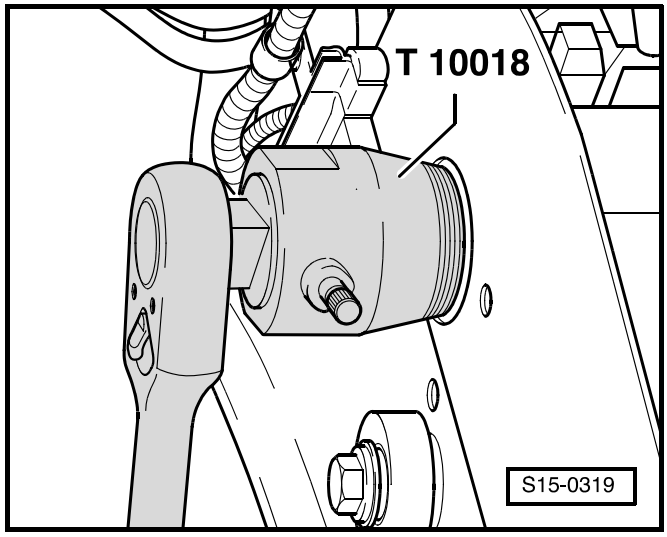
– Remove camshaft sprockets. To release the screws hold the camshaft sprockets with -T 10016-.

– Unscrew inner part of the gasket ring extractor -T 10018- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.

– Oil the theaded head of the gasket ring extractor.

– Forcefully screw in gasket ring extractor -T 10018- as far as possible in the gasket ring. ►

– Release knurled screw and turn the inner side against the crankshaft until the gasket ring is pulled out.



Installing

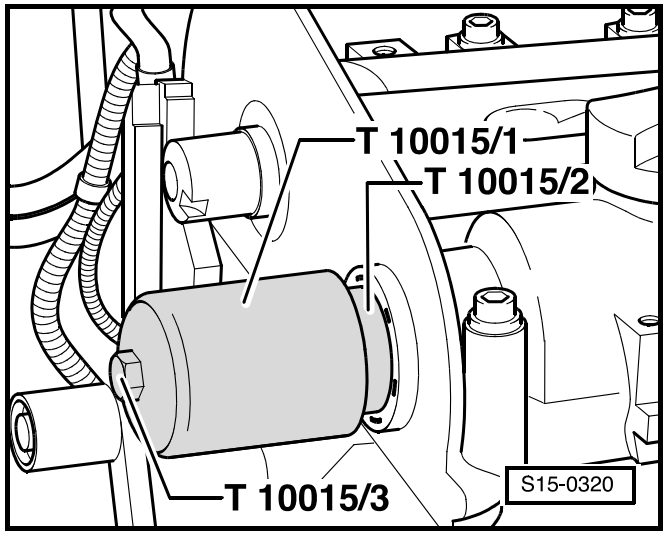
– Lightly oil the sealing lip of the gasket ring.

– Place the guide bushing -T 10015/2- on the camshaft stub. ►

– Slide gasket ring over the guide bushing.

– Press in the gasket ring with pressure bushing -T 10015/1- and screw -T 10015/3- up to the stop.

– Install camshaft sprockets.



Note

Pay attention to the position of the camshaft sprockets relatively to the cotter nuts in the camshafts.

– Hold the camshaft sprockets with camshaft lock -T 10016-.

– Tighten new screws to 20 Nm and torque a further $^1/_4$ turn (90 °).

Installing the two toothed belts ⇒ Chapter 13-1.

Further installation occurs in a similar way in reverse order to removal.

Inspect valve guides

Special tools, test and measuring equipment and auxiliary items required

- Universal dial gauge holder -MP 3-447-
- Dial gauge

Note

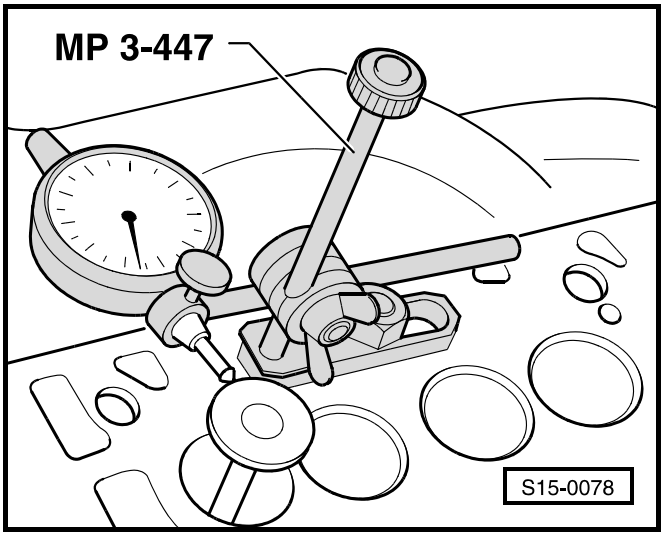
If the valve is replaced when carrying out repair work, use a new valve for the measurement.

Procedure

– Insert valve into guide. End of valve stem must be flush with guide. Because of the different stem diameters only use inlet valve in inlet guide or outlet valve in outlet guide.

– Determine valve rock.

Wear limit: 0.8 mm.



Note

If the wear limit is exceeded, repeat measurement with new valves.

If the valve rock is exceeded:

– Replace the cylinder head.

Replacing valve stem seals

With cylinder head installed:

Special tools, test and measuring equipment and auxiliary items required

- Supporting device -MP 9-200-
- Spark plug wrench, e.g. -3122B-
- Assembly device -MP 1-229- with pressure plate -MP 1-229/1-
- Extractor -MP 1-230-
- Insertion tool -MP 1-233-
- Pressure pad -T 30004- with replaceable stud -T 30004/1-
- Pressure hose -MP 1-210-

Note

With cylinder head removed, place cylinder head onto the valve supporting plate -MP 1-218-.

Removing

– Remove the V-ribbed belt ⇒ Chapter 13-1.

– Removing the main drive - toothed belt ⇒ Chapter 13-1.

– Remove cylinder head cover ⇒ Chapter 15-1.

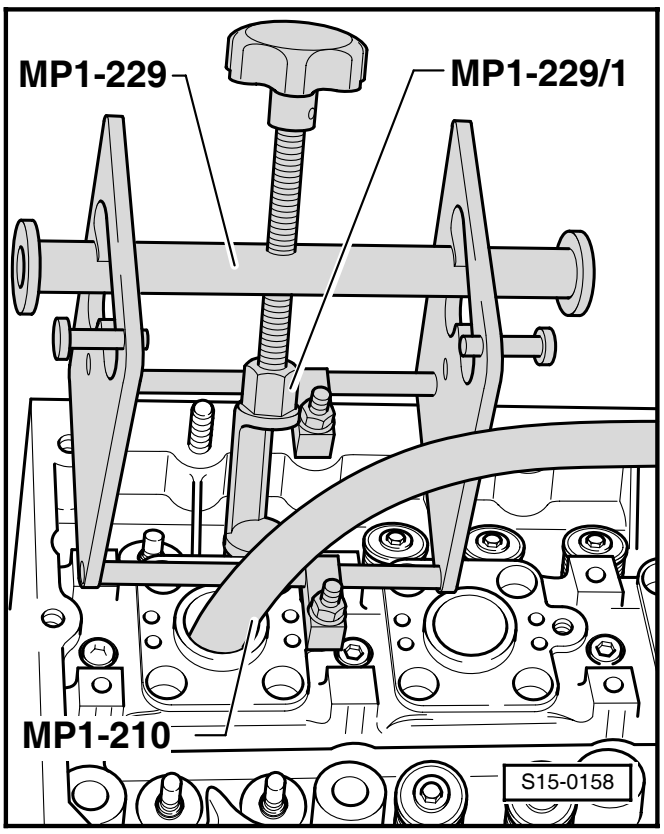
– Remove roller rocker arm and place on a clean surface. Make sure that you do not mix up the roller rocker arms.

– Unscrew the spark plugs with spark plug wrench -3122B-.

– Position piston of the relevant cylinder in bottom dead centre.

– Screw on Assembly device -MP 1-229- with pressure plate -MP 1-229/1-.

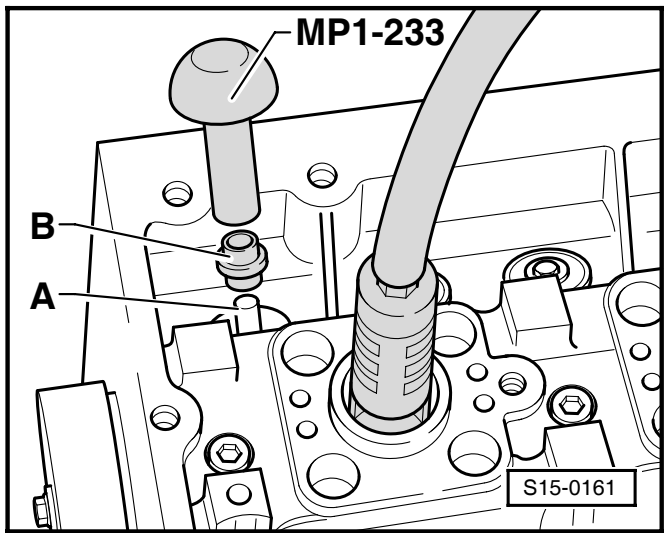
– Screw the pressure hose -MP 1-210- in the spark plug thread.



– Connect pressure hose to compressed air (min. 6 bar overpressure (0.6 MPa)) and remove the valve springs with -MP 1-229-.
– Pull off valve stem seals with extractor -MP 1-230-.

Installing

– Insert the supplied plastic bushings on the relevant valve stem. This will prevent any damage to the new valve stem seal.
– Insert the new valve stem seal -B- in the insertion tool -MP 1-233-. ►
– Oil the sealing lip of the valve stem seal and carefully slide onto the valve guide -A-.



Further installation occurs in a similar way in reverse order to removal.

– Install cylinder head cover ⇒ Chapter 15-1
– Installing the toothed belt and setting the timing ⇒ Chapter 13-1.

17 – Lubrication

17-1 Removing and installing parts of the lubrication system

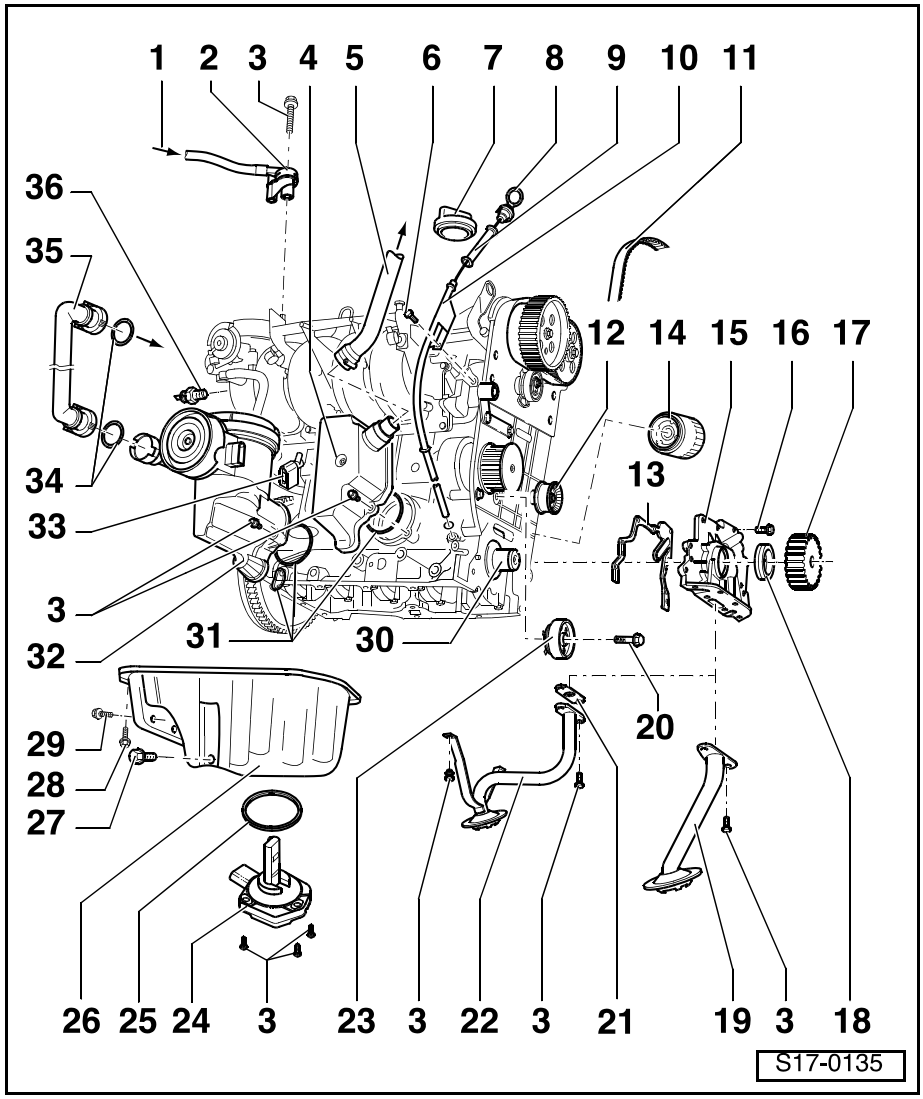
Note

The engine oil level must never exceed the max. marking - risk of damage to catalytic converter! ⇒ Inspection and Maintenance.

Inspecting oil pressure ⇒ **17-1** page 6.

Oil level and oil specification ⇒ Inspection and Maintenance.

Lubrication system - Overview of components



- **1 - From air filter**
- **2 - Non-return valve**
  - ❑ only engines with the engine codes BBY, BBZ, BKY
- **3 - 10 Nm**
- **4 - Oil separator**
  - ❑ Design for engines with the engine codes AUA, AUB
- **5 - To air filter**
  - ❑ for engines with the engine codes AUA, AUB
- **6 - 10 Nm**
- **7 - Cap**
  - ❑ Replace seal if damaged
- **8 - Dipstick**
  - ❑ oil level must not exceed max. marking
  - ❑ Inspect oil level ⇒ Inspection and Maintenance
- **9 - Filler funnel**
- **10 - Guide tube**
- **11 - Main drive-toothed belt**
  - ❑ before removing mark running direction
  - ❑ check for wear
  - ❑ do not kink
  - ❑ removing and installing, tensioning ⇒ Chapter 13-1
- **12 - Guide pulley**
- **13 - Gasket**
  - ❑ replace
  - ❑ must be positioned on dowel sleeves
- **14 - Oil filter**
  - ❑ slacken at hexagon
  - ❑ tighten by hand

- ❑ pay attention to installation instructions on oil filter

15 - Oil pump
- ❑ with pressure relief valve, open for an overpressure of 0.45 MPa (4.5 bar)
- ❑ must be replaced completely
- ❑ when fitting pay attention to the driver on the crankshaft ⇒ item 30
- ❑ must be positioned on dowel sleeves
- ❑ removing and installing ⇒ **17-1** page 4

16 - 12 Nm
- ❑ replace

17 - Crankshaft toothed belt sprocket
- ❑ pay attention to locating element when installing

18 - Gasket ring
- ❑ replacing ⇒ Chapter 13-1

19 - Suction line
- ❑ out of plastic
- ❑ as of 06.04 for vehicles with a manual gearbox
- ❑ Clean strainer if dirty

20 - 20 Nm

21 - Gasket
- ❑ replace

22 - Suction line
- ❑ out of metal
- ❑ as of 06.04 only for vehicles with an automatic gearbox
- ❑ Clean strainer if dirty

23 - Tensioning pulley
- ❑ for main drive-toothed belt
- ❑ Tension the toothed belt ⇒ Chapter 13-1

24 - Oil level/temperature sender -G266-
- ❑ only for vehicles with extended service intervals (WIV)
- ❑ check ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

25 - Gasket
- ❑ replace

26 - Oil pan
- ❑ removing and installing ⇒ **17-1** page 3
- ❑ clean sealing surface before installing
- ❑ install with silicone sealant -D 176 404 A2-

27 - Oil drain plug, 30 Nm
- ❑ replace

28 - Fixing screw
- ❑ Metal oil pan: 15 Nm
- ❑ Aluminium oil pan: 13 Nm - replace screws
- ❑ slacken and tighten only the bolts at the flywheel side with wrench bit -T10058- or -3249-.

29 - 45 Nm

30 - Driver
- ❑ coat with oil before installing the oil pump

31 - Gasket ring
- ❑ replace

32 - Oil separator
- ❑ with heated vacuum regulating valve (PCV valve)
- ❑ Resistance of heating element at 25°C: 2,5 - 5,9 Ω
- ❑ Design for engines with the engine codes BBY, BKY and BBZ

33 - Connector
- ❑ for heating resistor of crankcase ventilation -N79-

- ❑ only for engines with the engine codes BBY, BKY and BBZ

34 - O-ring

- ❑ replace if damaged

35 - To induction pipe

- ❑ only for engines with the engine codes BBY, BKY and BBZ

36 - Oil pressure switch 0.03...0.07 MPa (0.3...0.7 bar) -F1-, 25 Nm

- ❑ Identification: green
- ❑ check ⇒ **17-1** page 6
- ❑ Cut open gasket ring if leaking and replace

Removing and installing oil pan

Special tools, test and measuring equipment and auxiliary items required

- Wrench e.g. -T 10058- or -3249-
- Gasket remover Gasket Stripper (storage code GST, storage article no. R 34402), manufacturer Retech s.r.o.
- Cleaning agent and grease remover e.g. -D 000 401 04-
- Torque wrench
- Silicone sealant -D 176 404 A2-

Removing

– Remove the noise insulation.

– Drain engine oil.

– Remove front exhaust pipe from exhaust manifold.

– Release two fixing screws from the gearbox flange and the oil pan.

– Unplug connector of oil level/temperature sender -G266-.

– Unscrew the oil pan with silicone seal.

– Remove oil pan. If necessary release the oil pan by gently tapping it with a rubber hammer.

WARNING!

Wear protective gloves when working with sealant and grease remover!

– Clean sealing surface on cylinder block and on the oil pan from gasket residues with chemical sealant remover.

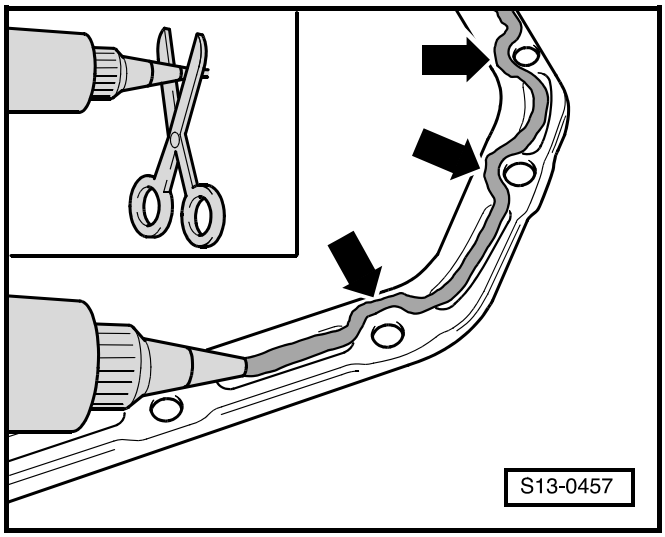
– Degrease the sealing surfaces.

