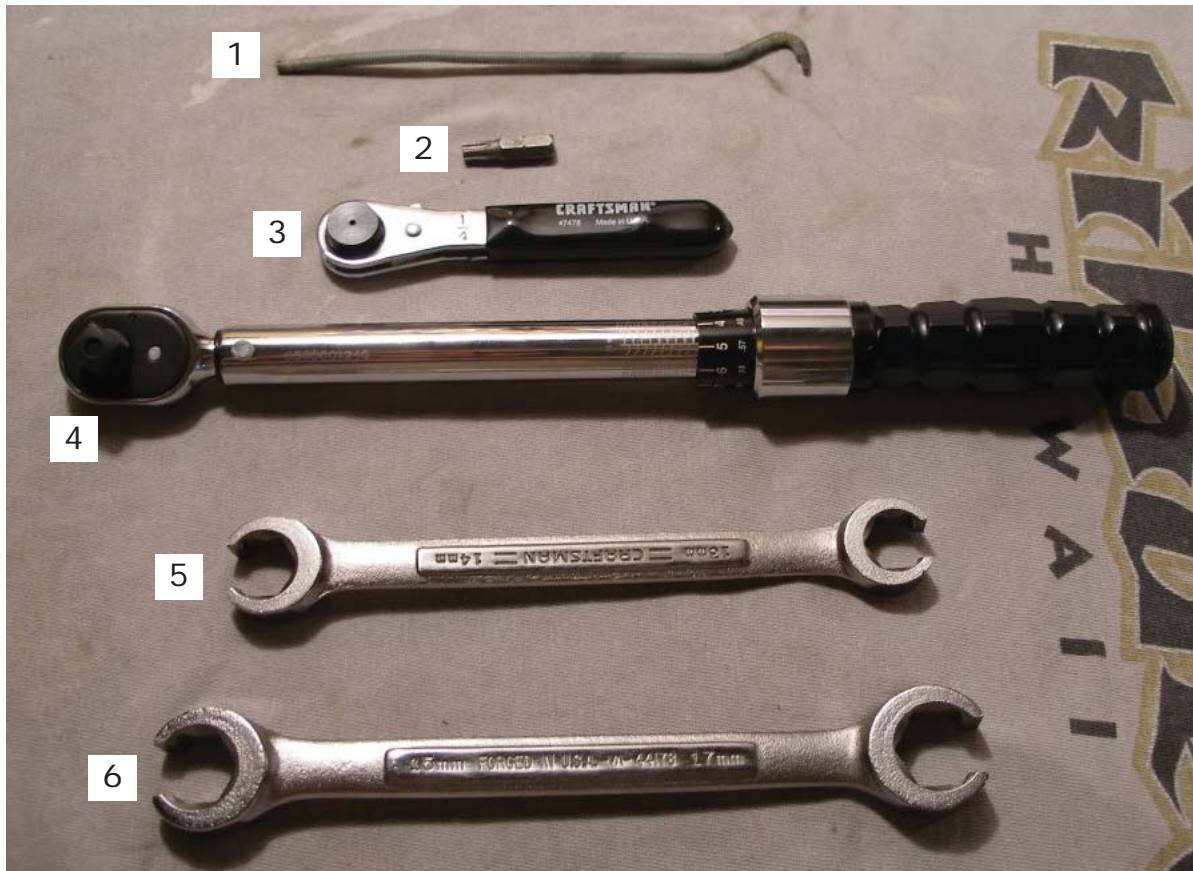


# RS4 manifold removal Instructions



1. Homemade tool with flat, sharp end to disconnect one of the electrical connectors under the small carbon fiber panel (see page 6). Stiff wire works. You'll see how to shape it once you try to remove the connector the normal way with a screw driver (which doesn't work).
2. T30 torx bit that works with 1/4" bit driver (Item 3).
3. 1/4" bit driver with magnetic bit holder for the T30 bit. I got this one at Sears. You can not do this job without this tool!
4. 3/8" drive torque wrench with readout in Newton-meters. Tightening of the (10) manifold bolts should be done with a good torque wrench as overly loose or tight bolts may cause problems.
5. 14mm flare nut wrench for small fuel line connections.
6. 17mm flare nut wrench for large fuel line connections.

