

Cooling system components, removing and installing

WARNING!

Hot steam can escape from the expansion tank when the filler cap is opened. Cover the filler cap with a cloth and unscrew it carefully.

Notes:

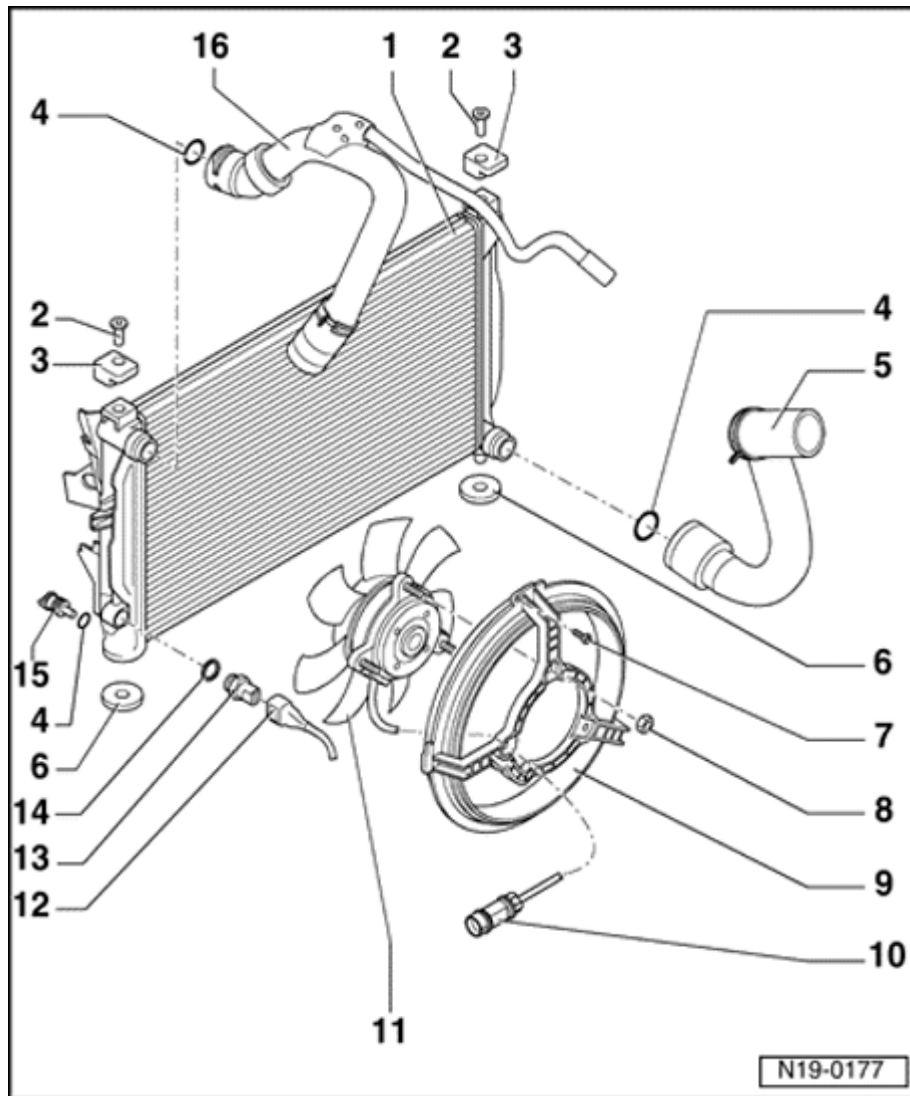
- ◆ *When the engine is hot the cooling system is under pressure. Carefully open filler cap on expansion tank to release pressure before starting repair work.*
- ◆ *Hoses are secured with spring-type clips. When repairing only use spring-type clips.*
- ◆ *VAG 1921 pliers are recommended when installing spring-type clips.*
- ◆ *The O-rings fitted at the quick-release connections must be replaced if damaged or leaking.*
- ◆ *When installing coolant hoses, ensure that they are free of stress and do not come into contact with other components (observe markings on coolant connection and hose).*

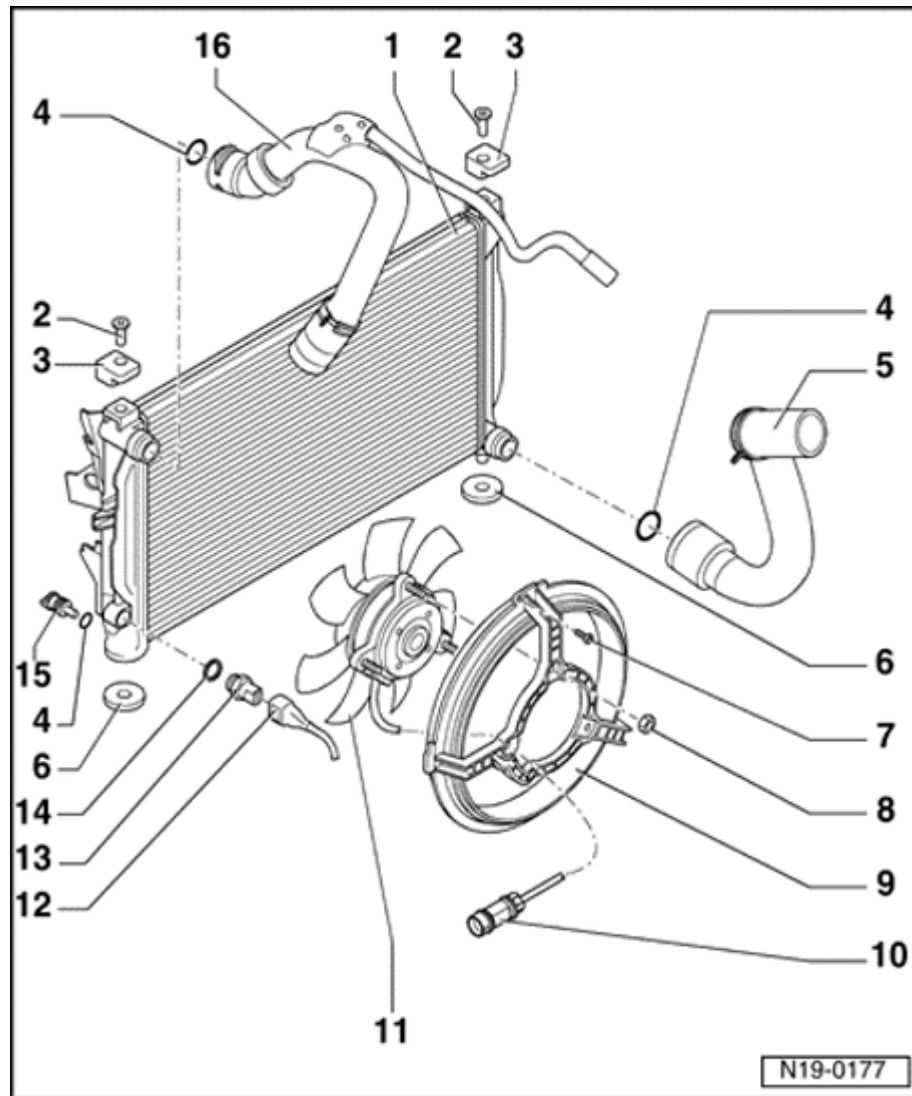
Perform leak test on cooling system with cooling system tester VAG 1274 and adapter VAG 1274/8.

Cooling system components (on body), removing and installing

Notes:

- ◆ *Parts of cooling system on engine* ⇒ [Page 19-8](#).
- ◆ *Diagram of coolant hose connections* ⇒ [Page 19-17](#).
- ◆ *Draining and filling with coolant* ⇒ [Page 19-19](#).
- ◆ *Coolant mixture ratios* ⇒ [Page 19-19](#), draining and filling cooling system.