Installing

Note

- *Pay attention to the 'use by date' on sealant.*
- *The oil pan must be installed within 5 minutes after applying the silicone sealant.*
- *The oil pan can be better and more securely installed if M6 threaded pins are inserted as guides in two locations on the cylinder block flange.*

– Cut off nozzle tube at the front marking (∅ nozzle approx. 3 mm).



– Apply silicone sealant to the clean sealing surface of the oil pan, as shown in the illustration. Sealant bead must:

- be 2...3 mm thick
- run past the area around the bolt holes on the inside -arrows-

Note

The sealant bead must not be thicker otherwise excess sealant may get into the oil pan and clogg the strainer in the oil suction pipe.

– Fit oil pan immediately and lightly tighten all oil pan screws.

– Tighten the oil pan screws to tightening torque:

- Metal oil pan: 15 Nm
- Aluminium oil pan: 13 Nm - replace screws

– Tighten up the bolts on the oil pan/gearbox to a torque of 45 Nm.

Note

After installing the oil pan, allow the sealant to dry for about 30 minutes. Only then may engine oil be filled in.

Removing and installing oil pump

Special tools, test and measuring equipment and auxiliary items required

- Bushing -T 10022-
- Gasket remover Gasket Stripper (storage code GST, storage article no. R 34402), manufacturer Retech s.r.o.
- Cleaning agent and grease remover e.g. -D 000 401 04-
- Inserting device -MP 1-207-

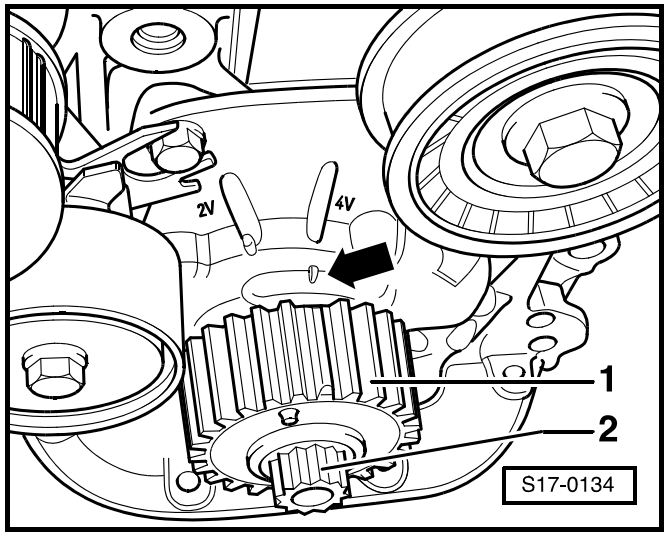
Removing

– Removing the main drive - toothed belt ⇒ Chapter 13-1.

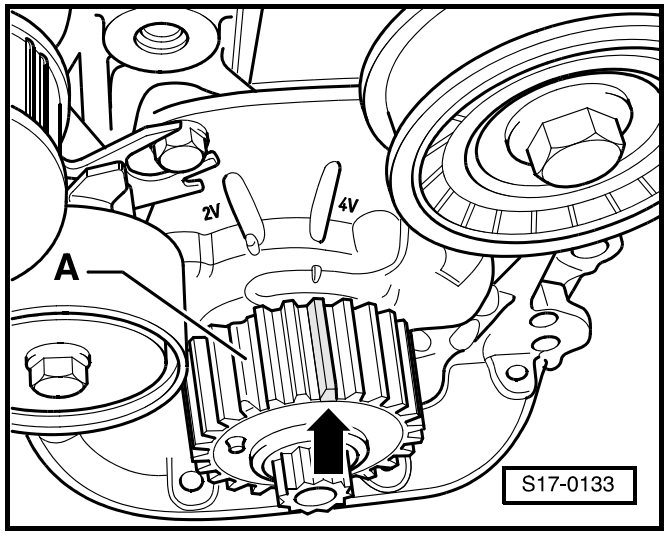
– Secure toothed belt gear -1- to the crankshaft with fixing screw -2-.
– Position crankshaft on TDC cylinder 1:

The chamfered tooth of the toothed belt must correspond with the marking on the oil pump -arrow-.

– Turn the crankshaft or if necessary toothed belt gear from TDC three teeth anti-clockwise:



The third tooth to the right -arrow- of the chamfered tooth -A- of the toothed belt gear must be flush with the TDC marking on the oil pump housing.



Note

Turning will give the crankshaft the fitting position for the oil pump. One of the four driver polygonal cams on the crankshaft points upwards.

– Remove main drive tensioning pulley.
– Removing the oil pan ⇒ **17-1** page 3.
– Removing the suction line ⇒ **17-1** page 1.
– Remove crankshaft toothed belt sprocket.
– Remove oil pump.
– Remove gasket ring.

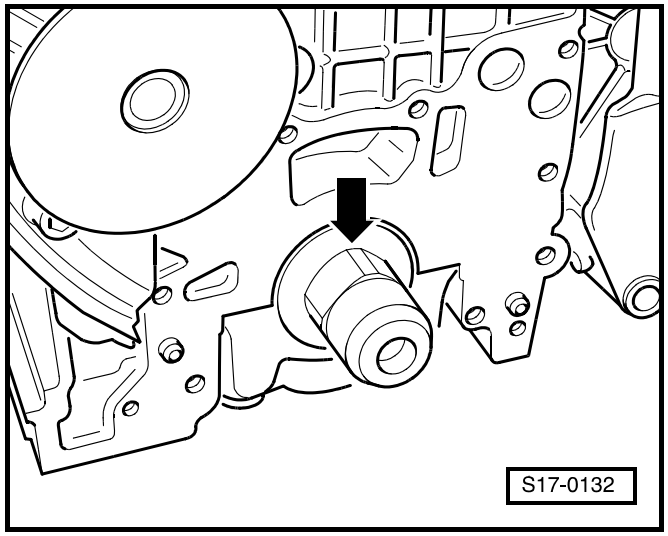
WARNING!

Wear protective gloves when working with sealant and grease remover!

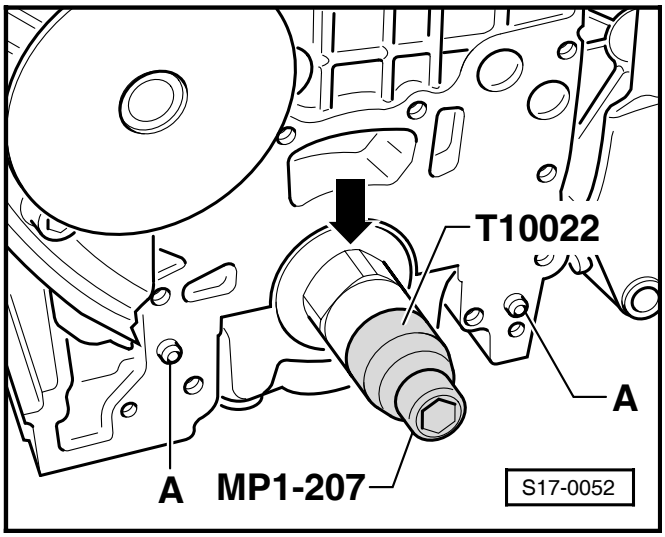
– Clean sealing surface on cylinder block and on the oil pump from sealant residues with chemical gasket remover.
– Degrease the sealing surfaces.

Installing

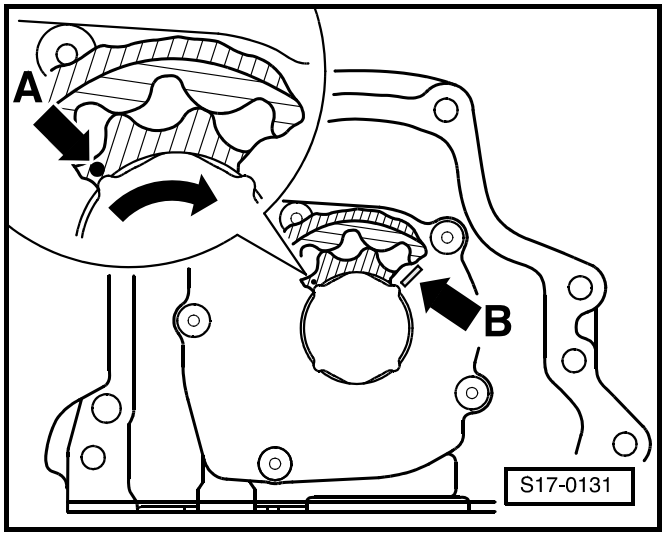
- One of the four driver polygonal cams -arrow- on the crankshaft points upwards.



– Position the bushing -T 10022- on the crankshaft and tighten the Allan screw of the inserting device -MP 1-207- by hand.
– Insert new seal on the dowel sleeves -A-.



– Place the marking -arrow A- of the inside rotor of the oil pump to the fitting position -arrow B- of the oil pump housing cover.
– Coat the polygonal cam of the crankshaft with oil.
– Lightly oil the gasket ring of the oil pump.
– Carefully push the oil pump onto the polygonal cam of the crankshaft.
– If necessary align the pump rotor with the polygonal cam of the crankshaft by turning slightly.
– Subsequently, carefully slide the oil pump over the dowel sleeves.
– Tighten the oil pump with new screws. Tightening torque: 12 Nm.
– Bushing -T 10022-.
– Installing the suction line ⇒ **17-1** page 1.
– Installing the oil pan ⇒ **17-1** page 3.
– Installing the main drive - tensioning pulley, installing and tensioning the toothed belt ⇒ Chapter 13-1.



Testing oil pressure and oil pressure switch

Special tools, test and measuring equipment and auxiliary items required

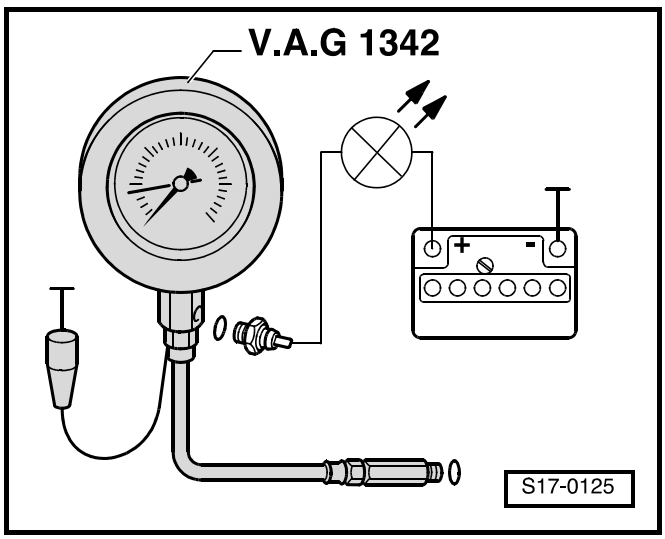
- Oil pressure tester, e. g. -V.A.G 1342-
- Diode test lamp, e.g. -V.A.G 1527-
- Measuring tool set, e.g. -V.A.G 1594 C-

Note

Functional test and repair of the visual and acoustic oil pressure display ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

Test sequence

– Remove oil pressure switch and screw into tester.



– Screw tester in the cylinder head instead of the oil pressure switch.
– Connect brown cable of tester to earth (-).
– Connect diode test lamp to battery positive and to oil pressure switch.
– Start engine and slowly increase engine speed. Given an oil pressure of 0.3…0.7 bar (0.03…0.07 MPa) the LED must light up, otherwise replace the oil pressure switch.
– Increase engine speed further. At 2000 rpm and an oil temperature of 80 °C the oil pressure should be at least 2 bar (0.2 MPa).

At a higher engine speed the oil pressure must not be greater than 7 bar (0.7 MPa).

19 – Cooling

19-1 Parts of the Cooling System

Note

- *When the engine is warm the cooling system is under pressure. Before repairs, if necessary reduce pressure by opening the cap on the coolant expansion reservoir.*
- *The hose connections are secured with spring-type clips. In the event of repairs only use spring-type clips.*
- *After replacing the cylinder head, replace all the coolant.*
- *The arrows affixed to the coolant pipes and the coolant hoses must stand opposite to each other.*

Parts of the cooling system fitted to body

1 - Radiator
- ❑ removing and installing ⇒ **19-1** page 6
- ❑ after replacing fill entire system with fresh coolant

2 - O-ring
- ❑ replace

3 - Top coolant hose
- ❑ secure to radiator with retaining clip
- ❑ connection diagram for coolant hoses ⇒ **19-1** page 5

4 - Fan shroud

5 - 10 Nm

6 - Auxiliary fan
- ❑ only on vehicles with air conditioning

7 - Fan holder

8 - Clip
- ❑ check tightness

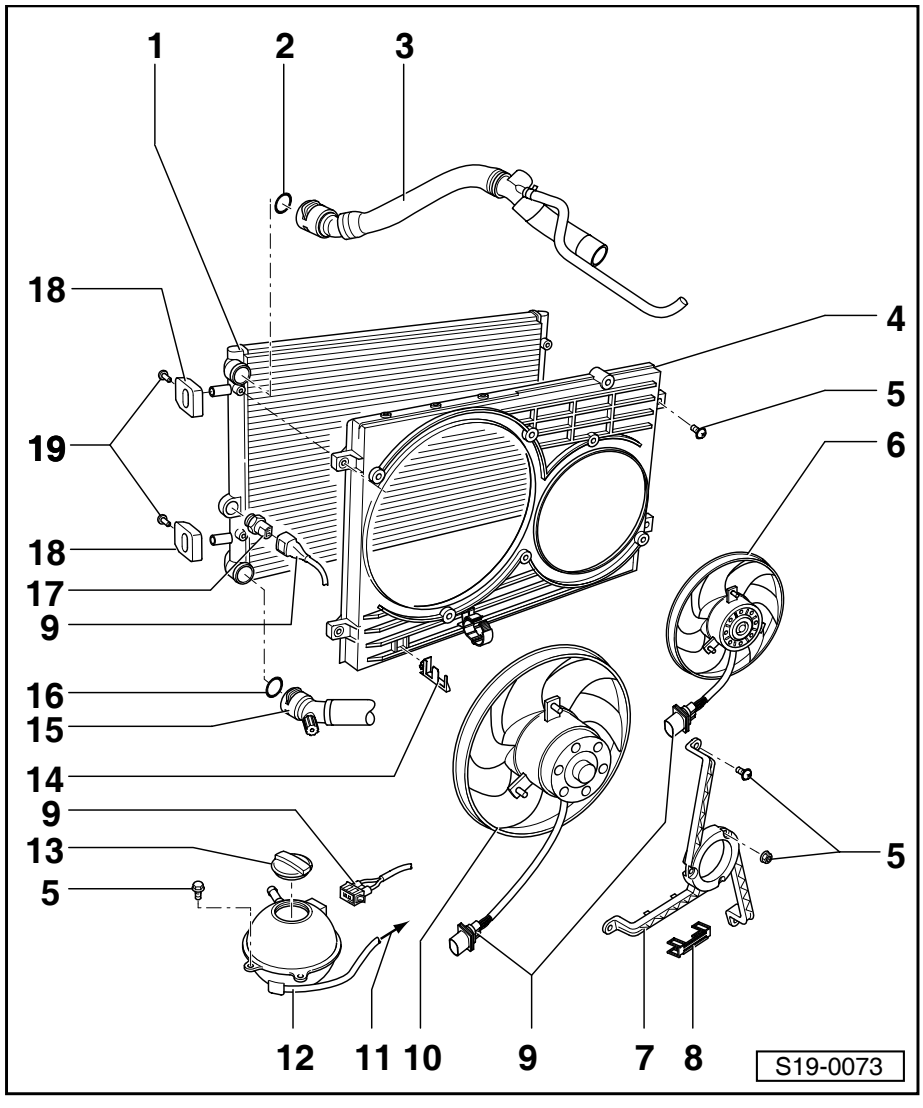
9 - Connector

10 - Fan for radiator

11 - To the coolant regulator housing
- ❑ ⇒ item 7 in **19-1** page 3
- ❑ connection diagram for coolant hoses ⇒ **19-1** page 5

12 - Expansion reservoir
- ❑ Inspect cooling system with coolant system tester, e.g. -V.A.G 1274- and adapter -V.A.G 1274/8- for leaks.

13 - Cap



- ❑ Inspect pressure relief valve with coolant system tester, e.g. -V.A.G 1274- and adapter -V.A.G 1274/9- for leaks.
- ❑ Test pressure 0.14 ... 0.16 MPa (1.4 ...1.6 bar)

14 - Bracket

- ❑ for connector

15 - Bottom coolant hose

- ❑ with drain valve at radiator
- ❑ secure to radiator with retaining clip
- ❑ connection diagram for coolant hoses ⇒ **19-1** page 5

16 - O-ring

- ❑ replace

17 - Thermo-switch -F18-, 35 Nm

- ❑ for electric fan
- ❑ switching temperatures:

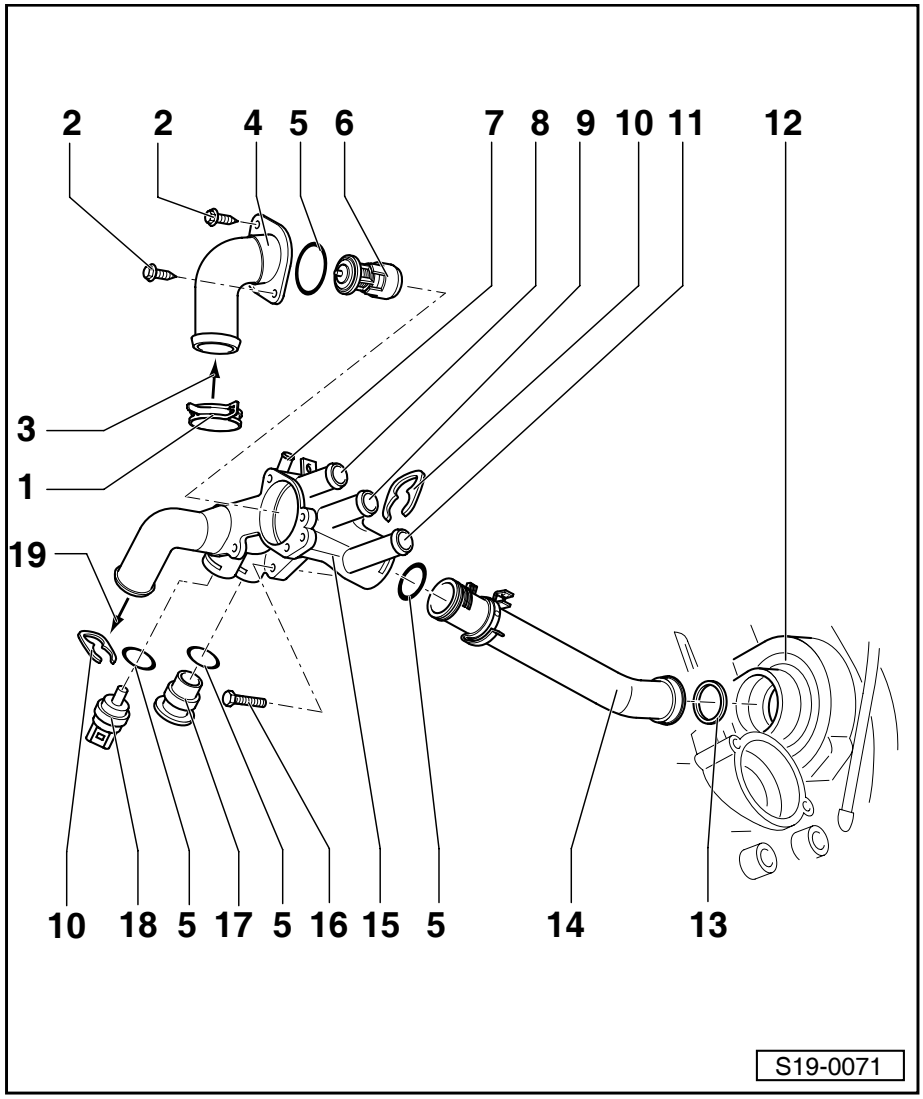
1. Stage on: 92…97 °C
1. stage off: 84…91 °C
2. Stage on: 99…105 °C
2. stage off: 91…98 °C

