



## Cooling system components, servicing

### **WARNING!**

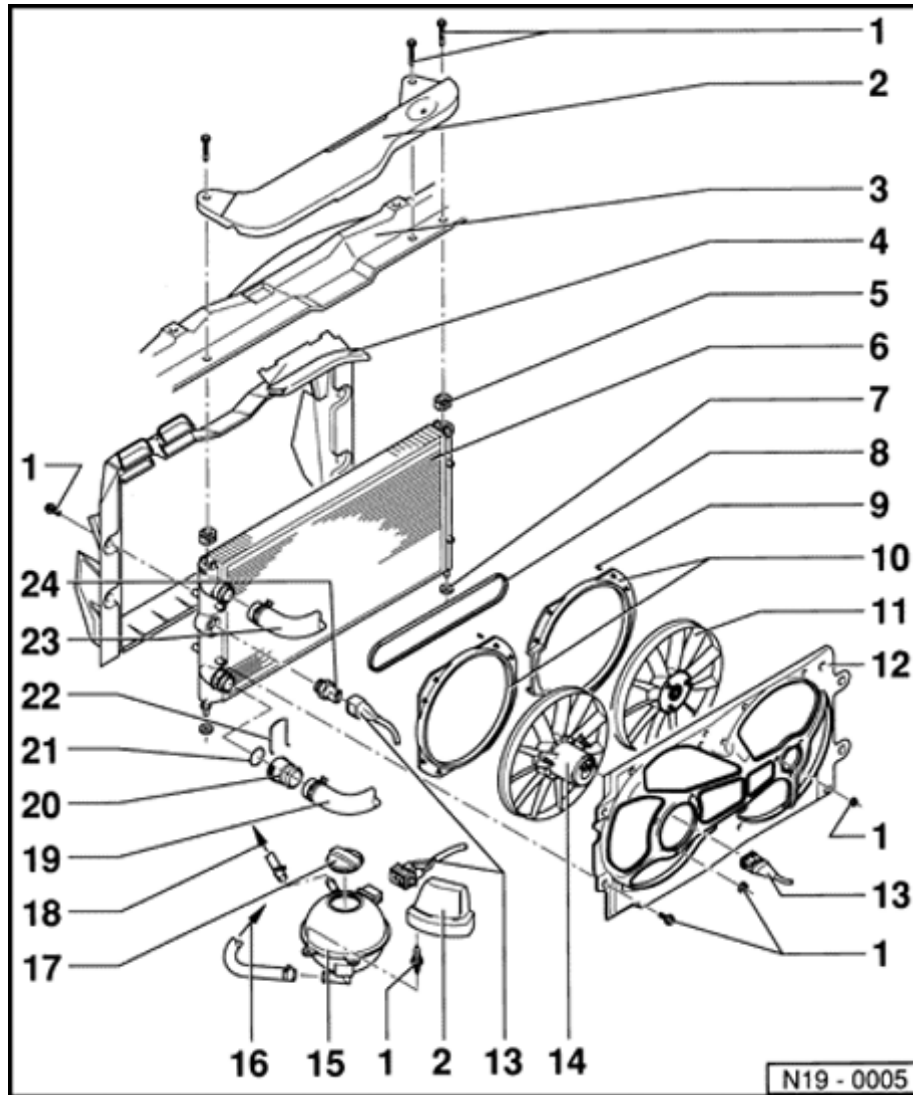
- ◆ *The cooling system is pressurized when the engine is warm. When opening the expansion tank, wear gloves and other appropriate protection, cover the cap with a cloth and open carefully to relieve system pressure slowly.*
- ◆ *Do not re-use any fasteners that are worn or deformed in normal use.*
- ◆ *Some fasteners are designed to be used only once, and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual-replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.*

### **Notes:**

- ◆ *Hoses are secured with spring-type clips. In*

*cases of repair only use spring-type clips for replacements.*

- ◆ *VAG1921 pliers are recommended for installing spring-type hose clamps.*
- ◆ *Engine coolant, draining and filling ⇒ [Page 19-10](#)*
- ◆ *Coolant mixture ratios ⇒ [Page 19-10](#)*
- ◆ *Cooling system leak-testing, use VAG1274 cooling system tester and VAG1274/3 adapter*



## Cooling system components, body side

1 - 10 Nm (7 ft lb)

2 - Cover

3 - Lock carrier

4 - Air intake elbow

5 - Bracket

6 - Radiator

◆ Removing and installing ⇒ [Page 19-14](#)

