


Riffraff Diesel 6.0L Fuel Rail Crossover™ FRx 99-03 INSTALLATION INSTRUCTIONS

 **IMPORTANT:** Before starting installation, please be sure that all items which were supplied with the kit are accounted for.



Parts Required:
FRx System

Recommended Parts:

1. Up-pipe bolts: Part# W400060
2. Gasket kit: Part# 3C3Z9433BJ
2. Reinstall kit: Part# 3C3Z9T514AG

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Buyer affirms products purchased are engineered to increase automotive performance and are used at buyer's own risk and accepts full responsibility.

INSTRUCTIONS

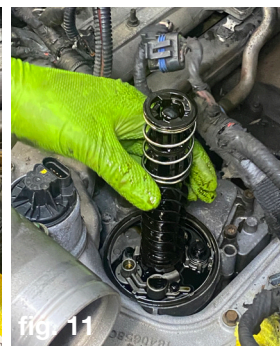
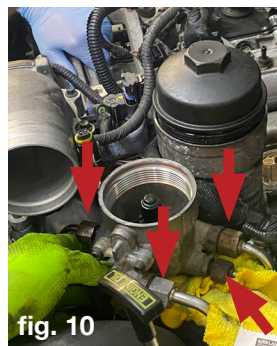
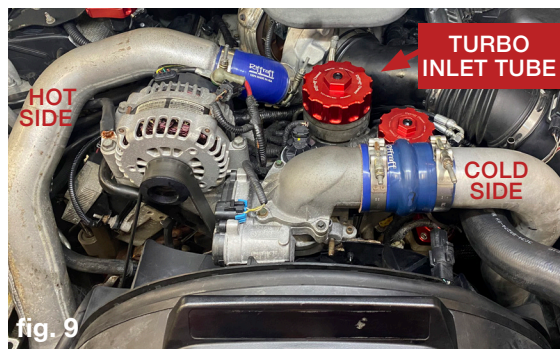
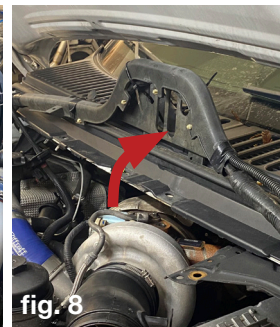
SECTION A | 6.0 FRx Installation Prep

- 1A** Disconnect the negative terminals from both batteries.
- 2A** Open the coolant drain valve at the bottom of the radiator on the driver's side to drain the coolant. Drain until the degas bottle and connected hoses are empty to prevent spilling coolant during subsequent steps.
- 3A** Loosen hose clamps on hose between radiator and degas bottle and remove the hose. **(fig. 1)**
- 4A** Loosen hose clamps on hose between degas bottle and EGR cooler and remove the hose. **(fig. 2)**
- 5A** Loosen hose clamps on hose between the bottom of the degas bottle and the radiator hose and disconnect the hose from the degas bottle. **(fig. 3)**
- 6A** Loosen and remove 2 bolts at the top of the degas bottle and remove the bottle from the engine bay. **(fig. 4)**

NOTE: Images may depict some items removed to improve clarity.



