Gen 2.1 - 6.7L Power Stroke CP4 Disaster Prevention Kit

CP4-6.7F-BP-G2.1

CP4-6.7F650-BP-G2.1

2011-2025 Ford Truck – 6.7L Power Stroke Diesel

CARB EO: D-756-6 – SEMA: SC-SDM01-0020

Installation Instructions

Recommended Tools:

- Sockets: 7mm (Some years), 8mm, 10mm, 12mm, 15mm (Deep well)
- Assorted Extensions, wobble extensions and universal joint is extremely helpful
- Using ¼" Drive tools is very helpful for tight areas
- Inch-pound torque wrench for FCA and plastic intake
- Side Cut Pliers for zip ties
- Flat Blade Screwdriver
- Plastic Fastener Removal Tool - Similar to Lisle® PN: 35260
- NOTE: The front bolt on the Fuel Control Actuator (FCA) can be difficult to access without the proper sockets
  - T25 Torx socket – *to remove FCA*
    - Similar to Gearwrench® 82514 OR 80183 with ¼" extension
  - 4mm Allen socket – *to install FCA with provided S&S Bypass Block & bolts*
    - Similar to Gearwrench® 82547 or 80442

Tips & Tricks:

- Use compressed air to blow out all components prior to installing to prevent debris from contaminating the fuel system. Common rail diesel fuel systems are very sensitive to debris, prioritize cleanliness during install.
- If you suspect a failed CP4 high pressure fuel pump AFTER the kit has been installed, the quickest way to confirm is to cut open the Donaldson return fuel filter and inspect the filter media for metal debris. (Longacre® 52-77750)
- In rare cases on early model years, it may be necessary to remove the casting flash on the lower intake to increase the clearance to the Fuel Control Actuator (FCA) electrical connector on top of the CP4 fuel pump with the S&S Bypass Block installed (Figure 1). Confirm adequate clearance before final intake assembly.

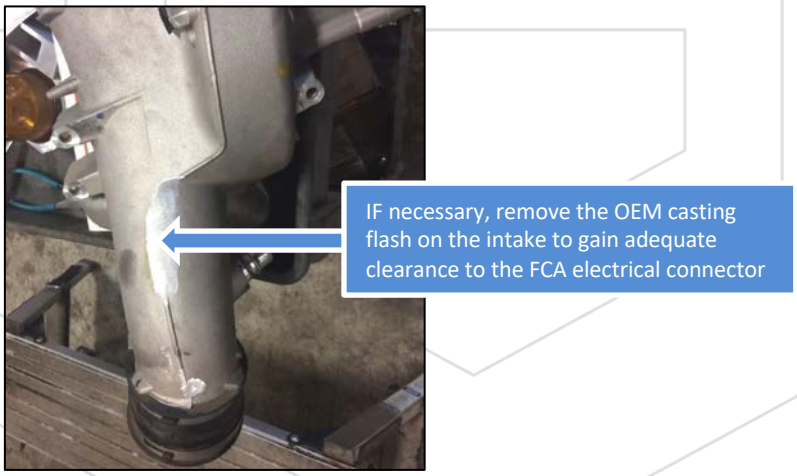


Figure 1: Clearance Location

*If you have experience removing the intake system, skip to step 5 for Bypass Kit specific instructions. Steps 1-4 describes removing intakes to get to the CP4 High Pressure Fuel Pump (HPFP) {early models shown}

1. **Remove the intake tube between the air filter and lower intake.**
   a. 2 hose clamps 8mm, some models may be 7mm.
   b. Some models have an additional bolt holding the plastic resonator chamber that must be removed.
2. **Remove the hot side charge pipe from turbo outlet and intercooler inlet for more room and accessibility.**

***** The intake design changed in 2020, steps 3, 4, and 5 represent model years 2011-2019. For detailed instructions on 2020+ models, use the video instruction QR code found on page 2.

3. **Remove the plastic upper intake. (Intake design changed in 2020, For trucks model year 2020 and higher, see video instruction link on page 2)**
    a. There are QTY: 15, 8mm bolts (Figure 2). Use ¼" drive sockets, deep well and short, universal joint, and wobble socket to ease removal.
    b. One bolt doubles as a fastener for the dipstick (10mm nut).
    c. Remove the other 2 bolts holding the dipstick to the intake and to each other.
    d. Remove all electrical connections and wires from the intake. Also removing the exhaust pressure sensor insulation (Figure 3) and wire clip can aid in access to intake fasteners.
    e. Remove fuel filter housing for extra room to remove intake. 4 bolts (Figure 4) may have to push/rotate fuel hardline upwards to access the bolt under them. Once you remove the fuel line, place it back on the lower hardline to keep it clean. Take special care to not introduce debris into the filter or fuel line.

