



03-07 Common Rail Dodge Cummins Installation Instructions

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GOLDEN FUEL SYSTEMS 7 STEP INSTRUCTIONS

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Step 1 - Installing the Trekker Tank

Step 1.0 - Necessary Tools

To start your installation it will be beneficial to have a few tools and supplies handy:

- Tubing Cutter for Cutting hard metal fuel lines



- A good sharp box cutting knife and hose cutter or side cutters to trim and cut the flexible fuel hose.
- These special blades can be purchased at most hardware stores. They are originally for cutting shingles but work great for trimming the sheath on 4B hose and trimming your switch cutout hole.



- Hand Vacuum Primer Pump for Priming Fuel Lines and Troubleshooting (not necessary, but very handy and cuts down on priming frustration and allows for quick diagnosis of restriction or air issues.) Most auto parts stores carry this item.
- Some rags or shop towels to keep things wiped up and clean.
- Although you can use screwdrivers for the hose clamps it is highly recommended to purchase some nut drivers to tighten the hose clamps. They don't slip off and will save you time and frustration. You will need 1/4" and 5/16" nut drivers. They

are cheap and easy to find at any hardware or automotive store.

- A screw gun or drill will also be handy. Again, 1/4 and 5/16 driver bits are a real help. The self-drilling screws for mounting the hardware of the kit are easily installed with the screw gun.
- A high quality set of wire strippers and wire terminal crimpers. (do not skimp here, diagnosing wiring connection issues is time consuming and frustrating.
- A tube of Teflon Pipe Joint Compound (also known as *pipe thread sealant*). *Special note: We do **not** recommend the use of Teflon tape in place of pipe joint compound. Teflon tape is much more likely to leak (either air in or fluid out.) We like the fool-proof 'smear-n-go' philosophy of the pipe joint compound.*
- 2.5" or larger hole saw to cut a hole in the trunk or bed of your vehicle to run the Triple Bypass Hose down to the frame rail. (4B hose)
- Stock Fuel Filter. Stock fuel filters remain one of the most neglected areas of a diesel maintenance regime. Diesel fuel filter during the conversion to prevent restriction issues and complicated troubleshooting after the installation.
- A gallon of coolant for your vehicle, we recommend getting a **universal formula** to mix with all types of coolant so you do not make a mistake in matching.

- Digital Volt/Ohm meter. These are less than \$20 dollars at most auto part stores and far superior to a test light. We do not recommend a test light because of its potential to damage complex computer circuits.

Step 1.1 - Preparation and Prerequisite Skills



Electrical Considerations:

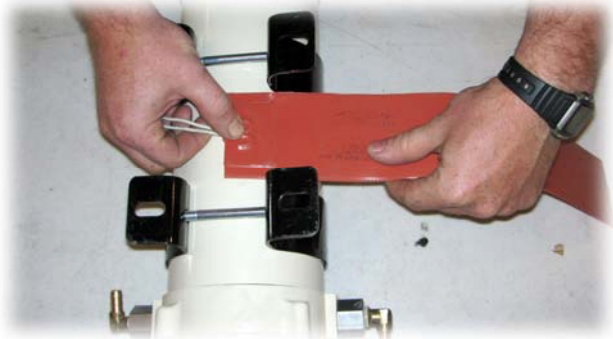
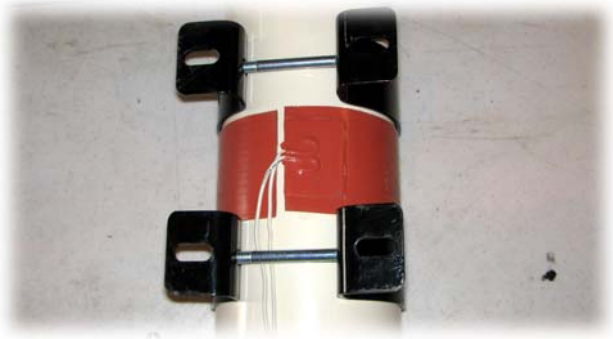

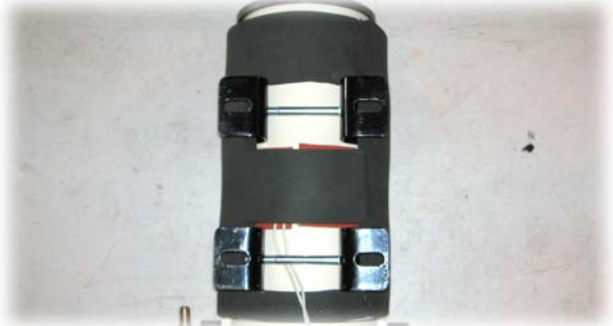
When using the supplied wire connectors, always use a proper crimping tool. Do not use pliers as they will not create a reliable connection. Always give your crimp a little tug to make sure it's secure before moving on. If the wire wiggles around in the connector, re-crimp it.

Step 2 – Assemble and Install the Trekker Tank

Overview: In this step you will mount GFS filter housing and fuel pump on the trekker tank before mounting it to the truck's bed with brackets. Remember that it is best to center the tank a bit towards the passenger side of the bed's centerline to allow room for the hole you will be cutting for the 4B hose to pass through the bed in the next step.

Step 2.0 – Assemble Trekker Tank

Assemble GFS Filter Housing	
<p>1. Locate the GFS filter housing and the fittings that screw into it. These fittings are O ring and compression style so there is no need for pipe dope.</p> <p><i>Note: Fittings in picture may be different than the ones supplied.</i></p>	
<p>2. Locate your FH1000 Fuel Filter, Filter Insulator and Heater Wrap.</p>	

<p>3. Remove the backing on the Heater Wrap and position the wiring side of the wrap in between the mounting brackets.</p>	
<p>4. Wrap the Heater Wrap completely around the Filter until both ends meet each other in the center of the back side of the filter.</p>	
<p>5. Remove the backing of the Filter Insulator and place it over the top of the previously installed Heater Wrap with the perforated side snugly against the mounting brackets.</p>	
<p>6. Wrap Filter Insulator around the Filter until both ends meet each other on the back side. Press down firmly Insuring adhesive has properly adhered to the Filter.</p>	

7. When finished, the installed Heater Wrap and Filter Insulator should be snugly fitted to the Filter. Use the large Zip ties to secure the insulator.