- 7A** Remove air filter assembly; loosen hose clamp between flexible air inlet tube and turbo inlet tube (**fig. 5**), remove filter minder from rear of filter box, disconnect mass airflow sensor (**fig. 6**), pull flexible air inlet tube off turbo inlet tube, and lift entire assembly from engine bay. (**fig. 7**)
- 8A** Remove plastic push retainers from harness tray over turbo, gently rotate tray back and up, and secure harness above hood seal. Secure with zip ties. (**fig. 8**)
- 9A** Loosen T-bolt clamps on hot side CAC boots and remove the boots. Remove the hot side CAC tube. (**fig. 9**)
- 10A** Loosen T-bolt clamps on upper and lower cold side CAC boots and remove the boots. Remove the cold side CAC tube. **Note: Some 2005-2007 models may use a plastic rather than metal CAC tube.** Removal is the same regardless of tube material. (**fig. 9**)
- 11A** Remove 2x mounting bolts between turbo inlet tube and mounting bracket, loosen hose clamp at turbo inlet, disconnect turbo inlet tube from turbo inlet, rotate crankcase vent (CCV) tube counterclockwise, and disconnect CCV tube with turbo inlet tube. (**fig. 9**)
- 12A** We recommend removing the oil filter housing to aid in removing the turbo and simplifying installation of the FRx regulator body and fuel pressure regulator (FPR) seals. If removing the filter housing, remove the fuel and oil filters, and remove the remaining fuel and oil.
- 13A** Remove 4x fuel lines from fuel bowl. (**fig. 10**)
- 14A** Remove 4x Torx bolts from base of oil filter housing and remove housing. Use caution to not damage the oil filter standpipe while removing the oil filter housing.
- 15A** Remove 1x Torx bolt from base of oil filter standpipe and remove it. (**fig. 11**)



16A Remove 2x hex bolts from turbo oil supply tube on top of turbo (**fig. 12**). Loosen hex bolt on clamp between up-pipe and turbo (**fig. 13**). Remove 3x hex bolts between turbo and pedestal. Disconnect VGT solenoid electrical connector (**fig. 14**). Insert non-marring tool into compressor discharge and leverage front of turbo up and free of pedestal (**fig. 14**). Rock turbo forward and backward carefully to disengage from up-pipe collector. Rotate turbo up and out toward front passenger side and remove from engine bay.



17A To provide more working space, lift and support the down-pipe from beneath so that it rests higher above the engine. (**fig. 15**)



18A Loosen and remove the clamp between the EGR cooler and up-pipes. (**fig. 16**)

19A Loosen the 1x EGR cooler to intake manifold support hex bolt.

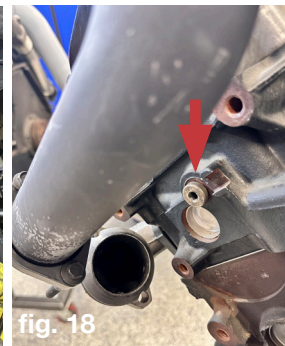
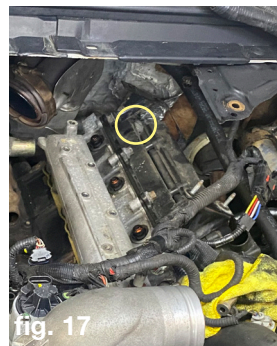
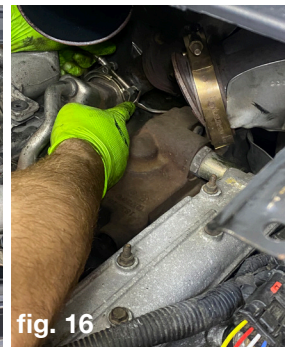
20A Loosen the 2x hex nuts fastening the EGR cooler to the oil cooler.

21A Disconnect up-pipes from exhaust manifold.

22A Remove 2x hex bolts to remove rear FICM bracket. (**fig. 17**)

23A Position up-pipes so that fuel rail plugs at the back of the block are accessible. Removal of the up-pipes is not necessary. (**fig. 18, fig. 19**)

24A Remove fuel rail plugs using an allen wrench.