7 - Retaining bolt

8 - Nut

◆ Tightening torque: 10 Nm

9 - Fan ring

◆ Clipped into air ducting and secured with retaining bolt -Item 7 -

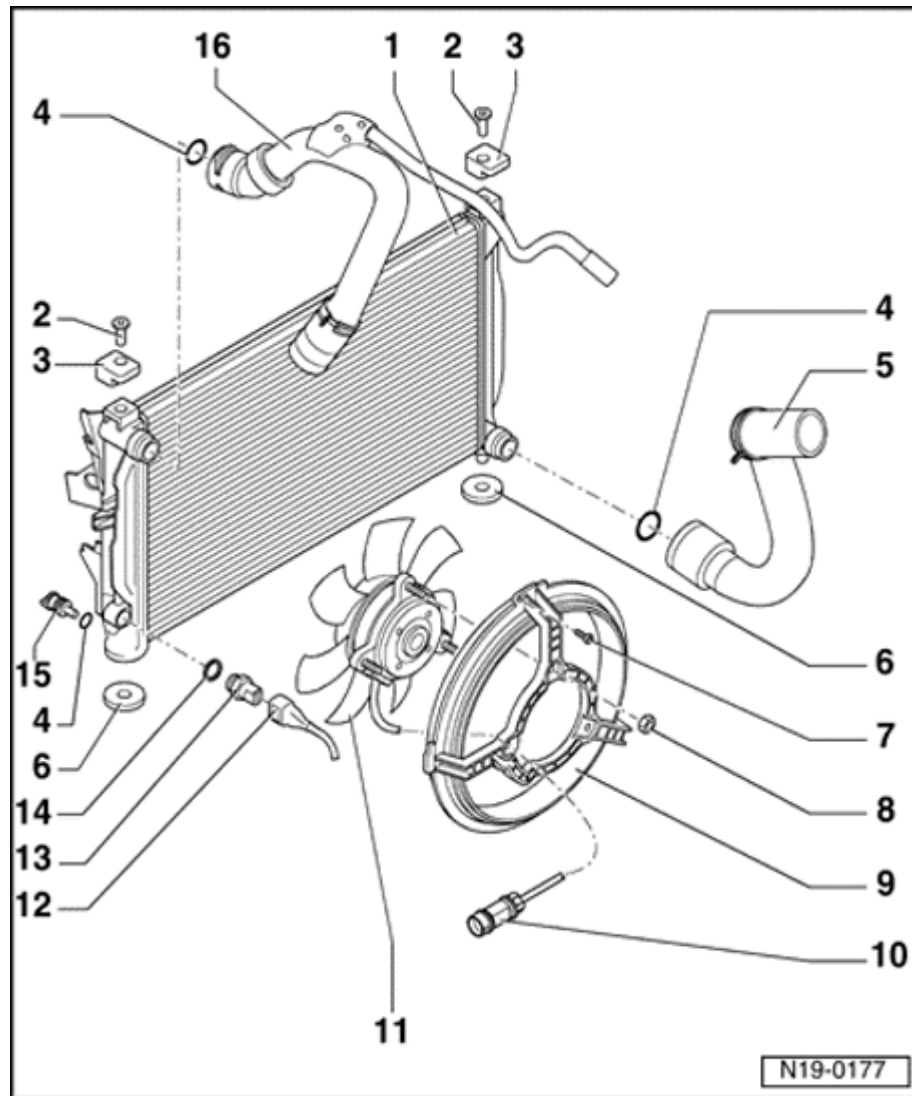
10 - 2-pin connector

11 - Radiator fan (-V7-)

12 - Connector

◆ Black, 3-pin

◆ For radiator fan thermoswitch



13 - Radiator fan thermoswitch (-F18-), 35 Nm

- ◆ For electric fan

Switching temperatures: Stage 1

- ◆ on: 92...97 °C

- ◆ off: 84...91 °C

Switching temperatures: Stage 2

- ◆ on: 99...105 °C

- ◆ off: 91...98 °C

14 - Seal

- ◆ Always replace

15 - Drain screw

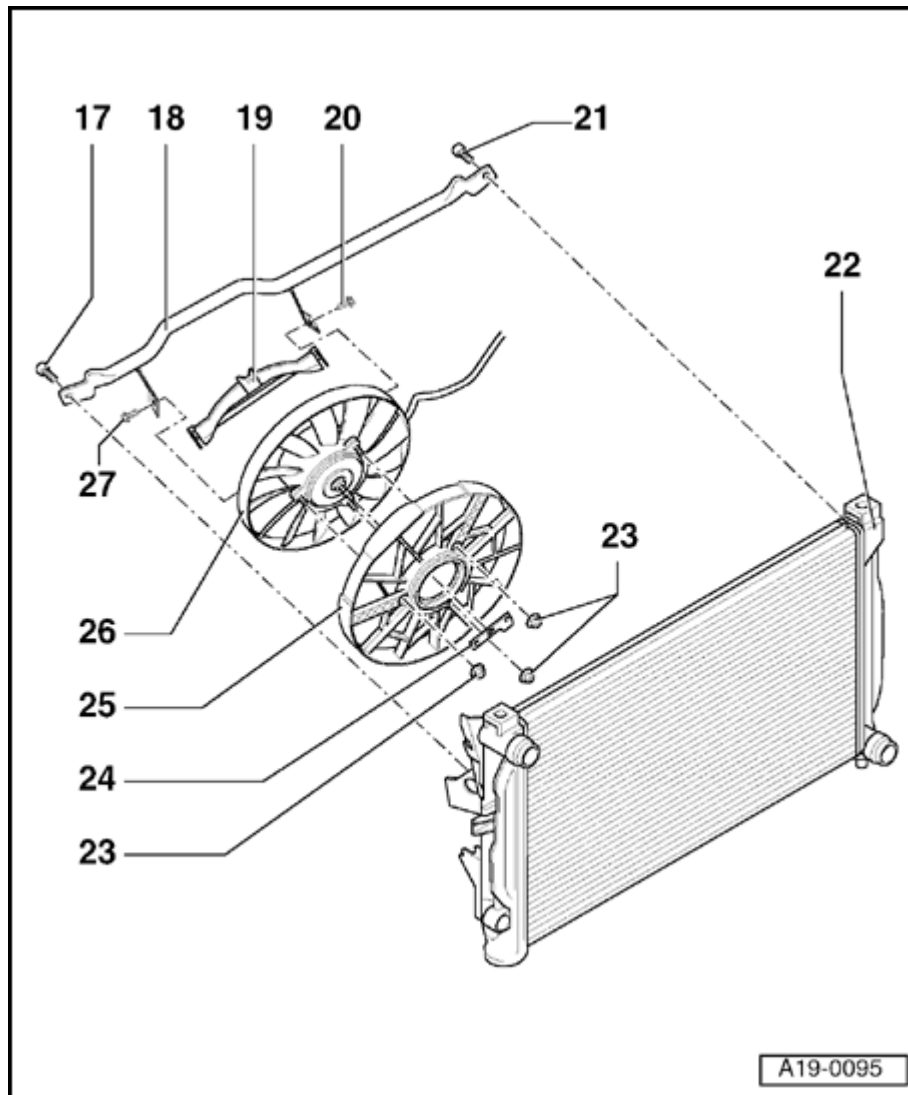
- ◆ Tightening torque: 10 Nm

16 - Top coolant hose

- ◆ Secured to radiator with retaining clip

- ◆ Check for secure seating

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)



17 - Bolt

- ◆ Tightening torque: 5 Nm

18 - Mounting rod

19 - Guard plate

20 - Bolt

- ◆ Tightening torque: 5 Nm

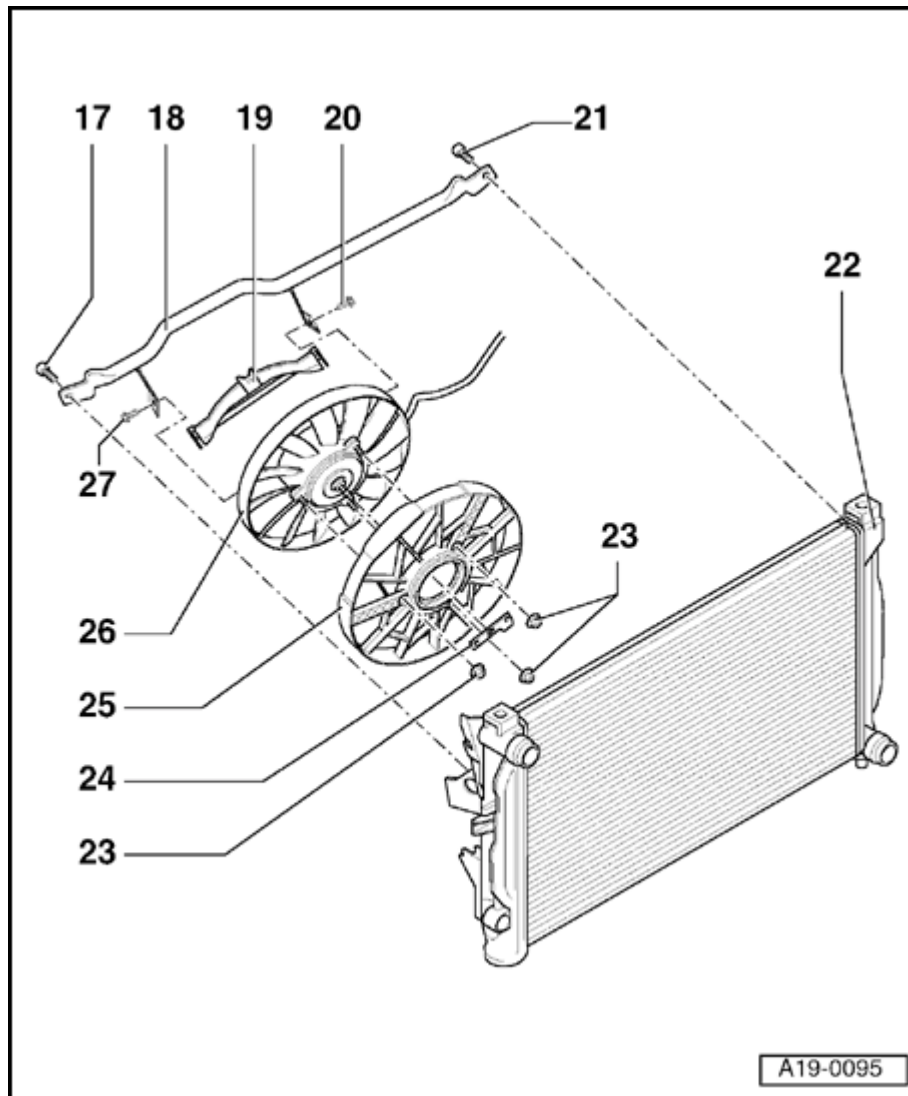
21 - Bolt

- ◆ Tightening torque: 5 Nm

22 - Radiator

- ◆ Removing and installing ⇒ [Page 19-26](#)
- ◆ After replacing, replace coolant in complete system