Mount GFS Filter

8. Position the GFS filter housing over the 4 brass nut inserts closest to the channel in the tank so that the filter covers the channel as shown in the image.





Note: Using 4 bolts is actually over kill. Using just 2 on the top is sufficient.



9. Using four of the 3/8" 16x1/2" bolts and 3/8" washers provided secure GFS filter housing to trekker tank. (Note: do not tighten bolts until all four are installed)



Step 2.1 - Mount Trekker Tank

Mounting Trekker Tank in the Bed of the Truck	
<p>1. Place completed Trekker Tank in bed so that the filter is on the driver side and the back of the tank touches the front of the bed as shown.</p>	
<p>2. Check to make sure there will be enough room between the tank and the wall of the truck bed to drill a 2.5 – 3" hole without damaging bed side to bed floor joint. (Check under bed to be sure)</p>	
<p>3. Once you are happy with location, line up black slotted steel 90° brackets on three sides so that they can be secured by two nut inserts on the tank side and one bolt through the truck bed.</p> <p><i>Note: Sometimes due to obstructions underneath the vehicle it is not possible to put the center front bracket in. Using only two side brackets is sufficient.</i></p>	
<p>4. Using (6) 3/8" 16x1/2" bolts secure brackets to tank.</p>	
<p>5. Lastly mark the drilling spot for your first bracket on the filter side. Next move the tank, drill the hole, and then reposition the tank. Bolt the filter side bracket and once secured, drill and bolt the remaining two brackets.</p>	

Caution: When considering the through bed mount location, pay attention to avoid any angled surfaces like ribs in the bed or liner that will force bracket to bend when tightening. It is also wise to check below to assure there is no obstruction below your proposed truck bed mount point before marking and drilling.

6. Reposition tank and using (3) 3/8" 16x1.5" bolts, (3) nuts and (6) washers secure tank to bed.



Step 3 - Running 4B Hose

Overview: In this step you will run 4B hose, return hose and vacuum hose through the bed and down along the driver side frame rail to the engine compartment. Then finish it off by plumbing and wiring the trekker tank.



Step 3.0 - Routing Triple Bypass (4B) Hose

Drilling 4B Hole


1. Using a 2.5"-3" hole saw bit for reference, choose a location for through bed hole to run 4B hose down to the driver side frame rail. Hole should be close enough to tank to allow hoses to flex gently while running up driver side of trekker into molded channel below filter housing. Drill hole.



Caution: Check below bed to assure you are not drilling through a body seam or rivet where the truck bed side meets the truck bed. Also assure there are no obstructions below drill area or from hole to frame rail.




<p>2. Feed the 4B and the return hose down the new hole towards driver side frame rail.</p>	
<p>3. Rout the hose along the frame rail toward the front of the engine.</p>	





Caution: Check to make sure that the 4B and return hose do not interfere with the emergency brake, transmission or transfer case linkages. The best way to do this is to set and test the emergency brake and observe below for interference. After confirming emergency brake properly functions, on flat ground, set the emergency brake then have an assistant cycle the shifters through their range while engine is not running, observing from below gives the best results. Do not permanently secure the 4B and return hose to the frame rail at this point. That will be our last step.

Preparing the 4B for Tank Plumbing	
<p>4. Using the curved box cutter blade, make a 3 foot incision on the sheath.</p>	

Caution: Do not discard as you will use it later to protect against chaff and add insulation.

3.1 Plumbing and Wiring Trekker Tank

<p>1. Take a piece of 3/8" hose and run it from port 5 on the heat exchanger to the "in" port on the filter. Rout the hose behind the filter brackets and through the channel in the tank. Now run a coolant line around the filter next too the fuel hose you just ran. Using a medium sized hose clamp secure it to port 2. Before you install the pump it's a good idea to rout the 3/8" return line behind the filter and connect it to port 6. (you will need several sections of 3/8" hose to finish plumbing the tank.</p>	 <p>The diagram shows the top plate of the Trekker Tank with several ports labeled. At the top, 'Coolant Supply 1' and 'Coolant Return 2' are in yellow. Below them, 'Purge Return 6' is in red and 'SVO Supply to Filter 5' is in green. On the left, 'Wire to Ground' is indicated with a black arrow. On the right, 'Green Wire' is indicated with a green arrow. Numbered yellow arrows point to ports 1 and 2. A red arrow points to port 6. A green arrow points to port 5.</p>
<p>2. Locate the raptor fuel pump and remove the screen from the inlet side of the pump.</p>	 <p>A close-up photograph showing a person's hands using a finger to pry a small, circular metal screen out of the inlet port of a black cylindrical fuel pump.</p>
<p>3. Bold the bracket to the front mounting holes.</p>	 <p>A photograph showing the black fuel pump mounted on a long, flat metal bracket. The bracket is secured with two screws through its front mounting holes. The pump is positioned in the center of the bracket.</p>

<p>4. Screw in fittings but do not tighten yet.</p>	
<p>5. Mount pump to tank</p>	
<p>6. Now you'll want to set the pressure on the pump. Loosen the Lock Nut and back the Set Screw all the way out. This will put you in the 10 - 15psi range. (Because of slight variances in the spring pressure, not every pump will be the same psi when backed all the way out.)</p>	
<p>7. Now from the "out" port of the filter connect it to the "in" port on the pump. Then connect the "out" port on the pump to the end of the 4B hose that goes forward to the engine compartment. (note, because of the orientation of the pump and filter "in" and "outs", it requires you to cross over from one side to the other when plumbing this stage.)</p>	

8. Now run the other coolant hose next to the hose that comes out of the pump.



Hint: Make sure that position of hoses is such that they do not kink. You may need to trim some to get them to all to lay down and run together but this will add to hose life and a quality look and make the next step easier.





9. Now take the sheath you removed from the 4B earlier and using zip ties, re-sheath the hoses where you can on their run to the heat exchanger from the 4B.



