

Volkswagen Jetta, Golf, GTI 1999, 2000

2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

19 Engine-Cooling system (Page GR-19)

Cooling system components, removing and installing

Coolant fans (V7 and V35), checking

Coolant feed pump (V51), checking

Coolant hoses, connection diagram

Coolant pump, removing and installing

Coolant, draining and filling

Cooling system components, body side

Cooling system components, engine side

Radiator, removing and installing

Thermostat housing, disassembling and assembling

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP Cooling system components, removing and installing (Page 19-1)

Notes:

- ◆ *The cooling system is under pressure when the engine is warm. Release pressure before making repairs.*
- ◆ *The hose connections are fastened with spring band clips and rapid action hose couplings. Only use spring band clips when making repairs.*
- ◆ *The pliers V.A.G 1921 are recommended for assembling the spring band clips.*
- ◆ *While installing, lay the hoses somewhat slack while being careful that they do not come in contact with other components (pay attention to the markings on the connector and hose).*

Test whether the cooling system is seal-tight using the test instrument V.A.G 1274 and the adapters V.A.G 1274/8 and V.A.G 1274/9.

Cooling system components, body side ⇒ [page 19-2](#).

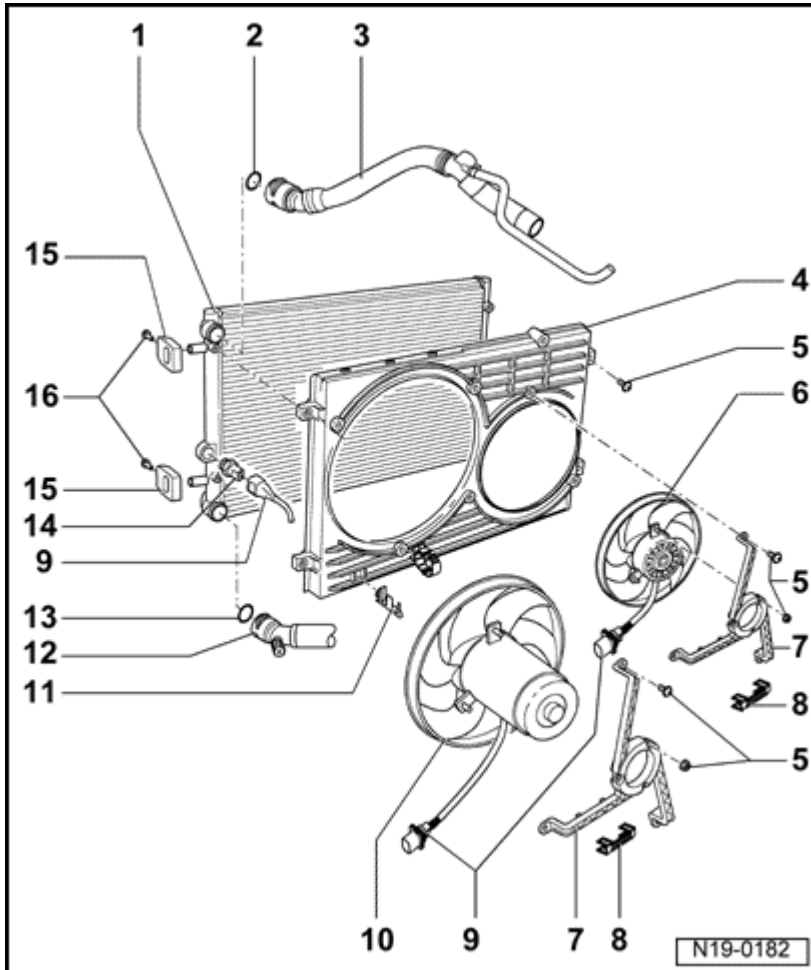
Cooling system components, engine side ⇒ [page 19-7](#).

Thermostat housing, disassembling and assembling ⇒ [page 19-13](#).

Cooling system components, body side

Main radiator

Auxiliary radiator ⇒ [page 19-5](#)



1 - Radiator

- ◆ Removing and installing ⇒ [page 19-19](#)
- ◆ After replacement, refill completely with new coolant

2 - O-Ring

- ◆ Replace if damaged

3 - Upper coolant hose

- ◆ Fastened to radiator with rapid action hose coupling
- ◆ Ensure tight fit
- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

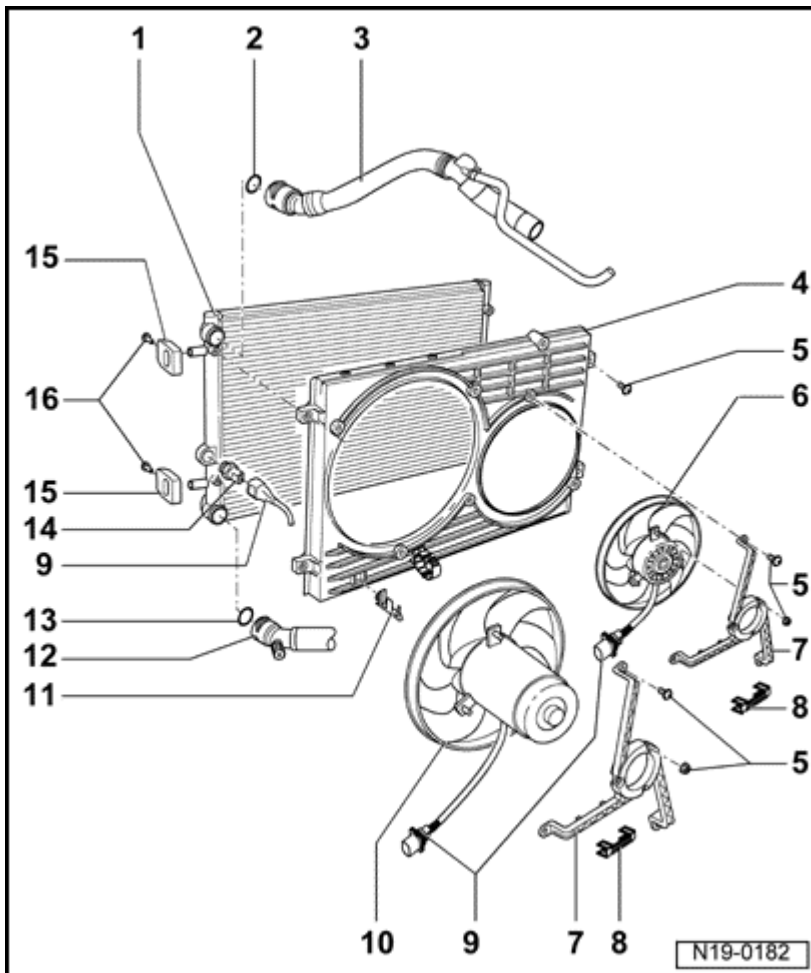
4 - Air scoop

5 - 10 Nm

6 - Coolant fan (V7)

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP
Cooling system components, removing and installing (Page 19-3)



7 - Fan bracket

8 - Retaining clamp

- ◆ Check for tight fit

9 - Connector

10 - Coolant fan (V35)