Other tools are standard wrenches, metric sockets, etc. A large torx bit (T50) is needed for the lift-eye brackets that bolt to the cylinder heads. A vacuum-style tool to refill the coolant system is a big help if you have one. Details on following instruction page...

If you also clean your valves, which requires you to crank the engine with the manifold off, you will need VCDS to clear DTC codes from both ECU's. Whenever the engine is cranked with harness connectors not plugged into various sensors/actuators, an EPC light will illuminate when you restart the vehicle.

## Removing

### CAUTION!

- ♦ **Fuel system is under high pressure! Before opening high pressure components of the fuel injection system, pressure must be relieved to residual pressure ⇒ Procedure that must be performed before opening the high-pressure fuel injection system - Pay close attention! .**
- ♦ **Then wrap a clean rag around the connection and relieve residual pressure by carefully loosening the connection.**

### Note:

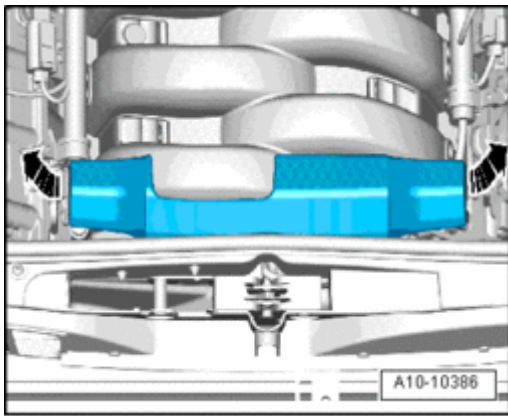
- ♦ *All cable ties opened or cut during engine removal must be reinstalled at the same locations during installation.*

– **Drain coolant** ⇒ 4.2 Liter V8 5V Engine Mechanical, Engine Code(s): BNS - Repair Group 19 .



**Draining the coolant is not necessary**, but the coolant tank does need to be removed. See next page.

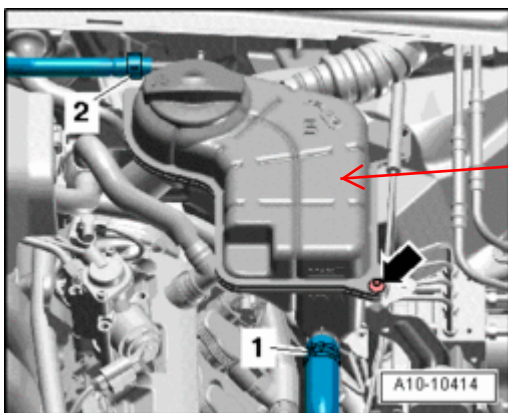
– Pull rear engine cover off - **arrows** - .



- Pull front engine cover off - **arrows** - .



- Remove cover - **1** - in engine compartment (left side).

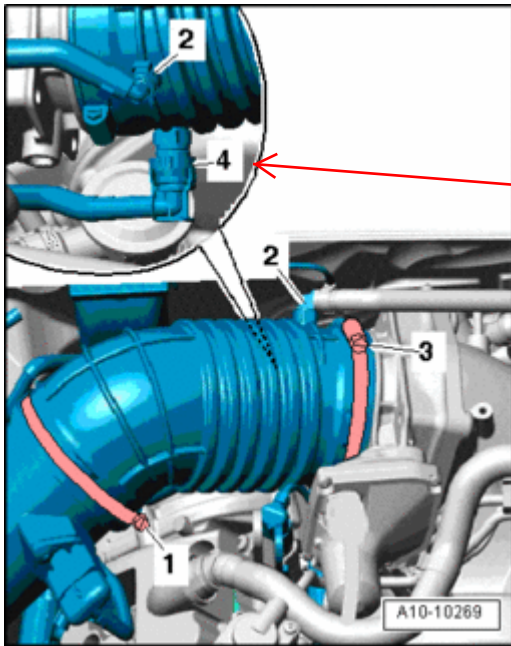


#### COOLANT TANK REMOVAL -

Remove small screw (black arrow). Loosen the hose clamps 1 and 2. Have a plug ready for the large hose at connection 1. Tilt the front of the tank upward and then pull off the large hose in front and plug it. Now pull off the small hose at connection 2. Remove coolant tank. if you set it down with the front tilted up, you shouldn't need to plug or cap the two openings, but it is recommended you cap them off so that you don't spill any coolant. Install clamp 1 around whatever you used to plug the hose so that coolant doesn't leak out of the hose while you work on the car.