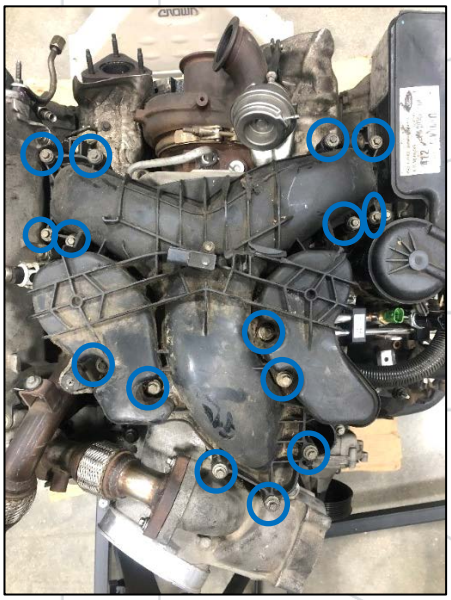


Figure 2: Intake removal

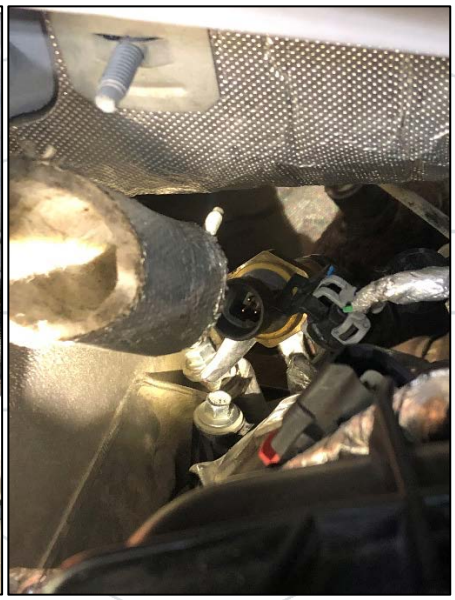


Figure 3: Insulation Removal

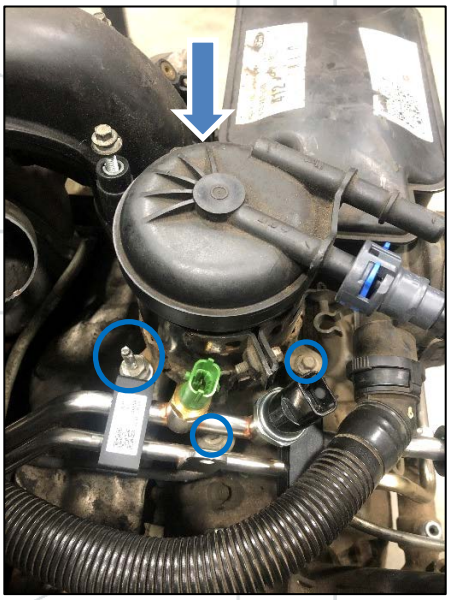


Figure 4: Fuel Filter housing removal

4. **Remove the EGR tube between the cooler and lower intake**
    a. QTY: 4, 8mm bolts
    b. Be sure to keep track of the gaskets as they will be reused.
    c. Disconnect the electrical connection and remove the wire clip from bottom of the lower intake.

5. **Remove the Lower Intake**
    a. Remove QTY: 3, 10mm bolts (Figure 5)
    b. Remove crankcase breather (Figure 6, this hose may be very brittle, be cautious to avoid damage)
    c. Loosen hose clamps that hold the intake to the turbo
    d. Remove clip with a flat screwdriver to take charge tube off the throttle body assembly
    e. Disconnect the electrical connection to the throttle body

Figure 5: Lower Intake Bolts

Figure 6: Crankcase Breather

Figure 7: Failing CP4 FCA without DPK installed

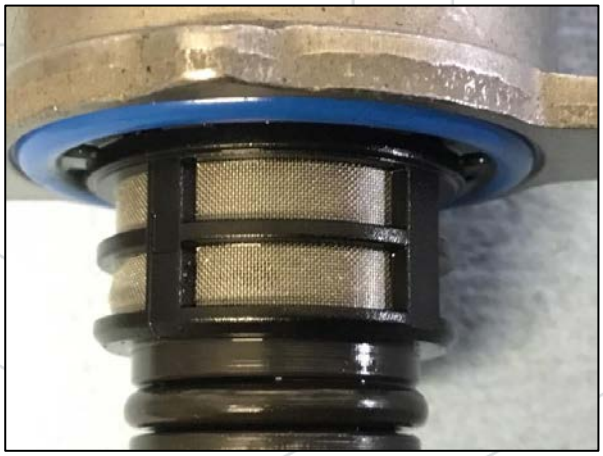


Figure 8: Clean FCA

6. **Install the S&S Bypass Block **(For 2020+ see page 7 for special instructions)****
   a. You should now have easy access to the Fuel Control Actuator (FCA) on the CP4. Thoroughly clean the area around the FCA with brake cleaner and compressed air **before** removing the FCA (Figure 9).
      i. **ENSURE NO DEBRIS ENTERS THE INLET OF THE PUMP WITH THE FCA REMOVED (Figure 9).**
   b. Remove the FCA using a T25 Torx and ensure the pump is healthy by checking the metering unit for debris (Figure 8 above). If it looks like figure 7, the pump and fuel system must be replaced.
   c. Remove dust covers from the bypass hose assembly quick connects and blow out S&S hoses with compressed air while being careful to not damage O-rings inside the quick connect fittings. *(The hoses*

are clean before shipping, but blowing them out again ensures no debris was able to enter the bypass block passages and hose during transport or handling).

d. Install the large and small O-ring onto the Bypass Block (Figure 10).
e. It is easiest to install the FCA into the S&S bypass block and insert the 'front of truck' bolt prior to installing the bypass block into the pump (Figure 11).
    i. Align the holes and hand thread the 'rear of truck' bolt first, then the 'front of truck' bolt taking care not to cross thread the bolts into the fuel pump.
f. Install Bypass Block and FCA onto the CP4 using supplied 4mm Allen head bolts. Torque to 60 inch-lbs.

