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A Serious Fix



GM Truck - Fixing A Serious Coolant Leak:

Replacing Intake Manifold Gaskets On A 1999 GMC Jimmy With A 4.3 Liter V6 Engine

This Article May Also Apply To Full-Size GM Pickups, Tahoe, Yukon, and Suburban With 5.7 Liter V8 Engines

<p>In This Article:</p> <p>Parts are removed from the top of the engine until the intake manifold is exposed. The manifold is removed, cleaned and replaced with new gaskets.</p>	<p>Related Articles - GMC Jimmy / Chevy Blazer:</p> <ul style="list-style-type: none"> • Rebuilding This Engine To Fix A Rod Knock • Replacing A Water Pump • Removing Air Ducting • Draining The Coolant • Removing Radiator Hoses • Moving The A/C Compressor
<p>Skill Level: 3-4 (Intermediate to Advanced)</p>	<p>Time Taken: About 16 Hours</p>

By Bruce W. Maki, Editor

Introduction:

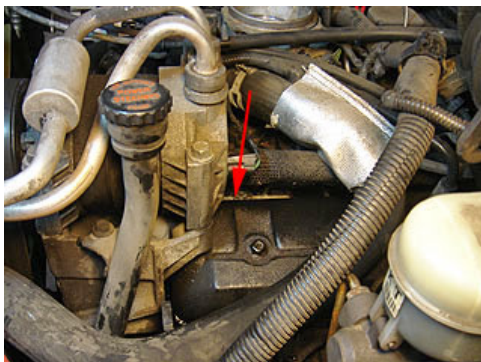
This 1999 GMC Jimmy had developed a serious coolant leak. The engine would lose about a **gallon** of coolant after 20 miles of driving.

I had replaced the water pump less than a year earlier, and initially I thought the pump gasket was leaking. When I leaned over the engine and looked straight down where the red arrow is pointing, I could see coolant dripping from the area near the right-hand mounting surface of the pump.

But an employee at a local auto parts store suggested that possibly the source of the leak was the intake manifold gasket, not the pump.



To inspect the area in question, I had to remove some of the air duct components.



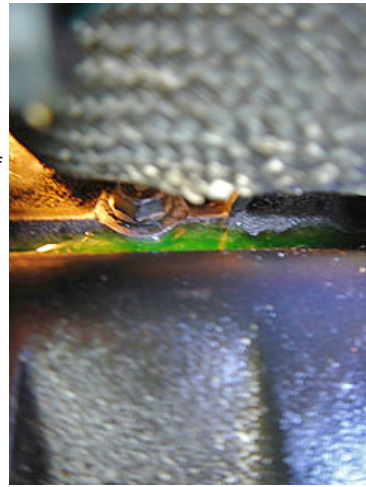
The arrow points to the area I needed to inspect.

This is the driver's side of the engine, just behind the air conditioning compressor.

After I cleaned up the dirt from the area between the intake manifold and cylinder head, I started the engine. Within a few seconds this pool of coolant appeared.

This confirmed my suspicions... the coolant was leaking from the intake manifold gasket, not the water pump.

This was not good news. As I looked at the engine I began to realize what a long project this would be... the engine is hiding beneath a tangled web of wires and hoses.



To get some extra guidance, I bought a Chilton's Repair Manual. But I didn't buy the book for the GMC Jimmy and Chevy Blazer. Instead, I bought the manual for full-size trucks (Chilton's book number 28624), which covers my 1996 GMC Yukon. We plan on keeping the Yukon, but we may sell the Jimmy someday soon.

The full-size truck repair manual covers procedures for the 4.3 liter V6 engine that GM puts in the Jimmy/Blazer, because that V6 is the base engine in GM's full-size trucks.

Chilton's procedures worked for me, but they can be frustrating because they omit essentially ALL of the details that would be needed by anybody who is not an experienced auto mechanic. Wait... don't people like you and me buy these Chilton's books precisely because we are **NOT** experienced mechanics?