10. Use remaining shield to cover the raw metal edges of the bed hole to protect the 4B and return hose line as well. Using a few short sections and wrapping the 4B to secure hoses snug works best to prevent damage.



Wiring the Trekker Tank

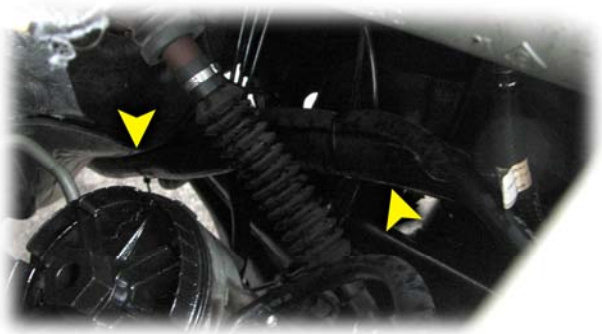
<p>11. Trim off the plug from the pump. Crimp on female connectors to the wires as shown in photo.</p>	
<p>12. Now run a ground wire from the green pump wire down to the bolt that goes through the bed directly below the pump. At this time you can also take one of the wires from your heater wrap, and the ground wire from your sending unit and ground it to the same spot using the appropriate connector.</p>	
<p>13. Connect the blue wire from the 4B hose to the remaining heater wrap wire. It doesn't matter which wire is used for ground or power on your heater wrap.</p>	
<p>14. Using a butt connector (Blue 14-16ga) secure the red wire from the 4B to the red wire on the fuel lift pump.</p>	

15. The green wire in the 4B is for the fuel sending unit. Attach the green signal wire to the sending unit pole labeled (S) with a small ring terminal (Blue 14-16ga). Connect the black wire to the pole on the sending unit labeled (G) in the same fashion. Test connections with a tug.



16. Secure the 4B hose entering the engine compartment

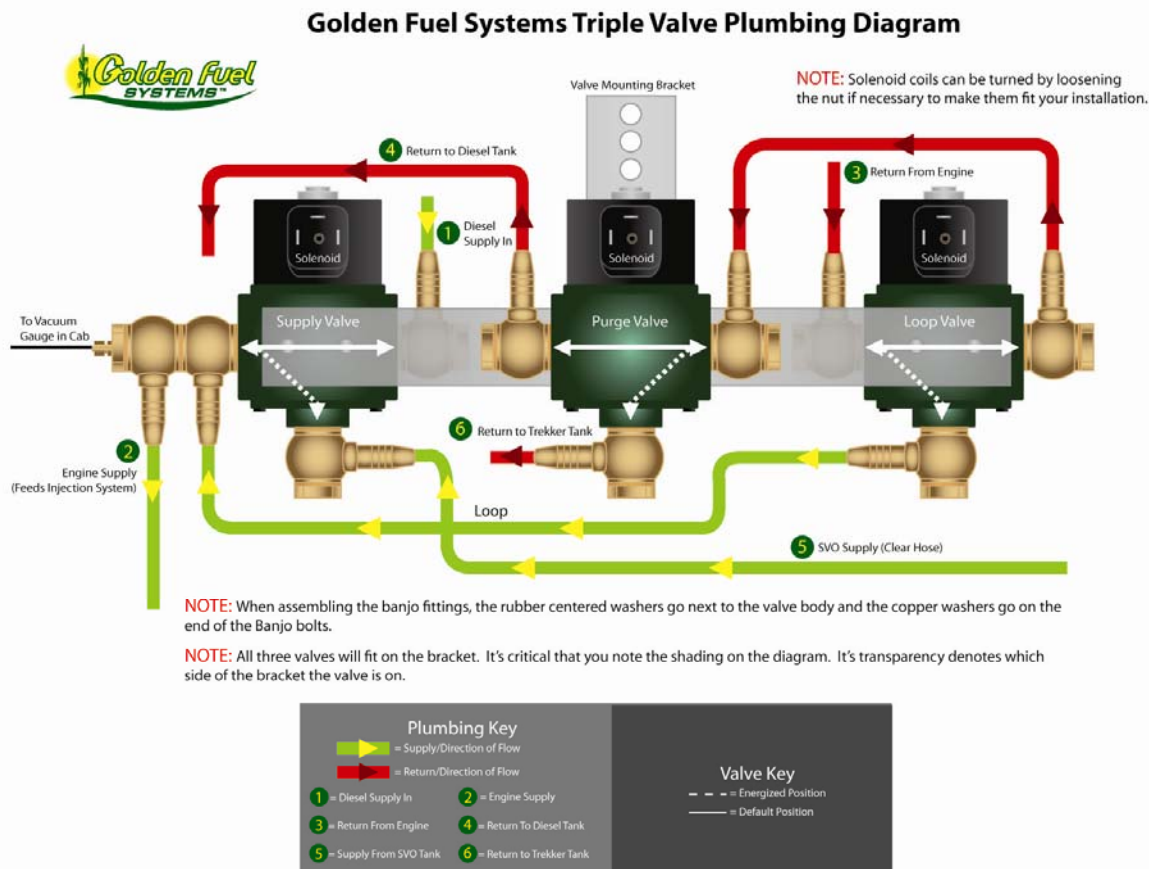
- a) Now that your trekker is mounted, plumbed, and wired you can inspect the 4B hose working from tank to engine compartment to make sure it does not have unnecessary slack in it, and check again to assure no inhibition of emergency brake, transmission, transfer case operation.
- b) Using zip ties, secure 4B hose so that it will not shake loose under driving conditions causing chafing on a metal edge or interference with vehicle operation.







Caution: Using the same method as before, check to make sure that 4B hose is not interfering with shifters or emergency brake before continuing.

