

# INSTALLATION INSTRUCTIONS

## FST KIT FOR PORT INJECTION

### 2013+ FORD FOCUS ECOBOOST

Document: 19-0168

Support: info@radiumauto.com

Working under the vehicle is required. This installation is best performed with the vehicle raised on a lift. If a lift is not available, be prepared to raise and safely support the vehicle. When installing any part which has an O-ring, lubricate with light oil.

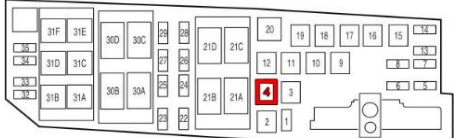



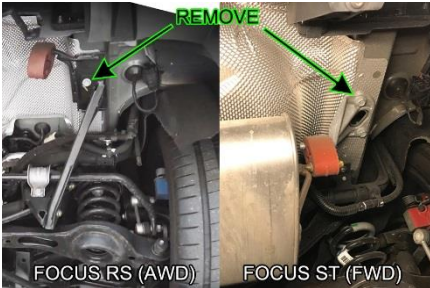

### CAUTION



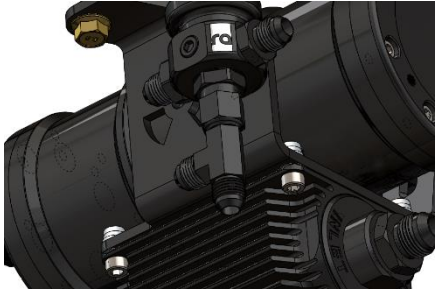

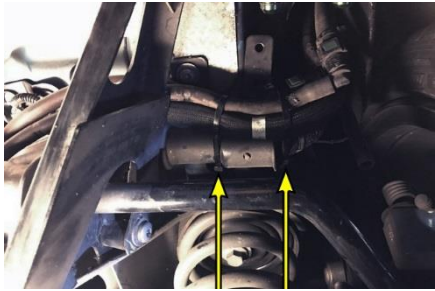

Only a qualified technician following applicable safety procedures should perform the installation of this product. One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product. **Gasoline and other fuels are flammable and can be explosive.** Only install in a well-ventilated location to minimize buildup of fuel vapors. No sparks, open flames, smoking or other ignition sources are to be present. Draining and removal of all fuel from the fuel system is recommended. Proper eye and personal protection is required at all times during installation.

### WARNING







The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure. Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only. Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.



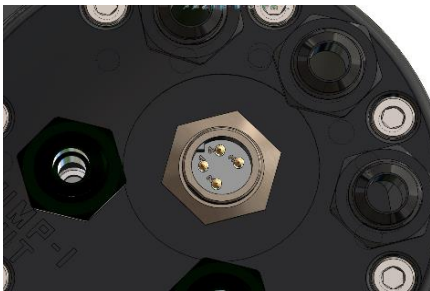
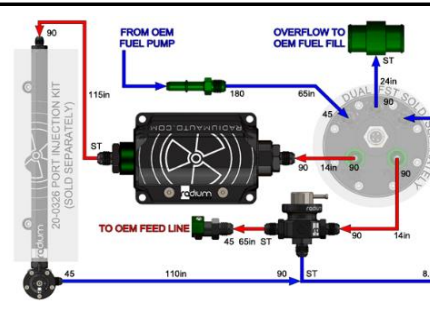

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1	Pipe Thread Paste	Apply pipe thread paste to the provided 1/8" NPT plug threads and install into the non adjustable fuel pressure regulator (FPR) front port.	
	3/16" Allen Wrench		
	Light Oil	Lubricate the two 6AN ORB fitting O-rings and install into the FPR side ports.	
	3/4" Wrench	Using the four included M4 screws, secure the FPR to the Focus mounting bracket, as shown.	
	2.5mm Allen Wrench		
2	8mm Wrench	Using the thumb tab, unlock the flying lead connectors from the relays.	
	3mm Allen Wrench	Using the thumb tab, unlock the fuse flying lead wires from the holder.	
		Secure the 2 relays and 2 fuse holders to the Focus mounting bracket. Be sure to overlap the mounting tabs together in pairs, as shown.	
3	4mm Allen Wrench	Secure the fuel surge tank (sold separately) to the Focus mounting bracket using the 4 provided M6 countersink screws.	
		NOTE: be sure the fuel surge tank (FST) pumps are orientated, as shown. The "PUMP-1 OUT" and "PUMP-2 OUT" ports should be at the lowest points when installed in the vehicle.	
4	Light Oil	Lubricate the 10AN ORB to 6AN adapter fitting O-rings and tighten to the fuel filter body.	
	1" Wrench	Next, slide the filter into the heat exchanger mount. This can go in either direction. Tighten the 2 countersink bolts to secure the filter in place, as shown.	
	3mm Allen Wrench		

