

Workshop Manual OCTAVIA

**1.4 l/55 kW Engine,
Mechanical Components**

Supplement Overview for the Repair Manual **OCTAVIA**

Edition: 09.03

1.4 l/55 kW Engine, Mechanical Components

Replaces List of Supplements - Edition: 04.02

Supplement	Edition	Subject	Article Number
	02.01	Basic Edition	S00.5132.50.20
1	04.02	Changes for the engine BCA	S00.5132.51.20
2	09.03	Modifications in Repair Group 10, 13, 15, and 17	S00.5132.52.20
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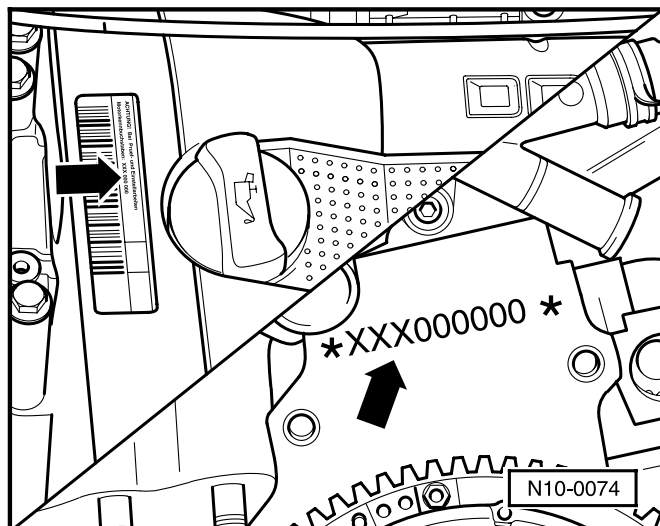
Technical data

Engine number

◀ The engine number („Engine identification characters“ and „Serial number“) is located on the end face of the cylinder block on the side of the gearbox below the coolant regulator housing -arrow-.

There is also a sticker with „Engine identification characters“ and „Serial number“ placed on the timing belt cover -arrow-.

The engine identification characters are also to be found on the vehicle data storage unit.



Features of the engine

Engine identification characters		AXP	BCA
Manufacture		08.00 ► 01.02	01.02 ►
Cubic capacity	l	1.390	1.390
Power output	kW at ...rpm	55/5000	55/5000
Torque	Nm at...rpm	128/3300	128/3300
Engine bore	diam. mm	76.5	76.5
Stroke mm		75.6	75.6
Compression ratio		10.5 : 1	10.5 : 1
Fuel - RON	minimum	95 lead-free ¹⁾	95 lead-free ¹⁾
Injection and ignition system		Motronic ME7.5.10	Motronic ME7.5.10
Knock control		Yes	Yes
Self-diagnostics		Yes	Yes
Lamda regulation		2 lamda probes	2 lamda probes
Catalytic converter		2 catalytic converters	2 catalytic converters
Turbocharging		No	No
Exhaust gas recycling		Yes	Yes
Secondary air system		No	No
Fulfils the exhaust gas limit values according to		EU-4	EU-4

¹⁾ in exceptional cases one can also use at least 91 RON but with reduced performance

Removing and installing engine

Special tools, testers and aids required

- ◆ Workshop crane e.g. -V.A.G 1202 A-
- ◆ Catch pan e.g. -V.A.G 1306-
- ◆ Torque wrench
- ◆ Pliers for spring strap clips
- ◆ Engine mount -MP 1-202-
- ◆ Repair stand -MP 9-101
- ◆ Lifting device -MP 9-201-
- ◆ Grease -G 000 100-
- ◆ Cable strap

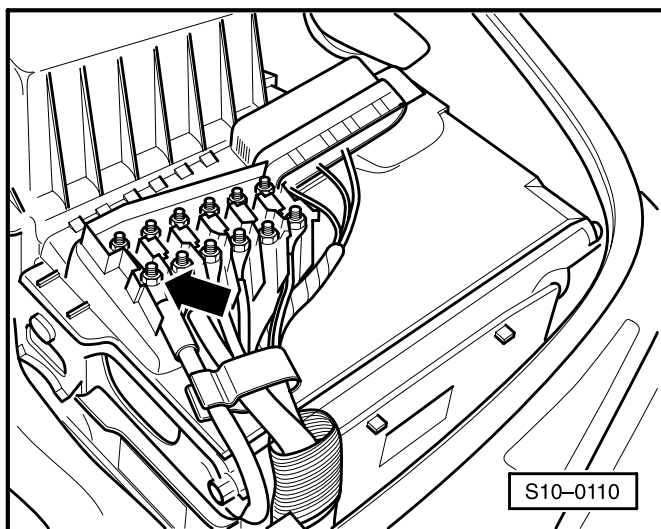
Removing

Notes:

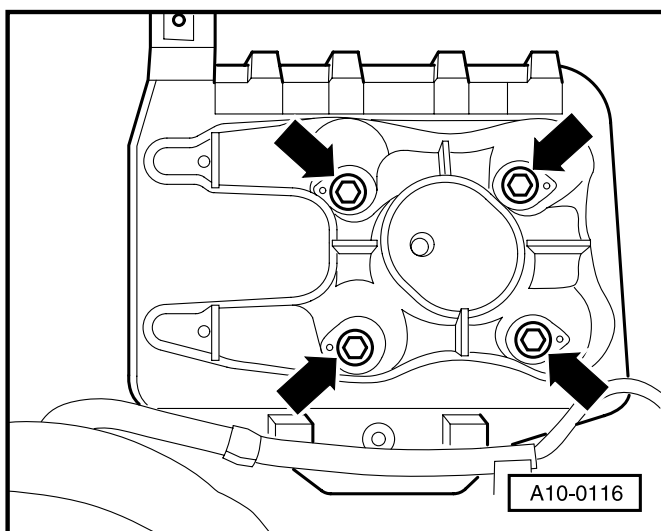
- ◆ *The engine is removed upwards together with the gearbox.*
- ◆ *All cable straps that have to be loosened when the engine was removed must be fitted again in the same location.*
- ◆ *Pay attention to correct assignment of the connectors, if necessary mark.*

Procedure

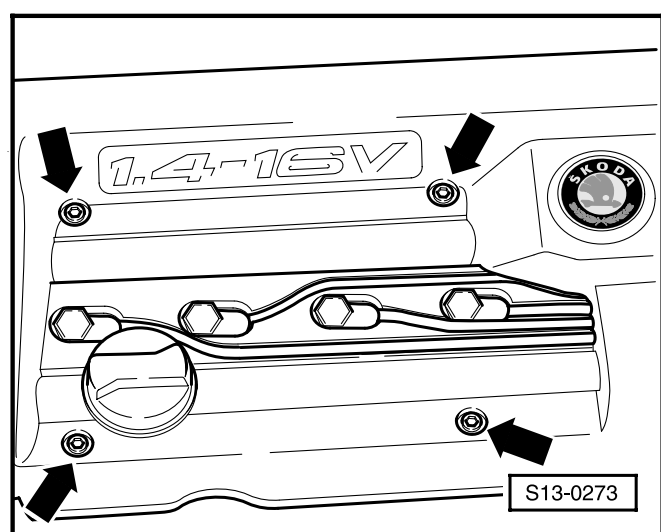
- On models fitted with a coded radio set, pay attention to the coding; determine if necessary.
 - Remove bonnet
- ⇒ Body Work: Repair Group 55.



- Switch ignition off and disconnect earth cable of battery.
- ◀ - Disconnect positive cable in security box at battery -arrows-.
- Disconnect cable from the battery to the security box at the battery and place to the side.
- Remove battery rack and lift battery out of the battery box.



- ◀ - Remove battery box.
- Disconnect positive cable from the battery to the starter (is removed together with the engine).
- Disconnect negative cable (is removed together with the engine).

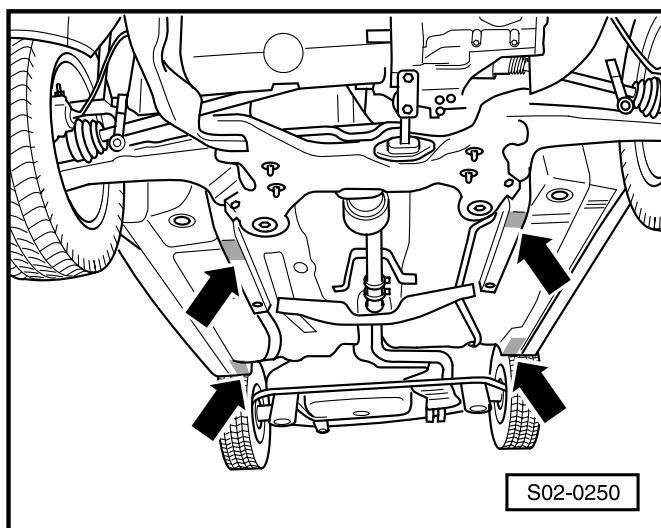


- ◀ - Remove engine trim panel -arrows-.
- Remove air filter
⇒ 1.4 I/55 kW Engine - Fuel Injection and Ignition System; Repair Group 24.

Note:

Before removing the poly V-belt, mark the direction of running. If a belt which has already been used, is fitted on again to run in the opposite direction, it may be destroyed. When installing the belt, ensure it is correctly positioned in the belt pulleys.

- Remove poly V-belt ⇒ page 13-4.
- Remove hydraulic pump of power-assisted steering and attach to the body. The lines remain connected.



- Open the cap of the expansion reservoir in order to release the pressure in the cooling system.

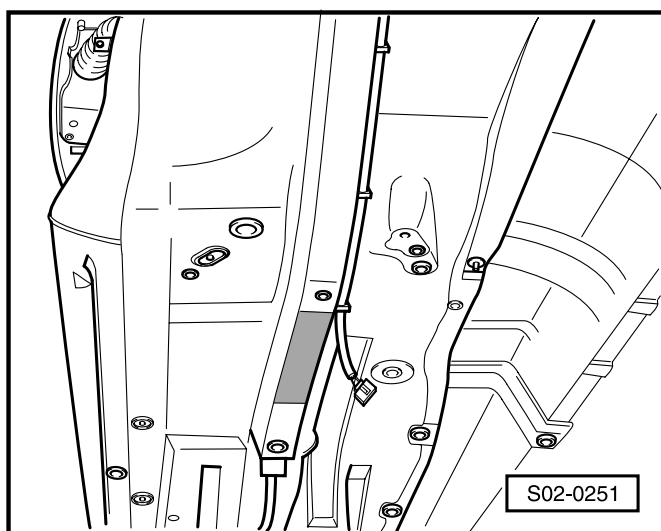
Warning!

Hot steam may escape when the expansion reservoir is opened. Cover over the cap with a cloth and open carefully.

- Raise vehicle with a lift platform; pay attention to the following points:
- ◀ - The arms of the lift platform must be positioned only below the side members of the body -arrows-.

Warning!

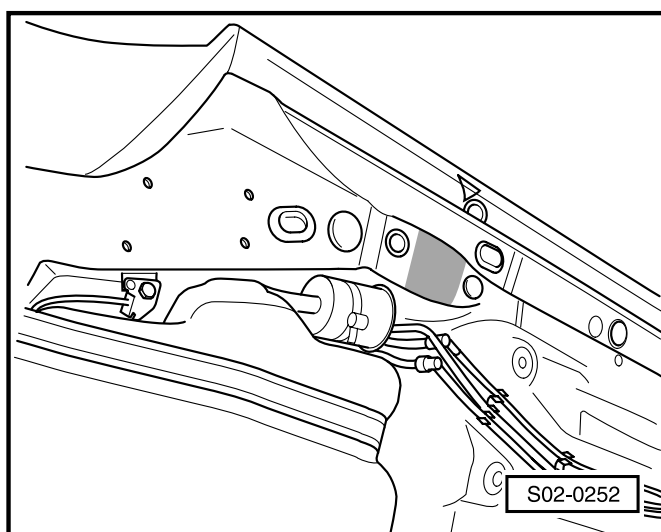
The arms of the lift platform must on no account be positioned below the sill, the front axle or rear axle.



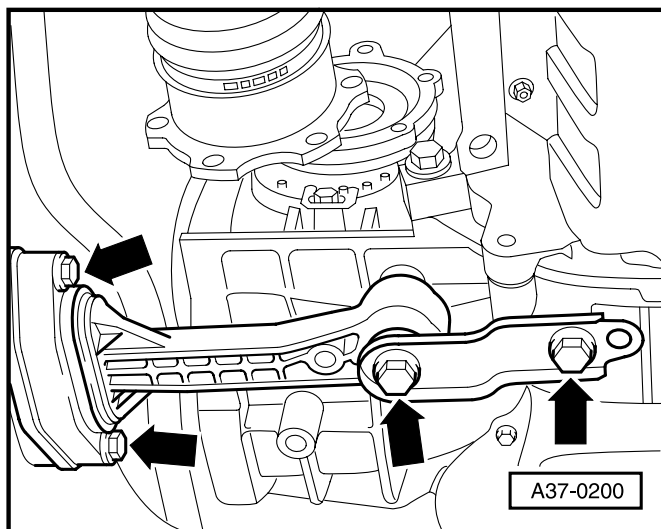
- ◀ - The two front jacking points are positioned at the two front side members at the level of the marking on the sill.

Warning!

Never start the engine and engage a gear when the vehicle is raised so long as only even one driven wheel is touching the ground.



- ◀ - The two rear jacking points are located at the two rear side members at the level of the marking on the sill.
- Remove plastic covers of engine.
- Unbolt front exhaust pipe from exhaust manifold and suspend at body ⇒ page 26-1.



- ◀ - Remove pendulum support -arrows-.
- Unbolt right and left drive shafts from gear-box
⇒ Running Gear; Repair Group 40; Removing and installing drive shaft.
- Drain coolant ⇒ page 19-9.

Models fitted with air conditioning

Warning!

Refrigerant circuit of air conditioning system must not be opened.

- Separate plug connection at AC compressor.
- Remove AC compressor and attach to lock carrier.

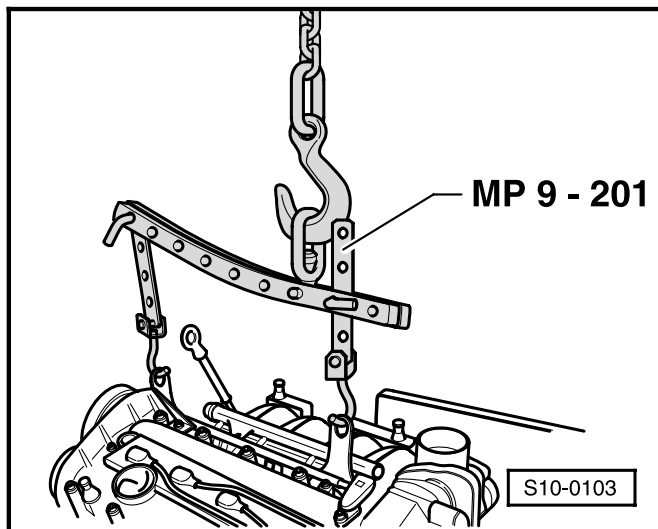
Continued for all models

- Remove clips for power-assisted steering pipe.
- Place drip tray below engine (e.g. -V.A.G 1306-).

Warning!

Fuel system is pressurized! Before opening system, place cleaning cloth around the connection point. Then, release pressure by carefully detaching the connection point.

- Detach feed line and return-flow line.
- Remove hoses of cooling and heating system.
- Detach hose of vent line of throttle valve.
- Detach vacuum hose to brake servo unit.
- Separate cable plug connections to gearbox and place to the side.
- Separate plug connections and cables of engine electrical system.
- Remove cover of plenum chamber
⇒ Body Fitting Work; Repair Group 66.
- Unplug connector of engine control unit, detach wiring loom from all the retaining clips and plug connections and attach at engine.

**Note:**

Engine is removed together with wiring loom.

- Remove cables of shift mechanism from gearbox and place down to the side.
⇒ Gearbox 02K; Repair Group 34.
- Remove clutch cylinder and place down to the side
⇒ Gearbox 02K; Repair Group 30.

Note:

Clutch pedal must not be depressed!

- ◀ - Attach lifting device -MP 9-201- and take up weight of engine with workshop crane.

Warning!

Use locking pins at the hooks and position pins to avoid any of them slipping out.

- Remove engine and gearbox mounts.
- Raise engine and run it out to the front.

Note:

Engine must be guided carefully so that it does not damage the body or other components.

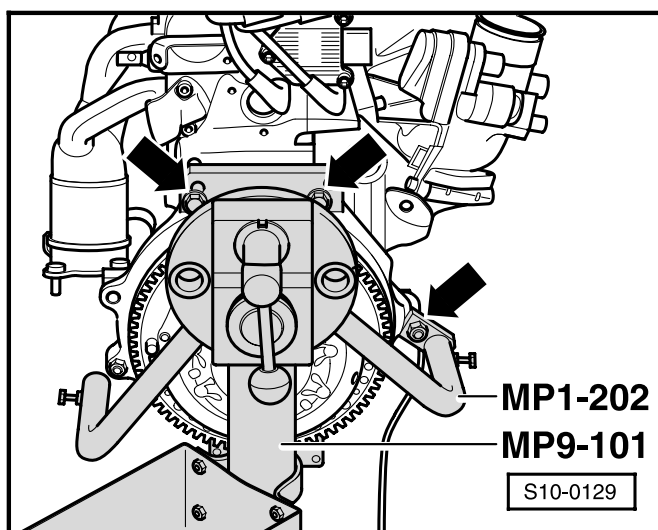
Attaching engine to repair stand

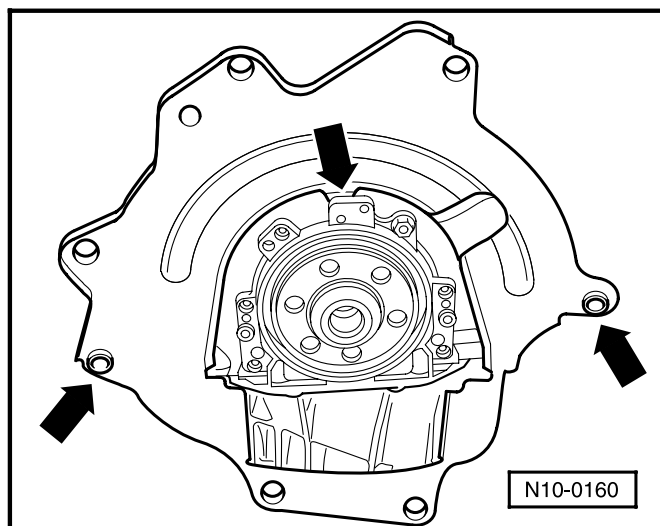
The engine must be attached with engine holder -MP 1-202- to the repair stand -MP 9-101- for carrying out any removal and installation operations.

- Unbolt gearbox from engine.
- ◀ - Attach engine to engine holder -MP 1-202- -arrows- at tensioning bracket -MP 9-101- and bolt on.

Note:

The engine can be supported only at three points because of the different spacing of the holes in the engine holder and the holes in the engine flange.





Installing

- Check whether the fitting sleeves for centring the cylinder block have been inserted and insert if necessary.
- ◀ - Hang in the intermediate plate on the sealing flange and push onto the fitting sleeves -arrow-.
- Take care that the intermediate plate is sitting properly.
- Check the centring of the coupling drive plate.
- Inspect the clutch release bearing for wear, replace if necessary.
- Slightly lubricate the clutch release bearing, guide bushing for clutch release bearing and serration of the drive shaft with grease -G 000 100-.
- Lower the engine into the engine compartment
- Install the console on the side of the gear-box.
Tightening torques ⇒ Page 10-11.
- Fix the assembly in the gearbox mount with clips.
Tightening torques ⇒ Page 10-11.
- Align the drive shafts.
- Install the console on the side of the engine mount.
Tightening torques ⇒ Page 10-11.
- Install the assembly on engine bracket.
Tightening torques ⇒ Page 10-11.
- Install the vane pump for the power steering
⇒ Chassis; Rep. Gr. 48; Removing and installing the vane pump for the power steering.
- Install the control cables for the gearshift mechanism
⇒ Gearbox 02K, Rep. Gr. 34.
- Installing the coupling cylinder
⇒ Gearbox 02K, Rep. Gr. 30.
- Install the drive shafts.
⇒ Chassis, Rep. Gr. 40; Removing and installing the drive shaft.

- Install the pendulum support and tighten the screws to the given tightening torques ⇒ Page 10-11.
- Install the air-conditioning compressor
- Fix the power-assisted steering pipe in place.
- Install the V-ribbed belt ⇒ Page 13-4.
- Install the exhaust pipe at the front and set-up the exhaust system so that it is not under tension ⇒ Page 26-1.
- Install the plastic covers for the engine.
- Close off the coolant shut-off valve.

Note:

All cable binders which were loosened or cut when removing the engine must be brought back into the same position when installing the engine.

- Connect up the air-conditioner plug connection.
- Connect together the plug connections and lines for the electrical engine systems.
⇒ Current Flow Diagrams, Fault Finding Electrics, Fitting Locations.
- Connect up the lines and plug for the sender to the gearbox.
⇒ Current Flow Diagrams, Fault Finding Electrics, Fitting Locations.
- Connect up the plug connector to the engine control unit.
- Connect up the fuel delivery line and the fuel return line.
- Install the hoses for the cooling and heating systems.
- Connect up the hose for the ventilation line of the throttling flap valve.
- Place on the vacuum hose of the brake servo unit.
- Install the battery box.
- Place the battery in the battery box and connect up.
- Install the engine covers.

- Install the plenum chamber cover
⇒ Body work, Rep. Gr. 66.

- Install the engine flap valve
⇒ Body work, Rep. Gr. 55.

Note:

Only use drained off coolant again when the cylinder block, cylinder head, radiator or heat exchanger have not been replaced.

- Fill up with coolant ⇒ Page 19-9.
- Connect up the electrical equipment
⇒ Current Flow Diagrams, Fault Finding Electrics, Fitting Locations.

Note:

All other additional work has to be undertaken as well when disconnecting and reconnecting the battery earth band ⇒ Electrical System, Rep. Gr. 27.

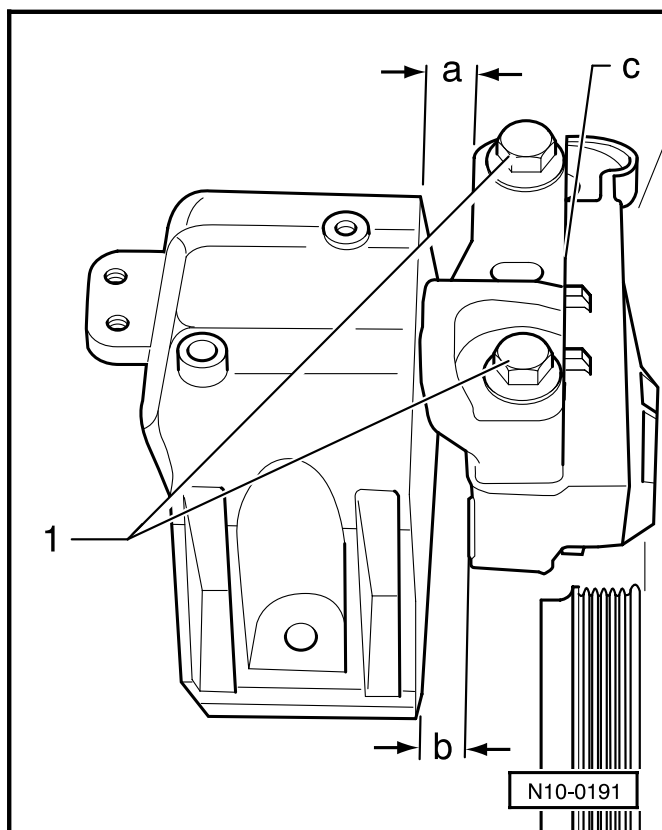
- Undertake fitting of the throttling flap valve control unit.
⇒ 1.4 l/55 kW engine - Injection and Ignition System; Rep. Gr. 24; Fitting the throttling flap valve control unit.
- Undertake a test drive, interrogate the error memory and then delete it
⇒ 1.4 l/55 kW engine - Injection and Ignition System; Rep. Gr. 01; Interrogating the error memory and deleting it.

Tightening torques

Note:

- ◆ *Tightening torques only apply to lightly greased, oiled, phosphated or carbonised nuts and screws/bolts.*
- ◆ *Additional lubricant such as engine or gearbox oil are allowed but one must not use Molykote.*
- ◆ *Do not use degreased parts*
- ◆ *The following tightening torques will apply if no other figures are quoted:*

Component		Nm
Screws/nuts	M6	9
	M8	20
	M10	40
	M12	70
The following deviate from this:		
Connecting screws Engine to gearbox		⇒ Gearbox 02K; Rep. Gr. 34
Drive shaft on the gearbox flange		⇒ Chassis; Rep. Gr. 40



Aligning the assembly bracket for the engine and gearbox

Warning!

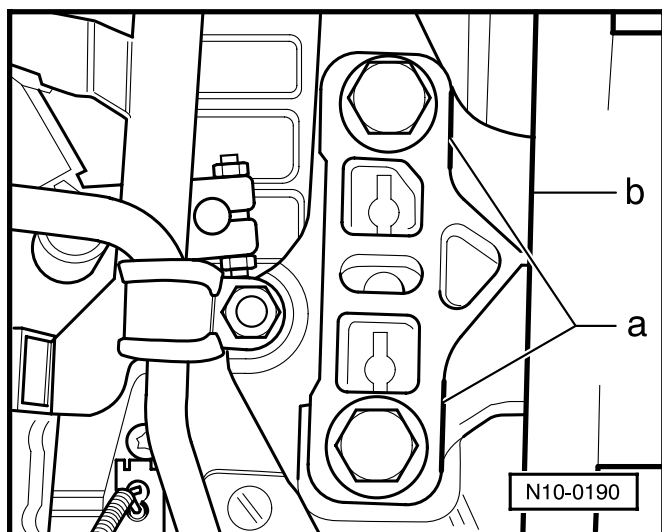
The assembly must be secured using the supporting device MP 9-200 before loosening the screws.

◀ Assembly bracket for the engine

a = 14.0 mm

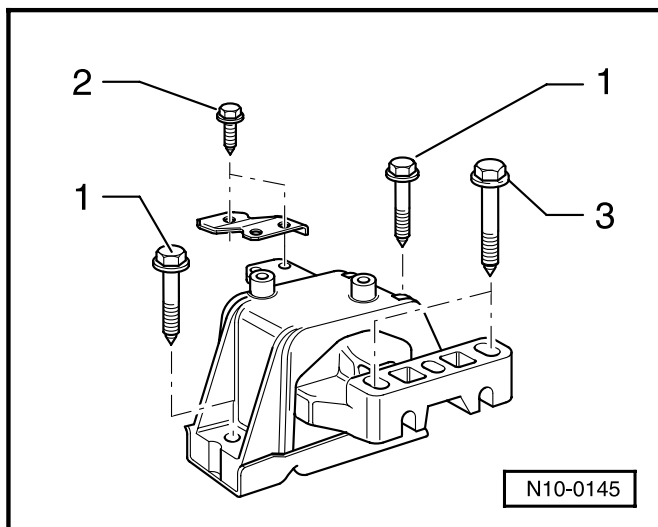
b = at least 10.0 mm

Both screw heads -1- must be flush with the edge -c-



◀ Assembly bracket for the gearbox

Edges -a- and -b- must be parallel to each other.



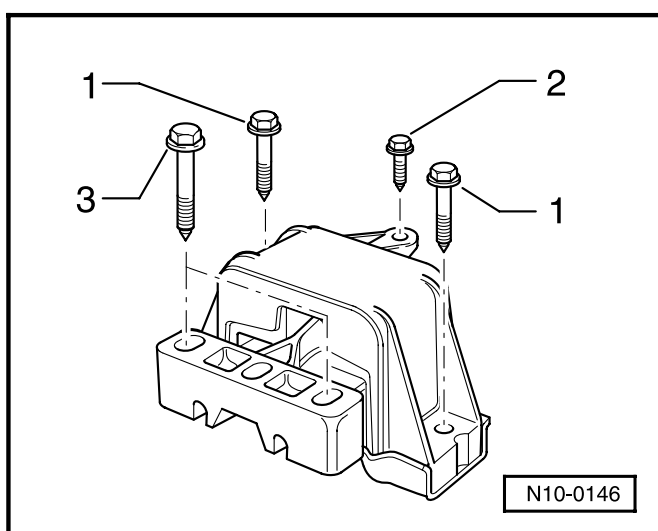
Assembly bracket

Tightening torques

◀ Assembly bracket for the engine

- 1 40 Nm + 90° ($\frac{1}{4}$ of a revolution)¹⁾
- 2 25 Nm
- 3 100 Nm¹⁾

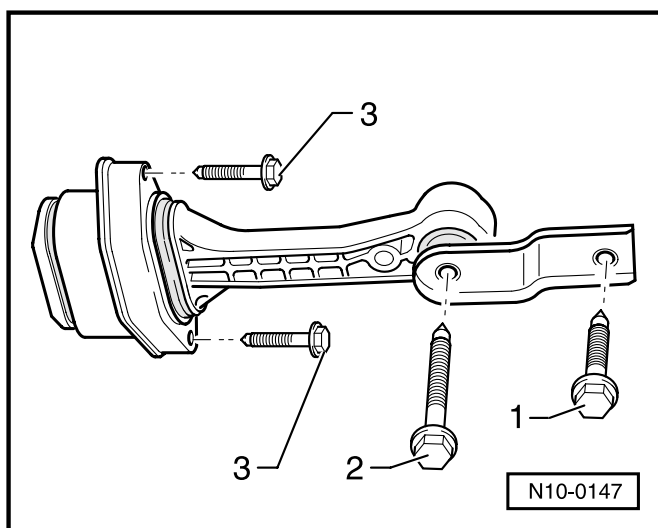
¹⁾ Always replace the screws



◀ Assembly bracket for the gearbox

- 1 40 Nm + 90° ($\frac{1}{4}$ of a revolution)¹⁾
- 2 25 Nm
- 3 100 Nm¹⁾

¹⁾ Always replace the screws



◀ Pendulum support

- 1 40 Nm + 45°¹⁾
- 2 40 Nm + 45°¹⁾
- 3 20 Nm + 90° ($\frac{1}{4}$ of a revolution)¹⁾

¹⁾ Always replace the screws

Additional guidelines and assembly work to be done on vehicles with an air-conditioning system

Warning!

The circuit of the air-conditioning system must not be opened.

Note:

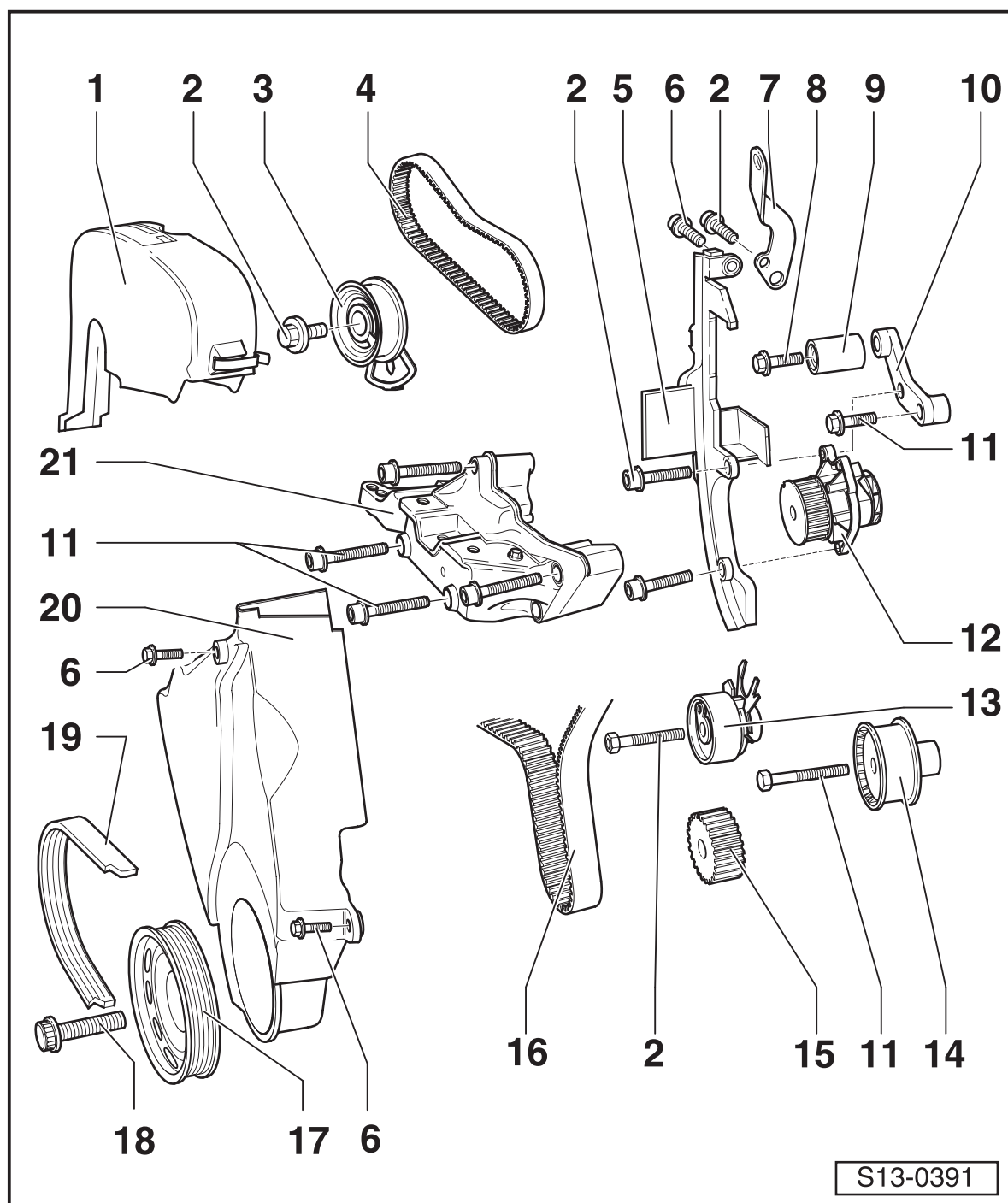
To avoid damaging the condenser, wiring and air conditioning hoses make sure that the lines and hoses are not excessively expanded, kinked or bent.

For the case where the engine is removed without opening the circuit of the air-conditioning unit:

- Unscrew the holding clamps for the air-conditioning unit line.
- Remove the V-ribbed belt ⇒ Page 13-4
- Remove the air-conditioning unit compressor
- Hang the air-conditioning unit compressor on the chassis in such a way that the lines and hoses are not under tension.