Summary Of Procedure:

Based on information from my mechanic's training, the Chilton's book and Haynes repair manual for GM full-size trucks, I made this quick summary of the procedure for replacing the intake manifold gasket:

Removing The Upper Intake Manifold (a.k.a. Plenum):

- Disconnect Battery (may not be absolutely necessary, but a good practice to avoid shorting a positive wire to ground).
- Remove serpentine belt.
- Drain the coolant.
- Remove air cleaner ducting and disconnect wires.
- Disconnect throttle linkage and bracket.
- Disconnect cruise control cable.
- Remove brake booster vacuum hose at manifold.
- Remove PCV hose.
- Remove ignition coil and bracket.
- Remove purge solenoid and bracket.
- Relieve fuel pressure at test port.
- Remove fuel lines and bracket.
- Remove upper intake manifold.

Removing The Lower Intake Manifold:

- Remove the distributor. Label the spark plug wires.
- Remove heater hoses and bypass hose.
- Remove upper radiator hose.
- Remove sensors and bracket on right side.
- Disconnect EGR tube, remove clamp and bolt.
- Remove PCV valve (and replace).
- Unbolt A/C compressor and move it aside.
- Loosen compressor bracket and slide forward, but do not remove it.
- Remove alternator bracket bolt (or remove alternator and set aside)
- Unplug all vacuum lines from intake manifold.
- Unplug all electrical connectors from manifold.
- Mark the location of intake manifold bolts. (Oops... I didn't do that.)
- Remove intake manifold bolts, and manifold.
- Clean mating surfaces

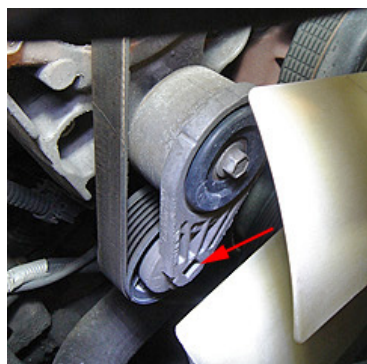
Installation:

- Set new gaskets in place and apply silicone to flat areas on front and rear of engine block.
 - Apply thread locking compound to manifold bolts.
 - Install manifold and tighten bolts in proper sequence.
- Torque: 1988-95** model years: 35 ft-lbs.
1996-2000 model years: Tighten in three stages... 2 ft-lbs, then 9 ft-lbs, then 11 ft-lbs.
- Install distributor.
 - Install upper intake manifold.

The remaining installation procedures are generally the reverse of removal.

Start:**Removing The Serpentine Belt:**

The serpentine belt is removed by rotating the automatic tensioner and slipping the belt off the easiest point, which is the idler pulley



There is a 3/8" square hole in the automatic belt tensioner (red arrow).

To rotate the tensioner, I inserted a 3/8" drive ratchet into the square hole and pushed the ratchet to the left (arrow). Then I slipped the serpentine belt off the idler pulley.

I found it best to start with the ratchet handle **straight up**, because when the belt is removed the tensioner will **rotate back**, and the wrench handle can hit the water pump pulley, making it impossible to remove the wrench.

**Draining The Coolant:**

I opened the drain valve on the radiator and placed a dishpan under the front of the car to catch the coolant that flowed from the drain hose.

For more details, see [Draining Coolant On A GMC Jimmy or Chevy Blazer](#).



Removing The Intake Air Ducting:

To reach the engine I removed the air ducting all the way to the air filter box.

For more details see [Removing Air Ducting On A Blazer/Jimmy](#)



Disconnecting The Throttle Cables:



I opened the throttle plate by hand and placed a screwdriver handle (that red thing, upper-right) in the throttle body to hold the plate open.

Then I grabbed the throttle cable connector and pushed it off the mounting peg (red arrow). I found it easiest if I turned the connector so the **cable pointed up**, then I could just **push straight down** to remove the connector clip.

Then I removed the cruise control cable by curling the wire and sliding the cable end **sideways** out of the hole in the metal bracket (arrow).





I removed the first throttle cable bracket. I used a 10mm socket to remove the two nuts.



Then I removed the second throttle cable bracket. There were 3 fasteners and they all required a 10mm socket.

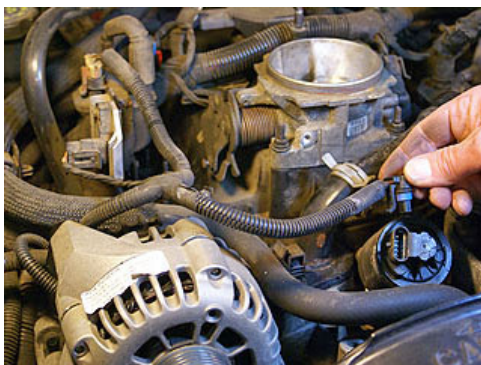
I moved the throttle cables and brackets far out of the way.



