

# FREIGHTLINER CASCADIA CUMMINS ISX12N BACK OF CAB INSTALL PROCEDURE

## Tank Test Fitting:

1. Install spreader bar and high capacity straps to the BOC (Back of Cab) unit using the quick disconnect lift points. (if applicable)
  - a. Ensure spreader bars are correct distance apart pulling the load perpendicular to the spreader bar.
  - b. Ensure straps used to lift unit are of adequate strength. (used polyester lift straps rated for a 3000 lb. vertical lift load)
  - c. Install padding behind hooks on unit to avoid damaging any paint or bodywork
  - d. **IMPORTANT:** ensure the clasp of the hook is facing the outside of the BOC unit.
2. Lift BOC assembly into position on the back of the chassis. Locate the area where you wish to mount it and ensure proper truck and pin box clearances.



*Figure 1: Proper Hook Attachment*



*Figure 2: Correct Hoist Set Up*

### Cutting Huck Bolts:

1. Once you identify fitment and system location, cut the necessary huck bolts from the chassis.
  - a. Note: Some frame bolts will be nuts and bolts instead of huck bolts. In this case, remove them as necessary.
  - b. If there is hardware in the way of where the system will be located, remove the nut and bolt or huck and relocate the brackets using a hole that will be used for the system or another nut and bolt on the chassis out of the way.
2. An angle grinder with a cut off wheel will be used to cut the huck close to the outside of the frame rail as close to the huck flange as you can get.
  - a. Do not cut against the edge of the huck and the frame, but, as close to the outside of the huck flange as possible.
3. Cut 50-75% of the way through the huck bolt and then use a hammer to remove the huck completely from the frame rail.
4. Remove any and all fittings, modules, or brackets on located on the inside or outside of the frame rail that will need to be relocated or temporarily moved until the system is installed.