SECTION B | 6.0 FRx Regulator Body Installation

- 1B** Remove fuel pressure regulator body from filter housing by removing 4x Torx bolts. Retain the fuel spring, internal brass tappet, and return line adapter for re-use. **(fig. 20, fig. 21)**
- 2B** Install regulator body o-ring, replace tappet seal, replace air purge o-ring, and fit FRx regulator body over fuel spring and against filter housing body. Install 4x included mounting screws. Note that the longer screw should be installed in the countersunk hole at the upper right of the FRx regulator body. Snug screws. **(fig. 21)**
- 3B** Reinstall the oil filter standpipe. Reinstall 1x Torx bolt at base of standpipe.
- 4B** Reinstall the oil filter housing, being careful to not damage the oil filter standpipe. Reinstall 4x Torx bolts to secure filter housing to oil cooler.
- 5B** Fasten 4x fuel lines to the fuel bowl.
- 6B** Reinstall fuel and oil filter elements and fuel and oil filter lids.
- 7B** Pre-assemble the FRx banjo bolts, banjo fittings, and copper washers.
- 8B** From beneath the truck, install the banjo bolt assemblies into the fuel rail plug holes until the banjo fittings rest between the routing tabs in the block. **(fig. 22, fig. 23)**

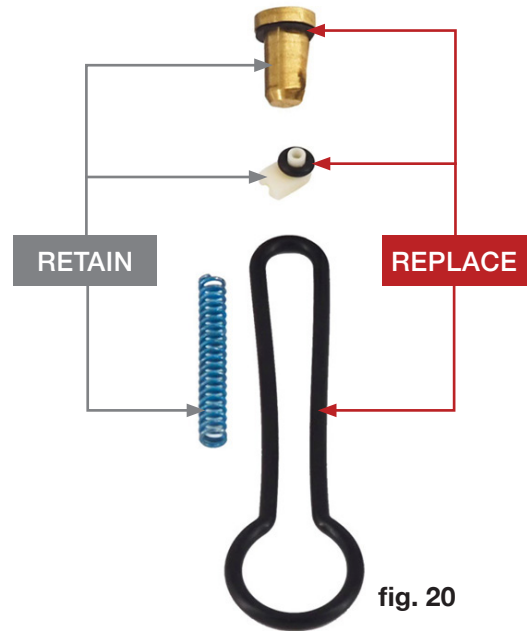


fig. 20

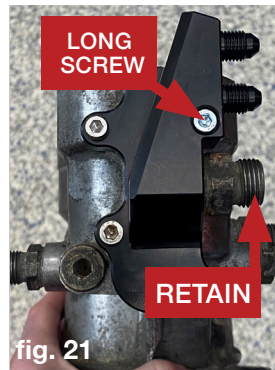


fig. 21

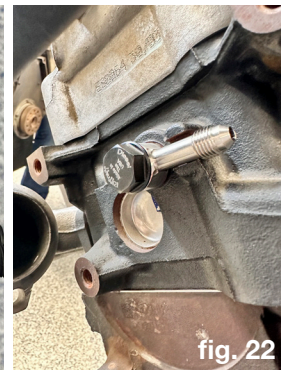
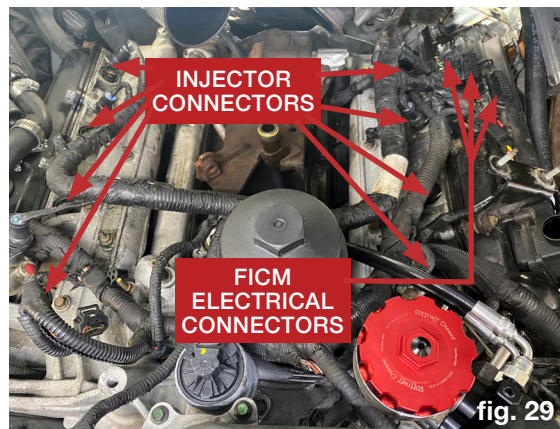
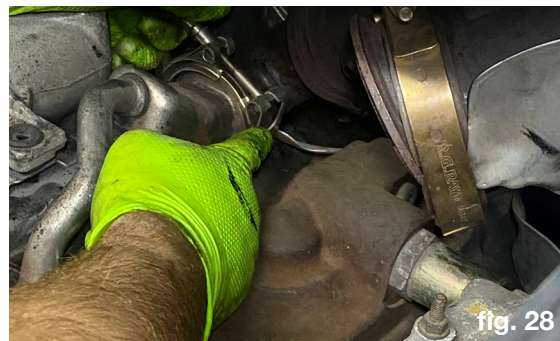