I removed the upper radiator hose.

[Read more details...](#)

Removing Electrical Connectors:



I removed several electrical connectors and moved the wire harness aside.

I removed four more electrical connectors (red arrows) that

were part of a thick wiring harness that runs across the engine.



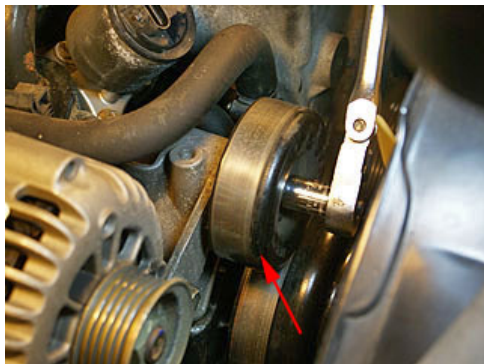
I removed the ignition wire at the ignition coil.

I just grabbed the boot firmly and pulled upwards.

I removed the ignition coil. This required removing two bolts with a 10mm socket.



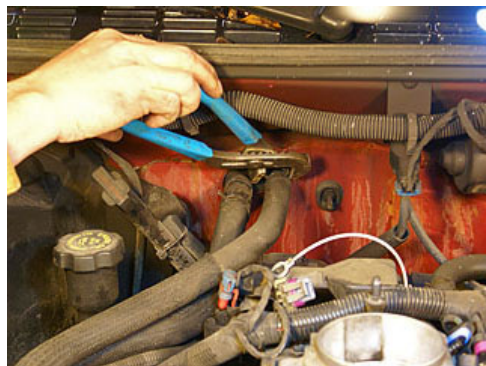
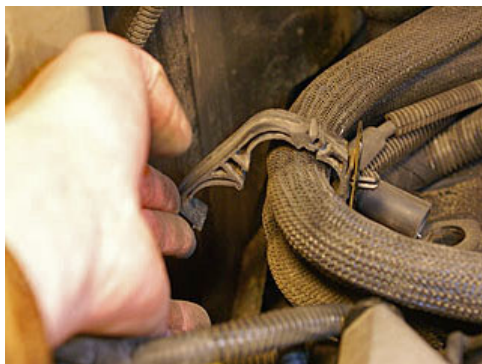
Removing The Heater Hoses:



Using a 13mm short socket, I removed the **idler pulley** (red arrow). This is necessary so I can reach the heater hose connections.

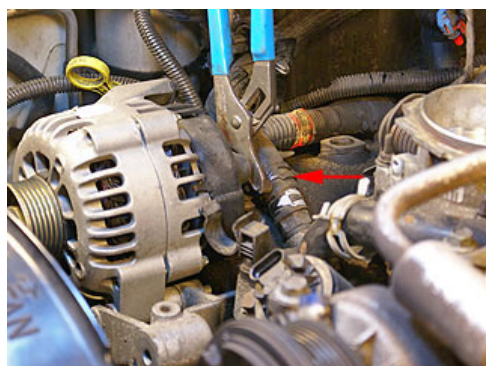
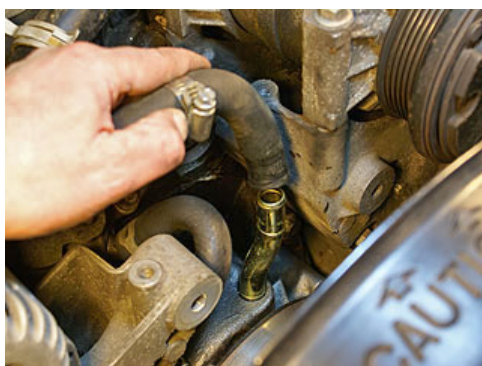
I opened up this dual hose-holder with a small flat screwdriver.

GM uses several plastic brackets to secure hoses and wires, and these can be a pain-in-the-rear to open.



I removed the clamps at the firewall and then I pulled the hoses off.