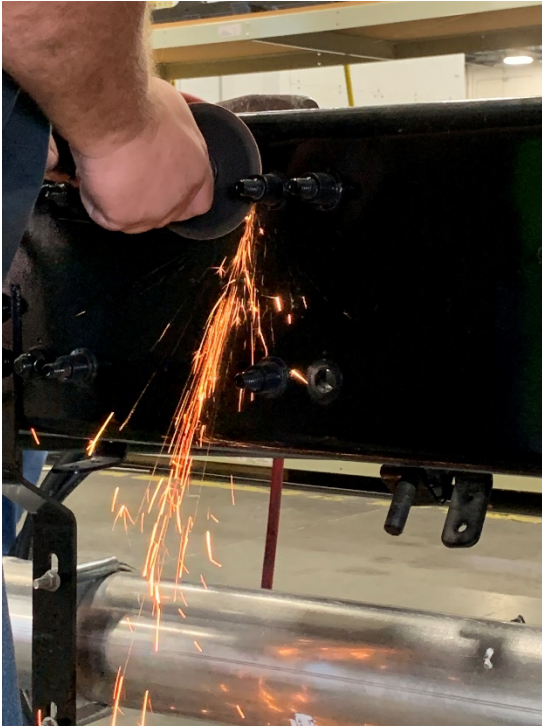


Figure 4: Huck Bolt



Figure 3: Huck Bolts on Frame





*Figure 6: Cutting Huck Bolt*



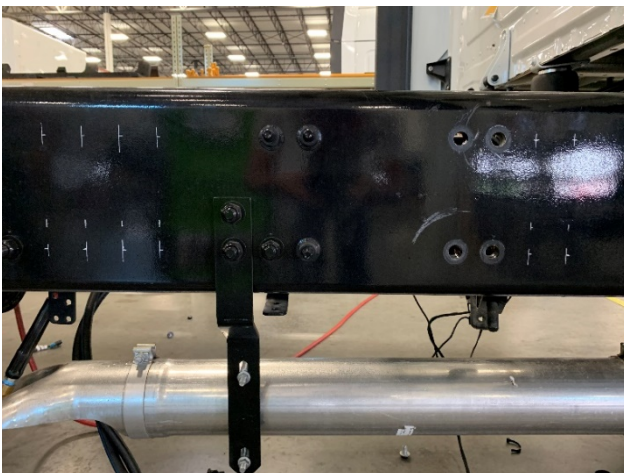
*Figure 5: After Huck Removal*

5. Cut and remove zip ties and locate wiring harness needed for system.

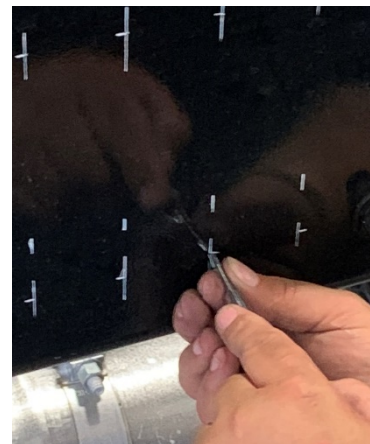
#### Marking Holes:

Depending on the chassis, and the system installed, the frame rails might need to be drilled in order to accept the back of cab system.

1. Use a T-Square on frame rail to locate hole installation as the provided drawing dimensions of the system bracket spacing requires.
2. Note: these hole locations will vary based upon truck, wheelbase, manufacturer, and options installed on the truck.

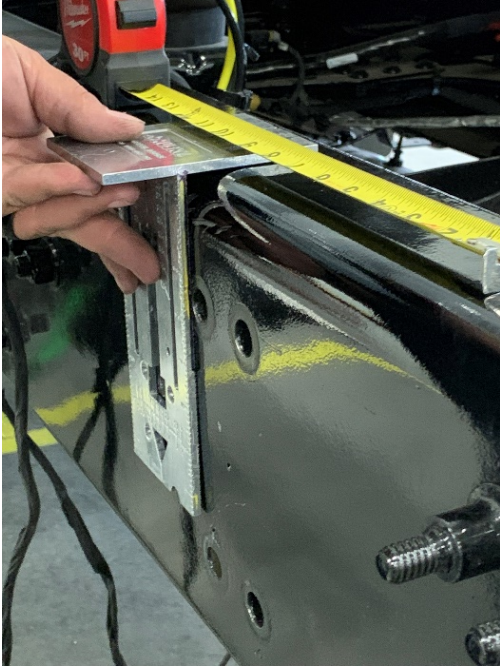


*Figure 8: Marked Holes on Chassis*

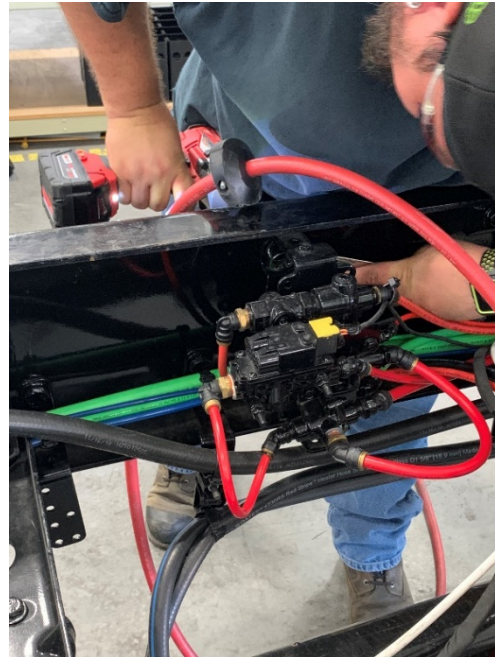


*Figure 7: Center Punching Holes*

3. Using the holes currently on the frame rail use the drawing for the hole spacing to create the lines center lines for the new holes to be drilled.
  - a. Each bracket gets a total of 8 bolts for the 175, 130, 2 tank- 70 DGE BOC system installs and 4 outside holes for the other system installs.