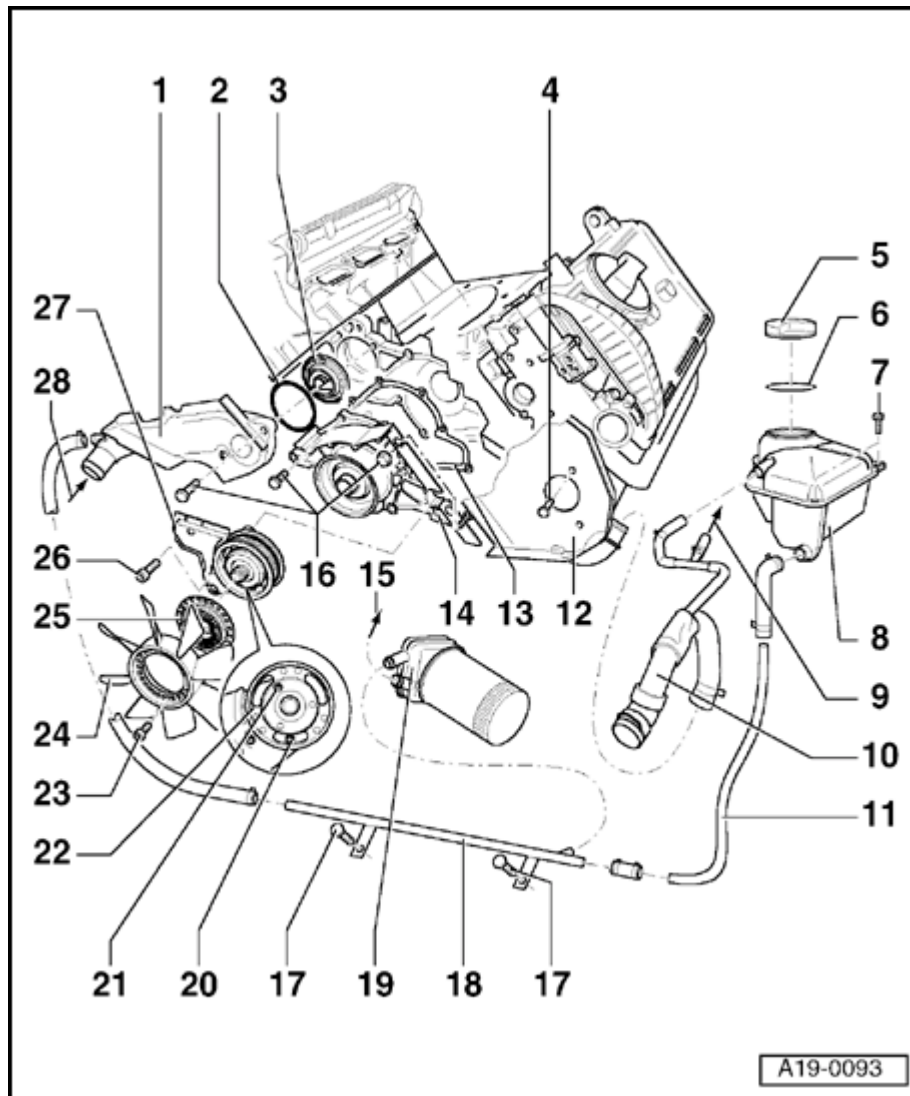
19-7

**23 - Nut**

◆ Tightening torque: 5 Nm

24 - Bracket**25 - Fan ring****26 - Pressurizing fan****27 - Bolt**

◆ Tightening torque: 5 Nm



Cooling system components (on engine, front), removing and installing

1 - Connection

- ◆ For thermostat

2 - O-ring

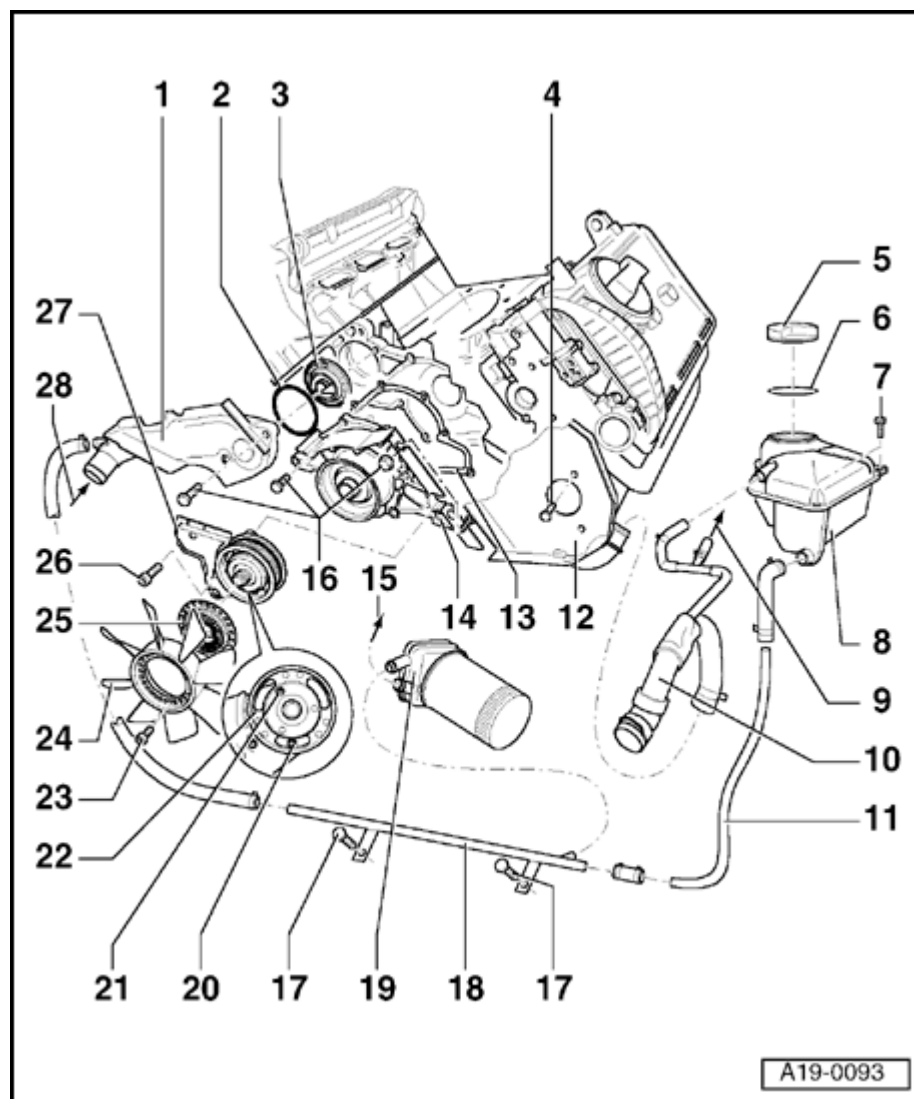
- ◆ Always replace

3 - Thermostat

- ◆ Checking: heat the thermostat in water
- ◆ Starts to open at about 86 ° C
- ◆ Opening travel: at least 7 mm

4 - Bolt

- ◆ Tightening torque: 10 Nm

**5 - Filler cap**

- ◆ Test with cooling system tester VAG 1274 and adapter VAG 1274/9
- ◆ Test pressure 1.4...1.6 bar

6 - O-ring

- ◆ Replace if damaged

7 - Bolt

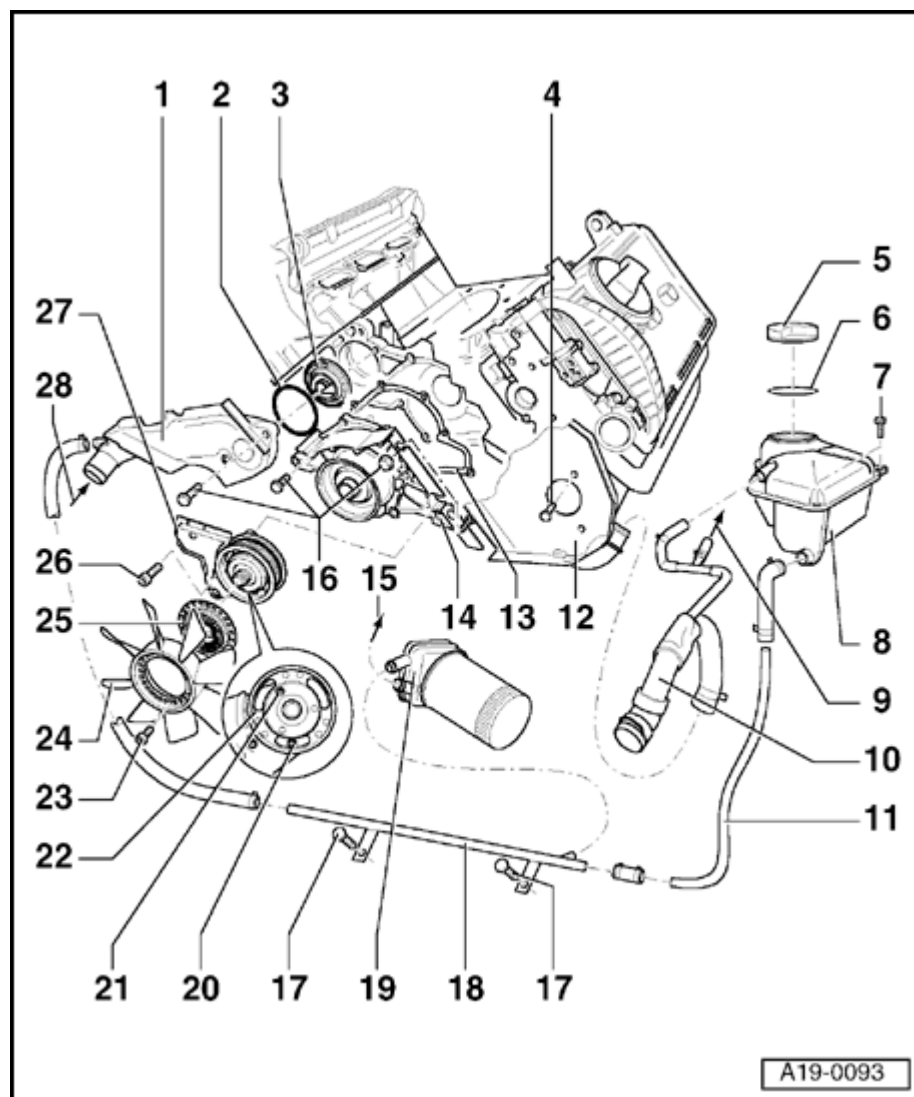
- ◆ Tightening torque: 10 Nm

8 - Expansion tank

- ◆ Carry out leak test of cooling system with cooling system tester VAG 1274 and adapter VAG 1274/8

