

ENGINE LIFT PUMP PROBLEMS SOLVED!

2004 Itasca “Horizon” 40AD

CUMMINS-ISC-350-CAPS FUEL INJECTION SYSTEM

PLUS -- FASS TITANIUM LIFT PUMP INSTALLATION

**Read all about upgrading your stock lift pump
...and solve your fuel delivery concerns!**

(8/1/2019)

THE CUMMINS ISC LIFT PUMP

These were the engine problems and symptoms we experienced over two seasons and after logging more than 6,000 miles of driving... and what we did to fix them:

- Slightly slower engine starts over time.
- Cold temperatures (below 35F) contributed to longer start-up or no-start conditions.
- The engine would not start until we changed the fuel filters...then it would start.
- Filter changes became shorter over time. The first change occurred with only 9,000 miles; and then the next time there was only 6,000 miles on the filters!

...And because the engine started we thought we picked up some bad fuel. However, this was not the case as we later discovered the real problem. (See below.)

- Climbing a grade faster than 35MPH sometimes caused the engine to cough and sputter.
- ¼ tank problem. This means the above problems presented themselves on two occasions when we shut the engine down with less than ¼ tank of fuel. (This is something common in older Dodge Ram trucks. However, our guess is that RVs are not reporting ¼ tank problems, because RV owners either don't park that often with less than a ¼ tank or RV owners are not aware there is a ¼ problem. Instead, they think they got bad gas because (like us) the engine starts and keeps running after the fuel filters are changed. However, the real problem probably lies elsewhere.
- At one point I thought the fuel tank vent might have been clogged, because I opened up the fuel cap and the engine started. However, this was my 4th attempt at starting my engine and as the engine heated-up the air leak sealed itself enough to keep the engine running. “The say: “Three times is a charm.” ...But we found our engine kept on running the 4th time we tried starting it.

Apparently, partially used filters reduce fuel line vacuum pressure and this contributes to your CAPS fuel pump starvation, because the gear driven pump loses suction as it draws fuel from your tank over 30 feet away. And when you starve your CAPS pump of fuel you are effectively reducing pump lubricity, which will lead to premature failure.

- And finally, this summer in 70F weather, our ISC engine would start and then quit 1 minute later. ...And with no way to get out of our camp spot, I was motivated to do some additional research on this subject. And that's when I found the solution to all my engine problems described above. And then I did more research to better understand the benefits of upgrading to a FASS electric fuel pump.

These are my experiences and I am sharing them to help other RV owners who might be plagued with these type of problems... so they don't have to go through what we experienced.

WHAT WAS THE SOLUTION THAT ENABLED ME TO START MY ENGINE?

Apparently, air was getting sucked into the fuel lines between the Transfer Pump gasket (aka Lift Pump gasket) and the fuel manifold. So we accessed the top of the engine (thru the bedroom floor) and tightened the 3 Lift Pump Bolts! That was it! And all the above problems went away!

And because I did all the work it did not cost me anything to fix, but 1 hour of my time. And for over 2 seasons we were wracked with problems, and twice I thought I would have to call a tow truck. I even took the coach to a diesel mechanic who suggested my fuel lines might be rotting-out from the inside due to ULSD fuel. (...But I did not have my fuel lines replaced, even though I was seriously considering it!) And never once did any diesel mechanic suggest to tighten the lift pump bolts!

Note: Do not put too much torque on those 7/16" lift pump bolts. The last you you want is to break one off or strip a thread or three.

We put almost a full turn on our bolts and that stopped air from leaking into the fuel lines. And after we tightened those bolts, our engine started and kept on running! Hurray!

So let's summarize:

- If your engine starts... then your lift pump is doing its job! And your problem is most likely a fuel delivery problem based on either or both of these two conditions: A) You have blockage caused by algae in your CAPS Accumulator Block or you might have partially clogged fuel filters like we did, but this was not the root cause of why our engine would not continue to run ...Or B): You have a fuel line vacuum problem caused by air getting sucked into the fuel line... like we did.

➔ Specifically, if you find yourself changing fuel filters prematurely, then maybe your lift pump bolts are loose?

Note: As your fuel filter traps contaminants, it increases back-pressure that will cause your vacuum pressure to drop below the minimum -5PSI limit; and when your CAPS injection system gets starved of fuel it will lose lubrication, and your pump will wear more until one day it will fail.

ULSD fuels also do not contain as much sulfur content in them as they once did, and sulfur provides lubrication. ...So less sulfur means less lubrication. ...And this is why many owners like to use diesel fuel additives like Lucas and other brands. (While other owners don't believe

in these products.) Note: We just tried Howe's diesel fuel additive and like it very much. Plus it's much easier to pour into your tank vs. Lucas which is thick and takes longer. I also think our diesel generator injectors like Howe's so that's going to be our new brand from now on!

Back to the subject at hand. ➔ To make matters worse, based on our experiences, when you lose your CAPS pump... 90% of the time you also lose your ECM.

➔ And the cost to replace your CAPS will run \$5000 - \$6,000. And if your ECM needs to be replaced at the same time you will spend \$8,000-\$9,000 in repair bills. (This is partially due to the fact it is so hard to replace the CAPS pump in your RV, given there is not much space between your CAPS pump and the Freightliner Evolution Chassis frame rails; and also because Cummins charges and arm and a leg for the CAPS injector pump; and everyone pays more to repair an RV, which should not be the case, but those are the facts as we have encountered them.

