

19 - ENGINE - COOLING SYSTEM

COOLING SYSTEM COMPONENTS, REMOVING AND INSTALLING

Cooling system components, removing and installing

CAUTION: Cover cap of expansion tank with rag and open carefully, as hot steam i.e. hot coolant may escape when opening.

NOTE:

- When the engine is warm the cooling system is under pressure. If necessary release pressure before commencing repair work.
- Secure all hose connections using hose clamps appropriate for the model type .
- Always replace gaskets and seals.
- Arrows on coolant pipes and coolant hoses must line up across from each other.

Coolant hose connection diagram

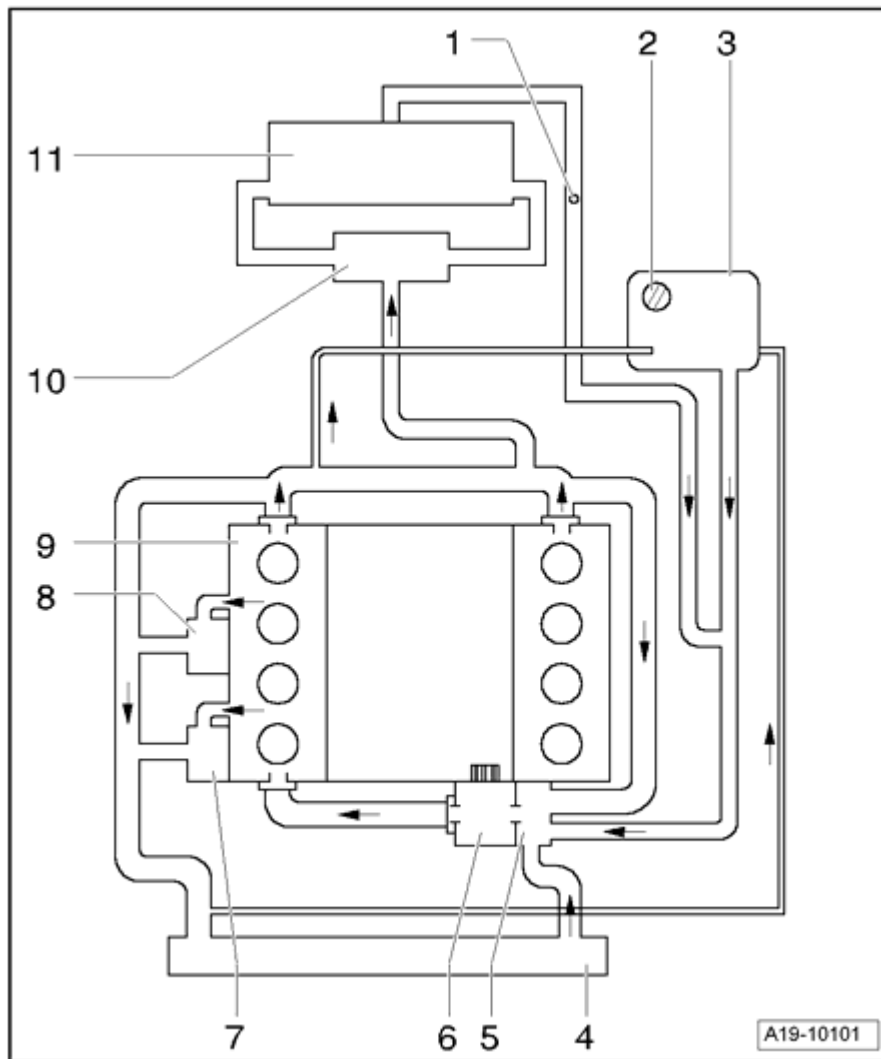


Fig. 438: Coolant Hose Connection Diagram

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bleeder screw

- Tighten by hand

2 - Cap

- Pressure relief valve in cap, checking **Pressure relief valve in cap, checking**

3 - Expansion tank

4 - Radiator

- Removing and installing --> **Radiator, removing and installing**

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- Replace coolant after replacing

5 - Coolant thermostat

- Removing and installing --> **Coolant thermostat, removing and installing**
- Checking --> **Thermostat, checking**

6 - Coolant pump

- Removing and installing --> **Coolant pump, removing and installing**

7 - Generator

8 - Oil cooler

- Removing and installing --> **Oil cooler, removing and installing**

9 - Cylinder head/cylinder block

- Replace coolant after replacing

10 - Pump valve unit

- Checking, removing and installing --> **87 - AIR CONDITIONING**

11 - Heater unit heat exchanger

- Replace coolant after replacing

Cooling system, draining and filling

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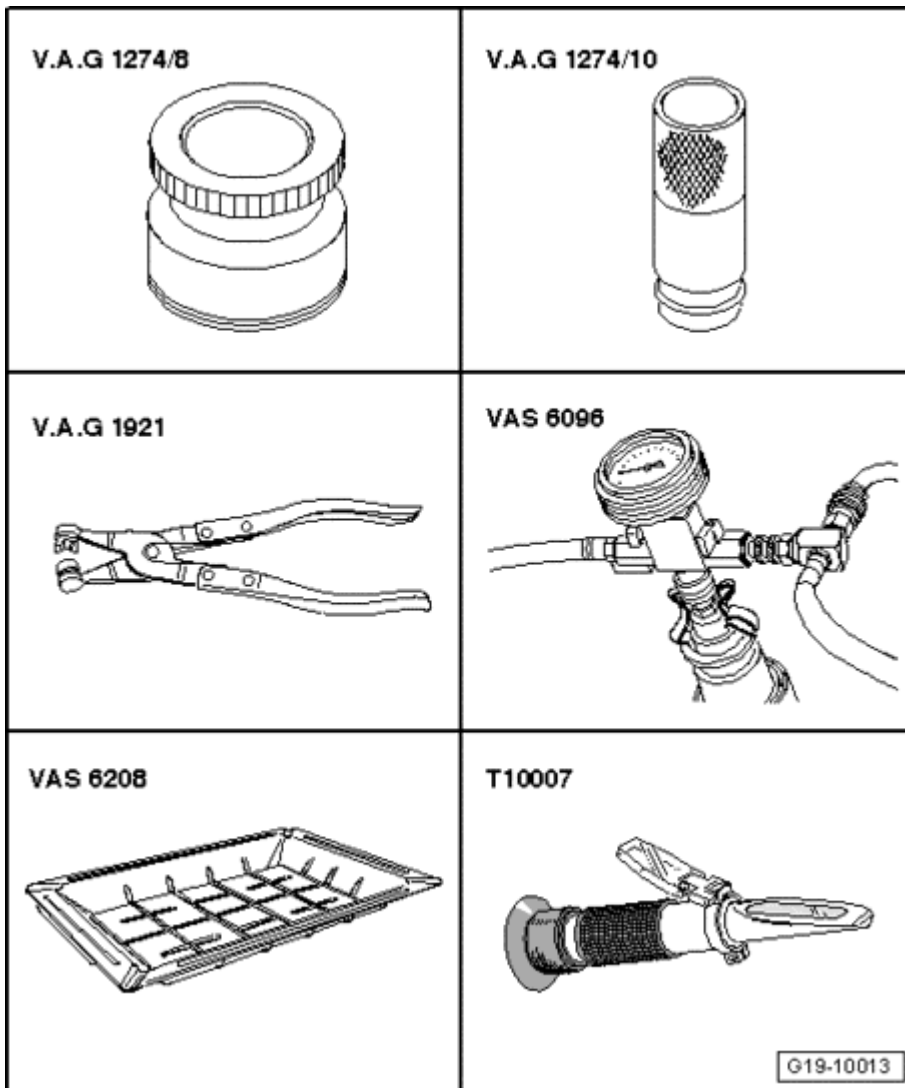


Fig. 439: Identifying Special Tools - Cooling System, Draining And Filling
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Adapter V.A.G 1274/8
- Adapter V.A.G 1274 tester V.A.G 1274/10
- Hose clamp pliers V.A.G 1921
- Cooling system charge unit VAS 6096
- Drip tray for workshop crane VAS 6208
- Refractometer T10007

Draining

NOTE:

- Drained coolant must be stored in a clean container for disposal or reuse.

CAUTION: Cover cap of expansion tank with rag and open carefully, as hot steam i.e. hot coolant may escape when opening.

- Open cap of coolant expansion tank.

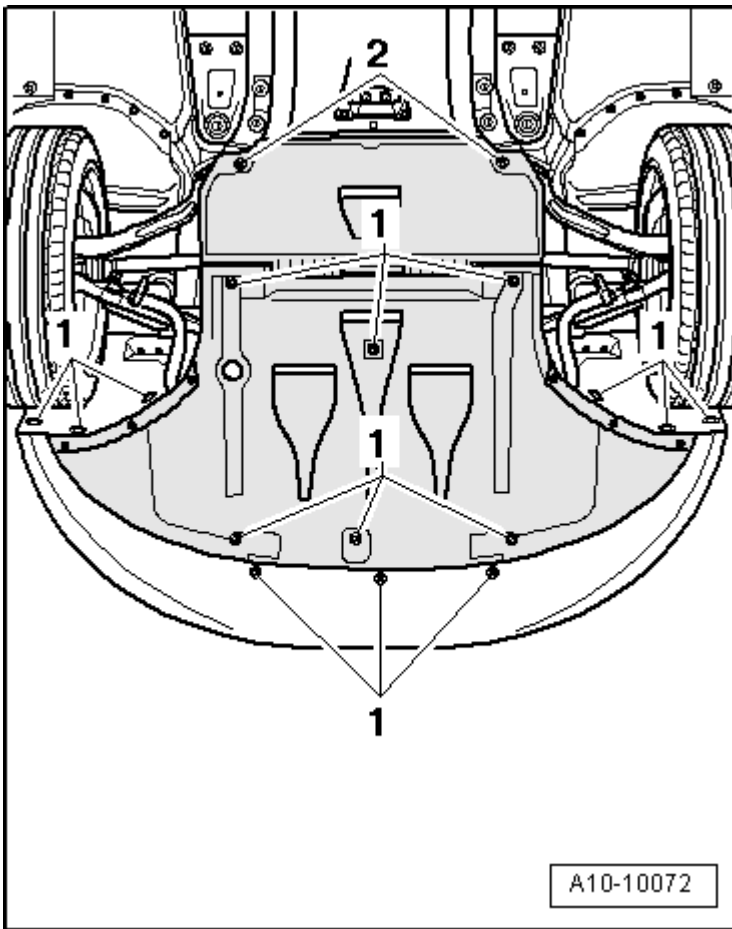


Fig. 440: Identifying Quick-Release Fasteners & Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen quick-release fasteners - 1 - and - 2 - and remove front noise insulation.

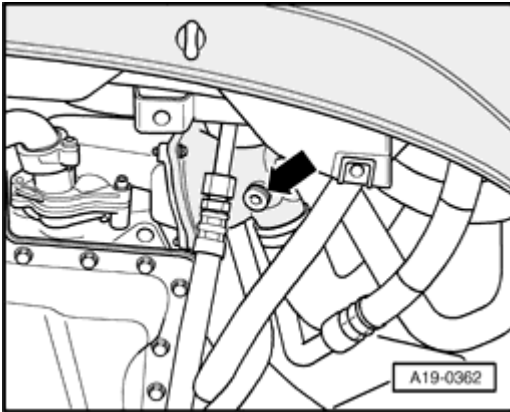


Fig. 441: Removing/Installing Drain Plug On Coolant Thermostat Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place drip tray VAS 6208 under engine.
- Remove drain plug - **arrow** - on coolant thermostat housing and drain coolant from engine.

Filling

- Ignition switched off.