18 - Bracket

- ❑ for radiator
- ❑ Check fitting position
- ❑ pay attention to the various different versions

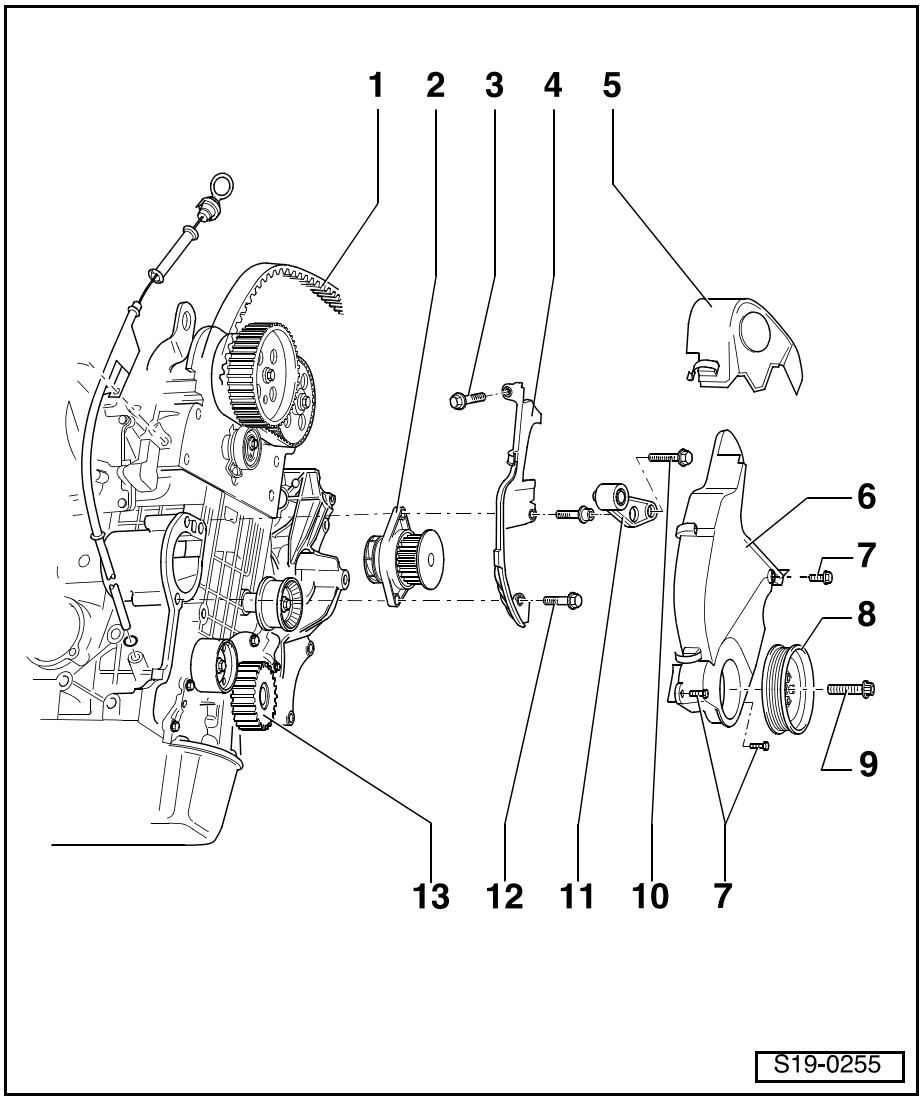
19 - 10 Nm

Coolant regulator - Summary of components



- **1 - Spring strap clip**
- **2 - Self-tapping screw, 9 Nm**
- **3 - from bottom of radiator**
  - ❑ ⇒ item 15 in **19-1** page 2
- **4 - Connection fittings**
- **5 - O-ring**
  - ❑ replace
- **6 - Coolant regulator**
  - ❑ Inspect proper operation: Heat thermostat in water bath, the thermocouple pin must move out
  - ❑ Temperature test: Opening start (approx. 84 °C) and end (approx. 98 °C)
- **7 - To the compensation bottle above**
  - ❑ connection diagram for coolant hoses ⇒ **19-1** page 5
- **8 - To heat exchanger**
  - ❑ connection diagram for coolant hoses ⇒ **19-1** page 5
- **9 - From compensation bottle**
  - ❑ ⇒ item 11 in **19-1** page 1
- **10 - Retaining clip**
- **11 - From heat exchanger**
  - ❑ connection diagram for coolant hoses ⇒ **19-1** page 5
- **12 - Cooling pump housing at cylinder block**
- **13 - Gasket ring**
  - ❑ replace
- **14 - Coolant pipe**
  - ❑ to the coolant pump
  - ❑ connection diagram for coolant hoses ⇒ **19-1** page 5
- **15 - Coolant regulator housing**
- **16 - 10 Nm**
- **17 - Cap**
  - ❑ or connection for ATF radiator
- **18 - Sender for coolant temperature -G62-**
  - ❑ inspect ⇒ 1.4/55 ; 1.4/74 Engine - Fuel Injection; Rep. Gr. 24
- **19 - Towards top radiator**
  - ❑ ⇒ item 3 in **19-1** page 1

Coolant pump - Summary of components



1 - Main drive-toothed belt
- ❑ before removing mark running direction
- ❑ check for wear
- ❑ do not kink
- ❑ Toothed belt routing ⇒ Chapter 13-1
- ❑ removing and installing, tensioning ⇒ Chapter 13-1

2 - Coolant pump
- ❑ with integrated gasket - warning - it must not be removed from the pump
- ❑ replace completely if untight or damaged
- ❑ check smooth operation
- ❑ removing and installing ⇒ **19-1** page 7

3 - 10 Nm

4 - Rear timing belt guard

5 - Top toothed belt guard

6 - Bottom toothed belt guard

7 - 12 Nm
- ❑ replace

8 - V-ribbed belt pulley
- ❑ pay attention to locating element when installing
- ❑ removing and installing V-ribbed belt ⇒ Chapter 13-1

9 - 90 Nm + torque a further $^{1}/_{4}$ turn (90 °)
- ❑ replace
- ❑ tightening may occur in successive stages
- ❑ the turning angle can be measured with a commercially available angle measuring plate, e.g. -Hazet 6690-.

10 - 50 Nm

11 - Guide pulley

12 - 20 Nm

13 - Crankshaft toothed belt sprocket
- ❑ pay attention to locating element when installing

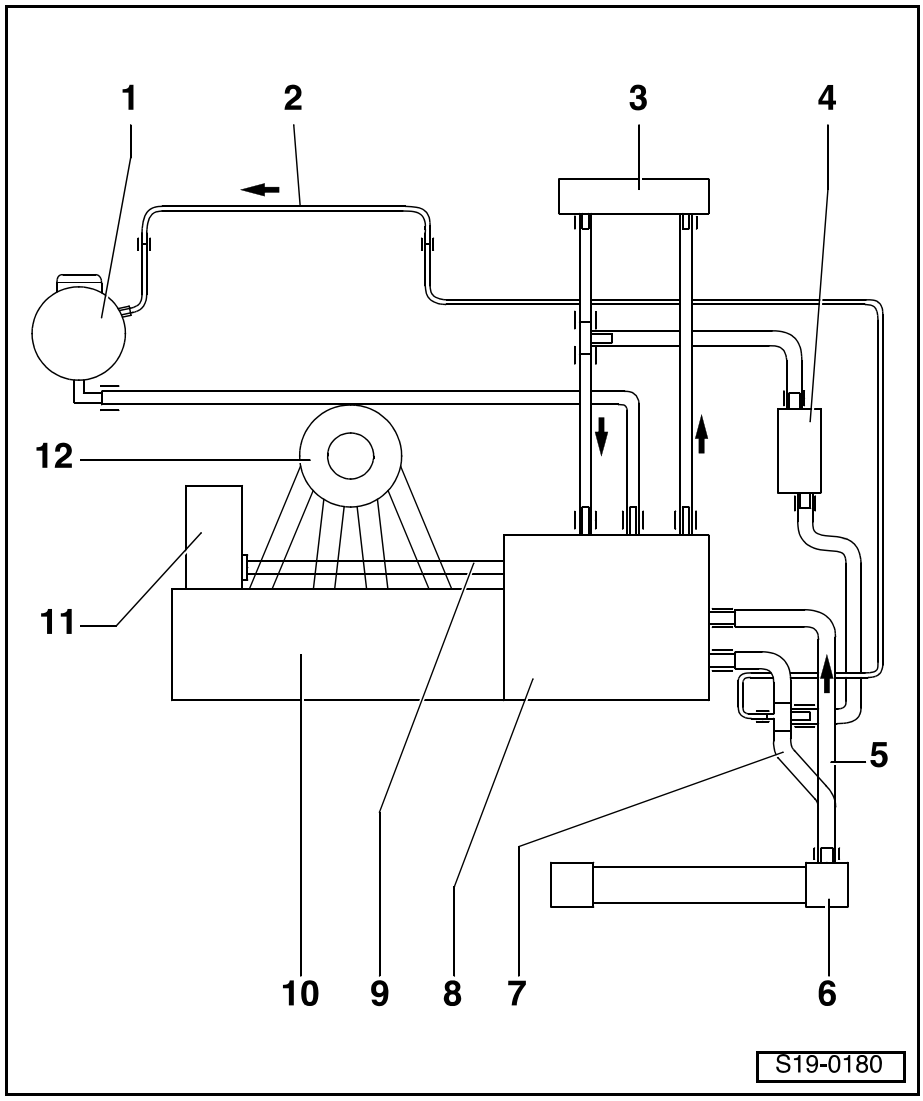
Connection diagram for coolant hoses

1 - Expansion reservoir
2 - Coolant pipe
- ❑ screwed onto the cylinder head cover

3 - Heat exchanger for heating
4 - ATF radiator
- ❑ only for vehicles with automatic gearbox

5 - Bottom coolant hose
6 - Radiator
7 - Top coolant hose
8 - Coolant regulator housing
9 - Coolant pipe
- ❑ to the coolant pump

10 - Cylinder block
11 - Coolant pump
12 - Intake manifold



Draining and filling up coolant

Special tools, test and measuring equipment and auxiliary items required

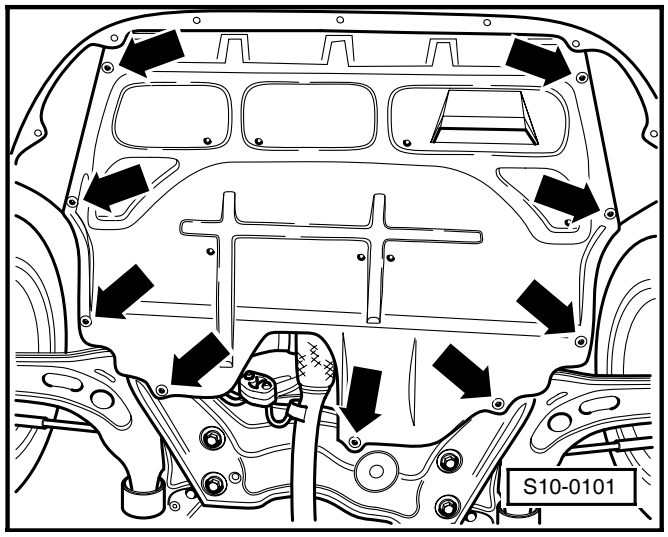
- Catch pan, e.g.-V.A.G 1306-
- antifreeze tester -T10007-

Draining

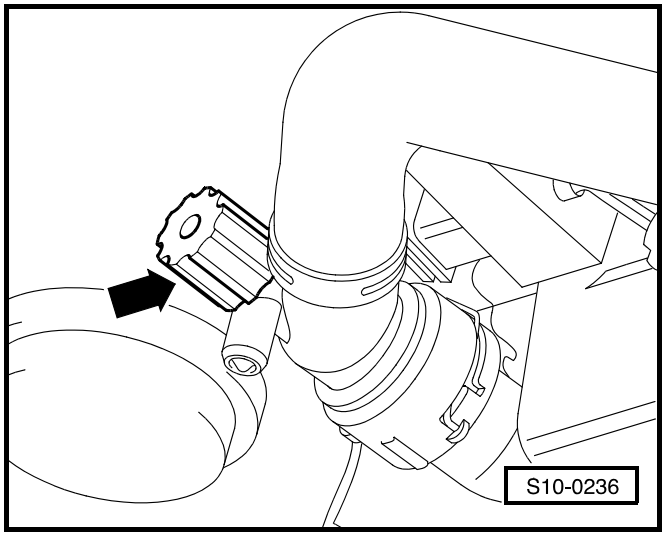
– Open the cap of the coolant expansion reservoir.
– Remove the noise insulation.
– Place a catch pan under the drain valve.

WARNING!

Hot steam may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.



– Open drain valve -arrow- at radiator.



Note

Observe the disposal instructions for coolant!

Filling up

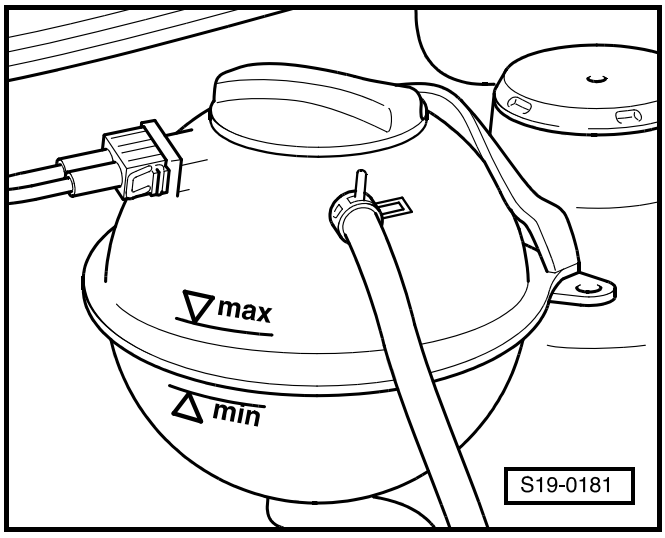
– Close drain plug on radiator.

– Install the noise insulation.

Select the appropriate coolant additive from the electronic original spare parts catalogue Škoda or from the list of allowed coolant additives ⇒ Inspection and Maintenance; Rep. Gr. 02.

– First of all prepare required quantity of coolant mixed to the correct ratio in a suitable vessel ⇒ Inspection and Maintenance; Rep. Gr. 02.

– Fill up coolant up to max. marking on the expansion reservoir.



– Seal expansion reservoir.

– Start the engine and increase the engine speed for about 3 minutes at about 2000 r.p.m. Run engine until fan starts.

WARNING!

Hot steam may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.

– Check the level of coolant and top up if necessary. When engine is at operating temperature the coolant level must be at the „max“ marking, when engine is cold between the „min“ and „max“ markings.

Removing and installing radiator

Special tools, test and measuring equipment and auxiliary items required

- Catch pan, e.g.-V.A.G 1306-
- Pliers for spring strap clips
- antifreeze tester -T10007-

Removing

– First check whether a radio set with anti-theft coding has been fitted. If this is the case obtain coding.

– Disconnect earth strap of the battery.

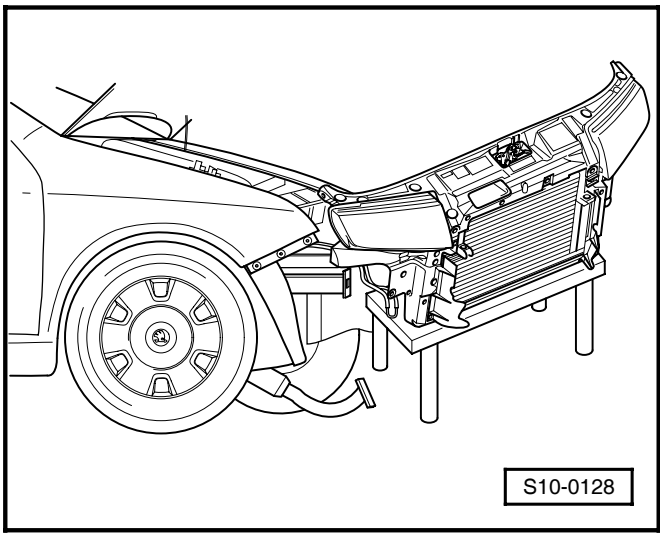
– Remove front bumper ⇒ Body Work; Rep. Gr. 63.

– Drain coolant ⇒ **19-1** page 5.

– Remove the coolant hoses from the radiator.

– Disconnect the connector plug from the radiator fan.

– Disconnect the connector plug from the thermo-switch -F18-.
– Remove lock carrier and lay aside ⇒ Body Work; Rep. Gr. 50.
– Release the fixing screws of the radiator and remove together with fan shroud and fan.
– Release the fixing screws and remove the fan shroud with the fan.



Vehicles with air conditioning:

– Observe supplementary instructions and assembly work ⇒ **19-1** page 7.

Installing

Installation is carried out in the reverse order. Pay attention to the following:

– Filling system with coolant ⇒ **19-1** page 5.

Supplementary instructions and assembly work on vehicles with air conditioning system:

WARNING!

Do not open the refrigerant circuit of the air conditioning system.

Note

In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.

Vehicles with air conditioning:

– Remove the V-ribbed belt ⇒ Chapter 13-1.
– Remove connector from the AC compressor.
– Remove AC compressor and tie to lock carrier.
– Remove retaining clips of the air conditioning hoses at the fan shroud.
– Unscrew the radiator from the air conditioning condenser and remove carefully.
– Observe the supplementary instructions and assembly work ⇒ Chapter 10-1.

Removing and installing coolant pump

Special tools, test and measuring equipment and auxiliary items required

- Catch pan, e.g.-V.A.G 1306-
- Pliers for spring strap clips
- antifreeze tester

Note

- *The integrated gasket of the coolant pump must not be removed from the pump.*
- *If leak and damage present, replace the coolant pump with gasket completely.*
- *Cover the toothed belt with a cloth before removing the coolant pump in oder to protect it from the coolant.*

Removing

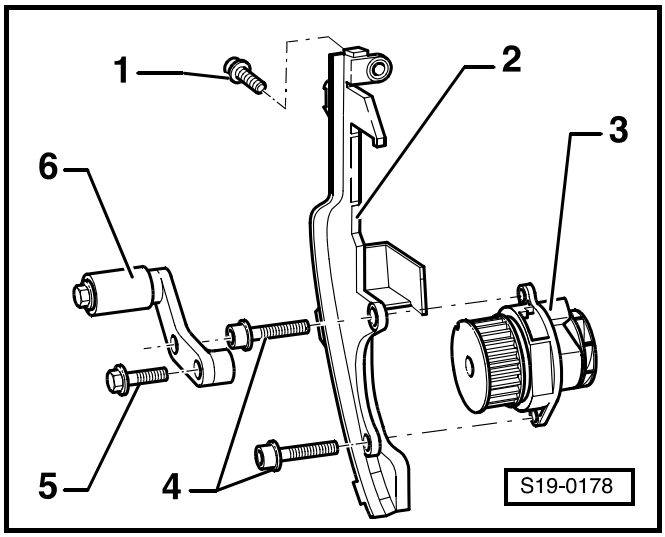
– Drain coolant ⇒ **19-1** page 5.