◆ After replacing, completely replace engine coolant

7 - Rubber washer

8 - V-belt

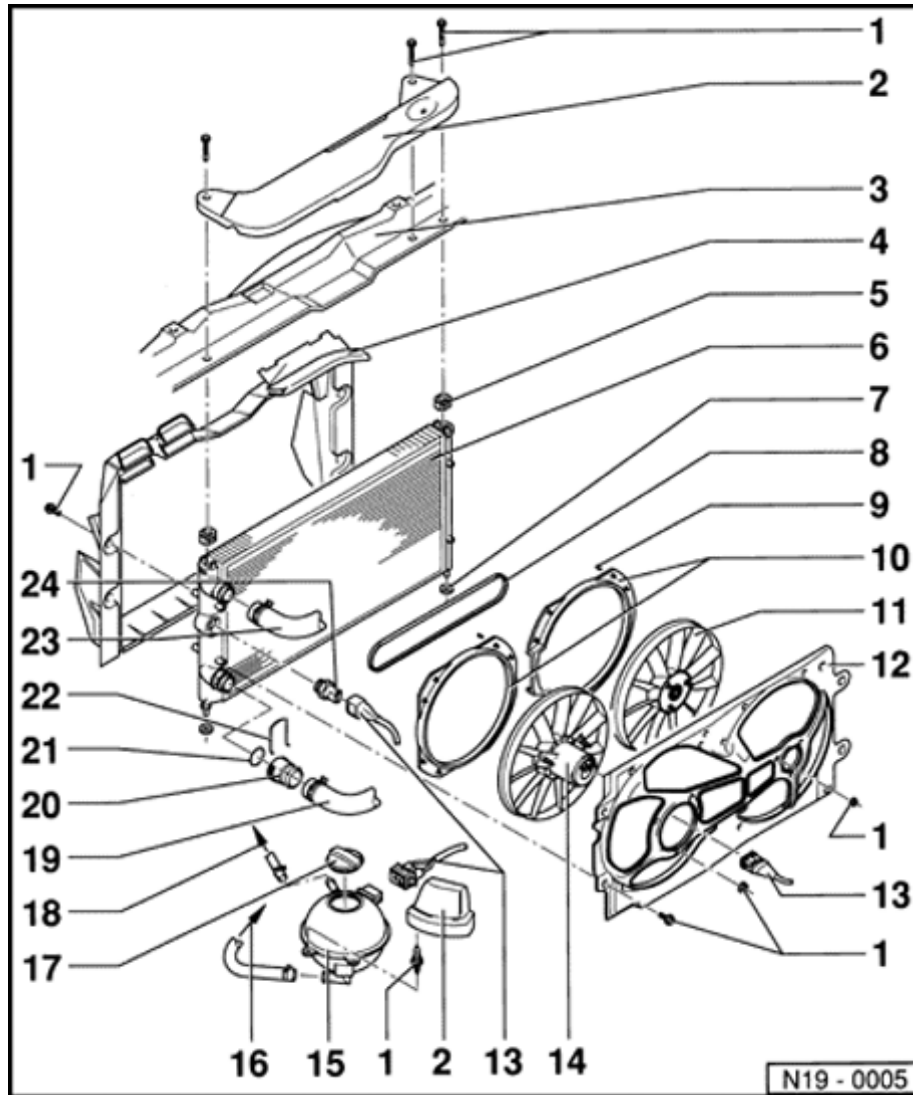
9 - Expandable pin

10 - Guide ring

◆ Note installed position

◆ Secured to lock carrier -3- with clips

◆ Removing and installing ⇒ [Page 19-14](#)



**11 - Additional fan**

**12 - Fan ring**

**13 - Connector**

**14 - Coolant fan**

◆ Removing and installing ⇒ [Page 19-14](#)

**15 - Expansion tank**

**16 - To coolant line**

◆ ⇒ [Page 19-6](#) , item 9

**17 - Cap**

◆ Check using cooling system tester VAG1274 and 1274/4

◆ Test pressure: 1.3-1.5 bar (20-23 psi)