I removed the front end of one heater hose where it connected to the water pump.



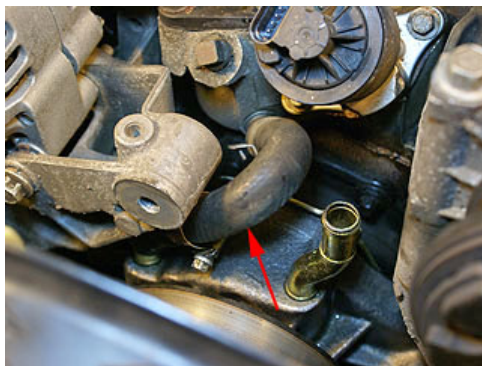
I removed the front end of the other heater hose. (I suspect this is the "return" hose).

BUT... Before doing this, I **disconnected the car's battery**. I realized that my pliers were very close to the alternator output wire, which is directly connected to the battery.

While there is only a small chance of creating a short circuit, I don't want any trouble. Besides, I'll clean up the battery terminals and apply some dielectric silicone grease to prevent corrosion. Corroded battery terminals are a common problem on GM trucks of this vintage, and it can prevent the truck from starting.

I also needed to remove this "crossover" hose (red arrow) that runs from the water pump to the intake manifold.

But... I did this later, after the alternator had been removed and the bracket moved forward, so I had more room to work.



I removed the alternator.

This involved removing the large wire, whose connector is hidden behind a rubber boot. The wire is fastened with a nut that requires a 13mm socket or wrench to remove.

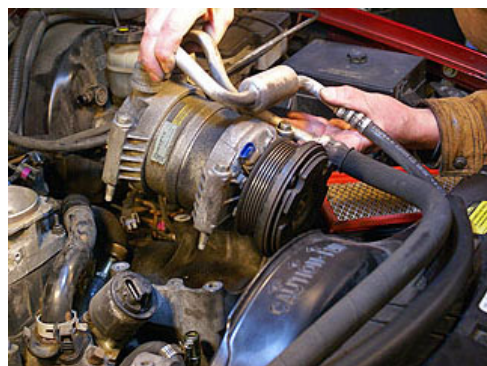
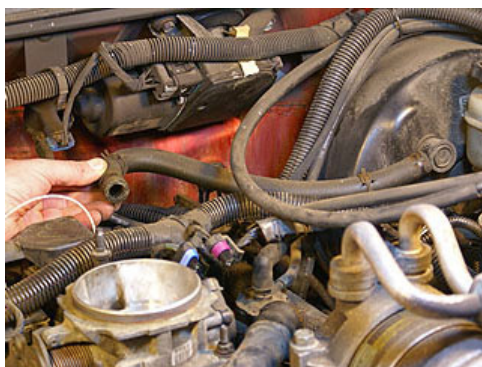
There is another wiring connector, which can be removed by lifting the release tab with a small screwdriver.

Then I removed 3 bolts using a 13mm socket. Once the bolts were removed I used a large pry bar to lift the alternator off the mounting bracket.

You can read more about [removing this alternator](#) in an article I wrote a few years ago.

I disconnected the vacuum hose that feeds the power brake booster.

While it may not be necessary to completely remove this hose, I did anyway because it gave me more room to work.



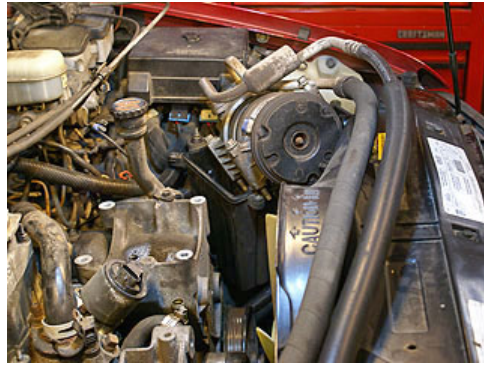
I unbolted the air conditioning compressor, using a 13mm socket and wrench.

I removed the air filter and placed the A/C compressor in the

air filter box. I didn't want it to fall and damage the hoses.

Read more about [moving the A/C compressor aside](#).

This should be obvious: DO NOT DISCONNECT ANY AIR CONDITIONING LINES. That would cause the refrigerant to leak out, which would require professional service to refill.