*Figure 10: Marking Holes*



*Figure 9: Bracket Removal*

#### Drilling Holes:

1. Once the hole centers have been located use a center punch each of the holes before starting.
  - a. The holes to be drilled in the frame are 11/16" size.
  - b. Ensure there are no obstructions on the inside of the frame rail such as brackets, electrical wire, or air lines so that they are not damaged during the drilling operations.
2. The use of a magnetic drill makes this job easier and safer for the installer although not required.
  - a. When using a magnetic drill:
    - i. Always keep a supportive hand on the drill in case of momentary power loss so that drill does not fall off the frame.
    - ii. Ensure the LED "safety switch" is illuminated green to indicate the magnet is seated properly against the frame rail.
    - iii. Clean the drill of metal chips in between each hole to keep metal fragments off of the magnet surface.
    - iv. Do not apply excess force to the drill.
    - v. Use cutting fluid





*Figure 12: Magnetic Drill*

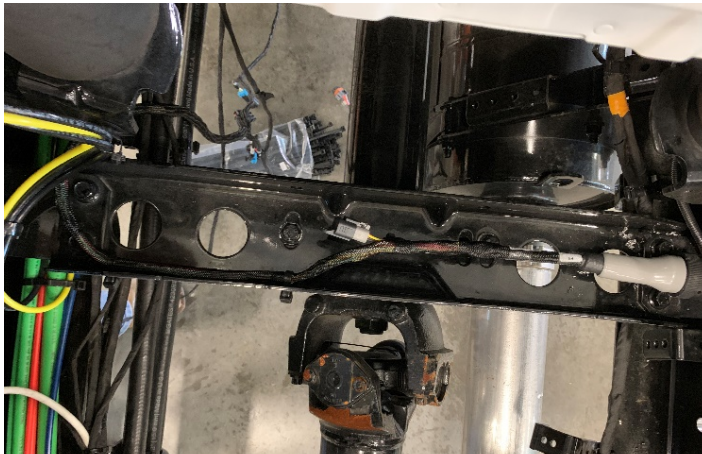


*Figure 11: Drilled Chassis Holes*

#### Wiring Installation:

1. Run electrical before the system is installed on chassis.
  - a. Note: Re-pinning the MP92-1608 wiring harness might be necessary on certain models (This applies to Cascadia Freightliners)
  - b. Cut zip ties flush with the head of the zip tie to avoid being cut
2. Wiring:
  - a. J1939-500KB-white w/yellow stripe
  - b. green w/yellow stripe
  - c. Black/Purple w/white strip-load lights
  - d. The four wires needed from the truck side are: power, ground, switch power, fuel signal, and load lights (if equipped)
  - e. Note: Wire locations and colors on the truck side will vary (these apply to Freightliner Cascadia trucks)
3. MP92-1028 harness (round BOC connector)-zip tie to the frame cross member, this will connect the BOC system to the rest of the truck. Ensure there is enough slack in the electrical to allow easy installation once the system is installed.
  - a. Avoid routing harness over any sharp or hard edges to avoid breaking wires.
4. MP92-1608-jumper harness is installed between the MP92-1028 system harness and the truck wiring.

- a. This harness allows the MP92-1028 system harness to be installed on Freightliner trucks.
5. MP92-1035-(J1939 Jumper Wire harness)-This jumper harness may be required for some cab configurations in order for harness to reach the inside of the cab.
6. On truck side: the purple w/white stripe (+) and the black (-) wires may have to have the connector on the momentum harness changed in order to connect to the harness of the truck.
  - a. New harness coming in the future to alleviate this problem.
7. Once harness is test fitted along the frame rail tie up any extra slack in the wire harness by looping them and using zip-ties to hold excess wire.
8. Continue running the harness along the top side of the left side frame rail into the under hood area of the truck with the main harness and air brake lines come through underneath the cab assembly.
9. Cut hole in the firewall of cab assembly to the right of where the truck air supply lines enter the cab.
10. Feed wire through firewall.