5	10mm Wrench	Prop the hood and remove the fuse cover panel. Remove the 20A fuel pump fuse at terminal 4. To relieve fuel pressure, start the engine and allow it to stall. Switch the vehicle OFF and replace the fuse and panel.	
		Release the battery cover tabs and pull upwards to remove. Disconnect the battery.	
6		Safely raise the vehicle.	
		From the RH rear of the vehicle (near the muffler), pop out the electrical connector from the chassis holes, as shown.	
7	Sand Paper	Next, remove the clip from the rearward hole, as shown. These holes will be used to secure the Focus mounting bracket.	
		The rear hole will also be used to chassis ground the electrical circuits described later. Remove a 1/2" diameter (minimum) of paint from both sides of the hole pointed to in the picture.	
8	Diagonal Cutters	From the rubber grommet, route the wire loom in between the 2 tabs.	
		Next, find the OEM sheet metal hole towards the RH rear side of this area.	
		Using the included zip tie, secure the OEM wire connector to this hole.	
		As shown, the connector will nest nicely in this area and free up the required space for the kit.	
9	13mm Socket Wrench	Remove the M8 bolt shown in the picture.	
		The function of this bolt is slightly different between the AWD Focus RS and the FWD Focus ST, but is found in the same chassis location.	
10	13mm Socket Wrench	Raise the FST assembly up to this area. Run the 2 provided M6 bolts (shown in gold) through the chassis and into the bracket rivet nuts.	
	10mm Socket Wrench		
		<b>Ford Focus ST (FWD) ONLY</b> The OEM M8 bolt will NOT be reused. Use the longer M8 bolt provided in this kit (shown) to secure the inner mounting tab.	
		<b>Ford Focus RS (AWD) ONLY</b> The OEM M8 bolt WILL be reused for securing the inner mounting tab. The extra M8 bolt provided in this kit can be discarded.	







11		<p>If there is interference between the FST and the OEM muffler chassis mount (AWD Focus RS), place the included washer on top of the inner mount to shim the assembly slightly downwards.</p>	
12	5mm Allen Wrench	<p>Point the fuel filter assembly so the green outlet cap is pointing towards the front of the vehicle.</p> <p>Using the 4 included M6 socket head bolts, secure the filter assembly to the rivet nuts on the bottom of the Focus mounting bracket.</p>	
13	11/16" Wrench	<p>Secure the provided 6AN "T" fitting to the FPR return port and orientate, as shown.</p>	
14	Diagonal Cutter	<p>Find the 3 OEM hoses directly in front of the FST. Pull out the OEM clips and cut the corresponding OEM zip ties to free up the hoses.</p>	
15	Diagonal Cutter	<p>Just in front of the FST port fittings is a metal tab where the clip was secured. Bend this tab up and out of the way.</p> <p>Use the provided zip ties to secure the OEM hoses, as shown. Repositioning these OEM hoses permits additional space for the new fuel hoses.</p>	
16	Pipe Thread Paste	<p>The FST overflow port will return fuel into the gas tank via the OEM rubber fuel filler tube. The included barbed coupler will replace a small cut away section from the OEM fuel filler tube.</p> <p>Apply pipe thread paste to the 1/4" NPT threads on the included 90 degree 6AN adapter fitting. Install the fitting in the barbed coupler. Install finger tight, then add another 1.5 to 3 turns. Make sure the black fitting is clocked so that it runs parallel with the barbed coupler.</p>	