9 - To rear water line

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

**10 - Top coolant hose**

- ◆ Secured to radiator with retaining clip
- ◆ Check for secure seating
- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

11 - Coolant line

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

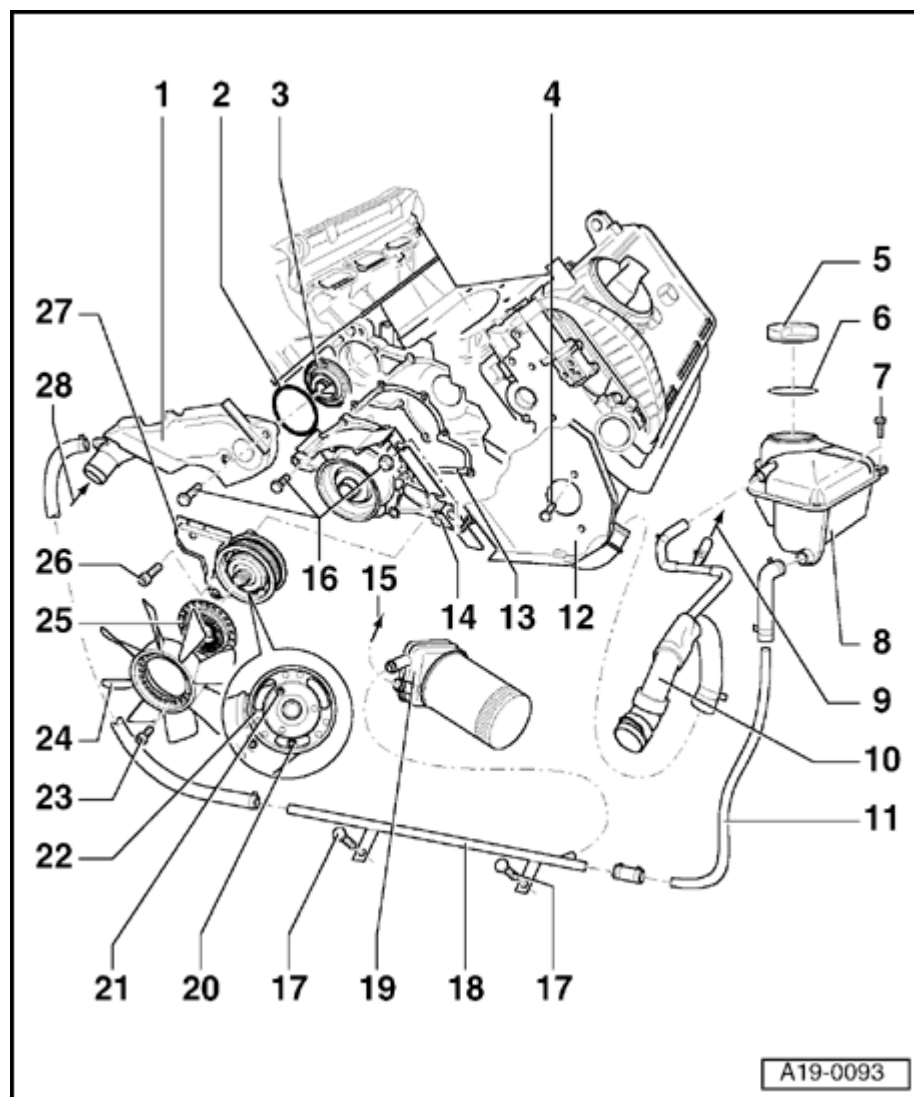
12 - Rear toothed belt guard**13 - Gasket**

- ◆ Always replace

14 - Coolant pump

- ◆ Check that pump runs freely
- ◆ If damaged or leaking replace complete
- ◆ Removing and installing ⇒ [Page 19-29](#)

19-11

**15 - To front coolant line**

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

16 - Bolt

- ◆ Tightening torque: 10 Nm

17 - Bolt

- ◆ Tightening torque: 25 Nm

18 - Lower coolant line

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

19 - Oil cooler**20 - Bolt**

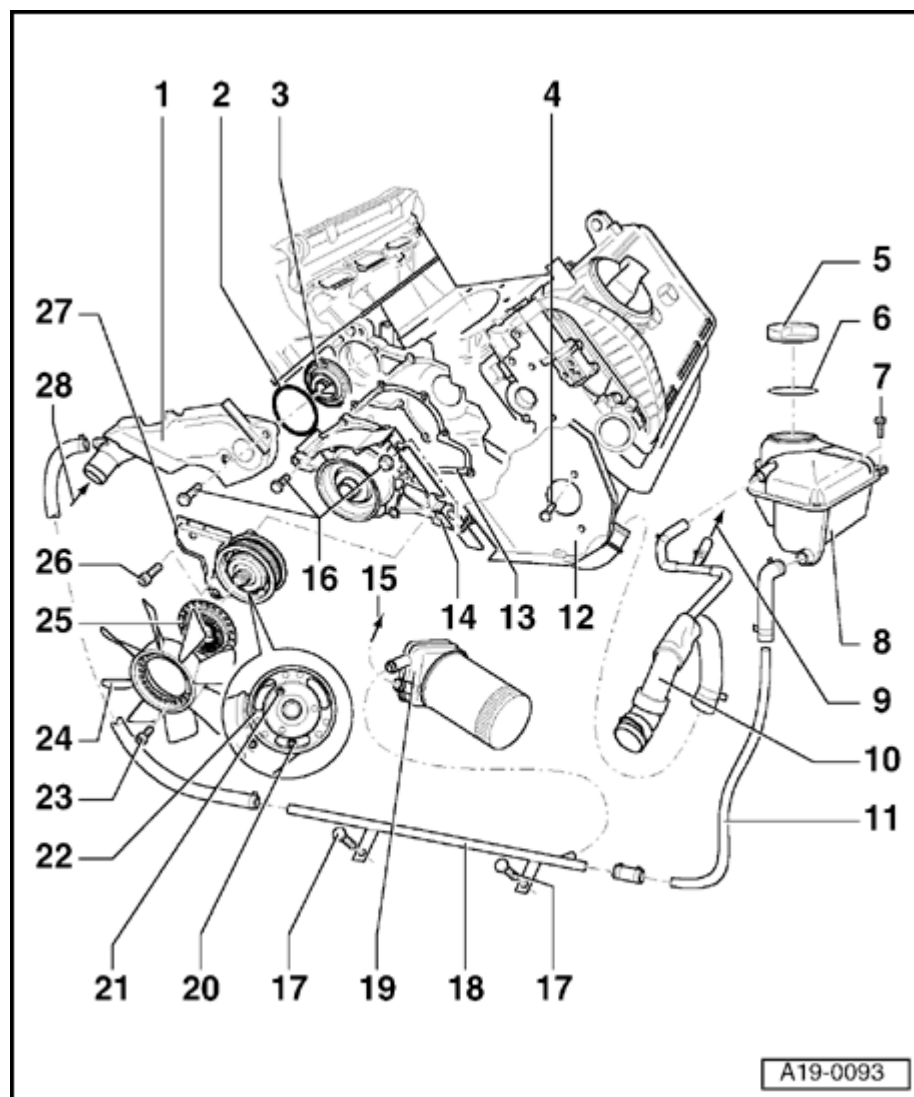
- ◆ Tightening torque: 25 Nm

21 - Bolt

- ◆ Tightening torque: 10 Nm

22 - Belt pulley

- ◆ For viscous fan

**23 - Bolt**

- ◆ Tightening torque: 10 Nm

24 - Fan wheel for viscous fan**25 - Viscous fan coupling**

- ◆ Note left-hand thread
- ◆ Tightening torque only applicable when using open-end spanner 3312
- ◆ Tighten to 37 Nm