Figure 9: FCA Removed (no debris)

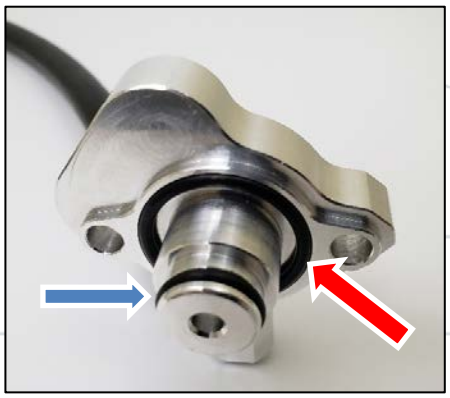


Figure 10: Install O-Rings

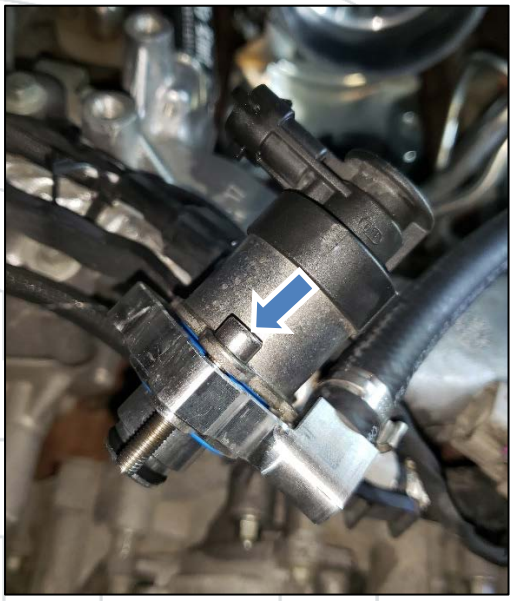


Figure 11: Subassemble Block, FCA, and front bolt

7. **Reinstall the lower intake**
    a. Torque QTY: 3, 10mm bolts to 18 ft-lb
    b. Tighten hose clamps
8. **Reinstall the EGR Tube with gaskets in place**
    a. Torque QTY: 4, 8mm bolts to 89 in-lb
9. **Reinstall the upper plastic intake**
    a. Torque QTY: 15, 8mm bolts to 89 in-lb
    b. Install fasteners for dipsticks
    c. Reconnect all electrical connections and reinstall insulation on pressure sensor
    d. Ensure that all wires are routed away from hot exhaust parts as they were previously
10. **Install the OEM fuel filter and housing**
11. **Complete bypass kit installation**
    a. Reinstall crankcase breather hose to lower intake (take special care if the hose is brittle)
    b. Remove factory fuel line from lower hard line
    c. Remove dust covers from the cleaned bypass kit quick connect fittings
    d. Push quick connect fittings onto their respective barbs (Figure 12) until you hear an audible click. Give them a small tug to ensure they are seated all the way.
    e. Use the supplied zip tie hose clips to keep the hose from chafing on nearby components (Figure 12)
        i. Use one on the crank case vent and if needed on the oil filler neck (red circles)