Moving The A/C Bracket:



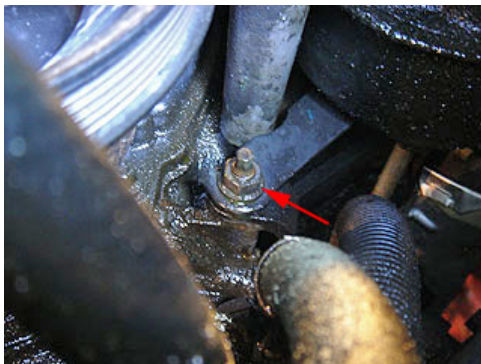
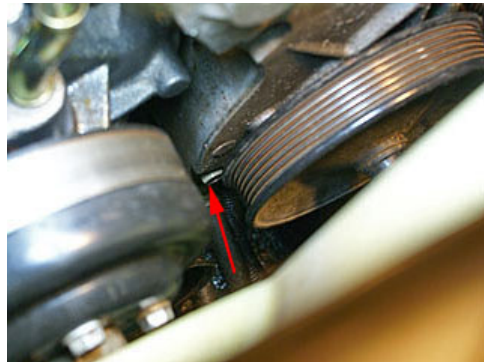
The air conditioning compressor bracket also needs to be unbolted and **moved forward** to get it out of the way. But the power steering pump is attached to this bracket, so the bracket cannot be completely removed without disconnecting hoses.

The arrows indicate the fasteners near the top... 2 bolts and a nut. These required a 14mm socket.

But... there was a **fourth bolt** way down low on the left side.

I was able to remove this bolt with a 14mm deep socket. The 3 bolts are all the same length, so I didn't need to keep track of which locations they came from.

But... the compressor bracket **still** couldn't be moved. Upon closer inspection I realized that the power steering pump was attached to a "hang hook", which appeared quite difficult to remove because the fasteners were so hard to reach.



This bolt connects the bottom of the hang hook to the engine. I was able to remove this with a 14mm deep socket and a 2-1/4" extension. I got underneath the car and placed the socket and extension on the nut, then I inserted the ratchet **from above** and loosened the nut.

By the way, there is a plastic splash guard under the front of the car, which I had removed before starting this job.

(I colorized this picture to make it easier to understand. The red area is the power steering pump; the green parts are the hang hook.)

This other fastener (red arrow), which is a **stud with a nut**, also connects the hang hook to the engine, just a few inches higher up.

Removing this nut was a b-i-t-c-h. A 14mm **deep** socket was too long (the ratchet hit the steering column) and I when I put a 14mm **short** socket on my ratchet I couldn't engage the hex on the nut. I was about to go buy a set of "mid-length" sockets, but I tried something else. I placed the short socket on the nut, then I slipped the ratchet into the socket *part way*. I turned the ratchet and the nut came off. Whew!



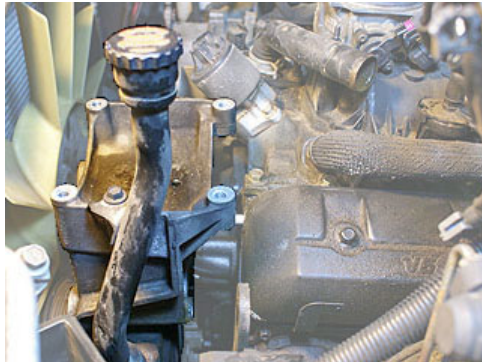
The good news was... this engine has been leaking so much oil and coolant that both of these nuts had no corrosion, so they came off without a fight.

Finally, I was able to slide the A/C bracket forward.

This picture shows the A/C bracket in the normal position...

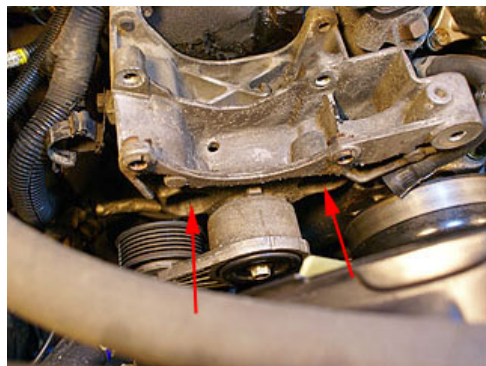


... and the bracket after being pulled forward about 2-3 inches. The movement is limited by the upper-most power steering hose. By making a slight U-bend in the hose I was able to bring the bracket forward as far as possible without sliding it off that long stud.