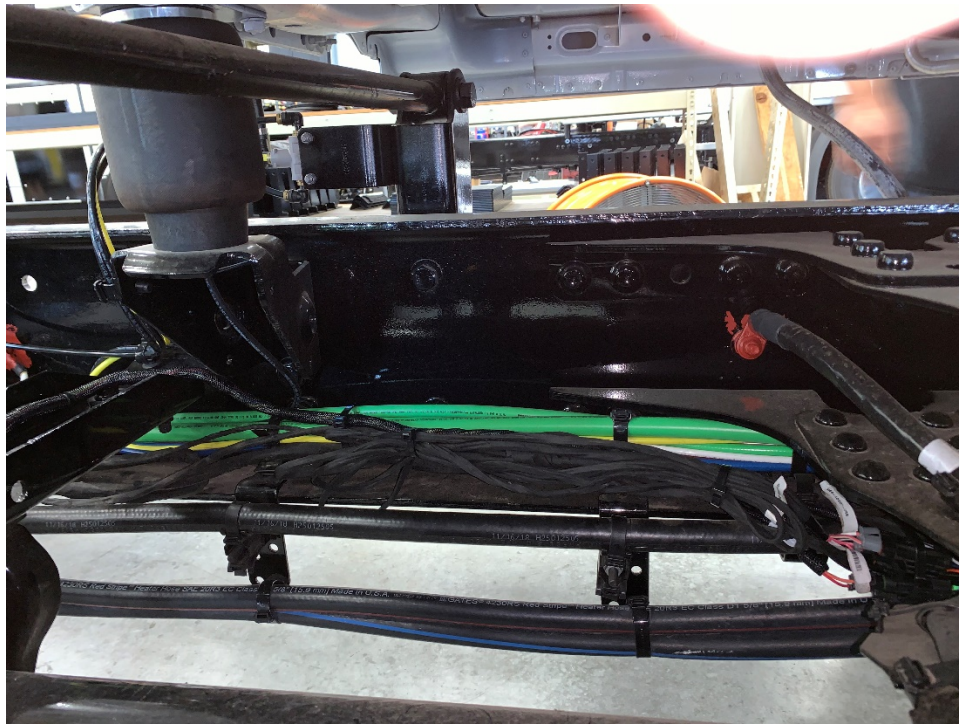
*Figure 14: BOC Harness Install*



*Figure 13: BOC Harness Install*



11. Zip tie under hood portion of the wiring harness to existing wiring harness away from any moving components which could cause damage.