17	Marker	Find the OEM rubber hose that connects the fuel filler tube to the gas tank port. NOTE: Access to the AWD Focus RS and FWD Focus ST models will be slightly different.	
		Make "upstream" and "downstream" cut marks on the hose where the barbed coupler will be located (AWD Focus RS shown). Make sure to allow enough room to access the hose end fitting that will be installed later.	
18	7mm Socket Wrench	Loosen the worm drive hose clamp near the gas tank.	
	Hose Cutter	Dislodge the rubber fuel filler hose from the gas tank and pull the hose down just enough to reach the cut lines. Cut at the upstream mark.	
19	Hose Cutter	Place the OEM fuel filler hose onto a workbench. As shown, cut out a 1/2" section near the downstream mark.	
		Slide the OEM rubber hose onto the side of the barbed coupler that is on the opposite side of the -6AN male fitting. In other words, the -6AN fitting will be pointing towards the rear of the vehicle when reinstalled.	
20	7mm Socket Wrench	Using a 1/4" socket, secure the short hose to the barbed coupler using one of the included hose clamps. Place the assembly onto the gas tank port.	
	1/4" Socket Wrench	Orientate the coupler so there is room to install a hose end to the -6AN fitting. Secure using the OEM clamp and a 7mm socket.	
		As shown, reinstall the upstream fuel filler hose to the barbed coupler and secure using the other provided hose clamp.	
21		<b>Ford Focus ST (FWD) ONLY</b> <b>THE PROVIDED 3/8" SAE CONNECTOR FITTINGS WILL NOT BE USED.</b> Find the SAE quick connect fuel line junction just in front of the gas tank on the RH side (shown). NOTE: The tubing with the green locking clip (shown) does NOT need to be removed.	
		Gently pry and remove the white locking clip from the 5/16" SAE connector. Be careful as these are brittle. Have a rag handy as about a cup of fuel will spill from this connection. Press the white 5/16" SAE quick connect thumb tab inwards and release the fuel tube.	
22		<b>Ford Focus RS (AWD) ONLY</b> <b>THE PROVIDED 5/16" SAE CONNECTOR FITTINGS WILL NOT BE USED.</b> Find the OEM fuel filter under the vehicle located just in front of the gas tank on the RH side. There are 3 SAE quick connect fittings in this area. Only the pre filter fitting will be unplugged. It is located furthest to the RH side of the car and has a black thumb tab (shown). The green and white thumb tab SAE connections do NOT need to be unplugged. Gently pry and remove the white locking clip from the SAE connector, as shown. Be careful as these are brittle. Have a rag handy as about a cup of fuel will spill from this connection. Press the black 3/8" SAE quick connect thumb tab inwards and release the fuel tube.	







23	5/64" Allen Wrench	Find the SAE female fittings provided in the kit (Focus ST = 5/16", Focus RS = 3/8"). Remove the green lock and lubricate the internal O-rings. Insert the fitting onto the OEM SAE male connection that was just unplugged. After engaged, reinstall the green retaining clip onto the fitting and secure with the small screw.	
	Light Oil		
24		Find the SAE male fittings provided in the kit (Focus ST = 5/16", Focus RS = 3/8"). Lubricate the male portion and insert into the OEM SAE female connector until a "click" is felt. Reinstall the OEM SAE white lock.	
	Light Oil	As depicted, install the fuel rail adapter to the Radium DMR body.	
	2.5mm Allen Wrench	Install the DMR onto the RH side (of vehicle) and the provided -8AN ORB to -6AN male adapter to the LH side (of vehicle) of the fuel rail (not included).	
	1" Wrench		
	1/4" Allen Wrench	If using the Radium Port Injection Kit P/N: 20-0326, install the included 8AN ORB plug to the center port.	
	3/4" Wrench		
7/8" Wrench	Find the optimal orientation for the DMR for fuel return plumbing. Install the -6AN ORB plug and -6AN male fitting to the Radium DMR.		
25	Pipe Thread Paste	Apply pipe thread paste to the fuel pressure gauge threads. Install the gauge to the -6AN female to male 1/8" NPT adapter finger tight. Then add another 1.5 to 3 turns.  Install the fuel pressure gauge assembly (shown) to the fuel rail inlet.  All connections to the system now have a -6AN male fitting.	
	7/16" Wrench		
	11/16" Wrench		
26		Before plumbing the fuel lines, temporarily plug in the FST pigtail harness. This will represent where the fuel lines can be routed without wiring interference.	
		NOTE: the FST connector has a keyway (shown) that must be orientated properly before inserting and screwing together.	
27		Use the included EFI fuel line and various Pusk Lok hose ends to route the plumbing, as shown. NOTE: orientation in diagram is not accurate.	
		When routing the hoses, be sure to stay away from moving components such as suspension as well as areas that get excessively hot.	
		NOTE: The following hose lengths are only recommendations. Depending on the vehicle and how the hoses are exactly plumbed, variations will be present. Measure before cutting and assembling.	
28	Light Oil	To properly install the 6AN Push Lok hose ends into the provided 3/8" EFI fuel hose, first lubricate the barbs. Fully push the hose onto the barbs until it bottoms out, as shown.  NOTE: Hose clamps are not necessary for Push Lok connections.	