Step 4 - Mounting and Plumbing Valves

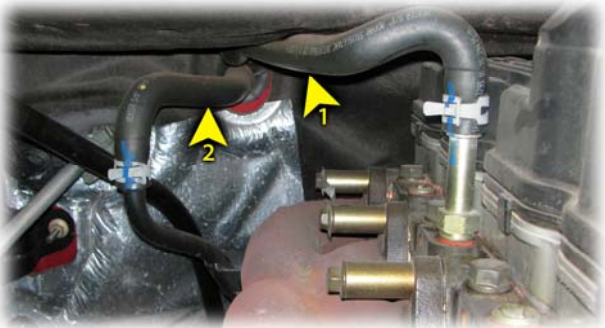
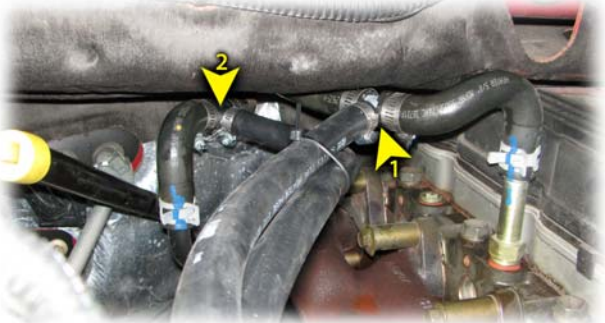
Plumbing the system is as simple as matching the labeled hoses in the image with the labeled fittings on the valve diagram found below. Cut hoses to fit and secure to valves with small hose clamps.



Step 4.0 – Mounting Valves

<p>1. Next remove the bolt as shown. Then bolt the valve bracket to the engine.</p>	
<p>2. Remove the short piece of hose shown in the picture; this will expose the engine supply and the diesel supply tap in spots. Refer to the diagram and run hoses from them to the appropriate ports on the valve.</p>	
<p>3. Cut the fuel return line with your tubing cutters here.</p> <p><i>Note: You will find this line on the inside frame rail under the drivers seat.</i></p>	
<p>4. Slip hose over the now cut ends and double clamp them. Run the hose to your valve set and hook 4 and 3 to their respective positions on the valves.</p>	

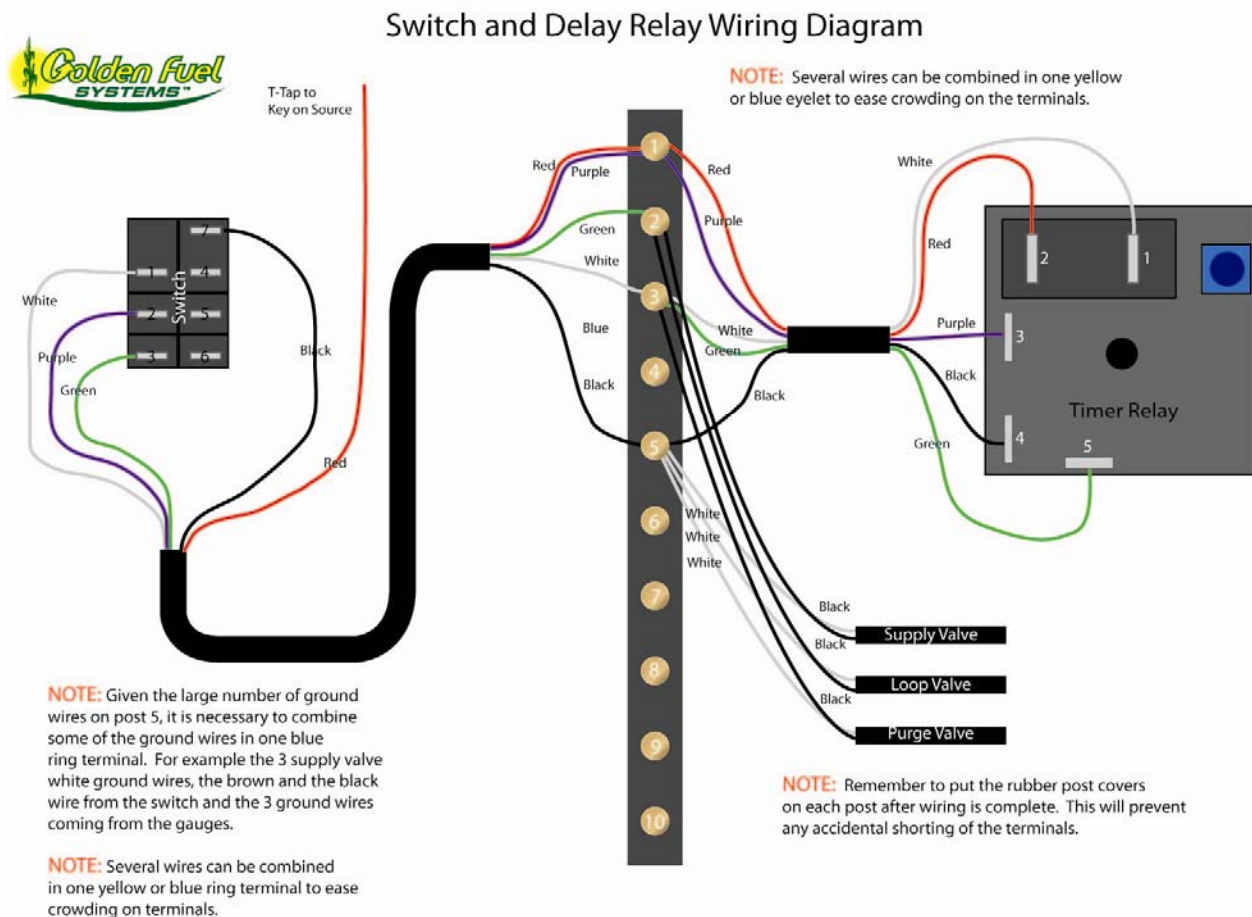
Step 4.1 - Plumbing Coolant Tees

<p>1. Place a drip pan below the location of the coolant lines where you will be splicing for coolant T installation. Cut the coolant supply hose as indicated by image and insert ½" coolant "T" and large hose clamps. Connect open end of "T" to 4B coolant hose.</p>	 A close-up photograph of an engine's coolant system. A black rubber hose is being cut with a pair of pliers. A yellow arrow labeled '1' points to the cut end of the hose. Another yellow arrow labeled '2' points to a ½-inch coolant T-tee being inserted into the cut. The T-tee is secured with a large blue hose clamp. The background shows various engine components and hoses.
<p>2. Cut the coolant return hose and insert coolant "T" and hose clamps. Connect open end of "T" to 4B coolant hose. Secure all ends of coolant "T"s with hose clamps.</p>	 A close-up photograph of the same engine's coolant system. A black rubber hose is being cut with a pair of pliers. A yellow arrow labeled '2' points to the cut end of the hose. Another yellow arrow labeled '1' points to a ½-inch coolant T-tee being inserted into the cut. The T-tee is secured with a large blue hose clamp. The background shows various engine components and hoses.