ii. Adjust as necessary to ensure hose does not rub on nearby components

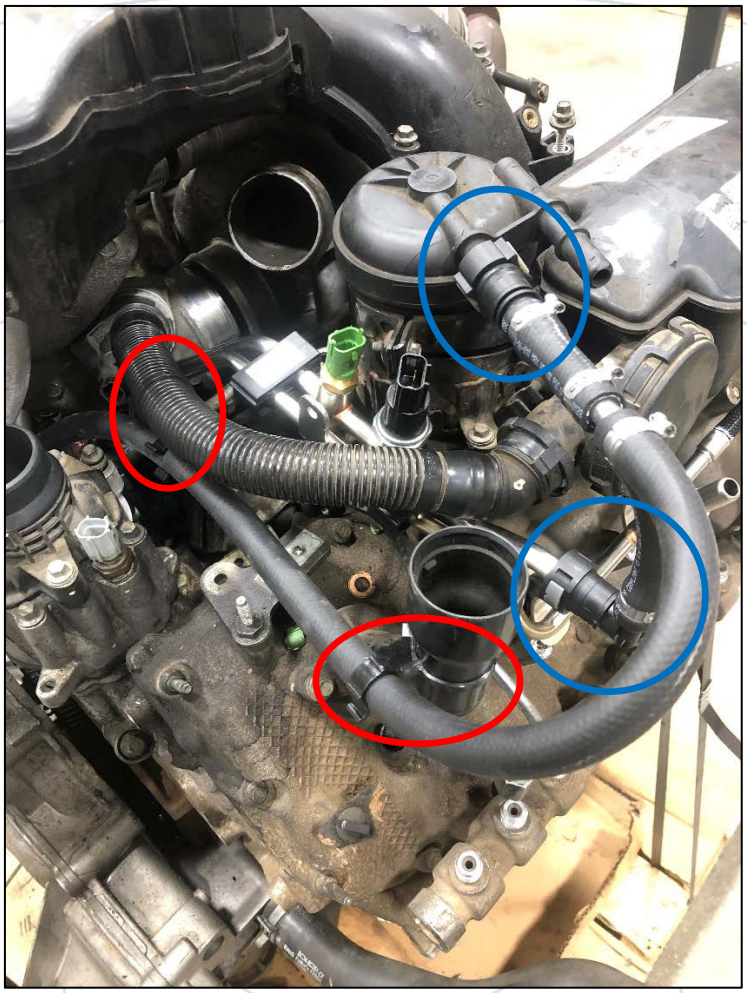


Figure 12: Hose Routing & Zip Tie locations

12. Install the hot side compressor outlet to intercooler pipe

2020+ Special Instructions

Additional parts provided:

- Hose clamp
- Hose and male quick connect assembly

1. **Remove the factory plastic line and quick connect assembly**
    a. This is best done by removing the factory supply and return line assembly and using a heat gun to soften the hose enough to pull it off the factory hardline as shown below.

2. **Install the supplied hose and quick connect barb assembly**
    a. Slide the hose over the barbs on the factory supply tube. Ensure there is no metal to metal contact from the aluminum fitting to the tube inside the hose.
    b. Tighten the hose clamp behind the 2nd barb (Reference image below).
    c. Take special care to not introduce debris into the system.
    d. Install the OEM metal lines and S&S adapter assembly
    e. Continue the install as normal on step 6

Change Log:

- Rev 00 - Initial Release
- Rev 01 – Green QC and Tips & Tricks
- Rev 02 – F650 part number, O-ring update, & CARB/SEMA information
- Rev 03 – Instructional Video QR code addition
- Rev 04 – In-truck Diagram, How It Works Diagram, Review/Support QR Codes, & Phone Number/Email

Gen 2.1 - 6.7L Power Stroke CP4 Return Filter Assembly

CP4-6.7F-BP-G2.1-RFA

2011-2025 Ford Truck – 6.7L Power Stroke Diesel

CARB EO: D-756-6 – SEMA: SC-SDM01-0020

Installation Instructions

Recommended Tools

- Wrenches:
  - 10mm, 7/16”
- Deep well Socket
  - 15mm
- Torque Wrench capable of 120 in-lb (10 ft-lb)
- 4mm Allen Wrench
- Flat Blade Screwdriver
- Flush cuts for zip ties
- Plastic Fastener Removal Tool
  - Similar to Lisle PN: 35260

Tips & Tricks

- Use compressed air to blow out all components prior to installing to prevent debris from contaminating the fuel system. Common rail diesel fuel systems are very sensitive to debris, prioritize cleanliness during install.
- If you suspect a failed CP4 high pressure fuel pump AFTER the kit has been installed, the quickest way to confirm is to cut open the Donaldson return fuel filter and inspect the filter media for metal debris. (Longacre® 52-77750)

Filter Change Interval:

- The filter is designed to be easily serviceable.
  - S&S Product Number: CP4-BP-G2.1-RF12 (pack of 12 filters)
  - Donaldson Part Number: P550943
- The return side fuel filter recommended change interval is the same as the other fuel filters on the vehicle. See below for the factory Ford filter change recommendations based on duty cycle and operating conditions.

Vehicle Service	6.7L Normal	6.7L Special*
Fuel Filter Change (both)1	Change both fuel filters every 3rd oil change or every 22,500 miles (36,000 km) or as indicated by the message center, whichever comes first.	Change every 15,000 miles (24,000 km) or 600 engine hours or as indicated by the message center, whichever comes first.

***Special** = Operating Conditions like Extensive Towing, Long Idle Time, Extended Low Speed Driving. For Off Road/Dusty Conditions oil change intervals should be every 7,500 miles (12,000km) or 300 hours of engine operation.

