



# SSI-R Race Intake Manifold

## '86-'93 5.0L Mustang

### Part # 5008

#### INSTALLATION INSTRUCTIONS

*Note; as with any short runner intake manifold design, this product is intended for highly modified engines that are used for high rpm race duty. By installing this unit onto your vehicle, it is assumed that you understand the basic concept of this type of intake manifold and have chosen to install it on an engine that can benefit from its design. The EGR valve will be deleted in this install and there may be a fair amount of customization required to make this intake work correctly on your application. These instructions are a general guide of the essential tools, replacement items, and techniques that we have used to perform a basic SSI-R intake installation on a showroom stock 87-93 5.0 Mustang. Depending on the application, your installation may require additional tools, replacement items, and installation steps that are not listed here.*

#### **Tools Required**

T-20 Torx  
 3/8" ratchet  
 Timing light  
 Electric drill  
 Torque wrench  
 Adjustable pliers  
 Flat head screwdriver  
 6" or longer extension  
 Cutters or heavy scissors  
 1/2", 11/16", and 1" deep sockets,  
 1/4" ratchet (or 3/8"- 1/4" reducer)  
 7/32", 1/4", 11/32", 5/16", and 10mm sockets  
 1/2", 5/8", 11/16", 1", and 1-1/8" open end wrenches  
 1/2" and 5/8" fuel line disconnect tools (spring lock type)  
 7/64", 1/8", 5/32", 1/4", 5/16", and 5mm, Allen wrenches

#### **Items That Commonly Need Replacement**

Thermostat  
 Engine oil and filter  
 PCV Valve & PCV Grommet  
 Any worn or damaged hoses/vacuum lines  
 Any worn or damaged fuel injector O-rings/tips

#### **Additional Items Required For Installation**

Teflon tape  
 Thermostat housing gasket  
 Lithium grease (or equivalent)  
 Tube of red Loc-Tite (or equivalent)  
 (1) Tube of grey (or equivalent) RTV  
 Large port intake to head surface gaskets  
 Coolant/Distilled water (depending on amount lost during installation)



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IMPORTANT- All appropriate safety equipment (i.e. gloves, tools) must be used during the installation of these product(s).  
 BBK Performance, Inc. accepts no responsibility for injuries resulting in the installation of any product(s).

## Installation Hardware

- (2) 90° fitting, 3/8-18 to 3/8" I.D. hose
- (2) Fitting, 1/8" NPT- 3/16" vacuum nipple
- (4) Throttle body mounting, 5/16-18 x 1" SS-SHCS
- (8) Bottom plate mounting, 1/4-20 x 3/8" SS-BHCS
- (2) Upper manifold locating pins (dowel pins) 1/4"x 3/4"
- (8) Base plate to lower mounting, 5/16-18 x 1-1/2" SHCS
- (2) Throttle cable bracket mounting M-8 x1.25 x 14mm SHCS
- (2) Water fitting/vacuum port block-off plugs, 3/8-18 pipe plugs
- (1) Upper to base plate (inside throttle body opening) 1/4"-20 x 3/4"
- (15) Upper to base plate mounting, *NOTE*; (2) of the (15) 1/4-20 x 5/8" SS-SHCS are used to attach the upper to the base plate during shipment. There should be (14) in the packaging and (2) in the intake. The (1) remaining bolt will be used in the fuel rail kit.

## Fuel Rail Kit

- (1) FPR mount
- (2) Small O-rings
- (2) Large O-rings
- (6) Mounting tabs
- (1) Crossover tube
- (3) Tubular spacers
- (1) Fuel rail end cap
- (24") 1/2" I.D. fuel hose
- (36") 3/8" I.D. fuel hose
- (1) Remote mount fuel rail
- (1) FPR to FPR mount gasket
- (2) Rail end plugs, 3/8-18 pipe plugs
- (1) 90° fitting- 1/4 NPT- 3/8" I.D. hose
- (2) 90° fitting- 3/8 NPT- 1/2" I.D. hose
- (1) Fitting, 3/8" hose to Spring Lock adapter
- (1) Rail mounting bolt, 1/4-20 x -5/8" SS-SHCS
- (3) Long rail mounting bolts 1/4-20 x 1-1/2" SS-SHCS
- (2) FPR bracket location, #10 x 1/2"- SELF TAPPING
- (12) Mounting tab to rail screws, 10-32 x 5/8" SS-BHCS
- (3) FPR mount to regulator bolts, 10-32 x 3/4" SS- SHCS
- (1) Fuel rail end cap locking screw 10-32 x 5/8" SS-BHCS
- (2) FPR mount to remote mount rail bolts, 6-32 x 3/4" SS-SHCS
- (1) Assembled hose, 90° 3/8 NPT fitting- 1/2" I.D. hose- Spring Lock