11 - Bracket

- ◆ For fan connector

12 - Lower coolant hose

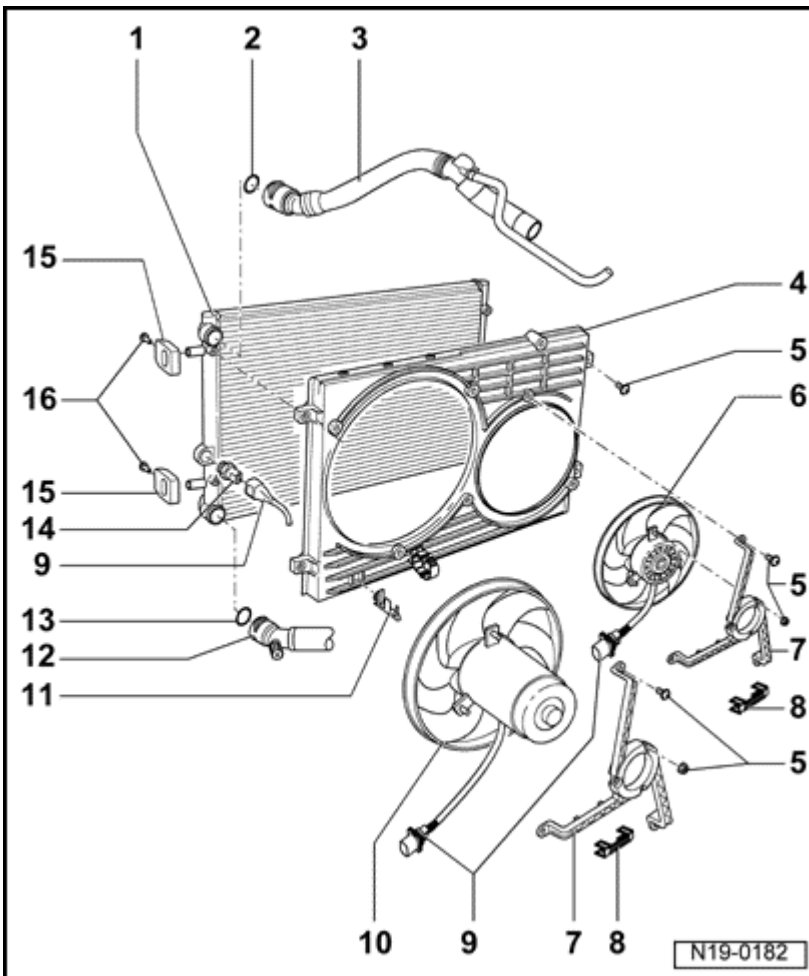
- ◆ Fastened to radiator with rapid action hose coupling
- ◆ Ensure tight fit
- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

13 - O-Ring

- ◆ Replace

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Cooling system components, removing and installing (Page 19-4)



14 - Thermo switch (F18), 35 Nm

- ◆ For electric fan

Switching temperatures, 1st stage:

- ◆ On: 92-97° C
- ◆ Off: 84-91° C

Switching temperatures, 2nd stage:

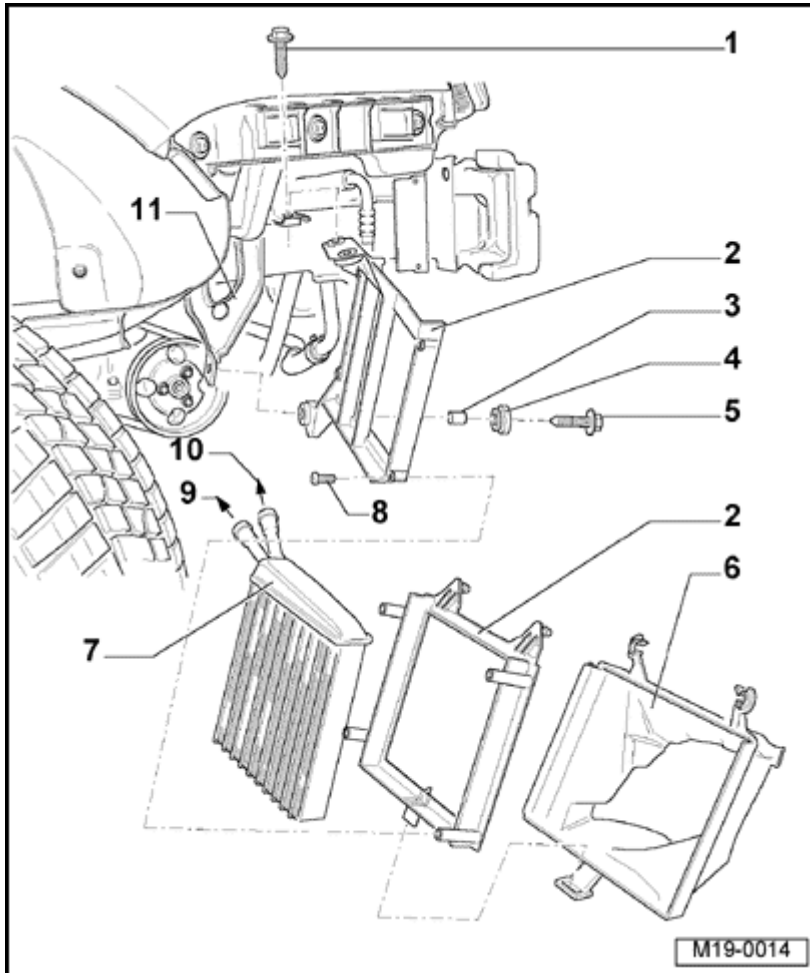
- ◆ On: 99-105° C
- ◆ Off: 91-98° C

15 - Bracket

- ◆ For radiator
- ◆ Observe install position

16 - 15 Nm

Auxiliary radiator



1 - 10 Nm

2 - Retaining frame

- ◆ For auxiliary radiator

3 - Spacer sleeve

4 - Rubber disk

5 - Lower bolt, 10 Nm

6 - Air scoop

- ◆ Clip into retaining frame

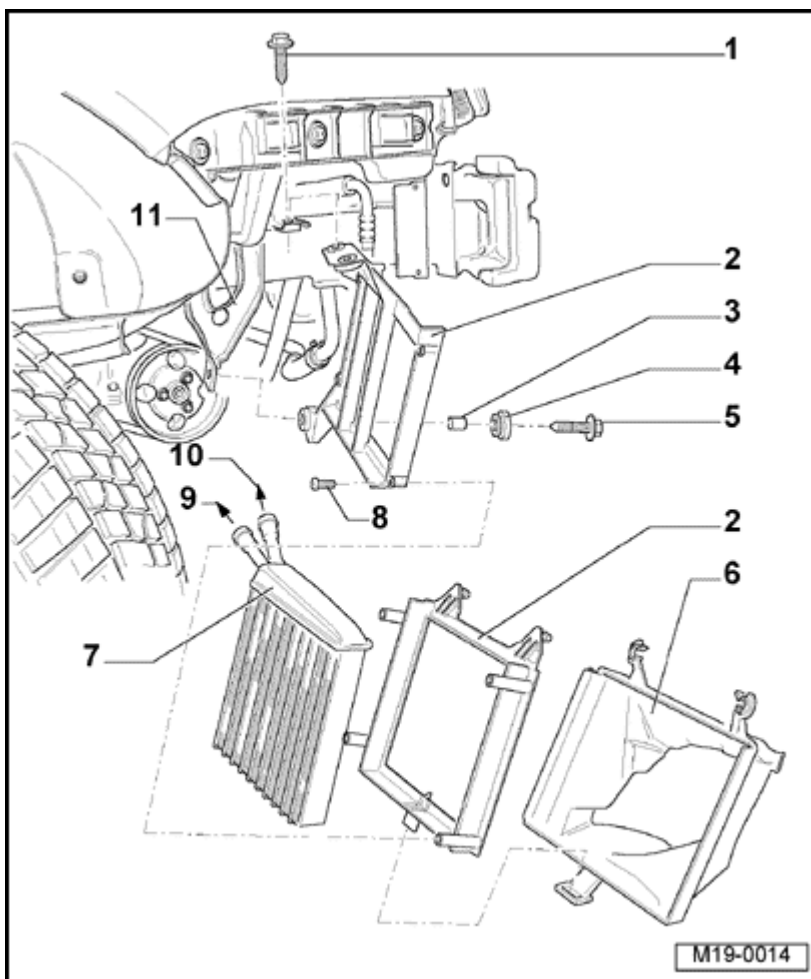
7 - Auxiliary radiator

- ◆ For vehicles in hot climates
- ◆ Removing and installing ⇒ [page 19-19](#)
- ◆ After replacement, refill completely with fresh coolant

8 - 5 Nm

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Cooling system components, removing and installing (Page 19-6)