Change Log:

- Rev 00 – Initial Release
- Rev 01 – Green QC and Tips & Tricks
- Rev 02 – CARB / SEMA information
- Rev 03 – Video & Website Instruction QR codes

Filter Head Assembly

1. **Install the small o-rings onto the aluminum filter head fittings & hand-thread the fittings into the filter head.**
2. **Using a 15mm deep-well socket, torque both fittings to 120 in-lb (10 ft-lb). DO NOT OVERTIGHTEN or damage may occur (Figure 1).**

Figure 1: Torque Fittings to 120 in-lb (10 ft-lb)

Figure 2: Model Year clarity for bracket to truck

3. **Thread the rubber isolators into the backside of the filter head until hand-tight.**
4. **Install the bracket and the serrated flanged nuts (Figure 2).**
   a. Use 7/16" wrench to tighten the nuts

Return Hose Installation

1. **Filter Flow Diagram**

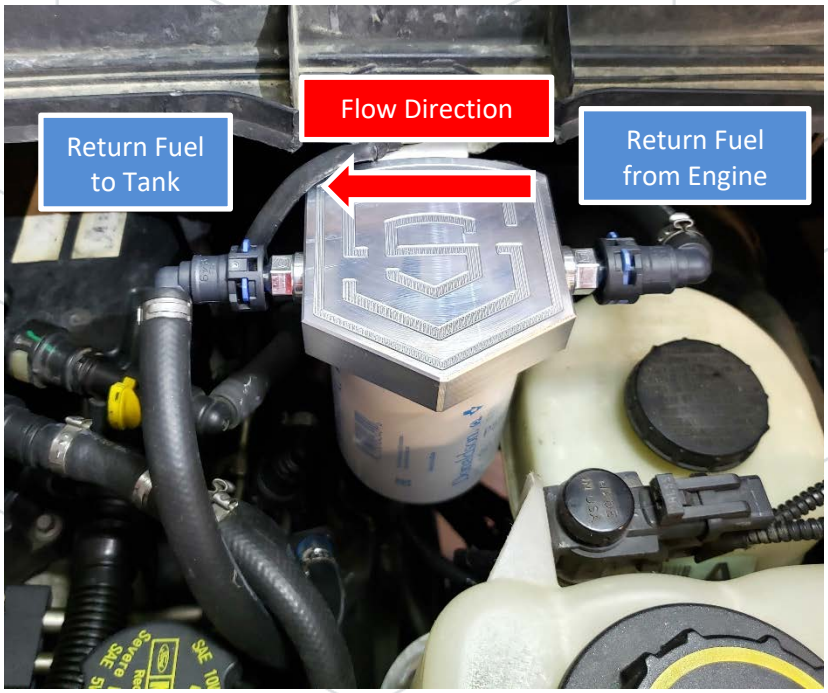


Figure 3: Filter hose orientation and flow direction

2. **Disconnect the return side quick connect and rotate the plastic fitting in the tube to point upward**
    a. Place some absorbent towels around the joint to catch diesel fuel
    b. Disconnect the return line quick connect fitting (Circled in blue, figure 4) from the factory metal return barb (Circled in red, figure 4)
    c. Hold the factory plastic line and rotate the plastic female quick connect fitting inside the molded tube 180°, so it is facing upward. Do not allow the molded tube to twist / kink during this process.

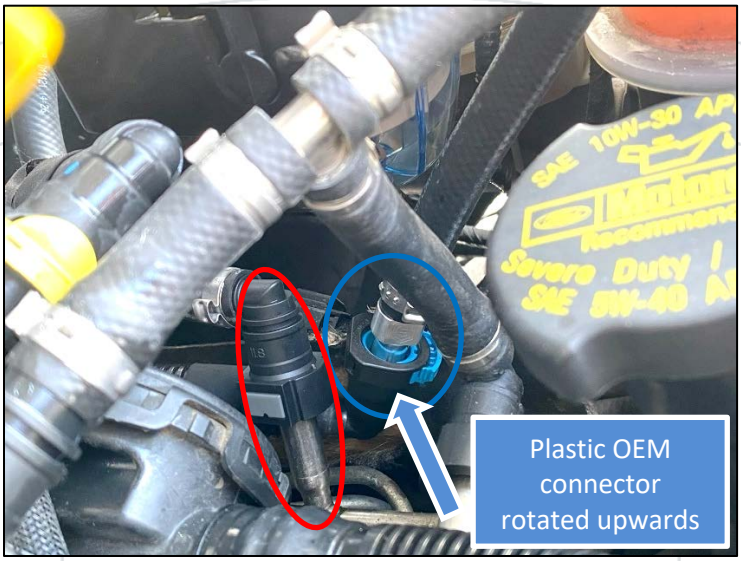


Figure 4: Quick connect to remove and rotate up (blue circle)

3. **Install the S&S hose with a plastic connector on both ends (right side of the filter – "Return Fuel from Engine")**
    d. The larger quick connect goes on the OEM metal barb that you removed the factory fitting from earlier (Figure 4).
    e. The hose wraps around the back of the filter and the blue plastic quick connect attaches to the right side of the filter head (Return Fuel from Engine).
4. **Install the supplied zip tie hose clip**
    f. Put the zip tie around the factory fuel supply line and clip the hose to it, adjust as necessary to keep the hose off the brake booster and reservoir (Figure 5).