*Figure 15: Wiring Harness Routing-Behind Cab*



*Figure 16: Wiring Harness Routing-Under Cab*





Figure 17: Wiring Harness Routing- Under Hood

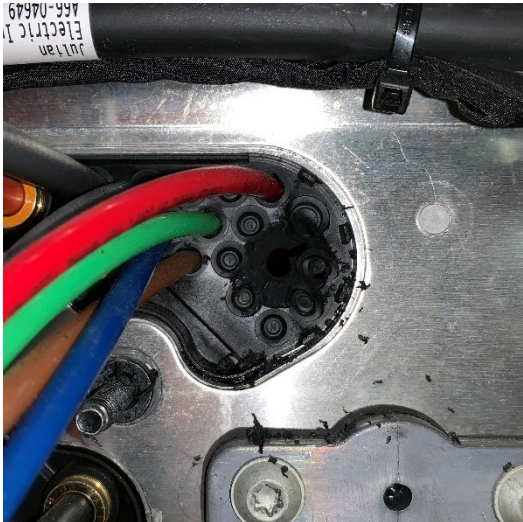


Figure 19: Firewall Hole Drilled

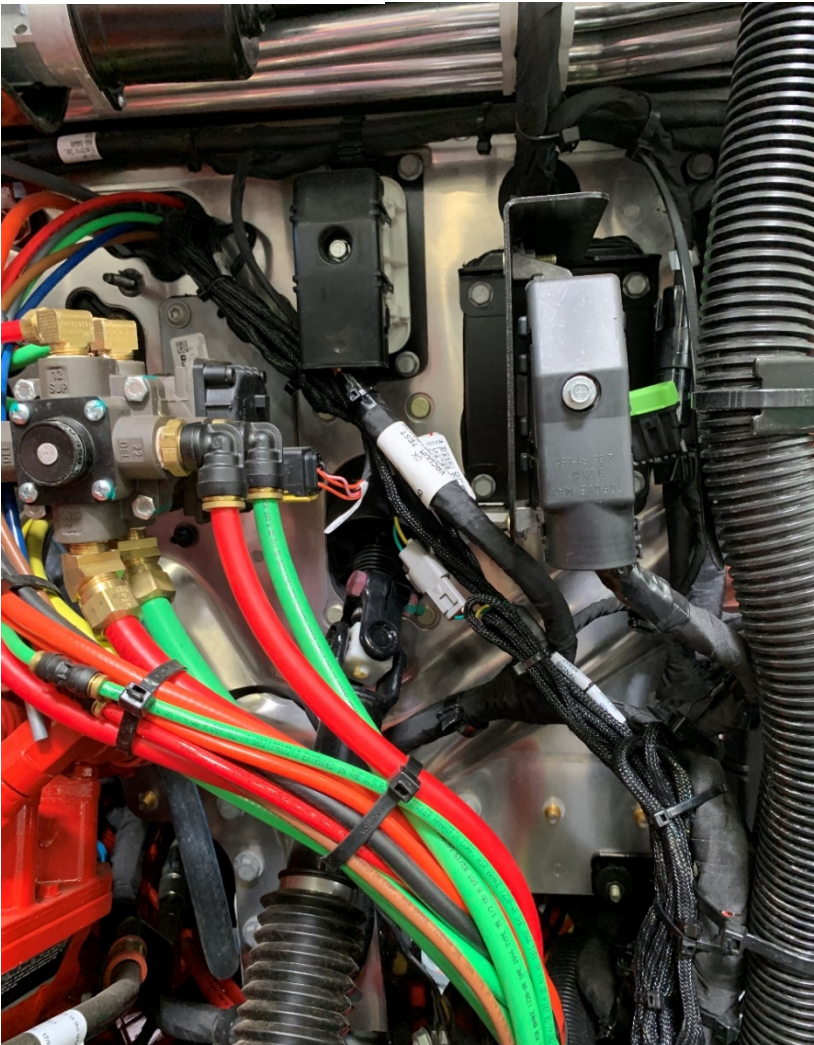


Figure 18: Under Hood Wiring



### Interior Dash Removal:

Once the wiring harness is routed into the cabin of the truck, the lower dash panels must be removed in order to route the ignition switch interrupter and the fuel gauge circuits.

1. Remove the small panel just above the gas pedal assembly with the 3 torx bolts. (Fig. 20)
2. Remove the grab handle assembly and plastic covers over the bolts that hold it in place.
3. Remove the foot well assembly across door threshold taking care not to damage the weather stripping.
4. Remove the left kick panel assembly.
5. Remove the 13 mm hex head along the firewall.
6. Remove the left side panel under key switch area.
7. Remove the center dash piece.
8. Remove the ignition switch from the dash assembly.

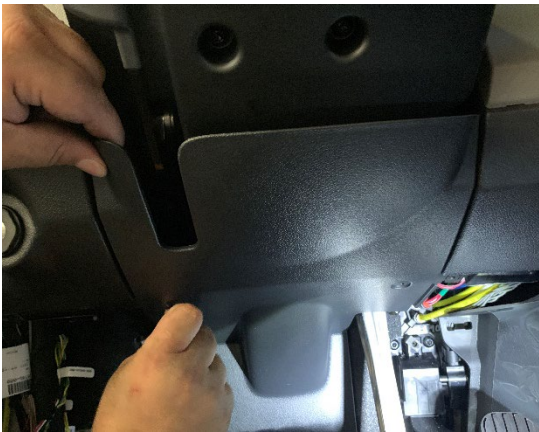


*Figure 20: Panel above gas pedal*



*Figure 21: Interior Grab Handle*







**Start Interrupter Circuit Installation:**

1. Cut the wire for the center pin of the ignition switch.
  - a. Note: Will always be the center pin on all trucks.
2. Install start interrupter circuit between the switch and the truck.
  - a. From the MP92-1608 harness, the yellow wire is the key switch side and the grey w/red stripe goes to the starter circuit.
  - b. After center pin wire is cut, install crimps on each side of the switch.
3. Reinstall key switch into dashboard.