– Removing the main drive - toothed belt ⇒ Chapter 13-1.

– Remove guide pulley -6-; to this end release the fixing screw -5- of the guide pulley.

– Unscrew the fixing screw -1- of the toothed belt guard at rear.

– Unscrew the fixing screws -4- of the coolant pump and remove the toothed belt guard at rear -2- and the coolant pump -3-.



Installing

Installation is performed in the reverse order. Pay attention to the following points:

– Position the coolant pump -3- in the cylinder block and install fixing screws -4- together with rear toothed belt guard. Tightening torque: 20 Nm.

– Install guide pulley -6- and tighten the fixing screw -5-. Tightening torque: 50 Nm.

– Install fixing screw -1- of the toothed belt guard at rear -2-. Tightening torque: 10 Nm.

– Installing the timing belt, tightening ⇒ Chapter 13-1.

– Install the V-ribbed belt ⇒ Chapter 13-1.

– Filling system with coolant ⇒ **19-1** page 5.

20 – Fuel Supply

20-1 Removing and installing parts of the fuel supply system

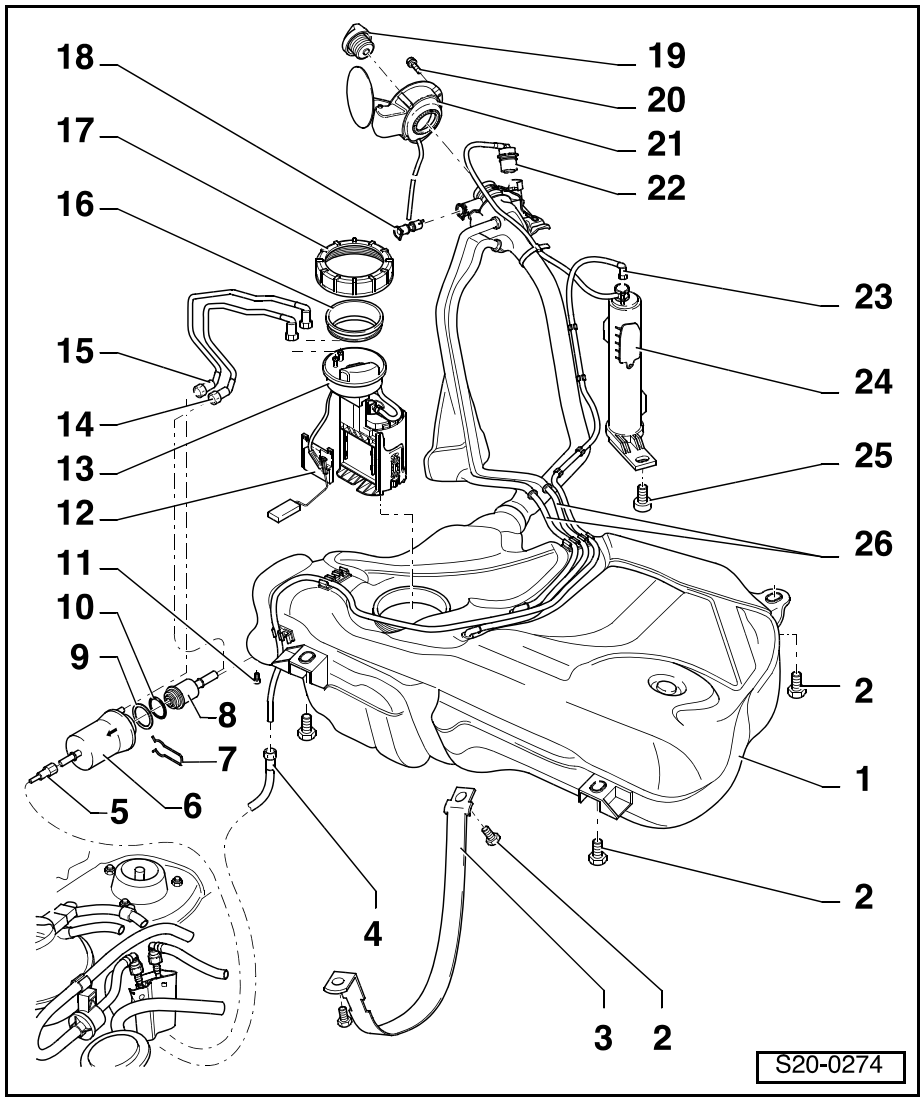
Note

- *The fuel supply system must be bled after removal of the fuel filter, fuel delivery unit and the fuel rail .*
- *The hose connections are secured with quick strap clamps.*
- *Fuel hoses at the engine must only be secured with spring-type clips. The use of clamp-type or screw-type clips is not allowed.*

Observe safety measures ⇒ **20-1** page 3.

Observe rules for cleanliness ⇒ **20-1** page 3.

Removing and installing fuel tank with attached parts and fuel filter



1 - Fuel tank
- ❑ support with engine/gearbox jack -V.A.G 1383 A- when removing
- ❑ removing and installing ⇒ **20-1** page 5
- ❑ after replacing the fuel tank, bleed ⇒ **20-1** page 10 the fuel supply with the valve on the fuel strip

2 - 25 Nm

3 - Tensioning strap

4 - Vent line
- ❑ to solenoid valve -N80- for activated charcoal filter in engine compartment

5 - Fuel feed line
- ❑ black
- ❑ to fuel rail at intake manifold

6 - Fuel filter
- ❑ up to 07.02 the filter was mounted with the integrated fuel pressure regulator; replace with a new illustrated version when replacing
- ❑ Pay attention to different connections of fuel lines:
  - for filter with integrated fuel pressure regulator in the middle black feed line and on the outside blue return-flow line
  - for filter with disassembled fuel pressure regulator in the middle blue return-flow line and on the outside black feed line

- ❑ as spare parts in the kit with a new gasket ring ⇒ item 9 and O-ring ⇒ item 10
- ❑ after replacing the fuel filter, bleed ⇒ **20-1** page 10 the fuel supply with the valve on the fuel strip
- ❑ Fitting position: Pin at filter housing must engage in the recess of the guide for the fixing clamp
- ❑ the direction of flow is marked by arrow

7 - Retaining clip
- ❑ check for firm seating

8 - Fuel pressure regulator
- ❑ 0.3 MPa (3 bar)
- ❑ as spare parts in the kit with a new gasket ring ⇒ item 9 and O-ring ⇒ item 10

9 - Gasket ring
- ❑ replace

10 - O-ring
- ❑ replace

11 - 5 Nm
- ❑ for collar clamp for fuel filter

12 - Fuel gauge sender
- ❑ removing and installing ⇒ **20-1** page 5

13 - El. fuel delivery unit
- ❑ removing and installing ⇒ **20-1** page 4
- ❑ inspecting fuel pump ⇒ **20-1** page 6
- ❑ Clean strainer if dirty
- ❑ Fitting position of flange of the el. fuel delivery unit ⇒ Fig. 1 in **20-1** page 3

14 - Return-flow line
- ❑ as of 07.02 between the el. fuel delivery unit and fuel filter
- ❑ as of 08.02 between the el. fuel delivery unit and fuel pressure regulator
- ❑ blue

15 - Feed line
- ❑ between the el. fuel delivery unit and fuel filter
- ❑ black

16 - Gasket ring
- ❑ moisten with fuel before installing

17 - Union nut
- ❑ use device -MP 1-227- ⇒ **20-1** page 4 for removing and installing

18 - Vent valve
- ❑ to remove, unclip valve at side and take out of filler neck.
- ❑ before installing, unscrew cap ⇒ item 19
- ❑ check ⇒ Fig. 2 in **20-1** page 3

19 - Cap

20 - 1.5 Nm

21 - Fuel tank lid unit
- ❑ with rubber bowl

22 - Gravity valve
- ❑ to remove, unclip valve at top and lift out of filler neck.
- ❑ inspect valve for blockage:
- ♦ valve vertical: open
- ♦ valve tilted 45°: closed

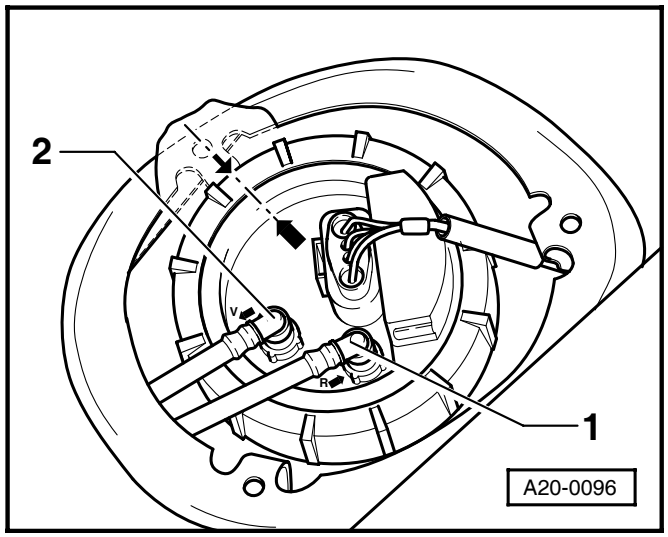
23 - Vent line
- ❑ between activated charcoal filter ⇒ item 24 and vent line ⇒ item 4

24 - Activated charcoal filter

25 - 10 Nm

26 - Vent line
- ❑ clipped in place on fuel tank

Fig. 1: Installation position of flange of fuel delivery unit ►



Marking on the flange must be aligned with marking on the fuel tank -arrows-.

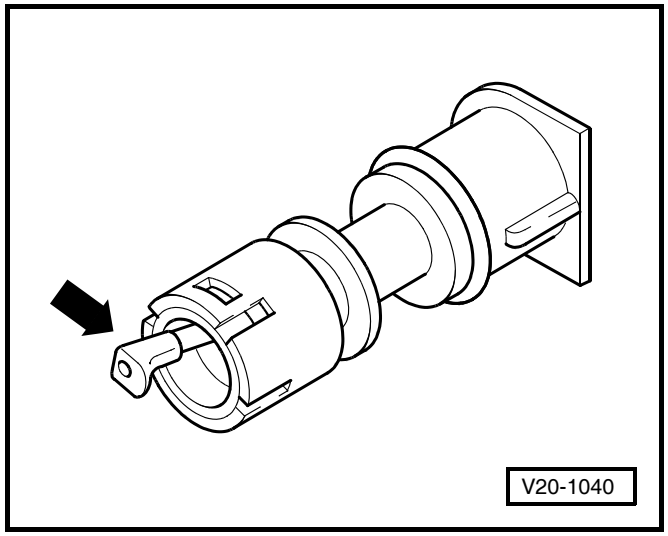
Blue return-flow line -1- on the connection with the marking -R-.

Black feed line -2- on the connection with the marking -V-.

Note

After installing the flange of the fuel delivery unit, check whether the feed, return-flow and vent lines are still clipped in place on the fuel tank.

Fig. 2: Inspect vent valve ►



Lever in off position: Valve closed.

Lever pushed in direction of arrow: Valve open.

Note

Before installing the vent valve, unscrew cap of fuel tank.

Safety precautions when working on the fuel supply system

WARNING!

The fuel feed line is pressurized! Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

Pay attention to the following points when removing and installing the fuel gauge sender or the fuel pump (fuel delivery unit) on a fuel tank that is filled or partially filled:

- The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly opening of the fuel tank in order to extract the released fuel gases, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m^3/h must be used.
- Avoid skin contact with fuel! Wear fuel-resistant gloves!

Rules of cleanliness

Carefully observe the following „5 rules for cleanliness“ when working on the fuel supply and injection system:

- Thoroughly clean the connection points and their surroundings before releasing.
- Place removed parts on a clean surface and cover. Do not use fuzzy cloths!

- Carefully cover or close opened components if the repair is not completed immediately.
- Only install clean parts: Remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. in tool boxes etc.).
- When the system is open: Do not use compressed air. Do not use the vehicle.

Removing and installing the fuel delivery unit

Special tools, test and measuring equipment and auxiliary items required

- Torque wrench
- Wrench for union nut, e. g. -MP 1-227-

Removing

– Observe the safety instructions before starting fitting work ⇒ **20-1** page 3.

– On models fitted with a coded radio set, pay attention to the coding; determine if necessary.

– Disconnect the earth strap from the battery with the ignition off.

– Remove the cover under the rear seat.

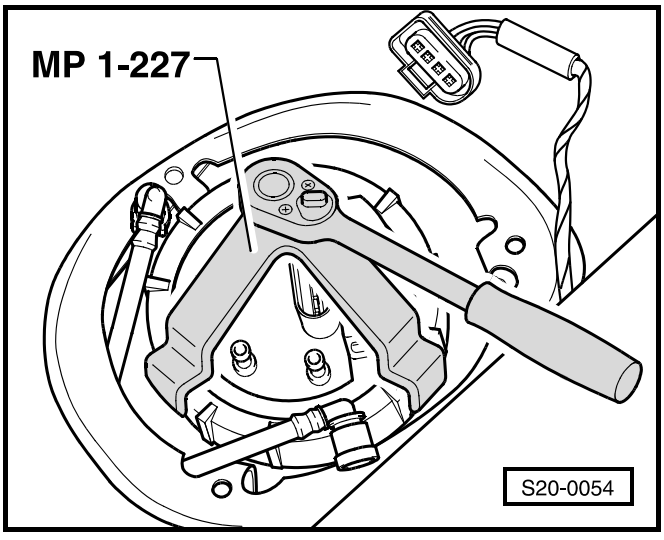
– Disconnect the 4 pin plug connection as well as the feed and return-flow line from the flange of the fuel delivery unit.

WARNING!

The fuel feed line is pressurized! Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

– Unscrew union nut with wrench -MP 1-227-.

– Pull the fuel delivery unit and the gasket ring out of the opening of the fuel tank.



Note

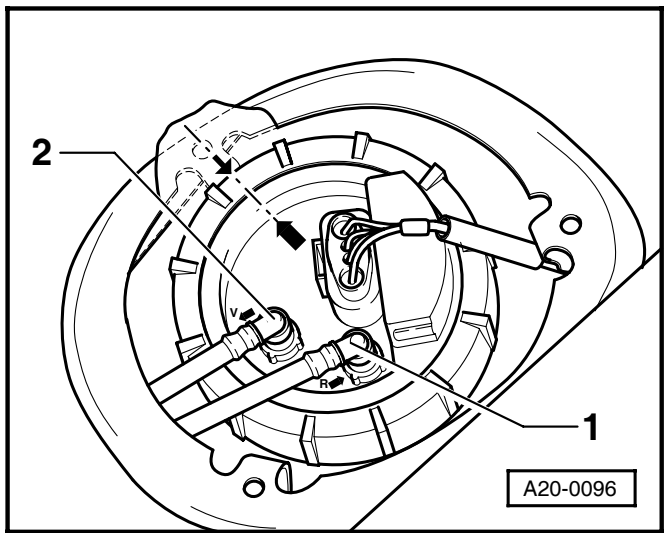
When replacing the fuel delivery unit drain the old fuel delivery unit before disposing of it.

Installing

– Installation of the fuel delivery unilt occurs in reverse order.

Note

- *When inserting the fuel delivery unit, ensure that the fuel gauge sensor is not bent.*
- *Moisten the gasket ring of the flange with fuel before fitting.*
- *Make sure the fuel hoses fit tightly.*
- *Pay attention to installed position of flange of fuel delivery unit: Marking on the flange must be aligned with marking on the fuel tank -arrows-.*
- *After installing, check the fuel delivery unit to ensure the feed, return-flow and vent lines are clipped into place at the fuel tank.*



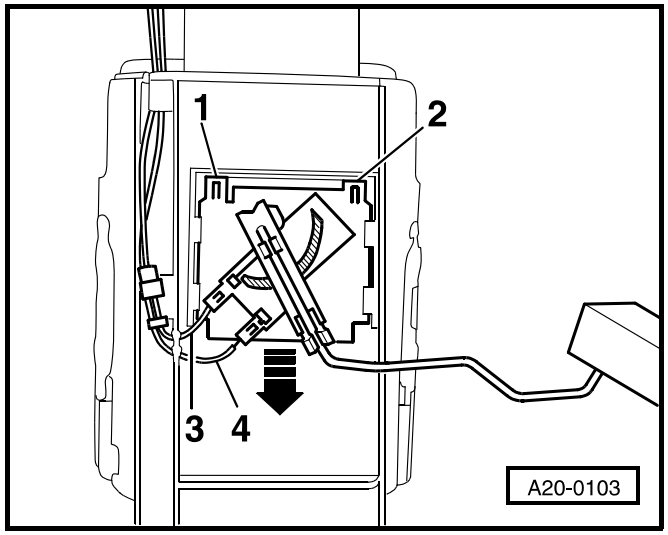
Removing and installing the fuel gauge sender

Removing

– Removing fuel delivery unit ⇒ **20-1** page 4.

– Unlatch and disconnect lines -3- and -4-.

– Raise catches -1- and -2- with a screwdriver and remove the fuel gauge sender towards the bottom -arrow-.



Installing

– Insert the fuel gauge sender in the fuel delivery unit guides and press upwards until they latch into position.

Removing and installing the fuel tank

Special tools, test and measuring equipment and auxiliary items required

- Engine/gearbox jack, e.g.-V.A.G 1383 A-
- Torque wrench

Removing

– Observe the safety instructions before starting fitting work ⇒ **20-1** page 3.

– On models fitted with a coded radio set, pay attention to the coding; determine if necessary.

– Disconnect the earth strap from the battery with the ignition off.

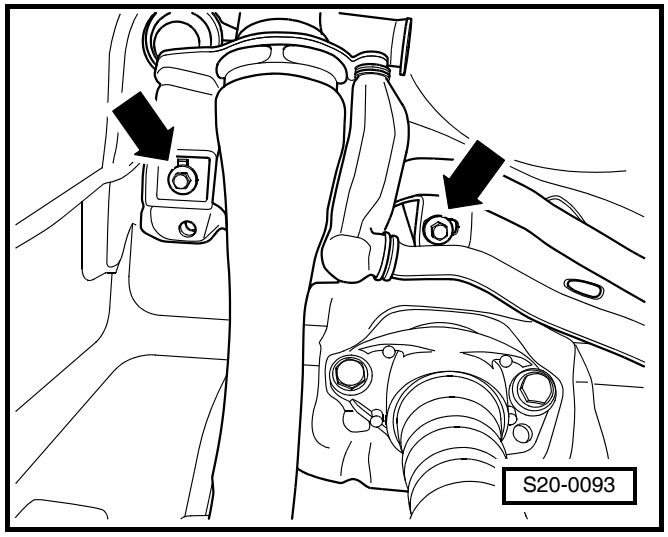
– Open the cap and unscrew fuel tank cap.

– Remove the rear right plastic wheelhouse liner ⇒ Body Work; Rep. Gr. 66.

– Unscrew fixing screws at tank filler neck -arrows-.

– Remove both ventilation lines from activated charcoal filter ⇒ Chap. 20-3.