## Components

- Lower manifold
- Upper manifold
- Bottom cover plate
- Upper manifold base plate

## Gaskets

- Throttle body to intake
- Upper to lower manifolds

## Hoses

- (1) Hose clamp
- (24") Vacuum hose 5/32" I.D.
- (24") Hose, 3/8" I.D. (cut to fit)

## Abbreviations



**SHCS=**  
Socket Head Cap Screw



**BHCS=**  
Button Head Cap Screw

**SS=** Stainless Steel  
**IAC=** Idle Air Control  
**PCV=** Positive Crankcase Ventilation  
**FPR=** Fuel Pressure Regulator  
**EGR=** Exhaust Gas Recirculation  
**MAP=** Manifold Absolute Pressure  
**RTV=** Room Temperature Vulcanizing (silicone sealant)  
**ATC=** After Top Center

- STEP 1** Allow engine to cool and disconnect negative battery terminal.
- STEP 2** Remove intake hose between the mass air meter and throttle body.
- STEP 3** Remove the distributor. ***(Use a marker pen to mark the position of the rotor on the lower cup of the distributor. Also, note where the distributor base is at the engine block. Your distributor should have a hash mark on it for ease of reference. This will help reassembly)***
- STEP 4** If your manifold has a decorative plate (5.0 H.O.) on top, you will need to remove the plate. Use a T-20 Torx to remove the screws then unclip the wiring harness locator from the manifold. ***(These screws are usually corroded and can be very challenging to remove. We use a small hammer to tap on the screw heads to help break them loose.)***
- STEP 5** Disconnect the electrical, vacuum, coolant, and cable connections at the throttle body, EGR valve, fuel pressure regulator, IAC valve, and the upper intake manifold. ***(There are vacuum lines underneath and behind the upper manifold)***
- STEP 6** Using a ½” socket and extension remove the upper intake manifold bolts, then slide the manifold towards the front of the car and disconnect the vacuum lines that attach to the rear of the manifold and the PCV. Lift the upper manifold out of the car and set it aside. ***(Some models have a steel bracket that connects between the upper and lower manifolds in the rear. Remove and discard this bracket if applicable.)***
- STEP 7** Unplug the wiring harness from the fuel injectors ***(Be sure to only pull on the plastic plugs, never pull by the wires)***, lower manifold connections, and oil pressure sending unit. Set the harness back and out of the way. ***(It is not necessary to remove the brown ground wire that bolts to the back of the driver side cylinder head)***.
- STEP 8** Disconnect the water hoses that run to the heater core feed/return pipes and thermostat housing. Remove the small water hose that runs to the EGR spacer. ***(To avoid spilling coolant we use a wet/dry shop vacuum to suck the water out of the hoses.)***
- STEP 9** Remove the sensors from the lower manifold and loosen the heater core feed/return pipe with a 1-1/8 open end wrench. ***(It's best to do this while the manifold is still bolted to the engine).***

**!WARNING!**

FUEL SYSTEM MAY BE UNDER PRESSURE. USE EXTREME CAUTION WHEN RELEASING PRESSURE. EXTINGUISH OPEN FLAMES AND IGNITION SOURCES WHEN WORKING WITH GASOLINE AND VAPORS. WEAR PROTECTIVE EYEWEAR.

- STEP 10** ***Carefully*** release any fuel system pressure by removing the cap on the fuel rail near the front end of the passenger side valve cover, behind the alternator and depressing the Schrader valve using a small screwdriver or pick. ***(Hold a rag over the valve while releasing the pressure to avoid fuel spray)***.
- STEP 11** Use the fuel line disconnect tools to separate the fuel feed and return lines from the injector rails.
- STEP 12** Unbolt and remove the lower manifold ***(The fuel rails will have excess fuel in them; use caution when removing to avoid spillage)***.
- STEP 13** Unbolt and remove the fuel rails and injectors from the lower manifold. ***(Check each injector to make sure that both of the O-rings are in place. The O-rings have a tendency to get stuck in the fuel rails)***.
- STEP 14** Separate the fuel pressure regulator from the stock fuel rail. ***(Skip this step if you are installing an aftermarket regulator)***.
- STEP 15** Inspect the injector tips and O-rings for cracks or damage. If you have any questionable items, we recommend replacing them ***(available through auto parts stores)***.