Figure 5: Zip tie clip placement

5. **Install the shorter left side hose (left side of the filter – "Return Fuel to Tank")**
    g. The S&S aluminum barb goes into the OEM quick connect fitting that was previously disconnected and rotated upward.
    h. The other side connects to the <u>left side of the filter head</u> (Return Fuel to Tank)
    i. Adjust rotation of quick connect fitting as necessary to avoid chafing as pictured (Figures 6 & 7)

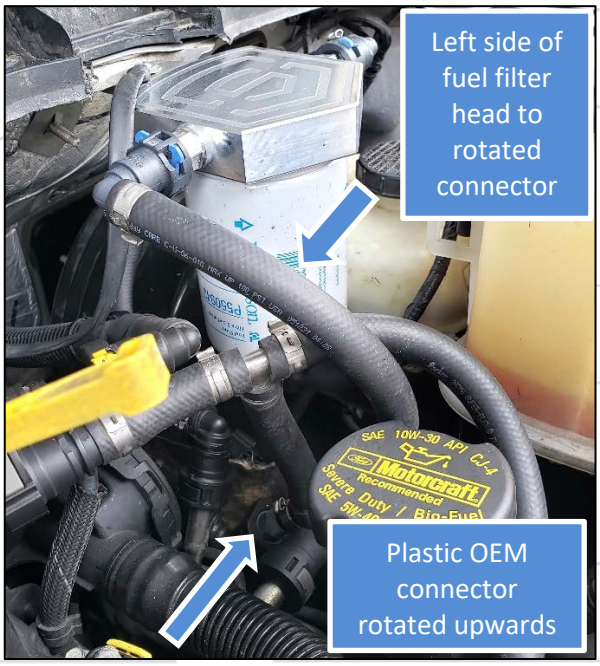


Figure 6: Left Side hose installation

Figure 7: Left Side hose installation (2017+)

<u>Filter Head Mounting</u>

- The filter head mounting is slightly different between 2011-2016 and 2017+ model years.

2011-2016

2017+

2011-2016 Model Years

1. **Remove the bolt holding the ground strap to the upper firewall/cowl above the brake fluid reservoir.**
2. **Install the filter head bracket on top of the metal cowl, put the ground strap on top of the bracket, and install the provided short panhead bolt.**
    a. Tighten with 4mm Allen wrench into the factory threaded hole for the ground strap.
3. **Install fuel filter to filter head.**
    a. Lubricate the filter O-ring with motor oil, diesel fuel, or similar lubricant.
    b. Spin-On filter until the rubber seal contacts the filter head and rotate ½ turn until fully tight by hand.
4. **Purge air and check for leaks.**
    a. Cycle the key to the accessory position to allow the electric fuel pump to run for 30 seconds to purge air prior to starting the engine.
    b. Start the engine and check for leaks.

2017+ Model Years

1. **Loosen the cowl to access the hole for installing the fuel filter.**
    a. Release the 3 clips in the front (red circle) and 2 clips underneath (near where blue circles are) that you release by wiggling and prying up on the cowl gently (Figure 8).
    b. If you break a clip (Figure 9) the part number is: W708771-S300

Figure 8: Clip Locations

Figure 9: Clip under the cowl x2

2. **Remove the plastic fastener from cowl (Figure 10).**
3. **Install the provided long filter bracket bolt and washer through this hole.**
    a. Put the washer on the long bolt.
    b. Put the provided long bolt through the hole, then the spacer, then the filter bracket (Figure 12).
    c. Tighten the provided nylon lock nut with 10mm wrench (nut) and 4mm Allen wrench (bolt).

Figure 10: Remove plastic fastener

Figure 11: Spacer below cowl

Figure 12: Filter Head Installed – 2017+

4. **Install fuel filter to filter head.**
    a. Lubricate the filter O-ring with motor oil, diesel fuel, or similar lubricant.
    b. Spin-On filter until the rubber seal contacts the filter head and rotate ½ turn until fully tight by hand.
5. **Purge air and check for leaks.**
    c. Cycle the key to the accessory position to allow the electric fuel pump to run for 30 seconds to purge air prior to starting the engine.
    d. Start the engine and check for leaks.

Quick Connect Removal Guide

- **Quick Connect Style #1 – Push-Button:** To release push in firmly on the buttons and remove connector (Figure 1).
- **Quick Connect Style #2 – Locking Tabs:** To release the locking tabs on the filter head quick connects, slide both tabs away from the filter head and push the tabs down towards the filter head male fitting. This releases the lock and allows the connector to be removed from the filter head fitting (Figure 2).

Figure 1: Push-Button QC

Figure 2: Locking Tab QC

- **Quick Connect Style #3 – Lock plus Push-Button:** To release the lock, spread the red ears away from the connector and push down until the lock is at its lowest detent position OR remove the lock entirely as shown. With the lock released, push the button firmly and pull the connector off of the fitting (Figure 3). Green: Up on Lock then Down on Button (Figure 4).