Step 5 –Mounting and Wiring Electrical

Overview: Due to the number of wires we have broken the wiring into 3 separate diagrams, however all of the wires go on the same terminal Junction.

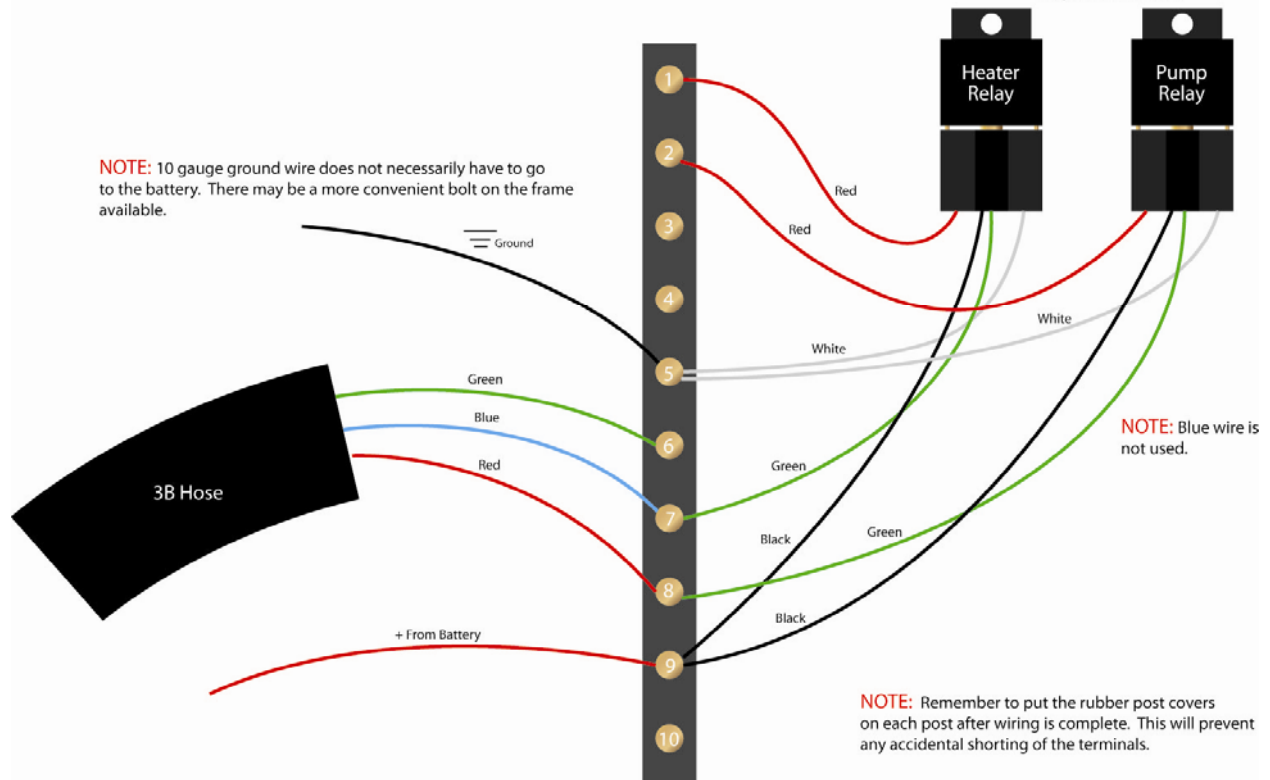
NOTE: GFS has upgraded our switch. The current wire bundle has more wires than necessary for this switch. Blue orange and brown are not used for the switch.



3B Relay Wiring Diagram



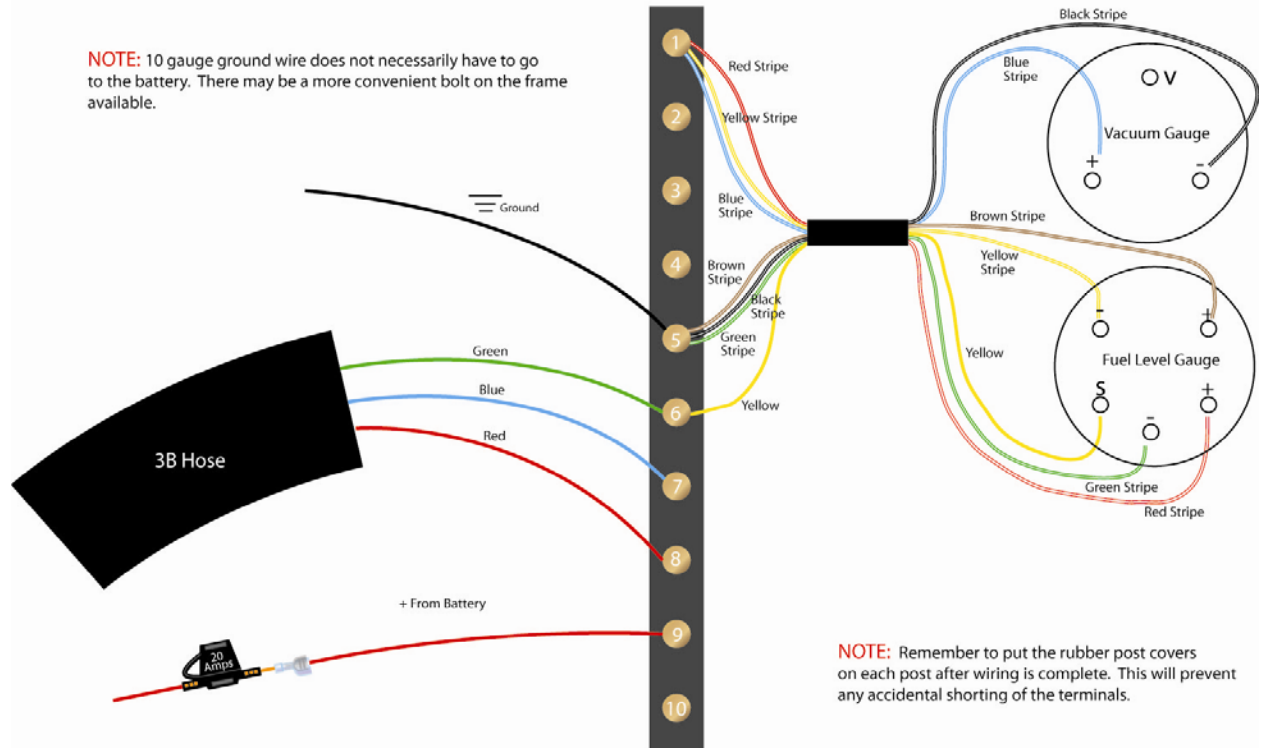
NOTE: 10 gauge ground wire does not necessarily have to go to the battery. There may be a more convenient bolt on the frame available.