**18 - To connection**

◆ ⇒ [Page 19-5](#) , item 3

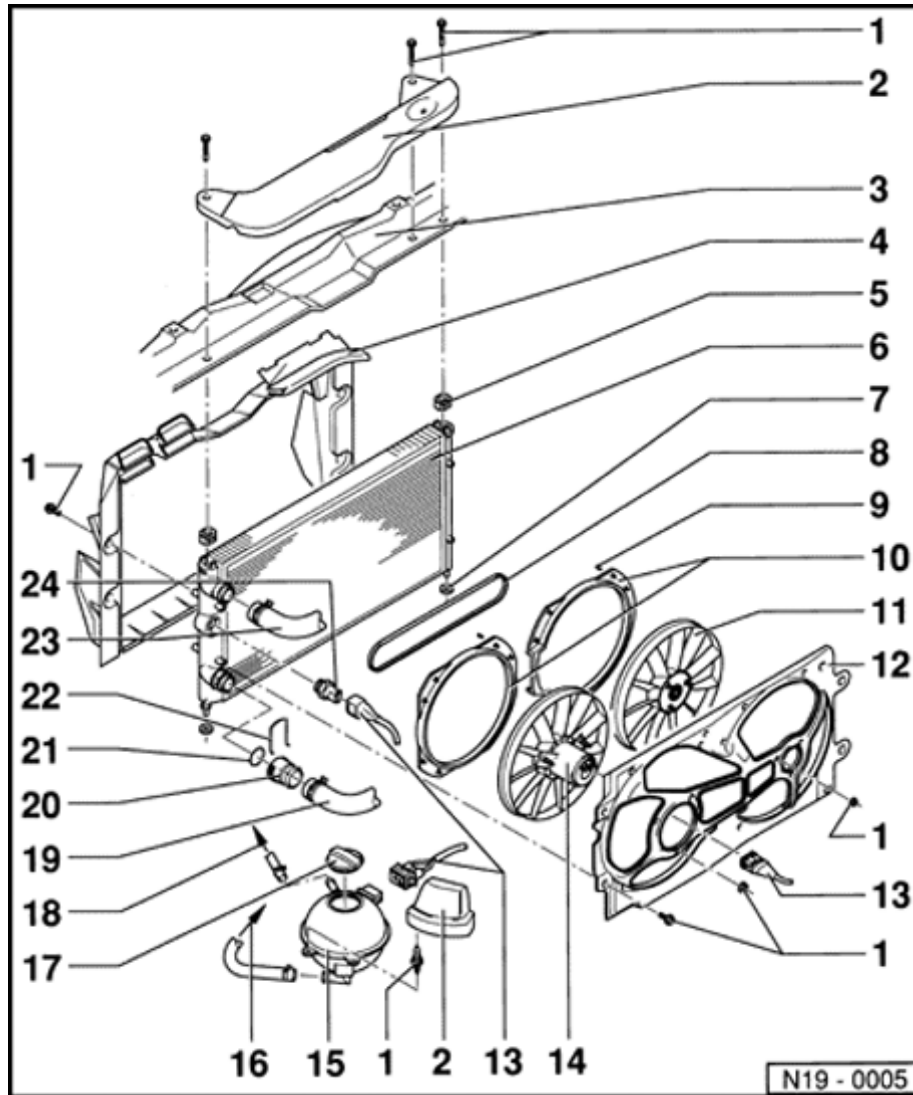
**19 - Lower coolant hose**

◆ To engine coolant pump ⇒ [Page 19-7](#) , item 18

**20 - Connection**

**21 - O-ring**

◆ Always replace



## 22 - Retaining clip

## 23 - Upper coolant hose

- ◆ To connection ⇒ [Page 19-7](#) , item 19

## 24 - Coolant Fan Control (FC) thermal switch -F18-

- ◆ 35 Nm (26 ft lb)
- ◆ For electric fan
- ◆ Only with optional extras: third speed coolant Fan Control (FC) thermal switch -F165- ⇒ [Page 19-5](#) , item 7