- STEP 16** To ensure proper sealing of your new intake, thoroughly scrape and clean the head surfaces, and engine block gasket areas. **(Be sure to get any debris, oil, or coolant out of the ports in the heads, and the intake valley. A shop/wet dry vacuum works well for this).**
- STEP 17** Apply a 1/8" bead of RTV to the bottom cover plate mounting surface of the BBK lower manifold, install the bottom cover plate using 10-32 SS-BHCS's, and fold the anti-back out tabs over each bolt head. **(The contour in the plate must go to the back).**
- STEP 18** Transfer all of the sensors, thermostat and housing, PCV strainer basket, rubber grommet, and PCV from your old lower intake to the BBK lower using a new thermostat housing gasket. **(Inspect your thermostat, PCV, and grommet. If they are old or damaged now would be a good time to replace them. When worn or damaged these items can negatively affect your engine's performance).**
- STEP 19** Wrap the threaded portions of the pre-assembled fuel rail to Spring Lock adapter with Teflon tape and tighten the feed line into the front of the passenger side rail. When the rails are installed and tightened the feed line needs to follow the angle of the valve cover pointing towards the passenger side.
- STEP 20** Attach the fuel rail mounting tabs to the fuel rails and shorty rail using 10-32 SS-BHCS's with red thread-locker applied to them.
- STEP 21** Place the supplied FPR gasket into the machined gasket surface area of the supplied FPR mount and attach the FPR of your choice to the FPR mount using the three 10-32 SS-SHCS's with red thread-locker applied to them.  
**Note; Lightly lubricating all O-rings will help to ensure proper sealing.**
- STEP 22** Place one of the **SMALL** O-rings into the machined O-ring groove on the bottom of the FPR mount and attach the FPR/FPR mount assembly to the remote rail using the two 6-32 SS-SHCS's with red thread-locker applied to them.
- STEP 23** Place the other **SMALL** O-ring over the fuel rail end cap into the O-ring groove. Install the end cap into the front end of the driver side fuel rail and secure it using one 10-32 SS-BHCS with red thread-locker applied to it.
- STEP 24** Insert the injectors into the rails with the electrical sockets pointing outward.
- STEP 25** Place one **LARGE** O-ring into the crossover tube port of each fuel rail.
- STEP 26** Install the passenger side fuel rail/injector assembly by guiding each injector into its respective port then pushing down lightly to ensure proper seating. Slip the spacer tubes behind the rail and into their seats and **START** threading two ¼-20 x 1-¼" SS-SHCS's. **(Do not tighten these bolts yet)**
- STEP 27** Insert the crossover tube into its port on the passenger fuel rail making sure that its bends follow the machined contour of the lower manifold and that it does not catch/snag the O-rings.
- STEP 28** Install the driver side rail while guiding the crossover tube and injectors into their respective ports. In the front, slip the spacer tube behind the rail into its seat and attach using a ¼-20 x 1-¼" SS-SHCS. In the back use the ¼-20 x 5/8 SS-SHCS. Tighten all four of the fuel rail mounting bolts **(As you tighten the rail mounting bolts the crossover tube will seat itself firmly into place).**
- STEP 29** Apply your choice of lower intake gaskets to the head surface and apply a ¼" bead of RTV sealant to the front and back edges of the engine block. **(Use this sealant instead of factory type end seal gaskets for best leak prevention).**
- STEP 30** Push the two supplied dowel pins into the two small holes in the top of the lower manifold **(If your application requires a driver side throttle body do not use the studs).**
- STEP 31** Place the BBK lower manifold/fuel rail assembly on the engine. Install the heater core feed/return pipe assembly and tighten the 12 lower intake mounting bolts **(Place the intake bolt that mounts the heater tube through the mounting tab and then tighten).**