NOTE:

- The cooling system is filled all year round with a mixture of frost and corrosion protection additives and water.
- Use only *coolant additive Plus G 012 A8F A1* (short: G12+) "according to TL VW 774 F". Other coolant additives may above all reduce the corrosion protection effect significantly. The damage resulting from this may lead to loss of coolant and consequently to severe engine damage.
- Coolant additive G12+ can be combined with additives G11 and G12.
- G12+ and coolant additives with the designation "according to TL VW 774 F" reduce frost and corrosion damage as well as lime deposits. They also raise the boiling point. For this reason the system must be filled all year round with frost and corrosion protection additives.
- Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- Protection against frost must be assured to about -25° C (in arctic climatic countries to about -35° C).
- The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. The coolant additive portion must be at least 40%.
- If for climatic reasons greater frost protection is required, the amount of G12+ can be increased, but only up to 60% (frost protection to about -40° C), otherwise frost protection and cooling effectiveness will be reduced.
- Only clean drinking water may be used for mixing coolant.

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- If the radiator, heater core, cylinder head and cylinder head gasket or cylinder block is replaced, completely replace the engine coolant.
- Dirty coolant must not be re-used.
- For coolant G12+ , use refractometer T10007 to test frost protection in cooling system.

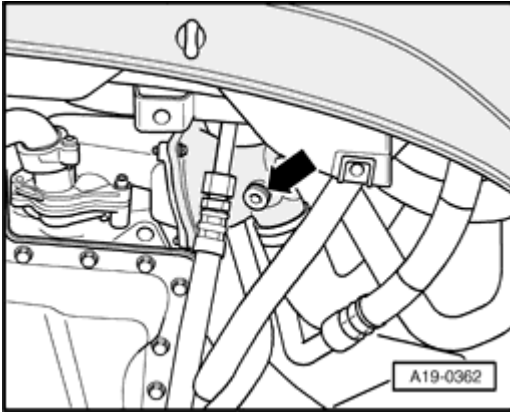


Fig. 442: Removing/Installing Drain Plug On Coolant Thermostat Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Re-install drain plug - **arrow** - with new sealing ring.

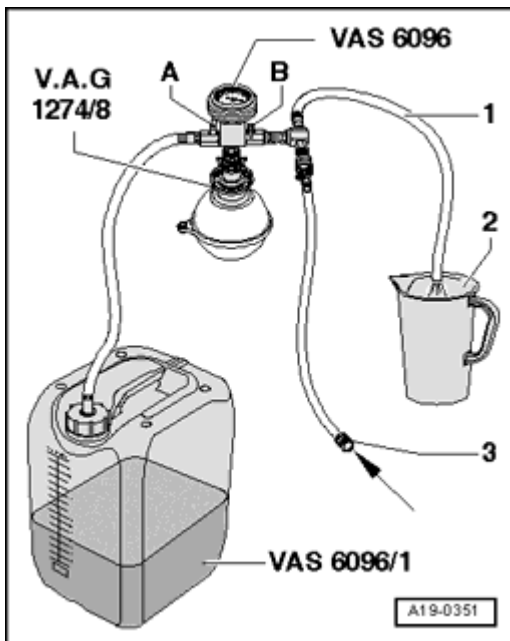


Fig. 443: Filling Reservoir VAS 6096/1 With At Least 12 Liters Of Premixed Coolant
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fill replacement reservoir VAS 6096/1 with at least 12 liters of pre-mixed coolant with correct mixture ratio:

- G12+ (40%) and water (60%) for frost protection up to -25° C
- G12+ (50%) and water (50%) for frost protection up to -35° C
- G12+ (60%) and water (40%) for frost protection up to -40° C
- Install adapter V.A.G 1274/8 onto expansion tank.
- Assemble Cooling System Charge Unit VAS 6096 on adapter V.A.G 1274/8.
- Place air outlet hose - **1** - into a small container - **2** -. (A small amount of coolant is drawn off which should be reserved with discharged air.)
- Close both valves - **A** - and - **B** - by turning lever perpendicular to direction of flow.
- Connect hose - **3** - to pressurized air.
- Pressure: 6 to 10 bar positive pressure.

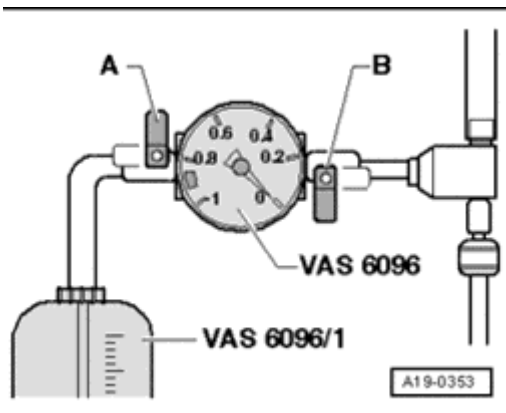


Fig. 444: Cooling System, Draining And Filling
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open valve - **B** -, turn lever in direction of flow to do this.
- A vacuum is created in the cooling system by the suction jet pump.
- Needle on instrument display must travel into green region.
- Also briefly open valve - **A** -, turn lever in direction of flow to do this, so that hose of replacement reservoir VAS 6096/1 is filled with coolant.
- Close valve - **A** - again.
- Let valve - **B** - remain open another 2 minutes.
- A further vacuum is created in the cooling system by the suction jet pump.
- Needle on the instrument display must still remain in the green region.
- Close valve - **B** -.

system is obtained for the upcoming filling.

- If needle stands below the green region, repeat procedure.
- If vacuum decreases, cooling system is leaking.
 - Disconnect pressurized air hose.
 - Open valve - A -.
- The vacuum in the cooling system has the effect of extracting coolant from coolant reservoir VAS 6096/1 ; cooling system is filled.

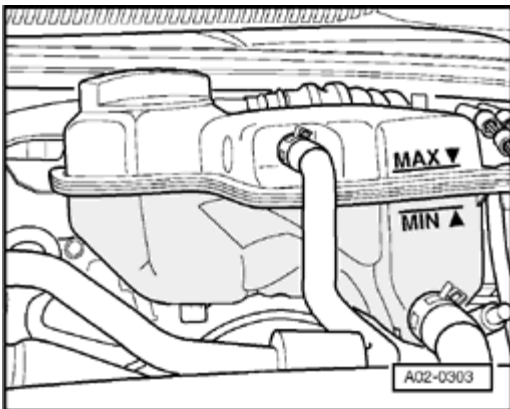


Fig. 445: Checking Coolant Level

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check coolant level and add coolant up to MAX-marking.

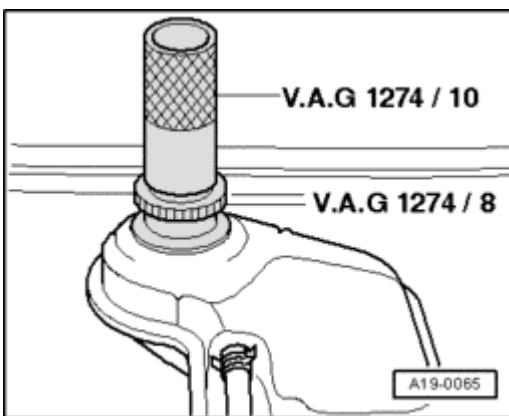


Fig. 446: Connecting Adapter For Cooling System Tester V.A.G 1274/10 To Adapter V.A.G 1274/8

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install adapter V.A.G 1274/8 onto expansion tank.
- Connect pipe V.A.G 1274/10 to adapter.

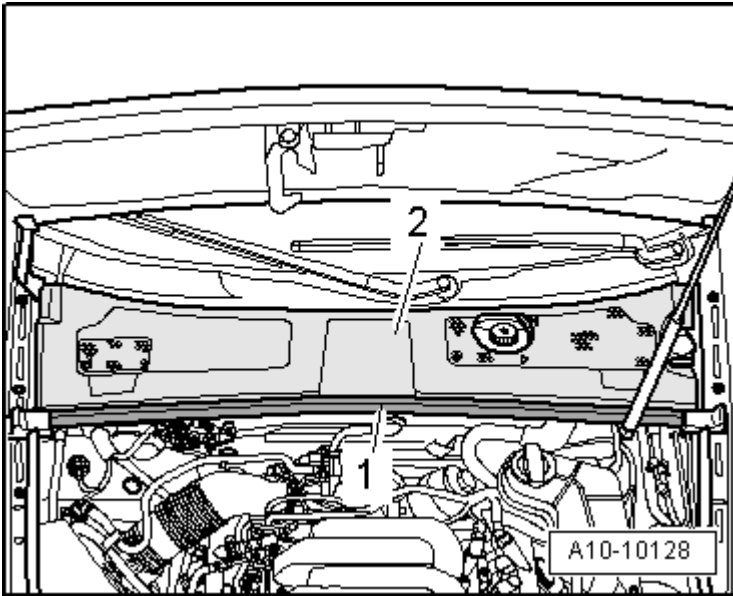


Fig. 447: Removing Rubber Seal For Plenum Chamber Cover & Plenum Chamber Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rubber seal for plenum chamber cover - 1 -.
- Remove plenum chamber cover - 2 - toward front.

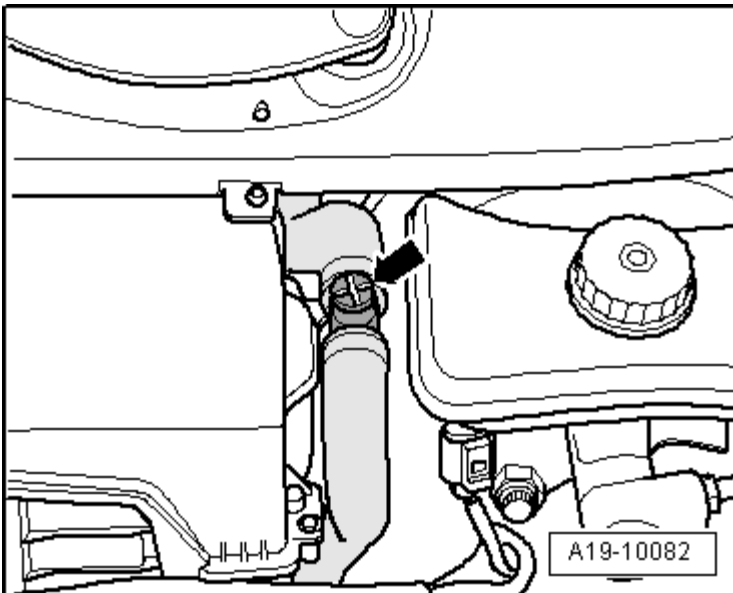


Fig. 448: Opening Bleeder Screw
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open bleeder screw - **arrow** - in coolant hose.
- Fill up coolant until it escapes from coolant hose bleeder screw without bubbles.
- Close coolant hose bleeder screw.

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- If present, switch on auxiliary heater for about 30 seconds.
- Twist expansion tank cap closed.
- Start engine.
- Set heating air conditioning system to "HI" on both sides.
- Let engine run at 2000 RPM for 3 minutes.
- Heating effect must be noticeable at the latest as soon as the needle on the coolant temperature gauge moves.
- Shut off engine.

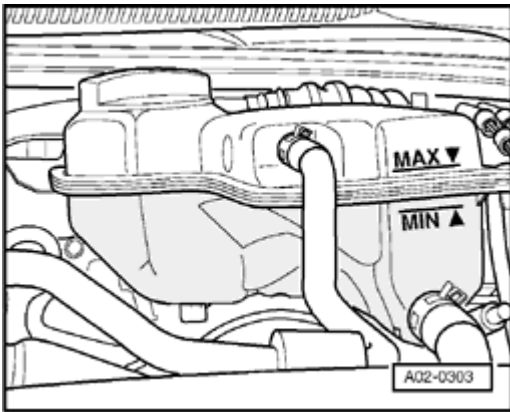


Fig. 449: Checking Coolant Level

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check coolant level.
- Coolant level may be above MAX marking with engine at operating temperature.