9 - To Y-branch of upper coolant hose

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

10 - To Y-branch of lower coolant hose

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

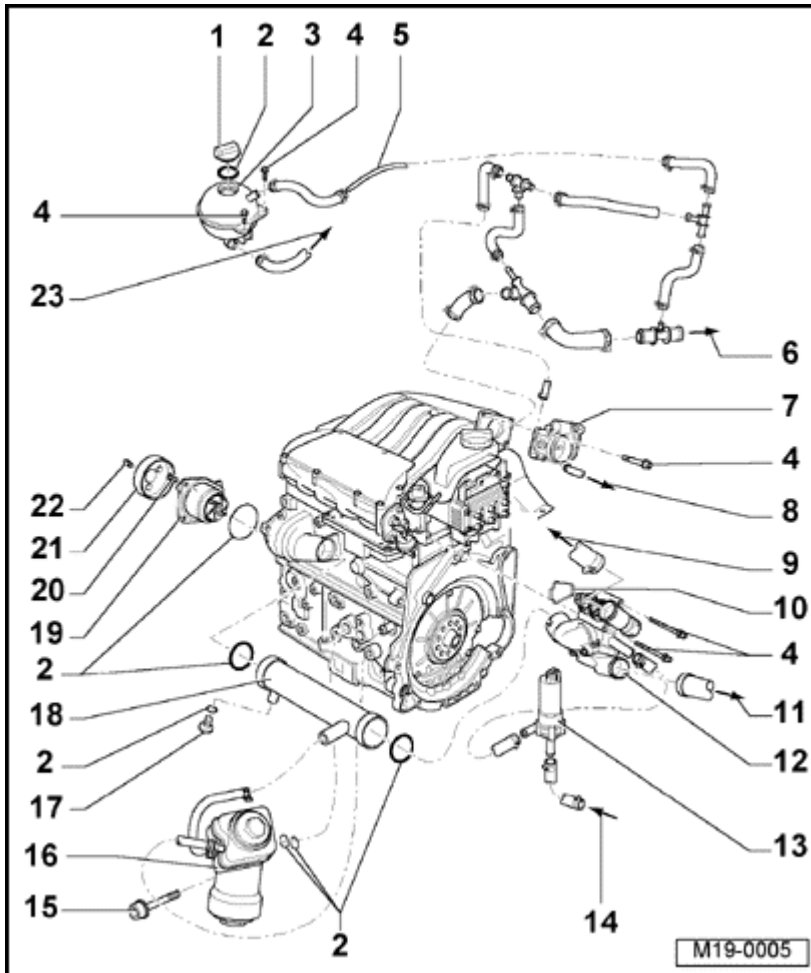
11 - Bracket

- ◆ For auxiliary radiator

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP Cooling system components, removing and installing (Page 19-7)

Cooling system components, engine side



1 - Pressure cap

- ◆ Check with V.A.G 1274 test instrument and V.A.G 1274/9 adapter
- ◆ Test pressure 1.4-1.6 bar

2 - O-Ring

- ◆ Replace if damaged

3 - Coolant recovery bottle

- ◆ Check for leaks in cooling system using V.A.G 1274 test instrument and V.A.G1274/8 adapter

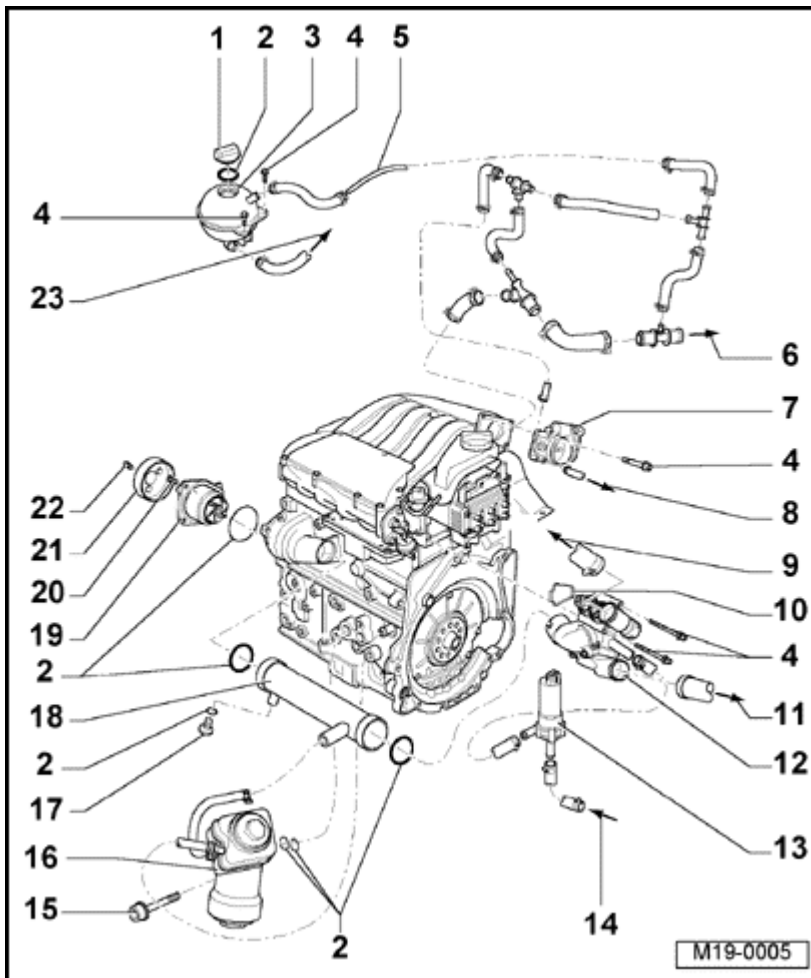
4 - 10 Nm

5 - Upper coolant pipe

- ◆ Clipped into the bulkhead
- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP Cooling system components, removing and installing (Page 19-8)



6 - To heat exchanger

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

7 - Throttle valve control unit (J338)

- ◆ Heated by coolant

8 - To upper coolant hose

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

9 - To upper radiator

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

10 - Gasket

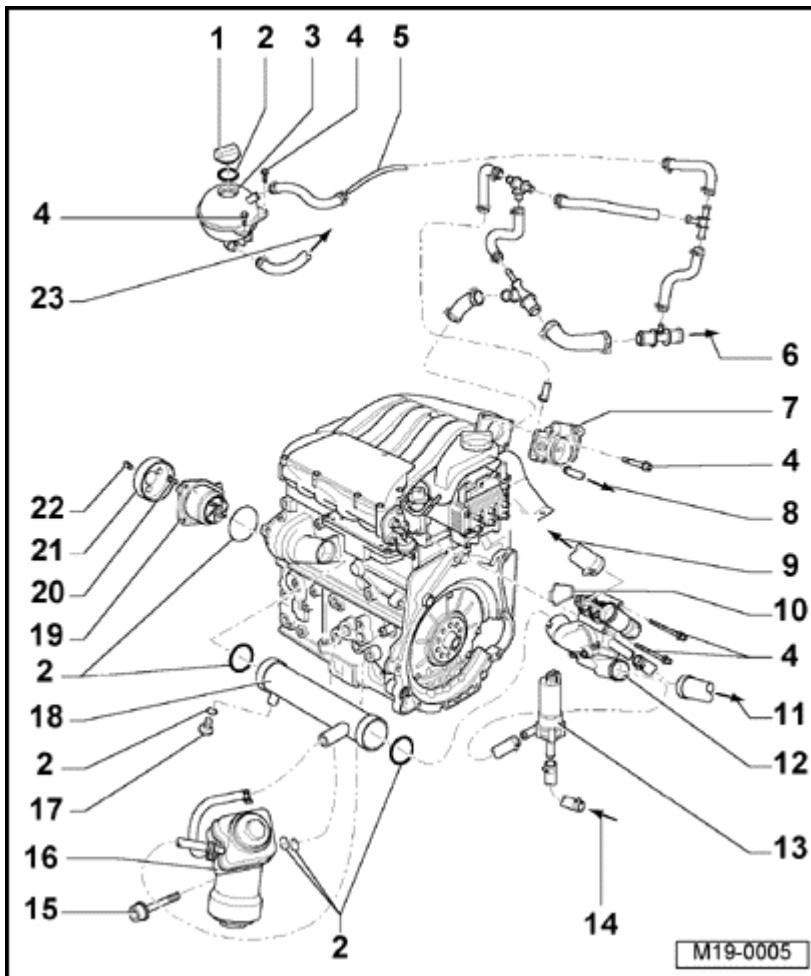
- ◆ Replace

11 - To lower radiator

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP Cooling system components, removing and installing (Page 19-9)