– Drain fuel tank and clean around the fuel filler tube.

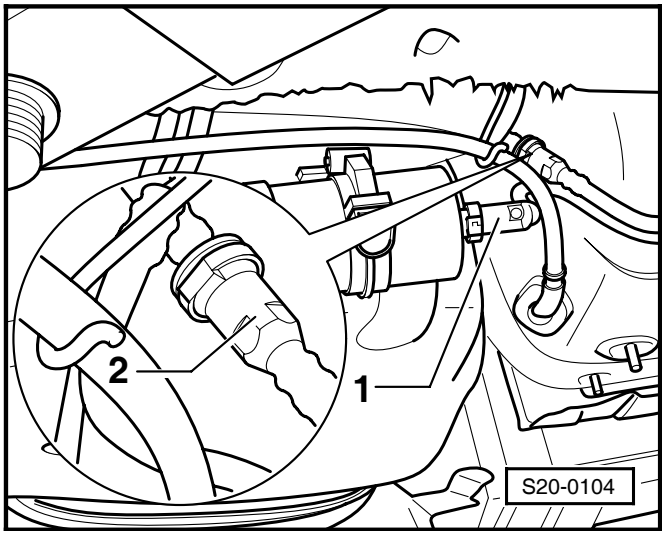


– Fold the rear seat forwards.
– Remove the fuel delivery unit guard and disconnect the plug connection from the fuel delivery unit flange.
– Removing rear axle ⇒ Running Gear; Rep. Gr. 42.

WARNING!

The fuel feed line is pressurized! Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

– Disconnect feed line -1- and ventilation line -2- by pressing the buttons on the hose connection.
– Unscrew tensioning strap.
– Position the engine/gearbox jack -V.A.G 1383 A- under the fuel tank for support and unscrew the fixing screws from the fuel tank.
– With the assistance of a second mechanic remove the fuel tank.



Installing

Installation is performed in the reverse order; pay attention to the following points:

- Check vent and fuel hoses for damage
- Make sure the fuel hoses fit tightly
- Do not mix up the feed and ventilation lines
- After replacing the fuel tank, bleed ⇒ **20-1** page 10 the fuel supply with the valve on the fuel strip

Note

After installing the fuel delivery unit, check whether the feed, return-flow and vent lines are clipped in place on the fuel tank.

– If the battery earth strap is disconnected and connected, carry out a few additional operations ⇒ Electrical System; Rep. Gr. 27.

Inspecting the fuel pump and fuel system

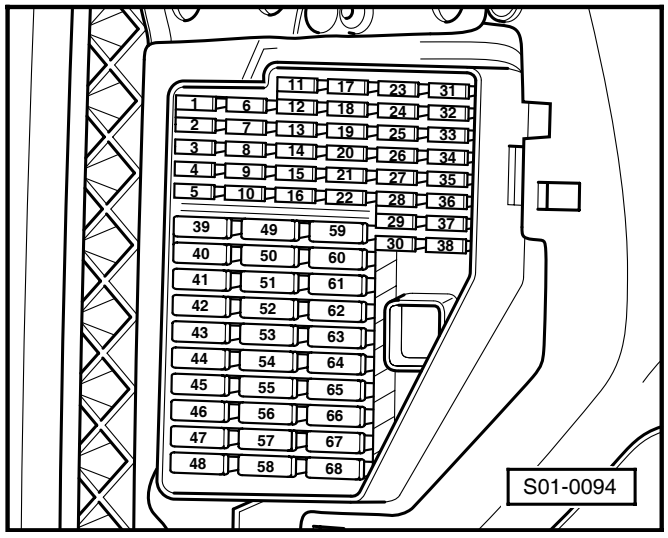
Special tools, test and measuring equipment and auxiliary items required

- Multimeter, e.g. -V.A.G 1526 A-
- Multimeter with current controlled pliers e. g. -V.A.G 1715-
- Remote control, e.g. -V.A.G 1348/3A-
- Vehicle system tester -V.A.G 1552- with cable -VAG 1551/3, 3A, 3B oder 3C-
- Adapter cable set (e. g. -V.A.G 1594 A- or -V.A.G 1594 C-)
- Wrench for union nut, e. g. -MP 1-227-

- Pressure gauge appliance, e.g. -V.A.G 1318-
- Adapter, e.g. -V.A.G 1318/1-
- Adapter, e.g. -V.A.G 1318/11-
- Adapter, e.g. -V.A.G 1318/17-
- Adapter, e.g. -V.A.G 1318/23-
- Torque wrench
- Measuring vessel
- Current flow diagram

Test conditions

- Battery voltage at least 11.5 volts
- Fuse No. 61 OK



Inspecting proper operation and power supply

– Fold the rear seat forwards.

– Removing fuel delivery unit guard.

– Switch on ignition. The fuel pump must be heard to start running.

– Switch off ignition.

If the fuel pump does not run:

– Remove cover from the fuse holder.

– Remove fuse No. 61 from the fuse holder.

– Connect remote control -V.A.G 1348/3A- with the adapter cable combination from the adapter cable set in fuse holder 61 and to positive terminal of battery (+).

– Activate remote control.

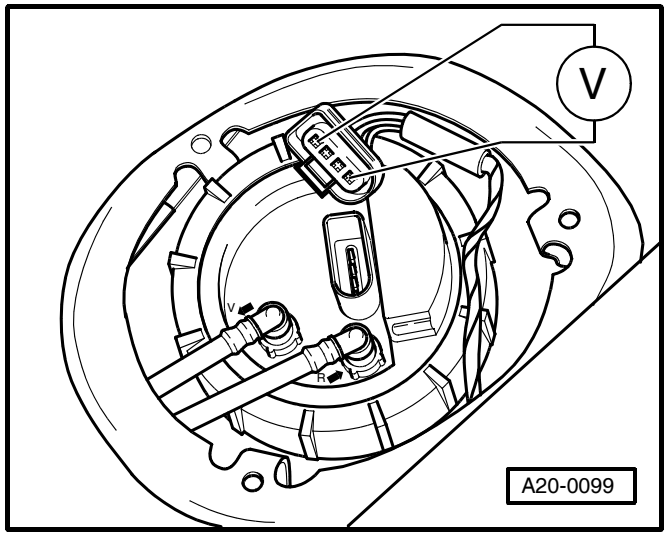
If the fuel pump starts running:

– Inspect fuel pump relay ⇒ 1.4/55 ; 1.4/74 kW Engine - Fuel Injection; Rep. Gr. 24.

If the fuel pump does not run:

– Disconnect the 4 pin plug from the fuel pump flange.

– Connect the multimeter for voltage measurement to contacts 1 and 4.



– Activate remote control.

Specified value: approx. battery voltage.

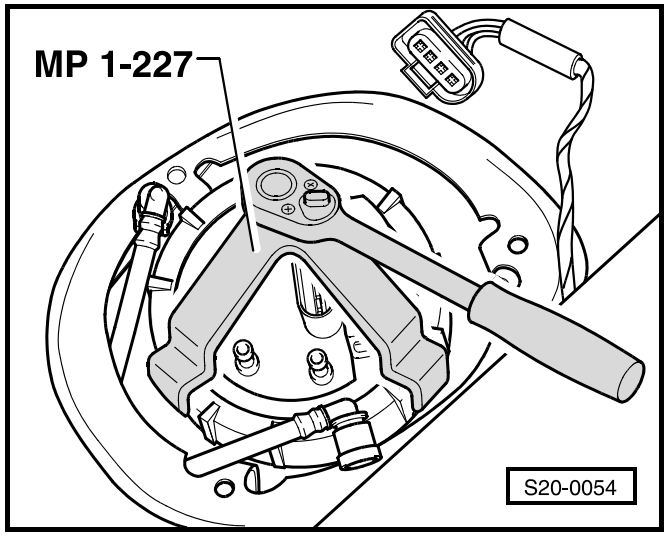
If the specified voltage value is not reached:

– Determine and remove open circuit in the wiring according to the current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

If the specified voltage value is reached:

– Unscrew union nut with wrench -MP 1-227-.

– Remove fuel pump and check whether the electric wiring between the flange and fuel pump is connected.



If no open circuit was detected:

– Replacing fuel delivery unit ⇒ **20-1** page 4.

Inspecting fuel flow rate

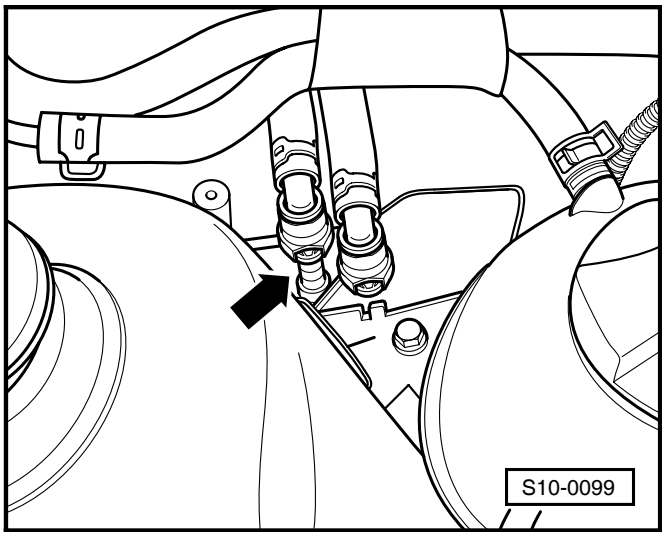
Test conditions

- Supply voltage OK
- Remote control -V.A.G 1348/3A- is connected.

Test sequence

– Unscrew cap from fuel filler neck.

– Pull off the fuel feed line -arrow- and gather residual fuel in a cloth.



WARNING!

The fuel feed line is pressurized! Place a clean cleaning cloth around the connection point before detaching hose connections. Reduce pressure by carefully releasing the connection point.

– Connect pressure gauge -V.A.G 1318- with the adapter -V.A.G 1318/23- and -V.A.G 1318/17- to the fuel feed line.

– Connect hose -V.A.G 1318/1- to adapter -V.A.G 1318/11- of the pressure gauge and hold in the measuring vessel.

– Open shut-off cock of the pressure measuring device. The lever points in the direction of flow -A-.

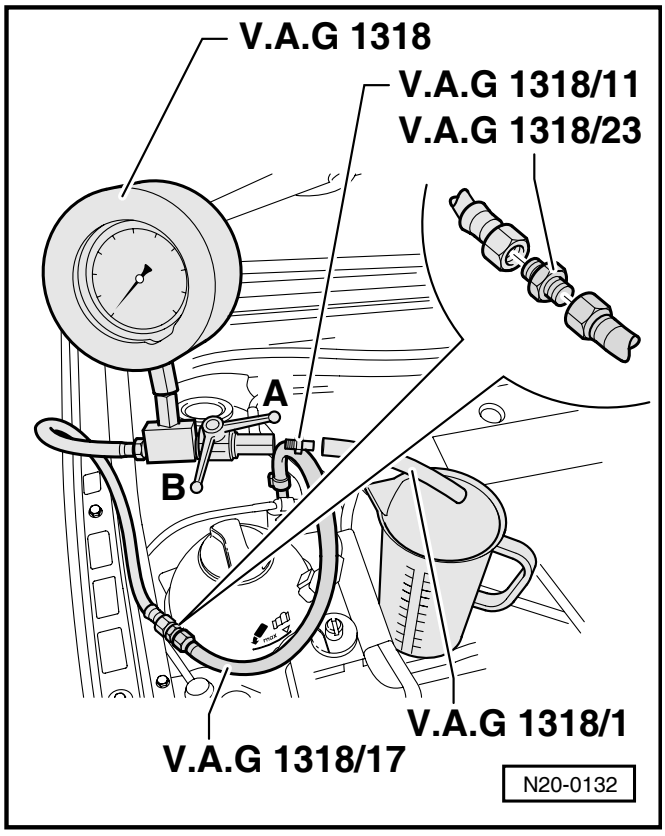
– Activate remote control -V.A.G 1348/3A-. Slowly close the shut-off cock until the manometer displays 3 bar overpressure (0.3 MPa). Now do not change the position of the shut-off cock.

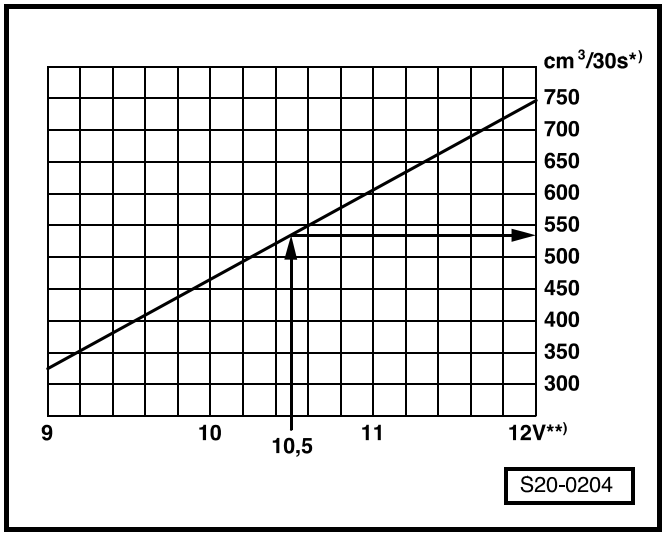
– Empty measuring vessel.

– The flow rate of the fuel pump is dependent on the battery voltage. Therefore connect the multimeter with the adapter cable to the vehicle battery.

– Activate the remote control for 30 seconds while measuring the battery voltage.

– Compare the fuel rate with the specified value.





*) Minimum flow rate cm^3/30 s

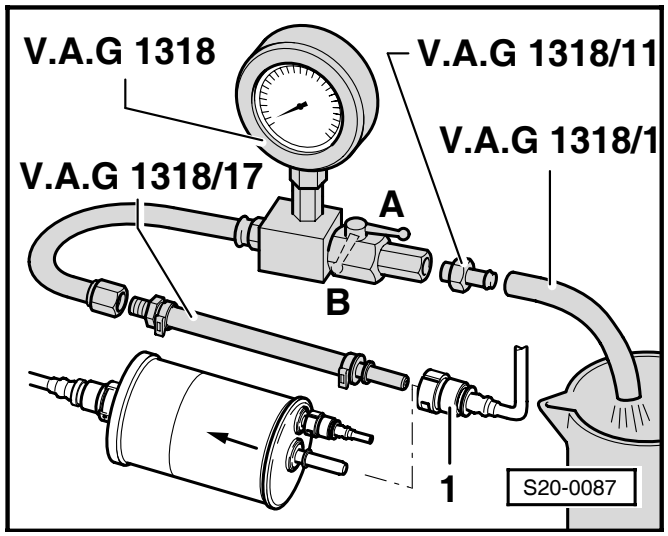
**)Voltage on the fuel pump when the engine is stopped and the pump is running (approx. 2 Volts less than battery voltage).

Read out examples:

During the test a voltage of 12.5 V was measured on the battery. As the voltage on the pump is approximately 2V less than the battery voltage, a minimum flow rate of 540 cm^3/30 s is obtained.

If the minimum flow rate is not reached:

– Check the fuel lines for possible diameter restrictions (kinks) or blocking.
– Disconnect hose -1- of the feed line from the fuel filter inlet (filter version with integrated fuel pressure regulator). ►



– Disconnect hose -1- of the feed line from the fuel filter inlet (filter version with separate fuel pressure regulator). ►
– Connect pressure gauge -V.A.G 1318- with adapter -V.A.G 1318/17- to the hose -1-.
– Repeat flow rate test.

If the minimum flow rate is reached:

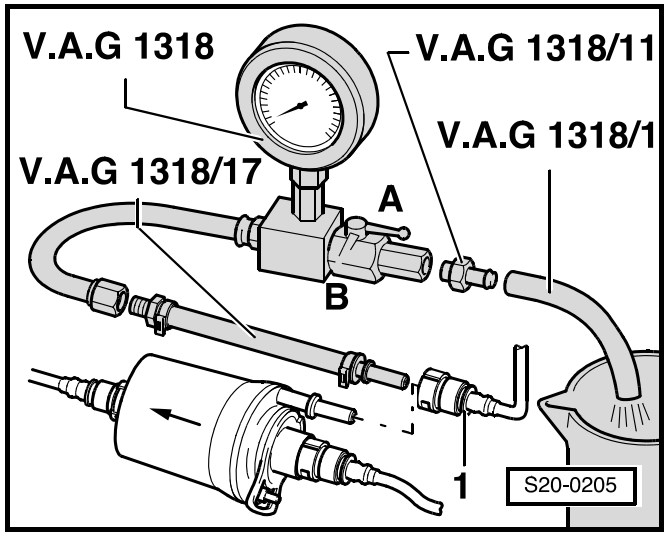
– Replace fuel filter.

If the minimum flow rate is again not reached:

– Remove the fuel delivery unit and check whether the pump strainer is not clogged up.

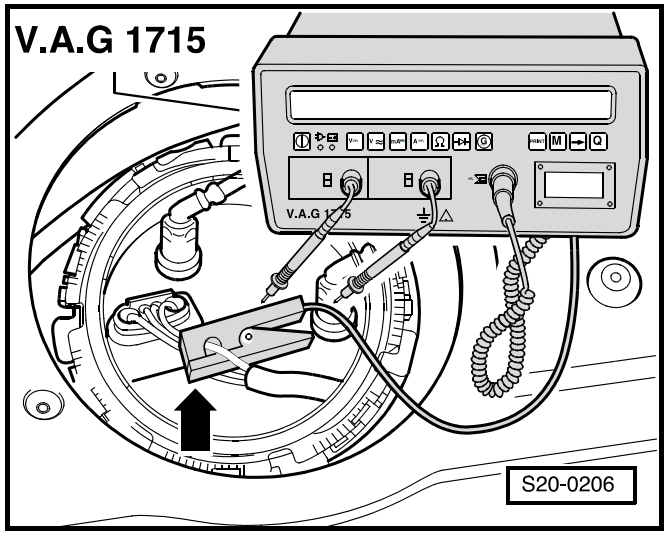
If no fault was detected until now:

– Replace the fuel delivery unit.



The flow rate was reached but a fault in the fuel supply system is suspected (e.g. temporary failure of the fuel supply system).

– Check the power consumption of the fuel pump as follows:
– Connect all released fuel lines.
– Connect the voltage measurement multimeter with the current pliers to the line of contact -1- of the plug connection at the fuel pump. ►
– Start engine and run in idle.
– Measure voltage consumption of the fuel pump. Specified value: max. 8 A.



Note

If the failure in the fuel supply system is occasional the test may be performed during a test drive. The assistance of a 2nd mechanic is required.

If the power consumption is exceeded:

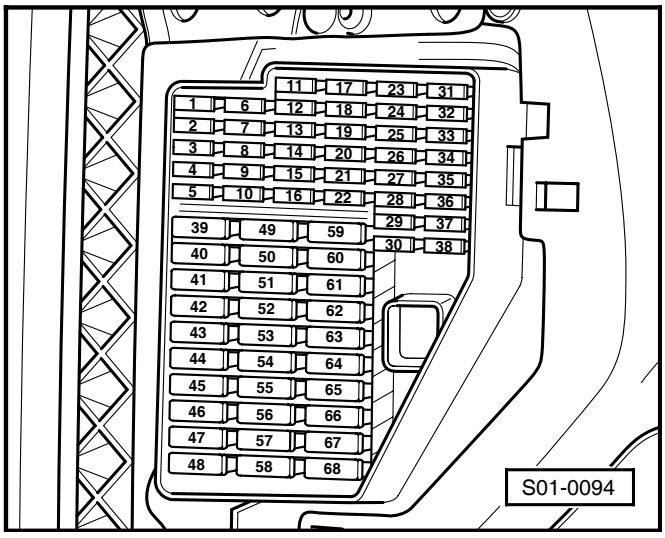
– Replace the fuel delivery unit.