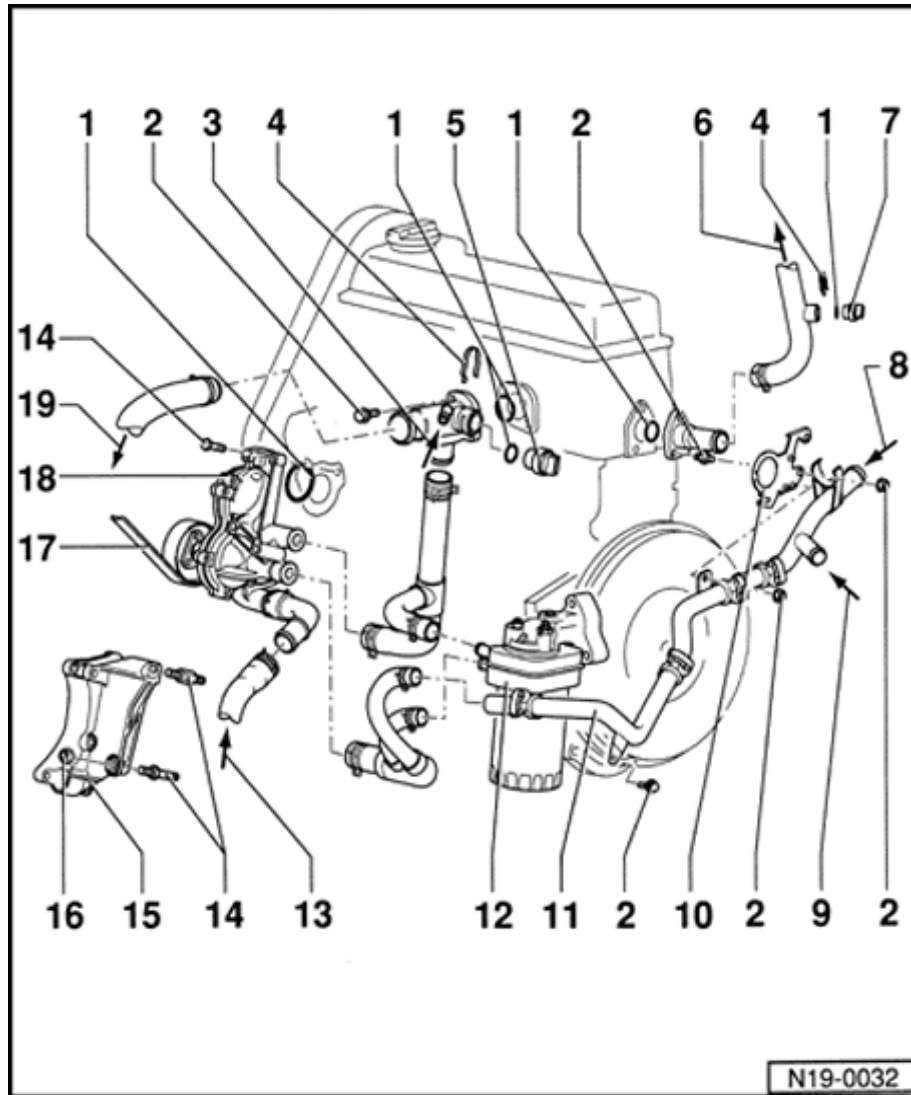
### Switching temperatures

#### Stage 1:

- ◆ On: 92-97 ° C (198-207 ° F)
- ◆ Off: 84 to 91 ° C (183-196 ° F)

#### Stage 2:

- ◆ On: 99-105 ° C (210-221 ° F)
- ◆ Off: 91-98 ° C (196-208 ° F)



## Cooling system components, engine side

### 1 - O-ring

- ◆ Always replace

### 2 - 10 Nm (7 ft lb)

### 3 - From expansion tank

- ◆ Item 18 ⇒ [Page 19-3](#)

### 4 - Retaining clip

### 5 - Engine Coolant Temperature (ECT) sensor -G62- or sensor for engine temperature -G27-

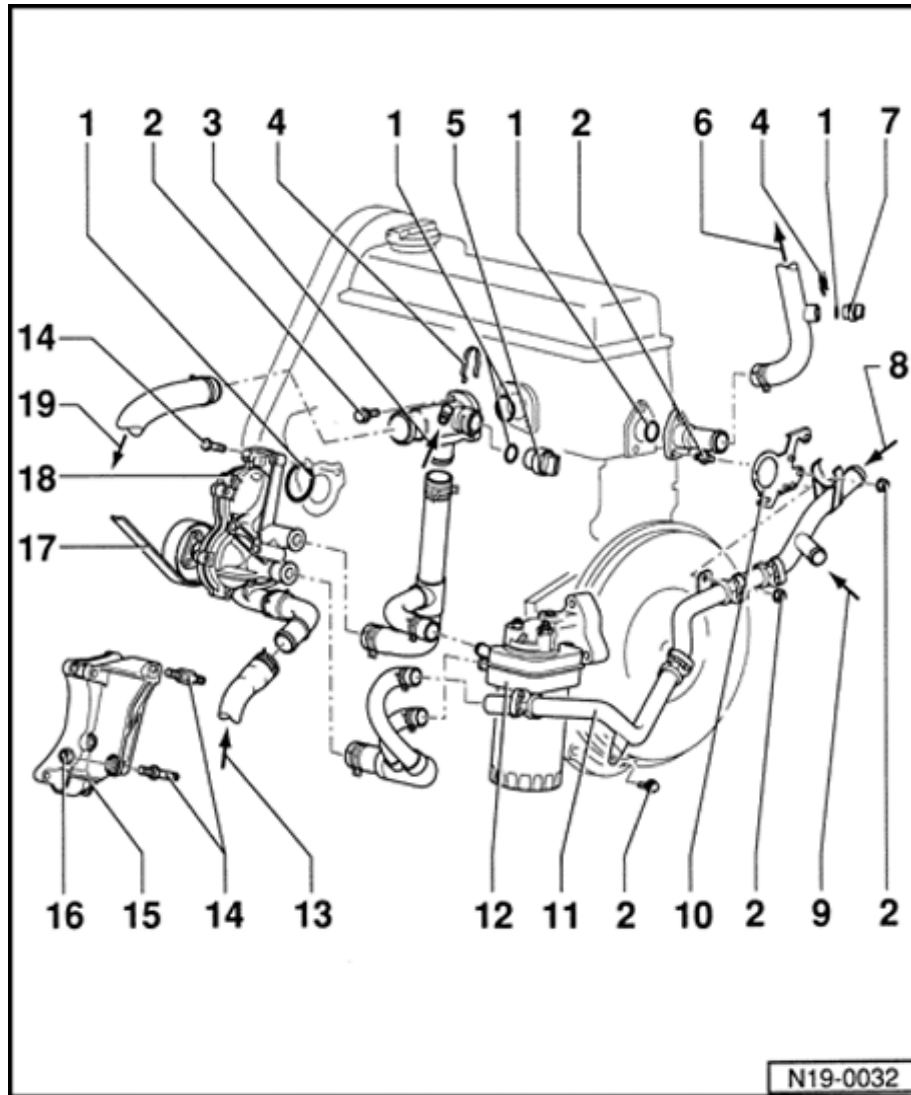
- ◆ With Engine Coolant Temperature (ECT) sensor -G2-