Coolant pump and coolant regulator, component overview

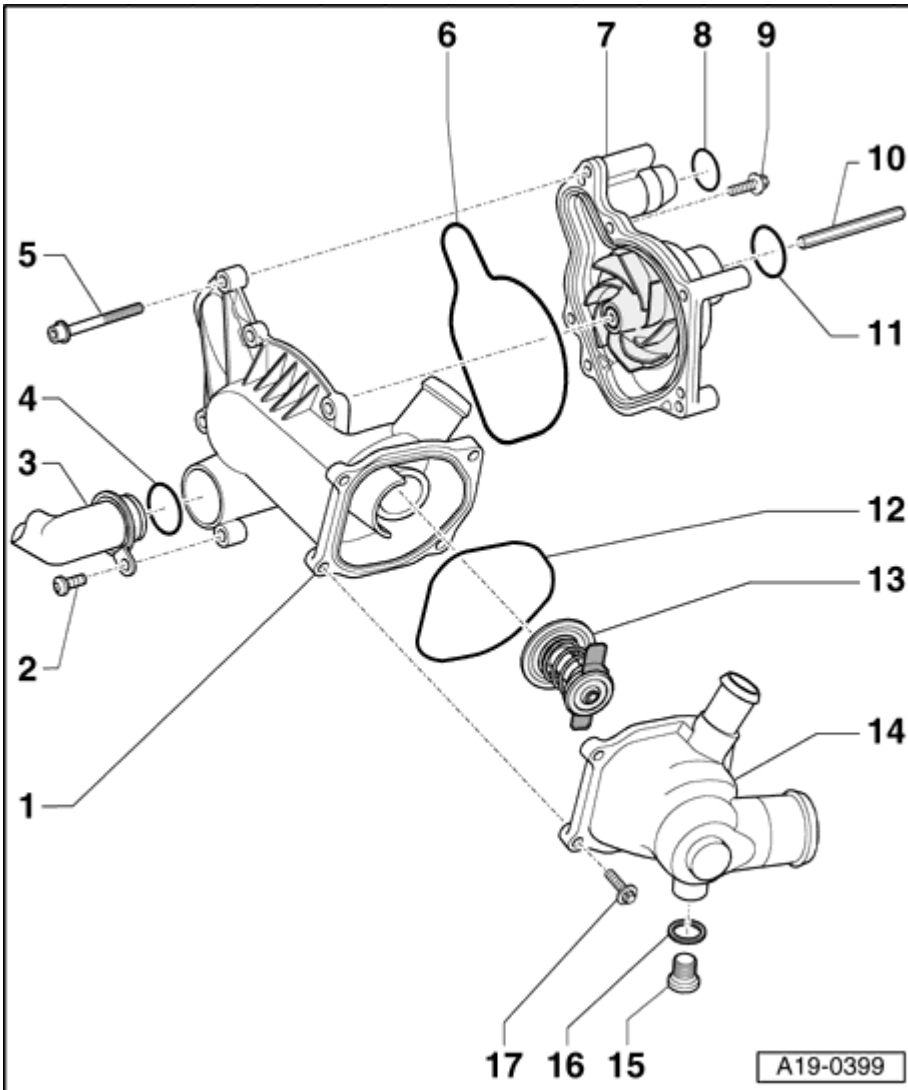


Fig. 450: Coolant Pump And Coolant Regulator, Component Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Housing

- For coolant pump
- Removing and installing --> **Coolant pump, removing and installing**

2 - 10 Nm

3 - Front coolant line

- Removing and installing --> **Front coolant line, removing and installing**

4 - O-ring

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- Replace

5 - 10 Nm

6 - Seal

- Replace

7 - Coolant pump

- Removing and installing --> **Coolant pump, removing and installing**

8 - O-ring

- Replace

9 - 10 Nm

10 - Input shaft

- For oil pump

11 - O-ring

- Replace

12 - Seal

- Replace

13 - Coolant thermostat

- Removing and installing --> **Coolant thermostat, removing and installing**
- Installed location **Coolant thermostat installation location**
- Checking --> **Thermostat, checking**

14 - Housing

- For thermostat
- Removing and installing --> **Coolant thermostat, removing and installing**

15 - Drain plug - 25 Nm

16 - Seal

- Replace

17 - 10 Nm

Coolant thermostat installation location

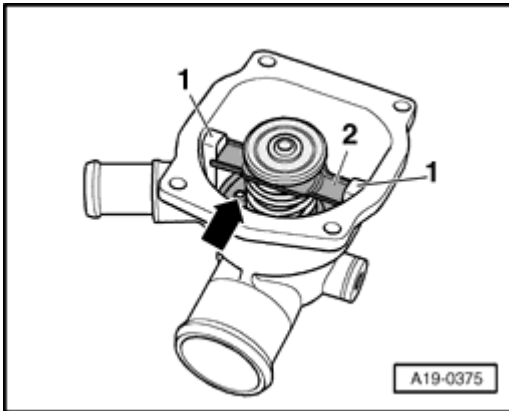


Fig. 451: Installed Location Of Bleeder Valve

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bleeder valve - **arrow** - toward top.

NOTE:

- Ignore - 1 - and - 2 -.

Coolant pump, removing and installing

Removing

- Bring lock carrier into service position --> **50 - BODY - FRONT** .
- Remove front coolant pipe --> **Front coolant line, removing and installing.**

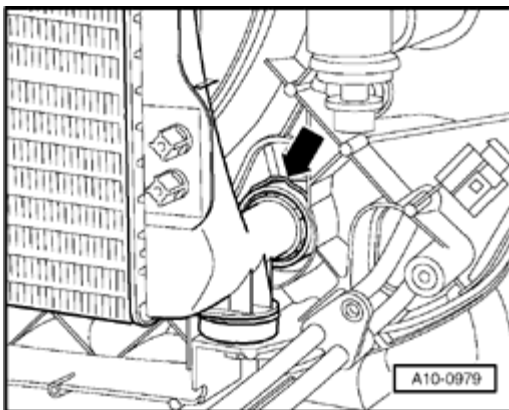


Fig. 452: Disconnecting Lower Coolant Hose From Radiator

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect lower coolant hose from radiator - **arrow** - and drain residual coolant.

NOTE:

- **After disconnecting the coolant hose, lock carrier can be pulled farther forward.**

- Disconnect coolant hoses at coolant regulator housing.

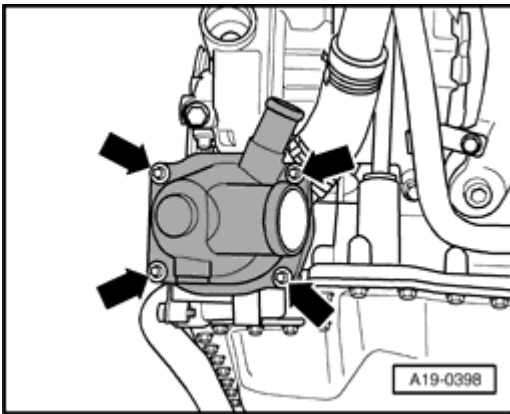


Fig. 453: Removing Bolts & Coolant Regulator Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Remove coolant regulator housing.

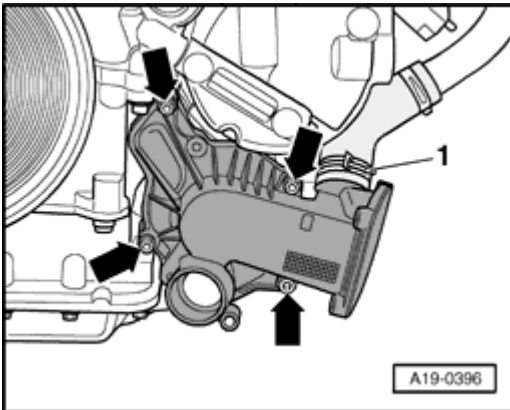


Fig. 454: Identifying Coolant Hose & Coolant Pump Housing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect coolant hose - **1** -.
- Remove bolts - **arrows** -.
- Remove coolant pump housing toward front, pay attention to drive shaft for coolant pump while doing this.

- Illustration is shown with lock carrier removed.

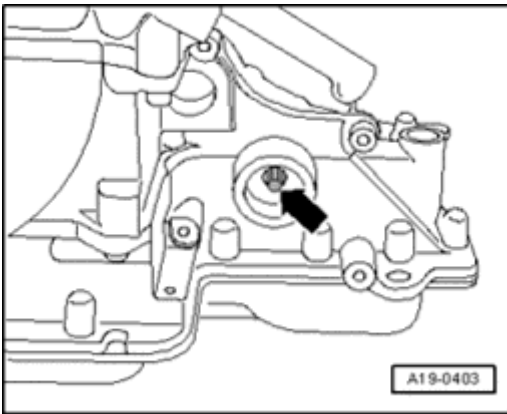


Fig. 455: Removing/Installing Drive Shaft For Coolant Pump From Oil Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drive shaft - **arrow** - for coolant pump from guide on oil pump.

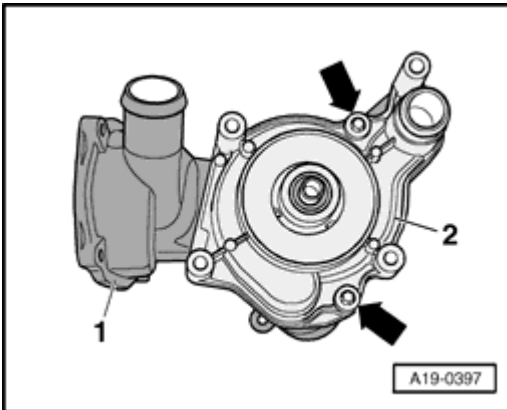


Fig. 456: Removing Bolts & Coolant Pump From Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Remove coolant pump - **2** - from housing - **1** -.

Installing

NOTE:

- Replace seals and O-rings.
- Secure all hose connections using hose clamps appropriate for the model type .

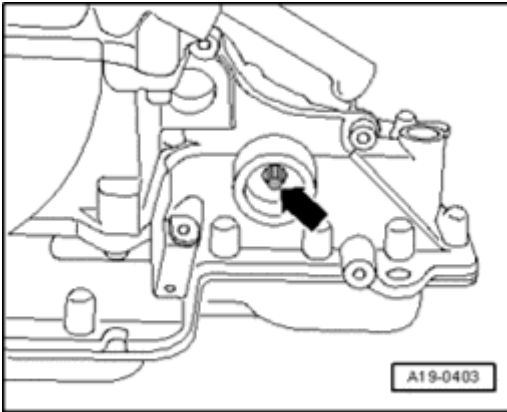


Fig. 457: Removing/Installing Drive Shaft For Coolant Pump From Oil Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert drive shaft - **arrow** - for coolant pump into oil pump mount on engine.
- Slide coolant pump into mounts on upper section of oil pan.

NOTE:

- To connect drive flange onto hex head of drive shaft, reach with the finger into the lower pipe connection of coolant pump and twist at impeller until coolant pump can be inserted completely.

Further installation is in reverse order of removal, note the following:

- Install coolant regulator --> **Coolant thermostat, removing and installing.**
- Install front coolant pipe --> **Front coolant line, removing and installing.**
- Install lock carrier with attachments --> **50 - BODY - FRONT** .

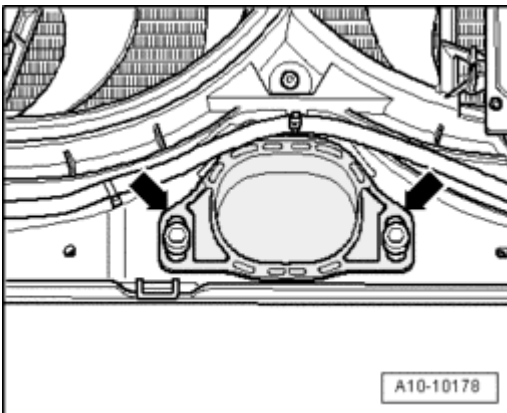


Fig. 458: Placing Torque Support On Rubber Buffer For Torque Support And Tightening Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place torque support on rubber buffer for torque support and tighten bolts - **arrows** -.
- Install front bumper --> **63 - BUMPERS** .

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- Adjust headlights --> **01 - MAINTENANCE** .