Disassembling and assembling engine

Removing and installing parts of engine on toothed belt side



1 - Top part of toothed belt guard

2 - 20 Nm

3 - Coupling drive-tensioning pulley

- ◆ inspecting ⇒ page 13-5
- ◆ tension toothed belt ⇒ page 13-5

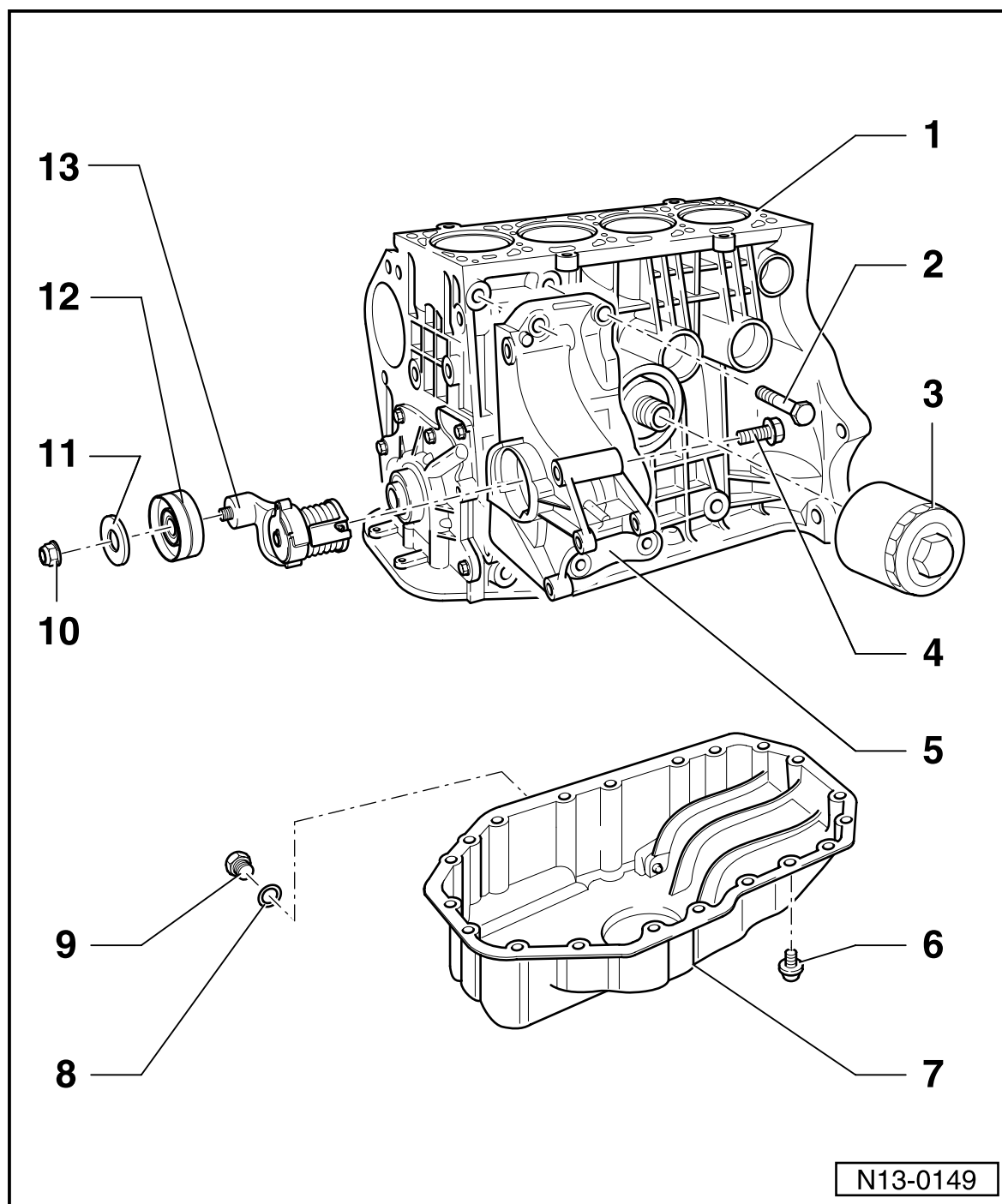
4 - Coupling drive-toothed belt

- ◆ mark running direction before removing
- ◆ inspect for wear
- ◆ do not kink
- ◆ routing of toothed belt ⇒ page 13-5
- ◆ removing and installing, tensioning ⇒ page 13-5

5 - Rear toothed belt guard

- 6 - 12 Nm**
- 7 - Lifting eye**
- 8 - 25 Nm**
- 9 - Guide pulley**
- 10 - Bracket**
- 11 - 50 Nm**
- 12 - Coolant pump**
 - ◆ removing and installing ⇒ page 19-13
- 13 - Main drive-tensioning pulley**
 - ◆ inspecting ⇒ page 13-5
 - ◆ tension toothed belt ⇒ page 13-5
- 14 - Guide pulley**
- 15 - Crankshaft toothed belt sprocket**
 - ◆ pay attention to position of toothed belt when installing
- 16 - Main drive-tensioning pulley**
 - ◆ mark running direction before removing
 - ◆ inspect for wear
 - ◆ do not kink
 - ◆ routing of toothed belt ⇒ page 13-5
 - ◆ removing and installing, tensioning ⇒ page 13-5
- 17 - Belt pulley**
 - ◆ pay attention to attachment when installing
- 18 - 90 Nm + torque a further $\frac{1}{4}$ turn (90°)**
 - ◆ replace
 - ◆ oil slightly
 - ◆ tightening may occur in several stages
 - ◆ the torquing angle can be measured with a commercially available angle measuring plate, e.g. -Hazet 6690-
- 19 - Ribbed V-belt**
 - ◆ mark running direction before removing
 - ◆ removing and installing ⇒ page 13-4
 - ◆ routing of toothed belt ⇒ page 13-4
- 20 - Bottom part of toothed belt guard**
- 21 - Console**

Removing and installing engine components at engine block side



1 - Cylinder block

- ♦ disassembling and assembling cylinder block ⇒ page 13-14
- ♦ disassembling pistons and conrods ⇒ page 13-28

2 - 50 Nm

- ♦ tightening order: tighten top right bolt first, then bottom right bolt, bolts on left last (viewed in direction of travel)

3 - Oil filter

- ♦ tighten by hand
- ♦ pay attention to installation instructions on oil filter

4 - 20 Nm + torque a further $\frac{1}{4}$ turn (90°)

5 - Compact holder

- ◆ for AC compressor and alternator
- ◆ removing and installing compact holder for models with air conditioning
⇒ heating, air conditioning; Repair Group 87

6 - 13 Nm**7 - Oil pan**

- ◆ removing and installing ⇒ page 17-3

8 - Seal

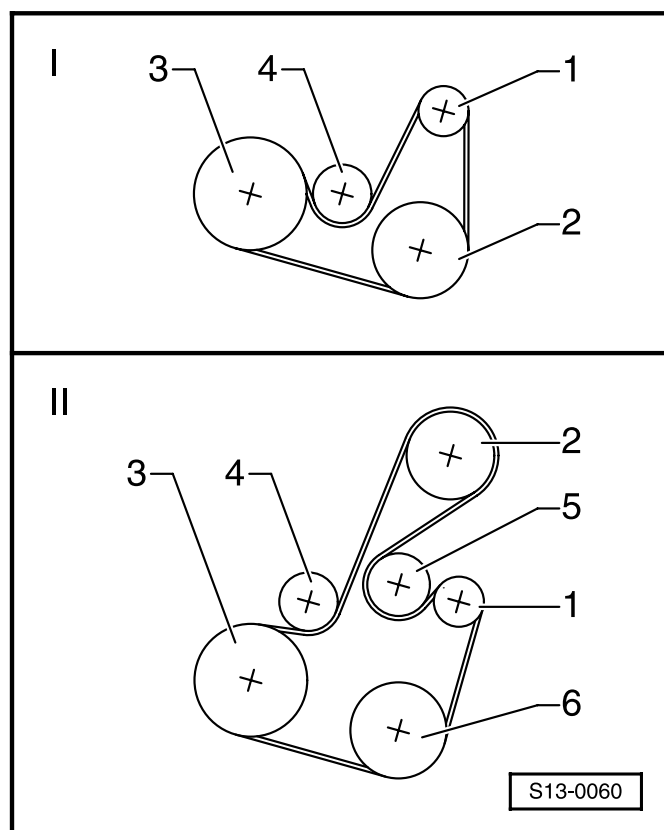
- ◆ replace

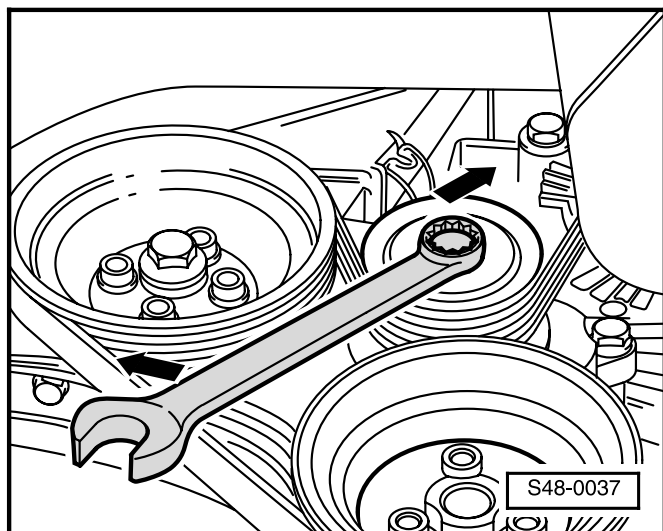
9 - Oil drain plug, 30 Nm**10 - 45 Nm****11 - Washer****12 - Tensioning pulley****13 - Tensioning element****Removing and installing poly V-belt****Note:**

Mark the direction of running of the poly V-belt before removing it. If a belt which has already been used is fitted on again to run in the opposite direction it may rapidly be destroyed. When installing the belt, ensure it is correctly located in the belt pulleys.

◀ Routing of poly V-belt**I - Models without AC compressor****II - Models with AC compressor**

- 1 - Alternator
- 2 - Power steering hydraulic pump
- 3 - Crankshaft
- 4 - Tensioning pulley
- 5 - Guide pulley
- 6 - AC compressor





Removing ribbed V-belt

- ◀ - Swivel tensioning pulley with a wrench in direction of -arrow-.
- Remove ribbed V-belt.

Installing ribbed V-belt

- First position the ribbed V-belt on the crankshaft toothed belt sprocket, then on the AC compressor belt pulley.
- Release tensioning pulley with the wrench and pull under ribbed V-belt.
- Check whether the ribbed V-belt fits correctly in the ribbing of all tensioning pulleys.
- Check belt with the engine running in idle.

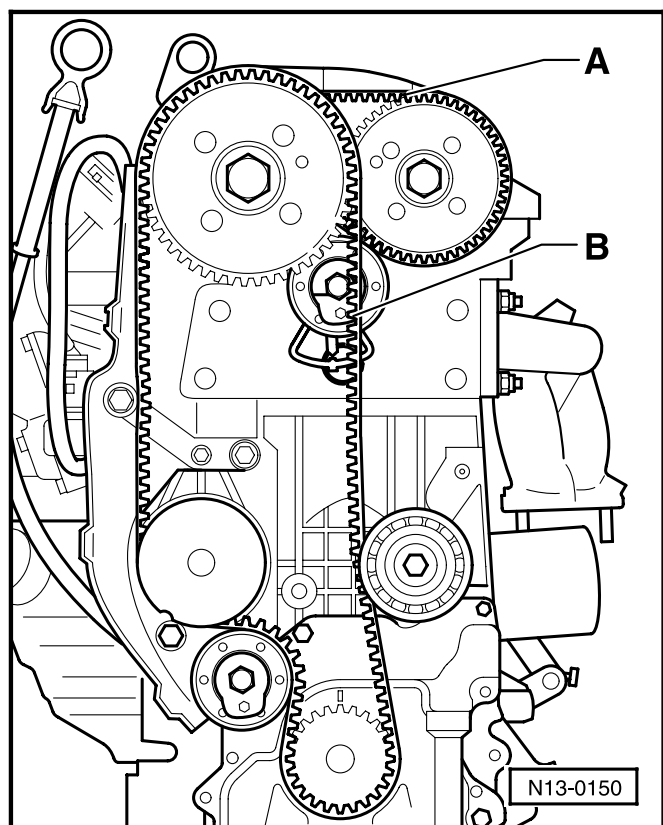
Removing and installing, tensioning toothed belt and inspecting the semi-automatic toothed belt tensioning pulley

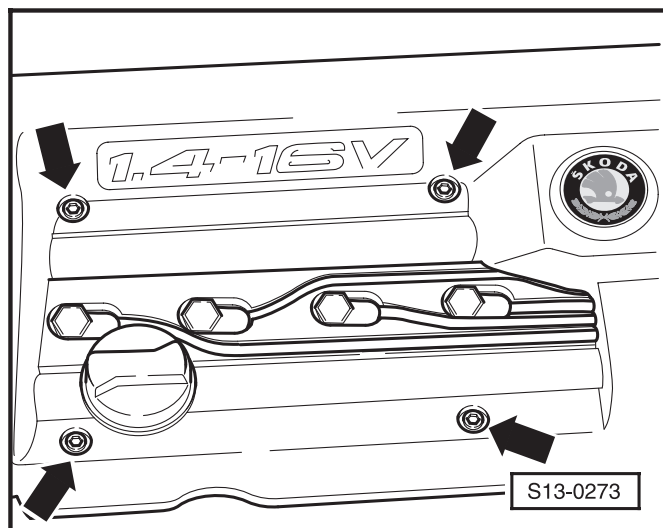
Special tools, testers and aids required

- ◆ Supporting device -MP 9-200-
- ◆ Counterholder -T30004- with replaceable stud -T30004/1-
- ◆ Camshaft lock -T10016-
- ◆ Torque wrench

◀ Routing of ribbed V-belt

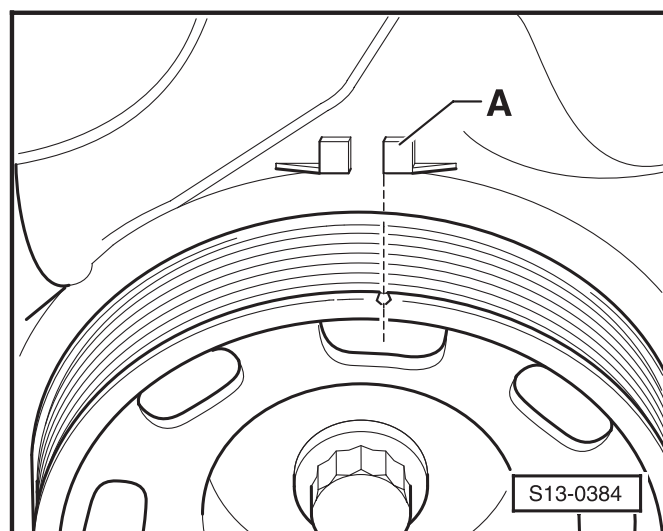
- A - Coupling drive-toothed belt
- B - Main drive-toothed belt



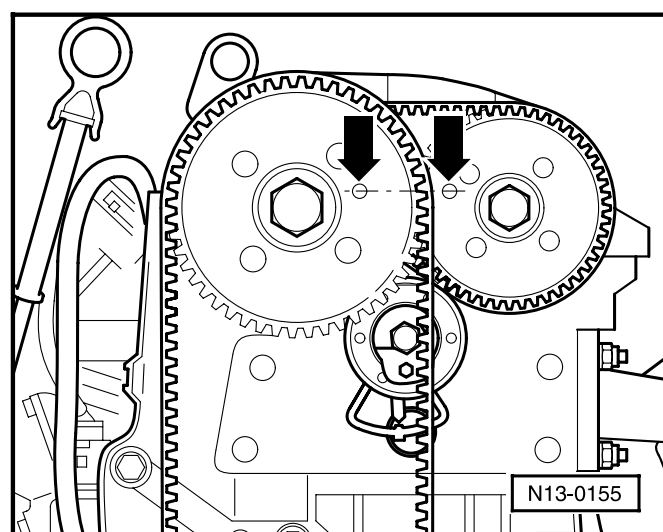


Removing and installing main drive-toothed belt

- ◀ - Remove engine cover -arrows- (cover for engine with identification characters AXP)
- Remove air filter
⇒ 1.4/55 kW Engine, Motronic Injection and Ignition system; Repair Group 24.
- Remove ribbed V-belt ⇒ page 13-4.
- Remove top part of toothed belt guard.
- Remove noise insulation.



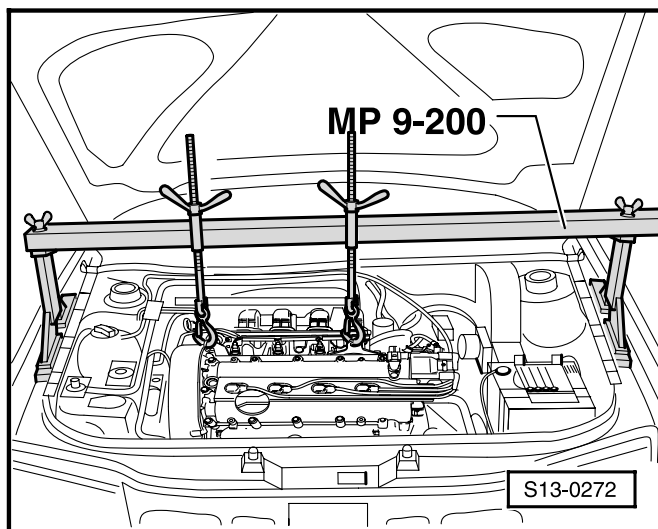
- ◀ - Position crankshaft to TDC of cylinder 1. The notch on the belt pulley must be aligned with the edge of the marking -A-.



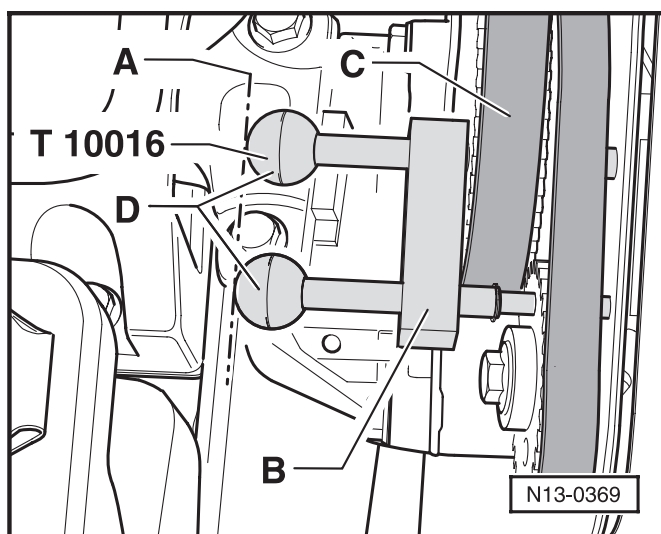
- ◀ - The locating holes in the camshaft sprockets must be aligned with the fit holes in the camshaft housing -arrows-.

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.



- ◀ - Insert supporting device -MP 9-200-.
- Remove the top securing screw from the bottom toothed belt shield below the engine mount.
- Remove power steering fluid reservoir, detach coolant reservoir and place down to the side.
- Remove assembly bearing together with body support
- Remove engine mount at cylinder head.



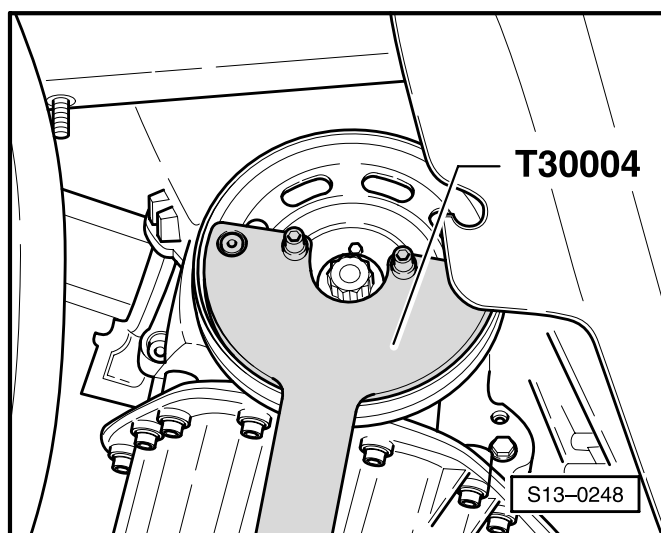
Attach both camshaft sprockets with device -T10016- as follows:

- ◀ - Insert the two locking pins through the locating holes of the camshaft sprockets up to the stop in the fit holes in the camshaft housing.

Note:

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

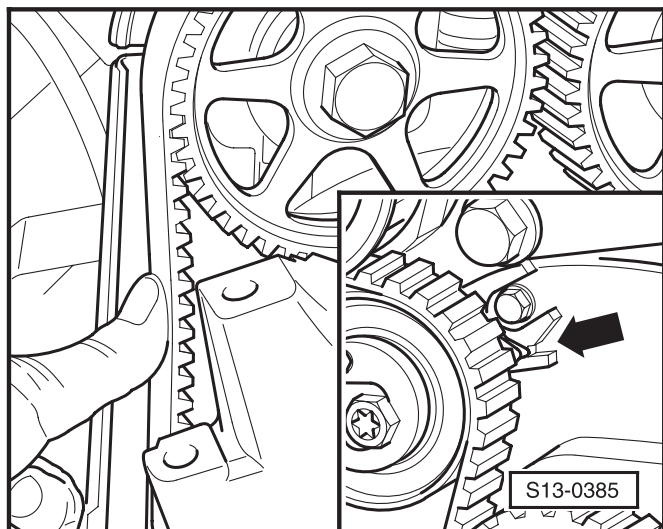
- Push the bracket -B- up to the stop onto the camshaft sprocket -C-.



- ◀ - Counterhold belt pulley with device -T30004- with inserted replaceable stud -T30004/1- and release the fixing screw for belt pulley and toothed belt gear.
- Remove belt pulley. Screw in the fixing screw with two washers to secure the toothed belt gear.
- Remove bottom part of toothed belt guard.
- For vehicles with air conditioning system remove the tensioning pulley.
- Mark the rotation direction of both toothed belts.

Note:

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

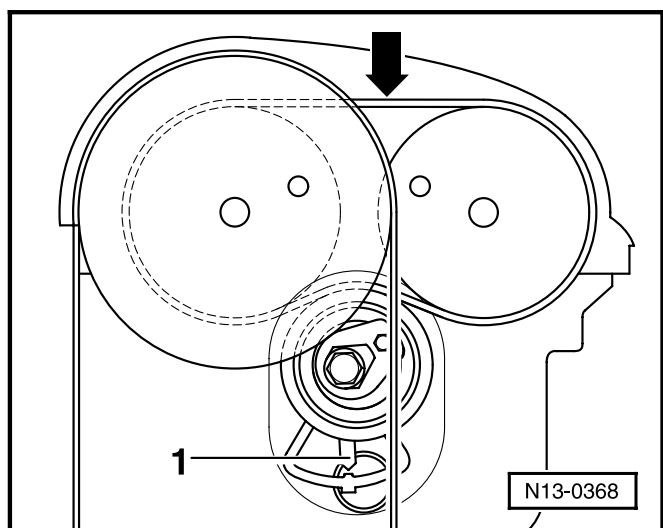


Inspecting main drive-tensioning pulley

- ◀ - Mark the pointer position of the tensioning pulley -arrow-. Use your thumbs to forcefully press on the toothed belt. 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 have returned to its initial position.

If the pointer has not returned to its initial position:

- Replace tensioning pulley.

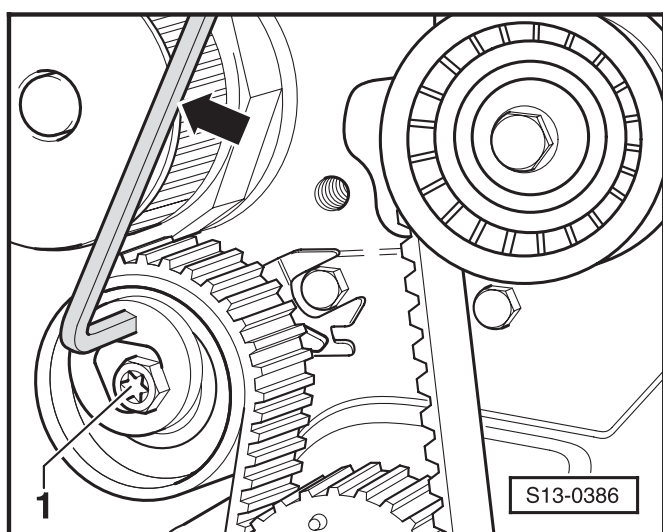


Inspecting coupling drive-tensioning pulley

- ◀ - Mark the pointer position of the tensioning pulley -1-. Use your thumbs to forcefully press on the toothed belt -arrow-. 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 have returned to its initial position.

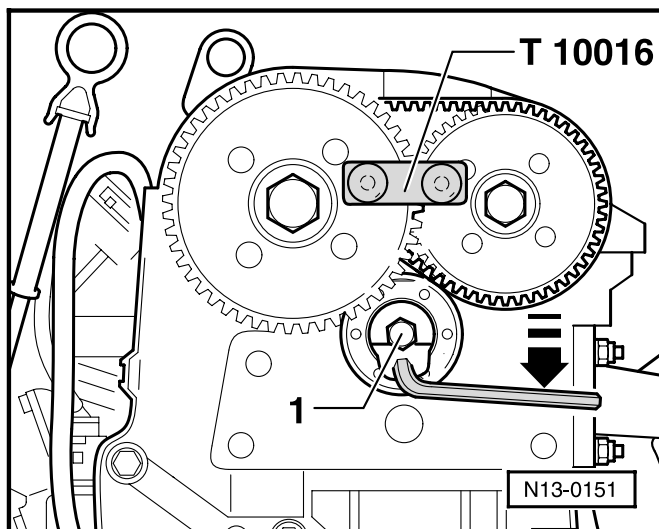
If the pointer has not returned to its initial position:

- Replace tensioning pulley.



Removing 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 the arrow-.
- Remove tensioning pulley.
- Remove camshaft lock -T 10016-.
- Remove toothed belt.
- Lock both camshaft sprockets with camshaft lock -T 10016-.



Removing coupling 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 the arrow-.
- Remove coupling drive-tensioning pulley.
- Remove toothed belt.

Installing

When installing, pay attention to the following:

- The toothed belt sprocket of the crankshaft is secured to the crankshaft with the fixing screw and two washers.
- Lock the camshaft sprockets with device T 10016 in the fit holes in the camshaft housing and secure against turning.

Note:

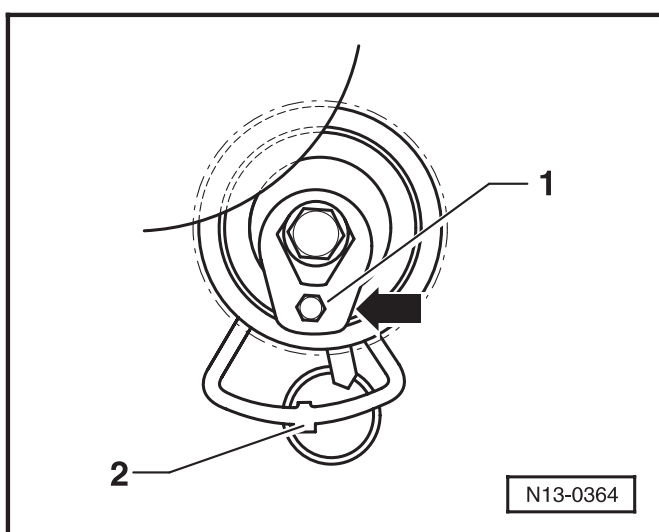
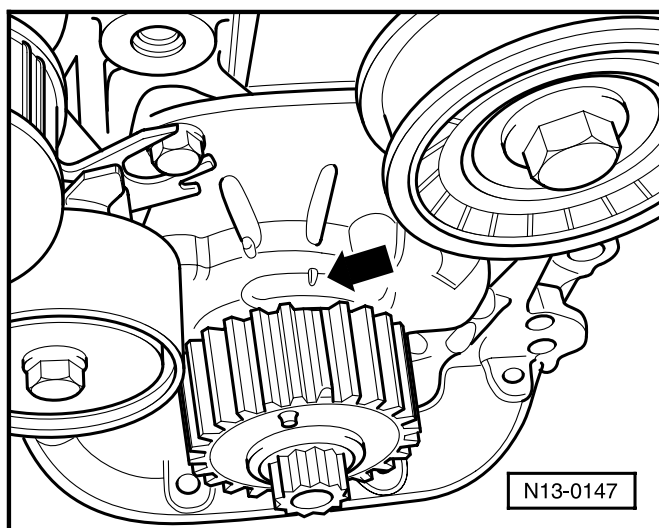
When turning the camshaft the valves may touch the piston in TDC.

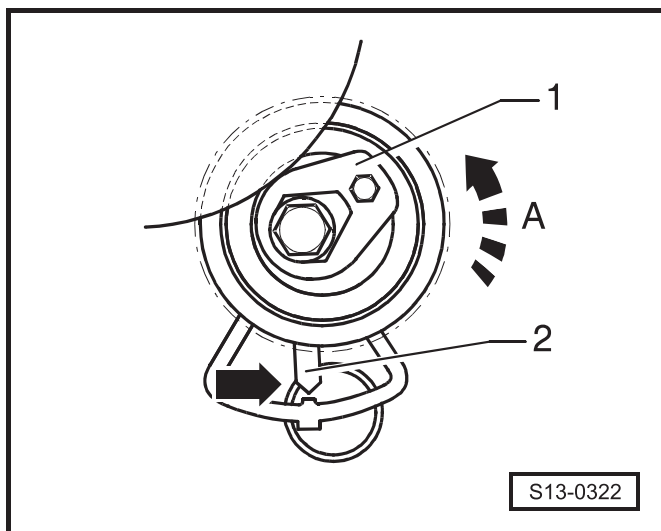
Procedure

- ◀ - Position crankshaft to top TDC of 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.

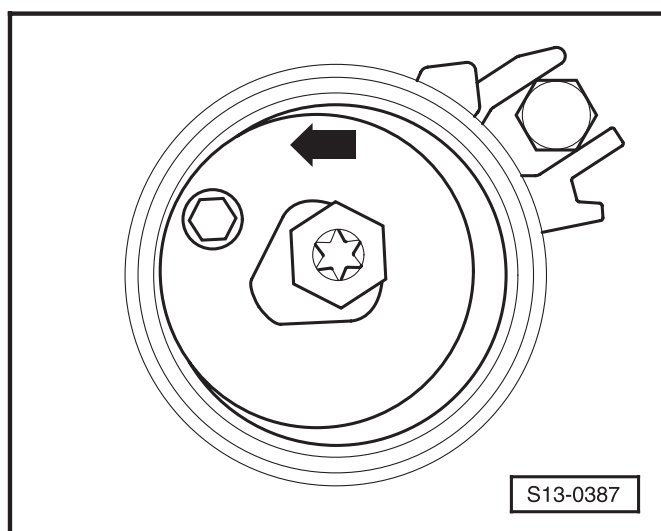
Install coupling drive-tensioning pulley as follows:

- ◀ - Loosely attach the coupling drive-tensioning pulley with Allan screw -1- towards the marking window -arrow- (tensioning pulley in released position) and tighten the fixing screw manually.
- Push the bottom part of the coupling drive-toothed belt using the tensioning pulley upwards. The peg of the base plate -2- must engage in the bore in the cylinder head.





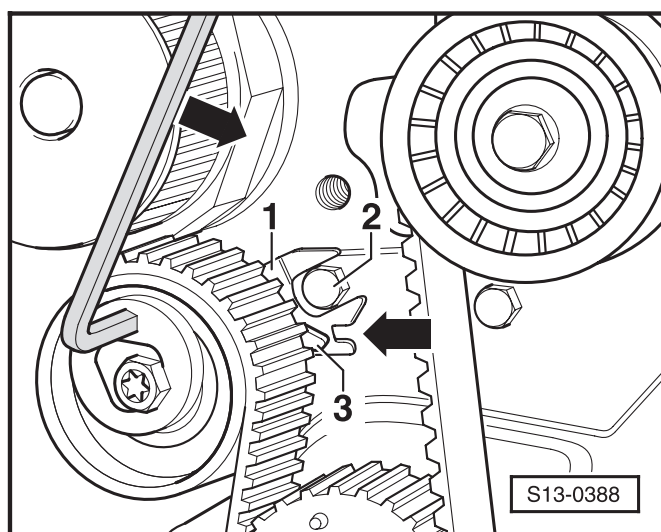
- ◀ - Subsequently tension the toothed belt by turning the tensioning pulley with an Allan key -1- anti-clockwise until the pointer -2- is positioned over the peg in the base plate in the marking window -arrow-.
- Tighten fixing screw of the tensioning pulley to tightening torque 20 Nm.
- Remove camshaft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



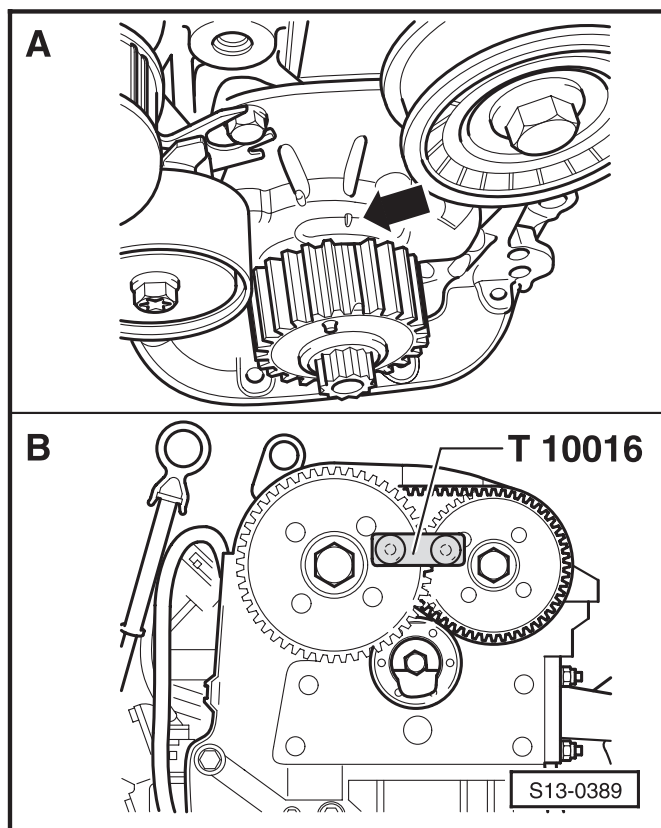
- Lock both camshaft sprockets with camshaft lock -T 10016-.

Installing main drive-tensioning pulley

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



- ◀ - Tighten the fixing screw manually. The screw in the cylinder block -2- must lock in the recess on the base plate -1-.
- 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 fixing screw of the tensioning pulley to tightening torque 20 Nm.
- Remove camshaft lock -T 10016-.



- ◀ - Now turn crankshaft two turns further in the running direction of the engine until the crankshaft is again on TDC for cylinder 1. The chamfered tooth must correspond with the marking on the sealing flange -arrow- in fig. -A-

In this position both camshaft sprockets must be locked with device -T 10016- in fig. -B-.

- Then inspect the toothed belt setting and tensioning pulley setting again, if necessary repeat tensioning of the two toothed belts.
- Install toothed belt guard.
- Install crankshaft belt pulley. Pay attention to the following:
 - ◆ The fixing screw for the belt pulley and toothed belt sprocket must be replaced.
 - ◆ Pay attention to the toothed belt sprocket attachment when installing the belt pulley.
 - ◆ Tightening process for the new oiled screw: 90 Nm + torque a further $\frac{1}{4}$ turn (90°).
- Install noise insulation
- Install engine console on cylinder head (50 Nm)
- Install assembly bearing. Tightening torques ⇒ page 10-11.
- Remove power steering fluid reservoir and install coolant reservoir.
- Install top part of toothed belt guard
- Install ribbed V-belt ⇒ page 13-4.