12 - Thermostat housing

- ◆ Disassembling and assembling ⇒ [page 19-13](#)

13 - Coolant feed pump (V51)

- ◆ Check ⇒ [page 19-24](#)

14 - From heat exchanger

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

15 - 25 Nm

16 - Oil cooler

- ◆ Coat contact surfaces outside of sealing ring with AMV 188 001 02
- ◆ Ensure free movement among surrounding components
- ◆ See Note ⇒ [page 17-1](#)

17 - Screw plug

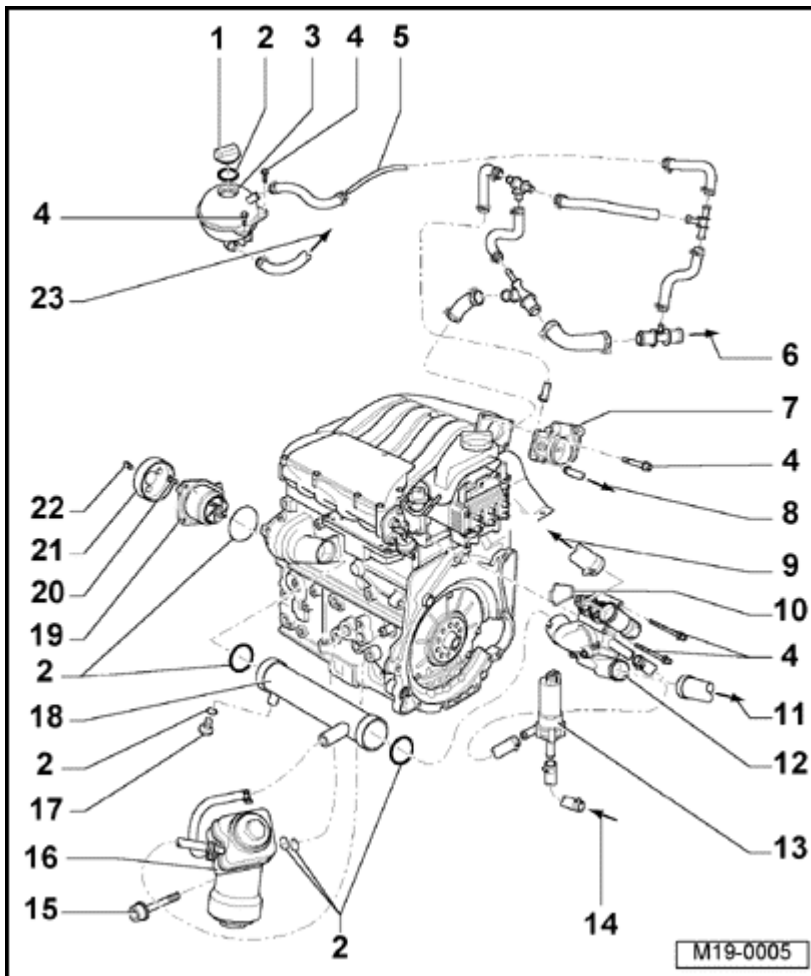
18 - Coolant pipe

- ◆ Coolant hoses, connection diagram ⇒ [page 19-11](#)

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-10)



19 - Coolant pump

- ♦ Observe install position
- ♦ Check for smooth running
- ♦ Replace completely if damaged or if leaking
- ♦ Removing and installing ⇒ [page 19-30](#)

20 - 15 Nm

21 - Pulley

- ♦ For coolant pump

22 - 25 Nm

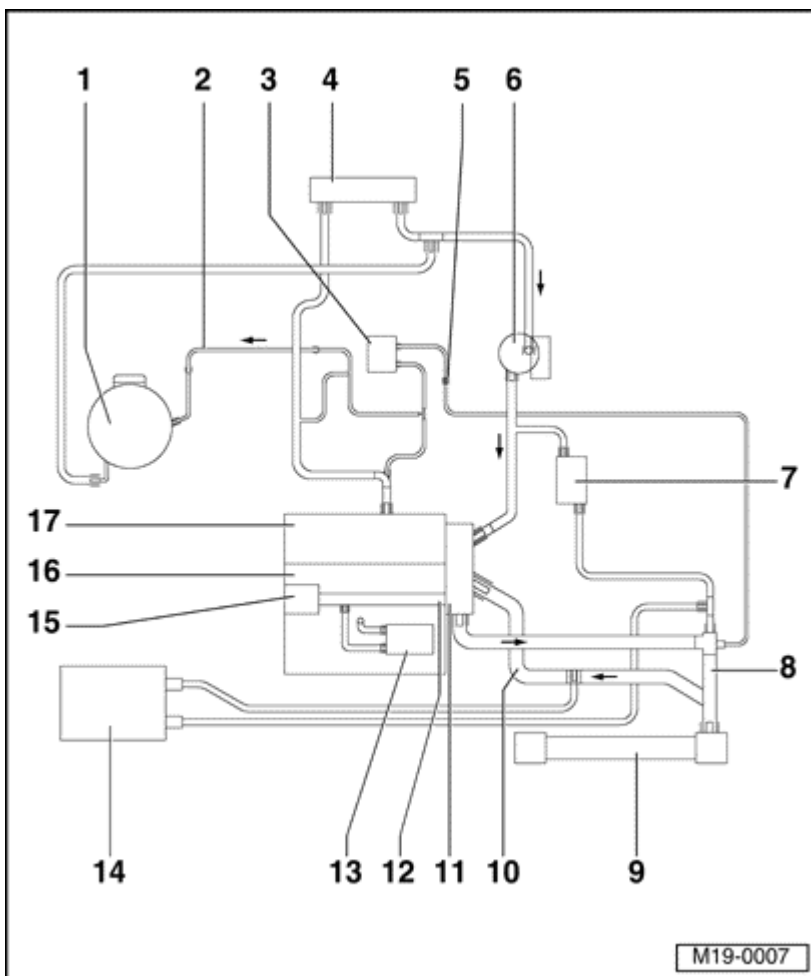
23 - To Y-branch of heat exchanger/coolant feed pump

- ♦ Coolant hoses, connection diagram ⇒ [page 19-11](#)

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-12)



- 11 - Thermostat housing**
- 12 - Lower coolant pipe**
- 13 - Oil cooler**
- 14 - Auxiliary radiator**
- 15 - Coolant pump**
- 16 - Cylinder block**
- 17 - Cylinder head**