### 6 - Coolant hose

- ◆ Engine code AHU: to EGR cooler
- ◆ Engine codes AAZ, 1Z: to heater core

### 7 - Not applicable for USA/Canada

### 8 - From heater core



### 9 - To expansion tank

- ◆ Item 16 ⇒ [Page 19-3](#)

### 10 - Bracket

### 11 - Coolant line

### 12 - Oil cooler

- ◆ Removing and installing ⇒ [Page 17-2](#)

### 13 - From bottom of radiator

- ◆ ⇒ [Page 19-3](#) , item 19

### 14 - 20 Nm (15 ft lb) + 1/4 turn (90°)

- ◆ Always replace

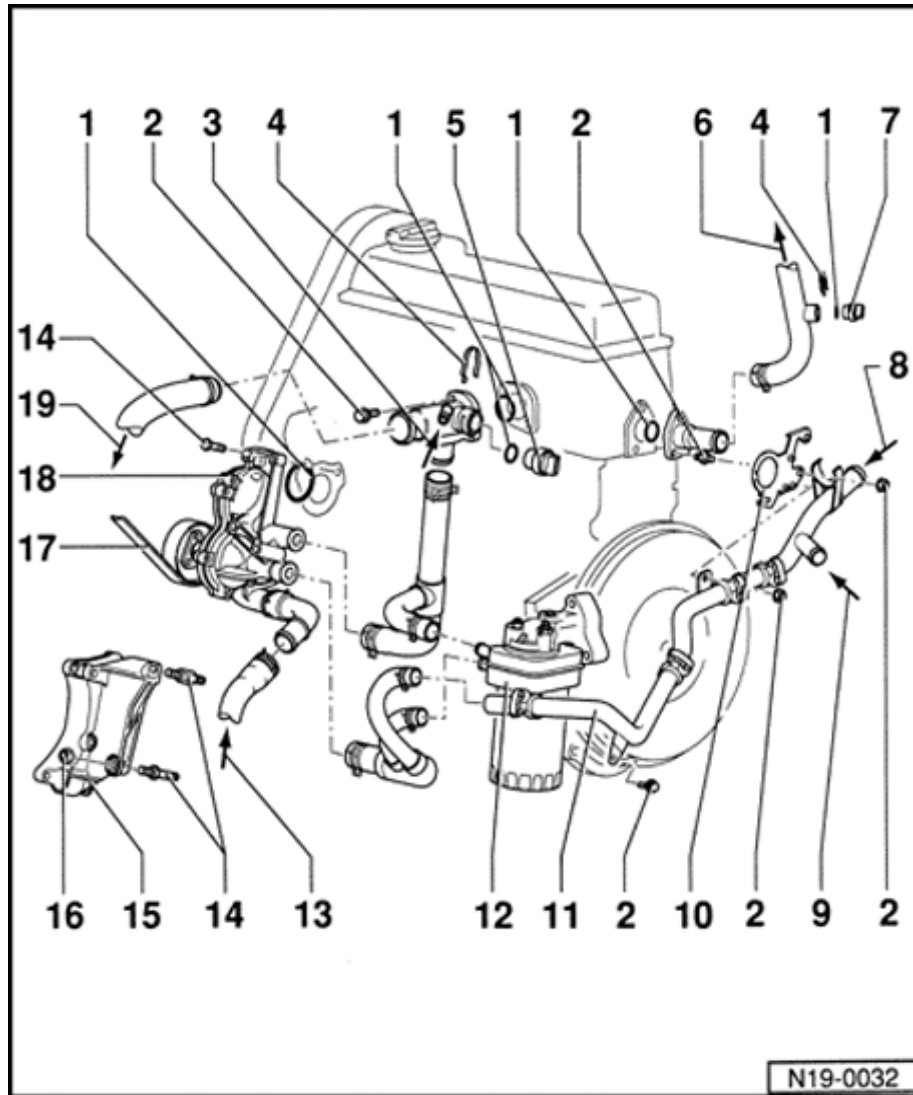
### 15 - Bracket

- ◆ For ribbed belts without tensioner

### 16 - 30 Nm (22 ft lb)

### 17 - V-belt/ribbed belt

- ◆ Removing and installing ribbed belt ⇒ [Page 13-14](#)
- ◆ Adjusting V-belt tension ⇒ [Repair Manual, Suspension Wheels, Brakes, Steering, Repair Group 48](#)