Torque specifications

Component	Nm
Coolant pump to housing	10
Coolant pump housing to upper section of oil pan	10
Torque support stop to lock carrier	40

Coolant thermostat, removing and installing

Special tools, testers and auxiliary items required

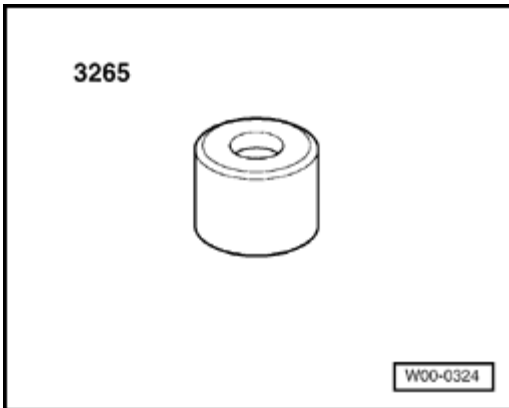


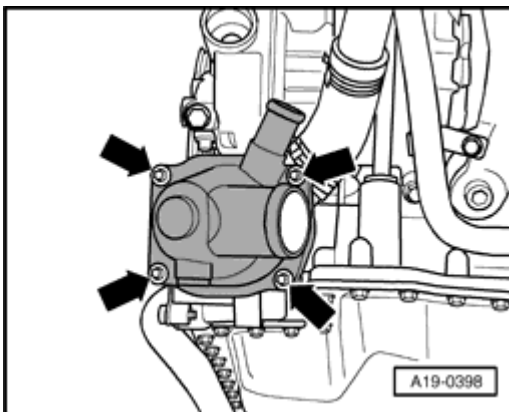
Fig. 459: Seal Installer 3265

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Seal installer 3265

Removing

- Drain coolant --> **Cooling system, draining and filling.**



Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect coolant hoses at coolant regulator housing.
- Remove bolts - **arrows** -.
- Remove coolant regulator housing.

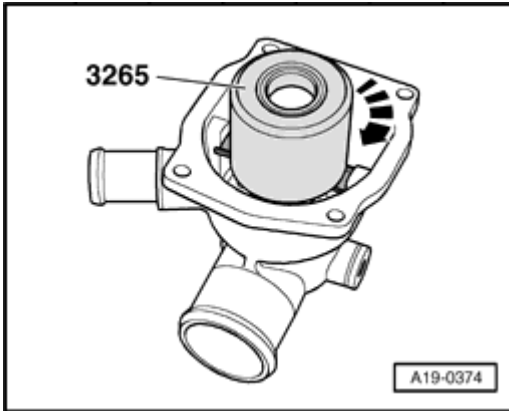


Fig. 461: Pressing Down Retaining Bracket Using Seal Installer 3265

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push down retaining bracket using seal installer 3265 and twist retaining bracket clockwise.

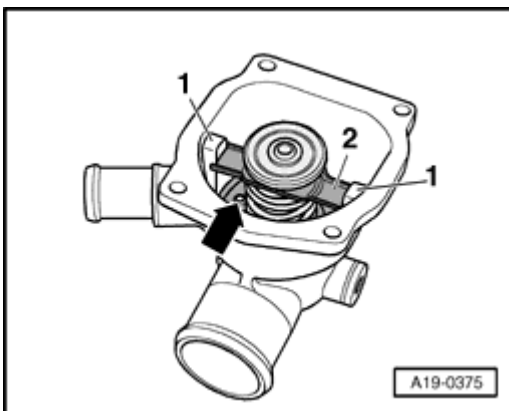
Installing

Installation is in reverse order of removal, note the following:

NOTE:

- **Replace seals.**
- **Secure all hose connections using hose clamps appropriate for the model type .**

- Clean and smooth sealing surface.
- Note location of coolant thermostat.



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Fig. 462: Installed Location Of Bleeder Valve

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Installed location: Bleeder valve - **arrow** - toward top.
- Push down and twist retaining bracket - **2** - using seal installer 3265.
- Retaining bracket must be engaged beneath pin - **1** - of the connection.
- Fill with coolant --> **Cooling system, draining and filling** .

Torque specifications

Component	Nm
Coolant regulator housing to coolant pump housing	10

Thermostat, checking

- Heat up removed thermostat in water.

Opening begins	Opening ends	Opening lift
approx. 87° C	approx. 102° C ¹⁾	min. 8 mm
• ¹⁾ Cannot be tested.		

Coolant pipes, component overview

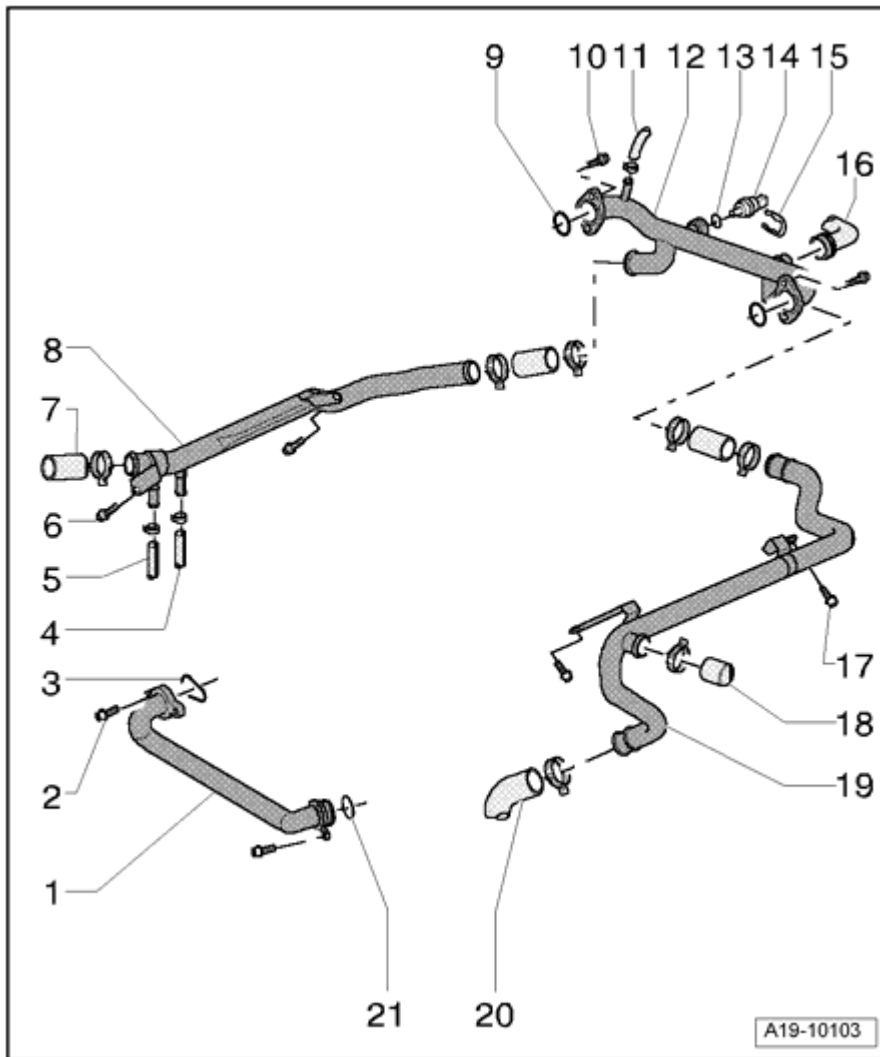


Fig. 463: Coolant Pipes, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Front coolant line

- Removing and installing --> **Front coolant line, removing and installing**

2 - 10 Nm

3 - Seal

- Replace

4 - Coolant hose

- To oil cooler

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5 - Coolant hose

- To generator

6 - 10 Nm

7 - Coolant hose

- To upper radiator

8 - Right coolant line

9 - O-ring

- Replace

10 - 10 Nm

11 - Coolant hose

- To expansion tank

12 - Rear coolant pipe

- Removing and installing --> **Rear coolant line, removing and installing**

13 - O-ring

- Replace

14 - Engine Coolant Temperature (ECT) Sensor G62

15 - Retaining clip

16 - Coolant hose

- To heat exchanger for heater unit

17 - 10 Nm

18 - Plug

19 - Left coolant line

- Removing and installing --> **Left coolant pipe, removing and installing**

- To coolant regulator housing

21 - O-ring

- Replace

Front coolant line, removing and installing

Special tools, testers and auxiliary items required

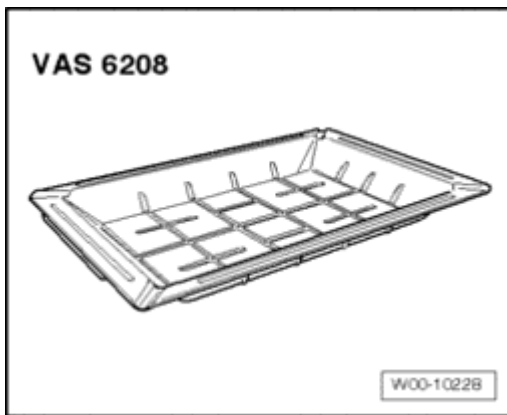


Fig. 464: Drip Tray For Workshop Crane VAS 6208
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray for workshop crane VAS 6208

Removing

- Drain coolant --> **Cooling system, draining and filling.**
- Bring lock carrier into service position --> **50 - BODY - FRONT** .

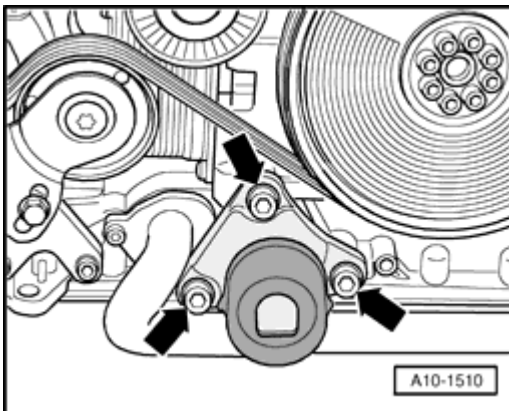


Fig. 465: Removing Bolts And Torque Support From Engine
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - and remove torque support from engine.

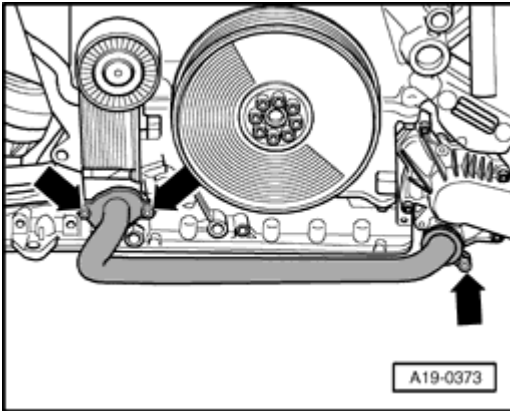


Fig. 466: Removing Front Coolant Pipe On Engine
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place drip tray VAS 6208 under engine.
- Remove front coolant pipe on engine - **arrows** -.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- Replace seals and O-rings.
- Secure all hose connections using hose clamps appropriate for the model type .

- Install lock carrier with attachments --> **50 - BODY - FRONT** .

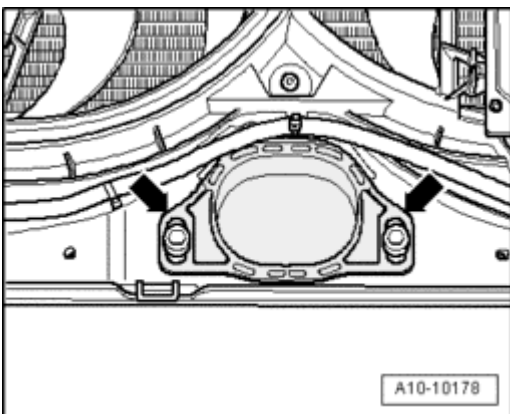


Fig. 467: Placing Torque Support On Rubber Buffer For Torque Support And Tightening Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place torque support on rubber buffer for torque support and tighten bolts - **arrows** -.

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- Install front bumper --> **63 - BUMPERS** .
- Fill with coolant --> **Cooling system, draining and filling** .
- Adjust headlights --> **01 - MAINTENANCE** .