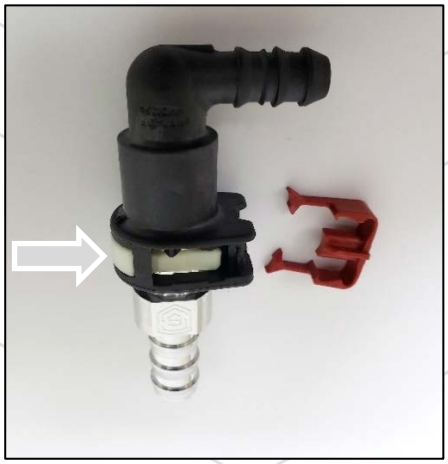


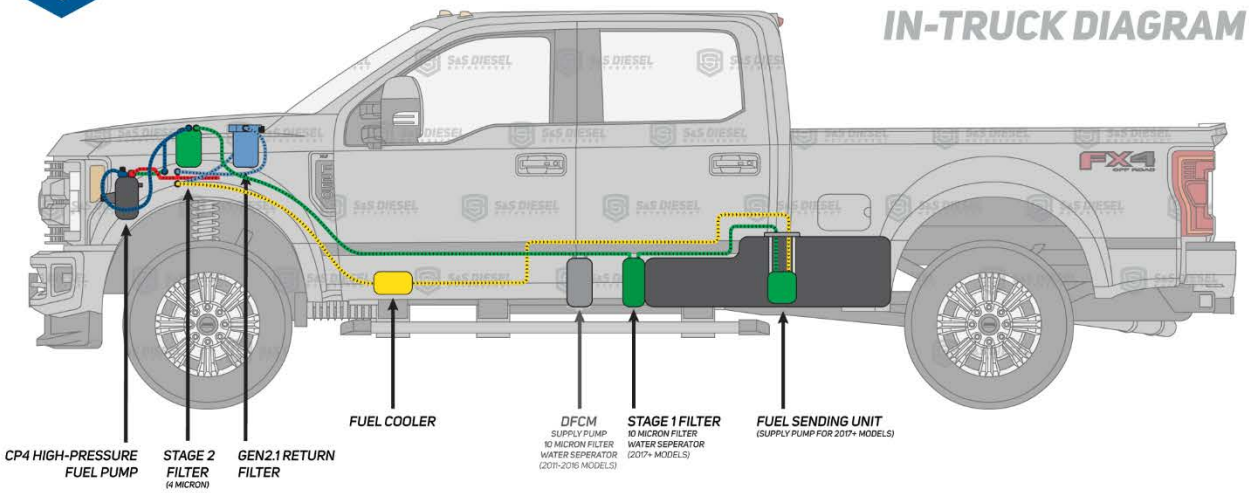
Figure 3: RED Lock + Push-Button QC – 2-step process