3B Gauge Wiring Diagram

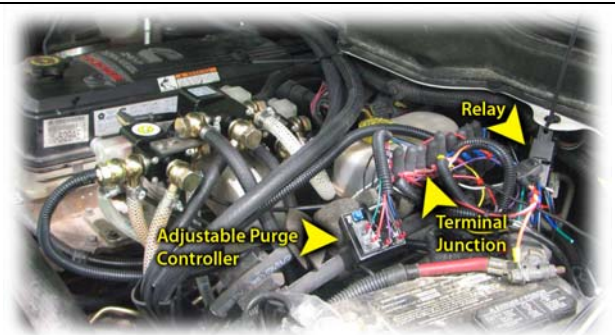


NOTE: 10 gauge ground wire does not necessarily have to go to the battery. There may be a more convenient bolt on the frame available.



Step 5.0 Mounting the Relays and Terminal Junction

1. The Adjustable Purge Controller, Terminal Junction and Relays can all be secured in the position shown with zip ties.



Step 5.1 Run Wires through Firewall

1. Take your two wiring harness cables and vacuum hose and run them through the firewall here.



This location is a plastic cover. Once located use a half inch drill bit to make the hole. You will now have ample room to run your wiring.

Step 5.2 Mount Switch

1. Using the image, to identify the switch mounting position on the dash. There is a blank insert that is perfect for mounting the switch.
2. Remove the dash piece and inspect the back to make sure there are no clearance issues or additional accessories to interfere with the installation.
3. Carefully measure and trace the hole you want to cut on the dash. Then using a very small drill bit, drill out the corners and make many small holes along the line that you traced. Next using a box cutter, cut between the small holes. Once the bulk of the material is gone, you can use the box cutter to shape the hole. (Hint, make the hole a little bit smaller than you need so that you have a little bit of a buffer.
4. Switch should rebound up from purge freely; if not there is too much pressure on the sides. You may need to finish the rough edges with a hand file.



Note: It is better to remove a small amount of material with the tool and then use a file or exact-o knife to finish the edges. Also, do not mount switch in dash piece yet. Remove it so you can wire it more easily then reinstall.

Step 5.3 Finding Key on Source

1. The 12v key on source for the Dodge is a pink wire under the steering column. Use a volt meter to confirm that it is the 12v key on source.	Dodge Cummins Diesel	
	2003	Dark Blue
	2004-2005	Pink/Lt. Green
	2006-2007	Small Pink/White

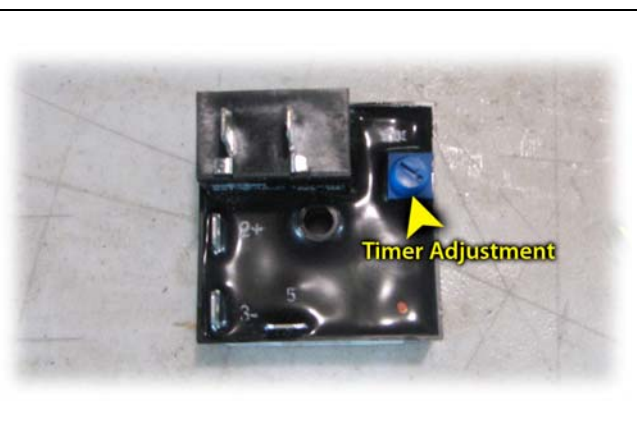
*Note: To check key on source, use a Digital Volt/Ohmmeter to find a wire under the dash that only has 12 volts only when the key is in the "RUN" position. It will not have power in the "OFF" position or the "ACCESSORY" position. You accomplish this by back-probing the wire with the red lead and then grounding the black lead. It should read 0.0 volts when the key is off but will read approximately 12 volts when you turn the key forward to the "RUN" position. This is two clicks forward, just before you begin operating the starter, when the dash lights and buzzers come on. **Use a Digital Volt/Ohm meter, NOT a test light** because of potential to damage complex computer circuits.*

Step 5.4 Wiring Key On Power

1. The red wire in the switch wiring harness needs to be T-Tapped into your 12v key on source.

Step 5.5 Adjustable Purge Controller

1. To set the timer, all the electrical connections need to be hooked up and the switch and valves functioning. Turn the timer adjustment all the way counter clockwise to start with. Now hit the purge button on the switch and time how long it takes for the light on the switch to go out. Make very slight adjustments clockwise until you're in the 35 to 40 second range on your purge.



Step 5.6 Mounting and Wiring Gauges

1. Gauges can mount in dual mount flat bracket below dash or in an “A-pillar pod”. Either way is it prudent to wire gauges before you permanently mount them in the bracket. Determine best mount for your application.

Step 5.7 Cleaning up Engine Compartment and Under Dash

1. Run split loom over the 12v supply from battery, 4B wires, and valve signal wires. The more you can consolidate them into individual split loom the cleaner the installation will appear and the easier to find wires during troubleshooting.
2. Be sure wires pass through firewall in either the factory bung or are insulated as they pass through a hole you must drill.
3. Collect any slack wire under the dash and fold neatly then zip tie to existing harnesses.

Step 6 – System Check and Test Drive

Overview: In this step you will prime both fuels and coolant, inspect and insert fuses in electrical system, then run the vehicle testing initially at idle then a 20-30 min real world test drive.

Step 6.0 – Electrical Inspection

1. Electrical Inspection

- a. In the cab, with the engine off but key on check gauges for back light and that they are reading properly. Fuel level should read but vacuum will most likely stay at 0.
- b. Next press the VO fuel selector switch and confirm that light illuminates.
- c. Then press all the way down on the switch to select the purge feature. Confirm that light illuminates and stays on for a period of time after you release the switch.
- d. Next find timer/purge relay underneath the dash and adjust the blue knob rotating left or right until the red light on the switch stays illuminated for about 25-30 seconds. This may take some adjusting but it is important step to protect the engine. Turning the knob to the right increases the duration of the lights illumination while turning the knob to the left decreases the duration of the lights illumination.

Step 6.1 – Priming Fuel

2. Priming Fuel

- a. ***If system came with fuel lift pump***, with key in the on position select Vegetable Oil fuel on the fuel selector switch. This will engage the fuel lift pump and drive VO fuel up to the fuel supply valve.

Note: Take the clear fuel line off of the valve and put it into a cup or other suitable receptacle to catch the fuel as it purges.

- b. **If system did not come with fuel lift pump**, disconnect VO fuel supply line from the fuel supply valve and use the vacuum pump to draw the fuel through the system until you see it at the pump. Once you have a steady stream of fuel, turn the key off and reconnect the hose.
- c. To prime the diesel side, press the fuel selector switch so that no lights are on, this is the diesel default position. Remove the engine supply hose from the valves and run it into a cup or other suitable receptacle and cycle the key on. Once you have a steady stream of fuel, turn the key off and reconnect the hose.

Note: Do not exceed engines red line, less than 50% of the engines safe RPM's is enough to cycle small amount of trapped air through the system.

- d. Next, with your foot still applying throttle above idle, press the VO fuel selector and maintain throttle position and engine rpm above idle until the engine sounds like it is running consistently.
- e. Lower the RPM's to idle and press the purge button to switch back to diesel.
- f. Fuel should be primed and engine should idle smoothly on either fuel.

Step 6.2 – Priming and Burping Coolant

3. Priming and Burping Coolant

- a. After confirming the engine is cool, remove the coolant reservoir cap and add fluid until it is at the factory fill level.
- b. Start the vehicle and idle the engine with the reservoir cap open for 10 min.
- c. After 10 min, turn on the heater to evacuate any trapped air from the heater core and let vehicle idle for another 10 min.
- d. Add coolant as needed.
- e. Replace coolant reservoir cap.

Step 6.3 – Short Test Drive

4. Short Test Drive

- a. Pack hose clamp size screw drivers, extra coolant, wrenches for fitting sizes, and a cell phone to take with you on your first test drive. This drive is to determine if any hidden drivability issues will present themselves so limit your route to secondary roads that are close to your installation location. It should be a 10 min drive.
- b. On your drive run engine at different throttle positions and speeds on both fuels. Assure that engine is performing normally and that vacuum gauge and fuel level gauge are responsive.
- c. After about 5-10 min of driving, pull over into a safe location and do a system inspection from tank to valves. Make sure that there are no leaks present in the plumbing or potential wire chafe occurring. Also inspect coolant level to ensure it is safe operating level.

Step 6.4 – Long Test Drive

5. Long Test drive

- a. Assuming everything worked well with the short test drive, now you are ready to run the vehicle for about 20-30 min. on all road types that are available. Bring your tools but at this point you should have no issues.
- b. Sit back and enjoy the feeling of running your diesel on straight vegetable oil!
- c. Upon returning to your installation location, do a final inspection of plumbing connections, electrical connections, and coolant level.
- d. Congratulations you have successfully installed your Golden Fuel System.

Step 7 - Troubleshooting

Step 7.0 – Recently Installed System

I switched over to SVO and the vehicle sputtered and coughed and the engine cut out. What should I do?

Most likely, the fuel lines weren't primed properly and there was air left in the system that caused the engine to turn off. Prime the fuel line by disconnecting the SVO fuel line to the switching valve and turning the accessory fuel pump on or using a hand vacuum pump until the fuel flows without any air bubbles. Reconnect the fuel line to the switching valve and tighten the hose clamp. Make sure that you are on the un-looped diesel system when you attempt to start the vehicle. If the vehicle is air-locked it might takes several attempts to start the vehicle again and to purge out the air from the system.

I've been running the car for 15-20 minutes and the vehicle is up to temperature, but the tank isn't warm. What should I do?

Most likely, the coolant lines weren't primed properly and there is air left in the system that isn't allowing the coolant to flow properly. Prime the coolant line with a water pump or hand primer pump. You might have to cycle the coolant a couple of times to purge the air pockets completely. Make sure to check your coolant level, as well.

Step 7.1 – Mature System

I switched over to SVO and am experiencing acceleration issues and lack of Power. What Should I do?

Most likely, there is restriction in the SVO system. This is usually caused by a clogged veggie filter. Change the veggie filter. Don't forget to prime it (fill it up with fuel) and make sure that it is sealed well.

I changed my SVO Fuel Filter and am still experiencing acceleration issues and lack of Power. What should I do?

If you are running a system that utilizes the stock fuel filter for both veggie and diesel, you might need to change the stock fuel filter.

I changed the SVO and Stock fuel filter and am still experiencing acceleration issues and lack of power. What should I do?

Most likely, there is some other source of restriction that will have to be traced down. Restriction can be caused by numerous foreign objects that get pulled up into the system.

I switched over to SVO and my vehicle began to sputter and cough and the engine cut out. What should I do?

Most likely, there is air that has been introduced to the system. If you just changed your fuel filter and didn't prime it properly, that could be the source. If you primed the filter properly, check to make sure that there is nothing loose on the filter. If nothing on the system has been changed recently, then the air leak will have to be traced down. A hand vacuum pump is convenient to trace down air leaks. Check all hose clamps and fittings for a secure fit, as well.