Torque specifications

Component		Nm
Coolant line	Coolant pump	10
front to	Oil pan (upper section)	10
Torque bracket to upper part of oil pan		40
Torque support stop to lock carrier		40

Rear coolant line, removing and installing

Special tools, testers and auxiliary items required

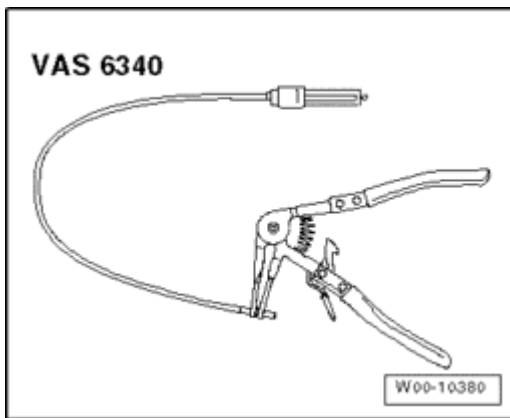


Fig. 468: Hose Clamp Pliers VAS 6340

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose clamp pliers VAS 6340

Removing

NOTE:

- All cable ties which are opened or cut open when removing, must be replaced in the same position when installing.
- Drain coolant --> **Cooling system, draining and filling**.
- Remove right coolant pipe.

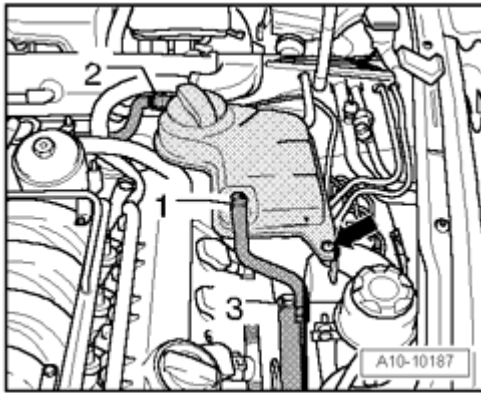


Fig. 469: Removing Coolant Hoses & Coolant Expansion Tank
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove coolant hoses - **1** - through - **3** -.
- Remove coolant expansion tank - **arrow** -.
- Disconnect electrical wiring to Engine Coolant Level (ECL) Warning Switch F66 at bottom of expansion tank.

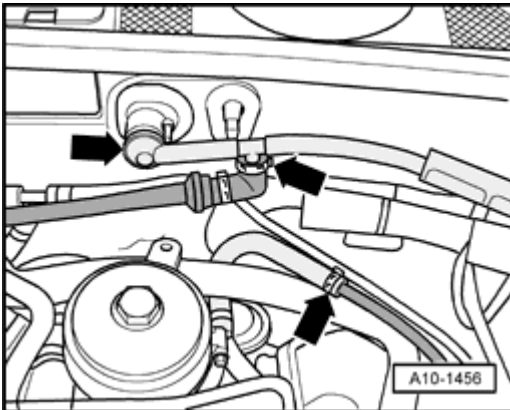


Fig. 470: Disconnecting Vacuum Hoses
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect vacuum hoses at positions indicated by - **arrows** -.

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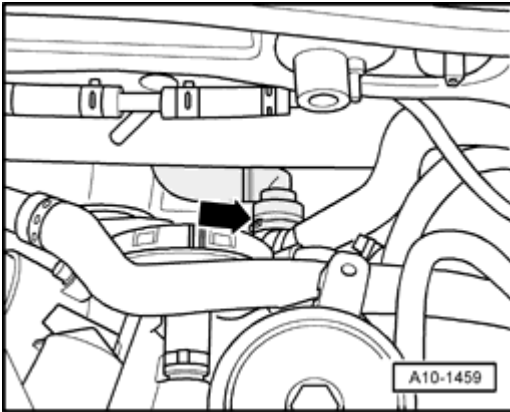


Fig. 471: Disconnecting Coolant Hose To Heater Core At Rear Coolant Pipe On Engine
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect coolant hose to heater core at rear coolant pipe on engine - **arrow** -.

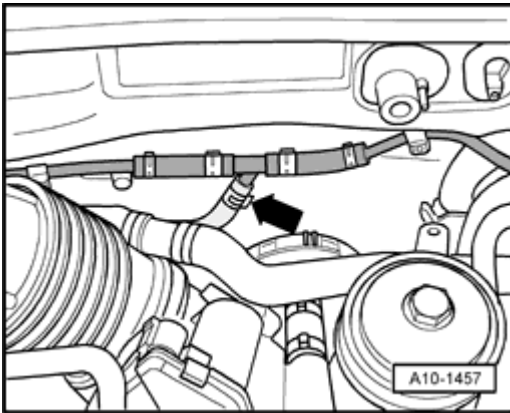


Fig. 472: Disconnecting Coolant Hose From Y-Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect coolant hose from Y-connector - **arrow** -.

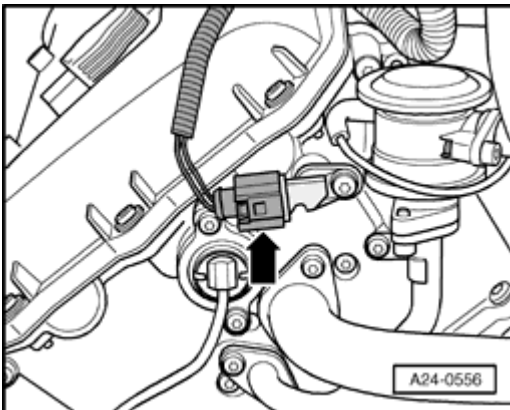


Fig. 473: Disconnecting Electrical Harness Connector For Camshaft Position (CMP) Sensor 2 G163 On Left Cylinder Head

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - **arrow** - for Camshaft Position (CMP) Sensor 2 G163 on left cylinder head.

NOTE:

- The following illustration depicts the engine removed from behind.

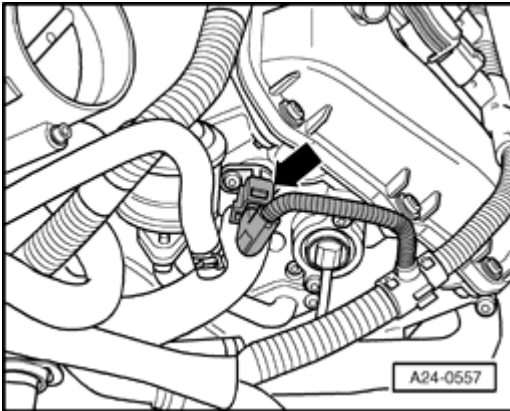


Fig. 474: Disconnecting Electrical Harness Connector For Camshaft Position (CMP) Sensor G40 On Right Cylinder Head

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - **arrow** - for Camshaft Position (CMP) Sensor G40 on right cylinder head.

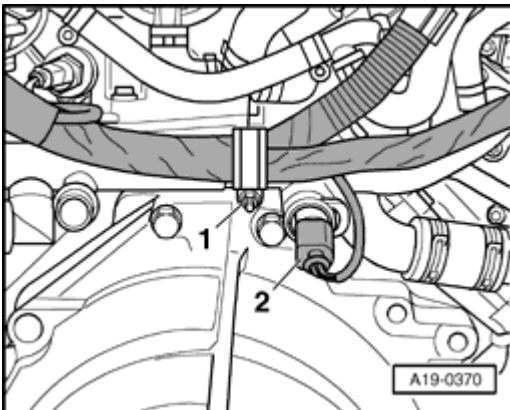


Fig. 475: Disconnecting Electrical Connector On Engine Coolant Temperature (ECT) Sensor G62 & Removing Nut And Electrical Wiring Harness At Rear Coolant Pipe

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - **2** - on Engine Coolant Temperature (ECT) Sensor G62.
- Remove nut - **1** - and remove electrical wiring harness at rear coolant pipe.

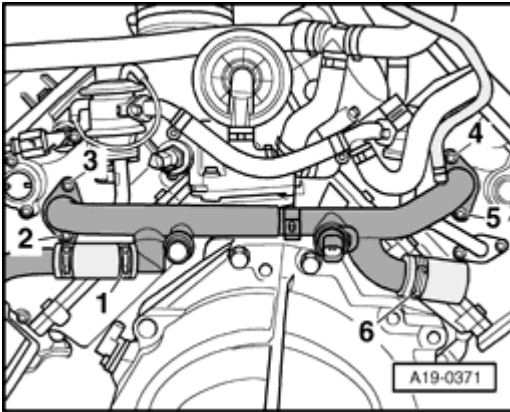


Fig. 476: Removing Bolts & Rear Coolant Pipe

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen hose clamps - **1** - and - **6** - with Hose Clip Pliers VAS 6340.
- Disconnect coolant hoses at coolant pipe.
- Remove bolts - **2 to 5** -.
- Remove rear coolant pipe.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- **Replace O-rings.**
- **During installation, all cable ties must be re-installed at the same location.**
- **Secure all hose connections using hose clamps appropriate for the model type .**

- Clean and/or smooth O-rings sealing surface before installing.
- Coat new O-rings with non-corrosive lubricant (Vaseline), install rear coolant pipe and tighten.
- Install right coolant pipe.
- Fill with coolant --> **Cooling system, draining and filling** .

Torque specifications

Component	Nm
Rear coolant pipe to cylinder head	10
Retaining clamps to rear coolant pipe	10

Left coolant pipe, removing and installing

Special tools, testers and auxiliary items required

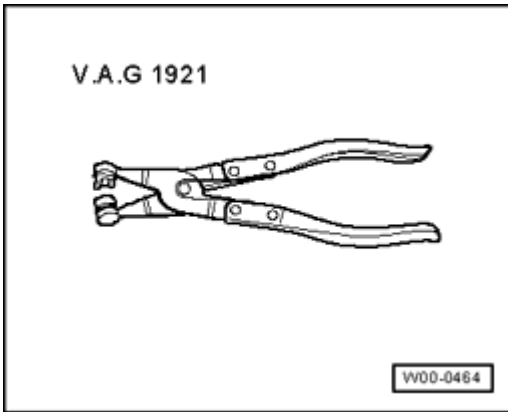


Fig. 477: Hose Clamp Pliers V.A.G 1921

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose clamp pliers V.A.G 1921

Removing

- Remove engine --> **Engine, removing and installing.**

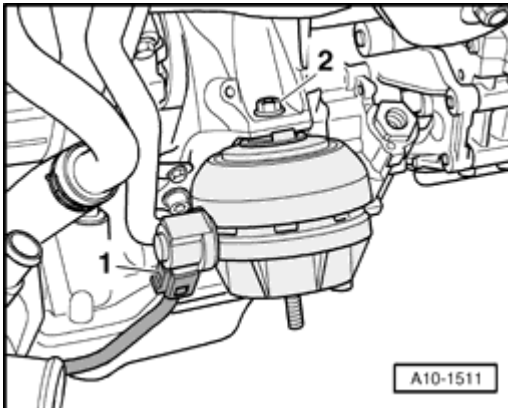


Fig. 478: Disconnecting Electrical Connector, Removing Nut And Engine Mount

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector - **1** - at left engine mount.
- Remove nut - **2** - and remove engine mount.

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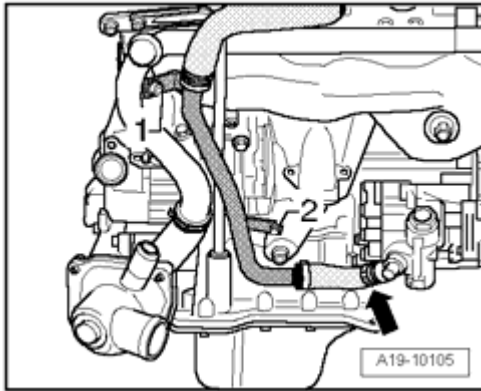


Fig. 479: Removing Bolts & Return Pipe From Power-Steering Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - 1 - and - 2 -.

NOTE:

- To prevent oil from escaping, the hose - arrow - remains connected to power steering.