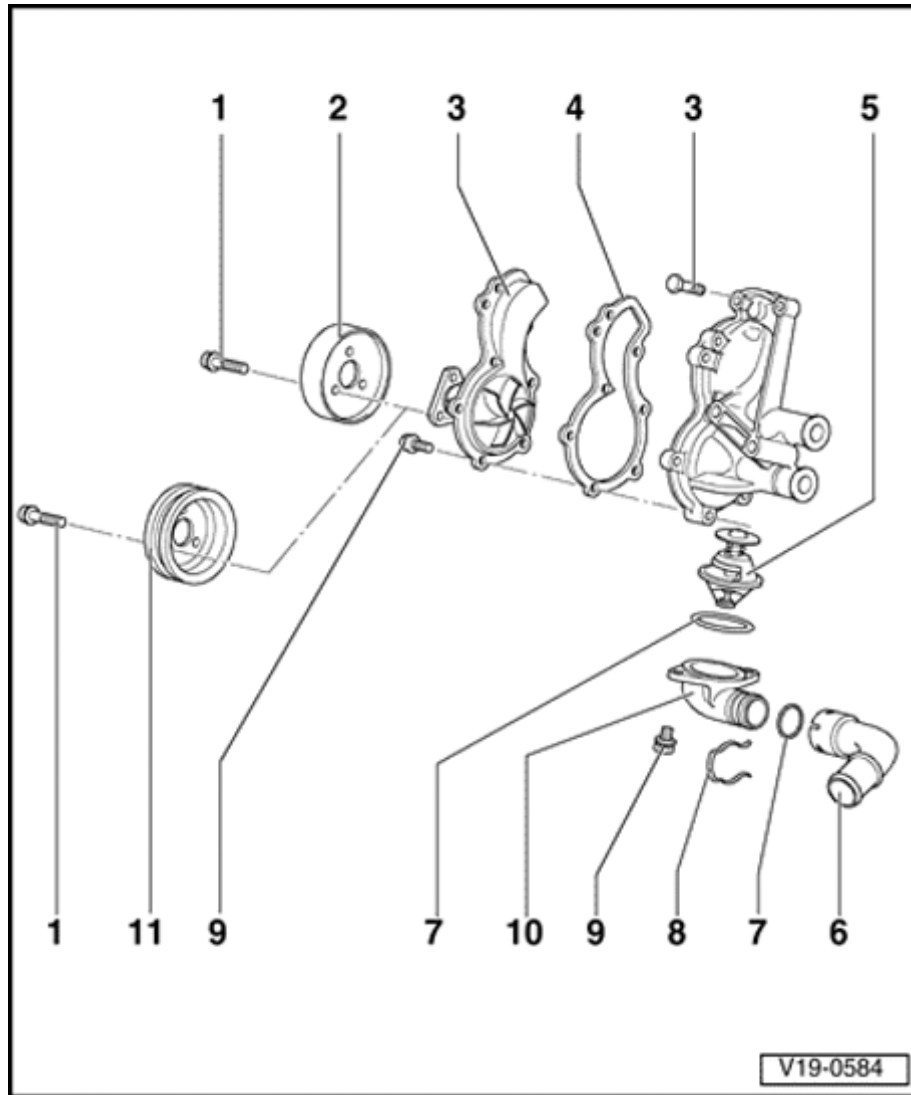


### 18 - Engine coolant pump

◆ Disassembling and assembling ⇒ [Page 19-8](#)