Vent the fuel system

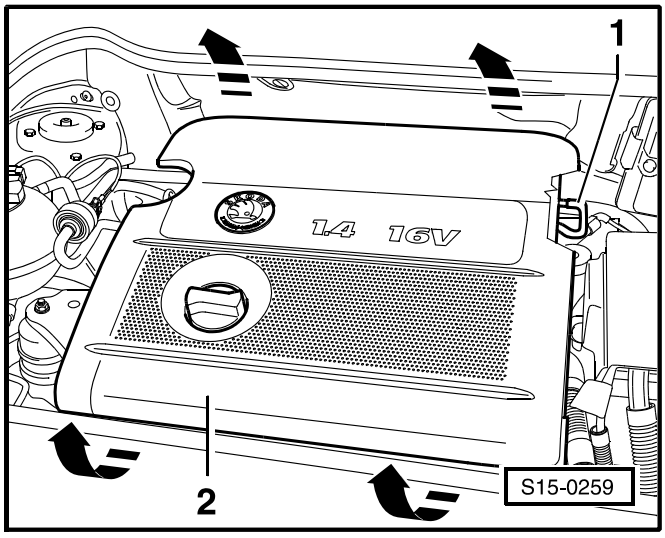
– Remove cover from the fuse holder.

– Remove fuse No. 61 from the fuse holder. ►

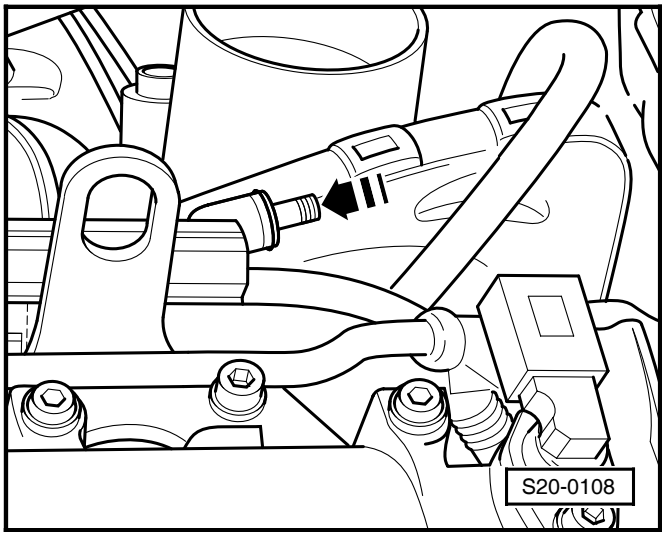
– Connect remote control -V.A.G 1348/3A- with the adapter cable combination from the adapter cable set in fuse holder 61 and to positive terminal of battery (+).



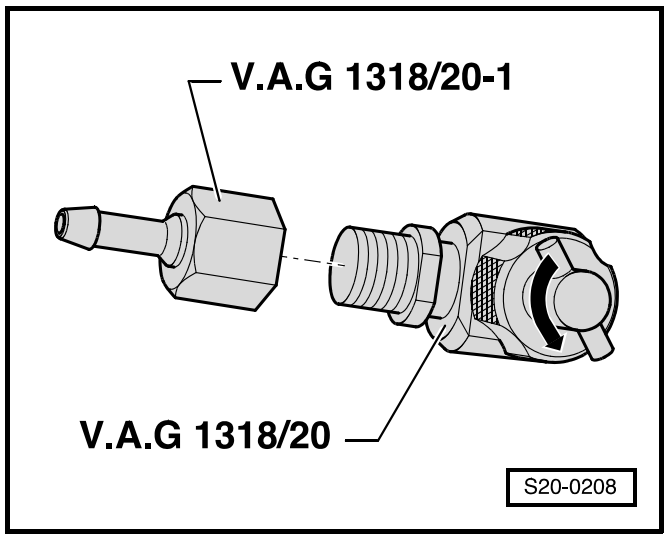
– Pull off hose -1- (for engines as of 04.02) and remove engine protection -2- with air filter upwards -arrows-. ►



– Unscrew the ventilation valve cap -arrow- on the fuel strip. ►



– Screw adapter -V.A.G 1318/20-1- onto adapter -V.A.G 1318/20-.
– Turn the valve (at T-union) anti-clockwise, until it is fully opened.
– Screw adapter -V.A.G 1318/20- fully onto the vent valve.
– Connect hose with catch pan to adapter -V.A.G 1318/20-1-.
– Screw valve (at T-union) clockwise up to the stop into the vent valve.
– Check the adapter and hose connections for tightness.
– Activate remote control -V.A.G 1348/3A-.
– As soon as fuel flows out of the hose without bubbles, unscrew valve (at T-union) anti-clockwise, until no more fuel escapes.
– Place vent valve with a clean cloth underneath.
– Throttle the ventilation hose and pull off from adapter -V.A.G 1318/20-1-.
– Unscrew adapter -V.A.G 1318/20- from vent valve.
– Screw in ventilation valve cap.
– Install engine cover with air filter.



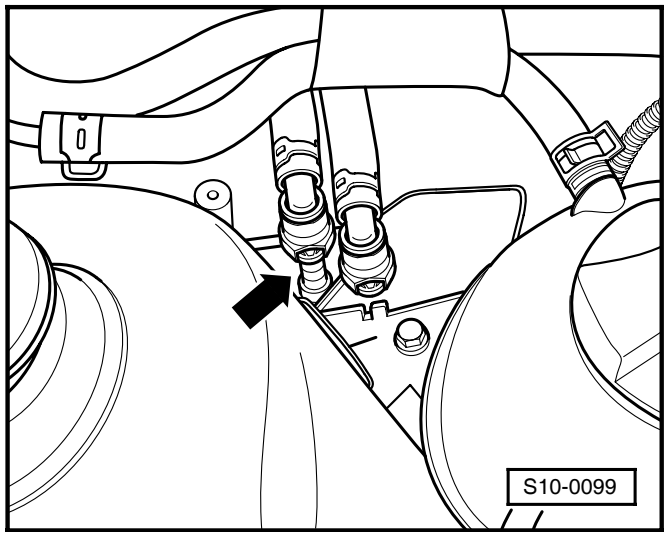
Inspecting the operating and holding pressure of the fuel, inspecting the non-return valve of the fuel pump

Inspecting the fuel operating pressure

Special tools, test and measuring equipment and auxiliary items required

- Remote control, e.g. -V.A.G 1348/3A- with adapter cable -V.A.G 1348/3-2-
- Pressure gauge appliance, e.g. -V.A.G 1318-
- Adapter, e.g. -V.A.G 1318/1-
- Adapter, e.g. -V.A.G 1318/11-
- Adapter, e.g. -V.A.G 1318/17-
- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B nebo 3C-

– Pull off the fuel feed line -arrow- and gather residual fuel in a cloth.



– Connect the pressure gauge -V.A.G 1318- with adapter -V.A.G 1318/11- and -V.A.G 1318/17- to the fuel feed line, the shut-off cock on the measuring device must be in position -A-.
– Start engine.

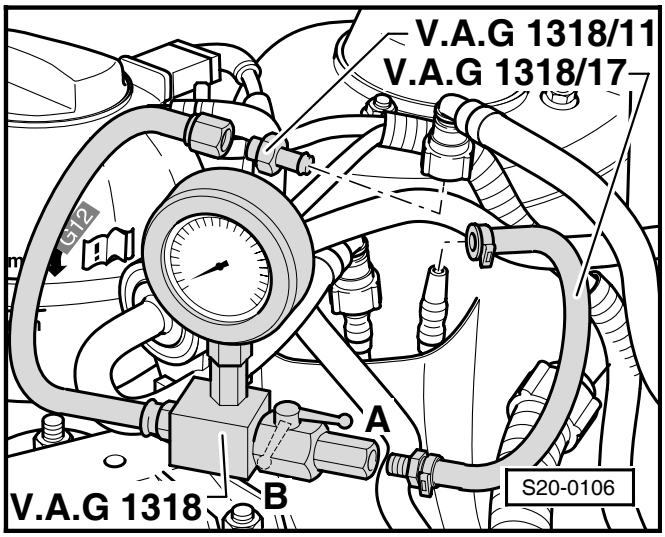
Nominal value 3 bar (0.3 MPa).

If the nominal value is higher than 3 bar (0.3 MPa):

– Check fuel return-flow line between the fuel filter and the fuel delivery unit for continuity, or replace fuel pressure regulator.

If the nominal value is lower than 3 bar (0.3 MPa):

– Check tightness of lines and fuel rail.

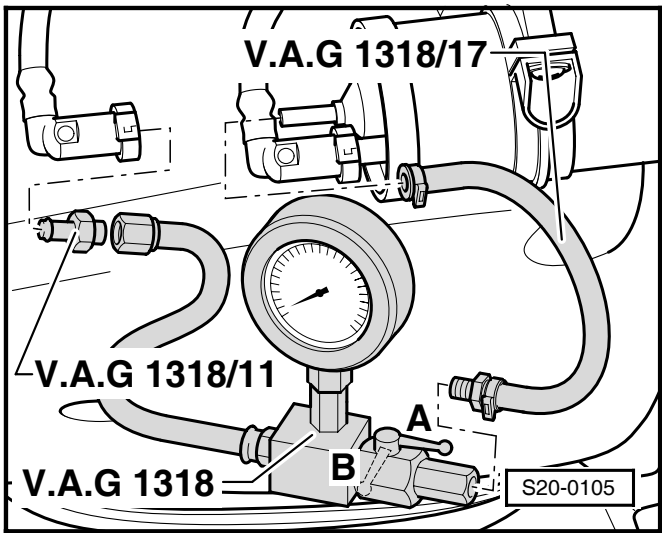


– Connect the pressure gauge -V.A.G 1318- with adapter -V.A.G 1318/11- and -V.A.G 1318/17- to the black feed line for the fuel filter pump (old version filter shown with integrated fuel pressure regulator). For the new version of the filter with disassembled fuel pressure regulator the black feed line is connected to the fuel filter border connection.
– Open shut-off cock on the measuring device -position A-.
– Start engine.

Specified value 3 bar (0.3 MPa) and higher.

If the specified value is not reached:

– Close shut-off cock -position B-.



Control the fuel delivery unit with the remote control -V.A.G 1348/3A-.

– Connect remote control -V.A.G 1348/3A- ⇒ **20-1** page 7.
– Activate remote control until the pressure is min. 3 bar (0.3 MPa).

Also perform fuel delivery unit test with the final control diagnosis.

– Connect vehicle system tester -V.A.G 1552-, switch on ignition and select address word 01 - Engine Electronics ⇒ 1.4/55; 1.4/74 - Engine - Fuel Injection; Rep. Gr. 01.
– Select function 03 „Final control diagnosis“ and confirm entry with Q.
– Using key → select the final control diagnosis for fuel pump relay.

```
Actuator diagnosis                    →
Fuel pump relay-J17
```

– The fuel pump will run for approx. 20 seconds or until key → is activated.
– End final control diagnosis for fuel pump relay after reaching minimum value 3 bar (0.3 MPa).
– Proceed with the final control diagnosis up to the end.
– Select function 06 „End output“ and switch off ignition.

WARNING!

Maximum pressure of the fuel delivery unit is 7 bar (0.7 MPa). If this pressure is reached the fuel delivery unit may be damaged.

If the nominal value of min. 3 bar (0.3 MPa) is reached:

– Replace fuel pressure regulator.

If the nominal value of min. 3 bar (0.3 MPa) is not reached:

– Replace the fuel delivery unit.

Inspecting the non-return valve of the fuel pump and holding pressure

Test conditions

- Pressure gauge -V.A.G 1318- connected ⇒ **20-1** page 11

Note

This test simultaneously checks the tightness of the connections of the fuel feed line from the fuel delivery unit through to the connecting points of the pressure gauge -V.A.G 1318-.

– Shut-off cock on measuring device in position -A- open.

– Activate remote control until an overpressure of 3 bar (0.3 MPa) is built up.

– Disconnect the remote control and observe the pressure drop on the manometer. The pressure must not drop below 2.5 bar (0.25 MPa) after 10 minutes.

If the pressure drops:

– Activate the remote control unit until an overpressure of 3 bar (0.3 MPa) is built up, and simultaneously close the shut-off cock on the measuring device in position -B-.

If the pressure does not drop:

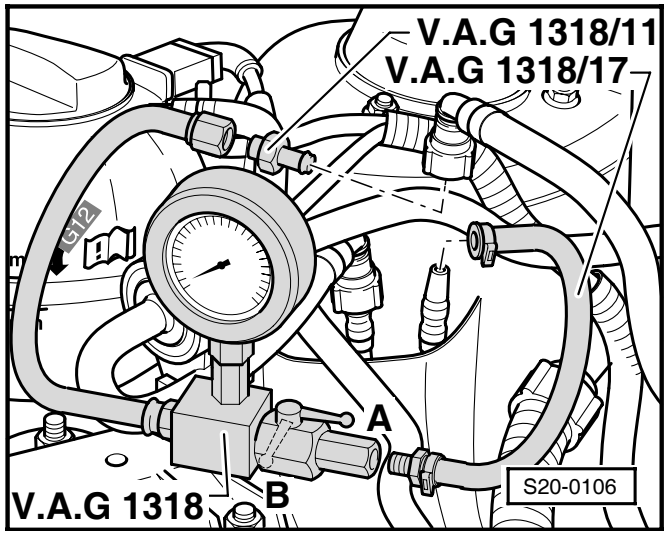
– Check the fuel rail for tightness.

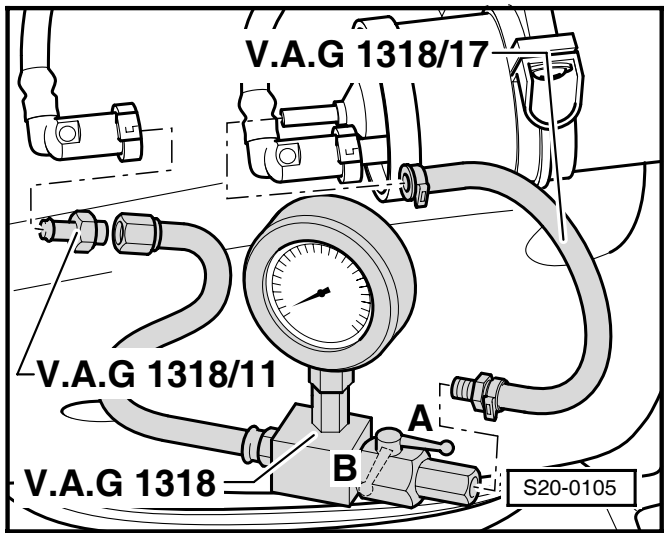
If the pressure still drops:

– Check the line connections for tightness.

If the lines are not found to be faulty:

– Connect the pressure gauge -V.A.G 1318- with adapter -V.A.G 1318/11- and -V.A.G 1318/17- to the black feed line for the fuel filter pump (old version filter shown with integrated fuel pressure regulator). For the new version of the filter with disassembled fuel pressure regulator the black feed line is connected to the fuel filter border connection.





– Open shut-off cock on the measuring device -position A-.
– Activate the remote control and simultaneously close the shut-off cock in the measuring device in position -B-.
– If a pressure of min. 3 bar (0.3 MPa) is reached, disconnect the remote control and observe the drop in pressure on the manometer. The pressure must not drop below 2.5 bar (0.25 MPa) after 10 minutes.

If the pressure drops:

– Check fuel line connections for leaks.

If the wiring is O.K.:

– Replace the fuel delivery unit.

If the pressure does not drop and the delivery unit is O.K.:

– Replace fuel pressure regulator.

Disconnecting the fuel delivery unit with crash signal

Operation

Vehicles with airbag are equipped with crash signal disconnection of the fuel delivery unit. If while driving the airbag units are ignited, the fuel pump relay opens and disconnects the fuel pump. The position for improved engine starting is simultaneously controlled. When the door is opened, the fuel pump is operated for about 2 seconds so that pressure is built up in the fuel system.

Observe safety instructions when opening the fuel system ⇒ **20-1** page 3.