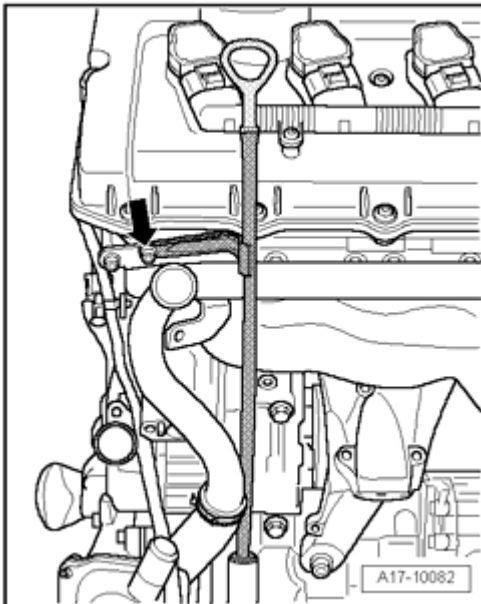


Fig. 480: Removing Guide Pipe For Oil Dipstick At Cylinder Head
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove guide pipe for oil dipstick at cylinder head - **arrow** - , pull up and remove.

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

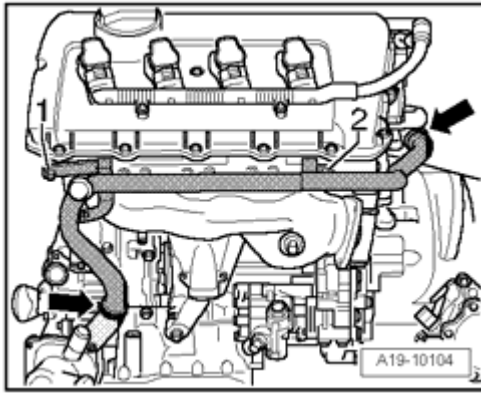


Fig. 481: Removing Bolts & Loosening Hose Clamps And Removing Left Coolant Pipe From Coolant Hoses

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** -.
- Loosen hose clamps - **arrows** - and remove right coolant pipe from coolant hoses.

Installing

Installation is in reverse order of removal, note the following:

NOTE:

- **Replace O-ring.**
- **Secure all hose connections using hose clamps appropriate for the model type .**

- Replace O-ring at guide tube for oil dipstick and insert guide tube into hole in oil pan (upper part).
- Install engine --> **Engine, installing.**

Torque specifications

Component		Nm
Left coolant pipe to cylinder head		10
Oil dip stick guide tube to cylinder head		10
Return line of	Bracket	10
power-steering to	Engine support	10

Radiator and coolant fan, component overview

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

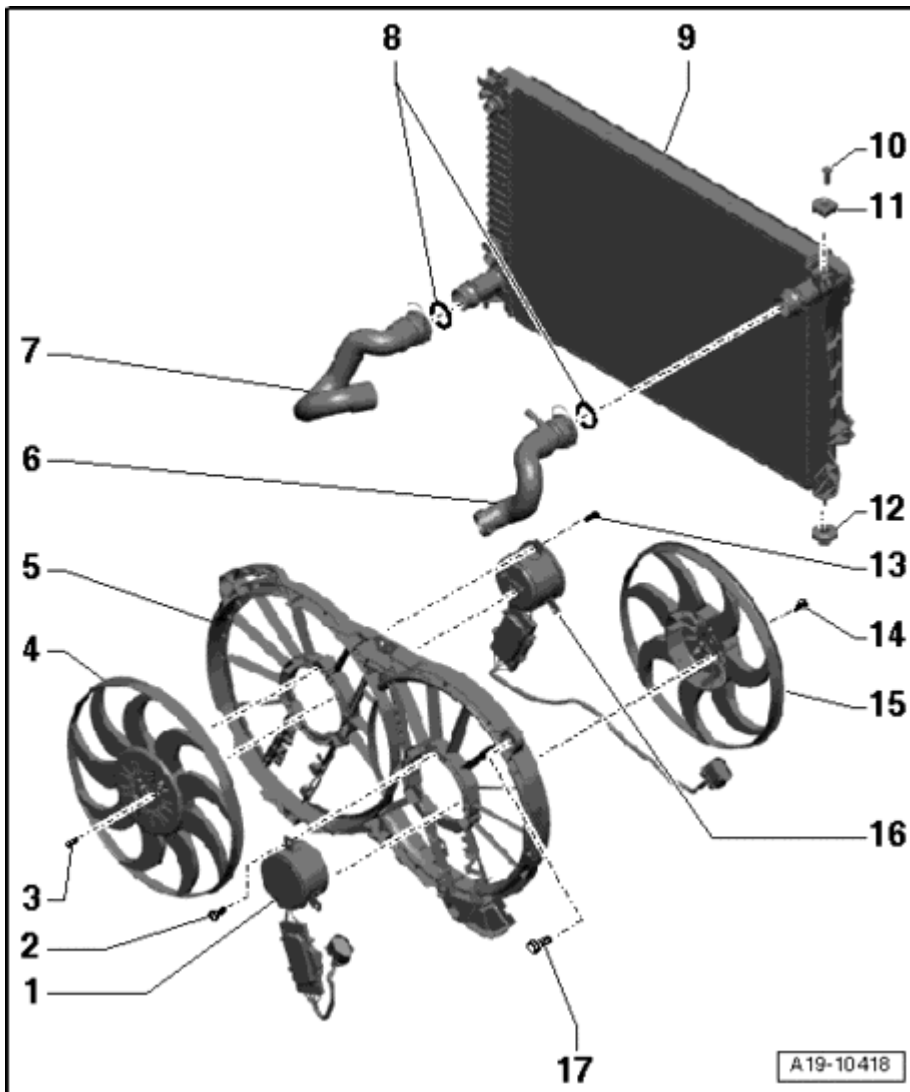


Fig. 482: Radiator And Coolant Fan, Component Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Coolant Fan V7

- With Coolant Fan Control (FC) Control Module J293
- Removing and installing --> **Coolant fan, removing and installing**

2 - 5 Nm

3 - 3.5 Nm

4 - Fan wheel

- Not delivered separately

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5 - Fan rib

- Removing and installing --> **Fan shroud, removing and installing**

6 - Coolant hose

- To pull off, disengage retaining clip

7 - Coolant hose

- To pull off, disengage retaining clip

8 - O-rings

- Replace

9 - Radiator

- Removing and installing --> **Radiator, removing and installing**
- After replacing, replace entire amount of coolant

10 - Retaining pin

11 - Rubber buffer

- Disengage and remove using screwdriver

12 - Rubber bushing

13 - 4.5 Nm

14 - 3.5 Nm

15 - Fan wheel

- Not delivered separately

16 - Coolant Fan 2 V177

- With Coolant Fan Control (FC) Control Module 2 J671
- Removing and installing --> **Coolant fan, removing and installing**

17 - 2 Nm

Radiator, removing and installing

Special tools, testers and auxiliary items required

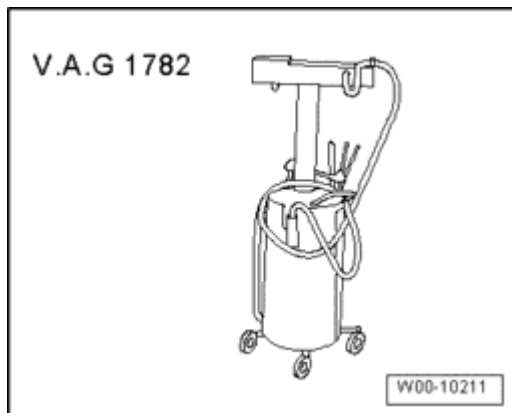


Fig. 483: Identifying Old Oil Collecting And Extracting Device V.A.G 1782
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Old oil collecting and extracting device V.A.G 1782

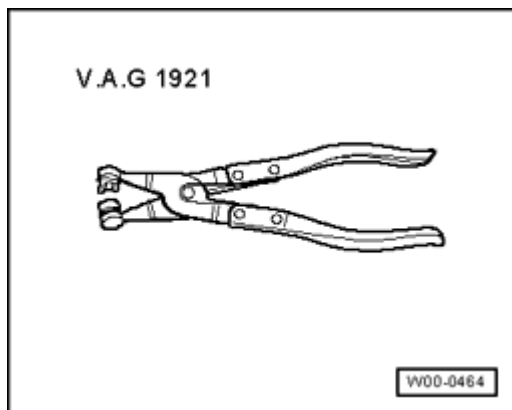


Fig. 484: Hose Clamp Pliers V.A.G 1921
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hose clamp pliers V.A.G 1921

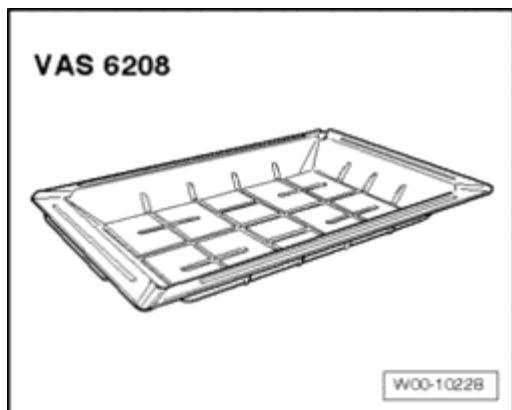


Fig. 485: Drip Tray For Workshop Crane VAS 6208
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray for workshop crane VAS 6208

Removing

NOTE: • Drained coolant must be stored in a clean container for disposal or reuse.

CAUTION: Cover cap of expansion tank with rag and open carefully, as hot steam i.e. hot coolant may escape when opening.

- Open cap of coolant expansion tank.

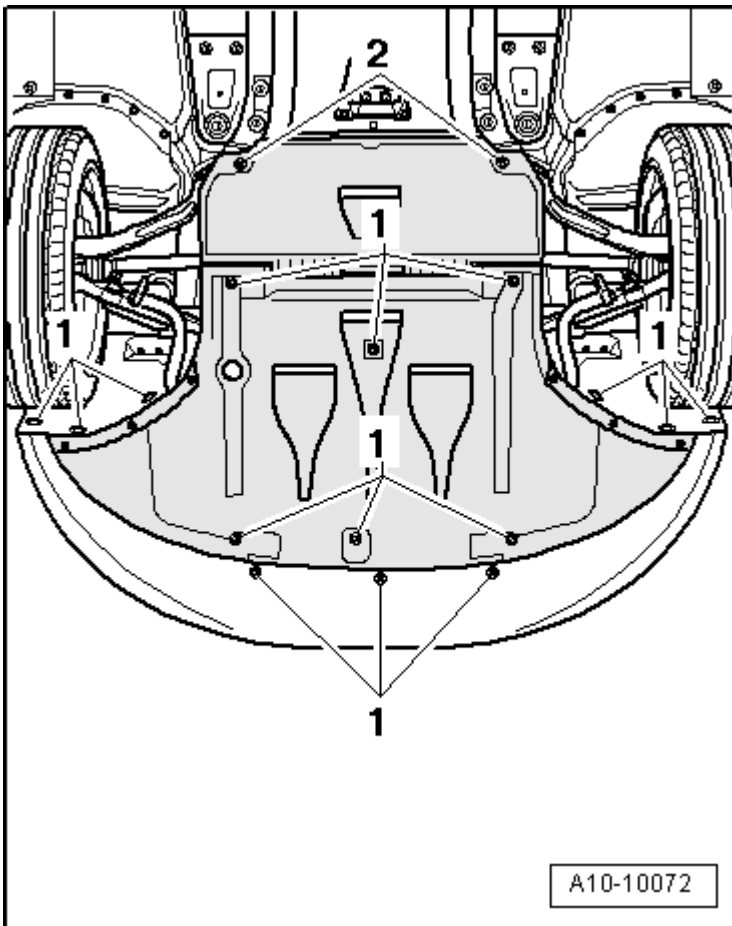


Fig. 486: Identifying Quick-Release Fasteners & Noise Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen quick-release fasteners - 1 - and - 2 - and remove noise insulation.
- Remove left front and right front wheel housing liners --> **66 - EXTERIOR EQUIPMENT** .

- Remove front bumper --> **63 - BUMPERS** .