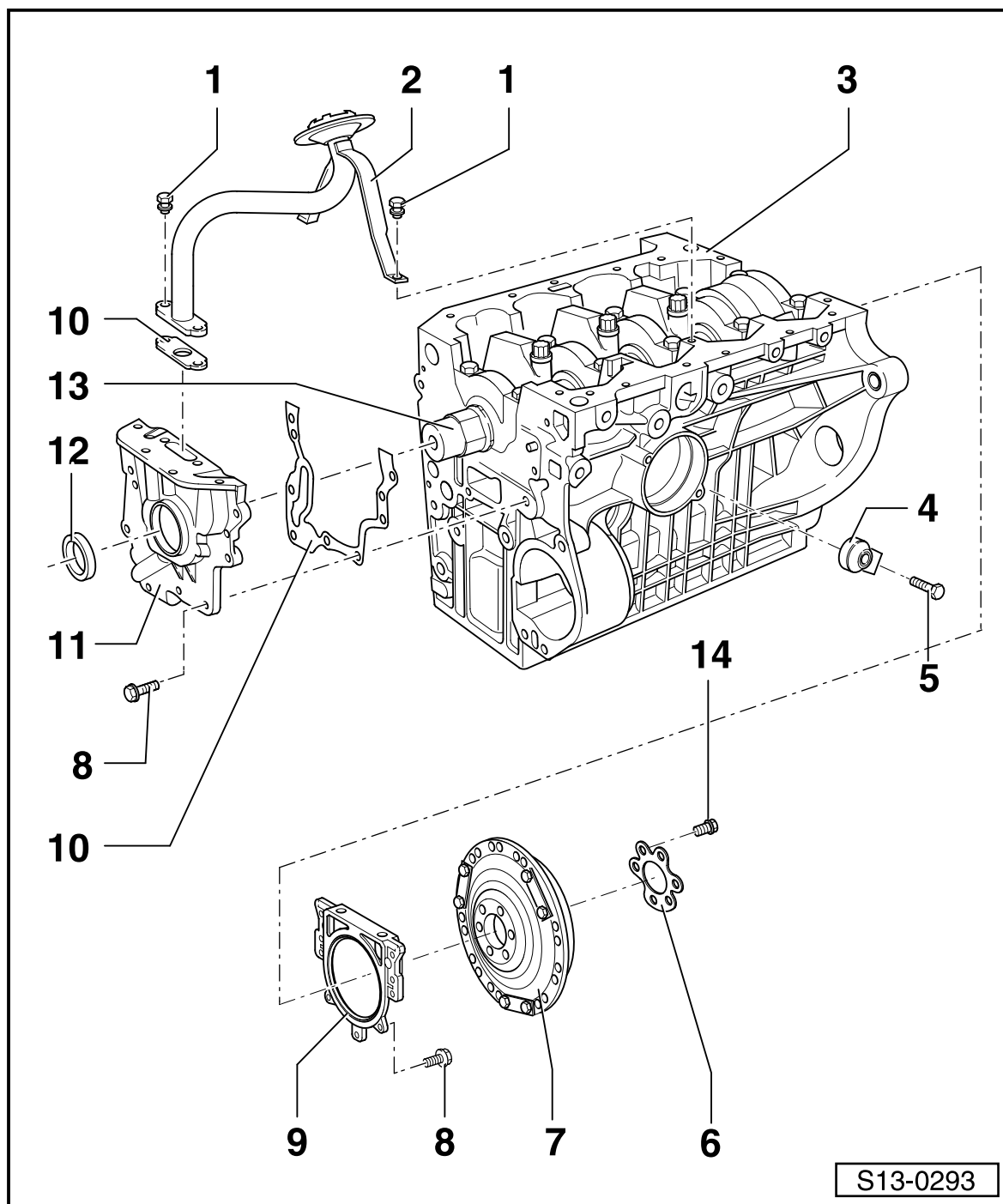
Note:

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

- Install air filter
⇒ 1.4/55 kW Engine, Motronic Injection and Ignition system; Repair Group 24.
- Install engine cover
- Interrogate fault memory ⇒ 1.4/55 kW Engine, Motronic Injection and Ignition system; Repair Group 01.

Removing and installing cylinder block

Overview of cylinder block



Warning!

- ♦ The crankshaft must not be removed. Even slackening the crankshaft bearing cap will result in deformations to the bearing pedestals of the cylinder block. These deformations will reduce the bearing play. If the bearing shells are not replaced, the altered bearing play can result in damage to the bearing.
- ♦ If the bolts of the bearing caps have been slackened, it is then necessary to replace the cylinder block complete with the crankshaft.

- ♦ It is not possible to measure the crankshaft bearing play with workshop equipment.

Note:

Servicing clutch ⇒ Manual Gearbox 02K; Repair Group 30.

1 - 10 Nm

2 - Intake line

3 - Cylinder block**4 - Knock sensor****5 - 20 Nm**

- ♦ tightening torque is important for proper operation of the knock sensor

6 - Intermediate plate**7 - Thrust plate****8 - 12 Nm**

- ♦ replace

9 - Sealing flange

- ♦ must be located in dowel sleeves
- ♦ do not damage or bend during removal and installation work

10 - Gasket

- ♦ replace

11 - Oil pump

- ♦ always replace complete
- ♦ when installing, pay attention to driver and crankshaft, item 13
- ♦ removing and installing ⇒ page 17-4

12 - Seal

- ♦ replace ⇒ page 13-16

13 - Driver

- ♦ coat with oil before installing oil pump

14 - 60 Nm + torque a further $\frac{1}{4}$ turn (90°)

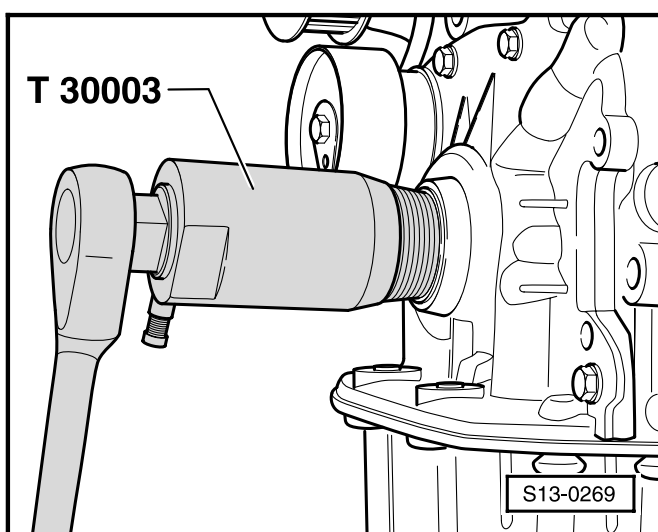
- ♦ replace

Replacing crankshaft sealing ring - belt pulley side

Special tools, testers and aids required

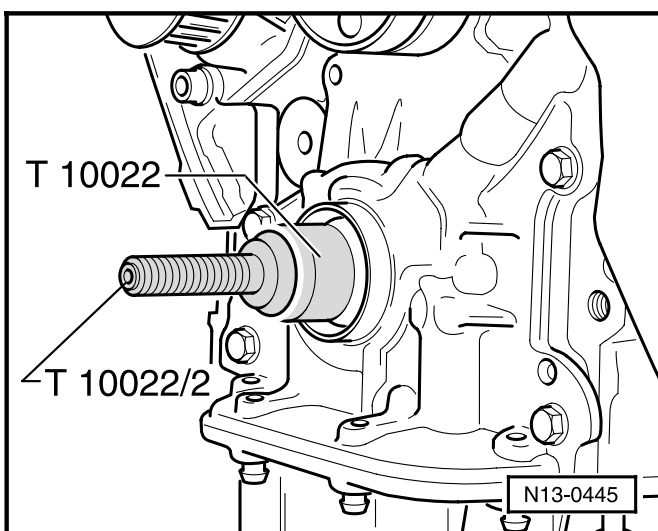
- ◆ Sealing ring extractor -T30003-
- ◆ Sleeve -T10022-
- ◆ Thrust piece -T10022/1-
- ◆ Spindle -T10022/2-

Removing

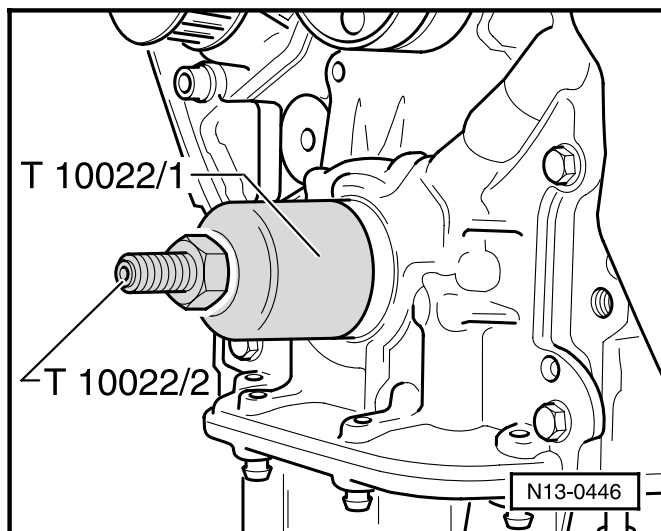


- Remove toothed belt of main drive ⇒ page 13-5.
- Remove toothed belt sprocket of crankshaft.
- Screw the bolt for attaching the toothed belt sprocket fully into the crankshaft to guide the sealing ring extractor.
- Turn inner part of seal extractor -T30003- two turns (about 3 mm) out of the outer part and lock with bolt.
- ◀ - Oil threaded head of sealing ring extractor, position and screw as far as possible into the sealing ring using considerable force.
- Slacken locking bolt and turn inner part against the crankshaft until the sealing ring is pulled out.

Installing



- Lightly oil sealing lip of sealing ring.
- ◀ - Mount sleeve -T10022- onto the crankshaft journal and turn in fully with spindle -T10022/2-.
- Push sealing ring over the sleeve -T10022-.



- ◀ - Press sealing ring in fully with thrust piece -T10022/1-.
- Install belt pulley of crankshaft.
- Install toothed belt of main drive
⇒ page 13-5.

Removing and installing pressure plate

Special tools, testers and aids required

- ◆ Counterholder -MP 1-221-
- ◆ M8x45 hexagon bolts and two M10 hexagon nuts
- ◆ Depth gauge

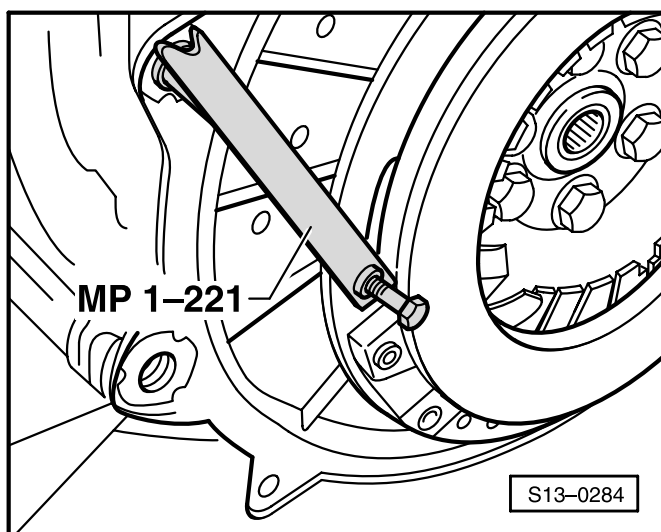
Slackening and tightening pressure plate

- ◀ - Insert counterholder -MP 1-221- into the hole at the cylinder block and screw on at pressure plate.
- Slacken bolts for pressure plate.

Note:

Replace bolts attaching pressure plate.

- Tighten bolts to a torque of 60 Nm and torque a further $\frac{1}{4}$ turn (90°).



Replacing crankshaft sealing flange - at flywheel side

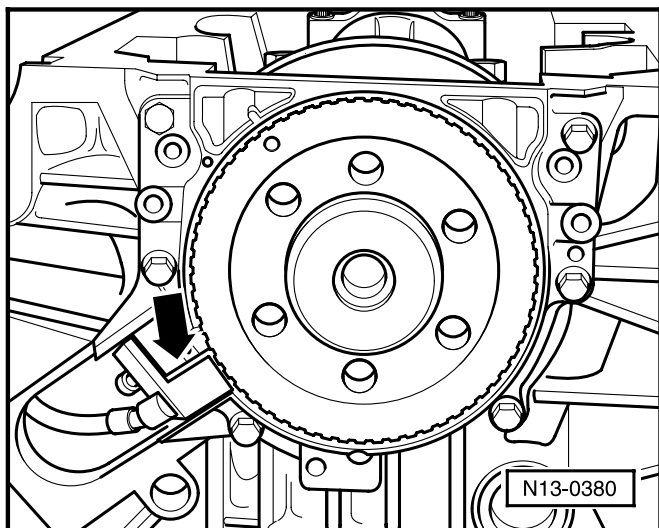
Special tools, testers and aids required

- ◆ Assembly device -T10017-
- ◆ Torque wrench, e.g. -V.A.G 1331- (5...50 Nm)
- ◆ Open-end wrench, e.g. -V.A.G 1332/9-
- ◆ Three M6x35 hexagon bolts
- ◆ Feeler gauge
- ◆ Sliding caliper

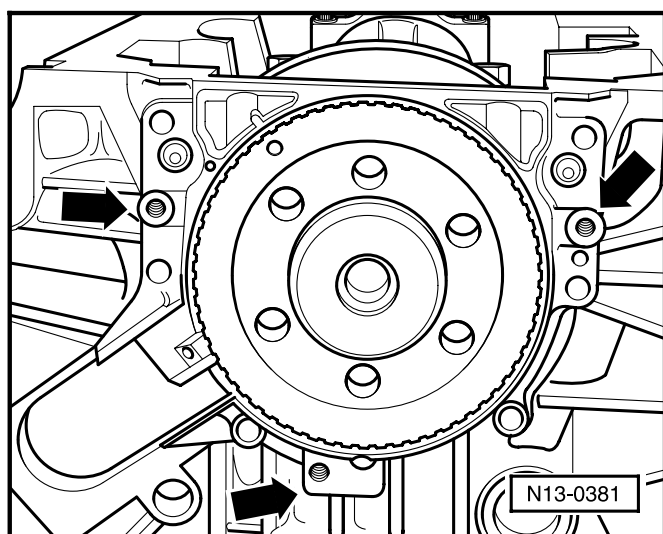
Pressing on sealing flange with sensor rotor

Notes:

- ◆ *These processes are described with the engine removed in order to more clearly illustrate the work involved.*
- ◆ *The procedures for engine installed and gearbox removed are identical.*



- Remove pressure plate ⇒ page 13-17.
- Take off sealing flange.
- Position engine to top dead centre of cylinder 1 ⇒ page 13-5, Removing toothed belt of main drive.
- Remove oil pan ⇒ page 17-3.
- ◀ - Remove engine speed sensor -arrow-.
- Unscrew bolts attaching sealing flange.

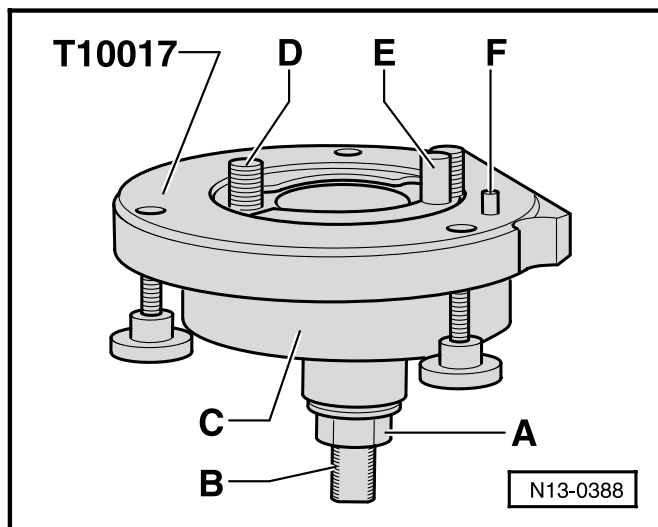
**Note:**

Sealing flange and sensor rotor are attached to the crankshaft together with three M6x35 bolts.

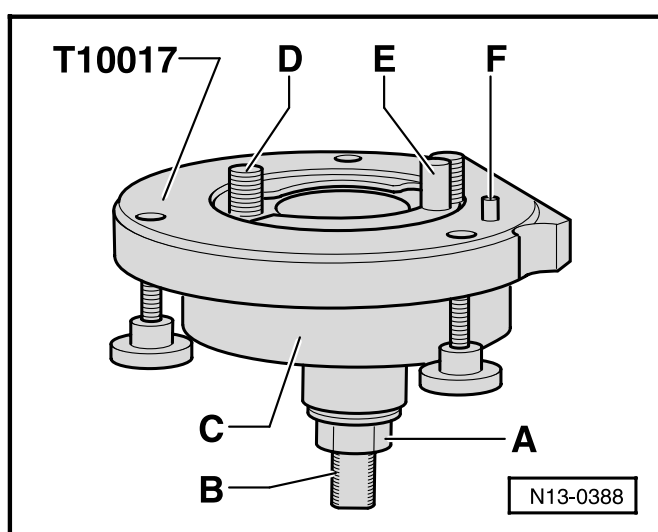
- K -
- Screw the three M6x35 bolts into the threaded holes of the sealing flange -arrows-.
 - Screw bolts alternately (max. $1/2$ turn for each bolt) into the sealing flange and press sealing flange out of the crankshaft together with the sensor rotor.

Pressing on sealing flange with sensor rotor**Notes:**

- ◆ Sealing flange and sealing ring must always be replaced together with the sensor rotor.
- ◆ The replacement part contains a new sealing insert made of PTFE (Teflon). Flange and spring sealing ring are always supplied as a replacement part.
- ◆ Before installing the sealing flange, ensure that the sealing rings and matching flanges are not mixed up. It is important that the sealing ring used is made of the same material as the one it is replacing.
- ◆ Flange with PTFE sealing ring is supplied with supporting ring. This ring is designed to assist installation and must not be removed before installing.
- ◆ Sealing flange and sensor rotor must not be separated or turned after being removed from the wrapping.
- ◆ The sensor rotor is provided with an elastomer film on the sealing surface facing the crankshaft. This film must on no account come into contact with dirt or grease.
- ◆ The sensor rotor must fit exactly onto the locating pin of the assembly device -T10017-.
- ◆ The installation position of the assembly device -T10017- is fixed by a guide pin which is inserted through the threaded hole of the crankshaft.

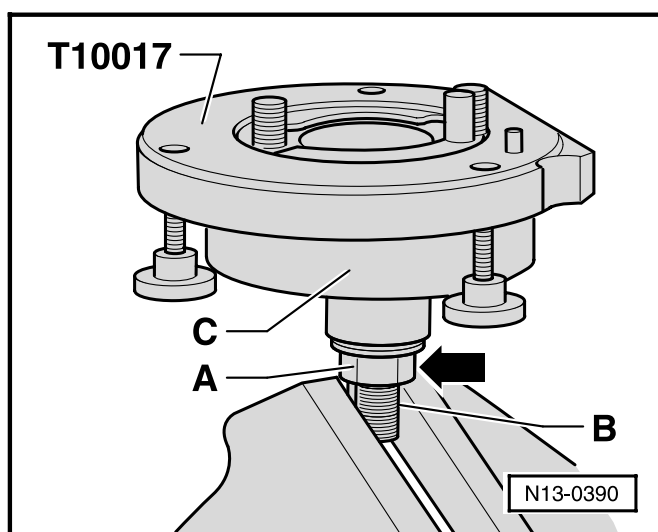


- ◀ A - Hexagon nut
- B - Tensioning surface
- C - Assembly bell
- D - Hexagon socket screw
- E - Guide pin
- F - Locating pin



A - Installing sealing flange with sensor rotor onto assembly device -T10017-

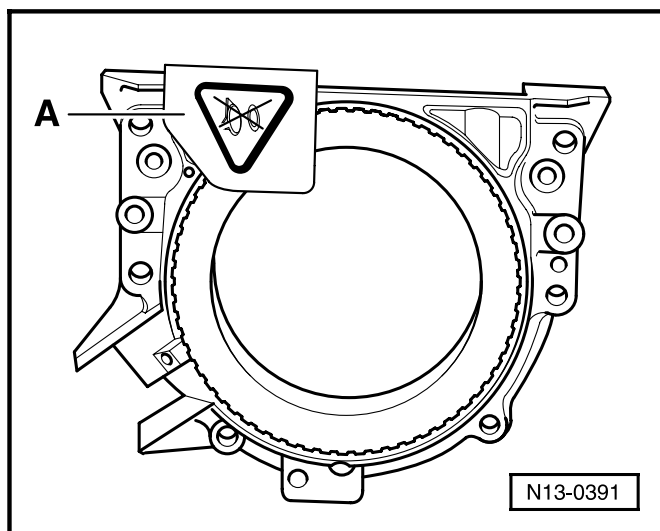
- ◀ - Screw in hexagon nut -A- until just before the tensioning surface of the threaded spindle.



- ◀ - Clamp the assembly device -T10017- in a vice at the tensioning surface -B- of the threaded spindle.
- Push the assembly bell -C- down so that it is resting on the hexagon nut -A- -arrow-.

Note:

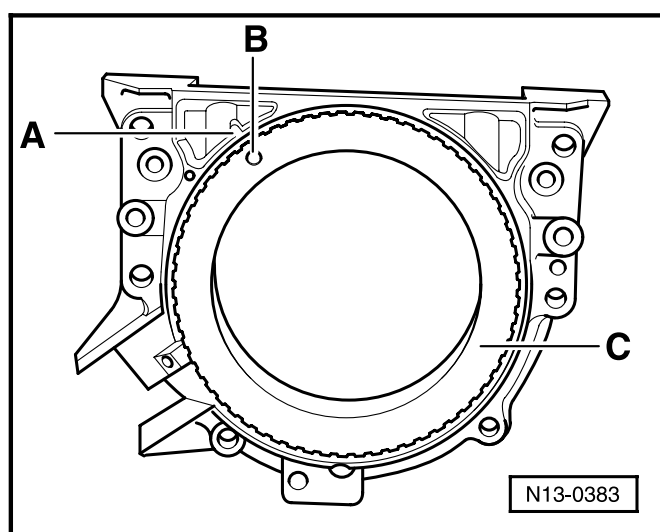
Inner part of assembly device and assembly bell must be at the same level.



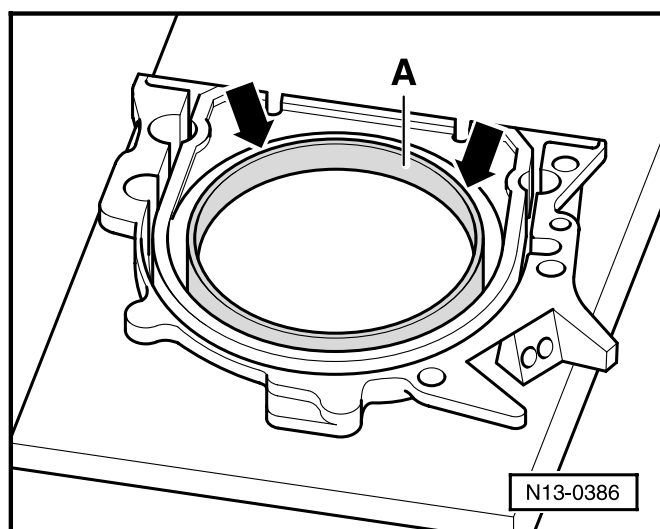
- ◀ - Remove the circlip -A- from the new sealing flange.

Note:

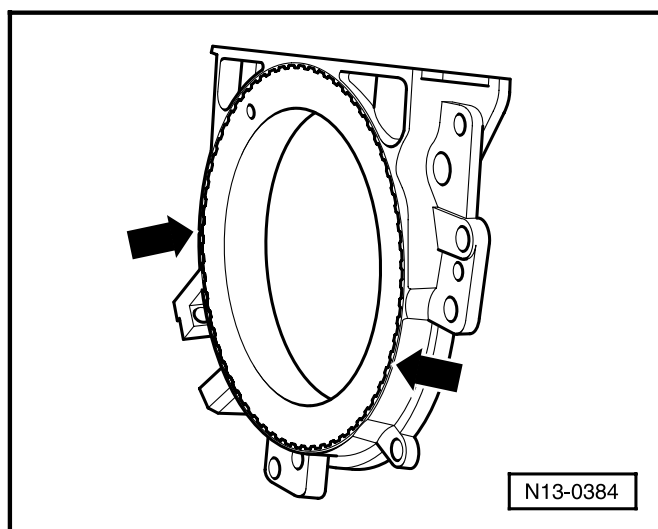
The sensor rotor must not be taken out of the sealing flange or turned.



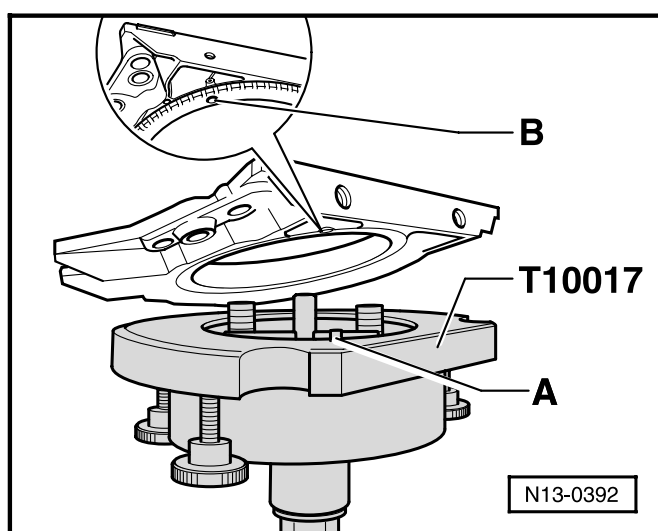
- ◀ - The locating hole -B- on the sensor rotor -C- must be aligned with the marking -A- on the sealing flange.



- ◀ - Place front of sealing flange down on a clean and flat surface.
- Press on the sensor rotor -A- until it is resting on the flat surface.



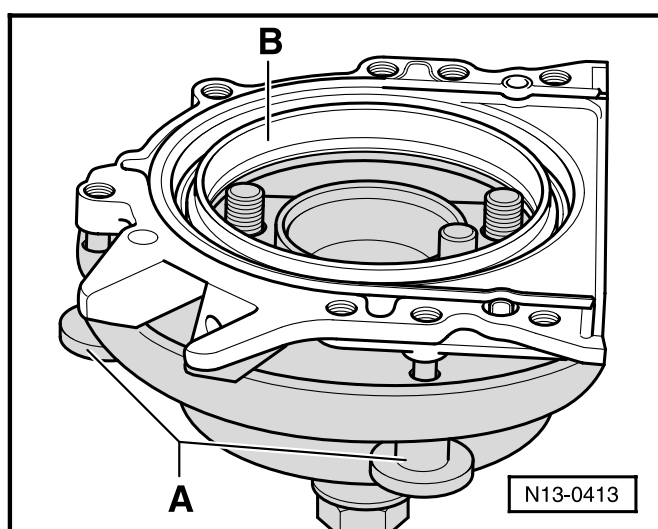
- ◀ - The top edge of the sensor rotor and the front edge of the sealing flange must be aligned -arrows-.



- ◀ - Place the front of the sealing flange onto the assembly device -T10017- so that the locating pin -A- is inserted into the hole -B- of the sensor rotor.

Note:

Sealing flange must be resting straight on the assembly device.



- ◀ - Press the sensor rotor -B- onto the surface of the assembly device when tightening the bolts -A- so that the locating pin can no longer slip out of the sensor rotor hole.

Note:

The sensor rotor must remain fixed in the assembly device when installing the sealing flange.

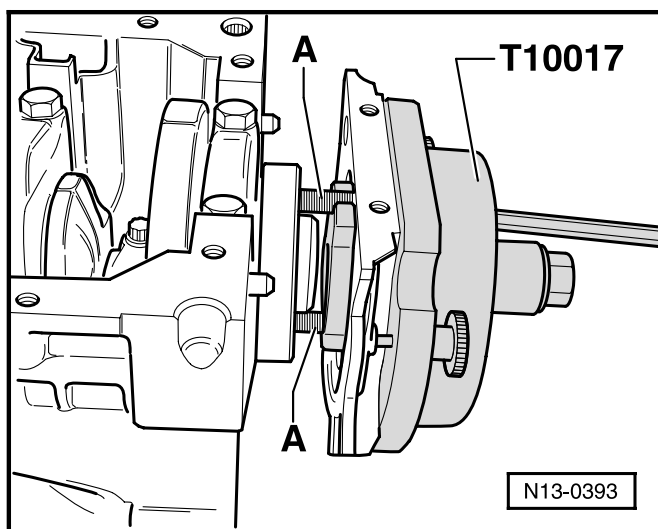
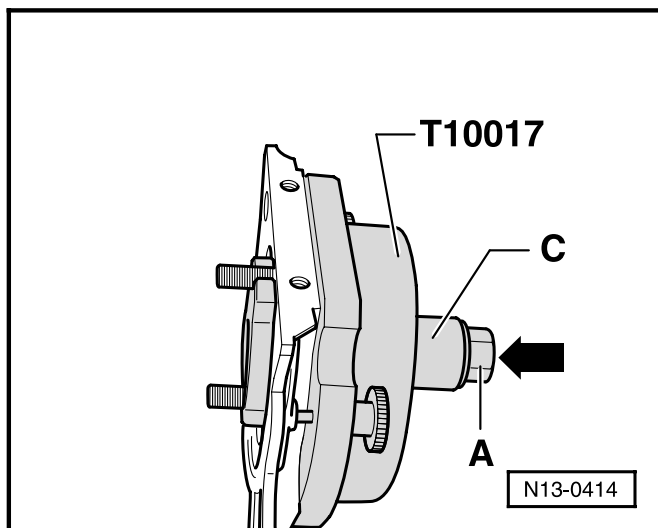
B - Fitting assembly device -T10017- with sealing flange onto the crankshaft flange

Assembly conditions

- Crankshaft flange must be free of oil and grease
- Pistons are positioned at top dead centre of cylinder 1

Procedure

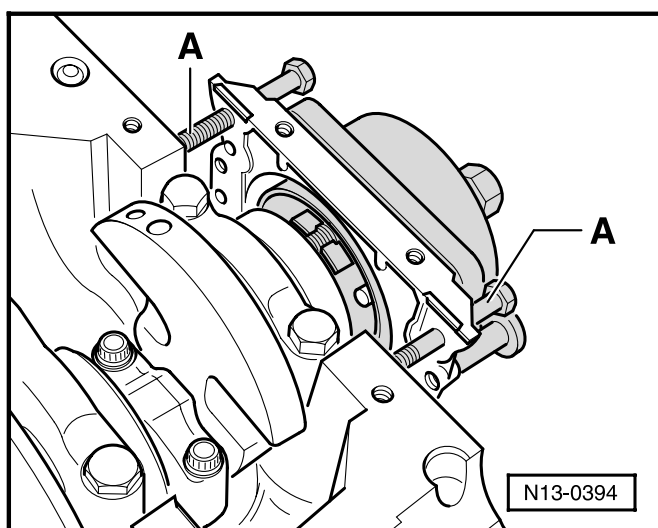
- ◀ - Screw in hexagon nut -A- up to the end of the threaded spindle.
- Press threaded spindle of the assembly device in direction of arrow until it is resting against the assembly bell -C-.
- Align the flattened side of the assembly bell to the sealing surface of the crankcase at the oil pan side.



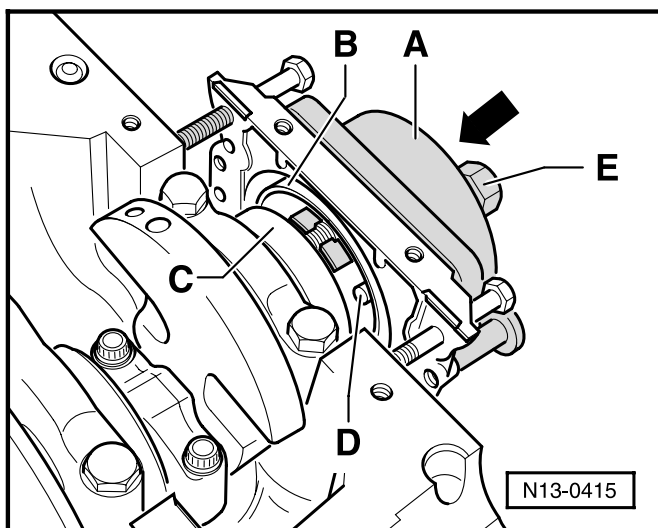
- ◀ - Screw in the assembly device with the hexagon socket screws -A- onto the crankshaft flange.

Note:

Turn in screws -A- about five turns of the thread against the crankshaft flange.



- ◀ - Screw two M6x35 bolts -A- into the cylinder block to guide the sealing flange.



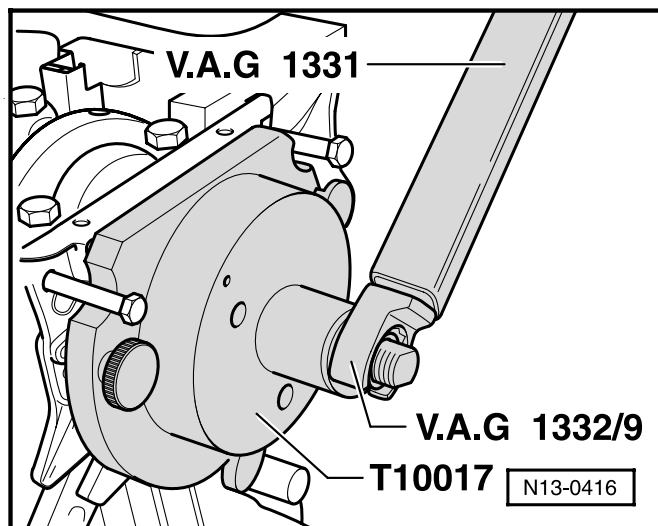
C - Bolting assembly device to crankshaft flange

- ◀ - Push assembly bell -A- by hand in direction of arrow until the sensor rotor -B- is resting against the crankshaft flange -C-.

Note:

The guide pins -D- of the assembly device is guided by a threaded hole in the crankshaft which ensures that the sensor rotor is moved into the final installation position.

- Hold the assembly bell in this installation position and tighten both hexagon socket screws of the assembly device by hand.
- Screw hexagon bolt -E- by hand onto the threaded spindle until it is resting against the assembly bell -A-.

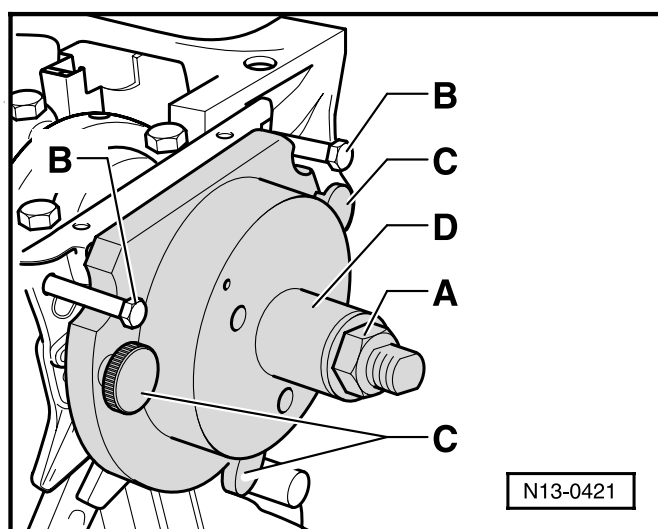


D - Pressing sensor rotor onto crankshaft flange with assembly device -T10017-

- ◀ - Use torque wrench -V.A.G 1331- and open-end wrench -V.A.G 1332/9- to tighten hexagon nut of assembly device. Tightening torque 35 Nm.

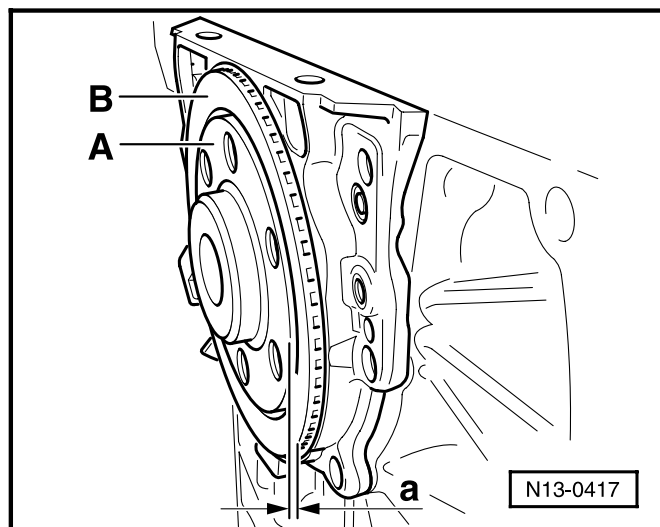
Note:

After tightening the hexagon nut, there must still be a slight gap present between cylinder block and sealing flange.