- Remove coolant hoses - **1** - and - **2** - .

- Remove coolant expansion tank - **arrow** - .

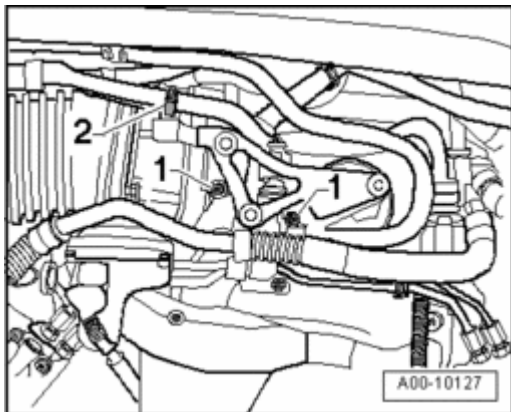


Not sure what is meant by "must not be opened". It has to be unclipped to proceed. Connection (4) is the inlet for the PCV system. In other words, fresh air is being drawn into the crankcase thru the small hose at Connection (4). The small hose snaps onto the connector on the rear of the larger air duct hose similar to how the breather hoses (not shown) snap onto the top of the red valve covers. The small hose HAS TO BE disconnected at Connection (4) in order for the air duct hose to be removed. Just pinch the connector and pull it off the air duct hose. A slight twist/pry from a flat screwdriver can help un-snap the connection.

- Disconnect electrical wiring to Engine Coolant Level (ECL) Warning Switch F66 at bottom of expansion tank.
- Disconnect vacuum hose - **2** - from air guide hose.
- Remove hose clamps - **1** - and - **3** - and lay air guide hose aside.

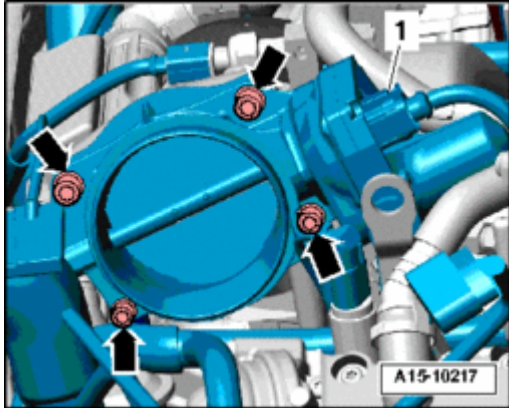
### CAUTION!

**Hose connector - 4 - must not be opened.**



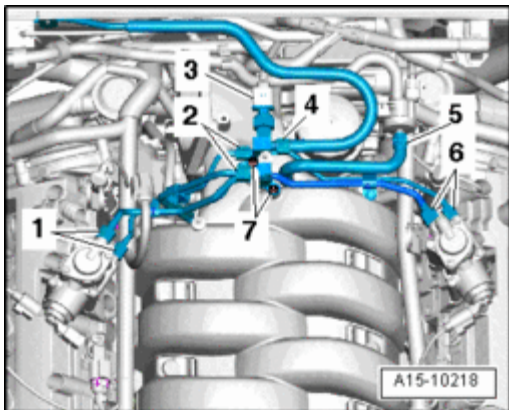
- Remove bolts - **1** - .

- Disengage retaining clip - **2** - and remove rear engine cover bracket.
- ~~- Remove cylinder head covers ⇒ 4.2 Liter V8 5V Engine Mechanical, Engine Code(s): BNS - Repair Group 15 and lay aside with hoses connected.~~



This must be an error. Removal of the head covers is not necessary.