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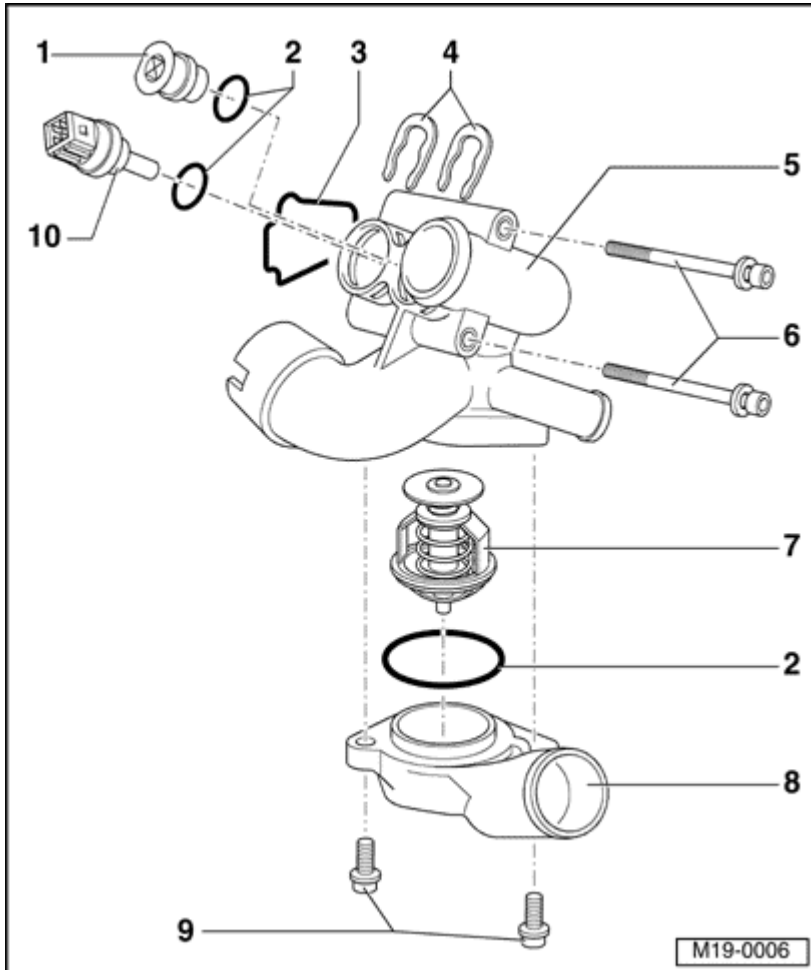
2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-13)

Thermostat housing, disassembling and assembling

Notes:

Routing of hoses at the coolant controller housing ⇒ [page 19-7](#).



1 - Plug

2 - O-Ring

- ◆ Replace

3 - Gasket

- ◆ Replace

4 - Retaining clamp

- ◆ Check for tight fit

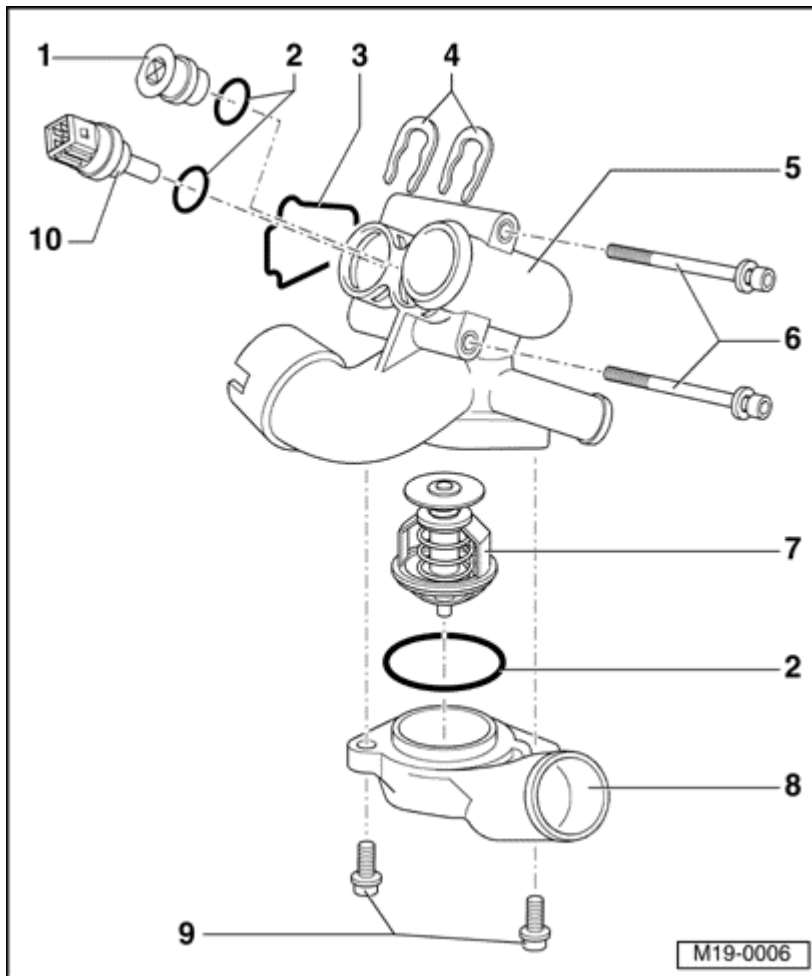
5 - Thermostat housing

6 - 10 Nm

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Cooling system components, removing and installing (Page 19-14)



7 - Thermostat

- ◆ Install position: large plate downward
- ◆ Checking: heat controller in water bath
- ◆ Opening starts at approx. 80° C
- ◆ Opening ends at approx. 105° C
- ◆ Travel at least 7 mm

8 - Connector

9 - 10 Nm

10 - Coolant temperature sensor (G62)

- ◆ With coolant temperature display sensor (G2)
- ◆ For engine control unit
- ◆ If necessary, release pressure from cooling system before removing
- ◆ Checking:

⇒ [Repair Manual, 2.8 Liter VR6 OBD II Fuel Injection & Ignition , Repair Group 01](#)

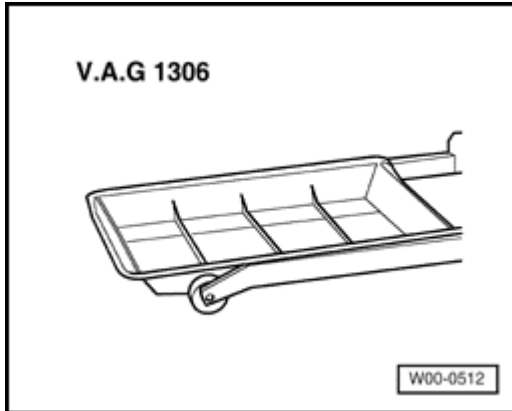
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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

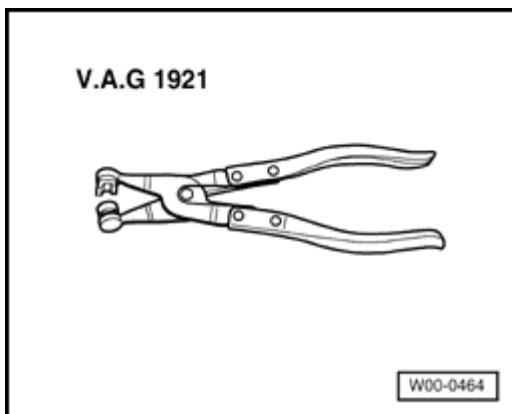
Cooling system components, removing and installing (Page 19-15)

Coolant, draining and filling

Special tools, equipment, test and inspection devices; required accessories



- ◆ V.A.G 1306 Drip pan



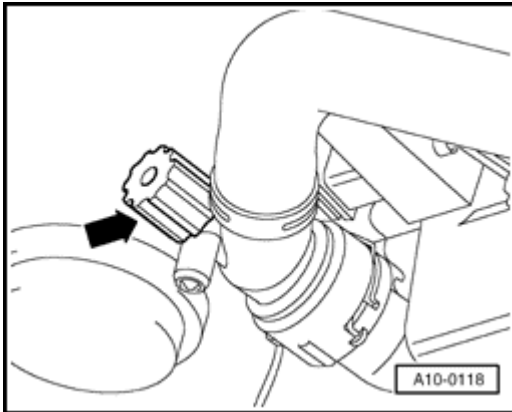
- ◆ V.A.G 1921 spring band clip pliers
- ◆ Hydrometer

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP
Cooling system components, removing and installing (Page 19-16)

Draining

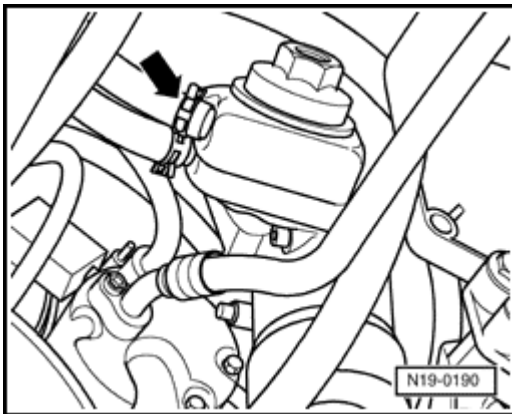
- Open the coolant recovery bottle cap.
- Remove damping pan:

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



A

- Unscrew the drain plug -arrow- from the radiator return to drain the coolant from the radiator.