E - Inspecting installation position of sensor rotor on crankshaft

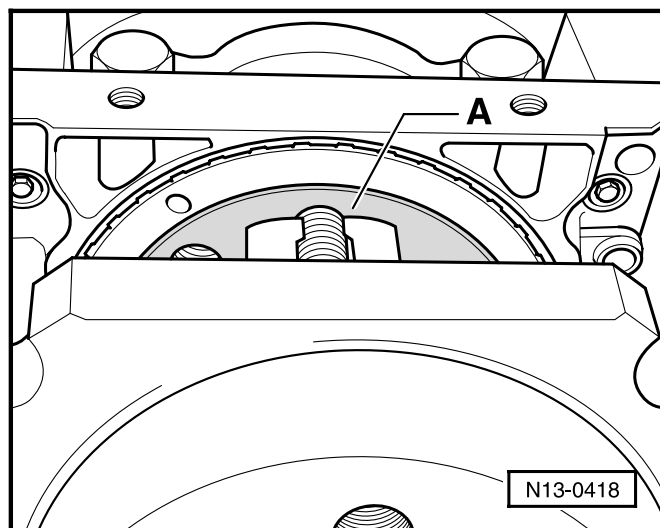
- ◀ - Screw in the hexagon nut -A- up to the end of the threaded spindle.
- Unscrew the two M6x35 bolts -B- out of the cylinder block.
- Take the three knurled screws -C- out of the sealing flange.
- Pull back the assembly bell of the assembly device -D- as far as the hexagon nut -A-.



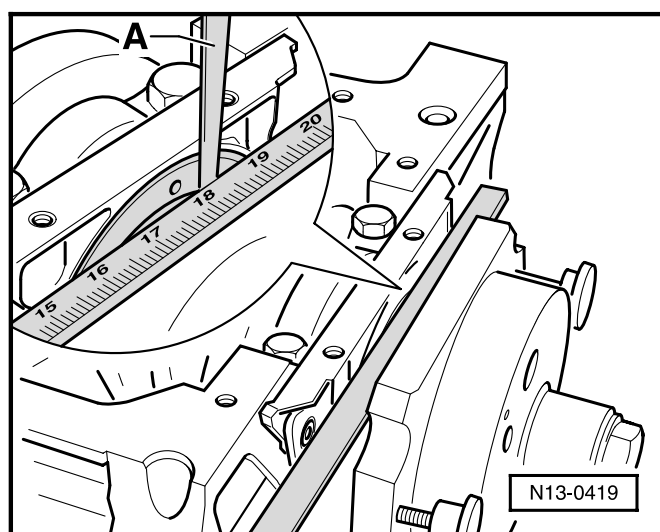
- ◀ - The sensor rotor has a precise installation position on the crankshaft if a clearance -a- of at least 0.5 mm is present between crankshaft flange -A- and the sensor rotor -B-.

Notes:

- ◆ In the case of flange with PTFE sealing ring, unscrew assembly device -T10017- and remove supporting ring.
- ◆ The crankshaft flange is shown without assembly device -T10017- attached in order to more clearly illustrate dimension -a-.



- ◀ - Position sliding caliper against crankshaft flange -A-.



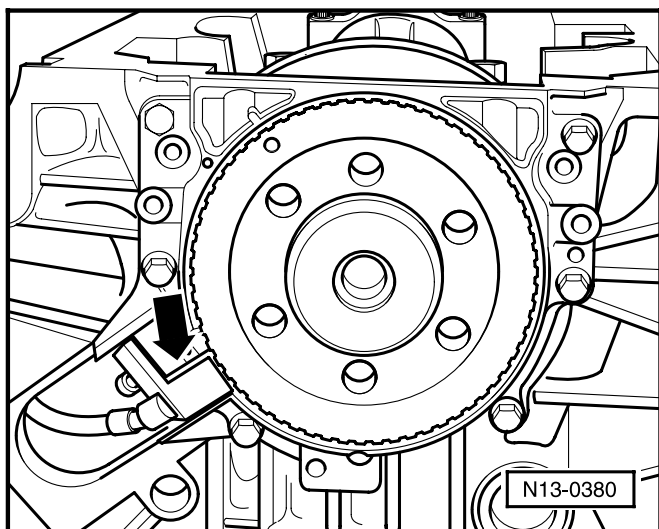
- ◀ - Use a feeler gauge to measure the clearance between caliper gauge and sensor rotor.

If the dimension is insufficient:

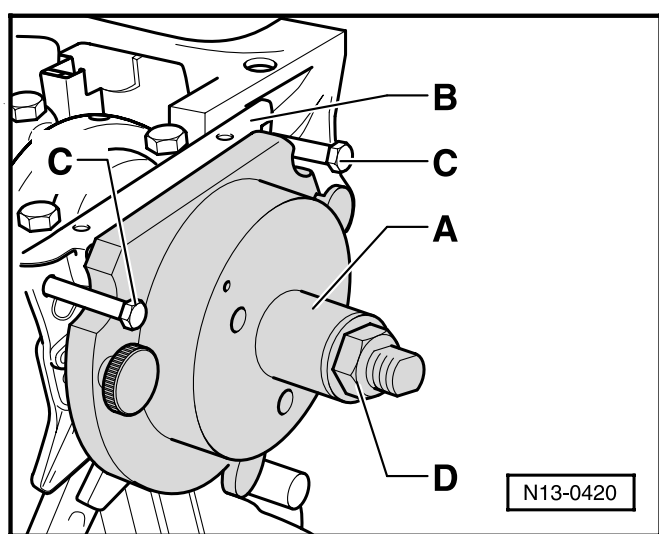
- Press on sensor rotor ⇒ page 13-24.

If the dimension is correct:

- Remove assembly device -T10017-.
- Tighten new bolts for attaching sealing flange alternately diagonally across to 12 Nm).

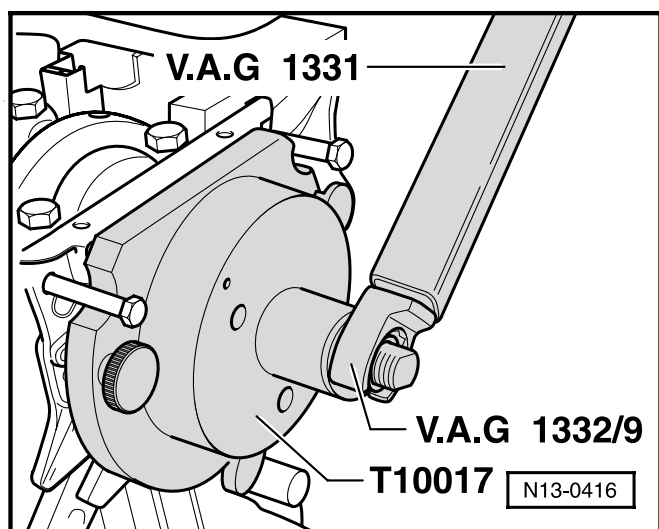


- ◀ - Install engine speed sensor -arrow- (5 Nm).
- Install oil pan ⇒ page 17-3.
- Install sealing flange.
- Install pressure plate ⇒ page 13-17.



F - Pressing on sensor rotor

- ◀ - Push on assembly bell -A- by hand up to the sealing flange -B-.
- Screw two M6x35 bolts -C- into the cylinder block for guiding the sealing flange -B-.
- Screw the hexagon nut -D- onto the threaded spindle until it is resting against the assembly bell -A-.

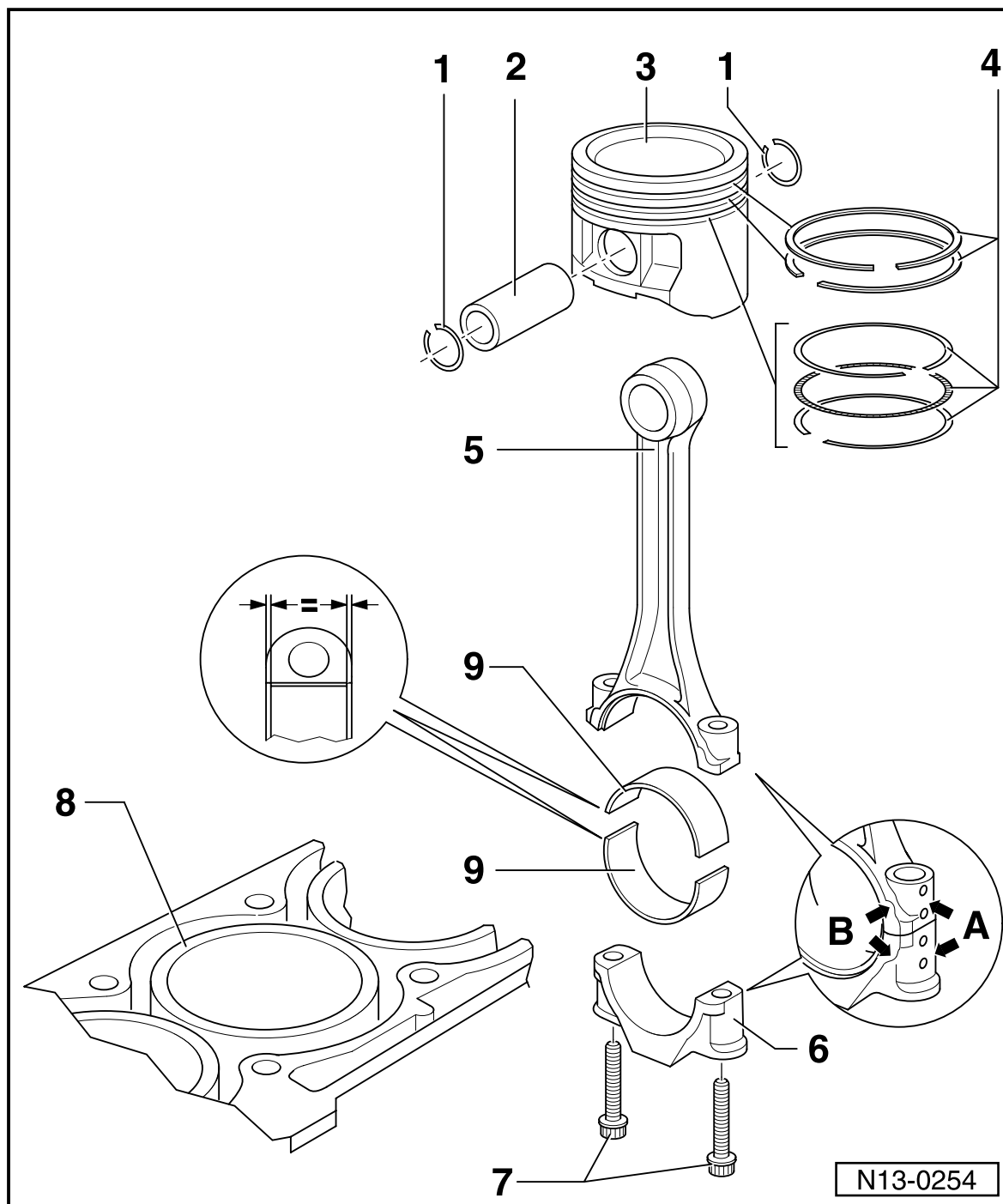


- ◀ - Use torque wrench -V.A.G 1331- and open-end wrench -V.A.G 1332/9- to tighten hexagon nut of assembly device to 40 Nm.
- Once again check the installation position of the sensor rotor on the crankshaft ⇒ page 13-24.

If dimension -a- is once again insufficient:

- Tighten the hexagon nut of the assembly device to 45 Nm.
- Once again check the installation position of the sensor rotor on the crankshaft ⇒ page 13-24.

Disassembling and assembling pistons and connecting rod



1 - Circlip

2 - Piston pin

- ◆ if tight, heat piston to about 60 °C
- ◆ use special tool -T10014- for removing and installing

3 - Piston

- ◆ inspecting ⇒ page 13-30, Fig. 3
- ◆ mark installation position and matching cylinder
- ◆ arrow on piston crown points toward belt pulley side
- ◆ piston $\varnothing = 76.470$ mm

4 - Piston rings

- ◆ offset joint 120°
- ◆ use piston ring pliers for removing and installing
- ◆ 3-section scraper rings, remove and install by hand
- ◆ marking -TOP- must point toward piston crown
- ◆ inspecting gap clearance ⇒ page 13-30, Fig. 1
- ◆ inspecting end clearance ⇒ page 13-30, Fig. 2

5 - Connecting rod

- ◆ always replace as a set
- ◆ mark matching cylinder -A-
- ◆ installation position: markings -B- must point toward belt pulley side
- ◆ located axially by pistons

6 - Conrod bearing 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 - Conrod

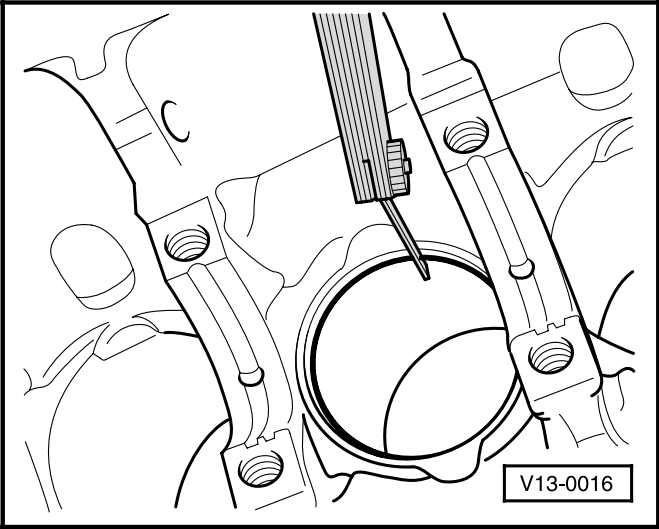
- ◆ replace
- ◆ M8 - 30 Nm + torque a further $\frac{1}{4}$ turn (90°)
- ◆ M7 - 20 Nm + torque a further $\frac{1}{4}$ turn (90°) + torque a further $\frac{1}{12}$ turn (30°)
- ◆ Oil thread and contact surface

8 - Cylinder block

- ◆ inspecting cylinder bore
⇒ page 13-31, Fig. 4
- ◆ cylinder $\varnothing = 76.51$ mm

9 - Bearing shell

- ◆ do not mix up used bearing shells
- ◆ insert in the middle
- ◆ axial play
new part: 0.10 to 0.35 mm
wear limit: 0.40 mm

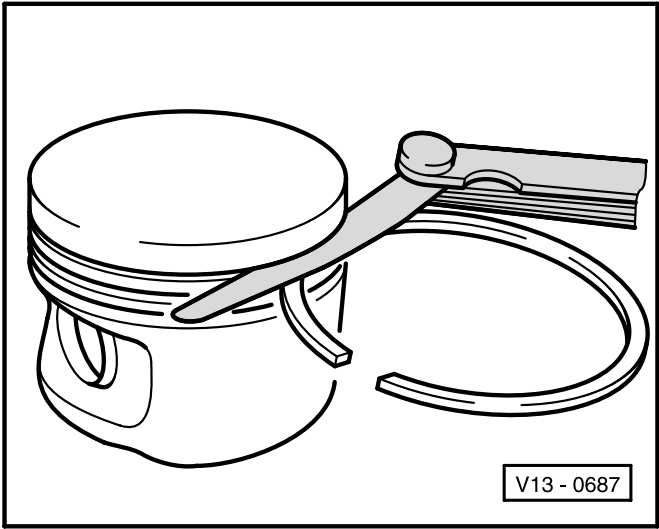


◀ Fig. 1 Inspecting piston ring gap clearance

- Insert ring at right angles to the cylinder wall from above as far as the bottom cylinder opening, about 15 mm away from edge of cylinder.

Piston ring Dims. in mm	New	Wear limit
1st piston ring	0.20...0.50	1.0
2nd piston ring	0.40...0.70	1.0
Oil scraper ring	0.40...1.40	-1)

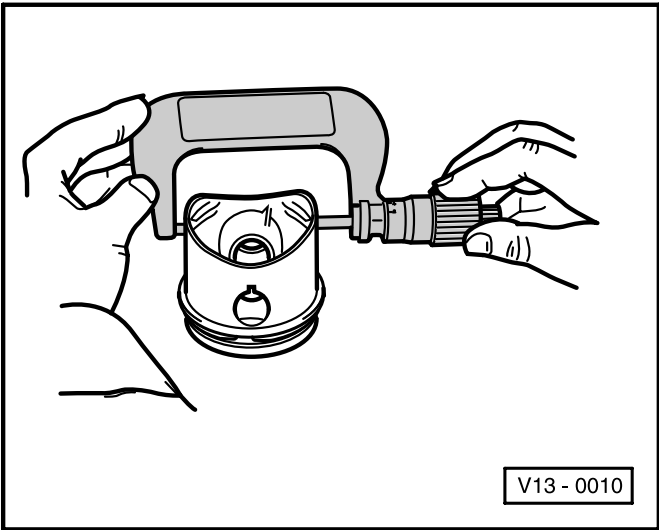
1) not possible to state wear limit



◀ Fig. 2 Inspecting piston ring end clearance

- Clean the groove in the piston before measuring.

Piston ring Dims. in mm	New	Wear limit
1st compression ring	0.04...0.08	0.15
2nd compression ring	0.04...0.08	0.15
Oil scraper ring	cannot be measured	

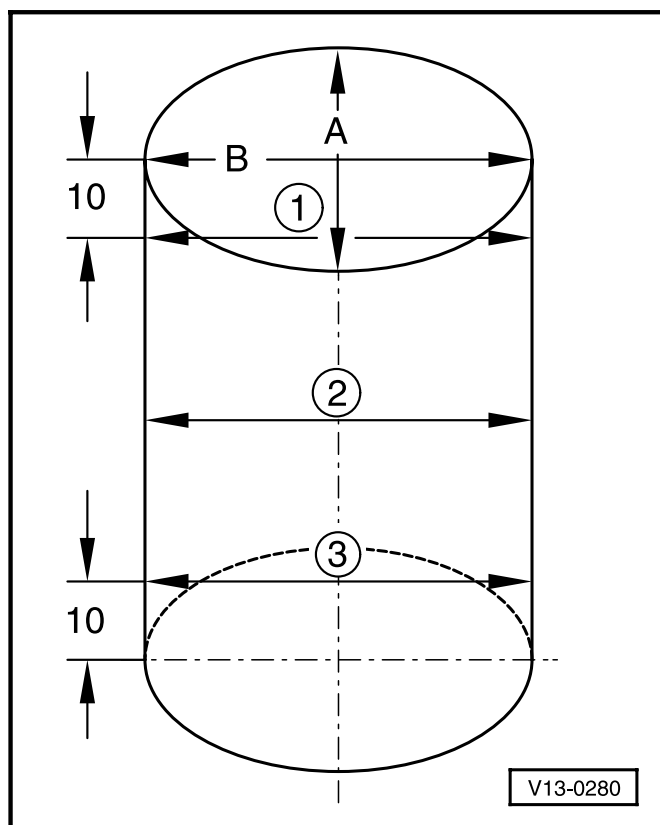


◀ Fig. 3 Inspecting pistons

Special tools, testers and aids required

- ◆ External micrometer 75...100 mm
- Measure about 10 mm from bottom edge at right angles to the piston pin axis.

Variation compared to base dimension
max. 0.04 mm



◀ **Fig. 4** **Inspecting cylinder diameter**

Special tools, testers and aids required

- ◆ Precision internal measuring instrument 50...100 mm
- Measure at 3 points diagonally across in transverse direction -A- and in longitudinal direction -B-. Variations compared to base dimension:
max. 0.08 mm

Note:

The measurement of the cylinder diameters must not be carried out when the cylinder block is attached with engine holder -MP 1-202- to the repair stand as this may result in incorrect measurements.

2 - Main drive-tensioning pulley

- ◆ inspect for wear
- ◆ do not kink
- ◆ removing and installing, tensioning
⇒ page 13-5

3 - Coupling drive-tensioning pulley

- ◆ inspect for wear
- ◆ do not kink
- ◆ removing and installing, tensioning
⇒ page 13-5

4 - 10 Nm + torque a further $\frac{1}{4}$ turn (90°)

- ◆ replace
- ◆ tighten from the middle

5 - Ignition cable guide

- ◆ pay attention to different versions

6 - Non-return valve

- ◆ as of 01.02

7 - From air filter**8 - Camshaft housing**

- ◆ removing and installing ⇒ page 15-3
- ◆ remove old sealant residues
- ◆ coat with agent -D 188 003 A1- before fitting
- ◆ when installing, fit onto stud bolts and dowel pins vertically from above.

9 - 10 Nm**10 - Dowel pin****11 - Roller arm**

- ◆ inspect roller bearings for smooth operation
- ◆ for installing, clip onto hydraulic supporting element with locking clip
- ◆ oil contact surface

12 - Hydraulic supporting element

- ◆ do not mix up insert bearing shells in the middle
- ◆ before installing, inspect axial play of camshaft ⇒ page 15-14, Fig 2
- ◆ oil contact surface

13 - Cylinder bolt

- ◆ replace
- ◆ observe the mounting instructions and sequence for loosening and tightening ⇒ page 15-9

14 - Cylinder gasket

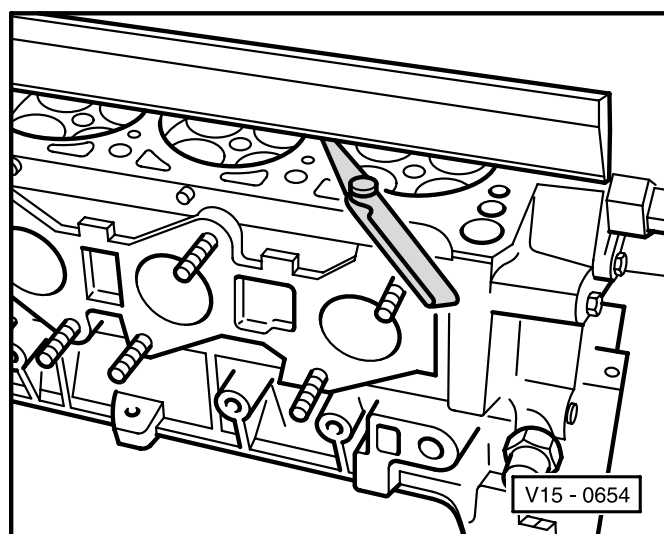
- ◆ replace

15 - Cylinder head

- ◆ removing and installing ⇒ page 15-6
- ◆ check for distortion ⇒ page 15-2, Fig, 1
- ◆ clean and de-grease the contact surfaces with the camshaft housing.
- ◆ after replacing fill entire system with fresh coolant ⇒ page 19-9

16 - Coupling drive-tensioning pulley

- ◆ inspecting ⇒ page 13-5
- ◆ tension toothed belt ⇒ page 13-5

17 - 20 Nm**18 - Rear toothed belt guard****19 - Lifting eye**

◀ **Fig. 1** Inspecting cylinder head for distortion

Max. permissible distortion: 0.05 mm.

Removing and installing camshaft housing

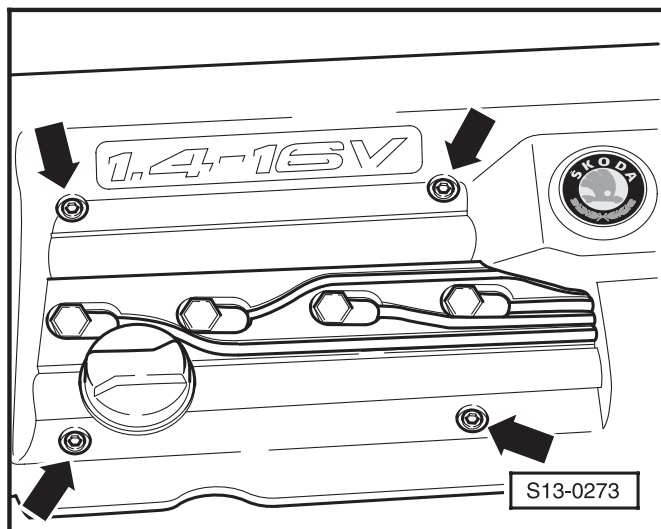
Special tools, testers and aids required

- ◆ Torque wrench
- ◆ Counterholder -T30004-
- ◆ Supporting device -MP 9-200-
- ◆ Camshaft lock -T10016-
- ◆ Sealant -D 188 003 A1-

Removing

Notes:

- ◆ *The camshafts are located in the camshaft housing. This is why the camshaft housing must only be removed once the two toothed belts have been removed.*
- ◆ *Do not rework the flange of the camshaft housing.*
- ◆ *When the battery is disconnected and reconnected, carry out rework ⇒ Electrical System; Repair Group 27.*



- 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.
- ◀ - Remove engine cover -arrows- (cover for engine with identification characters AXP)
- Remove air filter
⇒ 1.4/55 kW Engine, Motronic Injection and Ignition system; Repair Group 24.
- Remove both toothed belts ⇒ page 13-5.
- Remove spark plug connector together with ignition cable guide
- Disconnect the 4-pin plug connection from the ignition transformer.

- Disconnect the 3 pin plug connection from the hall sender.
- Release the fixing screw of the rear toothed belt shield near the right lifting eye.
- Remove the ventilation line holder on the camshaft housing.
- If necessary remove non-return valve
- Removing fixing screws of exhaust gas recirculation valve -N18- ⇒ page 26-8
- Slacken the camshaft housing screws cross-wise from outside and unscrew.
- Carefully remove the camshaft housing.

Installing

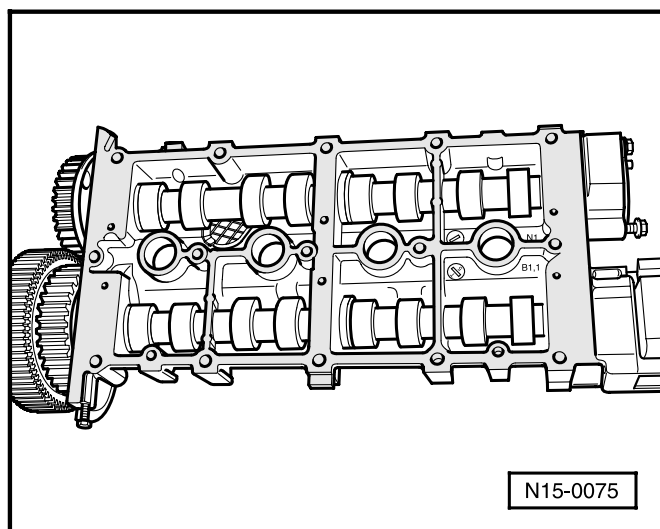
Conditions

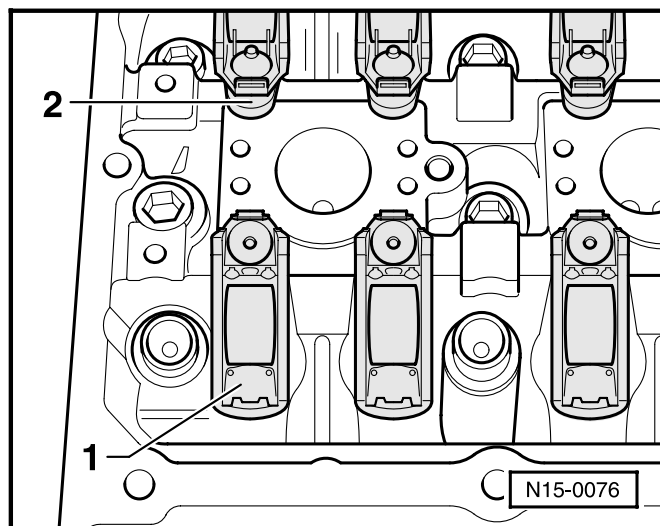
- The toothed belt sprocket of the crankshaft is secured to the crankshaft with the fixing screw and two washers.
- The pistons must not be in TDC.
- Lock the camshaft sprockets with device -T10016- in the fit holes in the camshaft housing and secure against turning.

Notes:

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

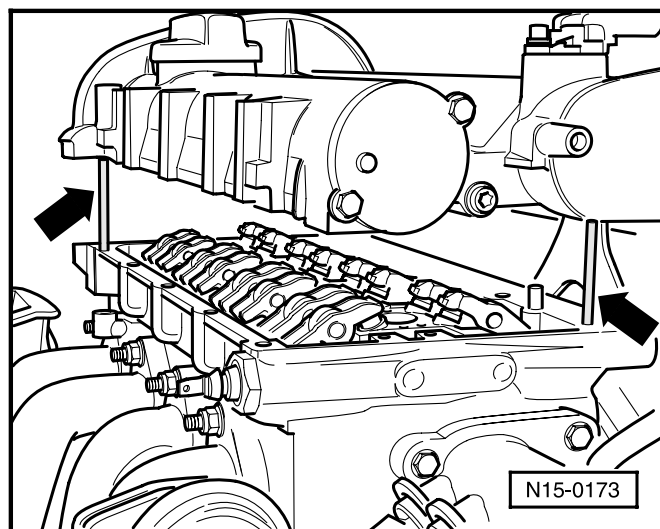
- Remove residual sealant on the cylinder head and camshaft housing with a commercially available sealant remover.
- Ensure that no dirt and sealant residues get into the cylinder head.
- Remove oil and grease from the sealing surfaces.
- ◀ - Apply a thin coating of sealant -D 188 003 A1- uniformly on the clean sealing surface of the camshaft housing (see grid surface).



**Note:**

Do not apply the sealant too thick otherwise excess sealant may get into the oil drillings and cause engine damage.

- ◀ - Ensure that all the roller drag levers are correctly fitted onto the valve stem ends -1- and onto the relevant hydraulic supporting elements -2-.
- Before installing camshaft housing, screw two M6 x 70 mm stud bolts into the cylinder head.



- ◀ - Carefully mount the camshaft housing from above onto the stud bolts and dowel pins of the cylinder head -arrows-.
- Tighten new bolts attaching camshaft housing evenly diagonally across from the inside to the outside.
- Ensure that the camshaft housing is not twisted when tightening the bolts.
Tightening torque
10 Nm + torque a further $\frac{1}{4}$ turn (90°).

Notes:

- ◆ *Allow the sealant to dry for about 30 minutes after installing the camshaft housing.*
- ◆ *The sealing surface of the camshaft housing must not be reworked or machined.*

The remaining installation is carried out in the reverse order of removal.

Removing and installing cylinder head

Special tools, testers and aids required

- ◆ Torque wrench
- ◆ Supporting device -MP 9-200-
- ◆ Bracket -T10014-
- ◆ Counterholder -T30004-
- ◆ Camshaft lock -T10016-
- ◆ Sealant -D 188 003 A1-
- ◆ Catch pan e.g. -V.A.G 1306-
- ◆ Pliers for spring strap clips

Removing

Prerequisites

- The engine must be at a maximum temperature of 20 °C.
- The pistons must not be in TDC.
- Remove camshaft housing ⇒ page 15-3.
- Open and close the cap of the expansion reservoir to reduce the pressure in the cooling system.
- Drain coolant ⇒ page 19-9.
- Release the spring strap clamps and disconnect the coolant hoses from the coolant regulator housing.

Note:

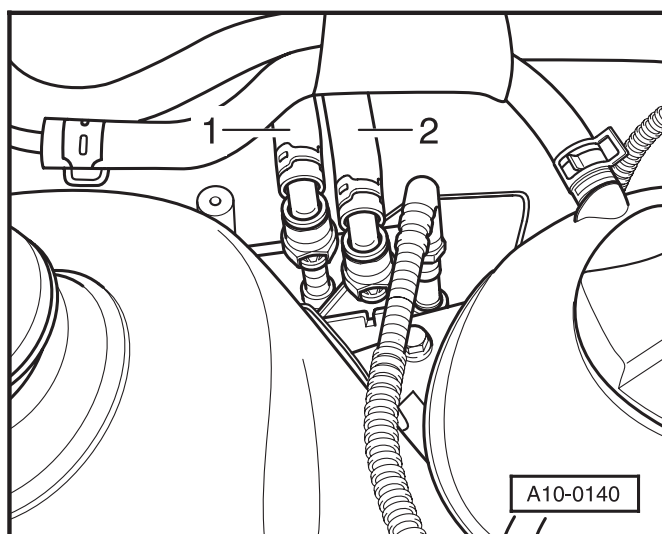
After the hoses are separated, remaining coolant may flow out; place the drip tray below for this purpose.

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

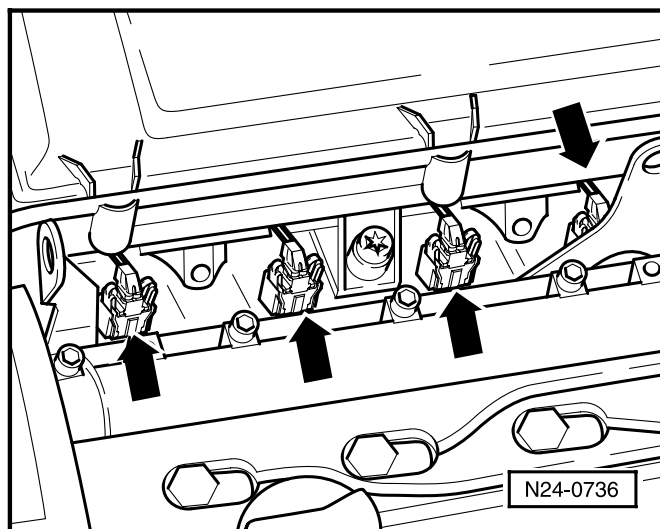
Note:

Standard self-tapping screws are used for attaching the air filter to the plastic intake manifold and for attaching the air filter top part to the air filter bottom part. The thread in the intake manifold or the air filter bottom part can be damaged if these screws are slackened or tightened with an electrical screwdriver. This is why an electrical screwdriver should only be used if:

- ♦ the screwdriver speed is maximum 200 rpm
- ♦ the tightening torque is maximum 3 Nm

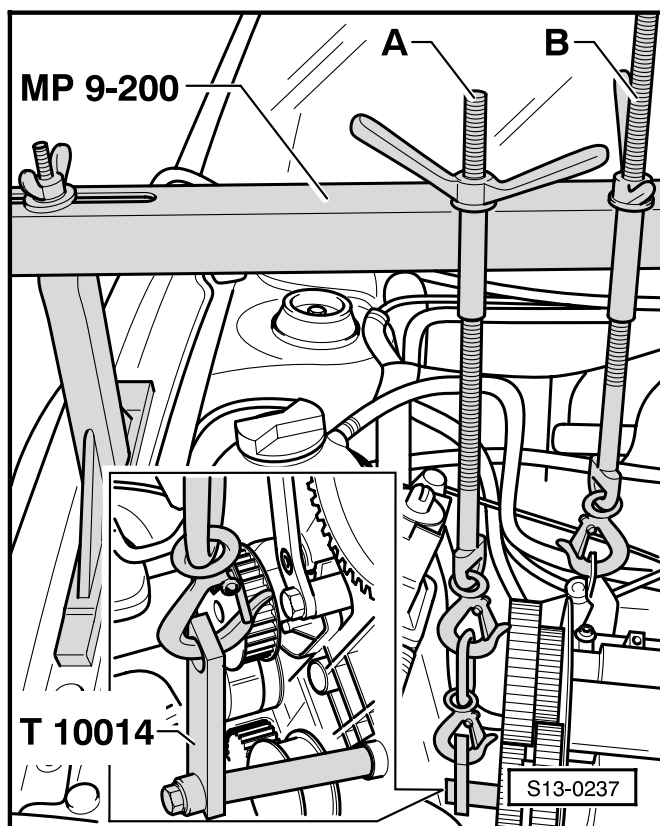


- Remove the guide tube from the oil dipstick.
- ◀ - Detach feed line -1- and return-flow line -2-.
- Disconnect the following components:
 - ♦ the hose from the crankcase ventilation
 - ♦ the hose from the activated charcoal filter system
 - ♦ the vacuum hose from the exhaust gas recirculation valve
 - ♦ the 2-pin plug connection from the knock sensor (rear cylinder block) and the 4-pin plug connection from the intake manifold sender.
 - ♦ the 2-pin plug connection from the engine speed sender and remove the plug from the holder.
 - ♦ connector from throttle valve control unit.
 - ♦ connector from coolant temperature sender and exhaust gas recirculation valve.