- Disconnect electrical connector - **1** - at Throttle Valve Control Module J338 by pulling rubber cover over release buttons.
- Remove bolts - **arrows** - .
- Remove Throttle Valve Control Module J338 .



If engine has been OFF for a few hours, the residual fuel pressure is "only" 50-60 psi. Just disconnect the rubber fuel supply hose (4) from the fuel manifold very slowly and have some rags handy.

- Disconnect electrical connector - **3** - .

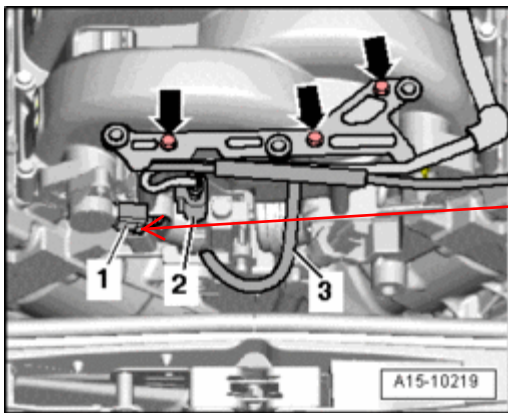
### CAUTION!

- ♦ **Fuel system is under pressure!**
- ♦ **Before opening system, place clean rags around the connection. Then release pressure by carefully loosening the connection.**

- Disconnect fuel supply line - **4** - .
- Open union nuts - **1** - , - **2** - and - **6** - at high pressure lines.
- Remove bolts - **7** - .

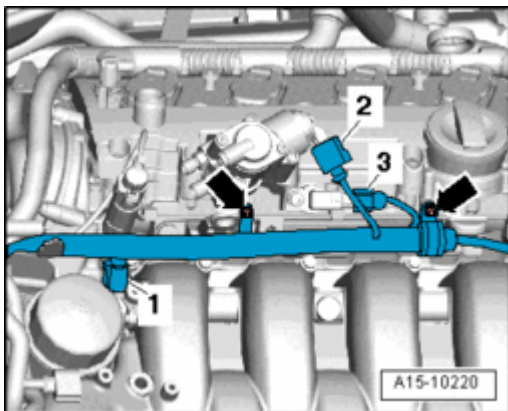
**Note:**

- ♦ *Do not change bend shape of high pressure lines.*
- Remove fuel rail with high pressure lines and sleeve.
- Pull off vacuum hose - **5** - from Evaporative Emission (EVAP) Canister Purge Regulator Valve N80 .

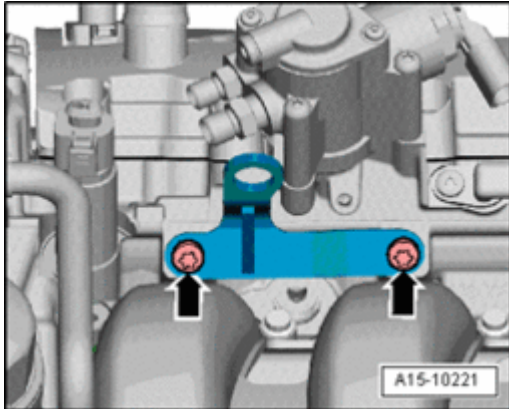


A homemade tool works here for connection 1 (connection 2 is removed the normal way - no special tool needed). Just take a 7" long stiff wire and bend 1" over at 90 degrees. Then sharpen the bent over end so that its like a flat screw driver tip. See the pic of my tool on page 1. The sharp tip bent at an angle is what you need to get this particular electrical connector undone.

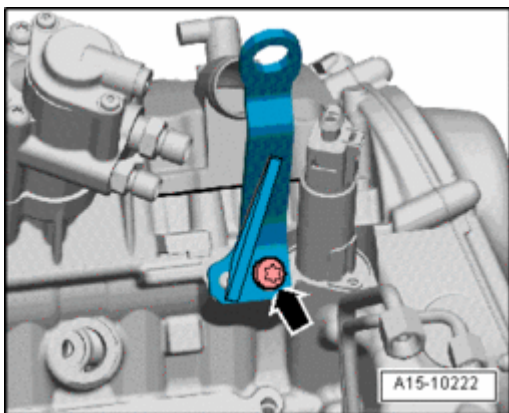
- Remove wiring bracket screws - **arrows** - at front of intake manifold.
- **Using assembly tool T10118** , disconnect electrical connectors at right Intake Manifold Runner Position Sensor G336 - **1** - and at Intake Manifold Runner Control (IMRC) Valve N316 - **item 2** - .
- Remove vacuum hose - **3** - to Intake Manifold Runner Control (IMRC) Valve N316 .