### 19 - To top of radiator

◆ ⇒ [Page 19-4](#) , item 23



## Engine coolant pump, disassembling and assembling

**1 - 25 Nm (18 ft lb)**

**2 - Pulley**

- ◆ Ribbed belt version

**3 - Engine coolant pump**

- ◆ Check shaft for ease of movement

**4 - Gasket**

- ◆ Always replace

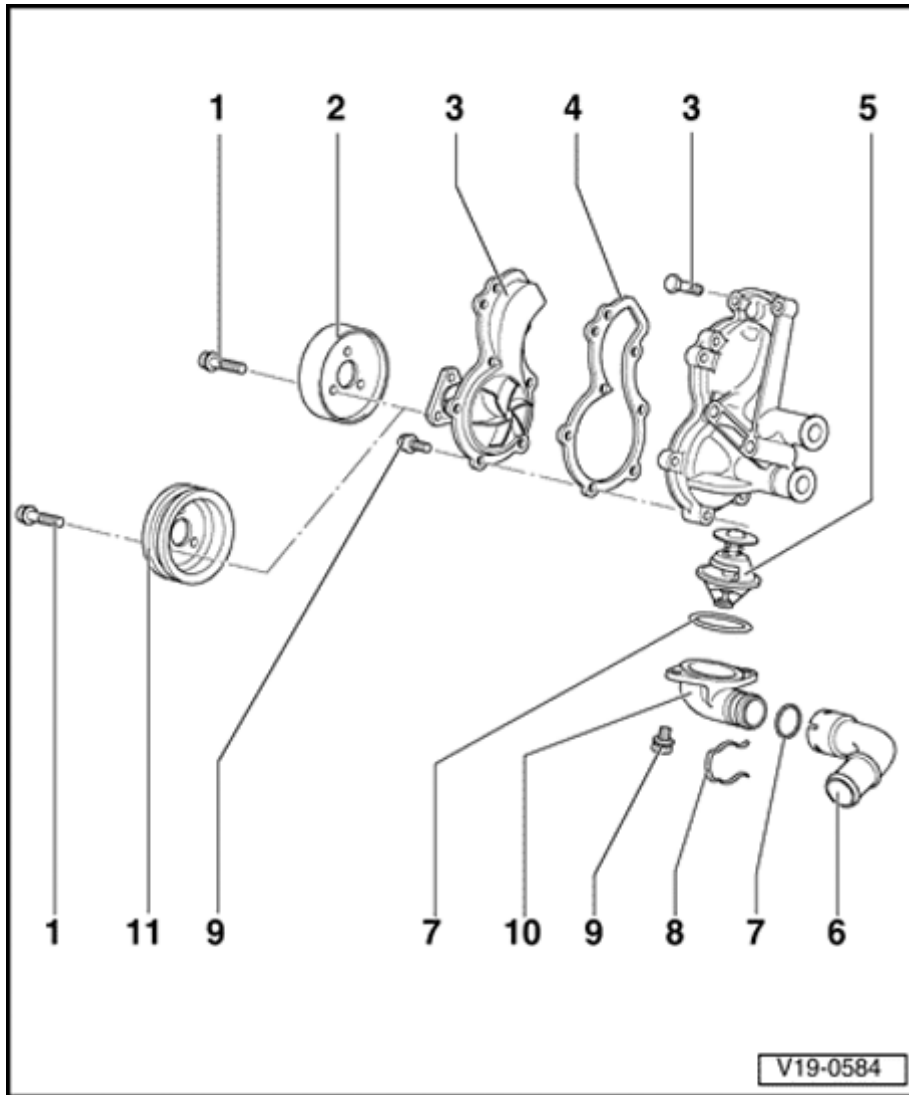
**5 - Coolant thermostat**

- ◆ Checking: heat thermostat in boiling water
- ◆ Opening starts approx. 85 ° C (185 ° F)
- ◆ Fully open approx. 105 ° C (221 ° F)
- ◆ Opening lift: 7 mm (0.27 in.) minimum

**6 - Elbow connection**

**7 - O-ring**

- ◆ Always replace



8 - Retaining clip

9 - 10 Nm (7 ft lb)

10 - Thermostat housing

11 - Pulley

◆ V-belt version



## Cooling system, draining and filling

- ◆ Anti-freeze and coolant additives marked "In accordance with TL VW774 B" prevent freezing, corrosion damage, scale formation and raises the coolant's boiling point.
- ◆ The high boiling point of the coolant mixture helps improve engine efficiency when operating at full load, particularly in tropical climates.
- ◆ The cooling system is filled for use year-round with a mixture of water and "G11" anti-freeze coolant additive.
- ◆ If the engine coolant radiator, heater core, cylinder head or cylinder head gasket are replaced, completely replace engine coolant. Do not re-use old coolant.
- ◆ Dispose of used coolant properly.

### **WARNING!**

***The cooling system is pressurized when the engine is warm. When opening the expansion tank, wear gloves and other appropriate***

*protection, cover the cap with a cloth and  
open carefully to relieve system pressure  
slowly.*



### **CAUTION!**

- ◆ ***A new "G12" coolant additive, recognized by its red color, has been introduced during m.y. 1997, replacing the "G11" used previously.***
  
- ◆ ***The "G11" and "G12" coolant additives are NOT interchangeable, and must NEVER be mixed. Use only water or "G12" coolant additive G 012 A8D A1 to top up cooling systems filled with "G12."***
  
- ◆ ***Contamination of "G12" with other coolants can be identified by discoloration (brown, purple, etc.), and foamy deposits in the radiator or expansion tank. If contaminated, the system must be drained and flushed immediately.***
  
- ◆ ***"G12" (Part No. G 012 A8D A1) may also be used in older vehicles, but only if the cooling system is drained and flushed as described below.***
  
- ◆ ***Part numbers listed are for reference only. Always check with the Parts department for***

*the latest information.*

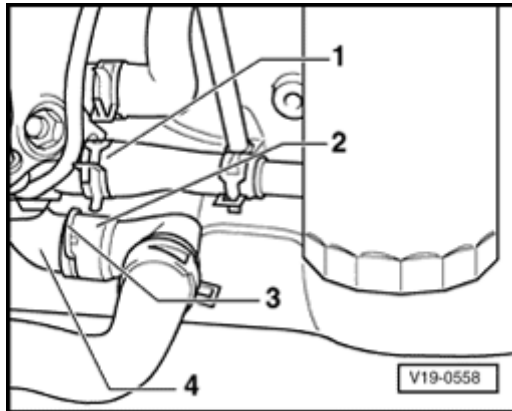
### Draining

- Remove cap from coolant expansion tank.