The real "pisser" is that there are only 4 bolt that hold the CAPS pump to the engine. That's \$2,000/bolt and believe me, I was not happy when I got this bill. So when we share this information with you it comes from our experiences... and from the heart! We just hope you find this information useful so you don't get stranded somewhere... because you did not tighten your 3 lift pump bolts!

To gain access to the top of our engine in our 2004 Itasca Horizon, you will enter through the bedroom floor. This floor board is beside the bed and the closet and you need to find the wood screws that hold it down. (Look inside the pile of your carpet.)

And you have to also pull the trap door in the closet to remove the "L-Bracket" screws which help support the floor you walk on.

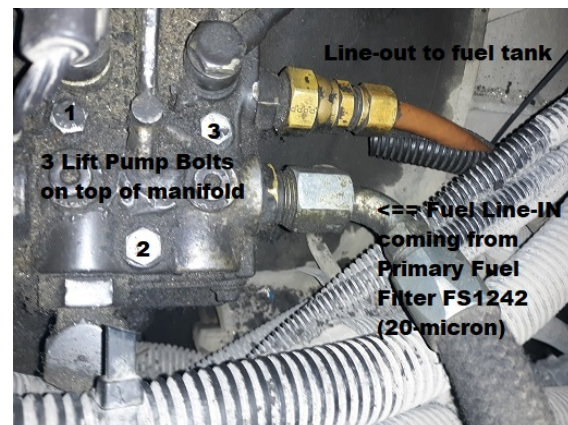
Note: We also added insulation over the engine lid and in the closet and under the bed too! This cut down on the heat entering the bedroom from the engine compartment and it's very easy to do!

Just buy the water heater insulation blankets so you have plastic backing on the insulation and not paper backing.

We bought 4 of these water heater rolls to complete the job... and now our basement AC performs better, because it was not sucking hot air in from under the closet.

The 3 lift pump bolts (7/16") are labeled below:

The is the top view of your lift pump after you open the engine compartment lid:



...And in the diagram below you can refer to #6 to see the profile of the bolt(s). There are 3 of them we assure you.



FASS TITANIUM LIFT PUMP INSTALLATION

And now we come to the part in this paper where we discuss how we solved our fuel delivery concerns by adding a FASS electric fuel pump.

We did this upgraded for 2 main reasons:

- 1) We wanted to provide (+) positive fuel pressure to the CAPS fuel pump to make sure it never gets starved of fuel again;
- 2) It was relatively easy to install and the price of the FASS Titanium "Signature Series" pump dropped to \$673 for the Dodge Kit. This Kit can be bought from FASS authorized distributors and all will charge the same price. We bought ours from Parley's Performance Diesel.

FASS says there are many other benefits to air separation, but in our opinion it's hard to put a price on these. Plus we are not needing a high volume fuel pump since our horse power in our ISC engine will remain under 600HP. So our reasons for upgrading came down to basically an "insurance policy"; i.e., we did not want to end up with another CAPS fuel injection failure that would leave us stranded somewhere on our vacation. And installing any FASS pump would meet this objective.

That said, we felt the FASS Titanium "Signature Series" (TS) pump was worth the extra effort to install vs. the FASS Adjustable (FA) pump for several reasons explained below.

FASS offers you 2 choices to upgrade your Cummins-ISC to a FASS fuel delivery system:

OPTION #1: The FASS "FA" Lift Pumps allow users to adjust the fuel pressure to match their specific needs and/or use their own filtration solution. (\$495)

This adjustable pump is rated at 95 gallons of diesel fuel per hour and come preset at 15 PSI. Using a 1/8" Allen plug, you can make a quick clockwise adjustment to increase pressure or counter-clockwise to decrease pressure to spec (16-18PSI)

...To install the FA pump you will place it in-between your Primary 20u (TS1242) and your Secondary 10u (TS1022) filter set-up.

...And electrically you will wire the same as the TS pump.

FASS Part# FA D08 095G



Notice there is no return fuel line on the FA pump, because this pump does not recycle unused fuel to the tank.

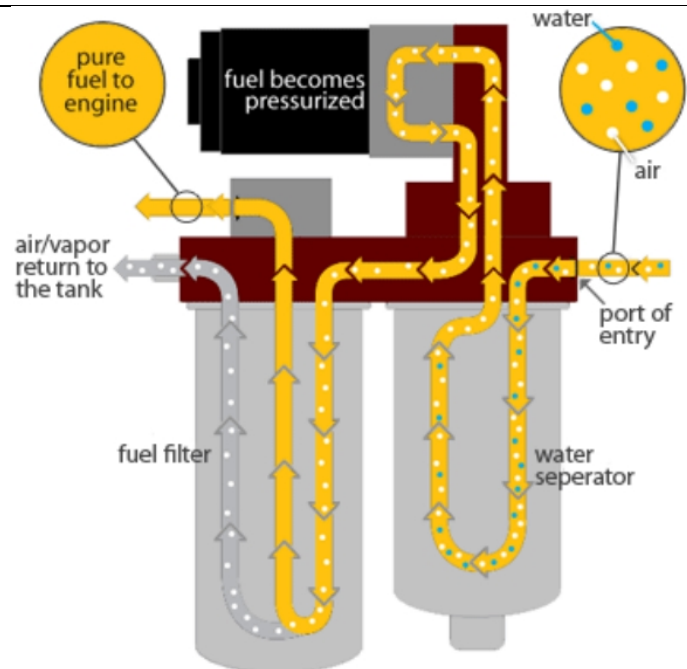
OPTION #2 : FASS Titanium "Signature Series" 95 GPH \$673 Part#: TS D08 095G

Fitment Notes: 1998.5-2004.5 Dodge Cummins (95gph) **Pre-set at 16-18 PSI**

* **Air Separation benefits:** Smoother engine idle, less injector wear, better performance.

* This pump recycles air and fuel from the FASS Pump back to the tank **over-and-over**, thus improving fuel quality delivered to your injection pump. This is what FASS calls "Fuel Polishing."

- We also rearranged our filters by putting the FS-1242 (20u) filter as the FASS #1 Filter (Note: This is the suction side of the FASS pump so don't go any smaller than 20u.)
- We used our FS-1022 (10u) filter as the FASS #2 filter, because it has a built in water sensor that our "Water In Fuel" warning light hooks up to.
- And our #3 Filter is the FASS FWS-3002 (2u)



- PF-3001 is a 140-micron Water Separator Filter
- XWS-3002 is a 2-micron cellulose Fuel Filter

Summary of your two choices: Adding a FASS "FA" pump is good, but adding a FASS Titanium "Signature Series" (TS) pump is better!

And when comparing costs the TS pump to the FA pump, the TS pump will require about 36' of ½" blue FASS fuel line (you can buy from FASS at \$3/foot) and about \$20 of misc. parts not included in the TS Kit designed for a Dodge Ram truck.

Installing the TS pump will also take you about 2-3 additional hours to install, because you have to route the fuel line and splice it into the fuel filler neck the FA pump does not utilize, but we think the Titanium TS Pump is a superior product and we like having a fuel filtration system that will remove contaminants down to 2-microns, in addition to the "fuel polishing" and the TS pump is designed to separate air out of your diesel fuel, which you will learn more about below.

We think almost anyone can install the Titanium TS pump if you are armed with the information in this paper to help you get started, and if you are not sure about wiring the pump up after you install it, then you can always take your RV to a qualified diesel mechanic to finish the job.

WHAT IS FASS?

FASS Stands For: Fuel Air Separation System

FASS believes their pumps offer the best air separation on the market today. And from the YouTube videos I watched, I have to say I am impressed.

Overall we think the TS pump outperforms the adjustable FA pump, so if you are going to the trouble to install a FASS pump we recommend installing the best... and that's the TS pump. As for the Cummins lift pump, it's a good pump, but we feel it's the wrong pump for diesel pusher applications since the CAPS gear pump has to draw fuel (under vacuum) from over 30 feet away vs. the FASS pumps that are bigger, stronger, and will provide (+) positive fuel pressure to your CAPS injection system.

Winnebago should have offered a FASS solution, but you can't fault them, because the FASS solution was not available back in 2005. And the FASS Titanium "Signature Series" pump just got released in March-2019.

Further, if you have a High Pressure Fuel Rail System, it may be even more beneficial for you to install a FASS Titanium "Signature Series" TS pump, because HPFR injectors operate at higher pressures and are more sensitive to air separation concerns vs. the fuel injectors used in a CAPS system.

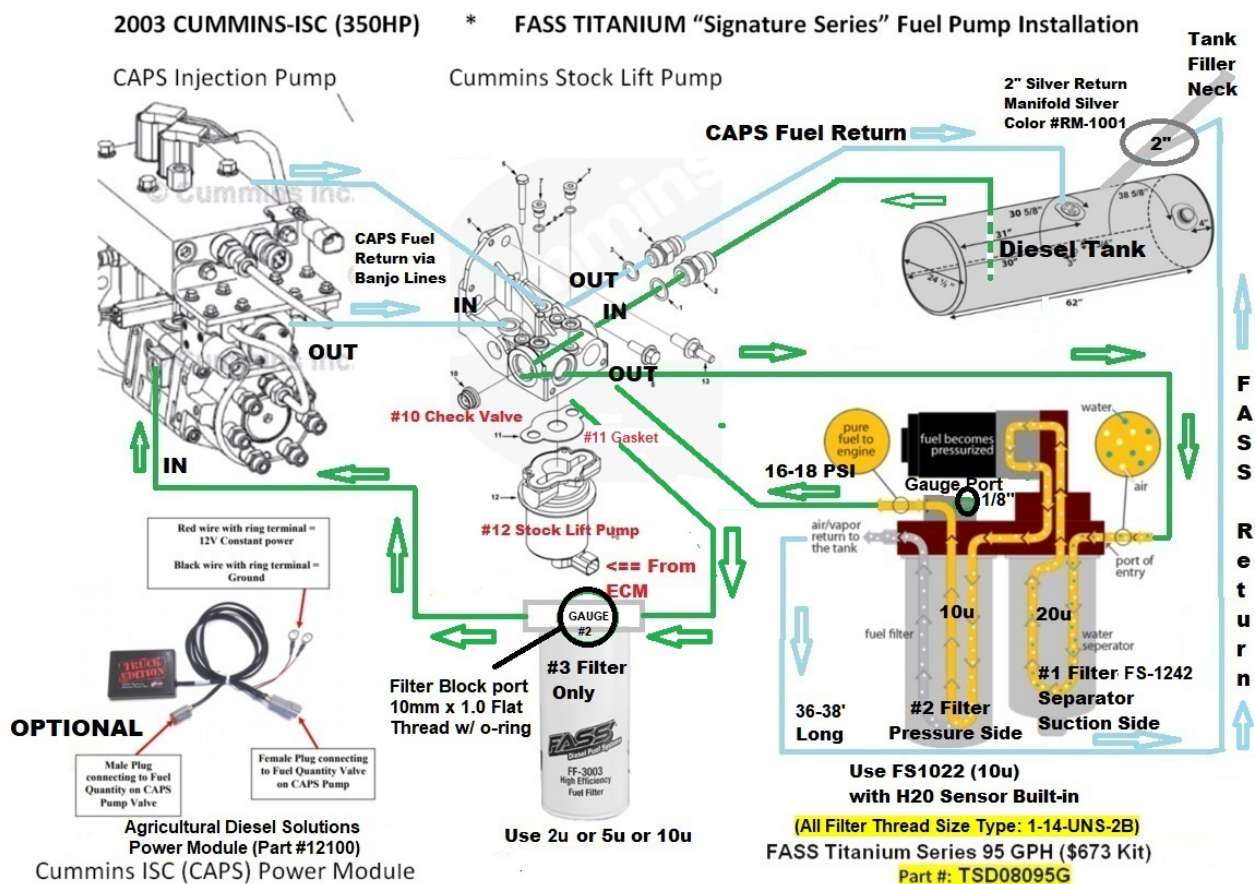
FASS says that when air is introduced into the fuel delivery system, it can interfere with the atomization of your fuel injectors. And if you did not know, diesel fuel will not burn unless it is atomized. So there may be some truth to these claims. On the other hand, CAPS injectors do not fail very often and can pass debris the HP Fuel Rail Systems "choke" on!

The most important and most valuable benefit of adding any FASS pump (TS or TA) to a CAPS injection system is to provide (+) positive fuel pressure to the CAPS injection pump, as this is supposed to prevent fuel starvation and early CAPS pump failure.

And because FASS uses the same filter thread sizes, we were able to re-use our new Fleetguard filters – and rearrange them. So our new FASS filtration system in our RV is based on 3 fuel filter types: 20u → 10u → 2u.

Note: Our engine preformed perfectly after we took out the primary filter and substituted a FASS TS pump in its place. We did not re-route the fuel lines at all, and our fuel pressure gauge indicated 15 PSI under acceleration and 16PSI at idle. ...And if you look at the following FASS Fuel flow diagram you will see our RV fuel deliver still sends fuel through the lift pump manifold. However, fuel will not pass through the Cummins Lift Pump when it's turned off. So we just left the Cummins Lift Pump where she sits, and disconnected the electrical leads so it cannot turn on. Note: If you run both FASS and the Cummins Lift Pump at the same time you will see 32PSI delivered to your CAPS injection pump; and while Cummins only specifies a minimum of -5PSI (vacuum) we do not think it's a good idea to run your engine with 32PSI of positive fuel pressure... even if the CAPS lift pump only stays on for 30 seconds. (See the section below on installing a relay when you disconnect the ECM electrical wires to the Cummins Lift Pump.)

NEW FLOW DIAGRAM WITH FASS TITANIUM PUMP



Note: We did not add the Optional ADS Power Module, because we did not see the ROI, but it's easy to install (1 hour or less)... and we may add this upgrade next year. (TBD)

WHAT ABOUT THE FASS ADJUSTIBLE “FA” PUMP?

As mentioned earlier, FASS also makes an adjustable pump. These “FA” pumps do not have any filtration capability and if you decide to use this pump you would install it between your primary and secondary filter.

The FA pump does not have a fuel return line so it is easier to install, but you have to devise your own mounting hardware since the FA pump does not come in a KIT. Most importantly, if the FA pump ever fails your engine will quit; i.e., the pump will block fuel flow and you have to remove it or replace it to start your engine.

This is not the case with the TS pump; i.e., if your TS pump ever fails your engine gear pump will still draw fuel from the tank (through the TS pump) and you can drive your RV to a repair facility.

Pricing on the FA pump is \$495 for just the pump, but it does not come in a Kit. So you still need to order all the miscellaneous parts, which basically means the price of the FA pump, after you buy these necessary parts, will end up being about the same price as the \$673 TS pump Kit (**Part#: TS D08 095G**) marketed for the Dodge Ram truck. (Note: This price comparison does not consider the \$130 you will spend on 36' of 1/2" blue fuel return line at \$3/ft to install the TS pump, plus shipping.)

All things considered, the FA pump will take about 2-3 hours less time to install, because there is no fuel return line to install; but we feel the TS pump offers additional, worthwhile benefits the FA pump lacks.

Either FASS pump (TS or FA) will be an upgrade over your Cummins stock lift pump and we highly recommend you install one of these FASS pumps ASAP. This is especially true if you have over 50,000 miles on your RV. (Note: We lost our CAPS pump and ECM at 73,000 miles and it cost us \$9,100 to replace both.) So why wait for your pump to fail and leave you stranded? If you are think you are going to own your RV for another 3+ years and 30,000 miles we recommend you make it a priority to upgrade your fuel delivery system to a FASS fuel pump ASAP!

To Install A FASS TS Pump In our RV we purchased these additional parts:

- 1) 1998.5-2002.5 Dodge Ram Truck (95GPH) pump Kit: **Part#: TS D08 095G** (\$673).

Note: You buy these kits from any FASS authorized distributor. FASS does not sell these kits direct; however, they will sell you miscellaneous parts the FASS distributor does not sell. This includes the blue fuel return line and any fuel line connectors you may need.

- 2) Two (2) extra mounting bolts, washers, and nuts... from your local hardware store. (\$4)
- 3) Then you need to modify the FASS wire harness in the Kit to fit your RV application.

* We found the FASS trigger wire in the Kit is long enough. It just needs to be trimmed down and we added a fuse near the TS pump so we can physically turn the pump off by pulling the fuse whenever it becomes necessary.

* Then we added 13 feet of battery wire (Green and Red) after the FASS installed fuse that came with the Kit.

4) Our RV also has a 2" fuel Return Manifold (RM-1001). This is the silver color RM vs. the 1-1/2" (blue) RM that comes in the Dodge Kit. We ordered this 2" RM direct from FASS. (\$15)

5) We needed 36' of 1/2" blue FASS fuel line. FASS charges \$3/ft plus shipping is 3-5 days.

6) Two... 2-1/2" hose clamps for the fuel return manifold

7) 8' of 3/4" split tubing to shield the fuel return hose from heat as it passes next to the intercooler

8) 12' of 12-gauge wire (red & green) for the extra length you need to add to the battery side of the wire harness

9) High quality Relay used to terminate the 2 ECM wires you disconnected from the lift pump.

10) And we also mounted an electronic fuel pressure gauge in the cockpit. (OPTIONAL \$150)

FASS CLAIMS

"FASS is the most versatile, high performance, aftermarket diesel fuel pump on the market today. FASS pumps provide constant fuel delivery to your injection pump. It is a huge upgrade over stock lift pumps and fuel pumps that do not keep up with high performance diesel engines; and in RV applications where a gear driven fuel pump has to suck fuel 20-40' from the tank to the rear engine.

OTHER COMMENTS

Note: We did not add the Optional ADS Power Module, because we did not see the ROI, but it's easy to install (1 hour or less). If you do add a power module you do need to install a FASS pump or similar type of pump. Air Dog is another manufacture and there are marine pumps too you might look at. However, we are very satisfied with FASS.

There is no FASS "RV KIT" available from FASS or their distributors at this time. However, we hope FASS will start marketing RV Kits soon so you don't have to source the few extra parts you need.

Once your FASS fuel pump is installed (TS or FA type) your fuel pressure will be +15-18PSI of positive fuel pressure to the CAPS injector pump. And this will make your engine start up faster and run quieter.

Our FASS Titanium “Signature Series” “TS” Pump installation took ~24 hours, because we never did this installation before and we made several changes along the way. However, now that we finished the job, and now that we are providing you with tips on how to install a TS pump in your RV (where previously we had 2 fuel filters mounted in your engine bay and now we have 3 filters), we think the total TS pump installation should only take you about 6-12 hours to install if you read this paper closely. (See pictures below.)

6 STEPS TO INSTALLING YOUR FASS TITANIUM “TS PUMP”

STEP #1) We mounted the FASS TS pump in about place of the Primary filter... using the same mounting brackets provided in the Dodge Kit. These brackets are ¼” steel and very sturdy! We also used about 90% of all the parts in the Dodge Kit so buying the Kit is the only way to go!

Our primary filter is on the left side of the engine compartment. (This is the FS-1242, 20u filter with a see-through bowl.)

* You should also be able to use your existing fuel lines and fuel line fittings. However, this is a critical part of your installation. So be sure you have the right parts before you start.

* We removed the old ½” pipe to -10AN flare fitting from our old primary filter block... and screwed these fittings into the FASS TS pump.

NOTE: Our fuel lines used ½” x ½” JIC Hydraulic fuel line fittings -- but these are designed to mate with -AN10, 5/8” flare fittings. And do not use pipe tape on the flare side of the fitting or you may end up with a fuel leak. *You can use and you should use pipe tape on the tapered ½” pipe thread ends that screw into the FASS pump!

This is my old Cummins 2-filter setup with the 20-micron FS-1242 filter on the left and my 10-micron FS-1022 filter on the right.

Use the Kit mounting brackets and mount like this:



* Then position the TS pump in the



engine bay and drill two 3/8" holes as shown by the yellow tape in the picture below.

* Use the L-bracket in the Kit to mark the position of the holes. ...And make sure you leave room for the nut to screw on underneath.



STEP #2) Mount the TS pump in about the same position as your primary filter (only turn it 90-degrees) so you can re-use the existing fuel lines.

Note: The FASS blue fuel line returns fuel to the tank. And you will notice we mounted a fuel pressure gauge on top of the secondary filter (10mm x 1.0 thread with washer and an 1/8" adapter). So our previous Secondary filter is now filter #3 in our FASS setup.

Note: If you do not elect to mount a fuel gauge in your dash, we recommend you mount a fuel gauge on top of your Secondary Filter. You might decide to do this before you put in a FASS pump to see what your vacuum pressure is? Just besure you get a vacuum gauge. You can even get a gauge that measures -30psi to +30psi, but

FASS TS Pump Kit - Dodge 95GPH pump
(Part#: TS D08 095G)



Your kit will include a "blue" 1-1/2" Return Manifold,

it's a cheap gauge. (Good enough to check your fuel pressure, but not reliable enough to leave it installed.)

We really like knowing our fuel pressure so I mounted a remote gauge in our dash. More about this later.



but your RV fuel filler neck is probably 2" in diameter. So you will need to order the "silver" color RM #1001 Return Manifold from FASS and use a couple 2-1/2" hose clamps not supplied in the kit to complete your filler neck splice/connection.



STEP #3) Route ~36' of fuel return line from the FASS pump to the fuel tank filler neck on the driver's side of the coach.

***Cover all parts of the blue fuel line near the intercooler (under the coach) with 5/8" split tubing.**

***There is plenty of room to route the blue fuel return line. It just takes time to choose the best route. ...Just follow all the hoses on the driver's side of the coach and fish both the fuel line with speaker wire (4-wire with good insulation) if you intend to install a remote fuel pressure gauge in your dash.**

STEP #4) Prepare the silver 2" Return Manifold (RM-1001) to be installed (spliced) into your fuel filler neck on the driver's side of your RV.

The 2" silver RM is too long and needs to be trimmed down on each end so it can be spliced into your existing filler neck...


➔ Cut the silver RM as follows: Remove 1/4" off one end and 1/2" off the other end and de-bur.

..And you may find that you need to adjust your cuts depending on how the RM you received was manufactured...

ebay Shop by category Search for anything

ebay > eBay Motors > Parts & Accessories > Car & Truck Parts > Air Intake & Fuel Delivery > Fuel Inject. Controls & Parts

FASS Return Manifold (2" Diameter) RM-1001



\$15.68
+ \$6.00 Shipping

Get it by Thu, Jul 25 - Mon, Jul 29 from Westport, Massachusetts

- New condition
- 30 day returns - Buyer pays return shipping

[Read seller's description](#)
[See details](#)

making sure you leave enough room for the hole clamp.

Note: We took our silver RM to Napa and they cut it for free on their hose chop-saw. Then we bought 13 feet of 10-gauge wire from Napa.

- Now cut the rubber filler neck hose in half (equal parts) with a long razor blade... then remove the rubber hose as shown in the pictures to the right.
- Then cut ~1-1/4" off the end of the metal filler neck... to leave room for a hose clamp... and so you can insert the silver RM.

➔ Positioned the yoke inlet to the Return Manifold so it points to the 11 o'clock position; and then looped the blue return fuel line over the top of your slide-out arm so the fuel line is out of the way of the retracting slide and cargo box.



Cut 1-1/4" out of your coach's filler neck to make room for the silver RM-1001.



* Then retract your slide... but stop short ~4" short from being completely closed. Now crawl under your coach to inspect this area for obstruction. It's really tight, but it can be done.

* There should be nothing in the way and you want to be sure your filler neck and return manifold are clear of the retracting cargo box.

* Now bring the slide-out all the way in and then re-confirm your installation is correct and clear of any obstructions. Then put the side out and tighten the hose clamps. (And re-check by repeating the above slide sequence.)

Side benefit: After we installed the FASS return fuel line we can now fill our tank up faster and almost to the top without the fuel nozzle clicking off!

Note: We also found the stock fuel line vent wrapped UNDER the filler neck. So we repositioned it above the filler neck.



STEP #5) You need a FASS “trigger wire” to connect to a switched +12V ignition source. And we chose to splice into the tow light 7-pin connector wire harness to obtain it. (See picture to the right.)

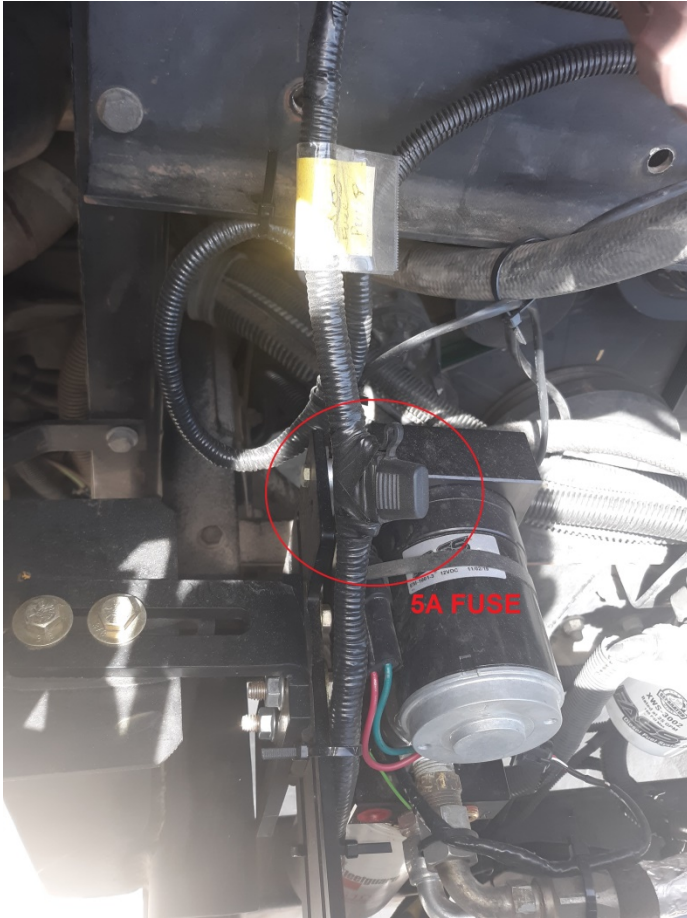
You will need to take the 7-pin tow connector off to gain access to the wire harness as shown.

Note #1: In our RV the “Pinkish” wire is the “Ignition Switched Hot Wire” that is normally used for power brakes... but you probably don’t have power brakes if you are just pulling a car. Plus it’s fuse protected by the tow light fuse block found to the right of the radiator (behind the last bay door).

Note #2: We also added a 5A fuse and strategically placed near your TS pump -- so you can always pull the fuse out (and check it) easily. This will also turn the pump off when the engine is running if you need to do that.

The “Pinkish” wire is the one closest to the black split hose cover. Just remove ¼” of insulation... wrap your trigger wire going to the FASS relay around the pink wire... solder it...and tap it up good. (Do not cut this wire.)





***Use good 3-M black tape (High Temp) and cover all wires with split tubing as it gets really hot in the engine bay!**

Then we mounted the FASS relay on the right side of the engine compartment...



NOTE #3: Add 13 feet of #10-gauge wire to the end of the FASS fuse... and route these wires direct to the battery.

*** Cover this wire will split tubing.**

Note: Unfortunately, the RAM truck kit did not provide enough wire to reach our engine battery bank behind our tires. So you will need to modify the FASS wire harness to fit your application. Our application took 13' of wire after the fuse connection.

STEP #6) Disconnect the stock lift pump 2-wires and only connect these wires to pins 85 and 86 on the relay. This will fool the ECM into thinking there is a lift pump (load) on the other end. And this relay will also keep the warning light in you dash from lighting-up!

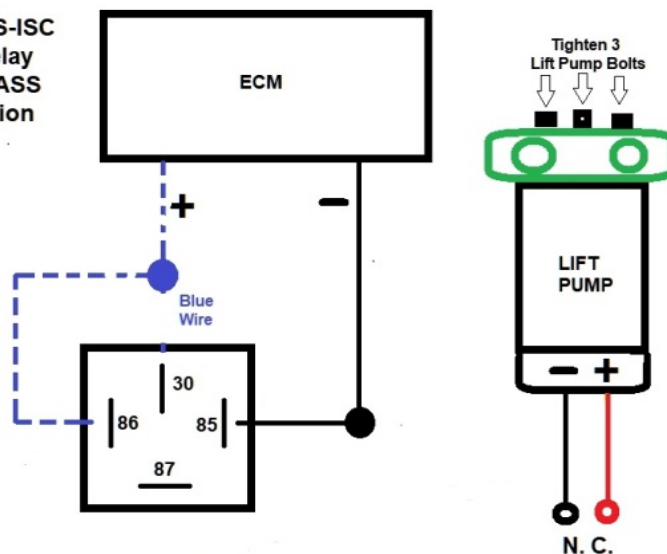
➔ Freightliner added the wiring in such a way that we can remove the relay and reconnect the wires to our stock lift pump in the future.

ECM – Relay installed by Freightliner:



Adding a relay is the cleanest way to disable your old lift pump so it never turns on. However, if you don't want to pay Freightliner \$300 to use a stock wire harness, then you can just wire the ECM to the relay with pig tail ends and hide it above your starter motor. You will not be able to easily re-connect your lift pump, but what are the odds you will ever need it in the future anyway? And saving \$300 is worth thinking this step over. Here is a block diagram of this relay connection to your ECM. (Note: Pin 85 to 86 is the coil side in the relay.)

**2003 CUMMINS-ISC
Stock Lift + Relay
Wiring After FASS
Pump Installation**



By adding a relay, this will trick the ECM into thinking there is a lift pump on the other end... when there is not! ...And you need to do this so you don't get a warning light on your dash!

We went to Freightliner to have them install the right connector on the ECM side so we can remove the relay... in the event our FASS TS Pump fails... and we want to re-connect our Cumminse Lift Pump. (They charged us 2 hour labor and \$50 parts.) ... But you can do it yourself if know what connector to use.

That's it! Now just connect the FASS power wires to your battery and test your pump by turning on your ignition key switch. We pulled the fuse before we installed the TS pump trigger wire so you might need to put the fuse back if you also pulled the fuse. Now enjoy your "ah-ha" moment!

The TS pump is "whisper quiet" ...just like FASS claims, so you may need to put your hand on the pump to feel it vibrating with the engine running. Your fuel pressure gauge will also show 15PSI. (And after 1,000 miles of driving it may then show 16PSI as the pump breaks-in.)

Note: If you need to drive your coach to a diesel repair shop to have the ECM relay wires worked on – you should disable the FASS pump until after the engine starts. (Just pull the fuse.) Otherwise, you will have both pumps running at time (for 30 seconds) and you will see 32PSI of fuel pressure to the injection pump.

32 PSI should not be a problem, but why worry about it if you can easily pull the FASS fuse and then reinstall the fuse 1 minute after the engine starts. This way you will only see 15PSI of fuel line pressure when the engine is running and that is what you want to see. (Not the -4 or -5PSI of vacuum pressure you would get from the Cummins gear driving injector pump.)

FYI, -4 o4 -5 PSI on the vacuum side of a pump is normal, but a poor design when you compare it to +15-18 PSI the FASS pump will deliver. As for 95 GPH, that is plenty of fuel delivery for a 350HP or 400HP engine. And what fuel you do not use will be returned by the FASS pump to

the tank; and so will your unused CAPS fuel pump be returning fuel to the tank. (See the FASS Fuel Flow Diagram above and look for the banjo bolts depicted above the lift pump manifold.)

We installed our FASS TS pump 2,000 miles ago and had no problems whatsoever!

We really like how our engine idles and I feel like the \$1,200 we spent for a complete FASS TS delivery system, complete with a remoted mounted fuel pressure gauge in the dash, and an ECM relay installed by Freightliner, was worth the extra money, because I have “peace of mind” knowing our CAPS pump is protected from fuel starvation in the future.

And now that you know how to install a TS pump in your RV...

...the entire installation time should only take you 8-12 hours if you have some mechanical abilities.

...And 3 hours to wire and mount the dash fuel pump gauge if you choose this option.

Note: If you are looking for a shop to install your FASS TS pump, you may have better luck getting a Diesel Truck Injection Shop or Performance Diesel Shop to install it. Why?

These guys know how to install FASS pumps and do it all the time in RAM trucks and Chevy Duramax trucks. And we found these truck installation are very similar in the way we installed the FASS TS pump in our RV.

You may need to coach them a bit, because these Diesel Performance Shops may not have ever installed a FASS pump in an RV, but based on my experience, I would rather take my RV to a Diesel Performance Shop over an RV repair shop if they have never installed a FASS pump. Same goes for Freightliner.

What you want to know is if the installer has a Dodge RAM or Chevy Duramax truck they installed a FASS TS pump in? And if they have, they should be qualified to everything you need. However, out of the lot we took our RV to Freightliner (or Cummins too) because they would understand the ECM connection we wanted them to build and how our Cummins lift pump works differently vs. a Ram or Duramax lift pump.

We also recommend you watch some YouTube videos on this subject as this will build your confidence and answer some other questions we did not cover in this article.

GOOD LUCK & WE HOPE YOU INSTALL YOUR FASS TS PUMP WITHOUT ANY DIFFICULTY!!! ...IT'S NOT THAT HARD. REALLY!!!

END.

...What information follows will help you with further. However, we just threw it together so please read between the lines as necessary.

OPTIONAL: ADD A DASH MOUNTED FUEL PRESSURE GAUGE

If you want to add a remote gauge you can do that too! We did and we highly recommend it. Just fish good insulated speaker wire (4-wire type) with your blue FASS fuel line; and then pull another 15' of speaker wire beyond your filler neck point. Then you can fish the speaker wire through the generator compartment... and then drill a hole through the firewall (to the left of your brake pedal) so you can route the wire to where you want to mount your fuel pressure gauge.

You will need to find +12V Ignition "Switched Power" and for that we tapped into the exhaust brake wire easily accessible after we lifted up the dash top cover. You can also tap into the dash lighting in this same areas. (Easy)

... And then we used the cigarette power wire (under the cup holder) for our +12V constant power wire (and added a fuse).

We also choose a location below the dash for the fuel pressure gauge. This is an ideal location since you do NOT want the lights of the gauge to interfere with your night driving; and the gauge is easily visible when you look down.

The FASS TS pump and the FA pump both have a 1/8" npt-Gauge Port the pump and connecting the sender unit and wires was easy. Note: The gauge uses 3 wires so that is why you need to order speaker wire (16-18 gauge) in a 4-wire spool.

DASH FUEL PRESSURE GAUGE PARTS:

- * Buy the gauge on Amazon \$95
- * Buy shielded 4-wire speaker wire in 100' length. (\$35)
- * Solder wires and use shrink tubing!

https://www.amazon.com/gp/product/B00SD2KMTQ/ref=ppx_od_dt_b_asin_title_s00?ie=UTF8&psc=1



https://www.amazon.com/gp/product/B01MU7QA4X/ref=ppx_yo_dt_b_asin_title_o02_s00?ie=UTF8&psc=1



Note: We like the digital read out. However, we wish this gauge color came in green to match our Freightliner gauges.

We highly recommend this gauge for “peace of mind.” However, for \$25 you can buy a fuel pressure gauge (in glycerin oil) that you can mount above the secondary filter block and it will give you the same results. ...You just can’t see it when you are driving. ...But after 1,000 miles you will not be looking at the pressure gauge as much. So this is an optional upgrade.