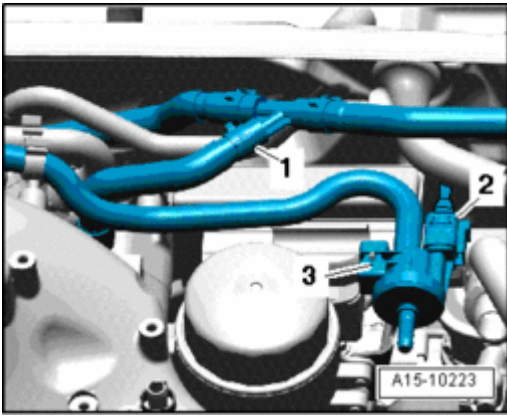
- Disconnect electrical connectors at Intake Manifold Runner Position Sensor 2 G512 - **1** - and at Fuel Metering Valve 2 N402 - **2** - .
- Disconnect electrical connector - **3** - at Camshaft Position (CMP) Sensor 2 G163 by pulling rubber cover over release button.
- Remove wiring bracket bolts - **arrows** - .



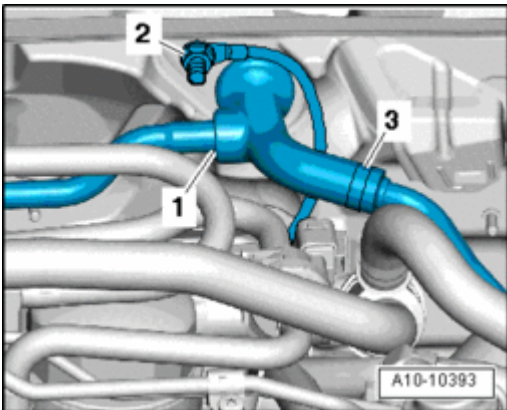
- Remove bolts - **arrows** - and remove left rear engine lifting eye.



- Remove bolts - **arrow** - and remove right rear engine lifting eye.



- Remove coolant hose - 1 - at Y-connector.
- Disconnect electrical connector - 2 - .
- Remove Evaporative Emission (EVAP) Canister Purge Regulator Valve N80 - 3 - from bracket.
- Lay aside Evaporative Emission (EVAP) Canister Purge Regulator Valve N80 with vacuum hose connected.



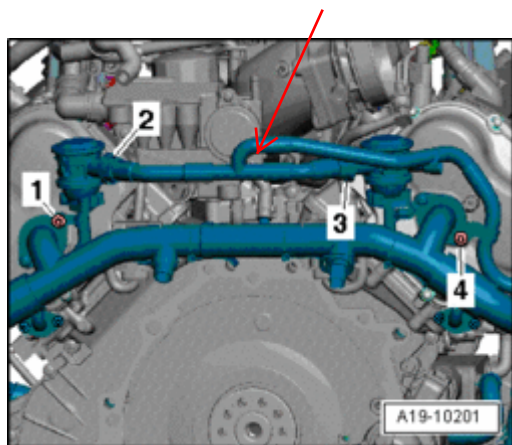
- Remove vacuum lines - 1 - and - 3 - to brake booster from distribution piece.

**Note:**

- ♦ Ignore - 2 - .

**Note:**

- ♦ In the following illustration, the procedure is shown from behind with engine removed.