26 - Bolt

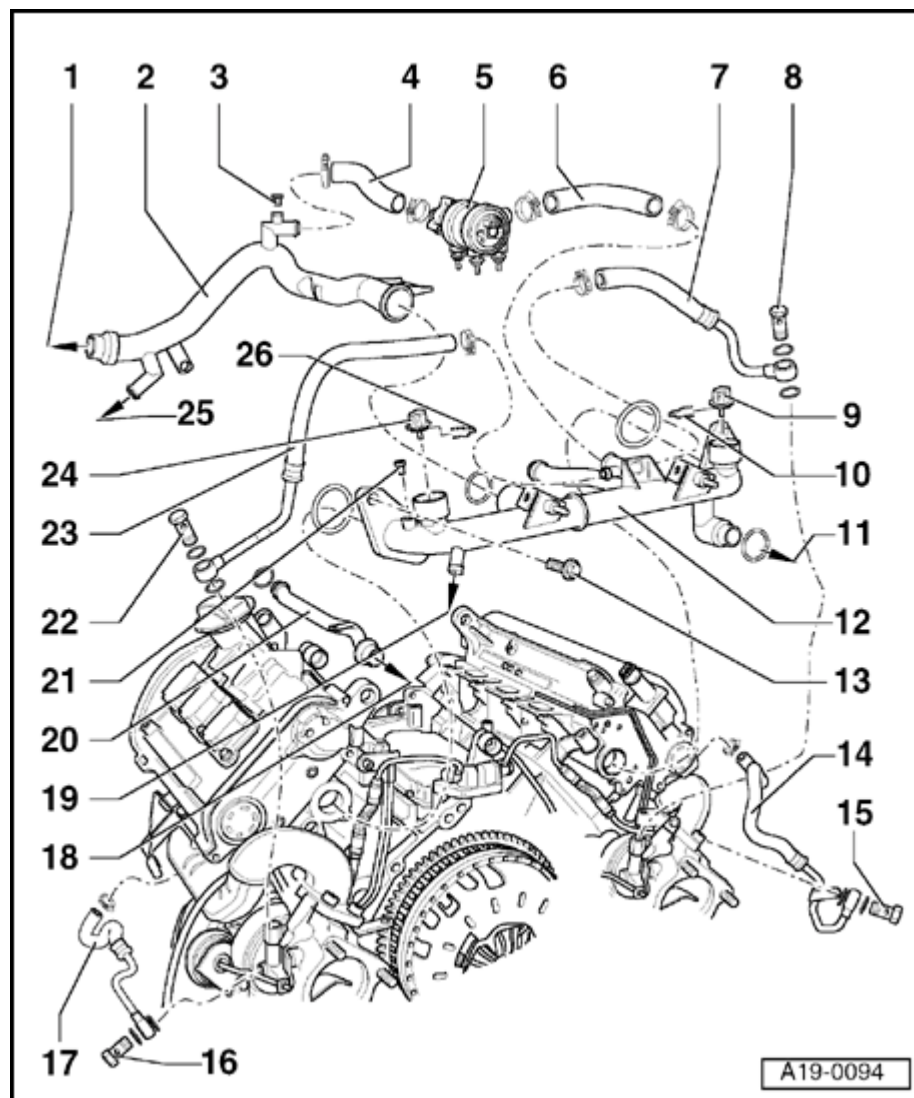
- ◆ Tightening torque: 25 Nm

27 - Bracket

- ◆ For viscous fan

28 - From bottom of radiator

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)



Cooling system components (on engine, rear), removing and installing

1 - To front water hose

2 - Front coolant line

◆ Diagram of coolant hose connections ⇒
[Page 19-17](#)

3 - Bleeder screw

◆ Tightening torque: 20 Nm

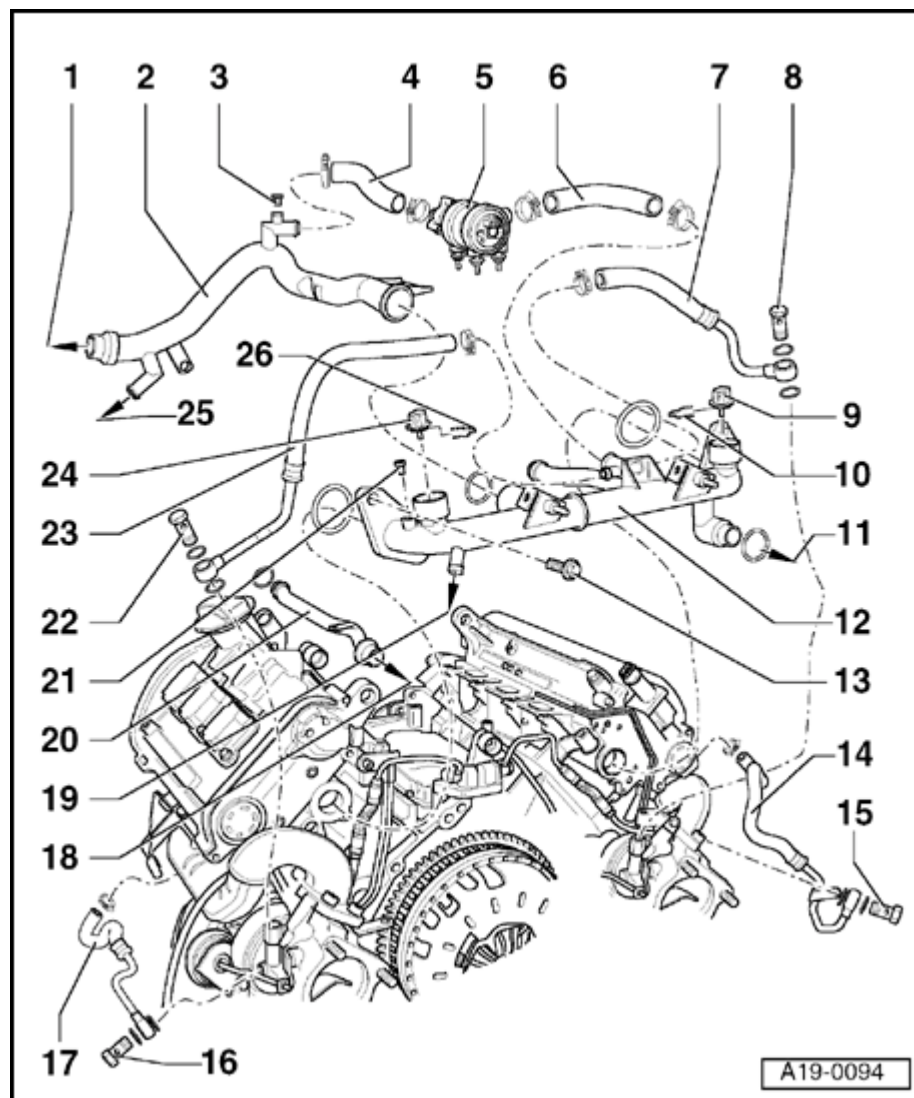
4 - Coolant hose

◆ From auxiliary water pump to front coolant line

5 - Auxiliary water pump

6 - Coolant hose

◆ From rear coolant line to auxiliary water pump

**7 - Right coolant line**

- ◆ From turbocharger to rear coolant line

8 - Banjo bolt

- ◆ Tightening torque: 35 Nm

9 - Coolant temperature sender (-G62-)

- ◆ For engine control module
- ◆ If necessary, release pressure in cooling system before removing
- ◆ Checking:

⇒ [Repair Manual, 2.7 Liter V6 5V BiTurbo Fuel Injection & Ignition, Engine Code\(s\): APB, Repair Group 01](#)

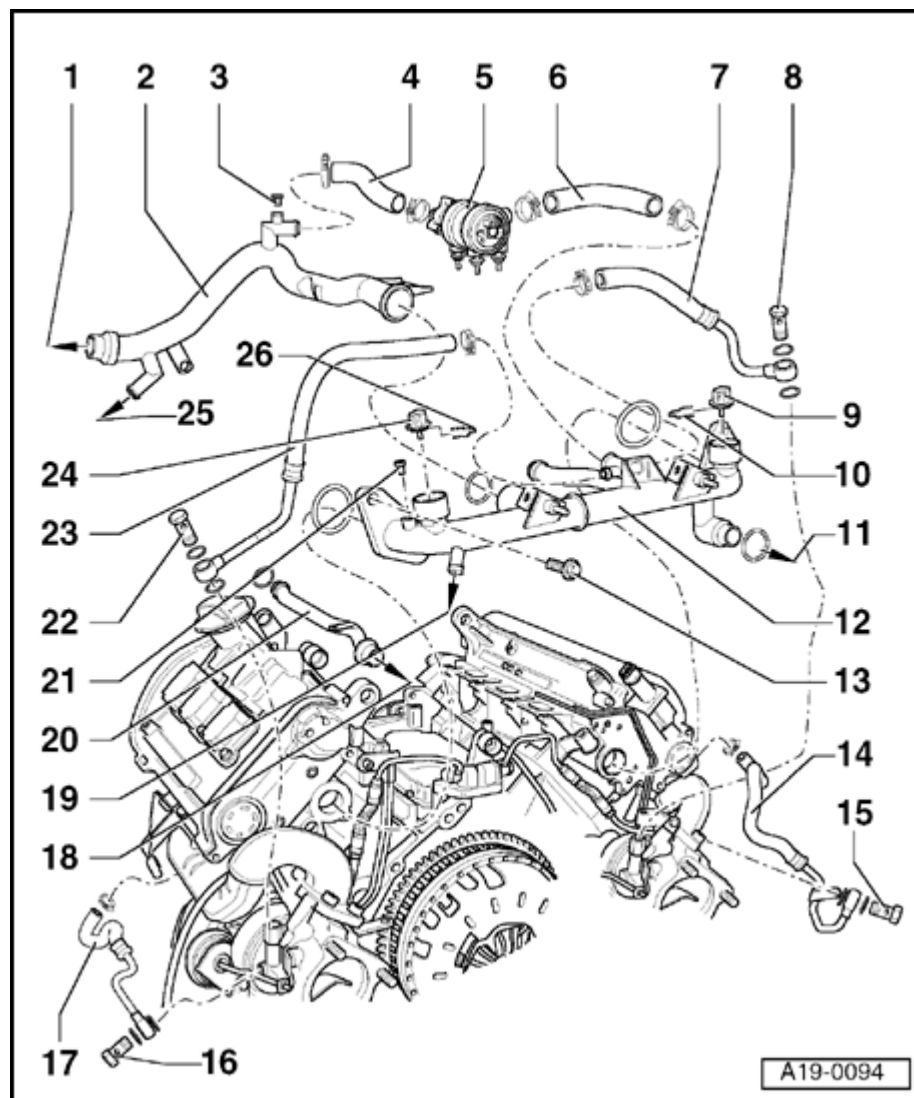
10 - Retaining clip

- ◆ Check for proper seating

11 - To heat exchanger**12 - Rear coolant line**

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

19-15

**13 - Bolt**

- ◆ Tightening torque: 10 Nm

14 - Right coolant line

- ◆ From engine block to turbocharger

15 - Banjo bolt

- ◆ Tightening torque: 35 Nm

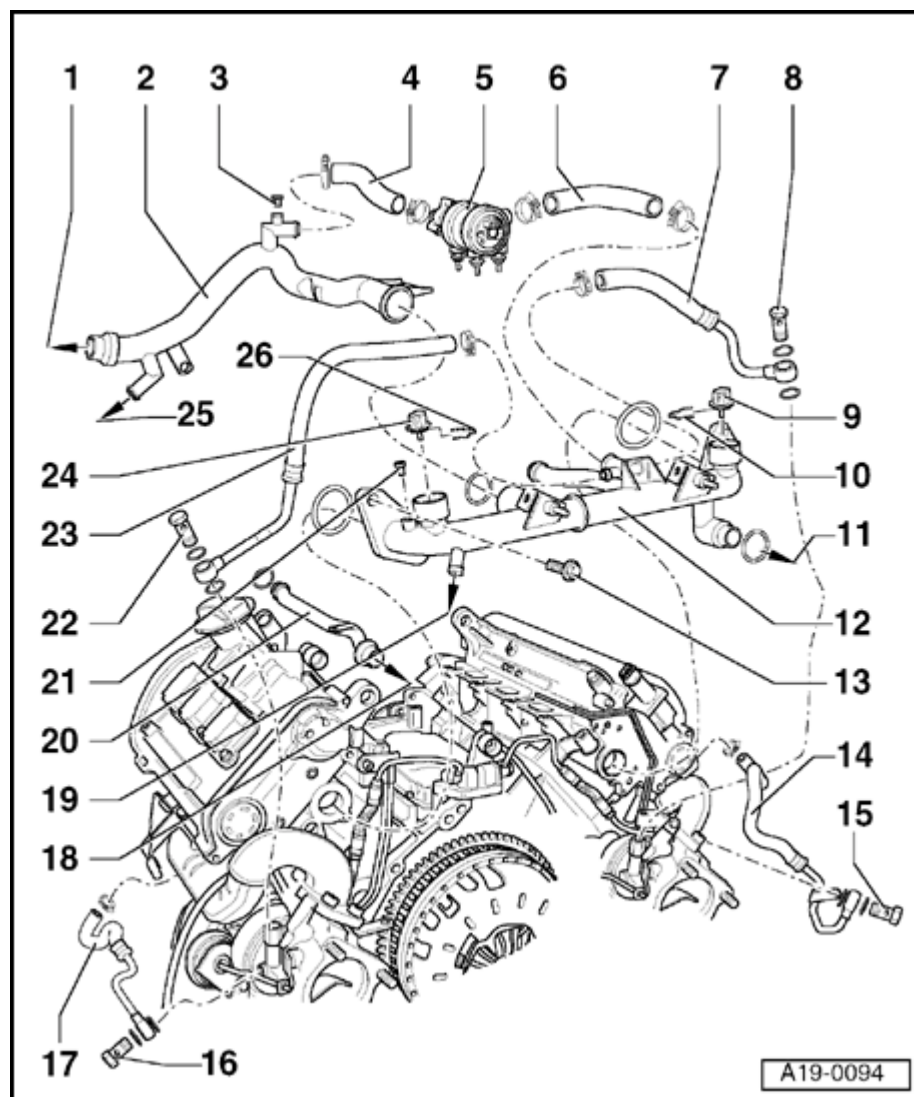
16 - Banjo bolt

- ◆ Tightening torque: 35 Nm

17 - Right coolant line

- ◆ From engine block to turbocharger

18 - From heat exchanger**19 - To front coolant hose**

**20 - Coolant line**

- ◆ Diagram of coolant hose connections ⇒ [Page 19-17](#)

21 - Bleeder screw

- ◆ Tightening torque: 20 Nm

22 - Banjo bolt

- ◆ Tightening torque: 35 Nm

23 - Left coolant line

- ◆ From turbocharger to rear coolant line

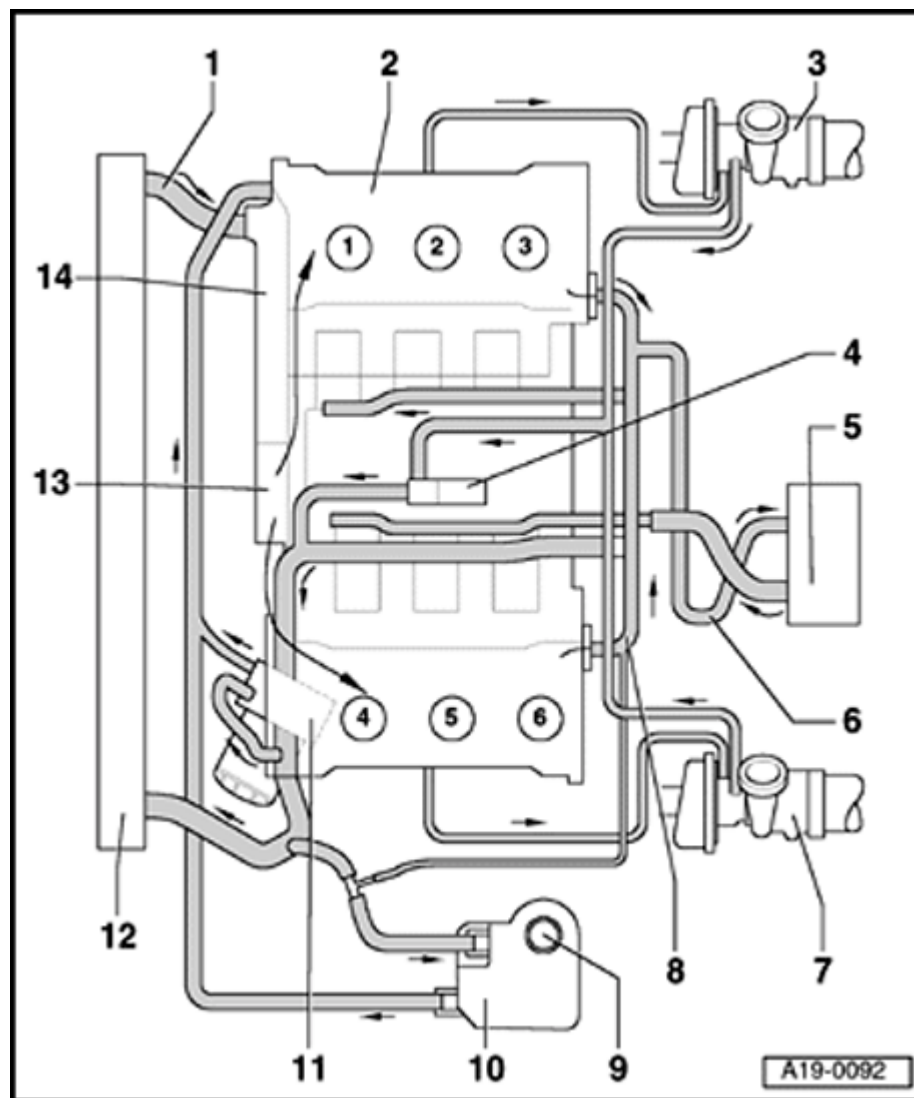
24 - Sender for auxiliary water pump

- ◆ 2-pin
- ◆ If necessary, release pressure in cooling system before removing

25 - To oil cooler**26 - Retaining clip**

- ◆ Check for proper seating

19-17



Coolant hose connections, diagram

1 - Bottom coolant hose

◆ From radiator to engine

2 - Cylinder head/ cylinder block

3 - Right turbocharger

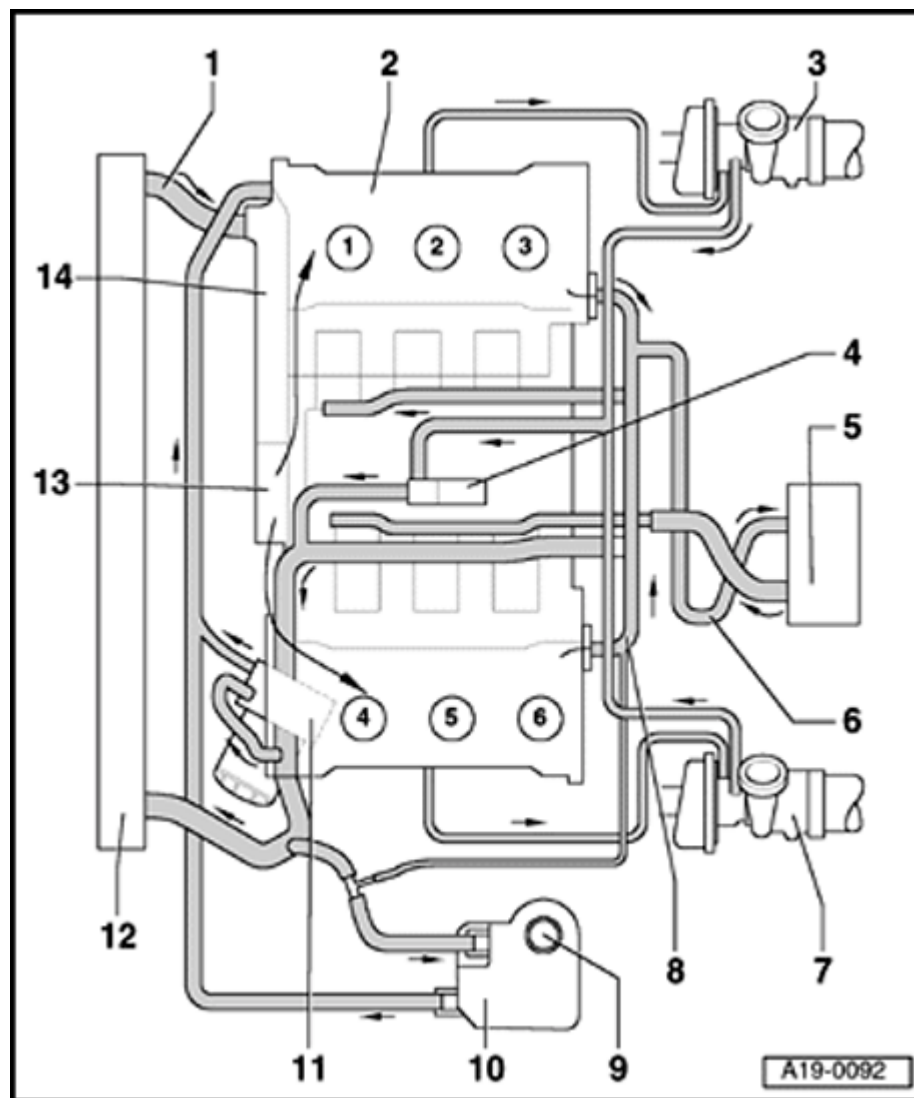
4 - Auxiliary water pump

5 - Heat exchanger for heater system

6 - Coolant hose

◆ To heat exchanger

7 - Left turbocharger



8 - Rear coolant line

9 - Cap for expansion tank

10 - Expansion tank

11 - Oil cooler

12 - Radiator

◆ Removing and installing ⇒ [Page 19-26](#)

◆ After replacing, replace coolant in complete system

13 - Coolant pump

14 - Connection

◆ For thermostat

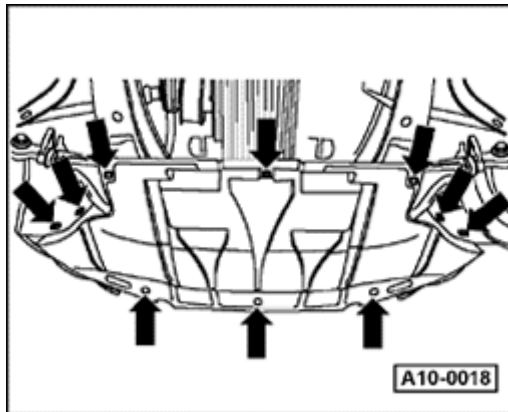
Cooling system, draining and filling

Draining

WARNING!

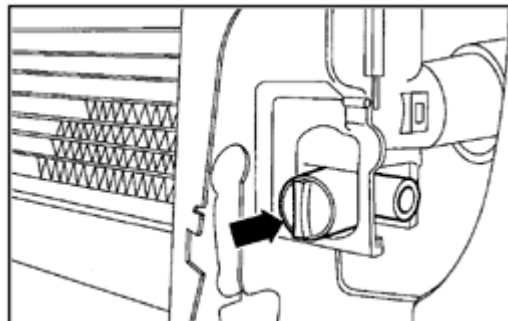
Hot steam can escape from the expansion tank when the filler cap is opened. Cover the filler cap with a cloth and remove it carefully.

- Remove filler cap on coolant expansion tank.



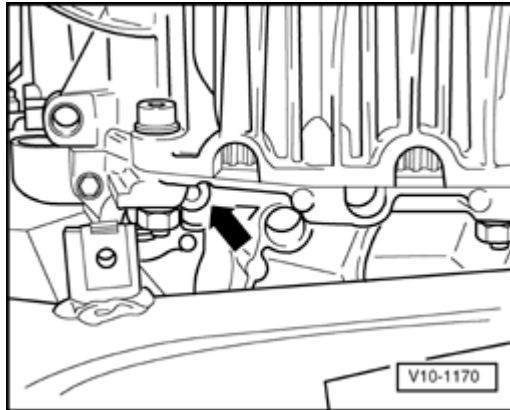
A

- Remove noise insulation panel.
- Place drip tray VAG 1306 under the engine.



A

- If bumper has been removed from vehicle, open drain tap -arrow- on bottom of radiator (left side) by turning anti-clockwise. Fit drain hose on connection if necessary.
- If bumper has not been removed from vehicle, pull out retaining clip on bottom hose going from radiator to engine (right side), and pull hose off radiator.



- Drain coolant from engine at drain screw -arrow-.

Note:

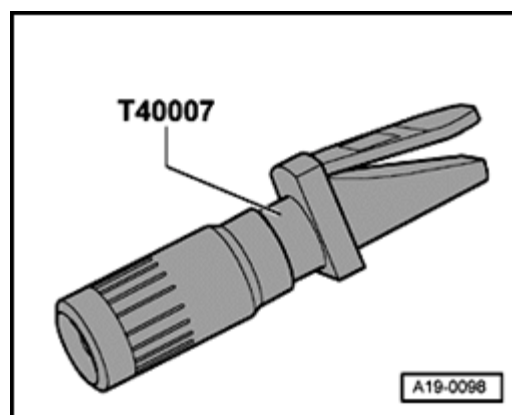
Observe disposal regulations for coolant.

Filling

Notes:

- ◆ *Use only coolant additive G 12 - meeting specification VW 774 D. Identification: colored red.*
- ◆ *G 12 must not be mixed with any other additives.*
- ◆ *If the fluid in the expansion tank is brown, this is an indication that G 12 has been mixed with another type of coolant. In this case the coolant must be changed.*

- ◆ *G 12 and coolant additives complying with specification "VW 774 D" prevent frost and corrosion damage, scaling and also raise the boiling point of the coolant. For this reason the system must be filled all year round with the correct additive for frost and corrosion protection.*
- ◆ *Particularly in countries with tropical climates, the higher boiling point of the coolant improves engine reliability when working under heavy load.*
- ◆ *The system must be protected against frost to about -25° C (in arctic climates to about -35° C).*



- ◆ *Use special tool T40007 to test coolant concentration and antifreeze protection.*

- ◆ *The coolant concentration should not be reduced by adding plain water, even in warmer seasons and in warmer countries. The concentration must be at least 40 %.*
- ◆ *If extra antifreeze protection is required in cold climates, the concentration of G 12 can be increased, but only up to a maximum of 60 % (frost protection to about -40 ° C); if this concentration is exceeded, the antifreeze protection will be reduced again and cooling effectiveness will also be impaired.*
- ◆ *Do not reuse the old coolant if the radiator, heat exchanger, cylinder head or cylinder head gasket have been replaced.*

Recommended mixture ratios:

Frost protection to	Antifreeze concentration	G 12¹⁾	Water¹⁾
-25 ° C	40 %	2.5 ltr.	3.5 ltr.
-35 ° C	50 %	3.0 ltr.	3.0 ltr.

¹⁾ The capacity of the cooling system can vary depending on the equipment installed on the

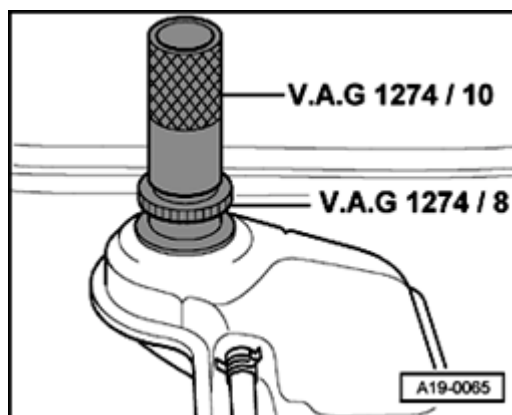
vehicle.

19-23

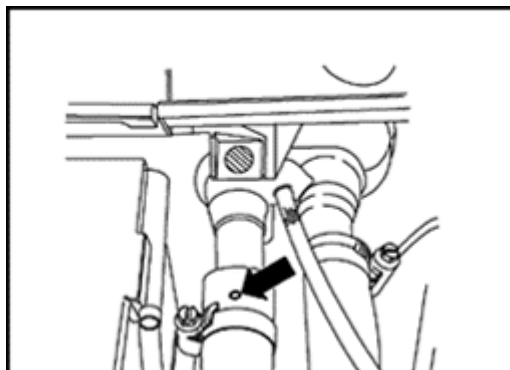
- Replace O-ring on coolant drain screw and screw drain screw back into engine.

Tightening torque: 20 Nm

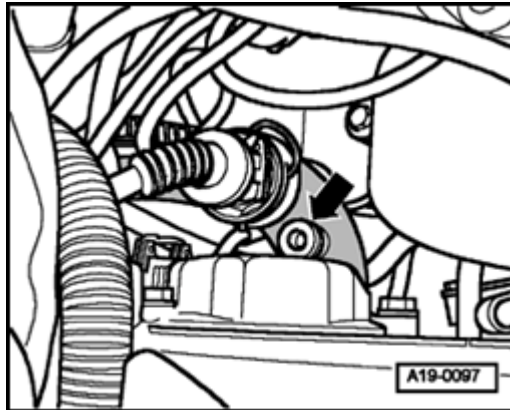
- Install bottom coolant hose and secure.
- Close coolant drain tap on radiator.



- Screw adapter VAG 1274/8 onto expansion tank and insert extension VAG 1274/10 into the adapter.

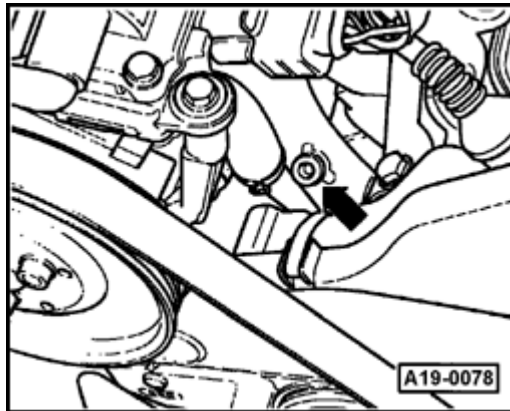


- Loosen coolant hose on heat exchanger and pull back hose far enough so that bleeder hole in hose -arrow- is no longer covered by connection.
- Fill up coolant until it comes out at bleeder hole in coolant hose.
- Push coolant hose onto connection and tighten.



A

- Loosen bleeder screw on rear coolant line -arrow- below expansion tank.
- Fill up coolant until it comes out at bleeder screw.
- Screw in bleeder screw (20 Nm).



A

- Loosen bleeder screw on front coolant line -arrow- between power steering pump and left cylinder head.
- Fill with coolant until it comes out at bleeder screw.
- Screw in bleeder screw (20 Nm).
- Fill coolant up to max. mark.
- Close filler cap on expansion tank.
- Set heater controls to maximum heat setting.

- Start engine and let it idle for about 10 minutes.
- Maintain an engine speed of about 2000 RPM for about 5 minutes.
- Allow engine to run at idling speed until bottom hose on radiator becomes hot.
- Check coolant level and top up if necessary. When engine is at normal operating temperature coolant level must be on max. mark, and between min. and max. marks when engine is cold.

Note:

When the engine is hot the cooling system is under pressure. Carefully open filler cap on expansion tank to release pressure before starting repair work.

WARNING!

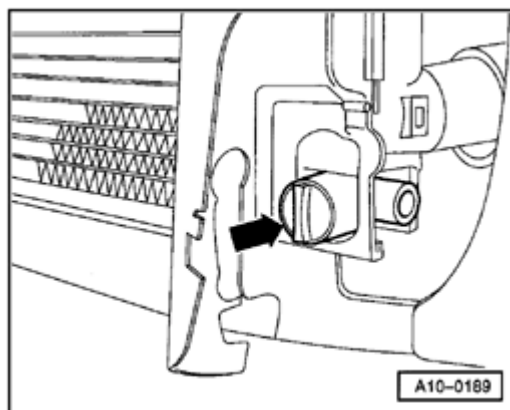
Hot steam can escape from the expansion tank when the filler cap is opened. Cover the filler cap with a cloth and remove it carefully.

Radiator, removing and installing

Removing

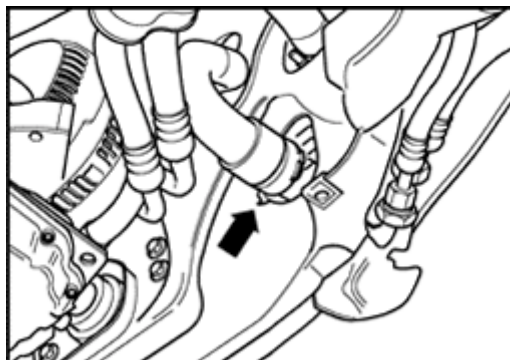
- Remove front bumper.

⇒ [Repair Manual, Body Exterior, Repair Group 63](#)



A

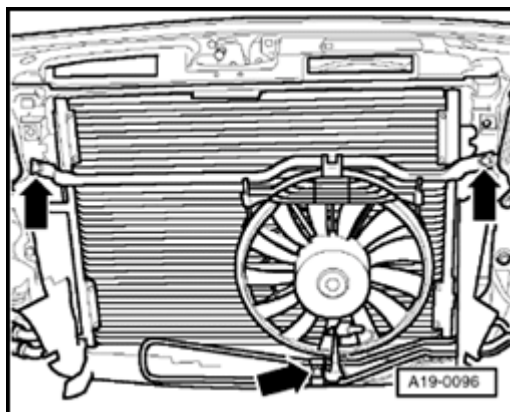
- Drain coolant ⇒ [Page 19-19](#) .



A

- Disengage retaining clips on connecting flanges -arrow- and pull coolant hoses off radiator.
- Unplug connector from thermoswitch on radiator (bottom left).

19-27



A

- Unbolt pressurizing fan and detach cooling lines for power steering hydraulic fluid -arrows-.

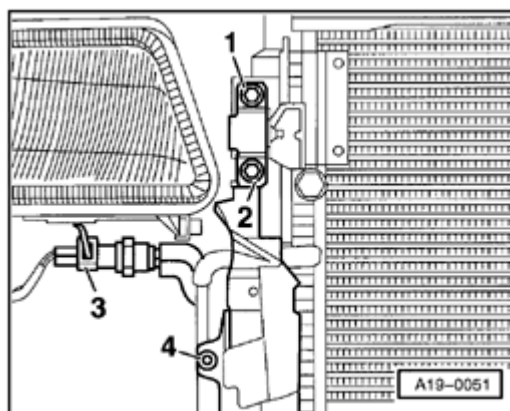
Vehicles with air conditioner

WARNING!

Do not open the air conditioner refrigerant circuit.

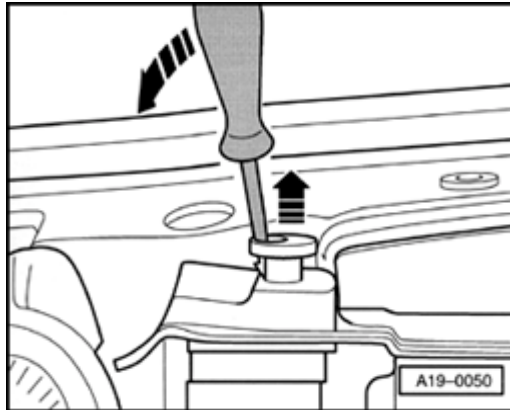
Note:

To prevent damage to the condenser and refrigerant lines and hoses, ensure that the lines and hoses are not stretched, kinked or bent.



A

- Detach air cowls from radiator -4- (left and right).
- Remove securing bolts -1- and -2- for condenser.
- Unplug connector -3- from air conditioner pressure switch -F129.
- Lift condenser up out of its bracket, turn it towards side and secure to right-hand front wheel with wire.



- Release two retaining pins for radiator and pull out upward -arrows-.
- Pivot radiator toward front and lift out.

Installing

Install in the opposite order to removing. When installing, note the following points:

- Fill with coolant ⇒ [Page 19-19](#) .

Tightening torques

Component	Nm
Condenser to radiator	10
Cooling lines to radiator	10
Pressurizing fan to radiator	10

Coolant pump, removing and installing

Notes:

- ◆ *Always replace seals and gaskets.*
- ◆ *Cover toothed belt with a cloth to protect it from coolant before removing coolant pump.*

Removing

- Remove front bumper.

⇒ [Repair Manual, Body Exterior, Repair Group 63](#)

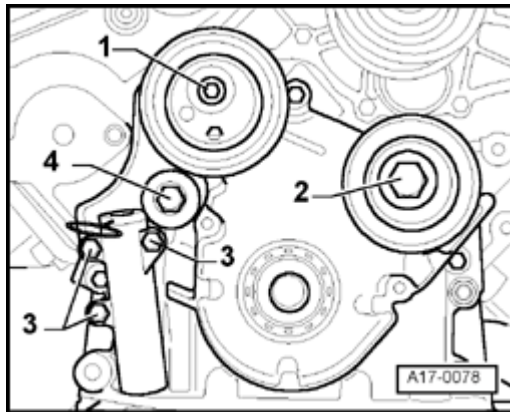
- Move lock carrier to service position.

⇒ [Repair Manual, Body Exterior, Repair Group 50](#)

- Remove ribbed belt ⇒ [Page 13-1](#) .
- Remove toothed belt ⇒ [Page 13-4](#) .

- Drain coolant ⇒ [Page 19-19](#) .

19-30

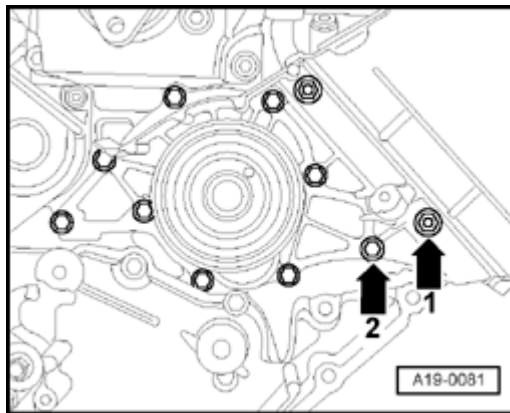


A

- Remove following components before unbolting coolant pump:

1 - Tensioning roller for toothed belt: 20 Nm

2 - Idler wheel: 45 Nm



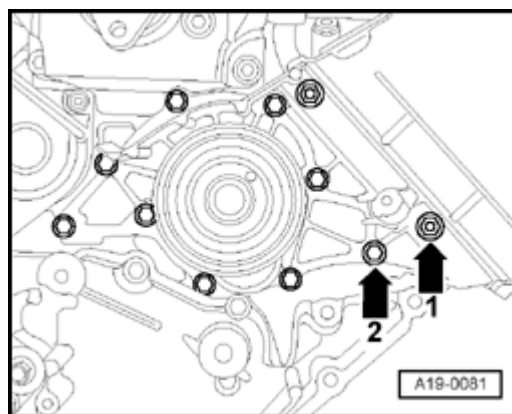
A

- Unbolt coolant pump from toothed belt guard -1- (2 nuts). Remove securing bolts -2- (9 bolts) for coolant pump and remove coolant pump.

Installing

Install in the opposite order to removing. When installing, note the following points:

- Remove residues of sealant on sealing surfaces of coolant pump and cylinder block.
- Clean sealing surfaces; ensure that they are free of oil and grease.
- Fit new gasket on coolant pump flange.



A

- Insert coolant pump into cylinder block and tighten all 9 securing bolts - 2-.
 - Secure rear toothed belt guard at coolant pump housing -1-.
- Tightening torque: 10 Nm.
- Install toothed belt ⇒ [Page 13-4](#) .
 - Install ribbed belt ⇒ [Page 13-1](#) .
 - Install toothed belt guard.
 - Fill cooling system ⇒ [Page 19-19](#) .