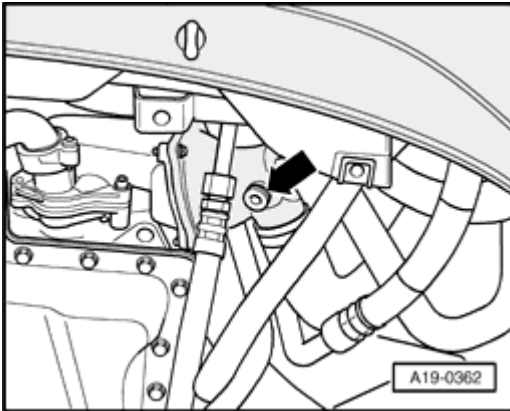


Fig. 487: Removing/Installing Drain Plug On Coolant Thermostat Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place drip tray VAS 6208 under engine.
- Remove drain plug - **arrow** - on coolant thermostat housing and drain coolant from engine.

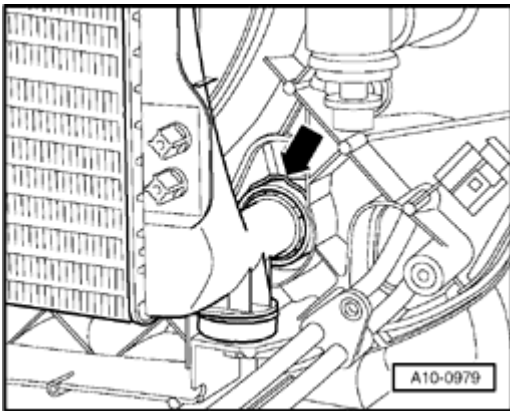


Fig. 488: Disconnecting Lower Coolant Hose From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect lower coolant hose from radiator - **arrow** - and drain residual coolant.
- Place old oil collecting and extracting device V.A.G 1782 under engine.

NOTE:

- **Observe the rules of cleanliness for working on automatic transmissions --**
> 00 - GENERAL, TECHNICAL DATA .

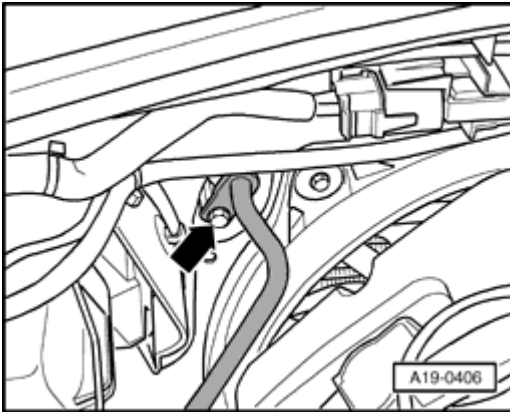


Fig. 489: Removing Upper/Lower ATF Line From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove upper and lower ATF line from radiator - **arrow** - --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

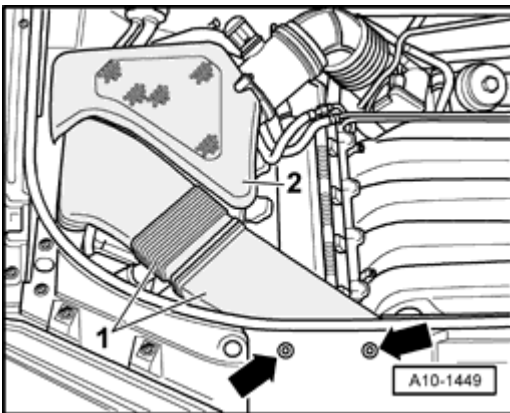


Fig. 490: Identifying Air Filter Cover & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove air filter cover - **2** - .
- Remove air duct - **1** - .

NOTE:

- To pull out clips - **arrows** - , use pry lever 80-200.
- If necessary, use silicon-free spray lubricant to facilitate removal.

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

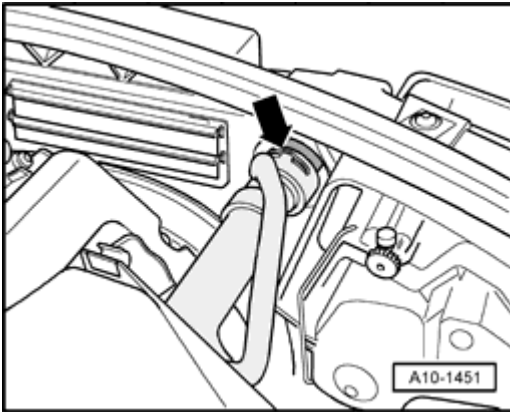


Fig. 491: Disconnecting Top Coolant Hose From Radiator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect top coolant hose - **arrow** - from radiator.

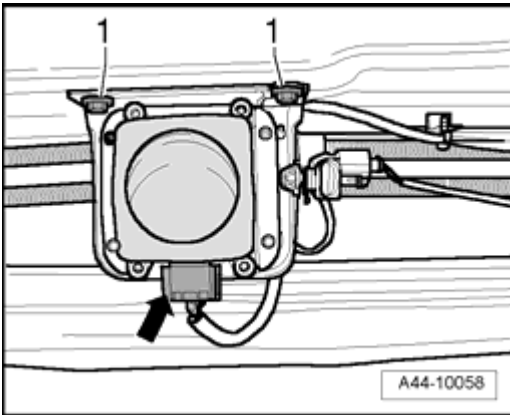


Fig. 492: Disconnecting Electrical Connector On Distance Regulation Control Module J428
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On a vehicle with distance regulation, disconnect electrical connector - **arrow** - on Distance Regulation Control Module J428.

NOTE:

- Ignore - 1 -.

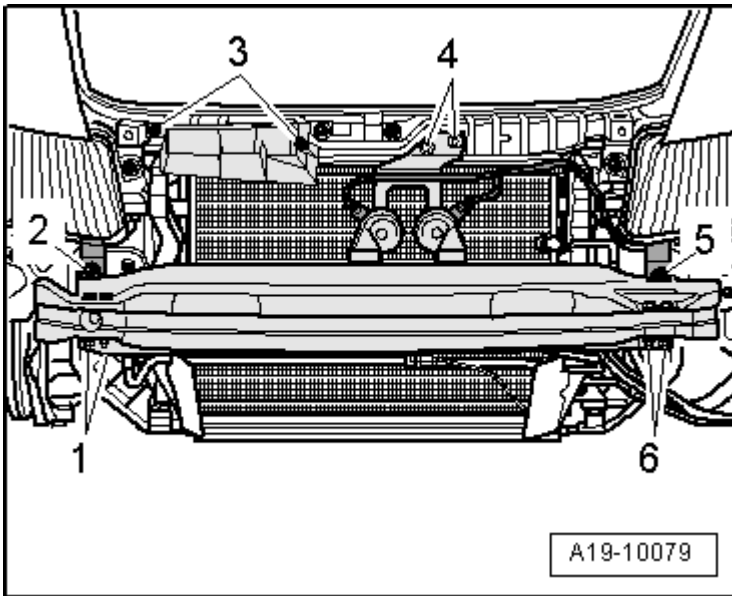


Fig. 493: Identifying Bolts, Brackets, Bumper & Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - 3 - and remove air duct.
- Remove bolts - 4 - and remove bracket for horns; leave electrical connections intact.
- Remove bracket - 2 - and - 5 - for headlight.
- Remove nuts - 1 - and - 6 - and remove bumper.

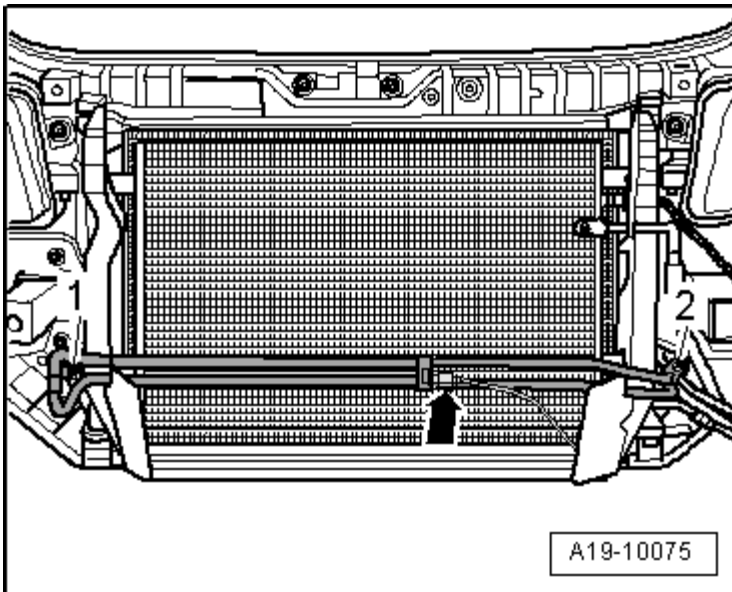


Fig. 494: Unclipping Outside Air Temperature Sensor G17 From Bracket & Removing Power Steering Cooling Coil Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove power steering cooling coil bolts - 1 - and - 2 - hydraulic hoses remain connected.

CAUTION: The air conditioning refrigerant circuit must not be opened.

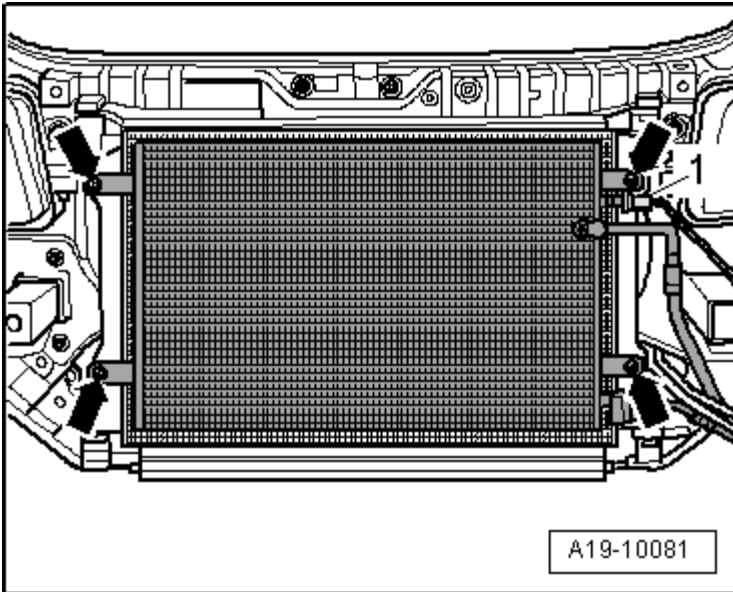


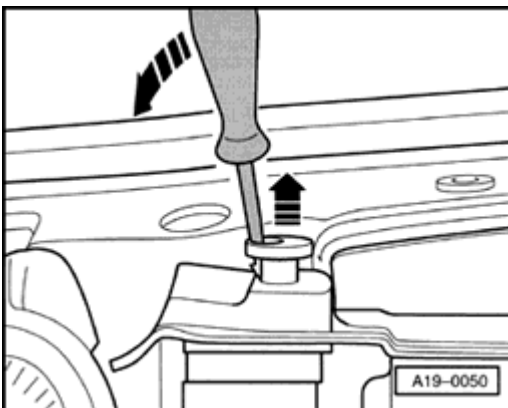
Fig. 495: Separating Electrical Connector & Removing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - 1 -.
- Remove bolts - arrows -.

NOTE:

- Do not bend or stretch lines or hoses as A/C compressor and/or refrigerant lines/hoses may be damaged.

- Pivot condenser downward with lines connected.



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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release both radiator retaining pins and remove by pulling upward - **arrows** -.
- Tilt radiator at upper edge forward, pull up and remove.

Installing

Installation is in reverse order of removal, note the following:

- Fill with coolant --> **Cooling system, draining and filling** .

NOTE:

- **Complete coolant must be replaced if the radiator was replaced.**
- **Secure all hose connections using hose clamps appropriate for the model type .**
- Fasten ATF lines --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- Install front bumper --> **63 - BUMPERS** .
- Check ATF level --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- If Distance Regulation Control Module J428 was removed, an adjustment must be made after reinstallation --> **44 - WHEELS, TIRES, WHEEL ALIGNMENT** and in "Guided Functions" operating mode.

Torque specifications

Component	Nm
Condenser to radiator	10
Cooling coil to radiator	10

Fan shroud, removing and installing

Removing

- Bring lock carrier into service position --> **50 - BODY - FRONT** .