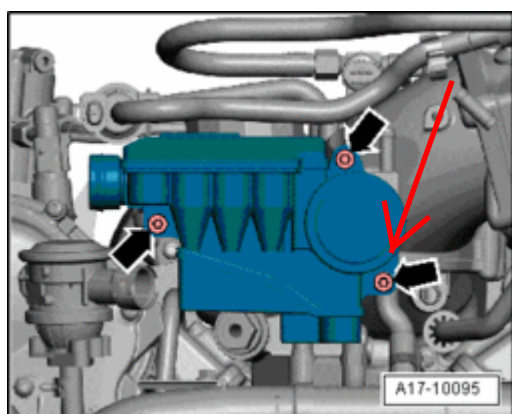
This is a view from the back of the engine. Bolts 1 and 4 are simply removed to allow the Secondary Air pipes some movement, and access to one of the (3) T30 torx screws (red arrow in this photo and the photo below) that hold the Crankcase ventilation pressure regulator - which is also the cyclonic oil separator).

With the coolant tank, air duct hose and throttle body removed in earlier steps, access to this area actually isn't too bad. Removal of bolts 1 and 4 here (T30 torx) along with the 3 bolts in the next step (also T30) is best done with a Sears 1/4" bit ratchet that holds the bits in magnetically. See the tool list on page 1. There is not room for a 1/4" socket wrench and a T30 socket or any other Torx tool that I know of.

- Remove bolt - 4 - at Secondary Air Injection (AIR) air duct.
- Remove bolt - 1 - at left Secondary Air Injection (AIR) combi-valve.

#### Note:

- ♦ *No additional bolts at back of coolant pipe should be loosened.*
- Unclip air guide hose at both Secondary Air Injection (AIR) combi-valves - 2 - and - 3 - by pressing release buttons.
- Swing air guide hose upward.

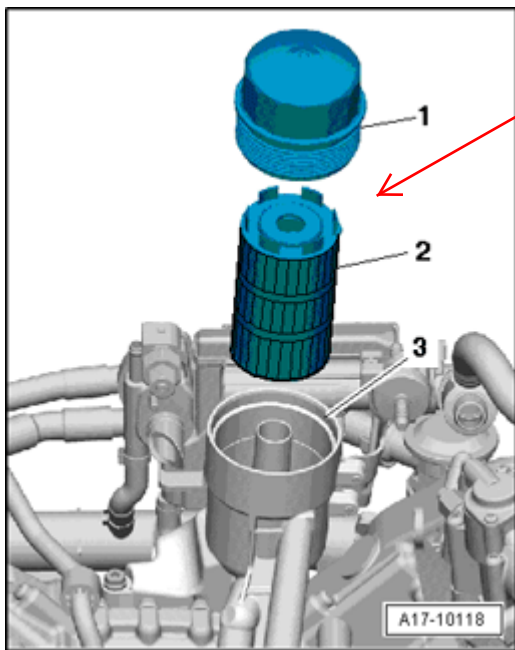


Unclipping these hoses requires a strong grip and small hands. Prepare to get bloody knuckles. It really helps to have someone hold one side while you unclip the other. There is very little room to grab them and move them as you are trying to squeeze and unclip - but it is possible. It just takes patience. The ONLY reason these hoses are being moved out of the way is to gain access to the lower T30 bolt (red arrow, bottom Figure) on the crankcase ventilation pressure regulator.

- Remove bolts - **arrows** - and remove crankcase ventilation pressure regulator valve toward rear.

#### Note:

- ♦ *Crankcase ventilation pressure regulator valve remains in engine compartment with return hose connected.*

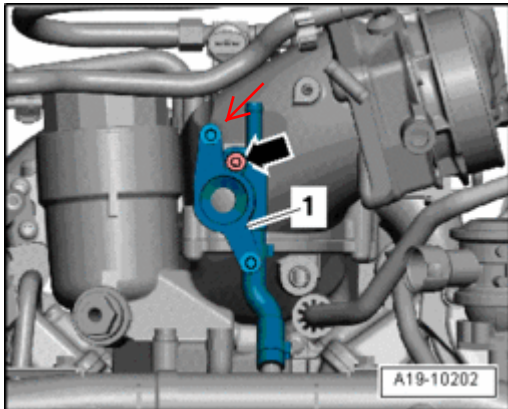


The oil filter and cap does **NOT** have to be removed. I prefer to leave it on so avoid anything falling in the oil filter housing.