- STEP 32** Install all of the lower manifold sensors into the BBK lower and install two of the supplied 3/8-18 pipe plugs wrapped in Teflon tape into the remaining holes. **(The EGR spacer water return fitting is not used on the BBK lower. One of the supplied 3/8-18 plugs must be installed to block it off).**
- STEP 33** Re-establish all lower manifold wiring connections that you disconnected in step 8 and re-connect the water hoses that run to the heater core feed/return pipes, and thermostat housing. **(The large black and white wiring harness connectors should now sit behind the driver side fuel rail).**
- STEP 34** Firmly push the supplied vacuum cap onto the EGR spacer coolant feed fitting on the heater core feed/return pipe. Tighten the supplied hose clamp around the cap.
- STEP 35** Wrap the threads of two of the 3/8-18 pipe plugs in Teflon tape and tighten one into the remaining threaded openings in the remote rail and the other into the rear of the fuel rail that you **will not** be using to feed the regulator. Determine where you are going to mount your remote regulator. Be sure to take heat and supplied hose length into consideration. If needed, test fit the upper intake and inlet tubing to avoid clearance issues once everything is reassembled. You can feed the remote mount with the rear of either fuel rail by installing one of the 90° hose fittings into the rail of your choice. The remaining 90° fitting will install into either end of the remote mount rail. **Note; Additional fuel hose can be purchased at local auto parts stores.**
- STEP 36** Mount the remote rail by drilling the supplied self tapping screws through the holes in the mounting tabs and into a solid surface such as the firewall or fender apron. If you intend on mounting this unit to the strut tower, be sure to pre drill the holes as the material there is very thick **(Be sure not to drill into anything that may be behind your mounting surface).**
- STEP 37** Apply a small amount of grease onto the barbs of the 90° fittings on the remote rail and the fuel rail. Connect the remote rail to the fuel rail by pushing the supplied 1/2" I.D. fuel hose fully onto 90° fitting that you installed on your fuel rail then trim the hose to the correct length and push the remaining end onto the 90° fitting on the remote rail. **(Be sure to use a small amount of grease on the barbs first, otherwise you will not be able to push the hose on without a great deal of needless effort!)**
- STEP 38** Wrap the threads of the 1/4" NPT -90° hose barb fitting in Teflon tape and tighten it into the threaded opening on the FPR mount. Be sure to have the barbs pointing towards the factory fuel return line to create a straight path for excess fuel to return to the gas tank.
- STEP 39** Grease the barbs on the 1/4" NPT -90° hose barb fitting and fully push one end of the supplied 3/8" fuel line onto the barbs.
- STEP 40** Snap the supplied Spring Lock adapter into the factory fuel return line and grease the exposed barbs. Cut the fuel return line from the remote rail to the correct length and fully push the remaining end onto the barbs of the Spring Lock adapter. **(Be sure to keep a tight grip on the metal return line while making this connection, it is possible to bend this line and create a kink in it).**

### **Instructions For Pressure Testing The Fuel Rails.**

**(If the car has automatic door locks or an alarm, be sure to leave the driver door open while following this procedure. Otherwise the doors might lock with the key in the ignition).** With the negative battery cable **disconnected** turn the ignition key to the **run** position. While watching the fuel rails and connections touch the negative battery cable to the negative terminal of the battery for 3 seconds. Repeat this 3 times. **(This will turn the fuel pump on momentarily and pressurize the fuel rails. If you have any leaking connections or fittings, this will allow you to find them before you put the upper intake manifold on).** Inspect the remote rail, fuel rails and injector assembly. Once you have verified that there are no fuel leaks in your system turn the key back off.



## Upper Intake

- STEP 41** Install the (2) supplied 90° vacuum fittings into the rear driver side bottom corner of the upper intake base plate. When installed they should both end up pointed at the brake booster.
- STEP 42** Lay the supplied gasket over the dowel pins on top of the lower intake. **(The gasket will only fit over the locating pins one way).** Using the dowel pins as guides set the base plate onto the lower intake. Apply thread locker to the supplied 5/16-18 x 1-1/2" SHCS base plate mounting bolts and torque them to 10 Ft-lbs.
- STEP 43** Use the supplied 3/8 hose to connect the PCV to one of the vacuum fittings on the base plate. Connect to the PCV first, then cut the hose to the correct length and push it onto the fitting.
- STEP 44** Connect the 3/8" vacuum line that comes from your vacuum tree to the remaining vacuum fitting on the base plate
- STEP 45** Tighten the (2) supplied 1/8" NPT- 3/16" vacuum nipples into the back of the throttle body neck of the upper intake.
- STEP 46** Squeeze a 1/8" bead of RTV onto the machined mating surface of the base plate. **(To avoid vacuum leaks, be sure not to leave any gaps in the bead)**
- STEP 47** Set the upper intake onto the base plate. To attach the upper to the base plate use thread locker on the (1) 1/4"-20 x 3/4 BHCS in the interior bolt (inside the throttle body opening), and all (15) of the remaining 1/4"-20 x 5/8" SS SHSC's to secure the perimeter bolt holes. **Tip; for a clean install, allow any RTV that may have squished out to set up for a day, then you can use a blade to carefully slice the excess off. (Wiping it when it's wet will just smear it all over your new intake)**
- STEP 48** Transfer the throttle body, and throttle cable bracket to the BBK upper. Apply RTV to the (4) 5/16-18 x 1" throttle body mounting bolts and install using the supplied gasket. Use the (2) supplied M-8 x 1.25 x 14mm bolts to mount the throttle cable bracket to the upper intake.
- STEP 49** Connect your FPR and any other vacuum accessories to the vacuum nipples on the upper intake. If needed, you can use the supplied 3/16" vacuum hose to connect items or repair broken lines. **Note; be sure to cap, block off, or plug any open vacuum ports that you choose not to use.**
- STEP 50** Re-establish any upper manifold connections that you disconnected in step 6 that still apply.
- STEP 51** Install and connect the distributor, cap, and spark plug wires. **(Be sure to line up your reference marks when inserting the distributor).**
- STEP 52** Connect the intake hose to the mass air meter and throttle body.
- STEP 53** Connect the negative battery terminal.
- STEP 54** Refill the radiator with your choice of coolant/water mixture.  
**If you think you may have dropped dirt, debris, or coolant into the intake valley of the engine during this installation, we STRONGLY RECOMMEND that you clean the area as much as possible to remove any remnants and change your oil and filter before attempting to start your engine.**
- STEP 55** Start the engine and adjust the ignition timing to your preferred setting. **(Stock setting is 10° ATC )**