Step 7.2 – SVO Cold Starting

You forgot to shut down on diesel! This is part of the “SVO Learning Curve.” Most folks running SVO have done it and chances are that you will, too. Every once in a while, we act like humans and forget to flip that switch before we shut down for the night. Don't panic, it's an easy fix and it doesn't harm your vehicle. Here are a few recipes that'll get you back on the road.

The first thing to do, before any of the following suggestions, is flip your fuel selector switch to Diesel. If the weather is above 45 or 50 degrees simply cycle your glow plugs twice and start the vehicle. It will likely require more cranking than normal but once it fires up it should clear out. Keeping your accelerator 50% engaged will help matters. If this approach doesn't work, try some of the suggestions below. These suggestions can be used separately or together (in the event of particularly harsh weather). **When cranking, be sure not to run your starter for more than 30 seconds at a time, allowing it a 60 second break between attempts, otherwise there is a risk of burning up your starter.**

1. **Plug in your block heater.** You can plug in your block heater and wait a couple of hours. Then cycle your glow plugs once or twice and she'll likely pop right off with minimal cranking of the starter. Just about every diesel has a block heater and sometimes they're worth their weight in gold.

2. **Place the vehicle in a heated garage.** If you are parked in a garage and it can be heated then by all means turn the furnace on.
3. **Heat via light.** You can place an incandescent or metal halide (fluorescent lights will not get hot enough) shop light shining on your injection pump, wait about an hour, cycle your glow plugs, and she should fire up!
4. **Hair dryer or heat gun.** Blast hot air on your injection pump and injectors until they feel warm. Cycle your glow plugs and crank her up.

Step 8 – Seven Golden Rules of Gathering SVO

It is highly recommended that you watch the DVD Liquid Gold available from www.goldenfuelsystems.com that deals specifically with collecting and filtering oil. Pictures are worth a thousand words and moving pictures with commentary are priceless.

Gathering Rule #1: Drive around back and inspect the oil before asking the owner if you can take it. The last thing that you want to do is make contact with a manager and then get permission to take the oil only to find out that the oil is less than desirable.

Gathering Rule #2: When checking for oil quality, note the consistency, color, and clarity of the oil.

Consistency - Open the bin, peer in, and kick the side of the bin to generate a bit of a wave. If it doesn't move at all (provided it's not a concrete grease trap), walk away. Even in 30°F weather, there should be some fluidity to it (for more information on gathering in the cold, see the next section Wintertime Gathering, definitely worth your time).

Color - If, looking down into the bin, you note the color of the oil is creamy, thick and milky looking, decline the oil. While such oil is certainly usable, it usually eats up more time and filter bags than it's worth. The milkiness is more free fatty acids (aka FFA's) and likely more water than you want to mess with. The actual color does not matter. It can look like new Wesson oil straight off the shelf, light ice tea, or maple syrup. The color will vary mattering on the type of oil (canola, peanut, coconut, etc.), what was cooked in it, what temperature they cooked at, and how long it was used.

Clarity – This is the most important test of all. This test is for warm weather collecting. Find a clear container and take a sample of the oil. Hold the sample up to the sun or a bright light and check the clarity. You should be able to see through the oil to the other side. If you can see through it then by all means it is great oil and I would collect it for use in my vehicle. If it is just a little hazy then I would take the sample home with me and let it set for a while to see if the oil settles out. If in a couple days the sample that you took settles out and looks clear when held up to a light then it is good oil. I would go back and collect the oil. Then take the oil home and let it settle out for a few days (or a couple weeks if possible).

The longer you let the oil settle then the more sediment will settle out and the longer your pre-filter bags will last! If it is cold outside and the oil in the bin at the

restaurant is thick and creamy I wouldn't walk away just yet. Take the oil sample just as you did before (in a clear container) but now you need to warm the oil up. Warming the oil up above the cloud point will melt any FFA's that have changed state. You can warm the oil by simply holding the container in front of the heater vent of your car or you can take the oil home and let it warm up and settle out there. The oil will slowly clear up and hopefully become translucent. Then you can make a decision on whether to collect and process it or not.

As you gain experience and knowledge with the visual and characteristic differences between good oil and bad oil you will be able to dip a stick into the bin and inspect the oil droplets as they fall off the stick. This is usually good enough for a seasoned Golden Fuel Systems burner to determine if it is worth their time in processing.

Gathering Rule #3: When proceeding to ask someone if you can take the oil, knock on the back door. All restaurants have a back door for receiving. Just knock on the door and ask the first person that answers the door if you can have their waste vegetable oil. Most of the time you will either get a 'yes' or a 'let me find out' and then they will find someone who does know. There is no real reason to bother the manager if you don't have to. This usually saves everyone time and hassle.

Gathering Rule #4: Don't bother with the practiced WVO speech about how you're working on this alternative fuel project and how you can run a diesel engine on waste vegetable oil and how you need their oil, etc. Most of the time, they are busy with work and other customers and are not interested. If they're interested, they'll ask what you are using the oil for, at which point, you can go a little more in depth with your explanation if you want to. Otherwise, keep it short and sweet: "Do you mind if I take a little bit of your used vegetable oil?" usually does the trick.

Gathering Rule #5: Never take the oil without the restaurant's consent! This is the golden rule of oil gathering, and should never be broken. Doing so can spoil it for all WVO burners. Even if restaurant owners have to pay to dispose of their oil (like most of them do), they're still likely to view such unsolicited favors as thievery. There have been reports of people who did not ask permission and had the police called on them.

Gathering Rule #6: Once you start pumping, never pump past the settling line! The settling line is the point of the grease bin where all the solids have piled up, and the oil will be thick and creamy. You do not want to collect the creamy stuff. The creamy stuff will clog your pre-filter bags very quickly. Don't take oil from any lower than at least 2" above the settling line is a good rule of thumb to follow. We are all guilty of getting greedy for that wondrous, free, eco-friendly oil, but it's not worth your time and pre-filters to take the settled junk.

Gathering Rule #7: Never leave a mess at a restaurant grease bin. Try to keep your gathering as clean as possible. We don't want gatherers to be declined by restaurant owners because of the mess someone else made. They're giving us fuel, so let's return the favor by showing them the respect of a clean pull.