- Remove cover - 1 - for oil filter housing - 3 - .
- Remove oil filter insert - 2 - .

**Note:**

- ♦ Seal oil filter housing with a clean cloth.

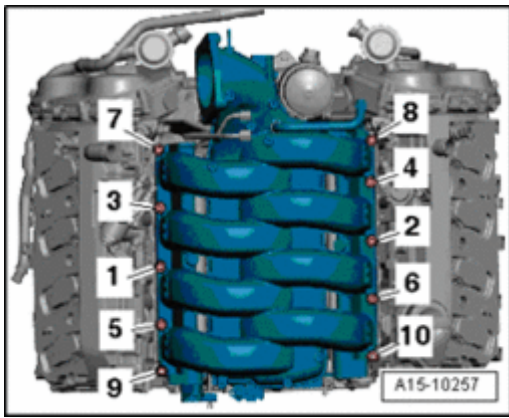


Once the T30 bolt (black arrow) is removed the PCV venturi tube (item 1) can be slid out of the back of the manifold. You'll notice that it can be twisted slightly when the bolt is out but doesn't seem to want to slide out. That is simply because there is an o-ring sealing it to the hole it slides into. I place a small block of wood on the top hole ear of the venturi (see red arrow) and tap with a rubber mallet. That is usually easier than trying to pull it out with your hands.

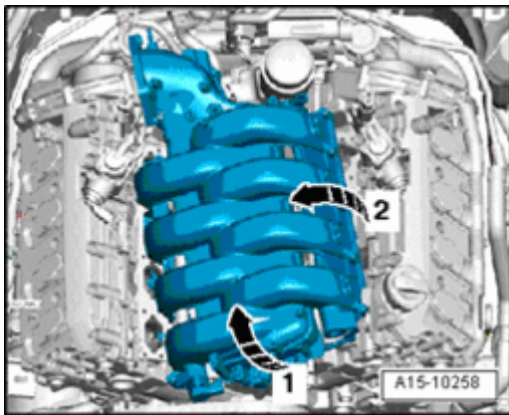
- Remove bolt - **arrow** - .
- Remove coolant connections - 1 - from intake manifold.

**Note:**

- ♦ Coolant connectors remain in engine compartment with coolant hose attached.



- Remove bolts on intake manifold in sequence - **10 to 1** - .
- To avoid scratching intake manifold, apply adhesive tape in area of high pressure lines.



### BE CAREFUL WHEN LIFTING MANIFOLD!

Sometimes there is a vacuum hose routed near the front of the manifold that allows very little movement. It helps to have another set of eyes watching as you lift. ALSO, the front underside of the manifold has several delicate items such as the manifold flap arms (white plastic arms), the vacuum diaphragms for the flaps and a flap position sensor. Be very careful not to set the weight of the manifold on these items or bump/snag them as you remove it.

- Next, raise front of intake manifold upward - **arrow 1** - .
- Swing intake manifold to right side of vehicle - **arrow 2** - , under high pressure fuel lines and out.
- Remove intake manifold from engine compartment.

### Note:

- ♦ *Plug the intake ports of the cylinder head with clean rags.*

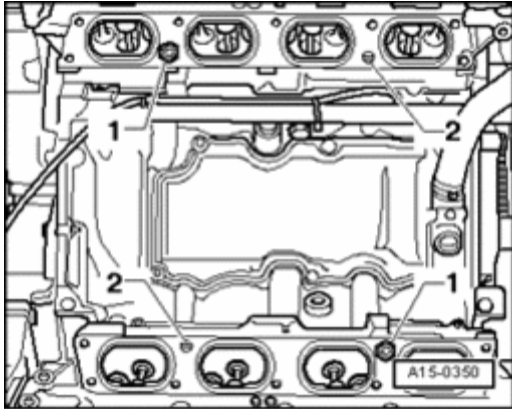
### Installing

Installation is in reverse order of removal. Note the following:

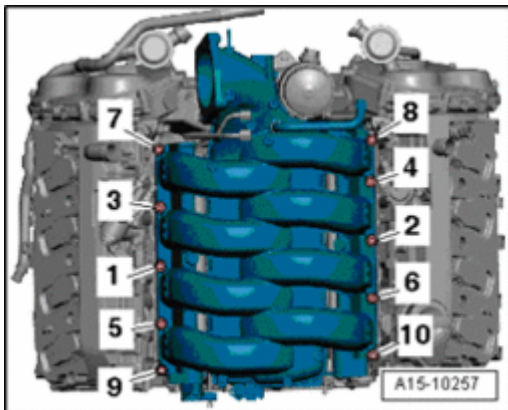
### Note:

- ♦ *Replace gaskets and O-rings.*

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



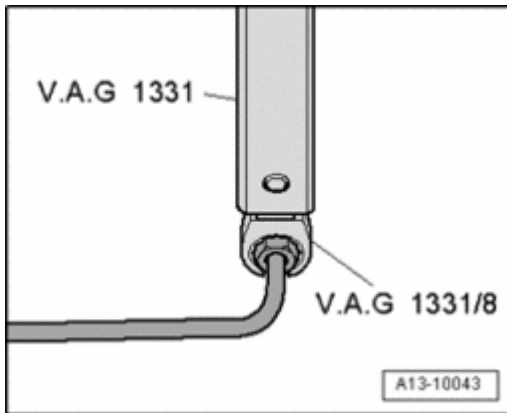
- Replace intake manifold gaskets while watching locating point - **1** - .
- Be aware of alignment pins - **2** - when setting intake manifold in place.



- Tighten intake manifold bolts to final position in sequence - **1 to 10** - .
- Retighten intake manifold bolts to final position in sequence - **1 to 10** - .

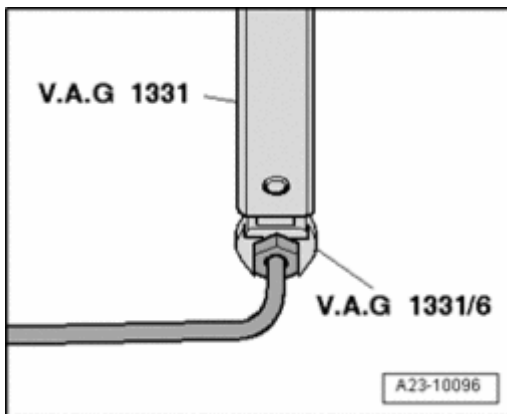
**Note:**

- ♦ *High pressure line connections must not show any signs of damage.*
- ♦ *Do not change bend shape of high pressure lines.*
- Hand-tighten union nuts for high-pressure lines.
- Make sure high-pressure lines are seated free of stress.



The flare nut tools shown on page 1 work fine for the fuel connections. Just make sure the get the threads started with your fingers and that everything is straight before you tighten the nuts. You can DAMAGE the metal sealing surfaces if you over-tighten or if they are not perfectly aligned as you tighten.

- To fasten SW 14 union nut for high pressure lines, use torque wrench V.A.G 1331 with 17 mm open end wrench socket V.A.G 1331/8 .



- To tighten SW 17 union nut for high pressure lines, use the torque wrench V.A.G 1331 with SW 17 socket V.A.G 1331/6 .
- Only install retaining tabs after high pressure lines have been tightened.
- Fill with coolant ⇒ 4.2 Liter V8 5V Engine Mechanical, Engine Code(s): BNS - Repair Group 19 .

### Torque specifications

Component		Nm	
Intake manifold to cylinder head		9	
Coolant connectors to intake manifold		9	
Cap to oil filter housing		25	
Crankcase ventilation pressure regulator valve to	Coolant connection	9	
	Bracket	9	
Combination valve for Secondary Air Injection (AIR) system to cylinder head		9	
Secondary Air Injection (AIR) air duct to cylinder head		9	

Engine lifting eyelet to cylinder head		22
Wiring bracket to intake manifold		9
Fuel distributor to intake manifold		25
High pressure lines to	Fuel rail	25
	High pressure pump	25
Fuel supply line to fuel rail		25
Throttle Valve Control Module J338 to intake manifold		9

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