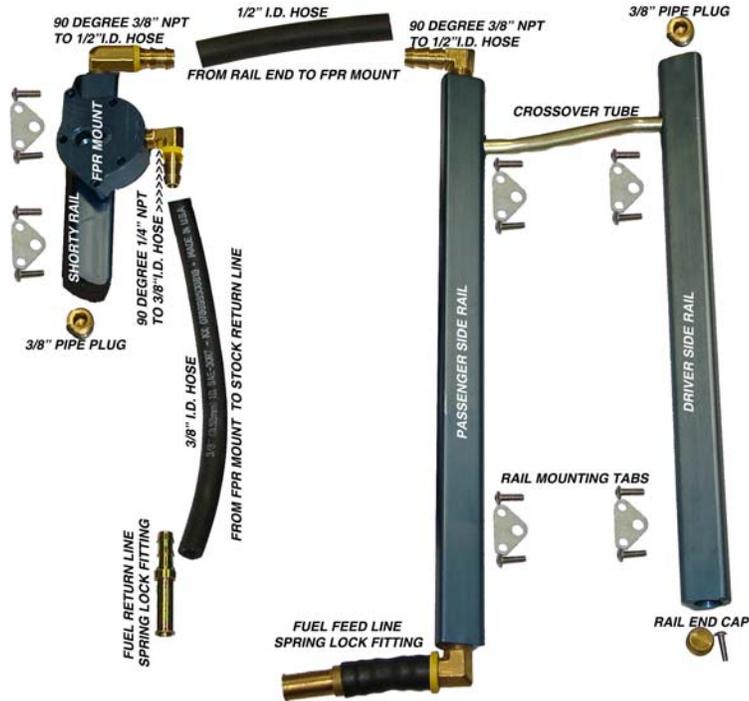
### **!WARNING!**

**ALWAYS USE CAUTION WHEN OPENING THE RADIATOR CAP! THE SYSTEM MAY BE UNDER PRESSURE AND THE COOLANT MIGHT BE HOT!**

**It may take a bit of driving to circulate any ingested air out of the engine cooling system. Keep watch over the temperature gauge and be prepared to add fluid until you are sure the system is full. You may need to top off the reservoir/radiator more than once after this install.**

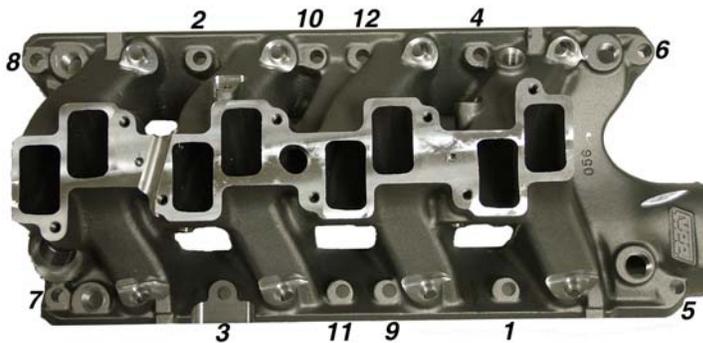


# SSI-R FUEL RAIL KIT OVERVIEW



NOTE: HOSE LENGTHS WILL VARY DEPENDING ON YOUR CHOICE OF FUEL PRESSURE REGULATOR MOUNTING LOCATION. SUPPLIED LENGTHS NOT SHOWN.

## Lower Intake Torque Sequence



Step 1. 12 Ft.- lbs.

Step 2. 18 Ft.- lbs.

Step 3. 24 Ft.- lbs.



3/8" 90 DEGREE FITTINGS  
POINTING OUT TO DRIVER SIDE FOR  
CONNECTION TO BRAKE BOOSTER & VACUUM TREE.