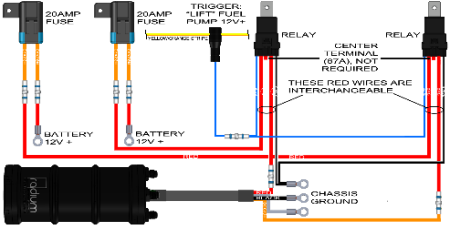




29		The highest point on the FST is used as the overflow port. It is important to route this hose to the Radium barbed coupler fitting that is attached to the OEM fuel filler hose. Route this hose along the same path and next to the OEM fuel filler hose, as shown.	
		<b>Hose Recommendations:</b>	
		Highest FST Port: 90 Degree Hose End	
		Barbed Coupler: Straight Hose End	
		Hose Cut Length: 24 inches	
30		The low pressure fuel from both the non adjustable FPR and the engine mounted port injection FPR (not included) must return to the FST. Route a hose from the forward facing fitting found on the "T" fitting to the upper LH FST port fitting, as shown.	
		<b>Hose Recommendations:</b>	
		Upper LH FST Port: 90 Degree Hose End	
		Forward Facing "T" Fitting: Straight Hose End	
		Hose Cut Length: 8.5 inches	
31		The fuel pump that is mounted in the RH side of the FST "PUMP-1 OUT" will be used to supply the OEM GDI system. Fuel must first route through the non adjustable FPR mounted to the bracket, as shown.	
		<b>Hose Recommendations:</b>	
		RH Pump Out-1 FST Port: 90 Degree Hose End	
		FPR High Pressure Inlet (Rear) Port: 90 Degree Hose End	
		Hose Cut Length: 14 inches	
32		The fuel pump that is mounted in the LH side of the FST "PUMP-2 OUT" will be used to supply the port injection system. Fuel must first route through the filter inlet, as shown.	
		<b>Hose Recommendations:</b>	
		LH Pump-2 Out FST Port: 90 Degree Hose End	
		Fuel Filter Inlet Port: 90 Degree Hose End	
		Hose Cut Length: 14 inches	
33		The OEM fuel pump inside the gas tank will supply fuel to the FST. Assemble a hose from the Radium SAE male fitting (shown) to the upper RH FST port. Direct the hose along the RH side of the gas tank then route it along a similar path as the previous "overflow" hose keeping it high up and away from hot and/or moving components.	
		<b>Hose Recommendations:</b>	
		Upper RH FST Port: 45 Degree Hose End	
		Radium SAE Male Fitting: 180 Degree Hose End	
		Hose Cut Length: 65 inches	
34		The non adjustable FPR will supply fuel to the OEM GDI system. Assemble a hose from the non adjustable FPR forward port to the Radium SAE female fitting connected to the OEM feed line (shown). Route this hose along a similar path as the previous hose.	
		<b>Hose Recommendations:</b>	
		FPR High Pressure Outlet (Front) Port: Straight Hose End	
		Radium SAE Female Fitting: 45 Degree Hose End	
		Hose Cut Length: 65 inches	

35	10mm Socket Wrench	Remove the RH side plastic underpaneling to expose the tunnel where the OEM hard lines run up to the engine bay, as shown.	
	Needle Nose Pliers		
	Flat Blade		
36	T30 Torx	Remove the front plastic underpaneling (shown).	
	Flat Blade		
37		From the engine bay, route the hose from the fuel rail gauge inlet fitting under the intake manifold towards the RH side of the vehicle, as shown. Run the hose down the firewall into the tunnel until it meets up with the OEM hard lines. Follow the hard lines back to the fuel tank connections. Follow previously installed hoses and connect to fuel filter outlet port.  <b>Hose Recommendations:</b> Radium Fuel Filter Outlet (Front) Port: Straight Hose End Port Injection Fuel Rail Inlet Fitting: 90 Degree Hose End Hose Cut Length: 115 inches	
38		The port injection's direct mount regulator (DMR) return hose should be connected to the lowest port on the "T". This low pressure fuel merges with the low pressure fuel from the Radium FPR used for the GDI system. Route this hose similarly to the previous port injection feed line. This hose will route to the low pressure DMR port, as shown.  <b>Hose Recommendations:</b> Radium DMR Outlet Port: 45 Degree Hose End Lower "T" Fitting: 90 Degree Hose End Hose Cut Length: 110 inches	
39	11/16" Wrench	Tighten all connections. It is recommended to use an aluminum wrench to prevent marring.  Using the provided cable zip ties, secure all hoses in place as shown. Make sure they are kept away from excessively hot areas and moving components.	
	Diagonal Cutter		
40	Scissors	Use roughly 2.5 feet of the provided heat tape to wrap the bundle of fuel hoses that route in front of the exhaust muffler, as shown.	