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- Remove retaining clip -3- and separate connection -2- from thermostat housing -4-.

- Remove coolant hose -1- or remove thermostat housing -4-.





### Flushing procedure

- Engine at normal operating temperature (heater valve open where applicable)
- Coolant drained
- Apply compressed air to expansion tank to help blow out remaining coolant.
- Close cooling system, fill with distilled water, then run engine for minimum of 2 minutes.
- Drain cooling system and apply compressed air to expansion tank to help blow out remaining water.
- Close cooling system and fill with appropriate mixture of "G12" coolant additive and distilled water ⇒ [Page 19-13](#) .
- Test drive vehicle and top off coolant level if necessary.

**CAUTION!**

- ◆ *Never reuse old coolant.*
- ◆ *Dispose of old coolant properly.*
- ◆ *Coolant G 012 A8D A1 may only be used in older vehicles after the original coolant is drained and the cooling system flushed as described above otherwise engine damage can result.*
- ◆ *Part numbers listed are for reference only. Always check with the Parts department for the latest information.*



## Filling

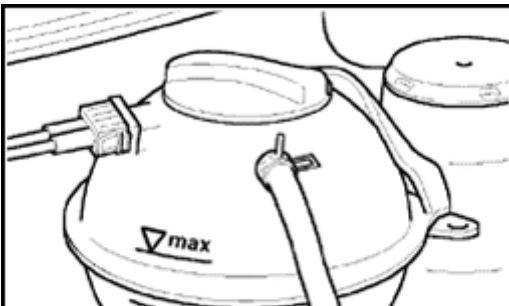
Recommended mixture ratios:

Protection down to	Coolant additive <sup>2)</sup>	Water <sup>2)</sup>
-25 ° C (-13 ° F)	2.6 liters(2.7 qt.)	3.9 liters(4.1 qt.)
-35 ° C (-36 ° F)	3.25 liters(3.4 qt.)	3.25 liters (3.4 qt.)

1) Percentage of anti-freeze must not exceed 60%: otherwise freeze protection and cooling efficiency will decrease.

2) Total coolant quantity may vary depending on vehicle equipment.

- Press down on top of radiator hose.



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- Slowly fill with coolant up to "max" mark on expansion tank (filling time approx. 5 minutes).
- Start engine and run at approx. 1500 RPM for 2 minutes max. while filling coolant up to over-flow hole on expansion tank.
- Re-install cap on expansion tank and run engine until radiator coolant fan has switched on.

- Check engine coolant level and top-off, if necessary.
  - When engine is at normal operating temperature, coolant level must be on "max" mark
  - When engine is cold, coolant level must be between "min" and "max" marks



## Radiator and coolant fan, removing and installing

### Special tools, testers and auxiliary items

VAG1921 pliers for spring type clips.

### Removing

#### **Note:**

*Vehicles with A/C, observe additional information and removal work ⇒ [Page 19-16](#) .*

- Drain coolant ⇒ [Page 19-10](#) .
- Remove radiator coolant hoses.
- Disconnect harness connectors from thermoswitch and radiator coolant fan.
- Remove radiator mounting bolts.
- Remove lock carrier with attachments.

⇒ *Repair Manual, Body Exterior, Interior Golf, GTI, Jetta, Repair Group 50*

- Lift out radiator, coolant fan and air guide housing.



## Installing

Installation is in the reverse order of removal procedure. When installing, note the following:

Filling with coolant ⇒ [Page 19-10](#)

Electrical connections and routing

⇒ [Repair Manual, Electrical Equipment, Repair Group 97](#)

- Check headlight alignment and adjust if necessary.

⇒ [Repair Manual, Maintenance](#)



### Additional removal information for vehicles with A/C

#### **CAUTION!**

- ◆ ***Disconnect A/C refrigerant line brackets and support points only.***
- ◆ ***DO NOT open the air conditioning refrigerant circuit.***
- ◆ ***Avoid damage from bending. Refrigerant lines kink easily.***
- Remove air cleaner assembly.
- Remove A/C fluid reservoir and allow to hang free.
- Remove retaining clamp(s) from refrigerant lines.
- Remove A/C condenser from radiator and pull forward as far as possible.

- Lift out radiator and fan assembly.
- Secure A/C condenser to body so that refrigerant lines/hoses are not stressed.