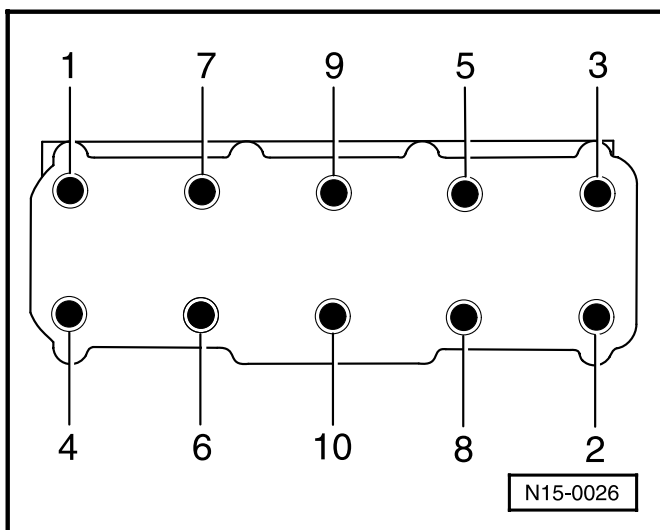


- ◀ - Unplug the connectors at the injectors -arrows-.
- Remove fuel rail together with injectors and place down to the side
⇒ 1.4 l/55 kW Engine - Fuel Injection and Ignition System; Repair Group 24.
- Detach exhaust manifold from cylinder head
⇒ page 26-1.

The two lifting eyes are located at the cylinder head; an additional bracket must be attached to the engine block for taking up the weight of the engine.



- Remove guide pulley of toothed belt drive.
- ◀ - Raise engine with spindle -B-.
- Screw in bracket -T10014- in place of the removed guide pulley.
- Raise engine with spindle -A- until spindle -B- is relieved.
- Slacken spindle -B- and pull it out of the cylinder head bracket.
- Pull off the clamp at the coolant thermostat housing which attaches the coolant pipe to the coolant pump.

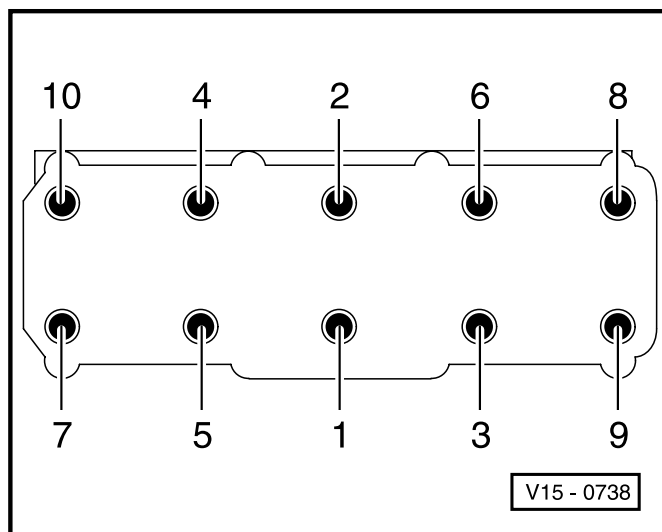


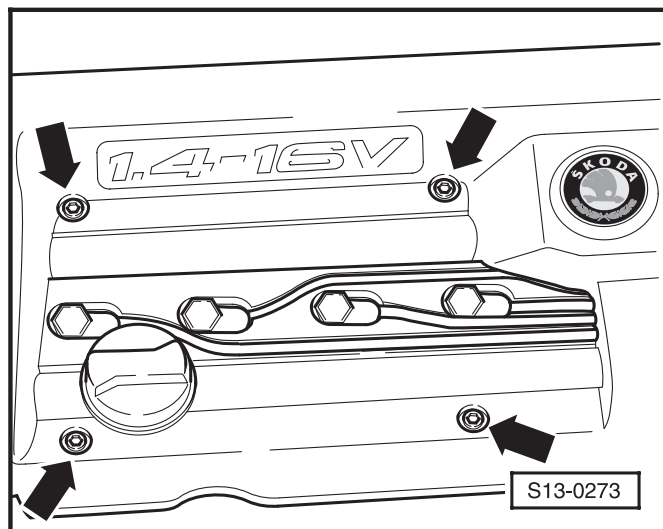
- ◀ - Remove cylinder head bolts in the specified order.
- Carefully take off cylinder head.

Installing

Notes:

- ◆ *Do not remove cylinder head gasket from its wrapping until just before installing.*
 - ◆ *Treat new gasket with particular care. Any damage will result in leaks.*
 - Make sure that when cleaning the cylinder head and cylinder block that no dirt gets into the cylinder or into the oil ducts as well as the coolant.
 - In the case of repairs the cylinder head contact surface and the engine block should be rendered clean of sealant residues using a chemical device.
 - Position piston of cylinder 1 to top dead centre.
 - Lock camshaft sprockets with -T10016-.
 - Position the new cylinder head. The inscription (spare part no.) must be legible.
 - Fit on cylinder head. Pay attention to the centering pins in the cylinder block.
 - Insert new screws and tighten by hand.
 - ◀ - Screw on the cylinder head bolts in the specified order.
 - Tighten all screws to tightening torque 30 Nm and torque a further $\frac{1}{4}$ turn (90°).
 - Subsequently tighten all screws + torque a further $\frac{1}{4}$ turn (90°).
 - Insert the hydraulic supporting elements in the cylinder head and position the relevant roller rocker arm on the valve stem ends.
 - Install camshaft housing ⇒ page 15-3.
- Further installation occurs in reverse order to removal.
- Top up coolant ⇒ page 19-9.





Testing compression

Special tools, testers and aids required

- ◆ Spark plug wrench, e.g. -3122 B-
- ◆ Torque wrench
- ◆ Compression tester, e.g. -V.A.G 1763-
- ◆ Extractor -T10094-

Test condition

- Engine oil temperature at least 30 °C

Test procedure

- ◀ - Remove engine cover -arrows- (cover for engine with identification characters AXP as shown)

For engines with identification characters AXP

- First remove the ignition cable guide with the spark plug connectors.
- ◀ - Disconnect the 4-pin plug connection from the ignition transformer -arrow-.

For engines with identification characters BCA

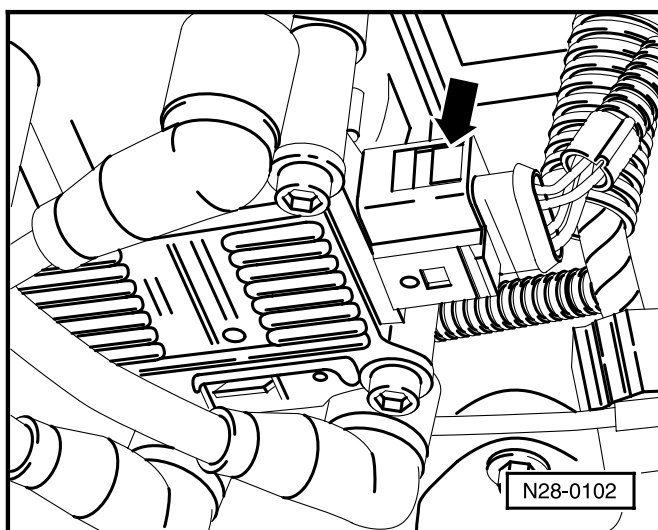
- Pull out all ignition coils using the extractor -T10094-

For all engines

- Unscrew the spark plugs.
- Press down the accelerator pedal fully (assistance of second mechanic required).
- Test compression pressure with compression tester e.g. -V.A.G 1763-.

Note:

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

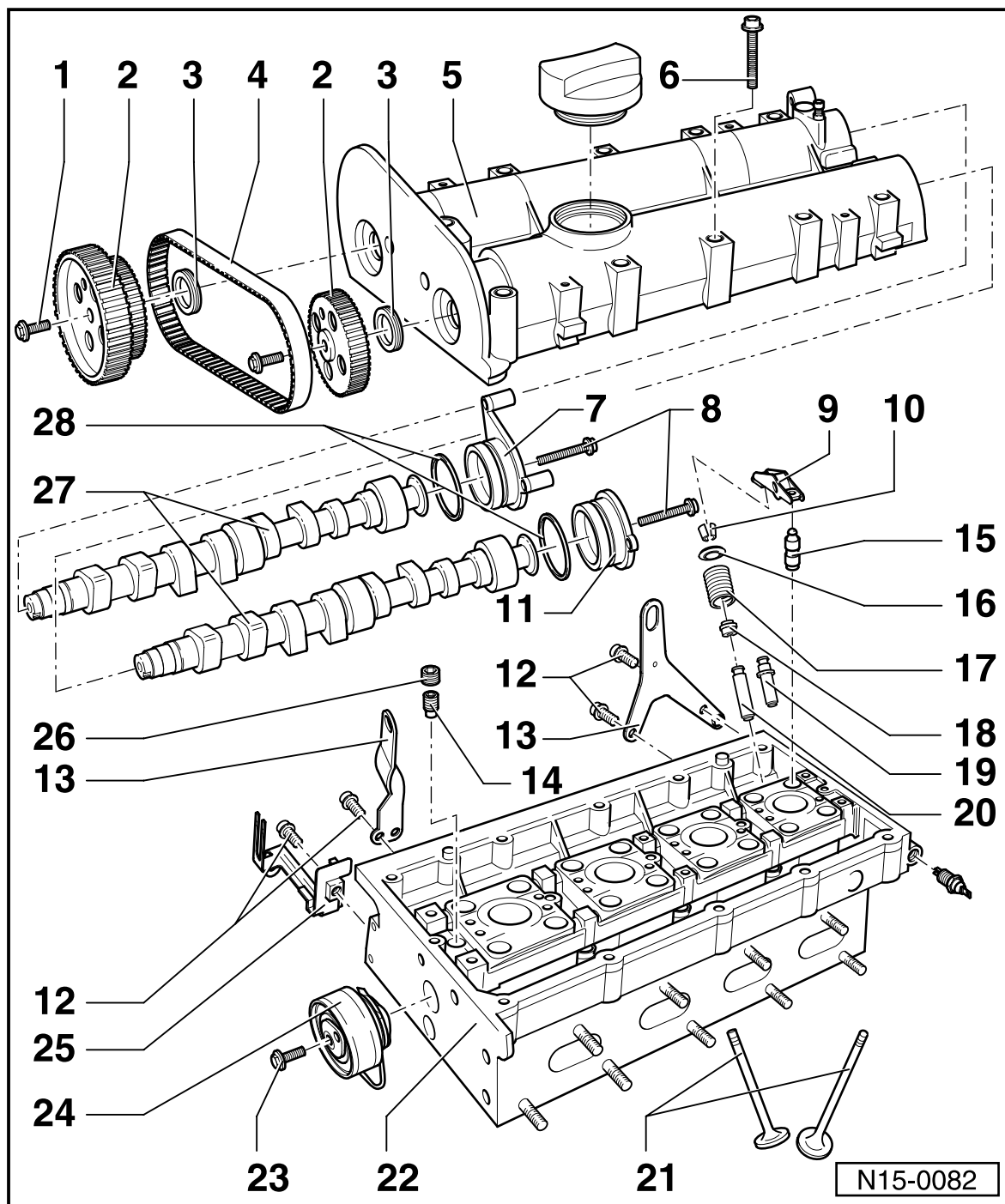


- Operate starter long enough until no further pressure rise is indicated by the tester.

Compression pressures:

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

Servicing valve gear

**1 - 20 Nm + torque a further $\frac{1}{4}$ turn (90°)**

- ◆ replace
- ◆ use device -T10016- ⇒ page 15-14, Fig. 1 for locking

2 - Camshaft sprocket

- ◆ pay attention to position of toothed belt when installing ⇒ page 13-5

3 - Seal

- ◆ lightly oil sealing lip
- ◆ replacing ⇒ page 15-18

4 - Coupling drive-toothed belt

- ◆ mark running direction before removing
- ◆ do not kink
- ◆ inspect for wear
- ◆ removing and installing, tensioning ⇒ page 13-5

5 - Camshaft housing

- ◆ removing and installing ⇒ page 15-3
- ◆ remove old sealant residues
- ◆ coat with agent -D 188 003 A1- before fitting
- ◆ when installing, fit onto stud bolts and dowel pins vertically from above.

6 - 10 Nm + torque a further 1/4 turn (90°)

- ♦ replace
- ♦ tighten crosswise from outside to inside

7 - Cap/holder for ignition transformer**8 - 10 Nm****9 - Roller arm**

- ♦ inspect roller bearings
- ♦ oil contact surface
- ♦ for installing, clip onto hydraulic supporting element with locking clip

10 - Valve collets**11 - Cap****12 - 20 Nm****13 - Lifting eye****14 - Non-return valve, 6 Nm**

- ♦ secure with device -D 154 102 A1-
- ♦ do not tighten excessively as the valve may tilt

15 - Hydraulic supporting element

- ♦ do not mix up
- ♦ before installing, inspect axial play of camshaft ⇒ page 15-14, Fig 2
- ♦ oil contact surface

16 - Valve spring retainer**17 - Valve spring**

- ♦ removing and installing with device -MP 1-229- ⇒ page 15-20

18 - Valve stem seal

- ♦ replacing ⇒ page 15-20

19 - Repair valve guide

- ♦ with collar

20 - Valve guide

- ♦ inspecting ⇒ page 15-19

21 - Valves

- ♦ do not rework, only grinding in is permissible
- ♦ valve dimensions ⇒ page 15-15, Fig. 4

22 - Cylinder head

- ♦ rework valve seats ⇒ page 15-16

23 - 20 Nm**24 - Tensioning pulley**

- ♦ inspecting ⇒ page 13-5
- ♦ tensioning toothed belt ⇒ page 13-5

25 - Bracket**26 - Cap, 45 Nm**

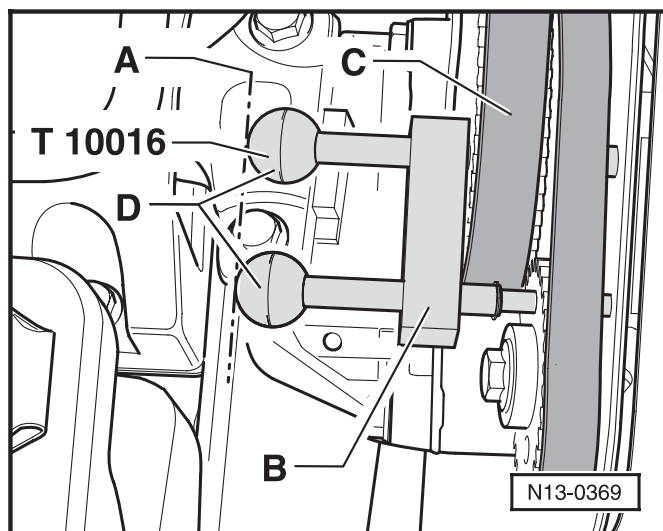
- ♦ use device -D 154 102 A1-
- ♦ must not be screwed in too deep
- ♦ maximum permissible recess of the camshaft housing contact surface 2 mm

27 - Camshafts

- ♦ inspecting axial play ⇒ page 15-14, Fig. 2
- ♦ identification and timing ⇒ page 15-15, Fig. 3

28 - Camshafts

- ♦ replacing
- ♦ coat with oil before inserting



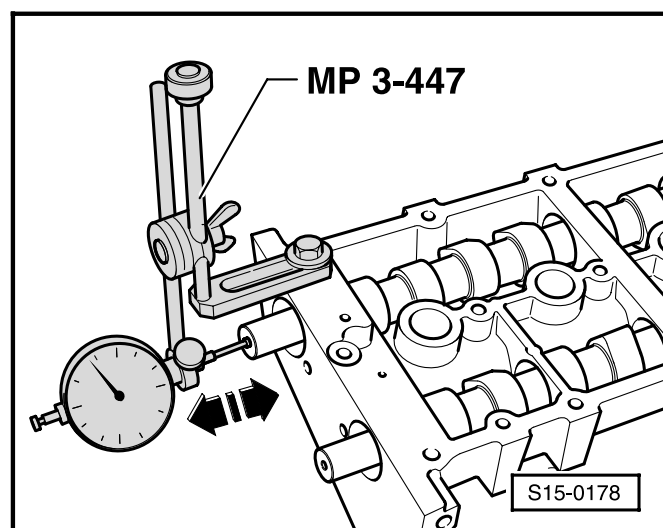
◀ Fig. 1: Locking both camshaft sprockets with the camshaft lock -T10016-

- Insert the two locking pins through the locating holes of the camshaft sprockets up to the stop in the fit holes in the camshaft housing.

Note:

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

- Push the bracket -B- up to the stop onto the camshaft sprocket -C-.
- If both camshaft sprockets are locked in the fit holes, it is possible to slacken or tighten the camshaft sprockets.



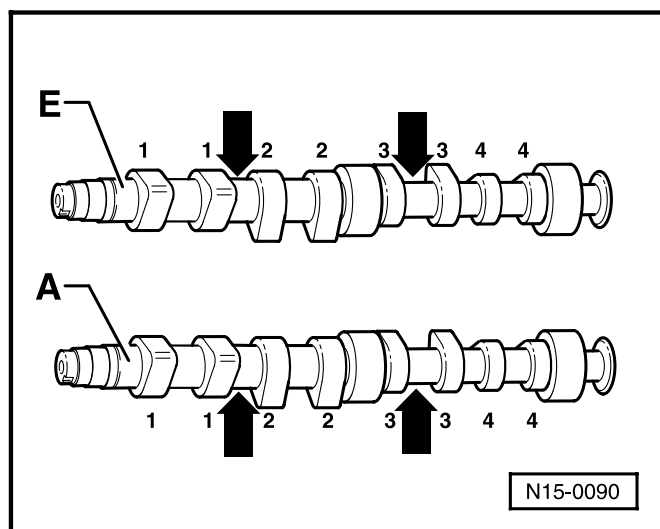
◀ Fig. 2: Inspect camshaft axial play

Special tools, testers and aids required

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

Carry out measurement with the camshaft housing removed and the end cover of the ignition transformer installed.

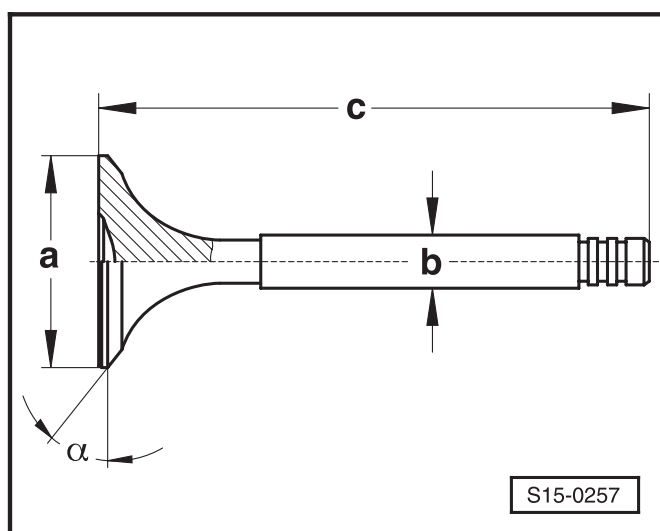
Wear limit: max. 0.15 mm.



◀ Fig. 3 Camshaft marking, timing

Marking

	Cylinder 1 and 2
Inlet shaft -E-	"036AC"
Outlet shaft -A-	"036AA"



◀ Fig. 4 Valve dimensions

Note:

Valves must not be reworked. Only grinding in is permissible.

Dimension		Inlet valve	Outlet valve
Ø a	mm	29.5	26.0
Ø b	mm	5.973	5.953
c	mm	100.9	100.5
α	∠°	45	45

Reworking valve seats

Special tools, testers and aids required

- ◆ Depth gauge
- ◆ Milling set for reworking valve seats

Notes:

- ◆ *When servicing engines with leaking valves, it is not sufficient to rework or to replace the valve seats and valves. It is necessary, particularly on engines with a high mileage, to inspect the valve guides for wear ⇒ page 15-19.*
- ◆ *Rework valve seats only sufficiently to obtain a proper contact pattern. Before commencing reworking, calculate the maximum permissible reworking dimension. If the reworking dimension is exceeded, proper operation of the hydraulic valve clearance compensation is no longer assured. In this case, replace the cylinder head ⇒ page 15-6.*

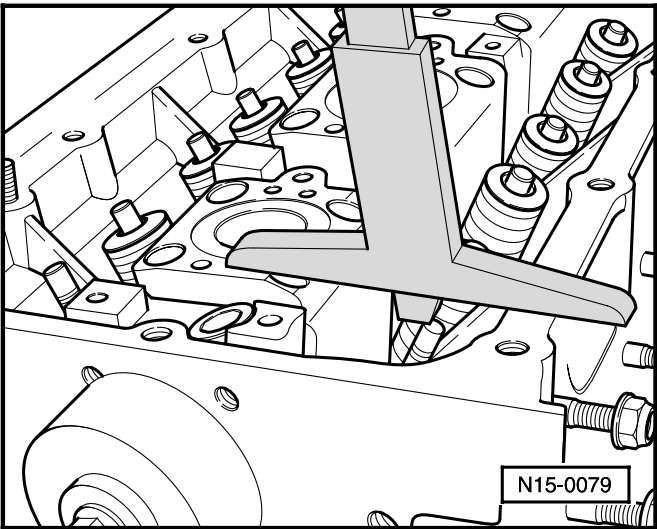
Calculating maximum permissible reworking dimension

- Insert valve and press firmly against the valve seat.

Note:

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

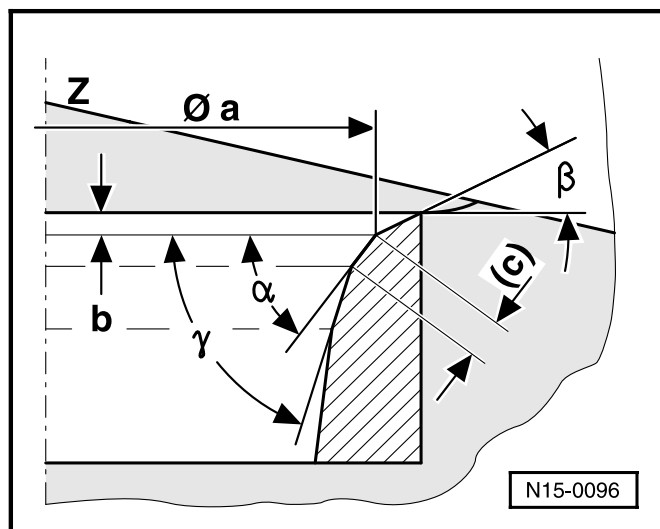
- ◀ - Measure distance between end of valve stem and top edge of cylinder head.
- Calculate maximum permissible reworking dimension from the distance measured and the maximum dimension.



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

Distance measured	8.0 mm
- Minimum dimension	7.6 mm
= Max. perm. reworking dimension ^{a)}	0.4 mm

a) The maximum permissible reworking dimension is shown as dimension „b“ for reworking the valve seats.



◀ Reworking inlet valve seat

- a = Ø 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 = Ø 25 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

Replacing camshaft seals

Special tools, testers and aids required

- ◆ Supporting device -MP 9-200-
- ◆ counterholder -T30004-
- ◆ Insertion device -T10015-
- ◆ Camshaft lock -T10016-
- ◆ Seal extractor -T10018-
- ◆ Torque wrench, e.g. -V.A.G 1331- (5...50 Nm)
- ◆ Torque wrench, e.g. -V.A.G 1332- (40...200 Nm)

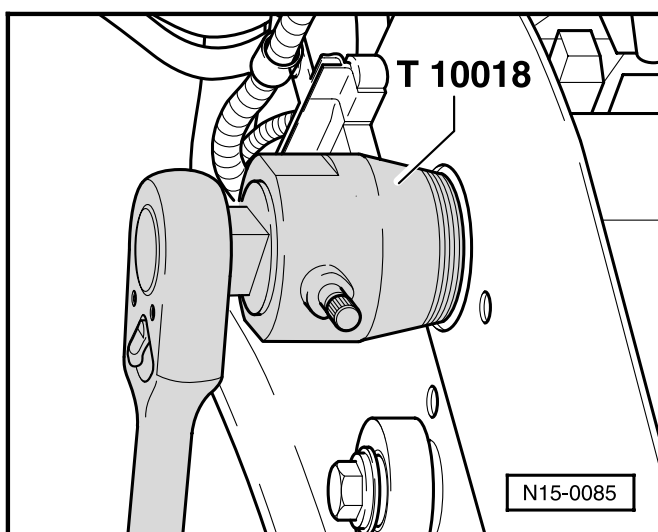
Removing

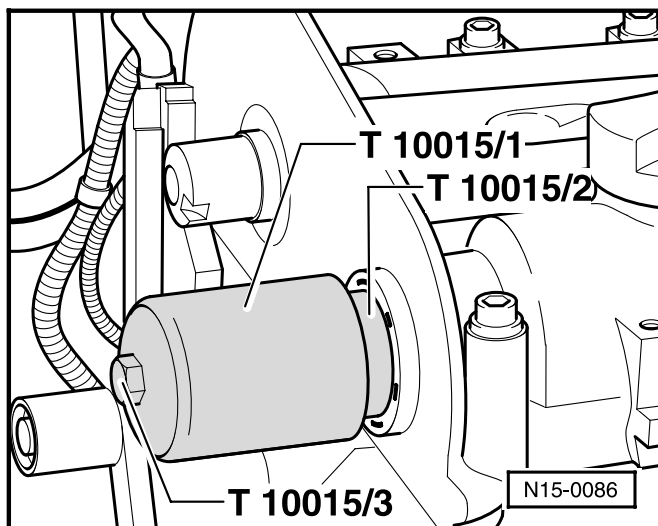
- First of all, remove both toothed belts ⇒ page 13-5.
- Rotate crankshaft back slightly.

Note:

Camshaft sprockets must be held in place by the camshaft lock -T10016- inserted into the fit holes in the camshaft housing.

- Remove camshaft sprockets. Hold camshaft sprockets tight with camshaft lock -T10016- for slackening the bolts ⇒ page 15-14, Fig. 1.
- Turn inner part of seal extractor -T10018- two turns (about 3 mm) out of the outer part and lock with knurled screw.
- Oil threaded head of seal extractor.
- ◀ - Screw seal extractor -T10018- as far as possible into the seal with considerable force.
- Slacken knurled screw and turn inner part against the crankshaft until the seal is pulled out.





Installing

- Lightly oil sealing lip of seal.
- ◀ - Fit guide sleeve -T10015/2- onto the camshaft journal.
- Push seal over the guide sleeve.
- Press in seal fully with thrust sleeve -T10015/1- and bolt -T10015/3-.
- Install camshaft sprockets.

Note:

Pay attention to position of camshaft sprockets relative to keyways in the camshafts.

- Hold the relevant camshaft sprocket tight with -T10016-.
- Tighten bolts to a torque of 20 Nm and torque a further $\frac{1}{4}$ turn (90°).
- Install toothed belt ⇒ page 13-5.

Inspecting valve guides

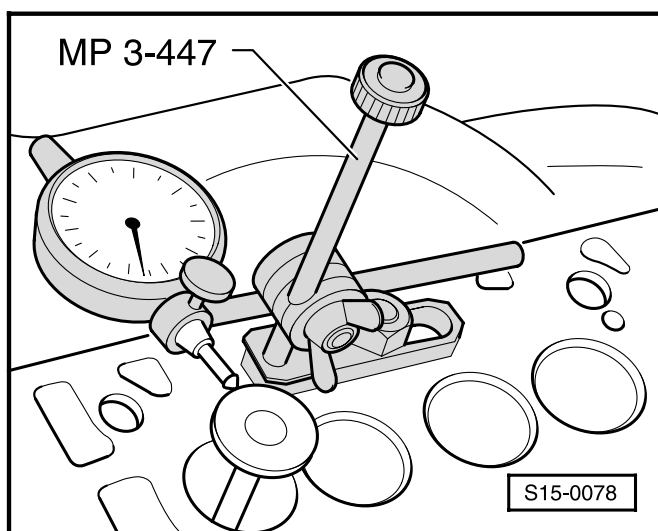
Special tools, testers and aids required

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

Procedure

- ◀ - Insert new valve into guide. End of valve stem must be flush with guide. Because of the different stem diameters, insert inlet valve only into inlet guide and exhaust valve only into exhaust guide.
- Determine valve rock.

Wear limit: max. 0.8 mm.



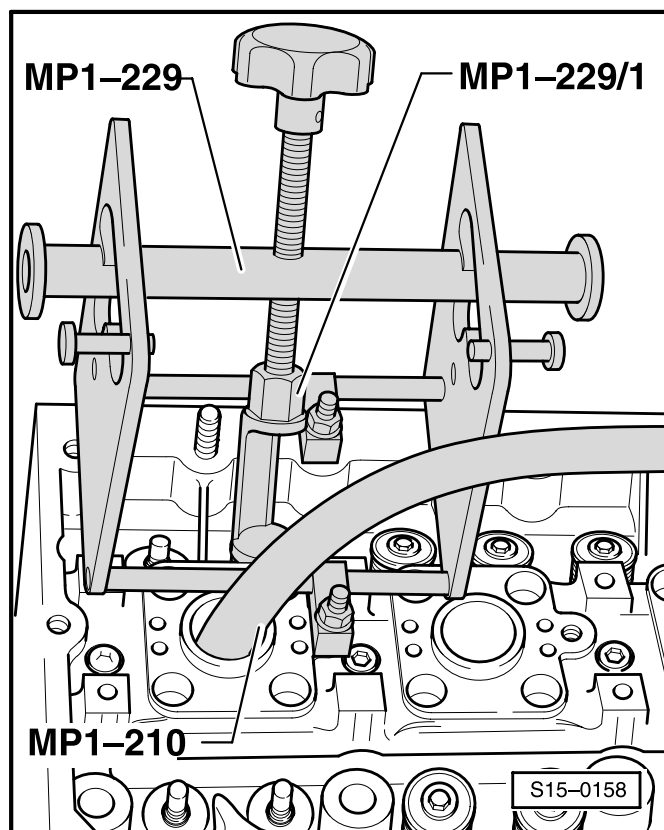
Replacing valve stem seals

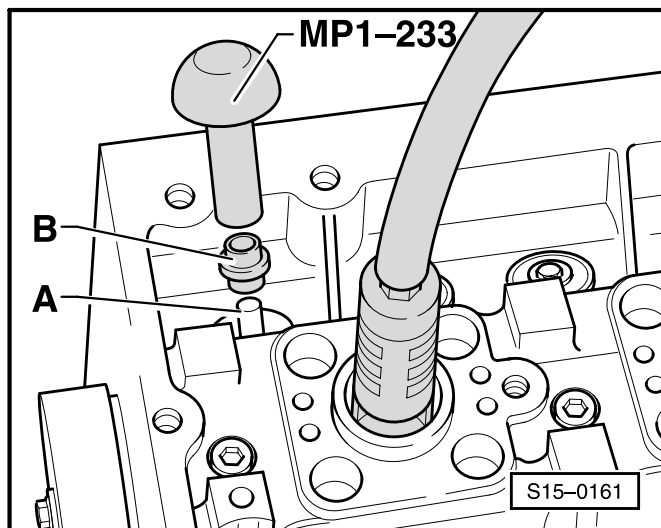
Special tools, testers and aids required

- ◆ Supporting device -MP 9-200-
- ◆ Spark plug wrench, e.g. -3122B-
- ◆ Assembly device -MP 1-229- with thrust piece -MP 1-229/1-
- ◆ Pulling device -MP 1-230-
- ◆ Valve seat ring insertion tool -MP 1-233-
- ◆ Counterholder -T30004-
- ◆ Pressure hose -MP 1-210-

Removing (cylinder head installed)

- Remove ignition strip from camshaft housing.
- Use spark plug wrench -T3122B- to unscrew spark plugs.
- Remove toothed belt of main drive ⇒ page 13-5.
- Remove camshaft housing ⇒ page 15-3.
- Take out roller drag levers and place down on a clean surface. Ensure that the roller drag levers are not mixed up.
- Position piston of the relevant cylinder to top dead centre.
- ◀ - Screw on assembly device -MP 1-229- with thrust piece -MP 1-229/1-.
- Screw pressure hose -MP 1-210- into the spark plug thread.
- Connect pressure hose -MP 1-210- to compressed air (min. 6 bar (0.6 MPa) pressure) and remove the valve springs.
- Pull off valve stem seals with special tool -MP 1-230-.



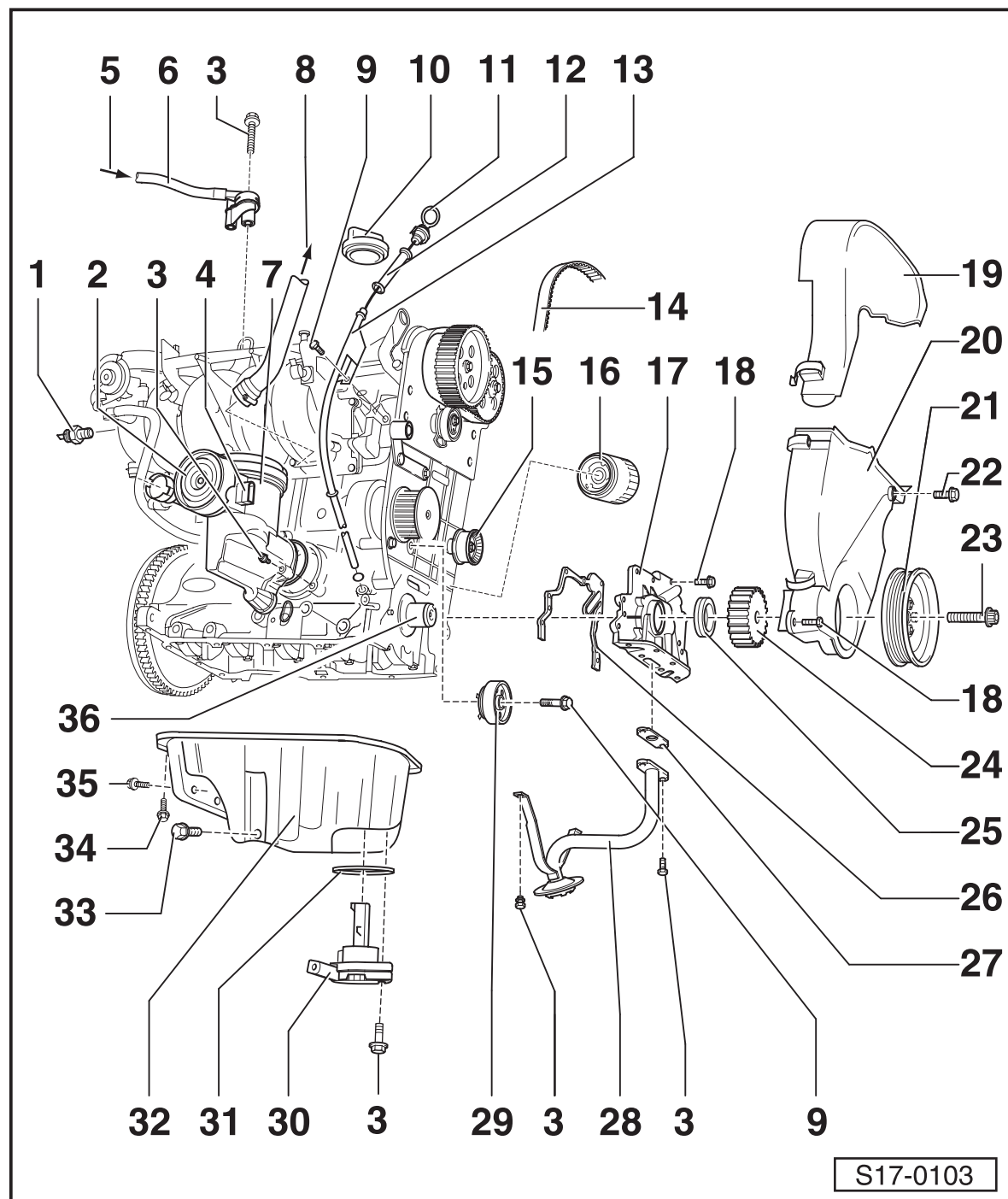


Installing

- Fit the supplied plastic sleeves onto the relevant valve stem in order to avoid damaging the new valve stem seals.
- ◀ - Insert the new valve stem seals -B- into the insertion tool -MP 1-233-.
- Oil sealing lip of valve stem seal and carefully push onto the valve guide -A-.
- Install camshaft housing ⇒ page 15-3.
- Install toothed belt and set timing ⇒ page 13-5.