*Figure 22: Key Switch-Center Pin*



*Figure 23: Key Switch Installed*

4. Zip tie key switch interrupter circuit harness out of the way, taking caution to avoid brake, gas, and steering assemblies.
5. Remove 4 torx head bolts for the in-dash cover plate to gain access to the area behind the dash.
6. Route the fuel gauge harness MP92-1031-C to this area.
7. Zip tie any loose wires from the fuel gauge harness taking caution to avoid the brake, gas, and steering assemblies.

8. Reinstall the lower dashboard assembly in the reverse order that it was taken apart.



Figure 24: Blank Dash Panel



Figure 25: Passenger Side Dash Pad

9. Remove the passenger side dashboard pad. This has no screws holding it into place.
10. Remove gauge blank (if applicable) otherwise a hole in the dash will have to be cut in an appropriate location.
11. Install gauge assembly into the dashboard.
  - a. Gauge comes with two styles of terminals
    - i. Standard terminals
    - ii. Freightliner, PACCAR, Kenworth, etc. style



Figure 27: Fuel Gauge Blank Removed



Figure 26: Fuel Gauge Installed

12. Locate power, ground, and backlighting splice blocks for fuel gauge under the dash.



13. Crimp new terminals onto positive (red) and negative (black) on the end of the MP92-1031-C harness.
  - a. Power connection needs to be switched power
14. Install the black ground wire of the MP92-1031 to the truck side of the splice block
15. Install the blue analog backlight to dimmer terminal splice block.
16. Install red power wire to a switched power splice block under dash.
17. Clean up wiring with zip ties and reassemble the dash after installing fuel gauge harness into the backside of the gauge assembly.



Figure 30: Ground Splice Blocks

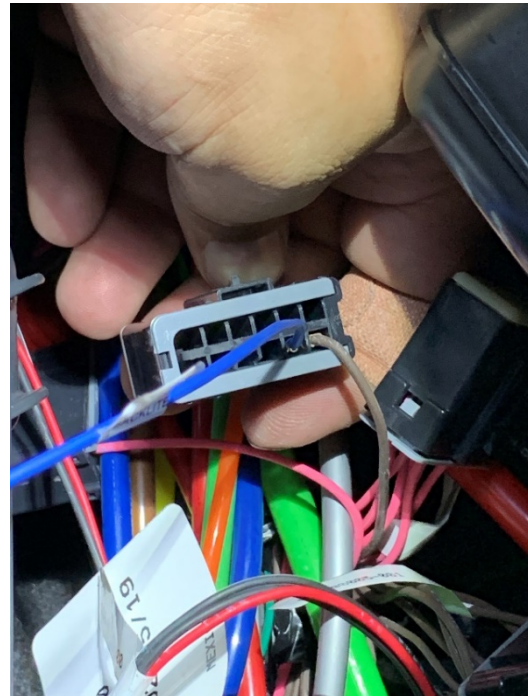


Figure 29: Gauge Dimmer Splice Block



Figure 28: Switched Power Gauge Block

### Installing BOC Unit on Chassis:

1. Be careful lifting the unit into place and locate the unit with the holes that we previously drilled.
2. Line up front and rear holes of the unit and insert a bolt with a washer from the through the outside of the frame and retain with a nut.
3. A spud wrench may be needed to get all of the holes to align as well as adjustment of the crane assembly.
4. Before torquing, install all 32 bolts through the brackets and frame.
5. After all bolts have been installed, reinstall any brackets that were removed on the inside of the frame rail.
6. Remove straps and quick disconnects from the system.