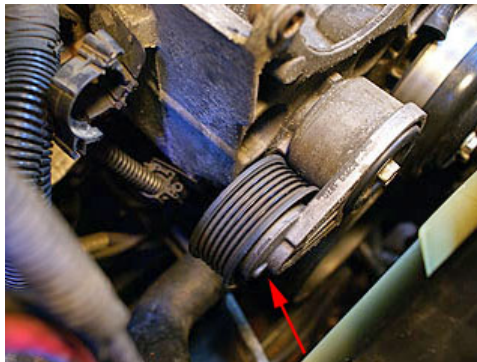


Moving The Alternator Bracket:

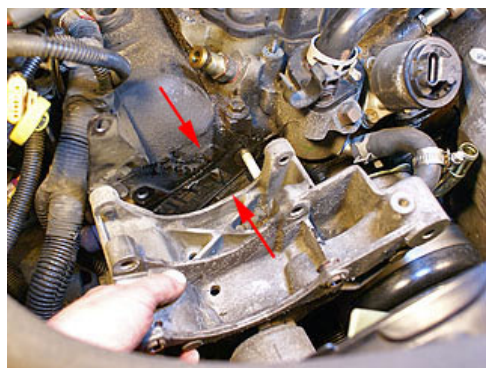
There are 3 fasteners on the alternator bracket: A bolt and nut near the top, and a bolt at the bottom left. All of these required a 14mm socket.



This photo shows the general location of the lower bolt (red arrow). It's below the serpentine belt tensioner, and it's not too hard to reach with a deep socket or a short extension.



First I **loosened** the lower bolt and upper nut. Then I used a 3/8" breaker bar (a ratchet would work fine) to rotate the serpentine belt tensioner **out of the way** of the upper left bolt. I removed the upper left bolt, then I released the tensioner and removed the other bolt and nut.



After the bolts and nut were removed, I slid the alternator bracket forward about 2 inches, which is indicated by the gap between the two arrows.

Removing The Thermostat and Tube:

It is possible to replace the intake manifold gasket without removing the thermostat and this tube. But I decided to replace the thermostat because it only cost \$9, and this part will eventually wear out.

This hose-holder clip just pulled off the threads of the stud.

Then I removed the stud-bolts with a 13mm deep socket and extension.

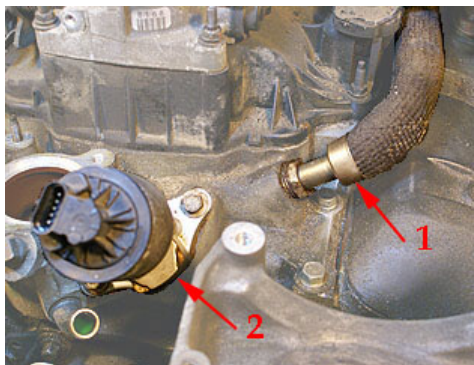




I used a small prybar to break the thermostat housing free from the intake manifold. The thermostat sits in a recess in the manifold. The thermostat has its own rubber gasket, so there is no other gasket required.

Disconnecting The EGR Tube:

I believe this tube (1) is the EGR (exhaust gas recirculation) tube, and the motor (2) controls the EGR valve which is buried inside the intake manifold.



I was able to loosen the tube fitting with a 22mm open-end wrench. A 7/8" wrench fit kinda sloppy, but it also turned the fitting.

There was also a hold-down bracket on the EGR tube towards the back of the engine, which I removed. The upper arrow indicates the bolt for that bracket.

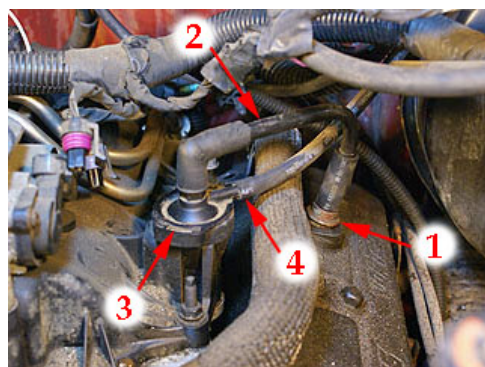
The lower arrow points to a metal bracket that supports some wires. I also removed this bracket. Note that the bolt **below** this bracket is for the upper intake manifold.



Also, directly in front of that hold-down bracket, there was a bracket that held the throttle cable. I removed that bracket too.

When I removed that back bracket, I was able to move the EGR tube a little farther to the right. Since the tube is metal, it's not very flexible, and I didn't want to kink it.

Removing The PCV Valve:

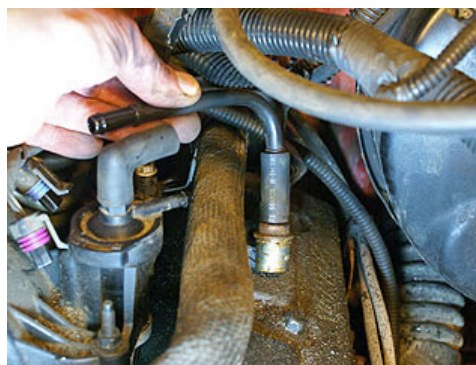


These parts are used for the positive crankcase ventilation system.

- 1: The PCV valve. This should be changed periodically.
- 2: A tube that connects the PCV valve to the upper intake manifold. I disconnected this hose by pulling on it.
- 3: Plastic connector device that is mounted on the upper intake manifold. There is nothing special inside this device.
- 4: A vacuum hose that runs toward the firewall on the driver's side. I disconnected this hose and set it aside.

I disconnected the hoses and removed the PCV valve from the right-hand rocker cover.

The PCV valve just pulls out.



Miscellaneous:

I tagged these small vacuum hoses (I think they are part of the evaporative emissions system) so I could remove them and get them out of my way. This may not be necessary.



I'm guessing that this device is the evaporative emissions purge solenoid that is mentioned in the Chilton's book.

I removed the pair of screws and moved it out of my way.



Disconnecting The Fuel System Components:



This 1999 GMC Jimmy has Central Sequential Fuel Injection (CSFI), where the fuel injectors are buried inside the intake manifold. There is a large electrical connector (red arrow) that controls the fuel injectors

Removing The Central Sequential Fuel Injection (CSFI) Electrical Connector:

First I pulled this white release "pin" upwards to remove it.





Then I used a small flat screwdriver to pull this "U"-shaped tab outwards.

There was another U-shaped tab on the other side of the connector, under the incoming wires. I pulled this outward with a screwdriver.

It was kinda tricky to keep these tabs from re-engaging. I pulled the connector upward after releasing the tab, so it wouldn't re-engage.

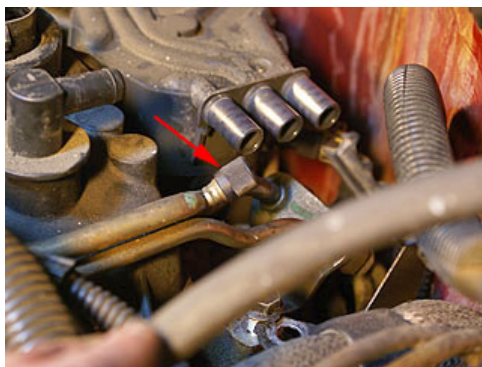


I grabbed the connector body and pulled upwards and it came out.

Notice how clean it is inside this connector. That's good.

Removing Fuel Lines:

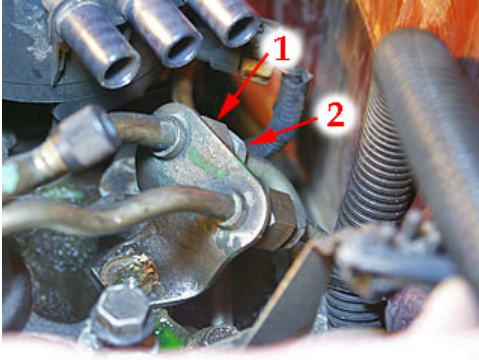
Under this cap is a **fuel system test port**, which is like a large tire valve.





First, I removed the fuel filler cap, to allow air to enter the system.