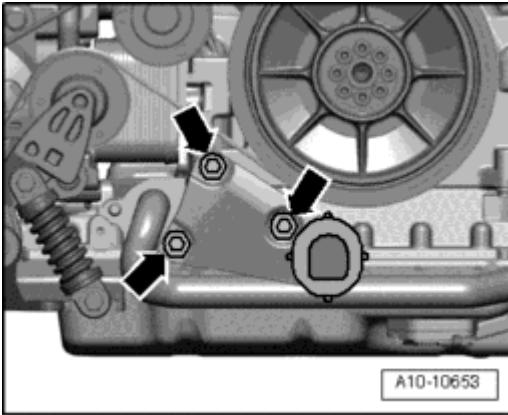


Fig. 497: Removing Bolts For Torque Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - for torque support.

NOTE:

- The torque support remains in installation location.

CAUTION: Risk of injury from coolant fan starting by itself.

- Before working in fan shroud area, disconnect electrical connectors.

- Disconnect electrical connectors - **1** - to coolant fans.

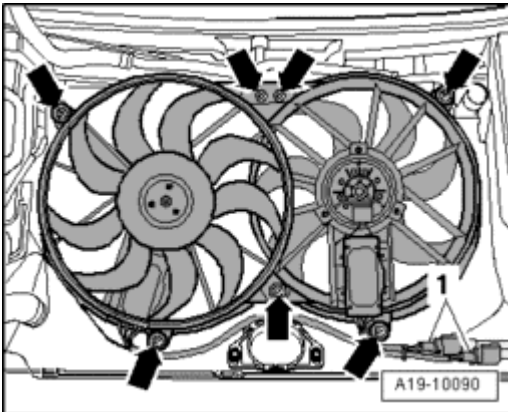


Fig. 498: Removing Bolts And Fan Shroud Upward And Out
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - and remove fan shroud upward and out.

Installing

Installation is in reverse order of removal, note the following:

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ENGINE 4.2 Liter V8 4V Engine Mechanical, Engine Code(s): BAT, BNK

NOTE:

- Secure all hose connections using hose clamps appropriate for the model type .

- Install lock carrier with attachments --> **50 - BODY - FRONT** .

Torque specifications

Component	Nm
Fan shroud to radiator	2
Torque bracket to upper part of oil pan	40

Cooling system, checking for leaks

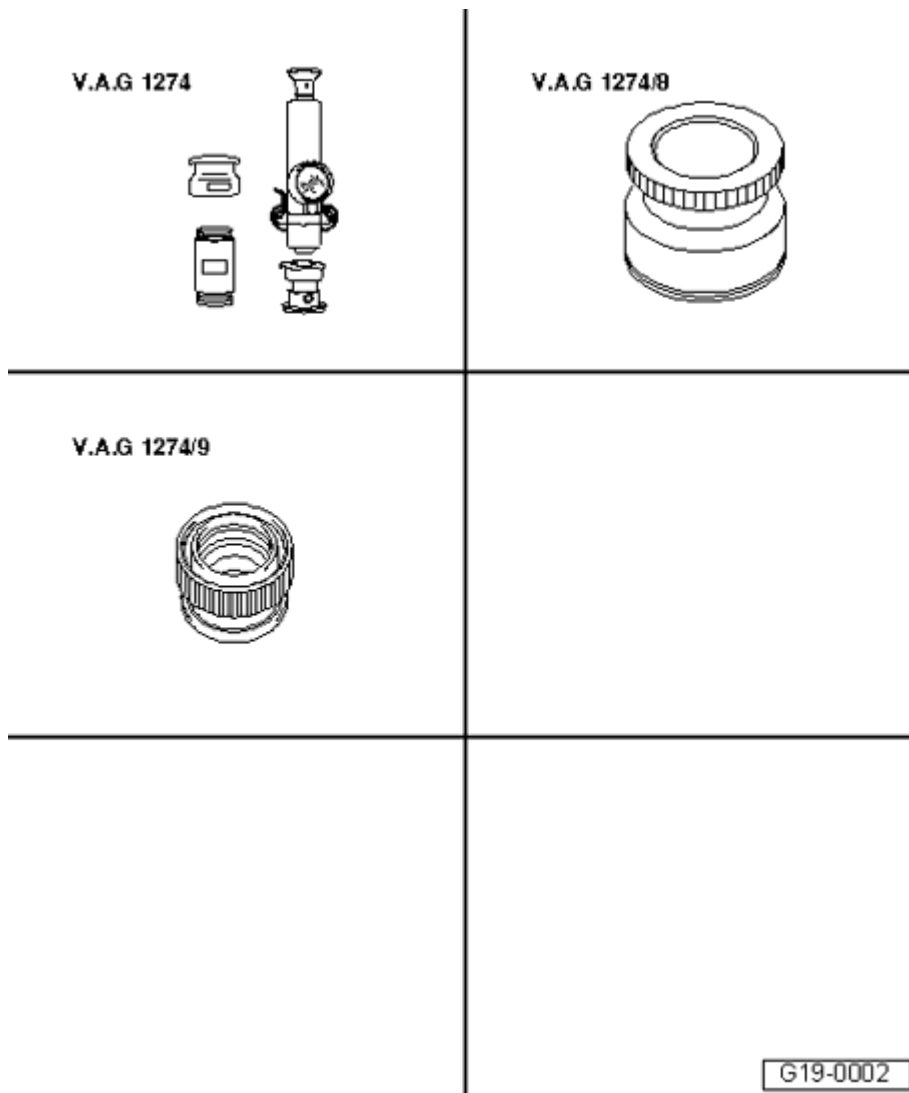


Fig. 499: Identifying Special Tools - Cooling System, Checking For Leaks
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Cooling system tester V.A.G 1274
- Adapter V.A.G 1274/8
- Adapter V.A.G 1274/9

Test conditions

- Engine at operating temperature.

Test sequence

CAUTION: Cover cap of expansion tank with rag and open carefully, as hot steam i.e. hot coolant may escape when opening.

- Open cap of coolant expansion tank.

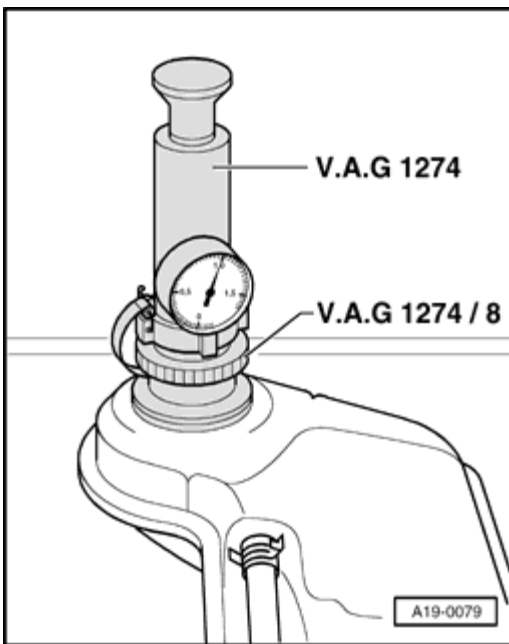
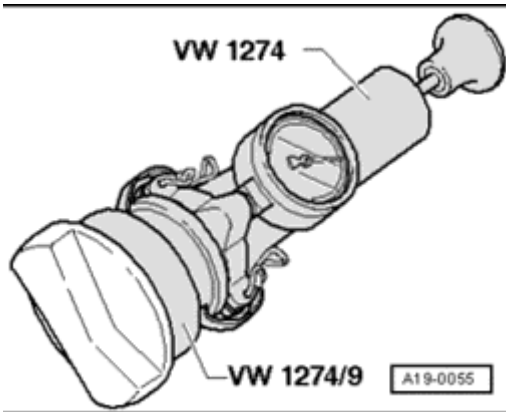


Fig. 500: Attaching Cooling System Tester V.A.G 1274 With Adapter V.A.G 1274/8 To Expansion Tank
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach cooling system tester V.A.G 1274 with adapter V.A.G 1274/8 to expansion tank.
- Generate a positive pressure of approx. 1.0 bar using hand pump of cooling system tester.
- If pressure decreases, search for leaking areas and repair the malfunction.

Pressure relief valve in cap, checking

**Fig. 501: Pressure Relief Valve In Cap, Checking**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach cooling system tester V.A.G 1274 with adapter V.A.G 1274/9 to sealing cap.
- Operate hand pump.
- Pressure release valve must open at a positive pressure of 1.4 to 1.6 bar.

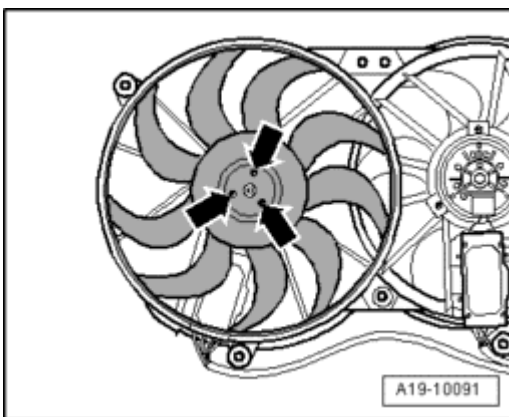
Coolant fan, removing and installing

Removing

NOTE:

- During installation, all cable ties must be re-installed at the same location.

- Bring lock carrier into service position --> **50 - BODY - FRONT** .
- Remove fan shroud --> **Fan shroud, removing and installing.**

**Fig. 502: Removing Bolts And Fan Wheel**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Coolant Fan V7 (left):

- Remove bolts - **arrows** - and remove fan wheel.

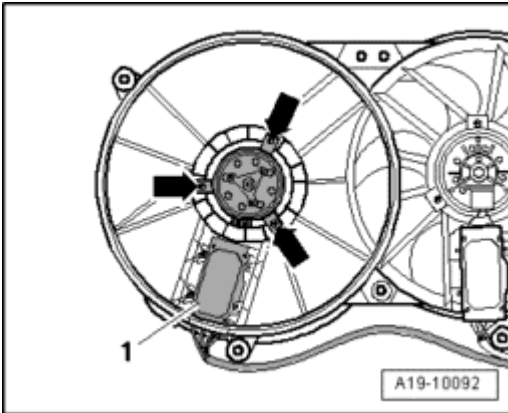


Fig. 503: Removing Bolts, Unclipping Coolant Fan Control (FC) Control Module J293 And Removing Coolant Fan And Coolant Fan Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.
- Unclip Coolant Fan Control (FC) Control Module J293 - **1** - and remove coolant fan and coolant fan control module.

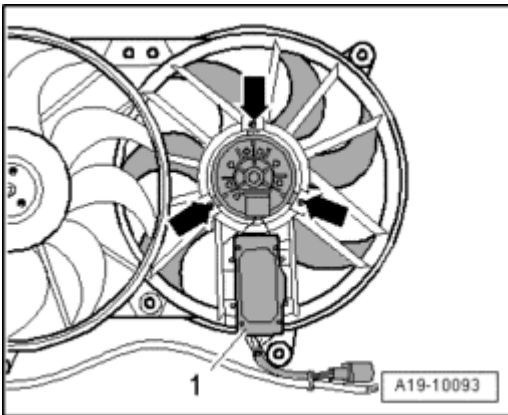


Fig. 504: Removing Bolts, Unclipping Coolant Fan Control (FC) Control Module 2 J671 And Removing Coolant Fan And Coolant Fan Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Coolant Fan 2 V177 (right):

- Remove bolts - **arrows** -.
- Unclip Coolant Fan Control (FC) Control Module 2 J671 - **1** - and remove coolant fan and coolant fan control module.

Installing

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NOTE:

- Secure all hose connections using hose clamps appropriate for the model type .
- During installation, all cable ties must be re-installed at the same location.

- Install fan shroud --> **Fan shroud, removing and installing.**
- Install lock carrier with attachments --> **50 - BODY - FRONT** .

Torque specifications

Component	Nm
Coolant Fan V7 to fan shroud	5
Coolant Fan 2 V177 to fan shroud	4.5
Fan wheel to coolant fan	3.5