– Testing fuel pump relay ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

20-2 Inspecting Electronic Power Control (Electronic throttle)

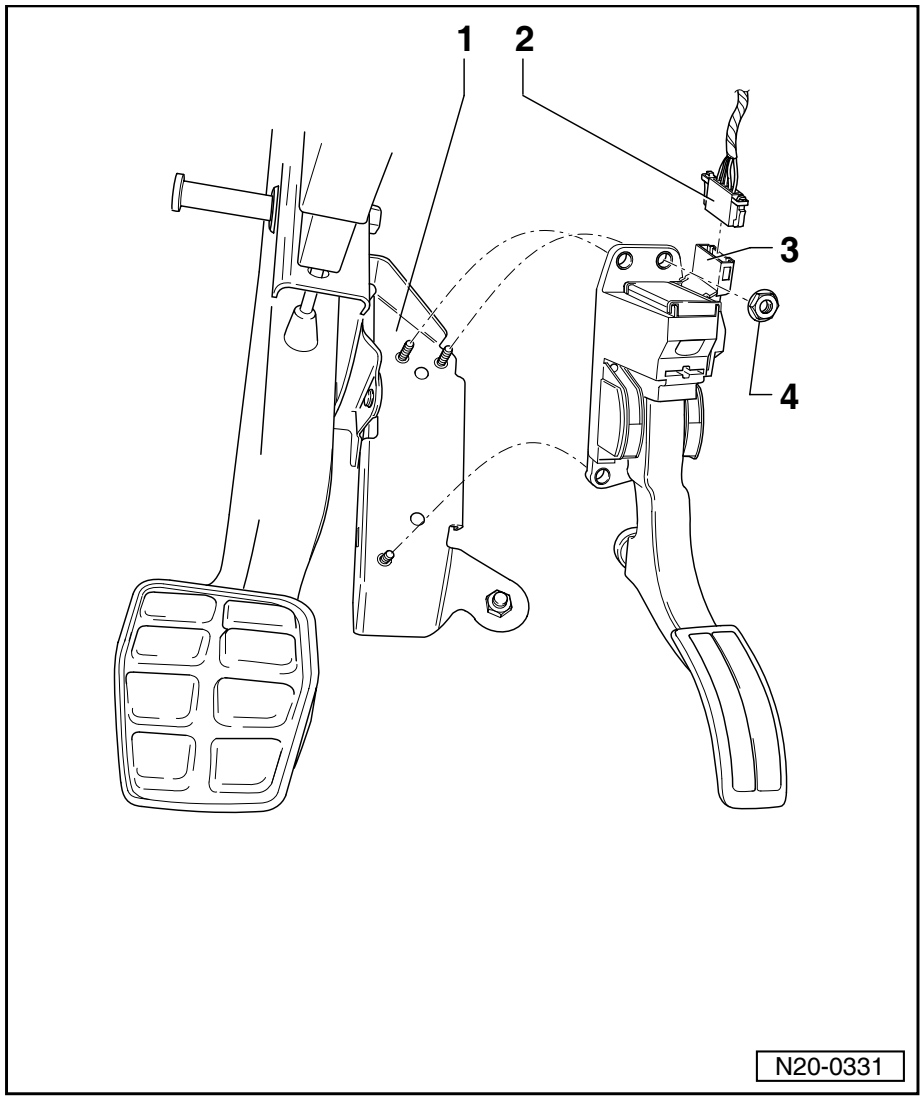
Summary of components

1 - Bracket
- ❑ removing and installing ⇒ Running Gear; Rep. Gr. 46

2 - Connecting plug
- ❑ black, 6 pin

3 - Accelerator pedal position sender (-G79- and -G185-)
- ❑ inspect ⇒ 1.4/55 ; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01
- ❑ to remove, remove dash panel and foot controls cover

4 - 10 Nm



20-3 Activated Charcoal Filter System

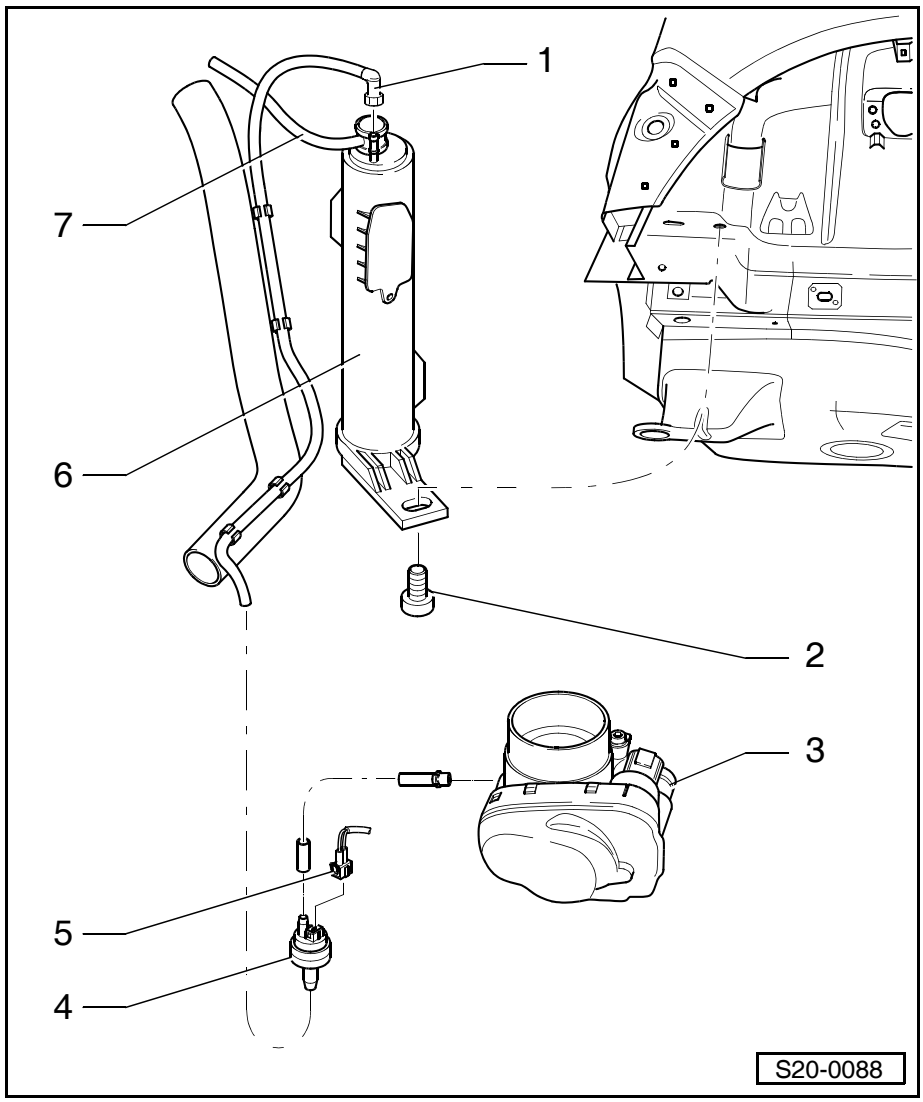
Summary of components of activated charcoal filter system

Note

The hose connections are secured with spring strap clamps or quick strap clamps.

Observe the safety precautions ⇒ Chap. 20-1.

Observe the rules for cleanliness ⇒ Chap. 20-1.



1 - Vent line
- ❑ from solenoid valve -N80- of the activated charcoal filter system (in engine compartment)

2 - 10 Nm

3 - Throttle valve control unit

4 - Solenoid valve -N80-
- ❑ in right of engine compartment
- ❑ valve is actuated (pulsed) by engine control unit
- ❑ inspect ⇒ 1.4/55 ; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01

5 - Connecting plug
- ❑ black, 2 pin
- ❑ of valve -N80-

6 - Activated charcoal filter
- ❑ Fitting location: in rear right wheelhouse
- ❑ attached to body
- ❑ filled by valve -N80- and by gravity valve
- ❑ removing:
- – Remove rear right wheel.
- – Removing the plastic wheelhouse liner ⇒ Body Work; Rep. Gr. 66.
- – Disconnect lines -1- and -7-.
- – Remove screw -2-.
- – Push filter down.
- ❑ Installing:
- – The installation occurs in reverse order.
- – Tightening torque of screw -2-: 10 Nm.

7 - Vent line
- ❑ from gravity valve to fuel tank

26 – Exhaust System

26-1 Removing and installing parts of the exhaust system

Note

- *When performing installation work on the exhaust system, make sure the exhaust system is not mounted under tension and has adequate clearance from the vehicle body. If necessary slacken the clamping sleeve (s) and collar clamp and align the silencer and exhaust pipe so as to create adequate clearance between these components and the vehicle body, and that the weight of the exhaust system is evenly distributed over the hangers.*
- *Always replace self-locking nuts.*

Exhaust manifold with pre-catalytic converter, front exhaust pipe with catalyst and component parts - Engines with engine identification characters AUA, AUB, BBY, BBZ

1 - Hot air collector/shield

2 - 10 Nm

3 - 40 Nm

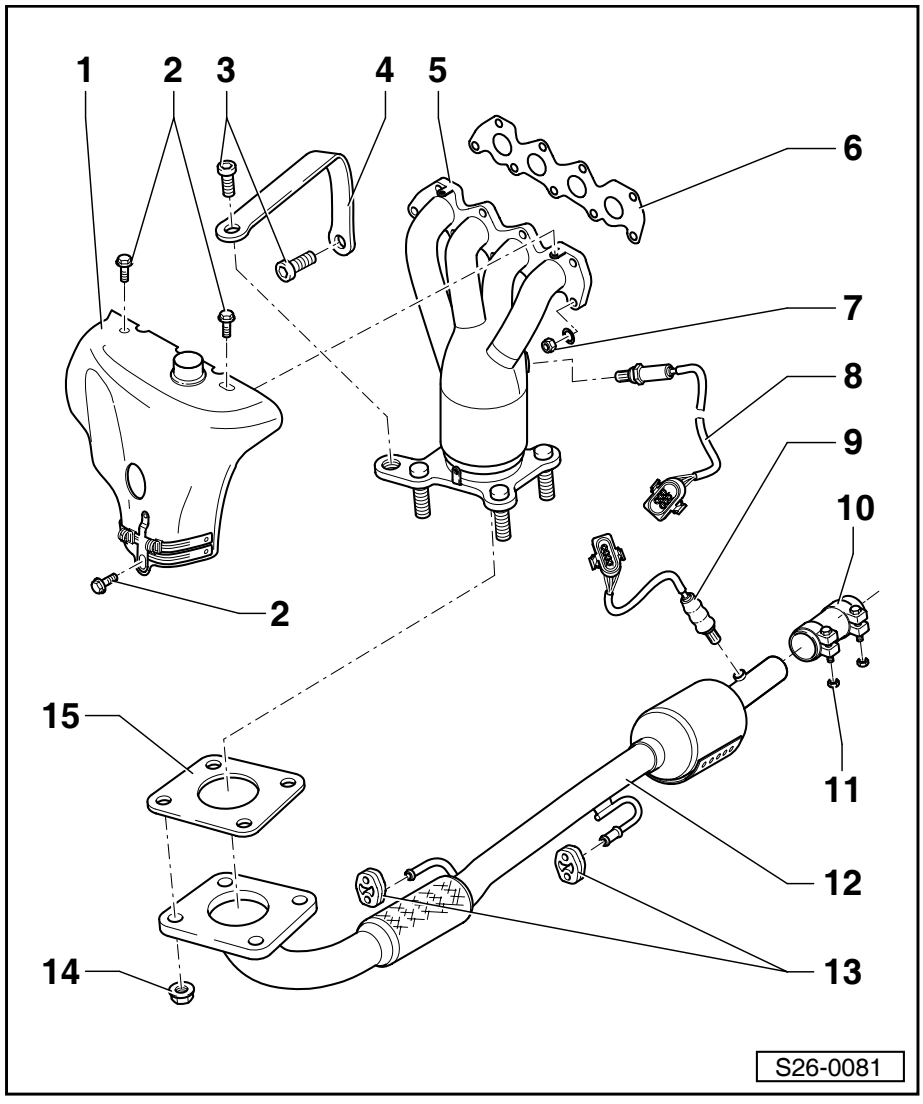
4 - Bracket
- ❑ attached to engine block

5 - Exhaust manifold
- ❑ with integrated pre-catalytic converter
- ❑ protect against shocks and blows

6 - Gasket
- ❑ replace

7 - 25 Nm
- ❑ replace
- ❑ Coat thread with hot bolt paste -G 052 112 A3-

8 - Lambda probe before catalyst -G39-, 50 Nm
- ❑ coat only thread with hot bolt paste -G 052 112 A3-; hot bolt paste must not get into the slot of the probe body
- ❑ inspect ⇒ 1.4/55, 1.4/74 Engine - Fuel Injection; Rep. Gr. 24
- ❑ use lambda probe wrench for removing and installing



9 - Lambda probe after catalyst -G131-, 50 Nm
- ❑ coat only thread with hot bolt paste -G 052 112 A3-; hot bolt paste must not get into the slot of the probe body
- ❑ inspect ⇒ 1.4/55, 1.4/74 Engine - Fuel Injection; Rep. Gr. 24
- ❑ use lambda probe wrench for removing and installing

10 - Clamping sleeve
- ❑ Before tightening, align the exhaust system in cold condition free of stress
- ❑ Fitting position: ends of the screws must not protrude beyond the bottom edge of the clamping sleeve, bolted connection must point to the left.
- ❑ Tighten bolted connections evenly

11 - 25 Nm
- ❑ replace

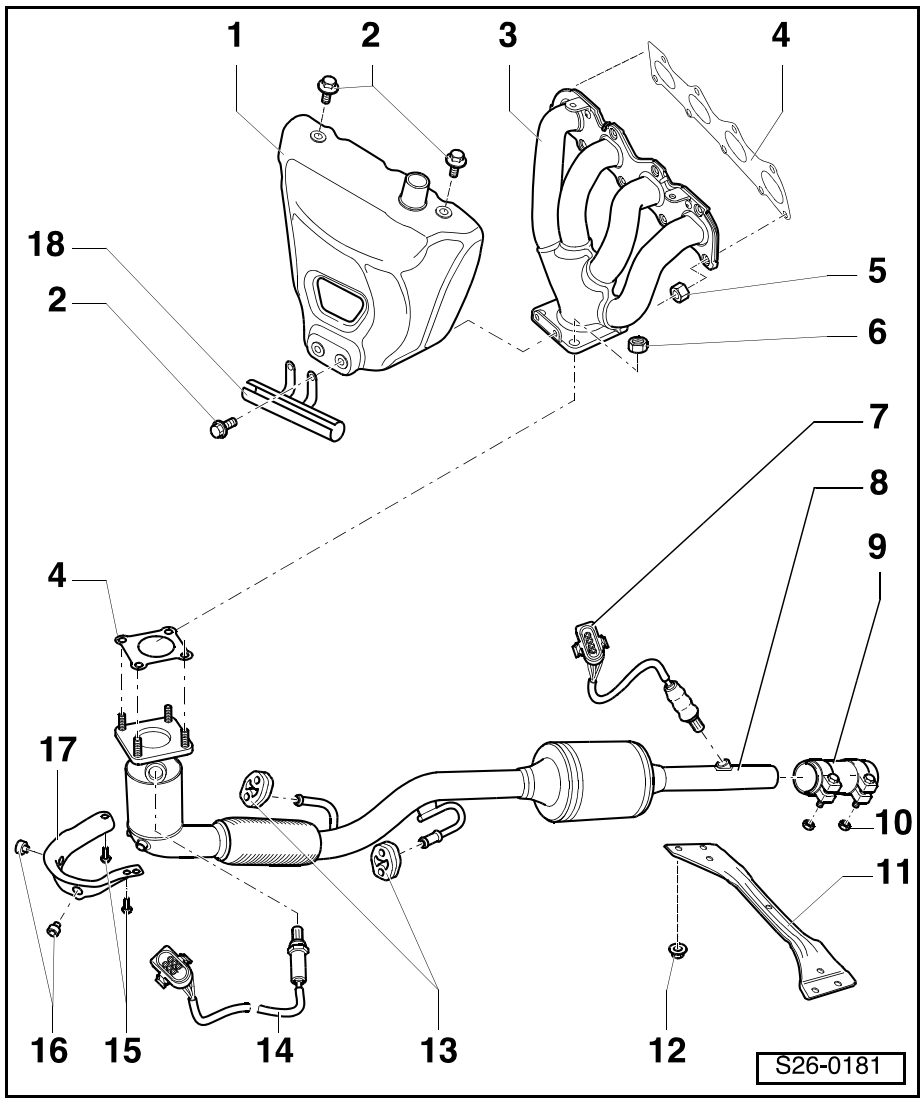
12 - Front exhaust pipe
- ❑ with catalytic converter
- ❑ protect against shocks and blows
- ❑ Inspecting catalyst ⇒ **26-1** page 4

13 - Retaining strap
- ❑ replace if damaged

14 - 40 Nm
- ❑ replace
- ❑ Coat thread with hot bolt paste -G 052 112 A3-

15 - Gasket
- ❑ replace

Exhaust manifold, front exhaust pipe with pre-catalytic converter and catalyst and component parts - Engine with engine identification characters BKY



- **1 - Hot air collector/shield**
- **2 - 10 Nm**
- **3 - Exhaust manifold**
- **4 - Gasket**
  - ❑ replace
- **5 - 25 Nm**
  - ❑ replace
  - ❑ Coat stud bolts of exhaust manifold with hot bolt paste -G 052 112 A3-
- **6 - 40 Nm**
  - ❑ replace
  - ❑ Coat stud bolts of exhaust pipe with hot bolt paste -G 052 112 A3-
- **7 - Lambda probe downstream of catalytic converter -G130-, 50 Nm**
  - ❑ only coat the thread with hot screw paste -G 052 112 A3-; the paste must not get into the slot of the probe body
  - ❑ 4-pin connector
- **8 - Front exhaust pipe**
  - ❑ with pre- and main catalytic converter
  - ❑ protect against shocks and blows
- **9 - Clamping sleeve**
  - ❑ Before tightening, align the exhaust system in cold condition free of stress
  - ❑ Fitting position: ends of the screw must not protrude beyond the bottom edge of the clamping sleeve, bolted connection must point to the left.
  - ❑ Tighten bolted connections evenly
- **10 - 25 Nm**
- **11 - Front tunnel bridge**
- **12 - 23 Nm**
- **13 - Retaining strap**
  - ❑ replace if damaged
- **14 - Lambda probe upstream of catalytic converter -G39-, 50 Nm**
  - ❑ only coat the thread with hot screw paste -G 052 112 A3-; the paste must not get into the slot of the probe body
  - ❑ 6-pin connector
- **15 - 20 Nm**
- **16 - 40 Nm**
- **17 - Bracket**
  - ❑ attached to engine block
- **18 - Holder for wiring loom**

Silencer with hangers

1 - 25 Nm

2 - Hanger

- ❑ Check fitting position

3 - Rear silencer

- ❑ Cylinder version as of 03.03
- ❑ for first equipment building unit with front silencer, replace individually when carrying out repairs
- ❑ align the rear silencer free of stress

4 - Separation point

- ❑ for repairs
- ❑ marked by recesses around circumference of exhaust pipe ⇒ Fig. 1 in **26-1** page 4

5 - Front silencer

- ❑ for first equipment building unit with rear silencer, replace individually when carrying out repairs

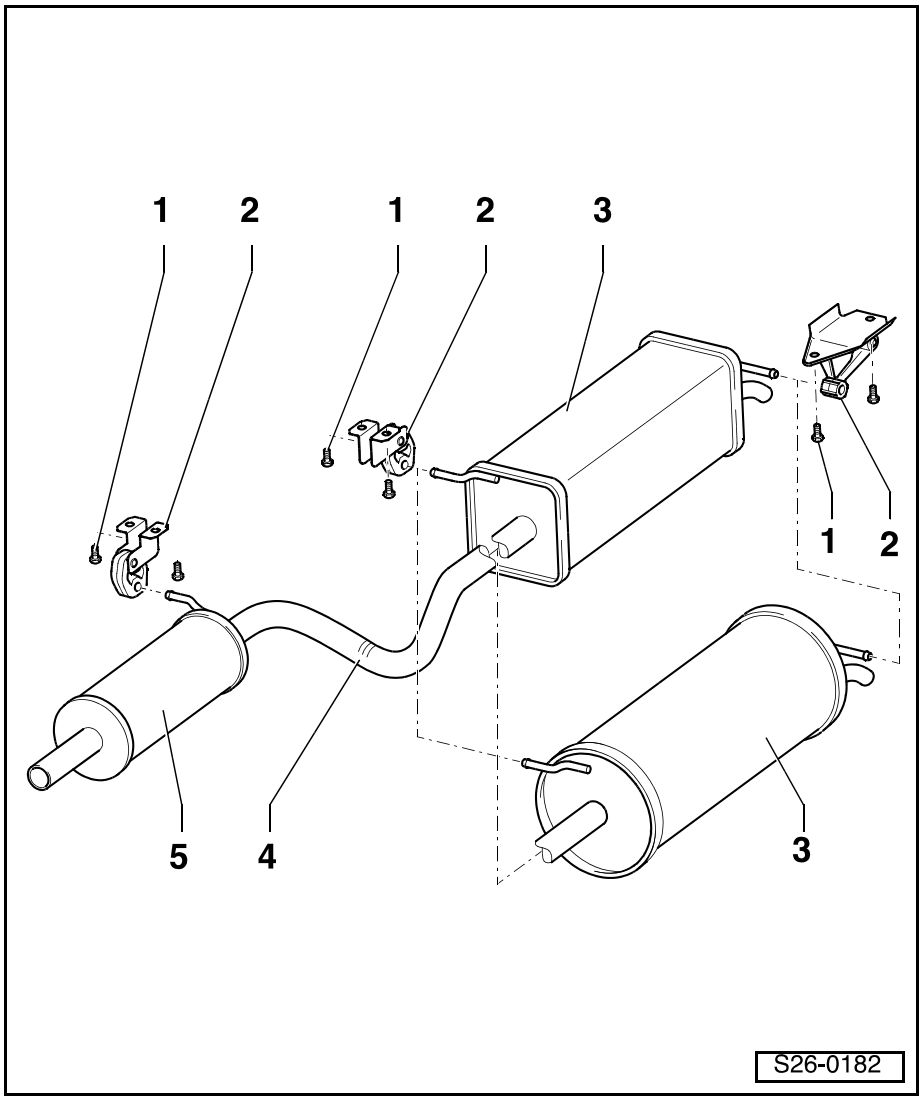
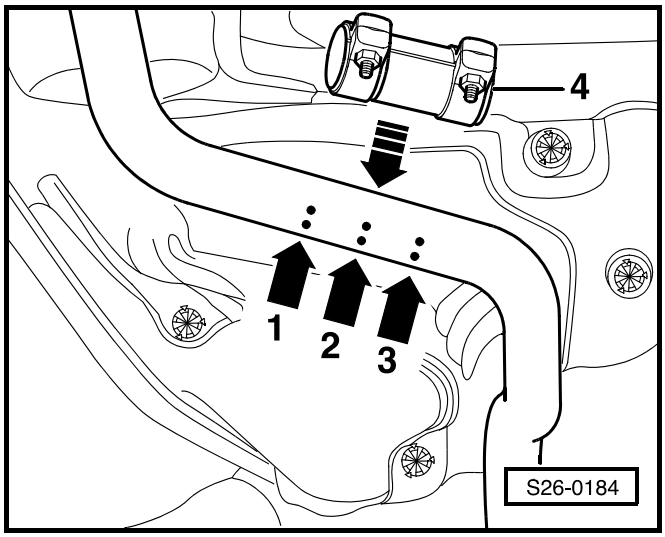


Fig. 1: Separation point at exhaust pipe



– Separate exhaust pipe at right angles at the separation point -arrow 2- with body saw, e.g. -V.A.G 1523-.

– When installing fit repair clamping sleeve -4- between -arrows 1 and 3-. Tightening torque 25 Nm.

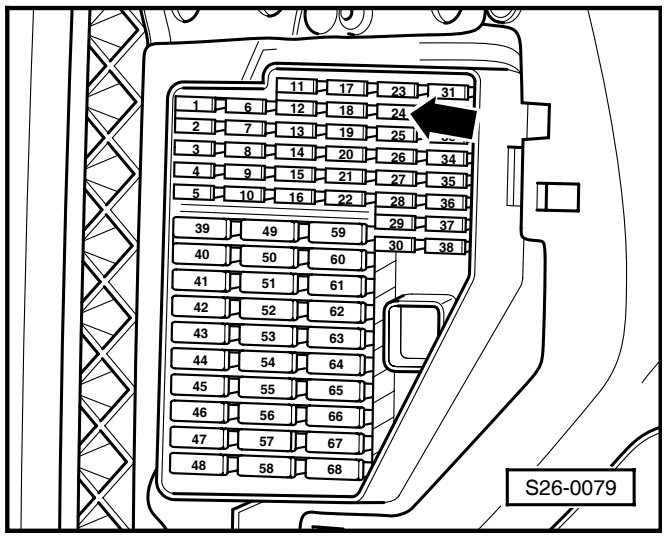
Testing the catalyst

Special tools, test and measuring equipment and auxiliary items required

♦ Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test conditions

- Fuse No. 24 -arrow - must be O.K.
- Exhaust system must be tight between the catalyst and the cylinder head.
- Coolant temperature minimum 80 °C.
- All electrical consumers, e.g. lights and rear window heater, must be switched off.
- If vehicle is equipped with air conditioning, this must be switched off.



Note

This diagnosis can only be performed successfully if the lambda probe ageing diagnosis was performed before ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 24.

Test sequence

– Connect vehicle system tester -V.A.G 1552-. Start engine and select address word 01 - Engine Electronics ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01.

– Interrogate fault memory, if necessary eliminate fault and again erase fault memory ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01.

– Select function 04 „Basic Setting“ and then display group 046.

Read-out on display (1...4 = display fields)

```
System in basic setting              46
2070 rpm   352.0 °C   99.6 %    Test OFF
```

– Maintain speed between 2000...3000 rpm until display in display field 4 switches from „Test off“ to „Test on“. Catalytic converter temperature in display field 2 must be at least 300 °C.

Note

This may take a few minutes.

– Further maintain speed between 2000...3000 rpm until the nominal result of the test is displayed in display field 4. Specified value: „Cat R1 O.K.“.

If display field 4 displays „Cat R1 N.O.K.“.

– Interrogate fault memory ⇒ 1.4/55, 1.4/74 Engine, Fuel Injection; Rep. Gr. 01.

– Read out Readiness code ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01.

– If the fault memory was erased or if the permanent power supply of the engine control unit was interrupted the readiness code must be generated again ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01.

Note

This test is foreseen for vehicles with a diagnosis of the vehicle voltage control unit and may indicate possible damage to the catalyst. If „Cat R1 N.O.K.“ is displayed,

the catalyst need not necessarily be replaced, it need only be replaced if the next exhaust emission test fails or if there is visible damage to the catalyst.

If the exhaust emission test fails or if the catalyst is damaged:

– Replace catalyst.

If the nominal value „Cat R1 O.K.“ is reached.

– Select function 06 „End output“ and switch ignition off.

26-2 Exhaust gas recirculation system

Note

The exhaust gas recirculation system is controlled by the 4LV control unit -J537- via the exhaust gas recirculation valve -N18- with exhaust gas recirculation potentiometer -G212-.

Summary of components of exhaust gas recirculation - engines with engine identification characters AUA, AUB, BBY, BBZ.

1 - Connector
- ❑ for exhaust gas recirculation valve -N18-

2 - EGR valve -N18- with potentiometer -G212-
- ❑ Inspect exhaust gas recirculation valve -N18- ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01
- ❑ Exhaust gas recirculation potentiometer -G212- ⇒ **26-2** page 2

3 - To air filter

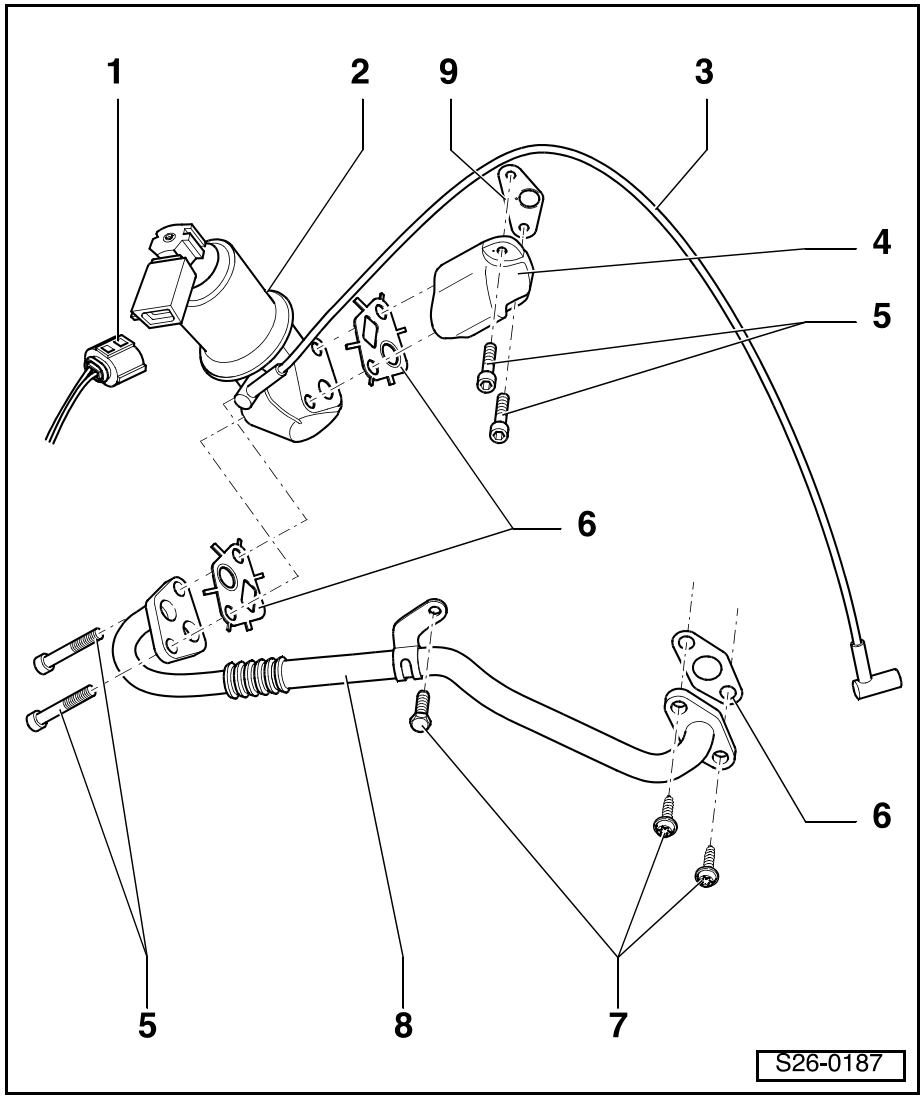
4 - Flange
- ❑ between EGR solenoid valve and cylinder head

5 - 20 Nm

6 - Gasket
- ❑ replace
- ❑ Check fitting position

7 - 10 Nm

8 - Connecting tube
- ❑ To intake manifold
- ❑ screw free of stress



Summary of components of exhaust gas recirculation - engine with engine identification characters BKY ➢ 05.05

1 - EGR valve -N18- with EGR potentiometer -G212-
- ❑ Inspect exhaust gas recirculation valve -N18- ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 01
- ❑ Exhaust gas recirculation potentiometer -G212- ⇒ **26-2** page 2

2 - Gasket
- ❑ replace

3 - Flange
- ❑ between EGR solenoid valve and cylinder head

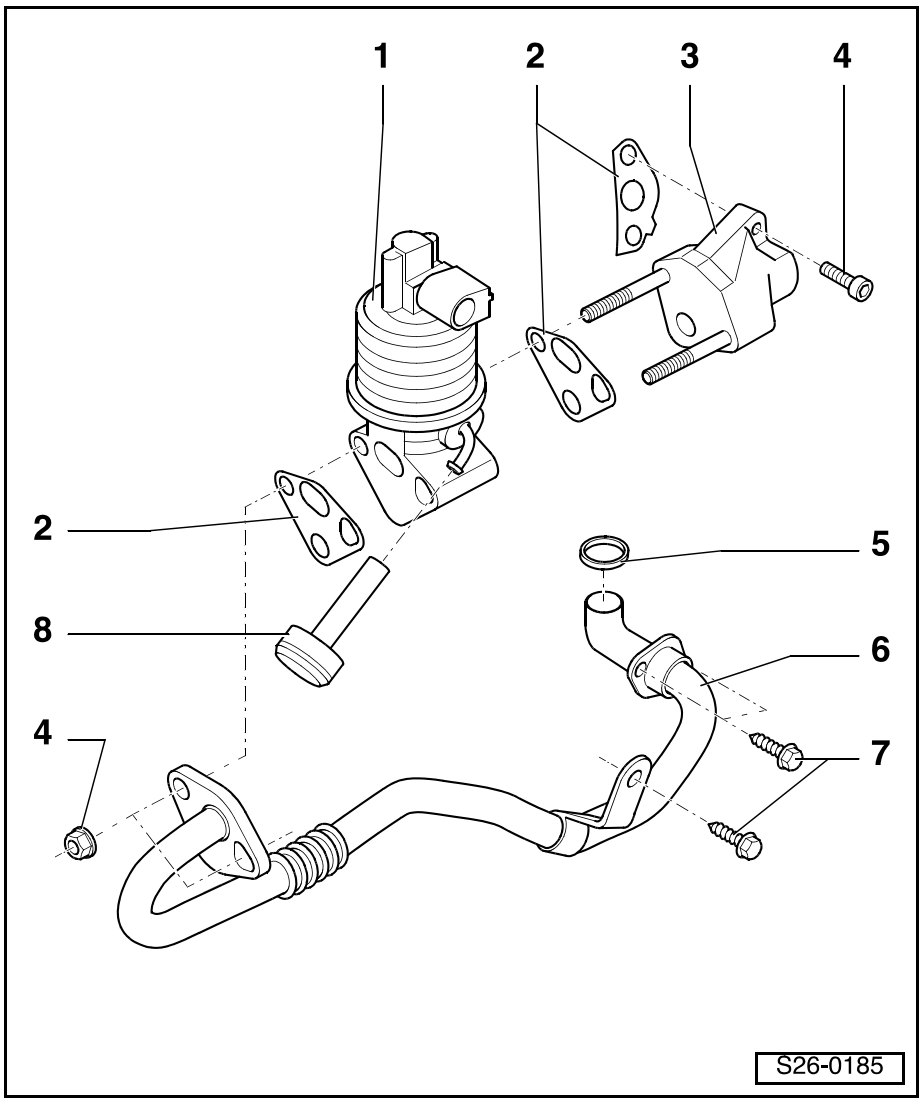
4 - 20 Nm

5 - Gasket ring
- ❑ replace

6 - Connecting tube
- ❑ To intake manifold
- ❑ screw free of stress

7 - 7 Nm

8 - Filter



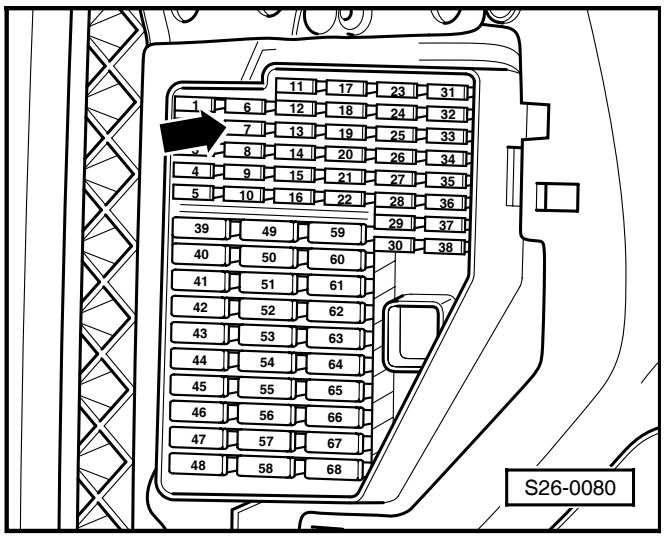
Check exhaust gas recirculation potentiometer -G212-

Special tools, test and measuring equipment and auxiliary items required

- Test box -V.A.G 1598/31-
- Measuring tool set e.g. -V.A.G 1594 C-
- Multimeter, e.g. -V.A.G 1526 A-
- Current flow diagram

Test condition

- Fuse No. 7 -arrow - must be O.K.



Test sequence

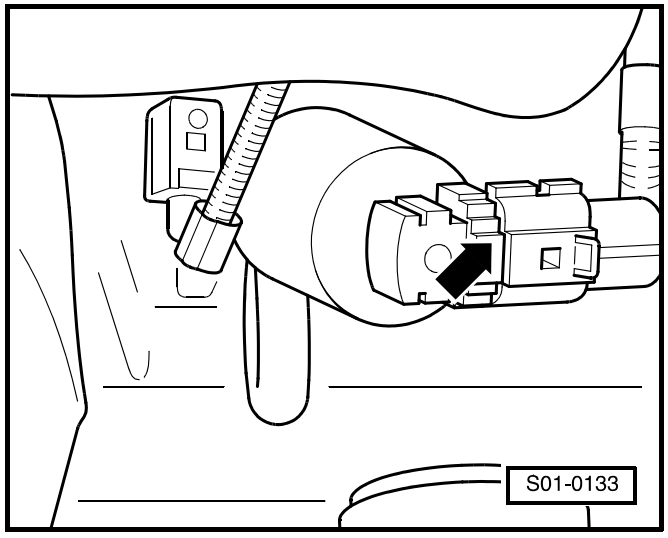
– Disconnect the 6 pin plug from the EGR valve. ►

– Switch on ignition.

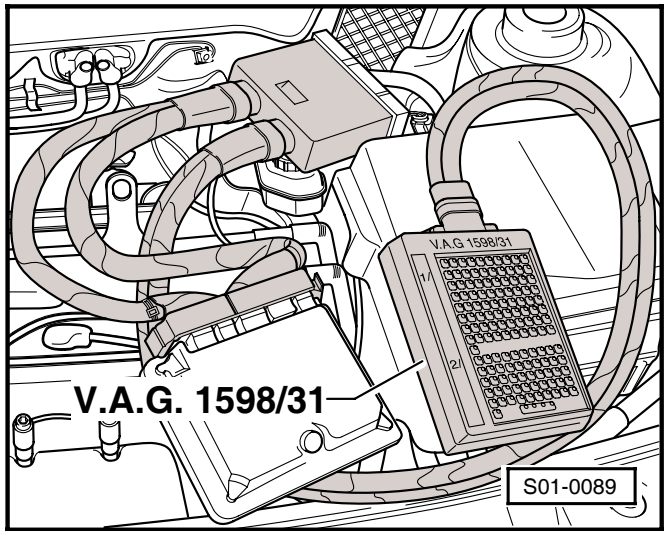
– Connect the multimeter for voltage measurement to contact 2 + 4 of the 6-pin plug.

Specified value: min. 4.5 V.

If the nominal value is measured:



– Connect test box -V.A.G 1598/31- to the wiring loom of the control unit (control unit is not connected). ►



– Check the cable from contact -6- of the plug to bush 100 of the test box -V.A.G 1598/31- for interruption. ►

Line resistance: max. 1.5 Ω

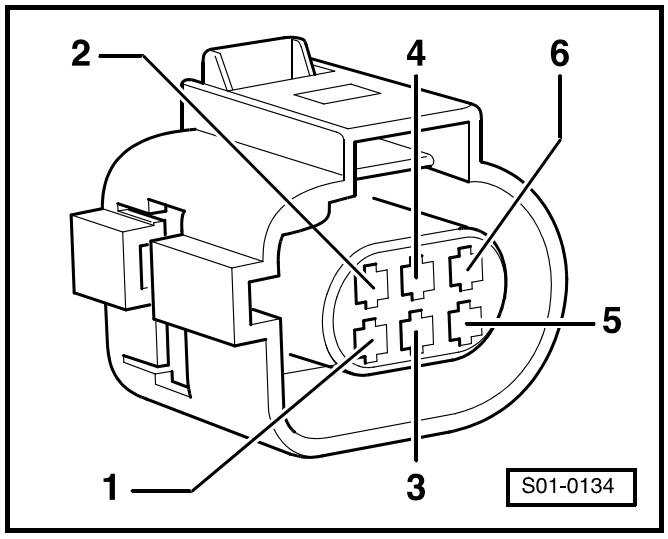
– Check the wiring of contact 6 on the plug for short-circuit to contact 2 + 4.

Specified value: ∞ Ω.

If the lines are not found to be faulty:

– Replace EGR valve -N18- with potentiometer -G212-.

If the nominal voltage between contacts 2 + 4 on the plug is not reached:



– Check wiring between the test box and the plug for interruption according to the Current Flow Diagram. ►

Plug contact	Bush to text box -V.A.G. 1598/31-
2	98
4	108
6	100

Line resistance: max. 1.5 Ω

– Check wiring for short-circuit, as well as for short-circuit to positive and earth.

Specified value: ∞ Ω.

If the lines are not found to be faulty:

– Replace 4LV control unit ⇒ 1.4/55; 1.4/74 Engine - Fuel Injection; Rep. Gr. 24.