Then I placed a small plastic cup and a paper towel under the test port. I used a small flat screwdriver to push in the center pin. But... no fuel came out, which tells me that the pressure in the fuel system had gone away, possibly because of a leaking check valve at the fuel pump, or a leaking fuel injector.



This is the rear fuel line connection. The larger tube is the fuel supply line, and the smaller tube is the fuel return line that goes back to the tank.

1: Female threaded connector. **These won't turn...** they are attached to the metal bracket. Holding these required a 19m wrench.

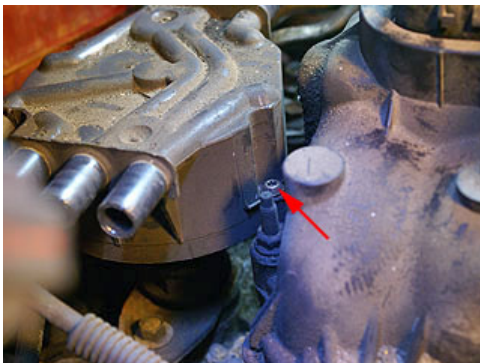
2: Male threaded tube fitting. Turning this fitting required a 16mm wrench.

But... I couldn't remove the fuel line connection with the distributor cap in the way.

So I removed the spark plug wires. Note that my numbering was wrong, but that doesn't matter as long as the wires go back in the same locations.



Removing The Distributor Cap:



The distributor cap is secured with two small **Torx**-drive screws. These required a **T20** bit. Each screw is located at the bottom of a notch in the cap.

I used a T20 bit on a 1/4" extension to remove these screws.

Once the screws were removed, I lifted the distributor cap off.

Note that this cap does not have "captured" screws that stay with the cap. These screws can be dropped easily. I used a telescopic magnet to pick the screws up after I loosened them.



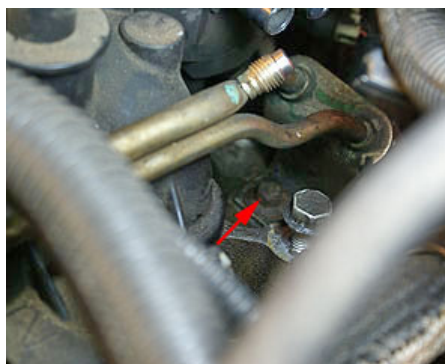
I used a 16mm open-end wrench on the fuel line connectors. I also held the larger nut with a 19mm open-end wrench, but I didn't show it in the picture because then you couldn't see a darn thing.

There was very little room to maneuver at the back of the engine, and I did not expect this to be easy. But, the fittings came loose without much effort.

I backed off the fuel line fittings until they were free, keeping a paper towel nearby to catch any spilled fuel.

Next I removed this bolt (arrow) that held the fuel lines at the back of the engine.

This required a 10mm socket.



Using an 8mm socket, I removed two nuts (red arrows) where the fuel lines enter the fuel injection unit.

Then when I pried on the fuel lines, they lifted out of the fuel injection unit.

Be careful when prying on fuel lines... it's possible to puncture a line.

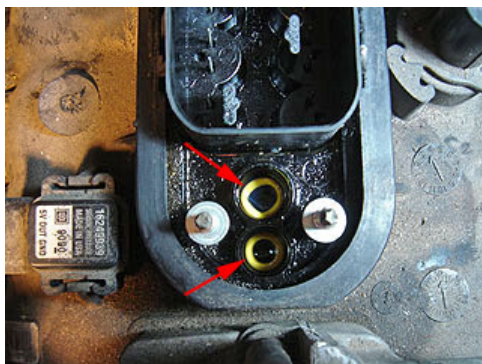


I lifted the fuel lines out.

But... before doing this, I **cleaned the area** around these tubes with a spray can of automotive brake parts cleaner and some Q-tips. There was a lot of dirt around this area, and if any of that grit gets into the fuel system it can ruin one or more fuel injectors.

Close-Up View, Looking Straight Down:

Note the yellow o-rings in each fuel connection (arrows). Underneath the yellow o-ring is a metal washer and a black o-ring. One set of these o-rings came out when I first removed the tubes.



Removing The Upper Intake Manifold:



At this point the upper intake manifold and throttle body were ready to be removed.

I used a bungee cord to lift that big wiring harness out of the way.