A

- Also pull the coolant hose out from the oil cooler -arrow- to drain the coolant from the engine.

Notes:

Please follow regulations for disposal!

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Cooling system components, removing and installing (Page 19-17)

Refilling

Notes:

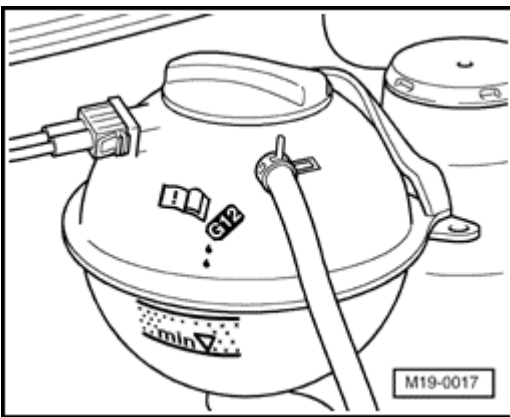
- ◆ *To satisfy TL VW 774 D, only G 12 may be used as a coolant additive. Color coding: red.*
- ◆ *Never mix G 12 with any other coolant additives!*
- ◆ *If the liquid in the coolant recovery bottle is brown, this means that G 12 was mixed with another coolant and the coolant has to be changed.*
- ◆ *G 12 and additives which are labeled "satisfies TL VW 774 D" prevent damage from freezing and corrosion and prevent lime deposits. They also raise the boiling point. For these reasons, the cooling system must be filled with antifreeze and anti-corrosion agents throughout the year.*
- ◆ *The coolant's higher boiling point will contribute to operational reliability under higher engine loads, especially in tropical climates.*
- ◆ *The antifreeze protection must go down to -25°C (in Arctic climates down to -35°C).*
- ◆ *The concentration of the coolant may not be reduced by topping up during the warm seasons or in warm countries. The proportion of additive must be at least 40%.*
- ◆ *If the climate requires stronger antifreeze protection, the portion of G 12 can be increased, but never above 60% (antifreeze protection down to about -40°C), otherwise the antifreeze protection will begin to decrease again and the cooling effect will be reduced.*
- ◆ *Do not reuse the same coolant if the radiator, heat exchanger, cylinder head or cylinder head gasket have been replaced.*

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Cooling system components, removing and installing (Page 19-18)

Recommended mixing ratios:

Protection to	Antifreeze	G 12 1)	Water 1)
-25°C	40%	3.6 liters	5.4 liters
-35°C	50%	4.5 liters	4.5 liters

- 1) The amount of coolant may vary depending on the vehicle accessories.
- Tighten the drain plug into the radiator return.
 - Push the coolant hose onto the oil cooler connection and pull it tight.



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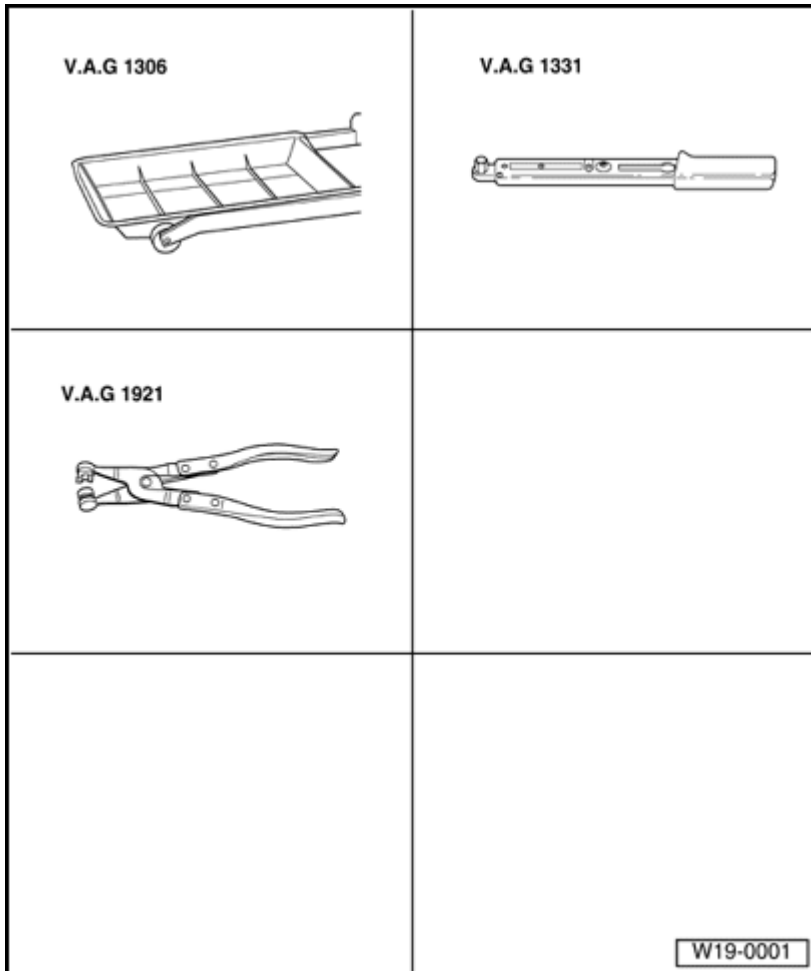
- Fill with coolant up to the upper mark on the cross-hatched area on the coolant recovery bottle.
- Close coolant recovery bottle.
- Expose the heater controls and turn-off the air conditioning if necessary.
- Start the engine and run at approximately 2000 rpm for about 3 minutes.
- Keep engine running until fan starts.
- Check coolant level and fill as necessary.
- The coolant level must be within the cross-hatched region when the engine is running warm. It must be above the lower mark if the motor is cold.

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-19)

Radiator, removing and installing



Special tools, equipment, test and inspection devices; required accessories

- ◆ V.A.G 1306 Drip pan
- ◆ V.A.G 1331 Torque wrench (5-50 Nm)
- ◆ V.A.G 1921 Pliers for spring band clips
- ◆ Hydrometer

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-20)

Main radiator

Auxiliary radiator ⇒ [page 19-22](#)

Removing

- Drain coolant ⇒ [page 19-15](#).

- Remove front bumper:

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

- Pull the quick coupler off the radiator.

- Pull the connectors off the thermo switch and the radiator fans.

- Place lock carrier into service position:

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

- Remove the radiator retaining screws and remove the radiator and the fan from below.

Notes:

For vehicles with air conditioning ⇒ [page 19-21](#).

Installing

Installation is in reverse order, but note the following:

- Fill coolant ⇒ [page 19-15](#).

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Cooling system components, removing and installing (Page 19-21)

Notes and assembly procedures for vehicles with air conditioning

CAUTION!

Do not open the A/C refrigerant circuit.

Notes:

To prevent damage to the condenser, refrigerant lines and hoses, be careful that the lines and hoses are not overstretched, creased or bent.

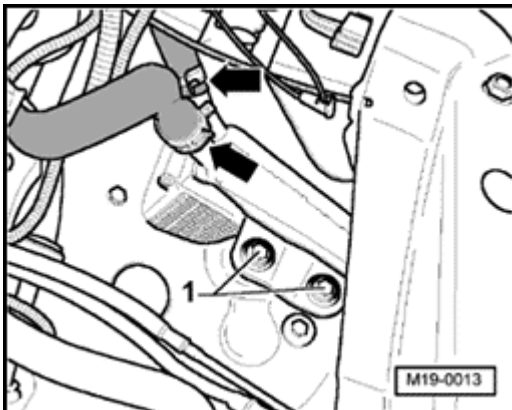
- Unscrew retention strap(s) on the refrigerant lines.
- Remove condenser from radiator and fasten to lock carrier.