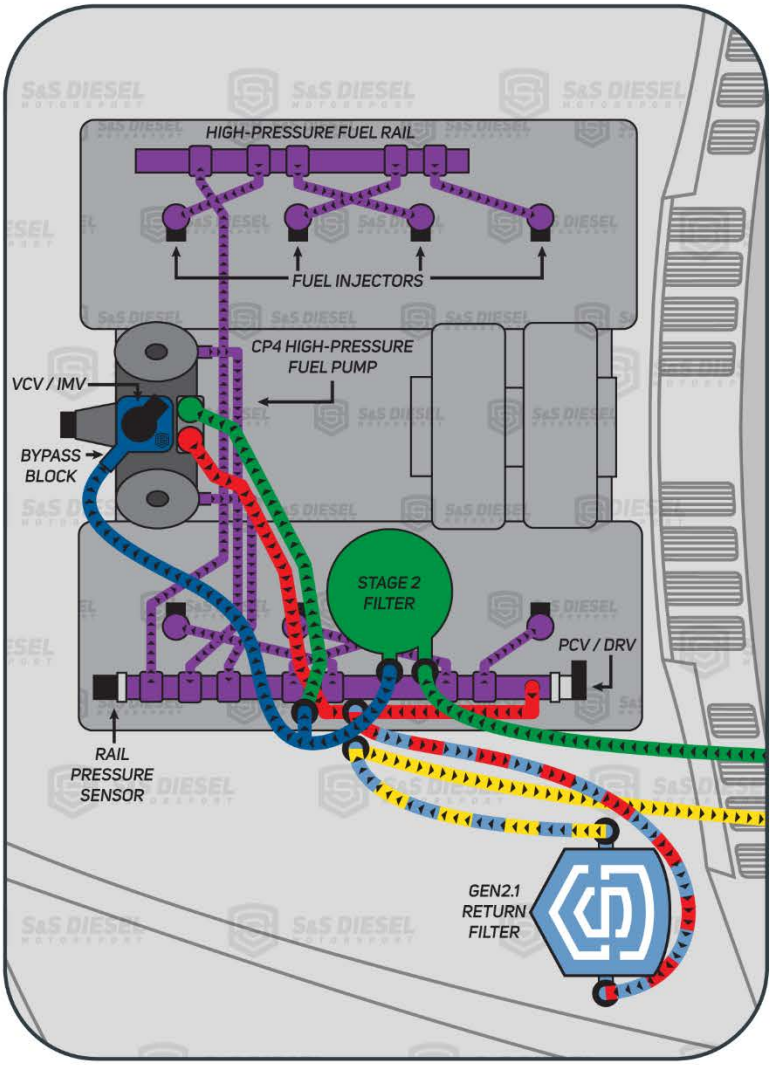
Figure 4: GREEN Lock + Push-Button QC

S&S DIESEL MOTORSPORT

GEN2.1 6.7L POWER STROKE CP4 DISASTER PREVENTION KIT

IN-TRUCK DIAGRAM

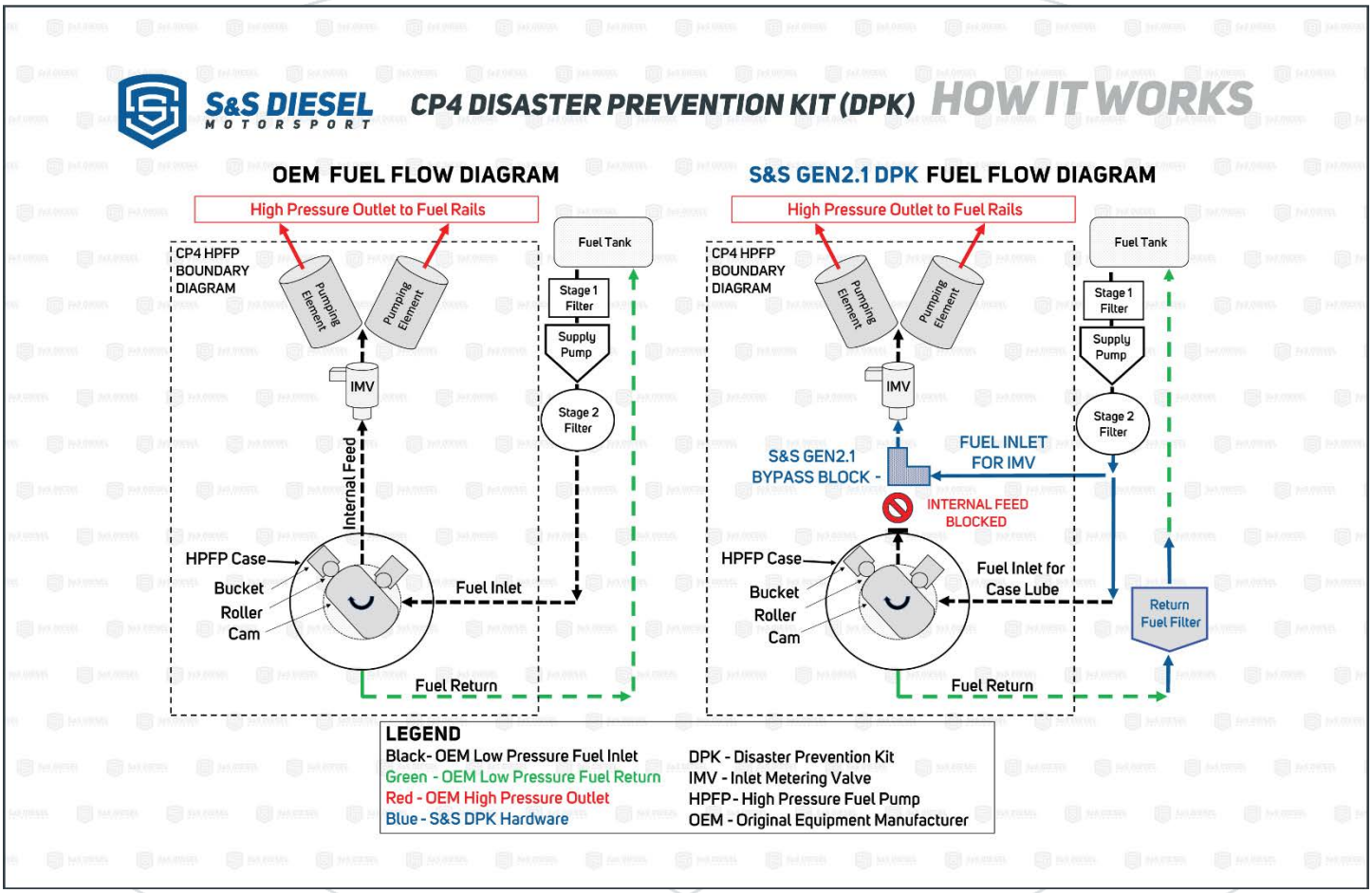




LEGEND

- LOW-PRESSURE SUPPLY
- S&S GEN2 BYPASS
- HIGH-PRESSURE SYSTEM
- UNFILTERED RETURN
- GEN2.1 RETURN FILTER
- FILTERED RETURN
- QUICK CONNECT

Thank you for spending your hard-earned money on the authentic S&S Diesel Motorsport Gen2.1 Disaster Prevention Kit (DPK) that was designed, machined, assembled, inspected, tested, and validated in the United States of America. While the S&S Gen2.1 DPK cannot prevent your CP4 from failing, rest assured that it WILL protect the rest of your fuel system by rerouting the internal fuel flow paths and trapping debris in the return filter. We have purposely failed CP4s in our fuel lab and on multiple in-house development trucks to test DPK functionality. In every test no metal was found in the high-pressure system.



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