fig. 22



fig. 23

- 9B** Route the FRx lines towards the back of the block. On the passenger side, route the FRx line beneath the turbo pedestal and over the EGR cooler to the banjo fitting (**fig. 24**). On the driver's side, route the line between the turbo pedestal and intake manifold to the banjo fitting. (**fig. 25, fig. 26**)
- 10B** Connect lines to banjo fittings.
- 11B** Connect lines to FRx housing. The passenger side line should connect to the top FRx body fitting, while the driver's side line should connect to the bottom FRx body fitting. Tighten all line fittings, at back of engine and at FRx housing. (**fig. 27**)
- 12B** Reconnect the negative battery terminals. Cycle the key to the on position and allow the fuel pump to run 4 full cycles. Check for leaks at all fuel fittings. Disconnect the negative battery terminals.
- 13B** Reinstall rear FICM bracket.
- 14B** Connect up-pipes to exhaust manifolds (Replace up-pipe bolts, Part# W400060). Leave hardware loose.
- 15B** Position EGR gasket (included in gasket kit, Part# 3C3Z9433BJ) between EGR and up-pipe. Loosely secure EGR to up-pipe with clamp. (**fig. 28**)
- 16B** Connect FICM harness to injectors. (**fig. 29**)
- 17B** Position FICM over mounting points. Plug 3x electrical connections into bottom of FICM, ensuring all three are snapped into place. Install 2x hex bolts through rear FICM mounting holes. Position turbo inlet tube mounting bracket over front FICM mounting studs and install 2x hex nuts. (**fig. 29**)



SECTION C | Reinstall Turbo

- 1C** Replace o-rings on turbo oil drain tube (included in reinstall kit, Part# 3C3Z9T514AG).
- 2C** Position turbo on top of pedestal and over turbo oil drain tube.
- 3C** Loosely connect clamp between up-pipe collector and turbine inlet.
- 4C** Install 2x hex bolts through turbo into pedestal (included in reinstall kit, Part# 3C3Z9T514AG).
- 5C** Lower the downpipe into position.
- 6C** Connect clamp between turbine outlet and downpipe.
- 7C** Tighten EGR to up-pipe clamp. (fig. 16)
- 8C** Install 1x hex bolt between EGR cooler and intake manifold.
- 9C** Tighten 2x hex nuts fastening EGR cooler to oil cooler. (fig. 12)
- 10C** Reinstall turbo feed line. Use new gasket from turbo reinstall kit (included in reinstall kit, Part# 3C3Z9T514AG). Tighten 2x hex bolts to the turbo and 1x hex bolt to the oil cooler.
- 11C** Reconnect CCV tube to CCV outlet and reconnect air inlet tube to turbo inlet.
- 12C** Reinstall the hot side CAC tube and tighten the CAC boot clamps. (fig. 9, fig. 10)
- 13C** Reinstall the cold side CAC tube and tighten the CAC boot clamps. (fig. 9)
- 14C** Reposition harness tray over turbo and reinstall push retainers. (fig. 8)
- 15C** Reinstall air filter assembly. Tighten hose clamp between turbo inlet tube and flexible air inlet tube, reinstall filter minder in rear of filter box, and reconnect mass airflow sensor. (fig. 5, fig. 6, fig. 7)
- 16C** Reinstall degas bottle and install 2x hex bolts. (fig. 4)
- 17C** Position short hose over degas bottle nipple and position clamp to fasten hose.
- 18C** Reinstall hoses between degas bottle and radiator and degas bottle and EGR cooler. Position clamps to fasten hoses. (fig. 1)

19C Refill coolant.

20C Reconnect the negative battery terminals.

21C Cycle the key to the ON position and allow the fuel pump to run 7 complete cycles to prime the fuel system.

22C Start the engine and check for fuel leaks.