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Cooling system components, removing and installing (Page 19-22)

Auxiliary radiator

Removing

- Drain coolant ⇒ [page 19-15](#).
- Remove right front sound-proofing mat:
⇒ [Repair Manual, Body-Exterior , Repair Group 50](#)
- Remove fender liner, front right:
⇒ [Repair Manual, Body-Exterior , Repair Group 66](#)
- Remove front right air outlet:
⇒ [Repair Manual, Body-Exterior , Repair Group 63](#)
- Remove the windshield washer reservoir:
⇒ [Repair Manual, Electrical Equipment , Repair Group 92](#)



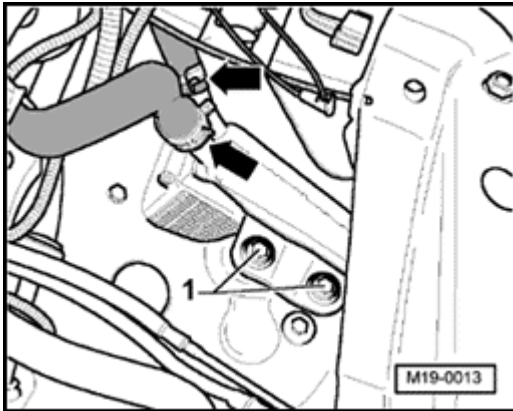
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- Using the pliers for the spring band clips (V.A.G 1921), pull the coolant hoses off the auxiliary radiator in the engine compartment below the right headlight -arrows-.

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Cooling system components, removing and installing (Page 19-23)



A

- Remove the upper retaining screws -1- of the auxiliary cooler.
- Remove the lower retaining screws in the front wheel housing from the bracket ⇒ [page 19-5](#) , item -5-.
- Carefully remove the auxiliary radiator with its attachments from below.

Installing

Installation is in reverse sequence, but observe the following directions:

- Fill coolant ⇒ [page 19-15](#).

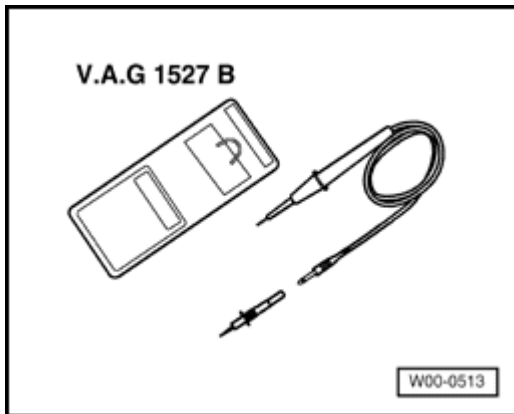
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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

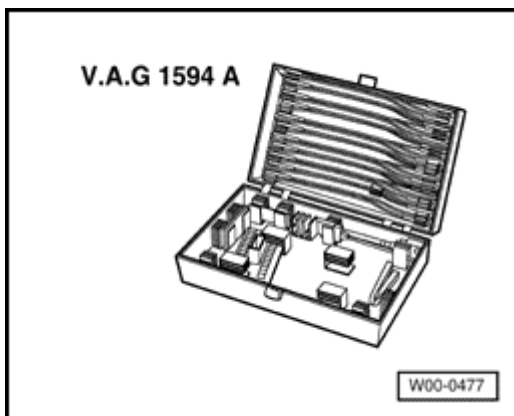
Cooling system components, removing and installing (Page 19-24)

Coolant feed pump (V51), checking

Special tools, equipment, test and inspection devices; required accessories



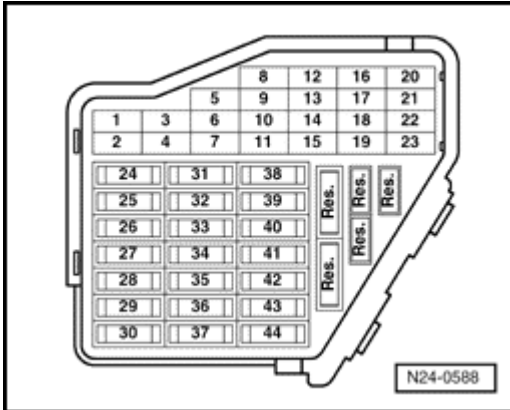
- ◆ V.A.G 1527 B diode test lamp



- ◆ V.A.G 1594 A auxiliary measuring tool set
- ◆ Wiring diagram

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Cooling system components, removing and installing (Page 19-25)

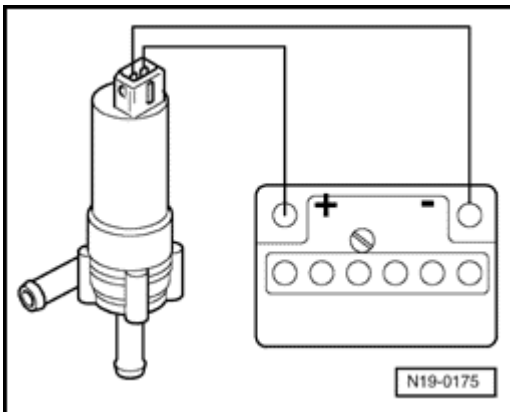
Test conditions



- Fuse # 16 OK

Test sequence

- Disconnect the two-way connector from the coolant feed pump (V51).



- Connect the contacts on the coolant feed pump (V51) with the battery using auxiliary cables from V.A.G 1594 A.

The pump should start.

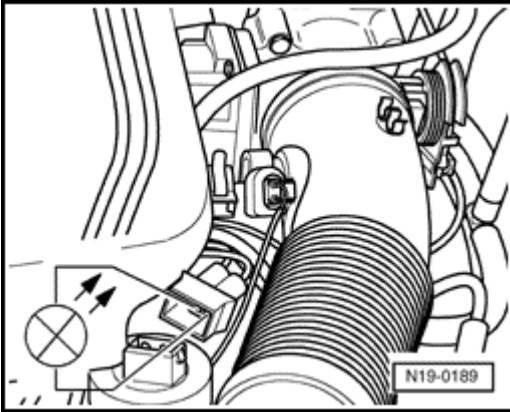
If the pump does not start:

- Replace the pump (V51).

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Cooling system components, removing and installing (Page 19-26)

If the pump (V51) starts:

- Turn the ignition off and on.



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- Connect the V.A.G 1527 B diode test lamp to the disconnected attachment plug of the coolant feed pump (V51) using auxiliary cables from V.A.G 1594 A.

The LED should illuminate.

Notes:

This test must be conducted within 10 minutes of the time that the ignition was turned off.

If the LED does not illuminate:

- Using the circuit diagram find and repair the open circuit:
⇒ Electrical Wiring Diagrams, Troubleshooting & Component Locations binder

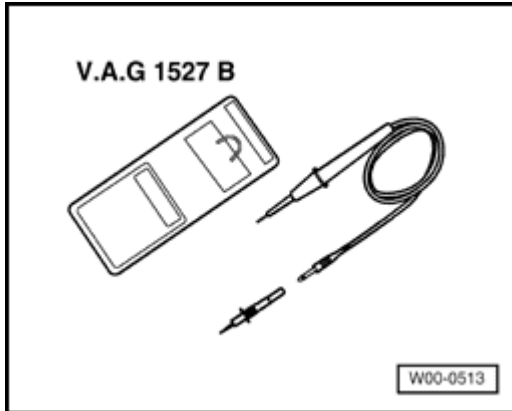
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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

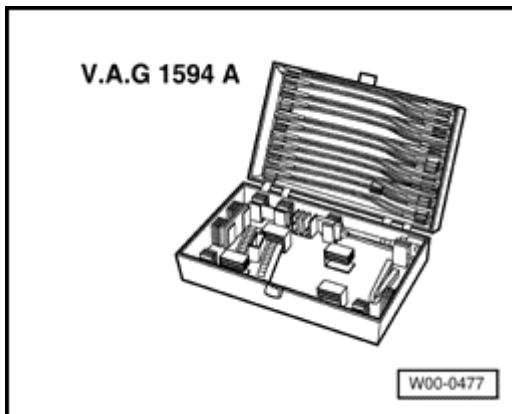
Cooling system components, removing and installing (Page 19-27)

Coolant fans (V7 and V35), checking

Special tools, equipment, test and inspection devices; required accessories



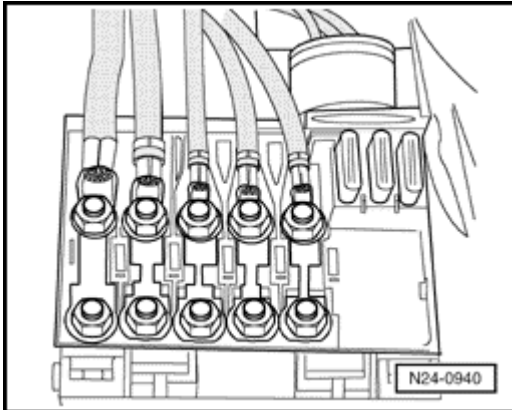
- ◆ V.A.G 1527 B diode test lamp



- ◆ V.A.G 1594 A auxiliary measuring tool set
- ◆ Wiring diagram

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP
Cooling system components, removing and installing (Page 19-28)

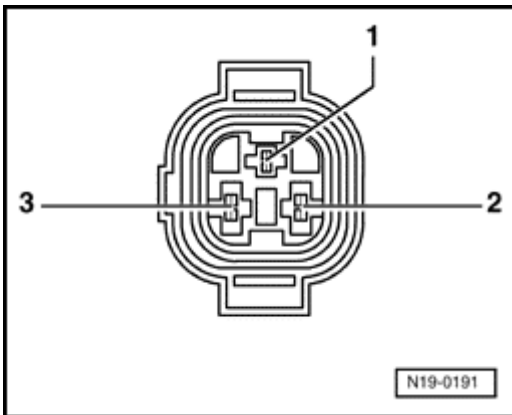
Test conditions



- Main fuses must be OK.
- Thermo switch for the coolant fan (F18) OK.

Test sequence

- Remove the 3-way connector from the thermo switch for the coolant fan (F18).



- Use auxiliary cables from V.A.G 1594 A to bypass contact -1- and contact -2- of the attachment plug.
Stage 1 of the coolant fans (V7) and (V35) should start.
- Turn ignition on.
- Use auxiliary cables from V.A.G 1594 A to bypass contact -2- and contact -3- of the attachment plug.
Stage 2 of the coolant fans (V7) and (V35) should start.

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-29)

If Stage 1 or 2 of the fans does not start:

- Use the circuit diagram to find and repair the open:

⇒ Electrical Wiring Diagrams, Troubleshooting & Component Locations binder

If no open could be found:

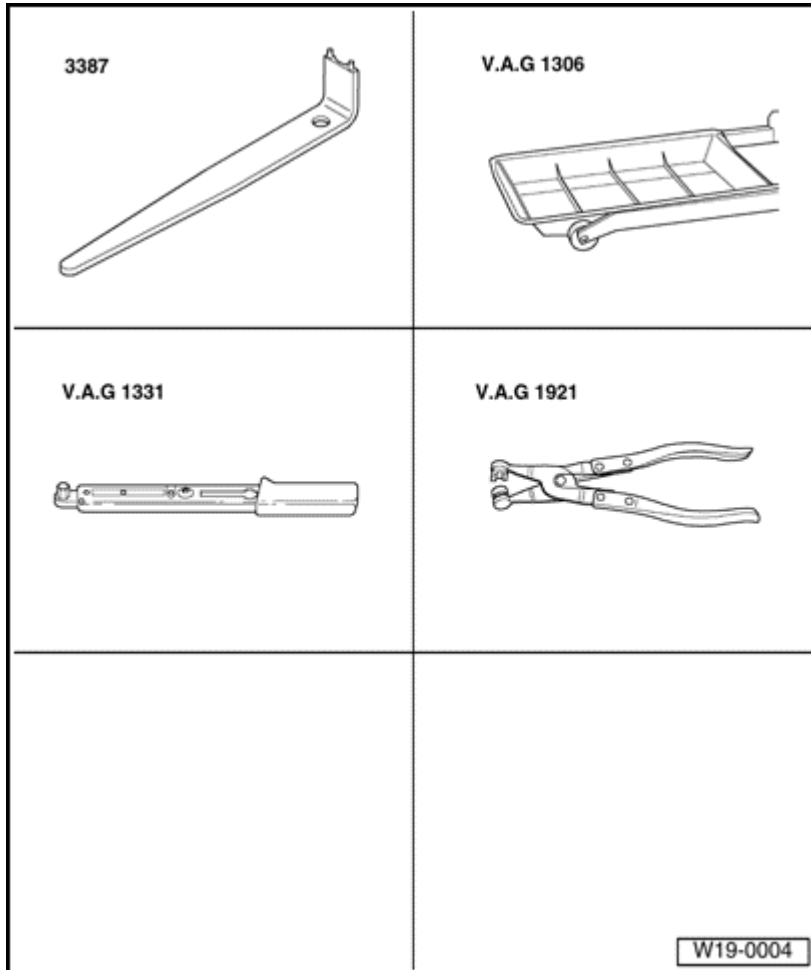
- Replace fan (V7) or fan (V35), respectively.

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2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-30)

Coolant pump, removing and installing



Special tools, equipment, test and inspection devices; required accessories

- ◆ 3387 face pin spanner wrench
- ◆ V.A.G 1306 drip pan
- ◆ V.A.G 1331 torque wrench (5-50 Nm)
- ◆ V.A.G 1921 Spring band clip pliers
- ◆ Hydrometer

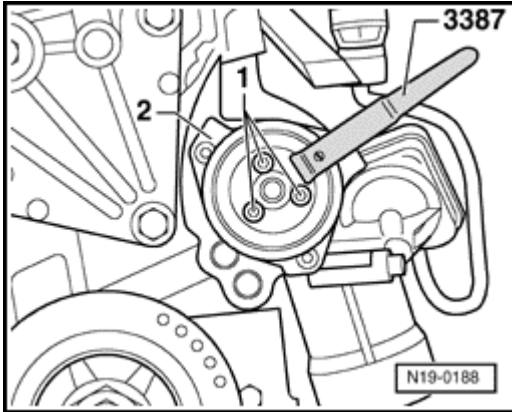
Volkswagen Jetta, Golf, GTI 1999, 2000

2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-31)

Removing

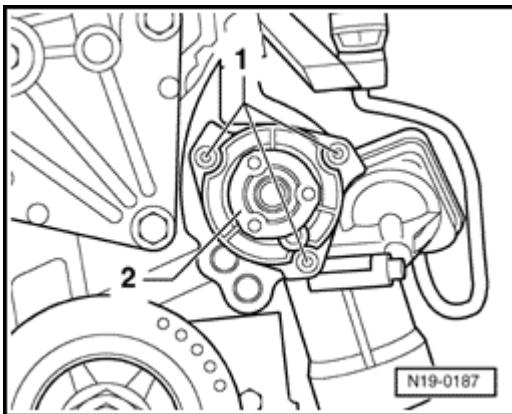
- Drain coolant ⇒ [page 19-15](#).
- Remove V-belt ⇒ [page 13-28](#).



- Remove the retaining screws -1- of the pulley for the coolant pump -2- and remove the pulley.

Notes:

Use the face pin spanner wrench 3387 for removing and installing the coolant pump pulley.



- Remove the coolant pump retaining screws -1- and remove the coolant pump -2-.

Volkswagen Jetta, Golf, GTI 1999, 2000

2.8 Liter VR6 2V Engine Mechanical, Engine Code(s): AFP

Cooling system components, removing and installing (Page 19-32)

Installing

Reassemble is in reverse order, but note the following:

Notes:

The coolant pump sealing plug points downward.

- Moisten the new O-ring with coolant.
- Insert the coolant pump into the engine block and tighten retaining screws to 15 Nm.
- Install V-belt ⇒ [page 13-28](#).
- Fill coolant ⇒ [page 19-15](#).