The remaining installation is carried out in the reverse order.

Removing and installing parts of the lubrication system



Inspecting engine oil level, quantity of oil and oil specification:

⇒ Inspection and Maintenance

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

- ◆ identification: green
- ◆ inspecting ⇒ page 17-7
- ◆ replace gasket if damaged

2 - PCV valve

- ◆ for engine with identification characters BCA

3 - 10 Nm

4 - Heating for crankcase breather -N79-

- ◆ for engine with identification characters BCA

5 - From air filter

6 - Non-return valve

- ◆ as of 01.02

7 - Oil separator

- ◆ only version shown on engine with identification characters BCA

8 - To air filter

- 9 - 20 Nm**
- 10 - Cap**
- ♦ replace gasket if damaged
- 11 - Oil dipstick**
- ♦ oil level must not exceed max. marking!
- 12 - Filler funnel**
- ♦ remove for extracting oil
- 13 - Guide tube**
- 14 - Coupling drive-toothed belt**
- ♦ removing and installing, tensioning ⇒ page 13-5
 - ♦ inspect for wear
 - ♦ do not kink
- 15 - Guide pulley**
- 16 - Oil filter**
- ♦ tighten by hand
 - ♦ pay attention to installation instructions on oil filter
- 17 - Oil pump**
- ♦ when fitting pay attention to the driver on the crankshaft ⇒ page 17-2 item 36
 - ♦ must be located on dowel sleeves
 - ♦ removing and installing ⇒ page 17-4
- 18 - 12 Nm**
- 19 - Top part of toothed belt guard**
- 20 - Bottom part of toothed belt guard**
- 21 - Belt pulley**
- ♦ pay attention to correct position when installing
 - ♦ removing and installing ribbed V-belt ⇒ page 13-4
- 22 - 20 Nm**
- 23 - 90 Nm + torque a further $\frac{1}{4}$ turn (90°)**
- ♦ replace
 - ♦ coat with oil before inserting
 - ♦ tightening may occur in several stages
 - ♦ the torquing angle can be measured with a commercially available angle measuring plate, e.g. -Hazet 6690-
- 24 - Crankshaft toothed belt sprocket**
- 25 - Seal**
- ♦ replace ⇒ page 13-16
- 26 - Gasket**
- ♦ replace
 - ♦ must be located on dowel sleeves
- 27 - Gasket**
- ♦ replace
- 28 - Suction line**
- ♦ clean strainer if dirty
- 29 - Toothed belt tensioning pulley**
- ♦ tensioning toothed belt ⇒ page 13-5
- 30 - Oil level/oil temperature sender**
- ♦ inspecting ⇒ Current Flow Diagrams, Fault Finding Electrics, Fitting Locations
- 31 - Gasket**
- ♦ replace gasket if damaged
- 32 - Oil pan**
- ♦ removing and installing ⇒ page 17-3
 - ♦ clean sealing surface before installing
 - ♦ install with silicone sealant -D 176 404 A2-
- 33 - Oil drain plug, 30 Nm**
- 34 - 13 Nm**
- ♦ slacken and tighten only the bolts at the flywheel side with wrench bit SW5 e.g. -3249-
- 35 - 45 Nm**
- 36 - Driver**
- ♦ coat with oil before installing the oil pump.

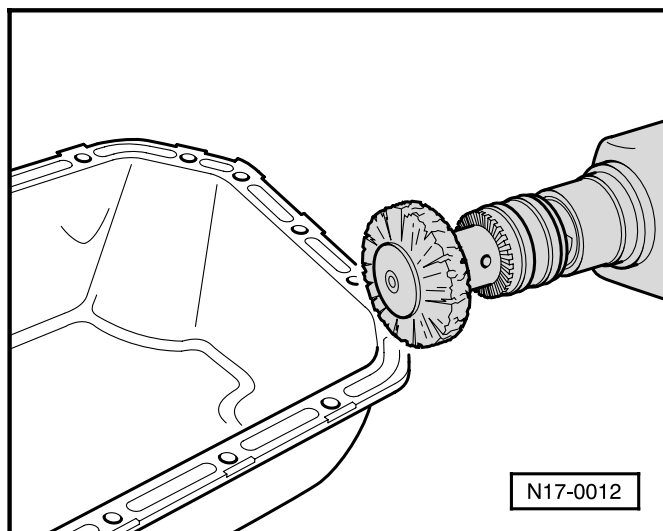
Removing and installing the oil pan

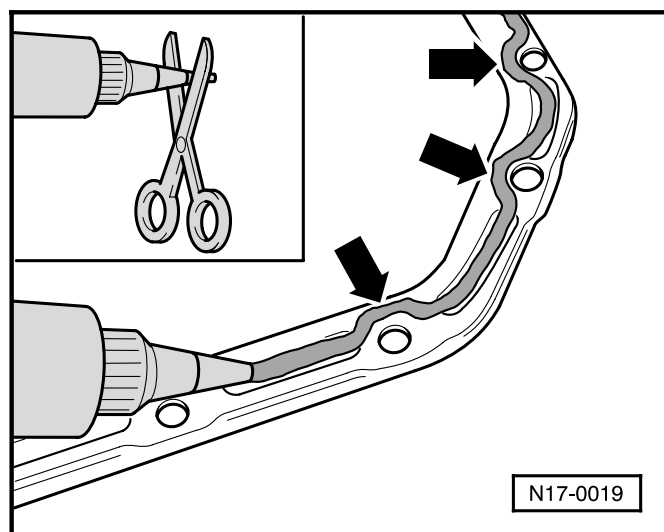
Required special tools, testing and measuring equipment as well auxiliary devices and material

- ◆ Hand drilling machine with a plastic brush insert
- ◆ Flat scraper
- ◆ Torque wrench
- ◆ Silicone sealant -D 176 404 A2-
- ◆ Key SW5, e.g. -3249-

Removing

- Drain off the engine oil
- Unscrew the front exhaust pipe from the exhaust manifold ⇒ Page 26-1.
- Pull out the plug for the sender for oil temperature.
- Unscrew two fixing screws for the flange of the gearbox and the oil pan.
- Unscrew the fixing screws for the oil pan.
- Remove the oil pan or loosen by giving it light blows with a rubber hammer.
- Remove residual sealant remains on the cylinder block using a flat scraper.
- ◀ - Remove residual sealant remains on the oil pan using the rotating plastic brush (wear protective spectacles).
- Clean the sealing surfaces of any oil or grease.





Installing

Notes:

- ♦ Pay attention to use before date of sealant.
- ♦ The oil pan must be installed within 5 minutes after applying the silicone sealant -D 176 404 A2-.

- ◀ - Cut off nozzle of tube at the front marking (Ø of nozzle approx. 3 mm).
- Apply silicone sealant, as shown in illustration, to the clean sealing surface of the oil pan. Sealant bead must:
 - ♦ be 2...3 mm thick
 - ♦ run past on the inside in the area of the bolt holes -arrows-.

Note:

The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and block the strainer in the oil inlet pipe.

- Fit on oil pan immediately and tighten all the oil pan bolts slightly.
- Tighten oil pan bolts in 2 stages (13 Nm).
- Tighten bolts of flange of gearbox and of oil pan (45 Nm).

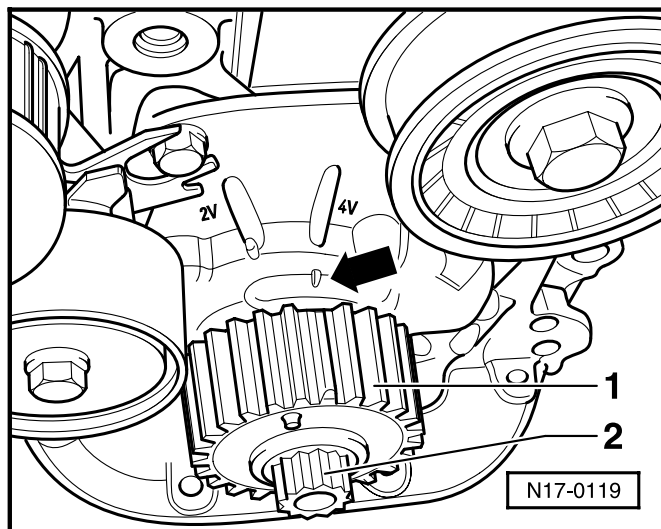
Note:

Allow the sealant to dry for about 30 minutes after installing the oil pan. Do not pour in engine oil until after this time has elapsed.

Removing and installing oil pump

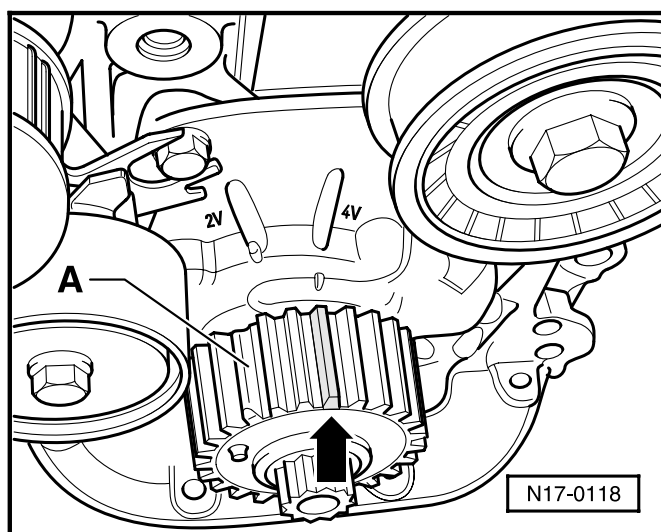
Special tools, testers and aids required

- ♦ Sleeve -T10022-
- ♦ Insertion tool -MP 1-207-
- ♦ Torque wrench, e.g. -V.A.G 1331- (5...50 Nm)



Removing

- Remove main drive-toothed belt
⇒ page 13-5.
 - ◀ - Secure crankshaft toothed belt sprocket -1- to the crankshaft with fixing screw -2-.
 - Position crankshaft to top TDC of cylinder 1:
- The chamfered tooth of the toothed belt -1- must correspond with the marking on the oil pump -arrow-.

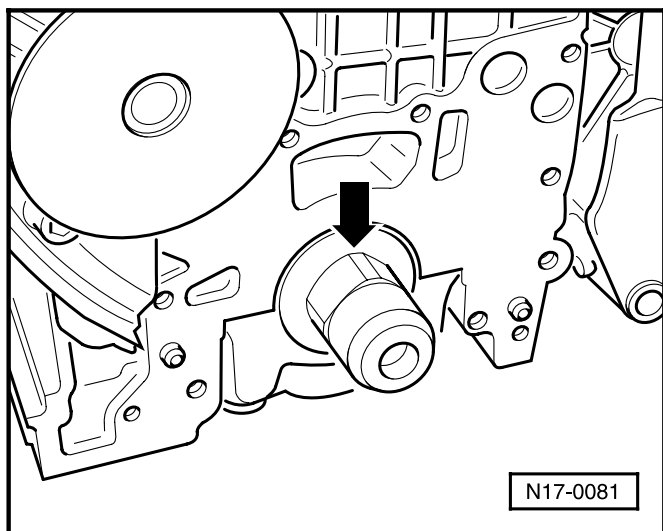


- ◀ - Turn the crankshaft or toothed belt sprocket from TDC position three teeth anti-clockwise:
- To the right next to the flattened of the toothed -A- belt sprocket, the third tooth -arrow- must be flush with the TDC marking on the oil pump housing.

Note:

Turning will give the crankshaft the fitting position for the oil pump. One of the four driver polygonal cams on the crankshaft is located at the top.

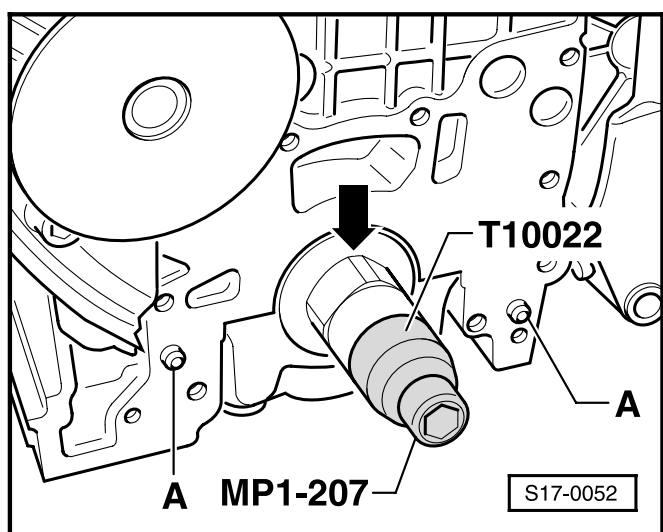
- Remove main drive-toothed belt
⇒ page 13-5.
- Remove oil pan ⇒ page 17-3.
- Remove suction line ⇒ page 17-2, item 28.
- Remove oil pump.
- Remove the gasket.
- Remove sealant residues at cylinder block.
- Remove oil from the sealing surfaces.



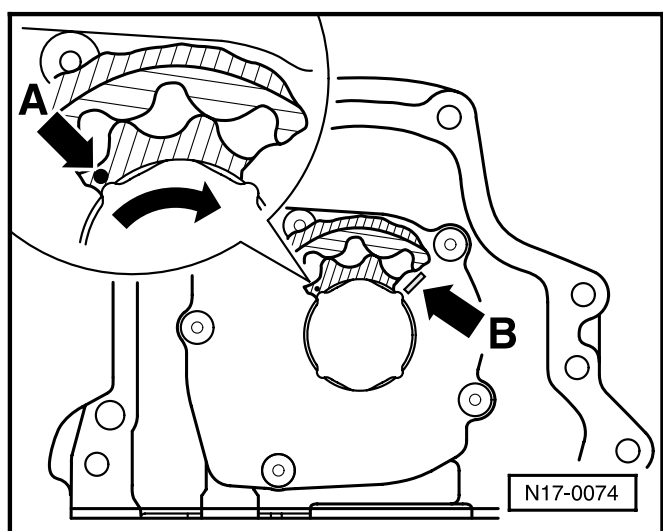
Installing

Condition

- ◀ • One of the four polygon driver cams -arrow- on the crankshaft is facing up.



- ◀ - Fit sleeve -T10022- onto the crankshaft and tighten the hexagon socket screw of special tool -MP 1-207- by hand.
- Fit new gasket onto the dowel sleeves -A-.



- ◀ - The marking -arrow A- of the inner rotor of the oil pump must be at the installation position -arrow B- of the oil pump housing cover.
- Moisten polygon cams of crankshaft with oil.
- Lightly oil seal of oil pump.
- Carefully guide oil pump onto the polygon cams of the crankshaft, align pump rotor if necessary by turning slightly relative to the polygon cams of the crankshaft.
- Carefully push oil pump onto the dowel sleeves.
- Tighten oil pump with new bolts (12 Nm).

- Remove sleeve -T10022-.
- Install suction line ⇒ page 17-2, item 28.
- Install oil pan ⇒ page 17-3.
- Install main drive-tensioning pulley, install and tension main drive-toothed belt ⇒ page 13-5.

Testing oil pressure and oil pressure switch

Special tools, testers and aids required

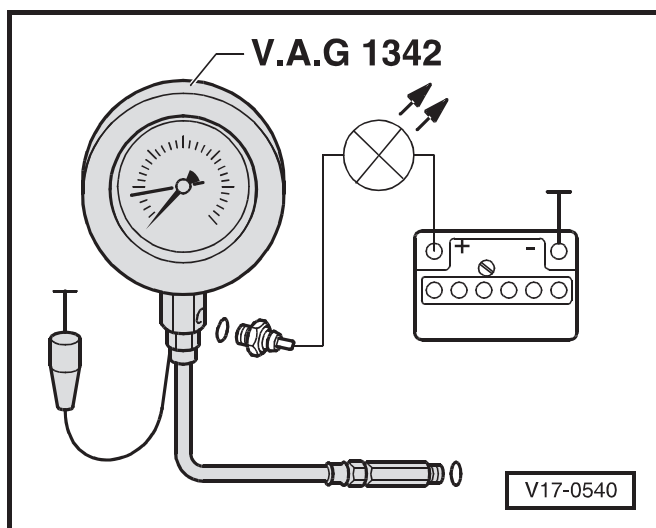
- ◆ Oil pressure tester e.g. -V.A.G. 1342-
- ◆ Diode test lamp e.g. -V.A.G. 1527-
- ◆ Measuring tool set e.g. -V.A.G. 1594 A-

Note:

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

Test procedure

- ◀ 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 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 overpressure should be at least 2 bar (0.2 MPa).
- At higher speed the oil overpressure must not exceed 7 bar (0.7 MPa).



Removing and installing parts of the cooling system

Notes:

- ◆ *When the engine is warm, the cooling system is pressurized. Release pressure before commencing repairs.*
- ◆ *Hose connections are secured with spring strap clips. Always use spring strap clips when carrying out repairs.*
- ◆ *When installing coolant hoses, route free of stress without allowing them to come into contact with other components (pay attention to marking on coolant connection and on hose).*

Draining and filling coolant system ⇒ page 19-9.

- ◆ *Coolant mixing ratios ⇒ page 19-10.*

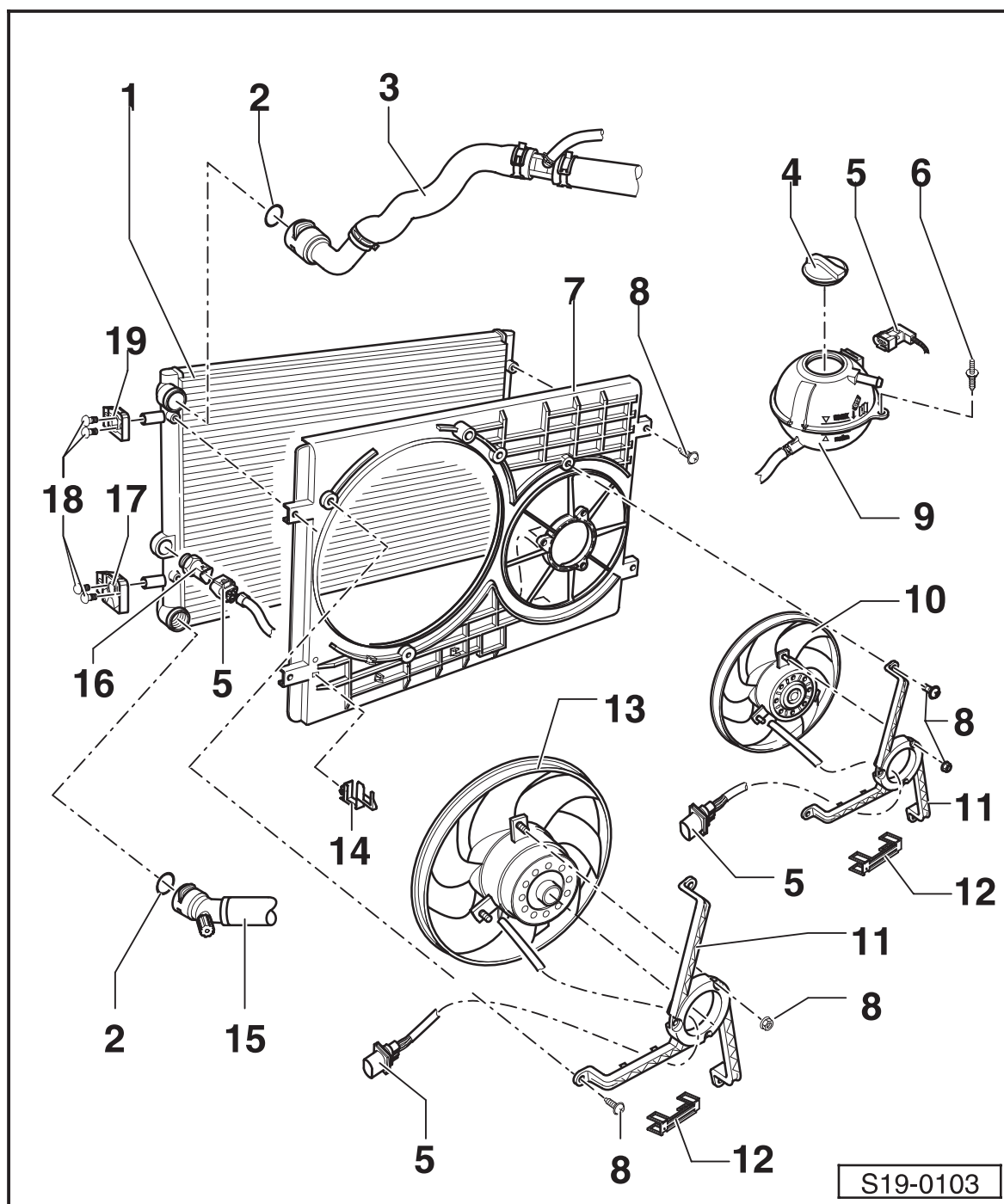
Connection diagram for coolant hoses ⇒ page 19-8.

Performing leaktightness test ⇒ page 19-11.

Parts of cooling system attached to engine ⇒ page 19-4.

Parts of cooling system attached to body ⇒ page 19-2.

Parts of cooling system attached to body

**1 - Radiator**

- ◆ after replacing, fill entire system with fresh coolant
- ◆ removing and installing ⇒ page 19-12

2 - O-ring

- ◆ replace

3 - Top coolant hose

- ◆ secure at radiator with retaining clips
- ◆ connection diagram for coolant hoses ⇒ page 19-8

4 - Expansion reservoir cap**5 - Connector**

6 - 2 Nm

7 - Air baffle

8 - 5 Nm

9 - Expansion reservoir

10 - Additional fan

- ◆ only on models with air conditioning

11 - Fan holder**12 - Clip**

- ◆ ensure correctly and tightly installed
- ◆ for fan cable

13 - Radiator fan**14 - Fixture for radiator connector****15 - Bottom coolant hose**

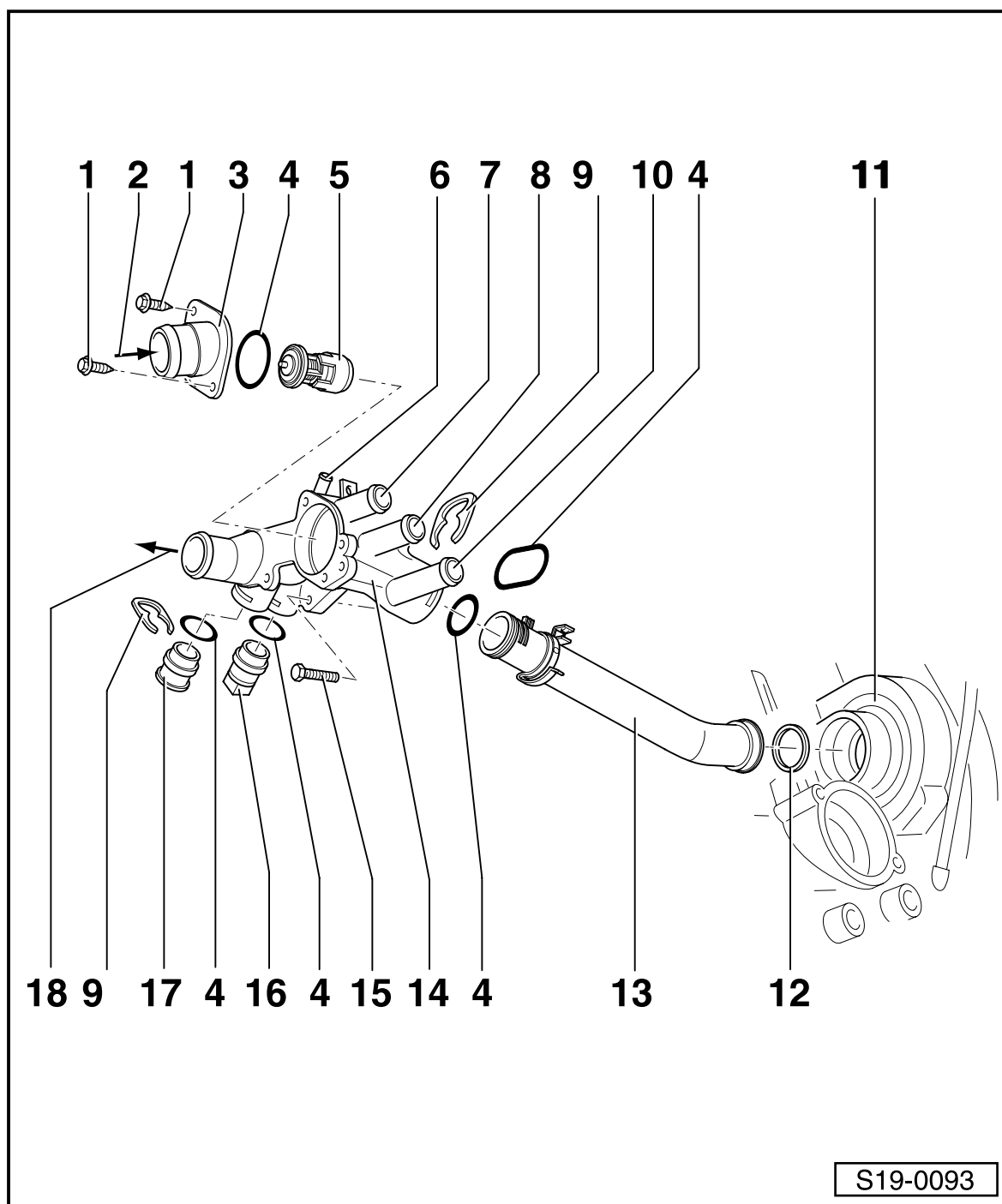
- ◆ secure at radiator with retaining clips
- ◆ connection diagram for coolant hoses
⇒ page 19-8

16 - Thermostatic switch for radiator fan**-F18-, 35 Nm**

- ◆ for electric fan
- ◆ switching temperatures
1st stage on: 81...91 °C
2nd stage on: 91...98 °C

17 - Bottom radiator mount**18 - 10 Nm****19 - Top radiator mount**

Assembly overview - coolant thermostat



1 - Self-tapping screw

2 - From bottom of radiator

- ♦ ⇒ page 19-3, item 15

3 - Connection fitting

4 - O-ring

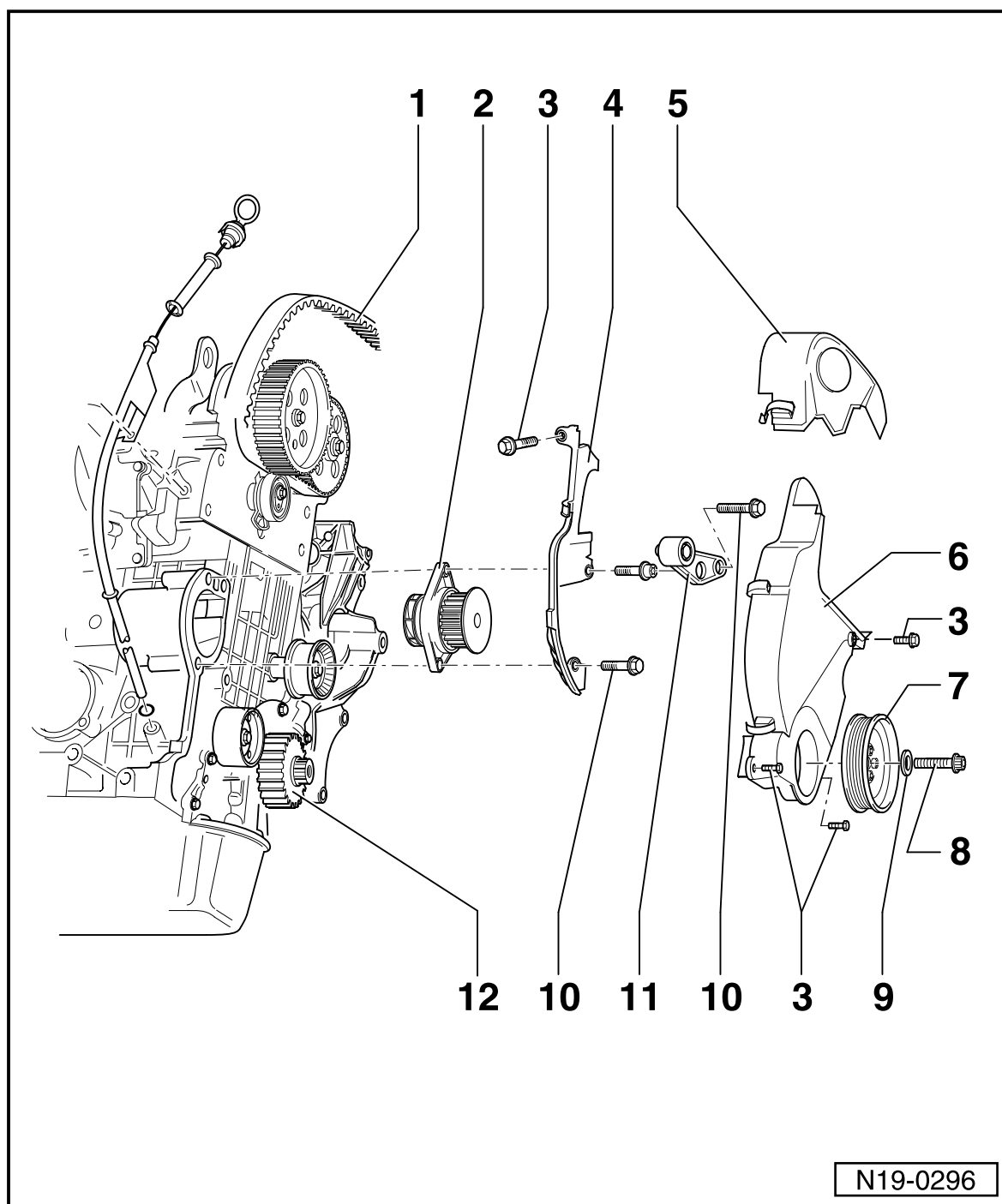
- ♦ replace

5 - Coolant thermostat

- ♦ testing operation: heat thermostat in bath of water; the pin of the thermocouple must move out
- ♦ temperature test: start of opening (approx. 84 °C) and end of opening (approx. 98 °C)

-
- | | |
|--|---|
| 6 - To expansion reservoir | 13 - Connection pipe |
| 7 - To heat exchanger | 14 - Coolant thermostat housing |
| 8 - From expansion reservoir | 15 - 10 Nm |
| 9 - Locking element | 16 - Coolant temperature sender -G62- <ul style="list-style-type: none">◆ testing ⇒ 1.4 l/55 kW Engine - Fuel Injection and Ignition System; Repair Group 24 |
| 10 - From heat exchanger | 17 - Plug |
| 11 - Coolant pump housing at cylinder block | 18 - To top of radiator <ul style="list-style-type: none">◆ ⇒ page 19-2, item 3 |
| 12 - Seal <ul style="list-style-type: none">◆ replace | |

Assembly overview - coolant pump



1 - Toothed belt of main drive

- ◆ removing and installing, tensioning
⇒ page 13-5

2 - Coolant pump

- ◆ inspect for unobstructed running
- ◆ replace complete if leaks and damage present
- ◆ removing and installing ⇒ page 19-13

3 - 10 Nm

4 - Rear toothed belt guard

5 - Top part of toothed belt guard

6 - Bottom part of toothed belt guard

7 - Crankshaft poly V-belt pulley

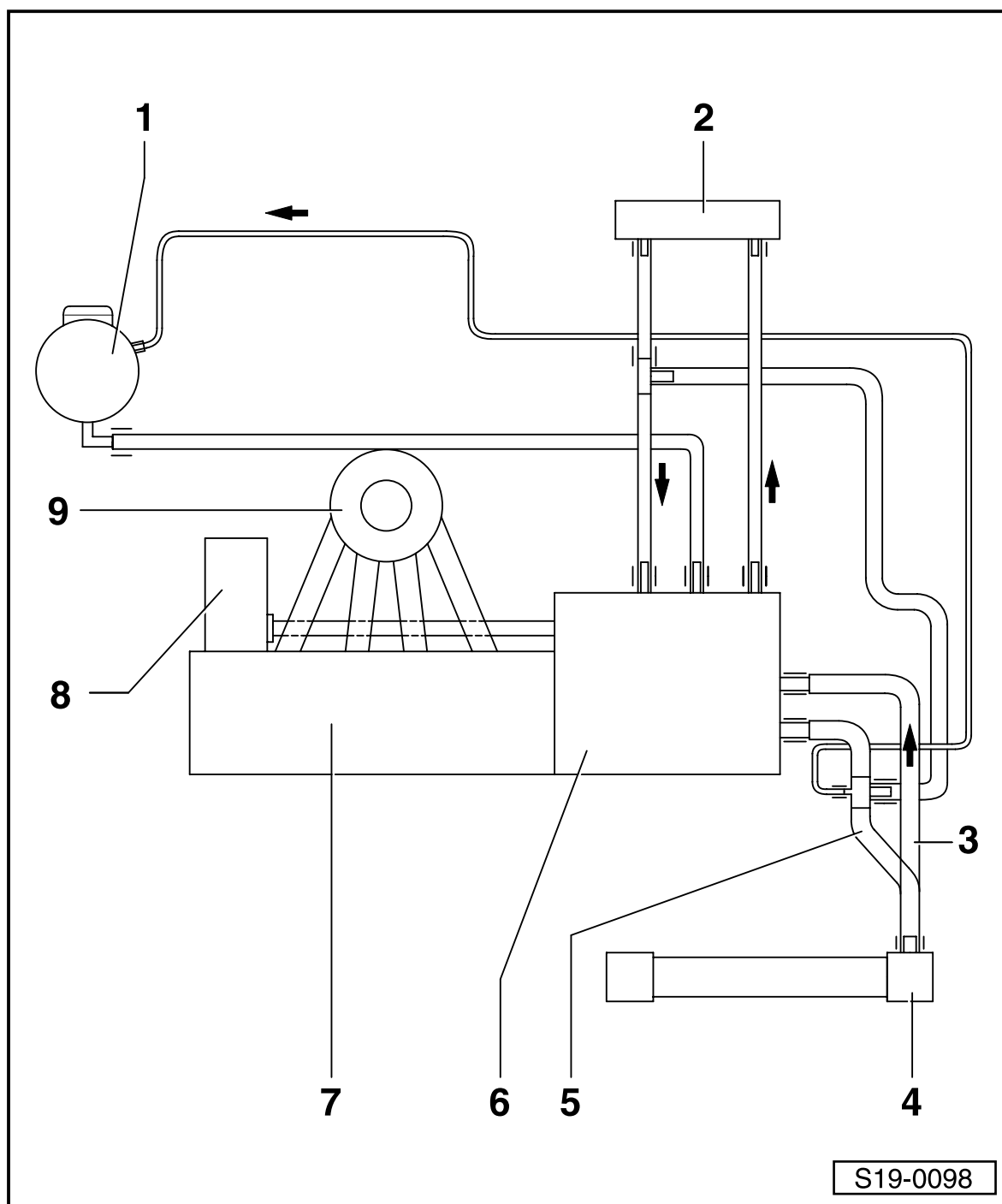
- ◆ pay attention to locating element when installing
- ◆ removing and installing poly V-belt
⇒ page 13-4

8 - 90 Nm + torque a further $\frac{1}{4}$ turn (90°)

- ◆ replace
- ◆ oil lightly before installing
- ◆ can also be torqued further in several stages
- ◆ the torquing angle can be measured with a commercial protractor, e.g. -Hazet 6690-

9 - Washer**10 - 20 Nm****11 - Guide pulley****12 - Crankshaft toothed belt sprocket**

Connection diagram for coolant hoses



1 - Expansion reservoir

2 - Heat exchanger for heating system

3 - Bottom coolant hose

4 - Radiator

5 - Top coolant hose

6 - Coolant thermostat housing

7 - Cylinder block

8 - Coolant pump

9 - Intake manifold

Draining coolant and filling it up again

Required special tools, testing and measuring equipment as well auxiliary devices and material

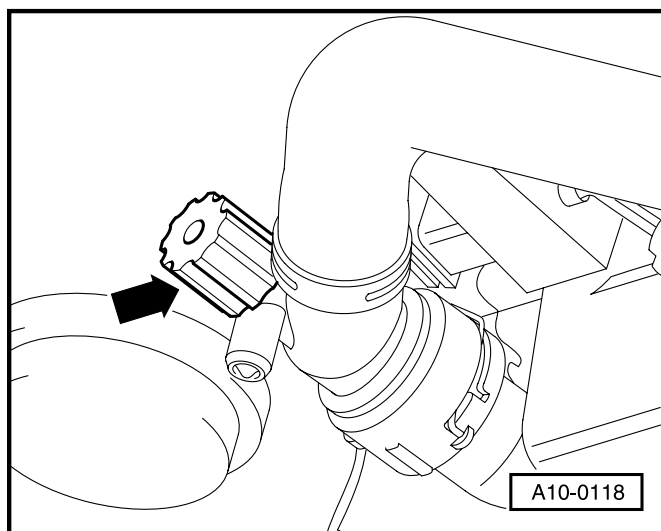
- ◆ Catch pan, e.g. -V.A.G 1306-
- ◆ Pliers for the spring strap clamps
- ◆ Anti-freeze tester for the coolant

Draining

Note!

Hot steam can be released when opening the expansion bottle. Cover the cap with a cloth and open carefully.

- Open up the cover of the coolant expansion bottle.
- Remove the sound-proofing on the left
- Place the catch pan, e.g. -V.A.G 1306- under the engine.
- ◀ - Loosen the drainage screw -arrow- on the radiator, attaching an auxiliary hose onto the pipe connection as required.



Note

- ◆ Catch the coolant which is drained off in order to dispose of it correctly.
- ◆ Please observe disposal regulations for the coolant.

Filling up

Select the coolant additives from the original spare parts catalogue ŠKODA, or possibly from a list of permissible coolants ⇒ Inspection and Maintenance; Re. Gr. 02

Recommended mixtures:

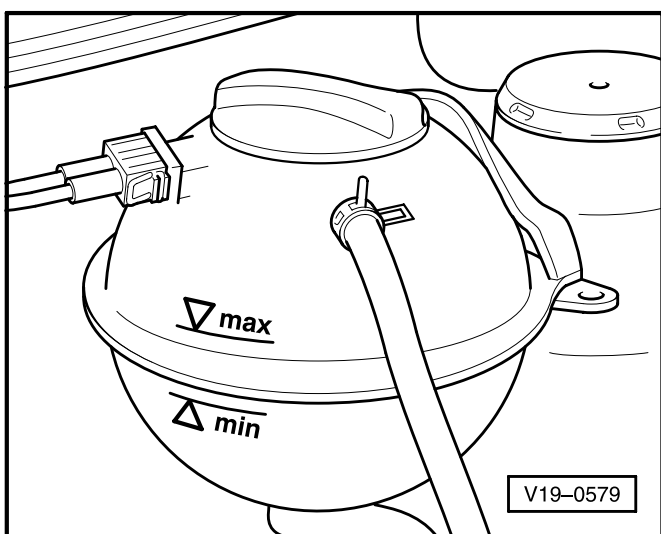
Anti-freeze protection up to	Proportion of anti-freeze ^{a)}	Water
- 25 °C	40%	60%
- 35 °C	50%	50%

a) The proportion of anti-freeze must not go above 60%; the anti-freeze protection and cooling effect reduce at higher proportions.

Filling up with coolant

If the following filling procedure is not followed correctly then the cooling system will not be completely filled with coolant and there will be some danger of experiencing damage to the engine.

- Screw in the drainage screw for coolant
- Attach the sound-proofing on the left
- ◀ - Fill up with coolant up to the „max.“ marking on the expansion bottle.
- Close the expansion bottle.
- Start the engine and let it run until the fan switches on.



Note!

Hot steam can be released when opening the expansion bottle. Cover the cap with a cloth and open carefully.

- Top up with coolant. The coolant level must be at the „max.“ marking for an engine at operating temperature while the coolant level must show as between „min.“ and „max.“ for a cold engine.

Checking the coolant system for leaks

Required special tools, testing and measuring equipment as well auxiliary devices and material

- ◆ Cooling system testing device, e.g. -V.A.G 1274-
- ◆ Adapter, e.g. -V.A.G 1274/8-
- ◆ Adapter, e.g. -V.A.G 1274/9-

Test conditions

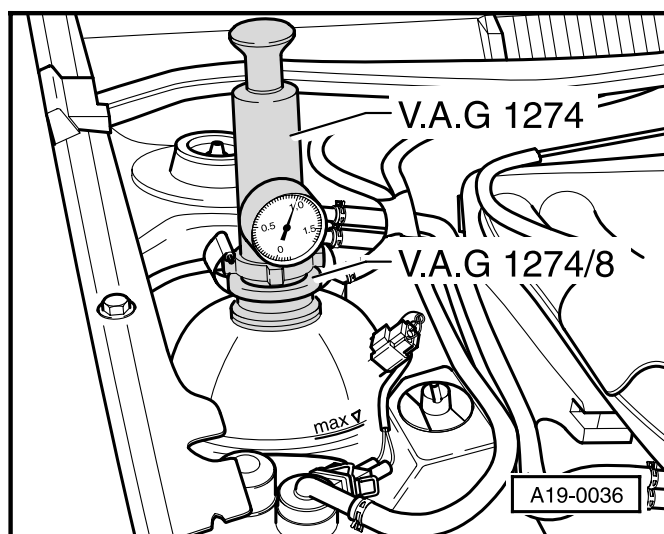
- Bring the engine up to operating temperature

Checking procedure

- Open up the cover of the coolant expansion bottle.

Note!

Hot steam can be released when opening the expansion bottle. Cover the cap with a cloth and open carefully.



- ▶ - Attach the testing device -V.A.G 1274- with adapter -V.A.G 1274/8- to the expansion bottle.
- Generate a positive pressure of about 0.1 MPa using the hand pump on the testing device.
- Search for leaks if the pressure drops and remove them.

Checking the overpressure valve in the cover

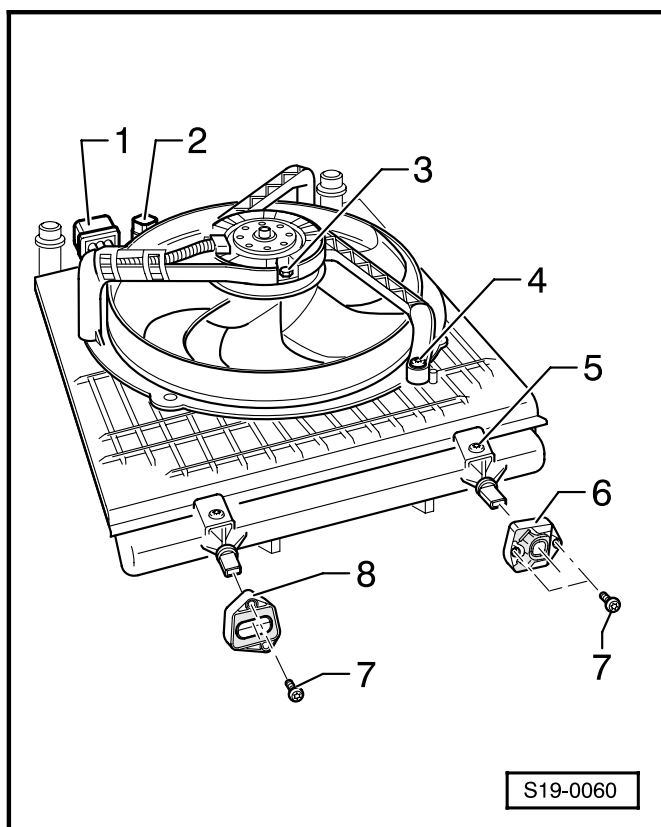
- Screw off the cover on the testing device using adapter -V.A.G 1274/9-.
- Generate a positive pressure of about 0.15 MPa using the hand pump on the testing device.
- The overpressure valve should open for a positive pressure of about 0.12 to 0.15 MPa.

Removing and installing the radiator

Required special tools, testing and measuring equipment as well auxiliary devices and material

- ◆ Catch pan, e.g. -V.A.G 1306-
- ◆ Torque wrench

Assembly overview



1 - Plug connection for the fan for the coolant -V7-

2 - Thermo-switch for the fan for the coolant -F18-, 35 Nm

◆ On: 95 °C

◆ Off: 84 °C

3 - 8 Nm

4 - 6 Nm

5 - 6 Nm

6 - Radiator bearing, below

7 - 8 Nm

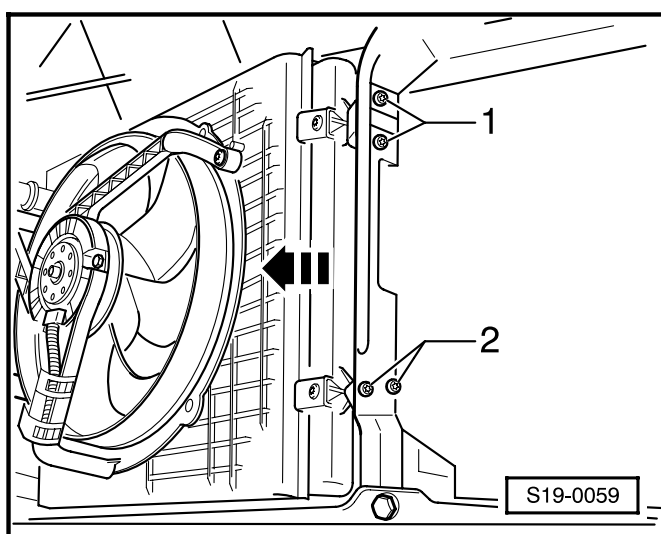
8 - Radiator bearing, below

Removing

- Drain off the coolant ⇒ Page 19-9.
- Disconnect the quick strap clamps (coolant hose connections) on the radiator.
- Pull out the plug for the thermo-switch.
- Separate plug connection of radiator fan.
- ◀ - Screw out screws -1- and -2- for the radiator bearing. Swing the radiator in the direction of the arrow and take it out of the left radiator bearings.

Note:

The left radiator bearing must not be loosened.



Installing

Installation is undertaken in the same way but in reverse order.

Note the installed position of the radiator bearing.

Removing and installing the coolant pump

Required special tools, testing and measuring equipment as well auxiliary devices and material

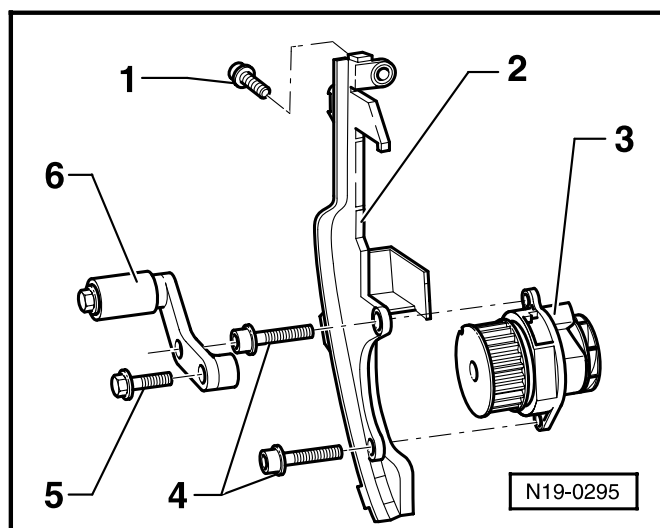
- ◆ Lifting device -MP 9-200-
- ◆ Catch pan, e.g. -V.A.G 1306-
- ◆ Torque wrench

Note:

- ◆ *Gaskets and gasket rings should always be replaced.*

Removal

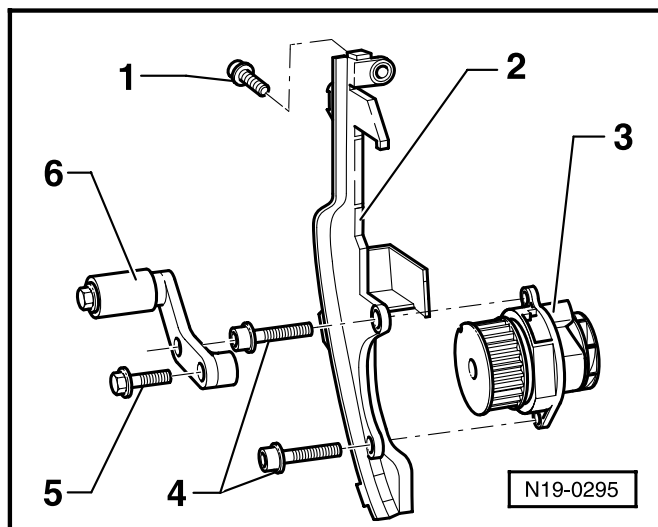
- Drain off the coolant ⇒ Page 19-9
- Remove the main drive-timing belt ⇒ Page 13-5
- ◀ - Remove the deflection roller -6-; this will require screwing out the fixing screw -5- of the deflection roller.
- Screw out the fixing screw -1- at the rear on the timing belt cover.
- Screw out fixing screws -4- on the coolant pump and remove the timing belt cover -2- at the rear and the coolant pump -3-.



Installing

Installation is undertaken in the same way but in reverse order while observing the following points:

- Place the coolant pump -3- in position in the cylinder block and fix in place firmly using the fixing screws -4- (20 Nm).
- Install the deflection roller -6- in place firmly using the fixing screw -5- (25 Nm).
- Fill up with coolant ⇒ Page 19-9.



- ◀ - Remove guide pulley -6-; unscrew bolt -5- attaching guide pulley for this purpose.
- Unscrew bolt -1- attaching rear toothed belt guard.
- Unscrew bolts -4- attaching coolant pump and remove rear toothed belt guard -2- and coolant pump -3-.

Installing

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

- Insert coolant pump -3- into the cylinder block and tighten the bolts -4- attaching it (20 Nm).
- Install guide pulley -6- and tighten bolts -5- attaching it (25 Nm).
- Fill system with coolant ⇒ page 19-9.

Removing and installing parts of the fuel supply system

Notes:

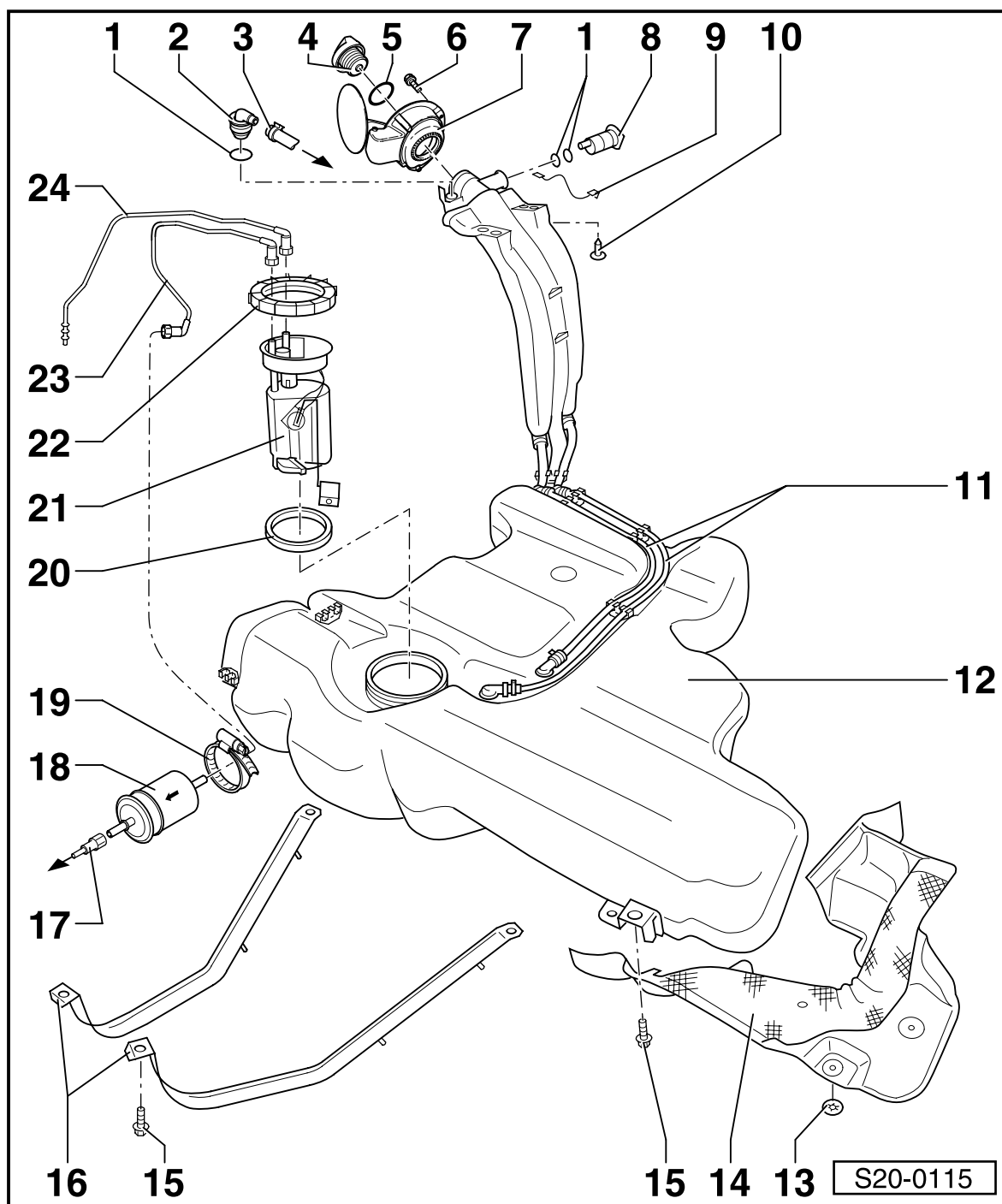
- ◆ *Hose connections are secured with spring strap clips.*
- ◆ *Fuel hoses at engine must be secured only with spring strap clips. It is not permitted to use collar-type or screw-type clips.*
- ◆ *Always replace seals and gaskets.*

Pay attention to safety precautions
⇒ page 20-4.

Pay attention to rules for cleanliness ⇒ page 20-4.

Assembly overview - Parts of activated charcoal filter system ⇒ page 20-13.

Removing and installing fuel tank with attached parts and fuel filter



1 - O-ring

- ♦ replace

2 - Safety valve

- ♦ to remove unclip valve and lift out of filler neck
- ♦ check clear passage of valve:
valve vertical: open
valve tilted 45°: closed

3 - Vent line

- ♦ ensure tightly connected

4 - Fuel filler cap

5 - Seal

- ♦ replace if damaged

6 - 1.5 Nm

7 - Fuel filler flap unit

- ♦ with rubber inserts

8 - Vent valve

- ◆ before removing, unscrew cap ⇒ item 4
- ◆ inspecting ⇒ page 20-4, Fig. 2

9 - Earth connection**10 - 10 Nm****11 - Vent line**

- ◆ ensure tightly attached
- ◆ secure with spring strap clips

12 - Fuel tank

- ◆ removing and installing ⇒ page 20-7

13 - Clamping washer

- ◆ installing: tighten to 2 Nm
- ◆ removing: turn to the left

14 - Heat shield

- ◆ for fuel tank

15 - 25 Nm**16 - Tensioning strap**

- ◆ pay attention to different lengths

17 - Feed line

- ◆ black
- ◆ to fuel rail

18 - Fuel filter

- ◆ black feed line

19 - Clip**20 - Seal**

- ◆ moisten with fuel before installing

21 - Fuel delivery unit

- ◆ removing and installing ⇒ page 20-5
- ◆ testing ⇒ page 20-9
- ◆ clean strainer if dirty
- ◆ installation position ⇒ page 20-3, Fig. 1

22 - Union nut

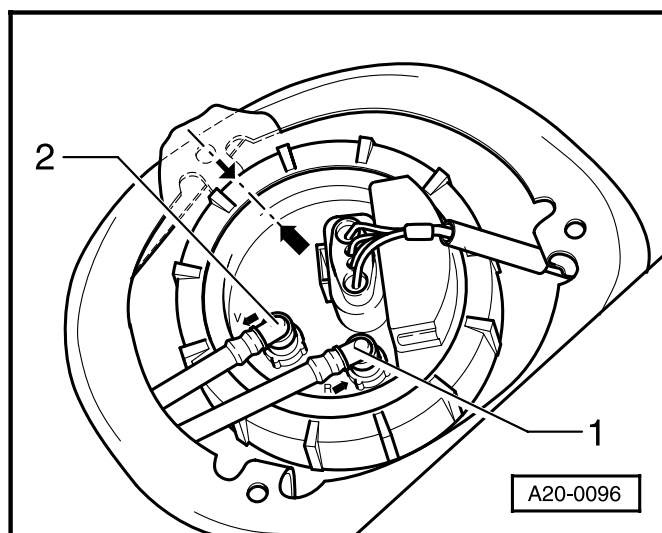
- ◆ removing and installing ⇒ page 20-5

23 - Feed line

- ◆ between fuel delivery unit and fuel filter
- ◆ black

24 - Return-flow line

- ◆ between fuel delivery unit and fuel filter
- ◆ blue



◀ **Fig. 1** Installation position of flange of fuel delivery unit

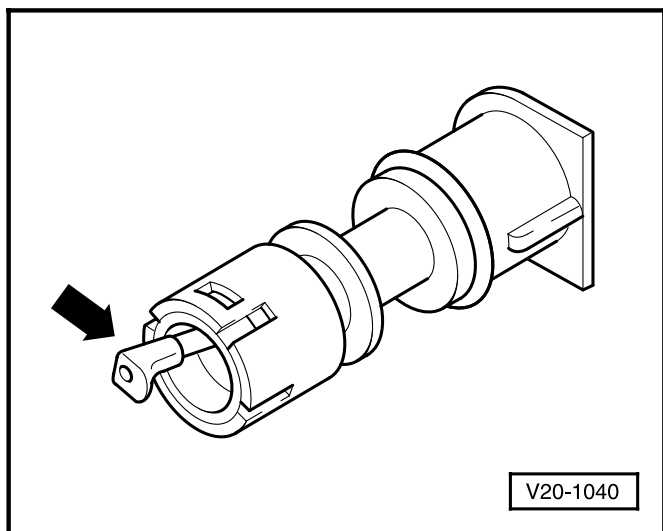
Marking on flange must be aligned with marking on fuel tank -arrows-.

Blue return-flow line -1- to connection marked -R-.

Black feed line -2- to connection marked -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 at the fuel tank.



◀ Fig. 2 Inspecting vent valve

Lever in rest position: valve closed

Lever pushed in direction of arrow: valve open

Note:

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

Safety precautions when working on fuel supply system

Warning!

The fuel system is pressurized! Before opening the system, place cleaning cloths around the connection point . Then, release pressure by carefully detaching the connection point.

Pay attention to the following points when removing and installing the fuel gauge sender or the fuel pump (fuel delivery unit) from the fuel tank:

- ◆ Fuel tank must not be more than two-thirds filled.
- ◆ Before commencing the work, the exhaust hose of an exhaust extraction system which is already switched on, must be placed close to the assembly opening of the fuel tank in order to extract any fuel gases which are released. If no exhaust extraction system is available, a radial fan (motor not positioned within air flow) with a delivery volume of more than 15 m³/h must be used.
- ◆ Avoid fuel getting onto your skin! Wear fuel-resistant gloves!

Rules for cleanliness

Pay careful attention to the following „5 rules“ for cleanliness when working on the fuel supply and injection system:

- ◆ Thoroughly clean connection points and the surrounding area before detaching.
- ◆ Place removed parts down on a clean surface and cover over. Do not use fluffing cloths!
- ◆ Carefully cover over or seal opened components if repairs are not carried out immediately.

- ◆ Install only clean parts:
Do not remove replacement parts from their wrapping until just before installing.
Do not use parts which have been stored unwrapped, for example in tool boxes.
- ◆ If the system is opened:
Avoid working with compressed air.
Avoid moving the vehicle.

Removing and installing fuel delivery unit

Pay attention to safety precautions
⇒ page 20-4.

Pay attention to rules for cleanliness ⇒ page 20-4.

Special tools, testers and aids required

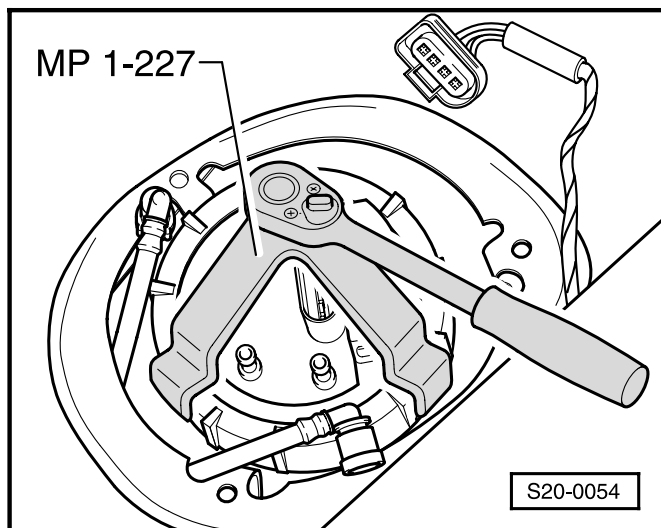
- ◆ Wrench for union nut, e.g. -MP 1-227-

Removing

- On vehicles fitted with a coded radio set, pay attention to the coding; determine if necessary.
- Switch off ignition (if not already off) and disconnect earth strap at battery.
- Unscrew cover (below rear seat).
- Detach feed and return-flow lines from the flange of the fuel delivery unit (press release button).
- Unlock and unplug 4-pin connector from flange at fuel tank.
- ◀ - Use wrench -MP 1-227- to unscrew union nut.
- Pull fuel delivery unit and seal out of the opening of the fuel tank.

Note:

If the fuel delivery unit is still filled with fuel, empty before disposing of it.

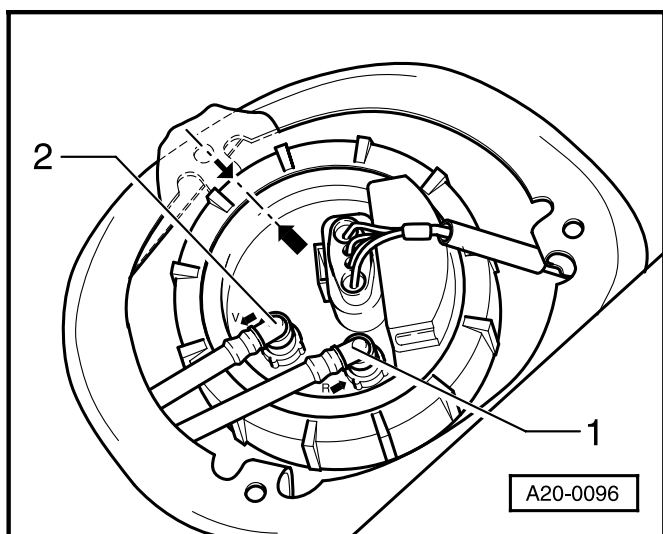


Installing

Installation is carried out in the reverse order.

Notes:

- ◆ When inserting the fuel delivery unit, ensure that the fuel gauge sender is not bent.
- ◆ Moisten seal of flange with fuel before installing.
- ◆ Ensure all the fuel hoses are tightly connected.
- ◆ Pay attention to installation position of flange of fuel delivery unit: marking on the flange must be aligned with the marking on fuel tank -arrows-.
- ◆ blue return-flow line -1- to connection marked -R-.
- ◆ black feed line -2- to connection marked -V-.
- ◆ After installing, check whether the fuel lines are correctly clipped in place at the fuel tank.



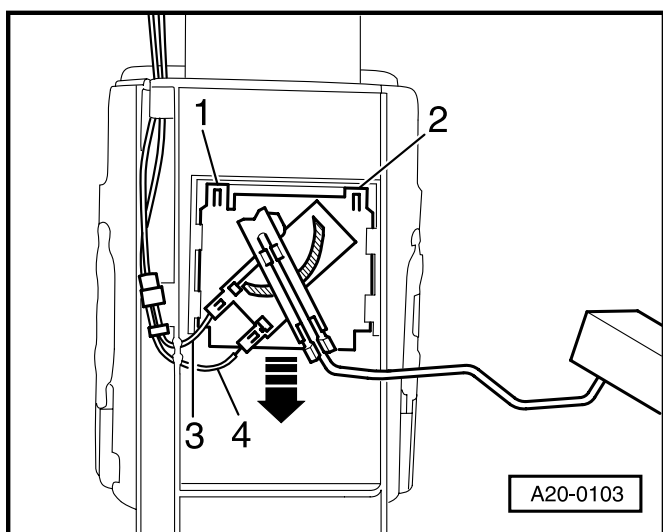
Removing and installing fuel gauge sender

Removing

- Remove fuel delivery unit ⇒ page 20-5.
- ◆ Unlock cables -3- and -4- and disconnect.
- Use a screwdriver to lift catches -1- and -2- and pull fuel gauge sender down and off -arrow-.

Installing

- Insert fuel gauge sender into the guides at the fuel delivery unit and push it up until it locks in place.
- Install fuel delivery unit ⇒ page 20-5.



Removing and installing fuel tank

Pay attention to safety precautions

⇒ page 20-4.

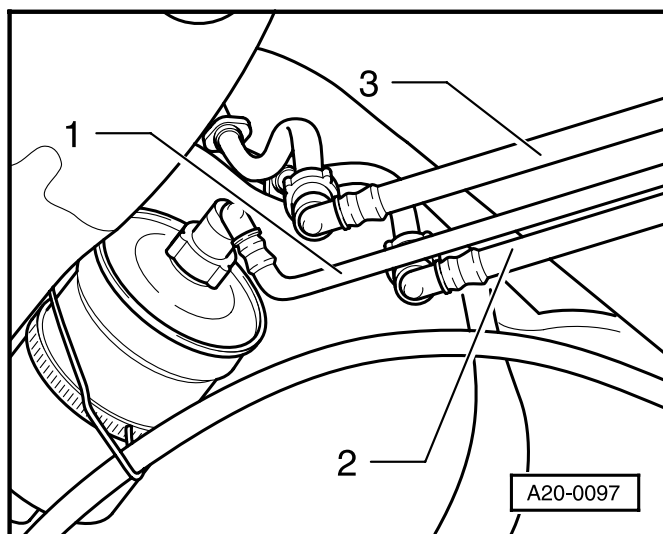
Pay attention to rules for cleanliness ⇒ page 20-4.

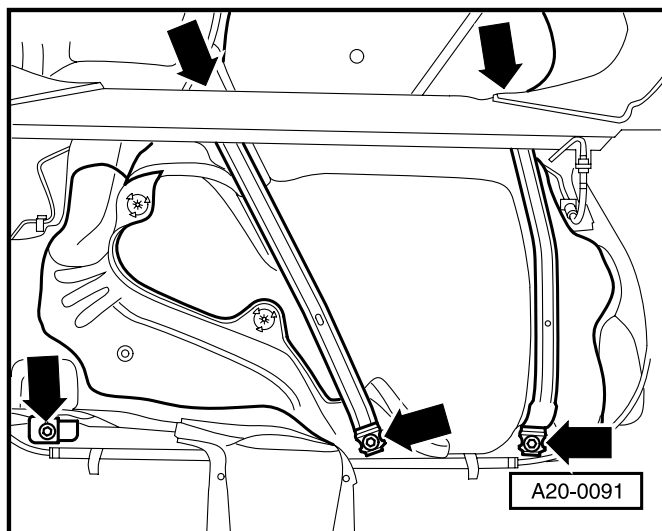
Special tools, testers and aids required

- ◆ Engine and gearbox lifter, e.g. -V.A.G 1383 A-
- ◆ Fuel extractor, e.g. -V.A.G 1433 A-
- ◆ Torque wrench, e.g. -V.A.G 1331- (5...50 Nm)

Removing

- Before commencing removal and installation work, pay attention to the safety precautions ⇒ page 20-4.
- On vehicles fitted with a coded radio set, pay attention to coding; determine if necessary.
- Switch off ignition (if not already off) and disconnect earth strap at the battery.
- Use fuel extractor (e.g. -V.A.G 1433 A-) to empty fuel tank.
- Remove rear axle
⇒ Running Gear; Repair Group 42; Servicing rear axle; Removing and installing rear axle
- Unscrew cover (below rear seat).
- Unlock and unplug 4-pin connector from flange at fuel tank.
- Remove fuel filler flap unit
⇒ Body Fitting Work; Repair Group 66.
- ◀ - Separate return-flow line -2- (blue), feed line -1- (black) and vent line -3- (white) at the front right of the fuel tank (press release button).
- Position engine and gearbox lifter (e.g. -V.A.G 1383 A-) below fuel tank to support it.





- ◀ - Remove screws -arrows- at front left and at the retaining straps.
- Lower fuel tank.

Installing

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

- ◆ Inspect vent and fuel hoses for damage.
- ◆ Ensure the fuel hoses are tightly connected.
- ◆ Secure fuel hoses with spring strap clips.
- ◆ Do not mix up feed and vent lines.

Note:

- ◆ After installing, check whether the fuel lines are correctly clipped in place at the fuel tank.

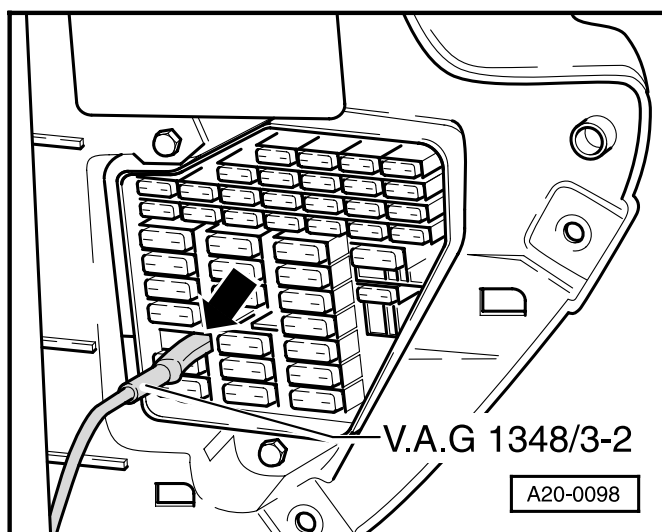
Connecting remote control

Special tools, testers and aids required

- ◆ Remote control -V.A.G 1348/3A- with adapter cable -V.A.G 1348/3-2-

Procedure

- Open cover of fuse box on left side of dash panel.
- Remove fuse 28 at fuse carrier (left row, 5th large fuse from top).
- ◀ - Connect remote control -V.A.G 1348/3A- with adapter cable -V.A.G 1348/3-2- to base of fuse 28 -arrow-.
- Connect crocodile clamp to vehicle battery (+).



Testing fuel pump

Special tools, testers and aids required

- ◆ Hand-held multimeter, e.g. -V.A.G 1526-
- ◆ Adapter cable set, e.g. -V.A.G 1594 A-
- ◆ Wrench for union nut, e.g. -MP 1-227-
- ◆ Current flow diagram

Test conditions

- Holding pressure o.k., testing:
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24; Testing fuel pressure regulator and holding pressure
- Battery voltage at least 12 V
- Fuse 28 o.k.
- Fuel filter o.k.

Test procedure

- Switch ignition on.

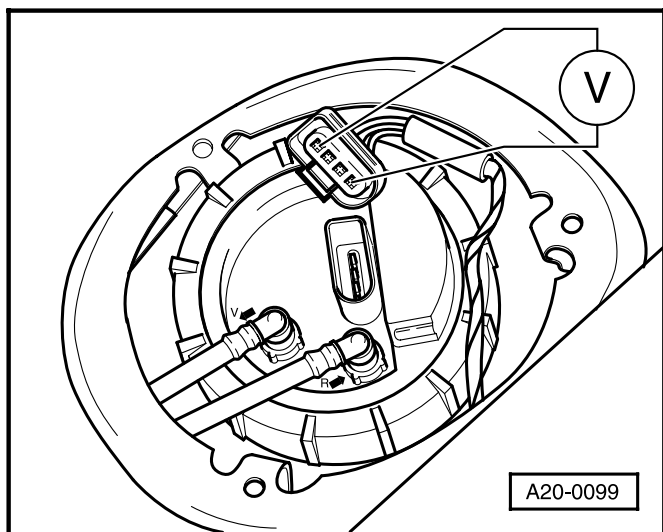
The fuel pump must be heard to run. (A second person may be required for this if there is a high level of surrounding noise).

If the fuel pump does not run:

- Switch ignition off.
- Connect remote control -V.A.G 1348/3A- with adapter cable -V.A.G 1348/3-2- ⇒ page 20-8.
- Operate remote control.

If the fuel pump runs:

- Test fuel pump relay:
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24; Testing and actuating fuel pump relay -J17-.



If the fuel pump does not run:

- Unscrew cover (below rear seat).
- Unlock and unplug 4-pin connector from flange at fuel tank.
- ◀ - Connect hand-held multimeter with adapter cables to the outer contacts of the connector.
- Operate remote control.
Specification: approx. battery voltage

If the specification is not achieved:

- Determine open circuit in wiring according to current flow diagram and rectify:
⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

If the specification is achieved:

- Use wrench -MP 1-227- to unscrew union nut.
- Check whether the electric cables are connected and test for open circuit, if necessary.

If no open circuit is present:

Fuel delivery unit is faulty.

- Replace fuel delivery unit ⇒ page 20-5.

Testing fuel delivery

Special tools, testers and aids required

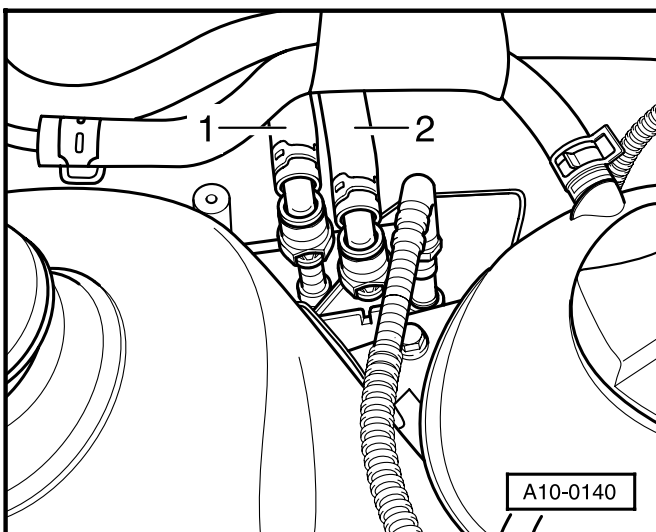
- ◆ Pressure measuring device, e.g. -V.A.G 1318-
- ◆ Adapter, e.g. -V.A.G 1318/17-
- ◆ Measuring vessel

Test conditions

- Battery voltage at least 12 V
- Voltage supply o.k.
- Fuel filter o.k.

Test procedure

- Switch ignition off.
- Connect remote control -V.A.G 1348/3A- with adapter cable -V.A.G 1348/3- ⇒ page 20-8.
- Remove cap from fuel filler neck.



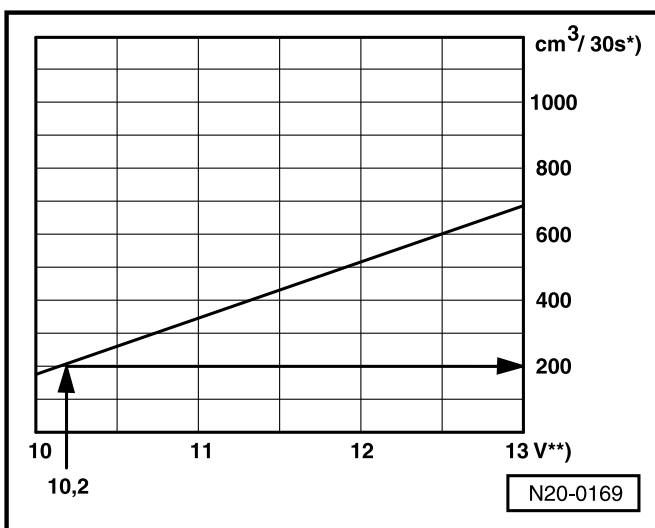
Warning!

Fuel system is pressurized! Place cleaning cloths around the connection point before opening the system. Then, release the pressure by carefully detaching the connection point.

- ◀ - Detach fuel return-flow line -2- (press release button).
- Connect hose to adapter -V.A.G 1318/17- and fit onto fuel return-flow line of engine and hold in measuring vessel.
- Operate remote control for 30 seconds (press and hold button).
- ◀ - Compare quantity of fuel pumped with specification.

*) Minimum delivery 1 cm³/30 s

**) Voltage at fuel pump when engine not running and pump running (about 2 V less than battery voltage).



Testing non-return valve of fuel pump

Test conditions

- Pressure measuring device is still connected
⇒ page 20-11
- Remote control connected ⇒ page 20-8

Test procedure

Note:

When this test is performed, the connections of the fuel feed line from the fuel delivery unit up to the connection point of the pressure measuring device -V.A.G 1318- are also tested for leaks.

- ◀ - Open shut-off cock at measuring unit to position -A-.
- Operate remote control until a pressure of 3 bar (0.3 MPa) is built up.
- Switch off remote control and observe pressure drop on gauge. The pressure must not drop below 2.5 bar (0.25 MPa) within 10 minutes.

If the pressure drops:

- Operate remote control until a pressure of 3 bar (0.3 MPa) is built up and at the same time close the shut-off cock at the measuring device by turning into position -B-.

If the pressure now does not drop:

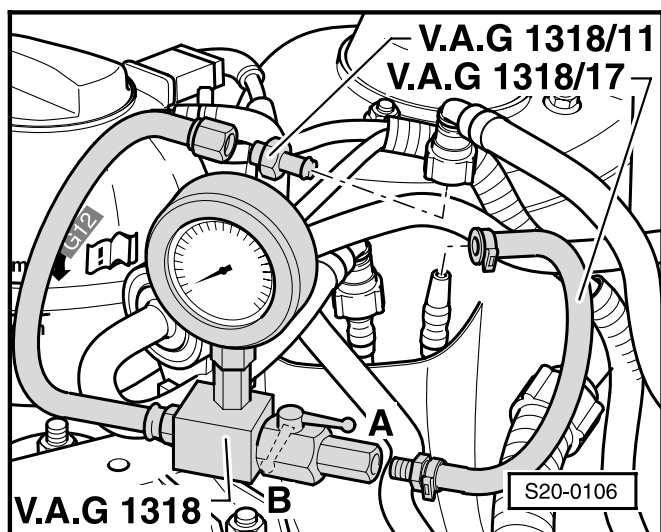
- Inspect fuel rail for leaks.

If the pressure drops further:

- Inspect line connections for leaks.

If no fault is found in the lines:

- Replace fuel delivery unit ⇒ page 20-5.



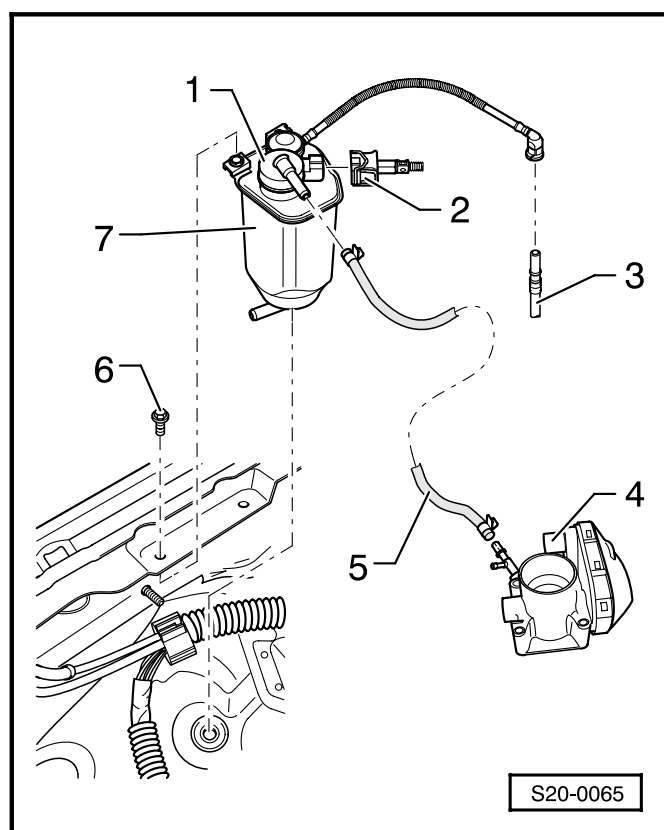
Switching off fuel delivery unit by means of crash signal

Function

Vehicles fitted with an airbag are equipped with a system of switching off the fuel delivery unit by means of a crash signal. If the airbag units are deployed when driving, the fuel pump is switched off by the fuel pump relay opening. At the same time, the position for improved engine starting is actuated. When the door is opened, the fuel delivery unit is actuated for about 2 seconds in order to build up pressure in the fuel system.

When opening the fuel system, pay attention to the safety precautions ⇒ page 20-4.

Removing and installing activated charcoal filter



1 - Activated charcoal filter solenoid valve -N80-

- ♦ testing function and actuation:
- ⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24; Testing activated charcoal filter solenoid valve

2 - Plug connection

3 - Vent line

- ♦ from safety valve at fuel tank
- ♦ to detach, press release button at connection

4 - Throttle valve control unit

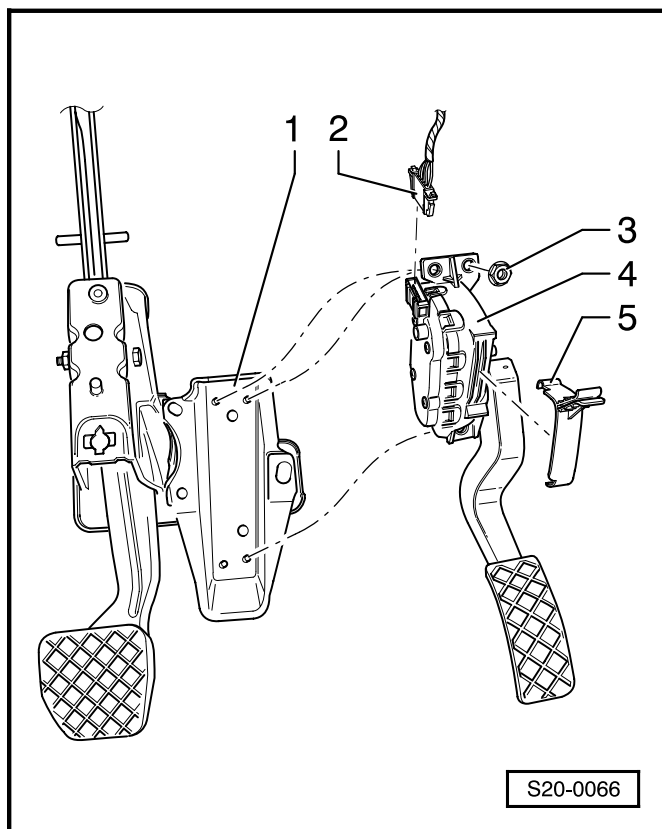
5 - Vent hose

6 - 10 Nm

7 - Activated charcoal filter

- ♦ with activated charcoal filter solenoid valve -N80-
- ♦ installation position: in right of engine compartment
- ♦ to remove, detach power steering reservoir and push to the side

Servicing accelerator pedal



1 - Bearing bracket

- ◆ removing and installing:
⇒ Running Gear; Repair Group 46

2 - Connector

- ◆ black, 6-pin

3 - 10 Nm

4 - Accelerator pedal position sender -G79-

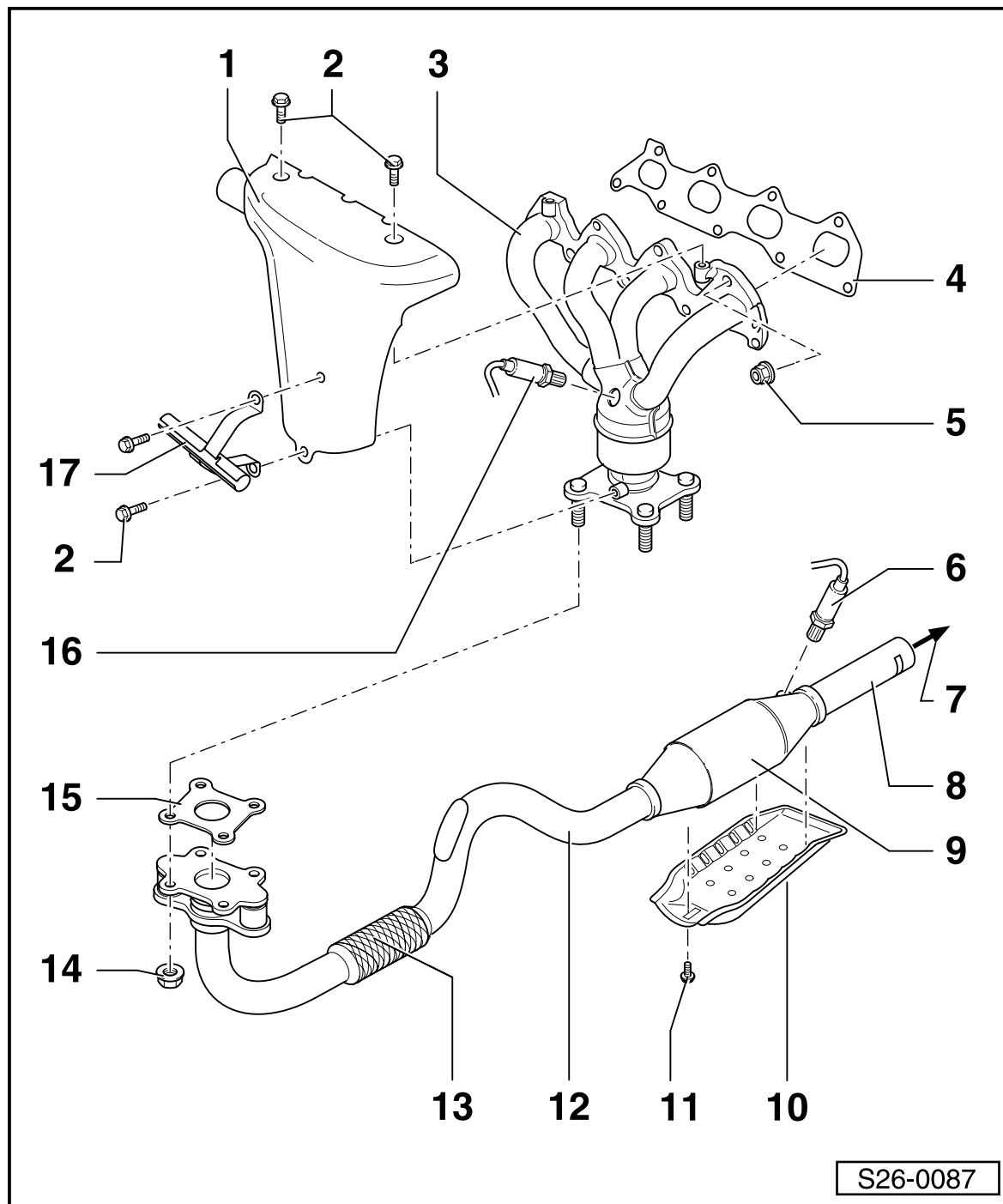
- ◆ cannot be adjusted
- ◆ the accelerator pedal position sender transmits the driver input to the engine control unit
- ◆ to remove sender, take out footwell lining
- ◆ testing
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24

5 - Bracket

- ◆ for footwell lining
- ◆ clipped in place at accelerator pedal position sender

Removing and installing parts of the exhaust system

Exhaust manifold with pre-catalytic converter, front exhaust pipe with catalytic converter and attached parts



Notes:

- ♦ Always replace seals and gaskets and self-locking nuts.
- ♦ When carrying out removal and installation work on the exhaust system, ensure that the exhaust system is not installed with any pre-stress and has adequate clearance to the body. If necessary, slacken double clamp and align silencer and exhaust pipe so that they

have adequate clearance to the body at all points and the weight of the exhaust system is evenly distributed over the hangers.

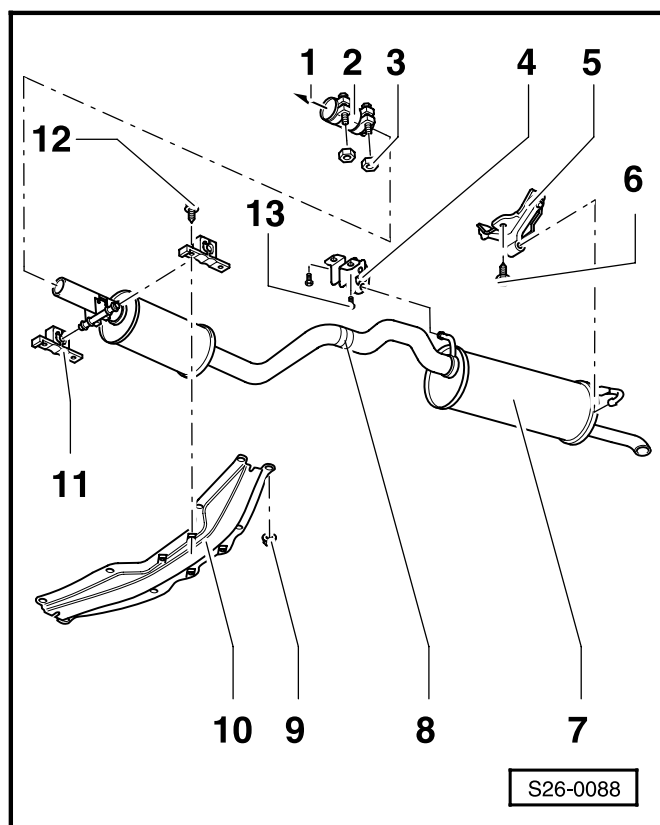
1 - Warm air baffle/heat shield

2 - 10 Nm

3 - Exhaust manifold with integrated pre-catalytic converter

- | | |
|---|--|
| <p>4 - Gasket</p> <ul style="list-style-type: none"> ◆ replace <p>5 - 40 Nm</p> <p>6 - Lambda probe downstream of catalytic converter -G130-, 50 Nm</p> <ul style="list-style-type: none"> ◆ coat with hot bolt paste -G 052 112 A3-; hot bolt paste -G 052 112 A3- must not get onto the slots of the probe body ◆ use lambda probe wrench for removing and installing ◆ testing: <p>⇒ 1.4 I/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24; Testing lambda control</p> <p>7 - To front silencer</p> <p>8 - Marking</p> <ul style="list-style-type: none"> ◆ three times around circumference <p>9 - Catalytic converter</p> <ul style="list-style-type: none"> ◆ testing ⇒ page 26-6 <p>10 - Heat shield</p> | <p>11 - 10 Nm</p> <p>12 - Front exhaust pipe with catalytic converter</p> <p>13 - Flex part of front exhaust pipe</p> <p>14 - 40 Nm</p> <ul style="list-style-type: none"> ◆ coat with hot bolt paste -G 052 112 A3- <p>15 - Gasket</p> <ul style="list-style-type: none"> ◆ replace <p>16 - Lambda probe upstream of catalytic converter -G39-, 50 Nm</p> <ul style="list-style-type: none"> ◆ coat thread with hot bolt paste -G 052 112 A3-; hot bolt paste -G 052 112 A3- must not get onto the slots of the probe body ◆ use lambda probe wrench for removing and installing ◆ testing: <p>⇒ 1.4 I/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24; Testing lambda control</p> <p>17 - Bracket</p> |
|---|--|

Middle and rear parts of exhaust pipe with hangers



1 - To catalytic converter

2 - Double clamp

- ♦ installation position
⇒ page 26-3, Fig. 1

3 - 40 Nm

4 - 25 Nm

5 - Rear hanger

6 - 25 Nm

7 - Rear silencer

- ♦ front and rear silencers are installed individually for repair purposes
- ♦ front and rear silencers are installed in the factory as a single part

8 - Separation point

- ♦ for repair purposes
- ♦ marked by indentations around circumference of exhaust pipe ⇒ page 26-4, Fig. 3

9 - 25 Nm

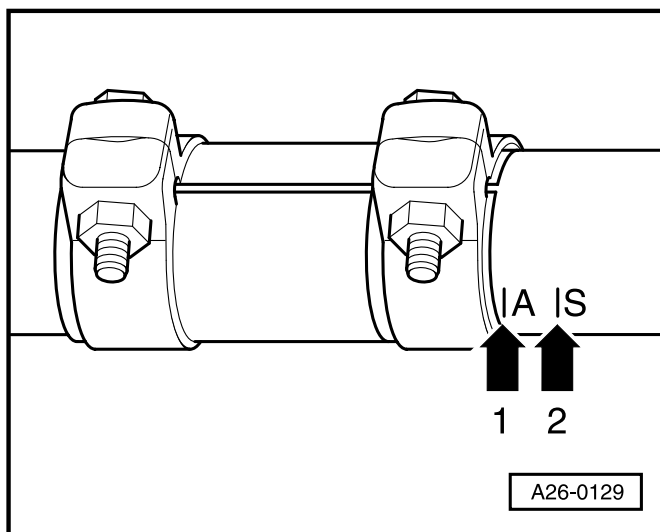
10 - Tunnel bridge

- ♦ with hole for aligning exhaust system
⇒ page 26-5

11 - Hanger

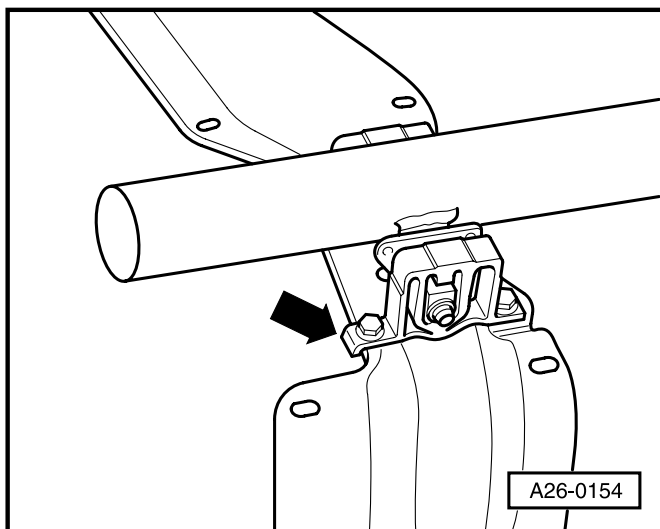
12 - 25 Nm

13 - Hanger



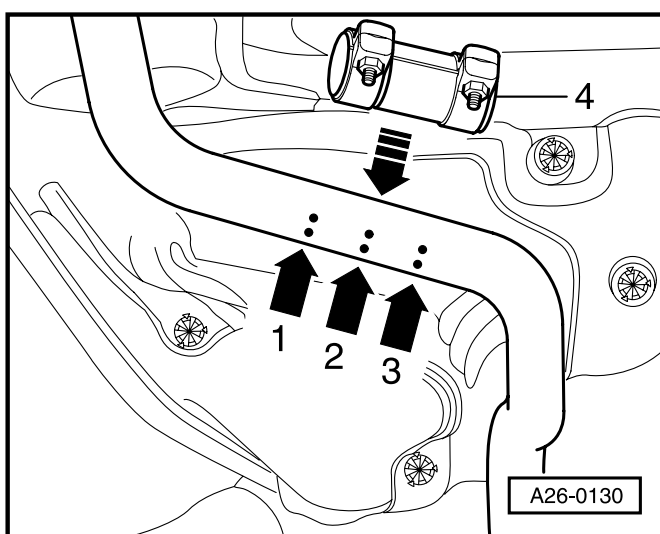
◀ Fig. 1 Installation position of double clamp

- Position double clamp spaced about 5 mm from the marking (three times around circumference of exhaust pipe):
- Arrow 2- for models with manual gearbox



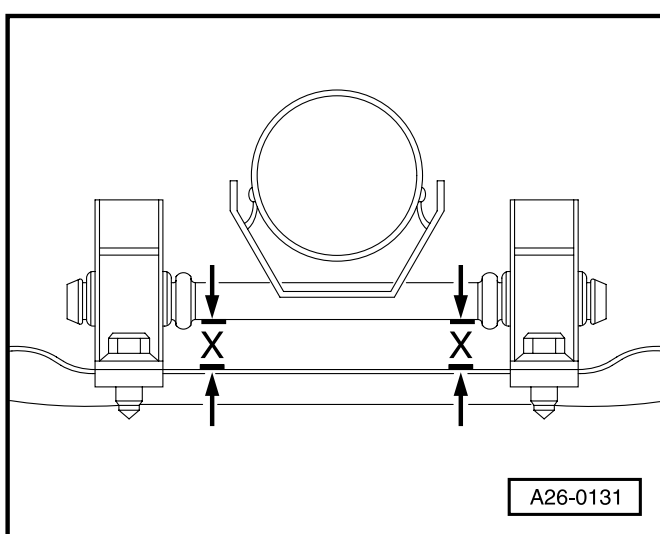
◀ Fig. 2 Installation position of hanger

- The angled side -arrow- at the base of the hanger points in direction of travel.



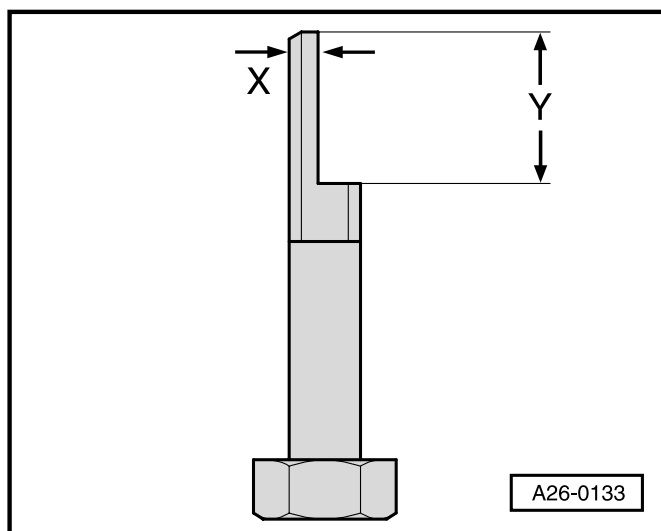
◀ Fig. 3 Separation point at exhaust pipe

- Use a body saw, e.g. -V.A.G 1523-, to separate exhaust pipe at separation point -arrows 2- at right angles.
- When installing, position repair double clamp -4- between -arrows 1 and 3-. Tightening torque 40 Nm.



◀ Fig. 4 Aligning rear silencer

- The hanger bolt at the exhaust pipe must be parallel to the tunnel bridge (dimension -X- identical on left and right).



Aligning exhaust system free of stress

Special tools, testers and aids required

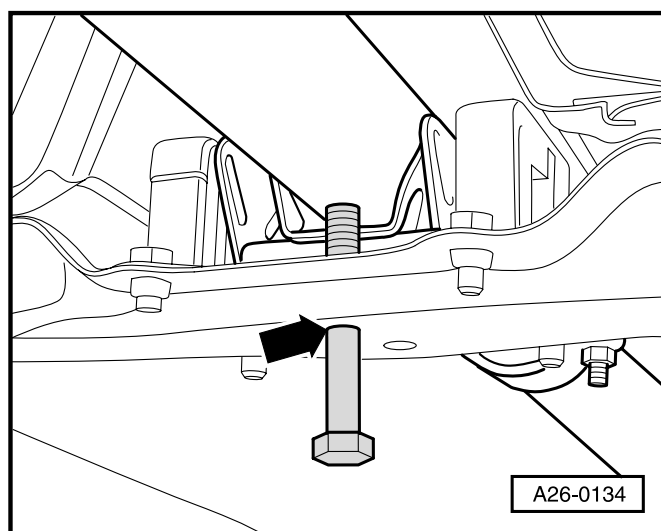
- ◆ Torque wrench, e.g. -V.A.G 1331- (5...50 Nm)

Procedure

- The exhaust system is aligned when cold.
- ◀ - Shop-make tool from an M10 bolt to the specified dimensions for aligning the exhaust system.
 - ◆ Dimension -X- = 4 mm
 - ◆ Dimension -Y- = 25 mm

Note:

A second person is required for aligning the exhaust system.



- Slacken bolted connections of double clamp between catalytic converter and front silencer.
- ◀ - Insert shop-made tool through the rear hole -arrow- of the tunnel bridge; the flat points toward the hanger bolt of the exhaust system.

Note:

The exhaust system is pretensioned in the direction of travel when the shop-made tool is inserted.

- Align rear silencer horizontally ⇒ page 26-4, Fig. 4.
- Attach double clamp to the exhaust system ⇒ page 26-3, Fig. 1.

Testing catalytic converter

Special tools, testers and aids required

- ◆ Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3-

Test conditions

- Fuse 43 is o.k.
- No leak in exhaust system between catalytic converter and cylinder head
- Coolant temperature at least 80 °C
- All electrical components switched off
- If vehicle is equipped with air conditioning system, system is switched off

Note:

*This diagnosis should be successfully completed only, if first of all, the diagnosis of the lambda probe ageing has been carried out
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 24*

Test procedure

- Connect vehicle system tester -V.A.G 1552-. Start engine and select address word 01 - Engine electronics
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.
- Interrogate fault memory, rectify any faults and once again erase fault memory
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.
- Select function 04 „Basic setting“ and display group 046.

System in basic setting				46 →
2070/min	352.0 °C	0.00	Test fra	

◀ Readout in display:

- Maintain engine speed between 2000 and 3000 rpm until the readout „Test off“ in display block 4 changes to „Test running“. Catalytic converter temperature in display block 2 must be at least 350 °C.

Note:

This procedure may take several minutes.

- Continue to maintain engine speed between 2000 and 3000 rpm until the specification result of the test appears in display block 4.

Specification: „Cat R1 o.k.“.

- Check amplitude ratio in display block 3.

Specification: max. 0.55.

- Interrogate fault memory
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.
- Read readiness code
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.
- If the fault memory has been erased or if the continuous voltage supply of the engine control unit was interrupted, it is then necessary to re-generate the readiness code
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.

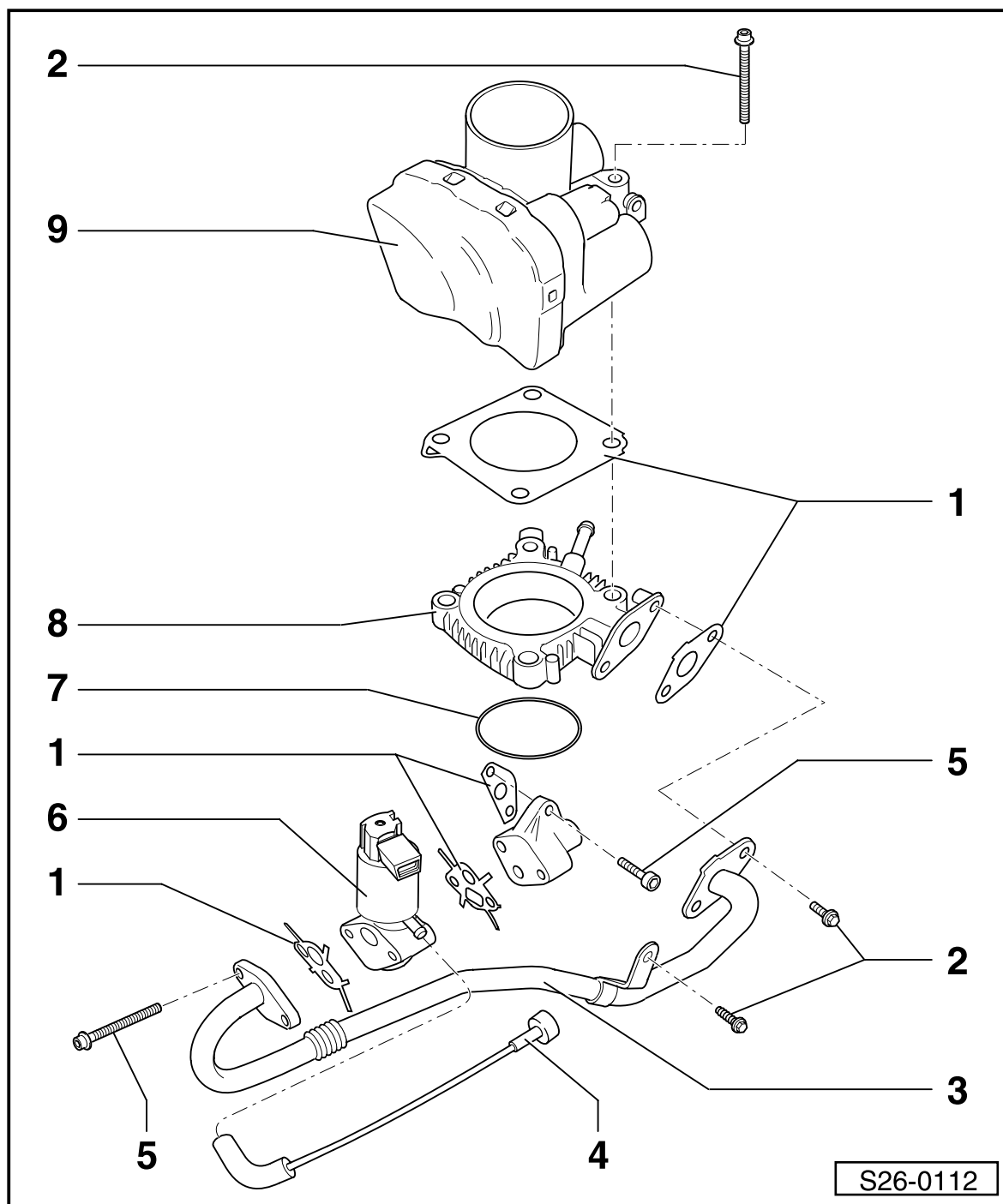
Note:

This test is intended for vehicles fitted with vehicle electrical system control unit and provides an indication of possible damage to the catalytic converter. If „Cat R1 n.o.k.“ is displayed, do not automatically replace the catalytic converter, but only if the next emission test is not passed or if visible damage is found at the catalytic converter.

If the exhaust test is not passed or if damage is found at the catalytic converter:

- Replace catalytic converter.
- If the specification „Cat R1 o.k.“ is achieved:
- Select function 06 „End output“ and switch ignition off
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.

Assembly overview - Exhaust gas recirculation system



Notes:

- ◆ The exhaust gas recirculation system is actuated by the engine control unit through the EGR valve -N18- with the EGR valve potentiometer -G212-.
- ◆ Testing EGR valve -N18-
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.

- ◆ Testing EGR valve potentiometer -G212-
⇒ 1.4 l/55 kW Engine, Fuel Injection and Ignition System; Repair Group 01.

1 - Gasket

- ◆ replace
- ◆ pay attention to installation position

2 - 10 Nm

3 - Connection pipe

4 - Filter

5 - 20 Nm

**6 - Exhaust gas recirculation solenoid
valve -N18- with potentiometer -G212-**

7 - Gasket

♦ replace if damaged

8 - Inlet connection

9 - Throttle valve control unit (J338)