41	Scissors	Use the rest of the provided heat tape to wrap the fuel hoses that route just to the RH side of the exhaust muffler, as shown.	
42	T40 Torx	Plug in the electrical relay and fuse flying lead connectors and allow them to dangle. Lower the vehicle.	
		Open the rear RH door. Remove the bottom 2 RH rear seat bolts (shown). Pull the seat up and move out of the way.	
43		Gently pull the panel (shown) to the RH side to pop out the plastic retainer from the door sill.	
		Gently pull up to release the plastic door sill panel.	
		Pull up the carpet and secure the seat belt out of the way so it does not interfere while working in this area.	
44		To activate the surge tank fuel pumps, the relays will be triggered from the OEM fuel pump's power wire. The FWD Focus ST (shown) uses 1 fuel pump controller. The AWD Focus RS uses 2 fuel pump controllers (shown next picture). Unplug the connector by squeezing the lock and simultaneously pulling. For AWD Focus RS, use the rearward controller.	
		Alternatively, the fuel pump that will drive the port fuel injectors can be triggered by boost pressure using Radium Engineering P/N: 20-0236 Adjustable Pressure Switch. This can easily be implemented but is not discussed in these instructions.	
45	Wire Stripper	Unscrew both ends off the included black Posi-Tap connector. Insert the OEM power wire (yellow/orange stripe) from the fuel pump module connector into the slotted end of the Posi-Tap connector. Screw the center section back on making sure the wire gets pierced.	
		Slide the Posi-Tap collar end piece over the blue wire provided in the kit. Strip the blue insulation back to expose 3/8" of copper and insert into the end of the Posi-tap connector. Finally, smash the blue wire by tightening the collar end into the Posi-Tap connector, as shown. See the online Posi-Tap tutorial videos for more information.	
46		Next to the OEM fuel pump controller is a rubber grommet plug. As shown, pull up to release. Looking in the hole, there is a passage for the blue trigger wire to route back to the new fuel pump relays. Poke a small hole and insert the blue wire through the middle of the rubber grommet. Feed the wire down until it can be found underneath the car.	
		Reattach the rubber grommet. For strain relief, allow slack in the wire so it does not pull away from the OEM fuel pump controller. Use the included split wire loom to protect the wire. Route it safely avoiding any sharp edges that could cause unwanted chaffing.	



47	Electrical Pick	<p>Find the 2 included relay flying lead connectors. The large red wires located in the center (terminal 87A) of each connector will not be used.</p> <p>To remove, first pry off the large red rubber seal and slide it along the 5 wires to dislodge it from the connector. As shown, insert a pick into the socket and pry the terminal loose from its internal lock. Simultaneously push the wire through the front of the connector.</p> <p>Discard the wire/terminal and reattach the large red rubber seal. Apply a small dab of silicone RTV into the unused hole of the red rubber seal.</p>	
	RTV Silicone		
48	Wire Cutters	<p>Assemble the components as shown in the wiring schematic (not to scale). Cut all wires to length.</p>	
	Wire Strippers		
	Wire Crimpers		
49	Heat Gun	<p>Note the different locations of the included solder butt connectors in the wiring schematic diagram above. There are 7 in total.</p> <p>To properly use the solder butt connectors, strip each wire insulation back and insert both wires into the butt connector ends. Use a heat gun. Be careful with the surrounding area as the internal solder will take a few minutes to melt. Verify the connection is solid by giving it a tug.</p>	<p>Position wires into Solder Splice, as shown.</p> 
50	10mm Socket	<p>For strain relief, always allow some slack in the wire so it does not pull.</p>	
51	Diagonal Cutter	<p>Use the included split wire loom for protection. Route it safely avoiding hot areas or any sharp edges that could cause unwanted chaffing.</p> <p>Use the small zip ties included to secure the wire loom in place.</p>	
52		<p>Temporarily remove the FST pump fuses. Reconnect the battery. Switch the ignition to the ON position a few times without starting the engine. This will prime the OEM fuel pump and fill the FST. Check for leaks and fix any that may have occurred.</p> <p>Reinstall the fuses. Start and idle the engine. Recheck for leaks. NOTE: When first starting the engine, it may take longer than usual due to air pockets being bled out of the system.</p> <p>Reinstall all components in reverse order.</p>	

53	3/8" Open End Wrench	The Radium DMR is NOT preassembled to a specific fuel pressure. To adjust, the port injection fuel pump must be running.
	3/32" Allen Wrench	
		To increase pressure, tighten set screw. To reduce pressure, loosen set screw. Once adjusted, lock the set screw in place with the jam nut.
		If a 1:1 rising rate is required, connect a 5/32" vacuum hose (not included) from the DMR vacuum barb to the intake manifold.
		<b>INSTALLATION COMPLETE</b>