Figure 33: BOC Final Installation

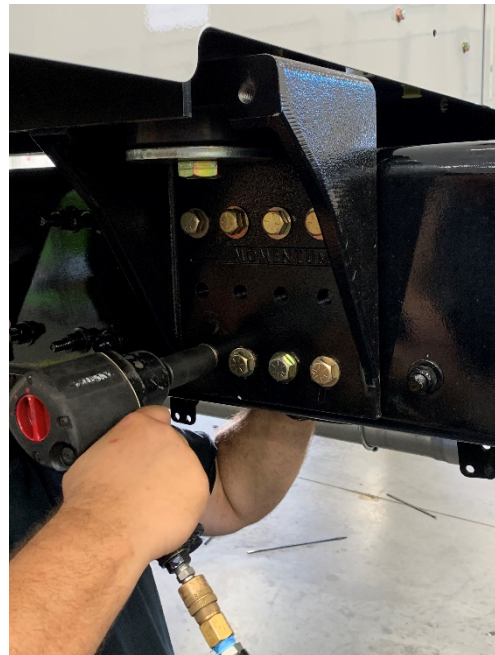


Figure 32: Torquing Mounting Bolts

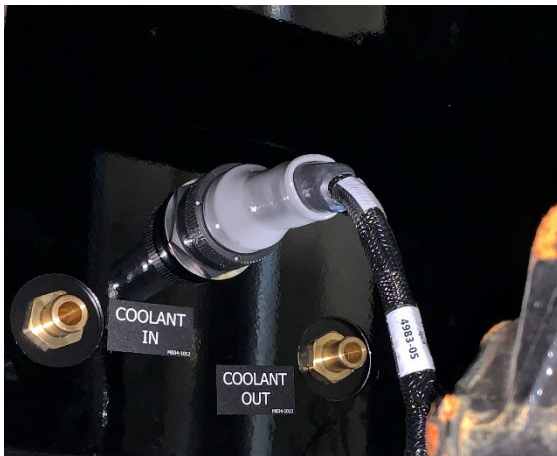


Figure 31: Final Torqued All Bolts

7. Once the system has been installed and torqued connect the pre-run electrical into the bottom of the BOC unit.
  - a. Make sure round connector is in the proper orientation.

#### Coolant and Fuel Lines:

1. If the coolant lines have been run from the manufacturer, locate them and cut them to proper length.
  - a. Ensure a routing that is away from the driveshaft or any sharp edges.
  - b. Note: to avoid spilling excess coolant use coolant hose clamps and a drain pan.
2. Install coolant in/out in either orientation as the regulator used in our systems does not require a flow direction.
  - a. Install using standard worm drive hose clamps.
3. Connect the low pressure fuel line to the BOC unit.
  - a. This might require a 90 degree fitting be used.
4. Final zip tie all brackets, hoses, and electrical connections throughout the truck.



*Figure 34: BOC Electrical Connection*



*Figure 35: BOC Electrical and Coolant*

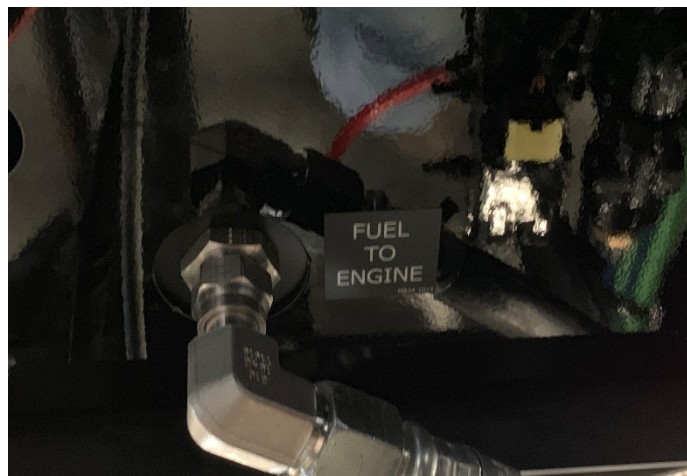




*Figure 38: Freightliner Coolant Hoese:  
(Blue/Red)*



*Figure 37: Low Pressure Fuel Line Install*



*Figure 36: BOC Fuel Line Install*

### Start Interrupter Circuit Check:

1. Open the fuel fill door of the truck located on the driver side.
  - a. Note: If having trouble locating, look for the door open circuit switch as pictured. (Located in the same area as the NGV1 and NGV2 fuel receptacles.
2. Turn the ignition on and attempt to start the truck, if no crank condition exists, the start interrupter circuit is working correctly.
3. Close the fuel fill door then attempt to start the truck again, if the truck cranks, the start interrupter circuit is fully-functioning.



*Figure 40: Fuel Fill Door*



*Figure 39: Start Interrupter Switch*

### Solenoid Check:

1. Open system door panel and ensure when the truck is in the key-on position the solenoid clicks as it should.



Additional Install Photos:

