



INSTRUCTIONS

FAST® LSXR™ 102mm Intake Manifold Part #146302 / #146302B LS1/LS2/LS6

Thank you for choosing FAST® products; we are proud to be your manufacturer of choice. Please read this instruction sheet carefully before beginning installation, and also take a moment to review the included limited warranty information. Contact us toll free at 1.877.334.8355 or at www.fuelairspark.com under Tech Help with any questions.

BEFORE YOU START: Be sure you have any required installation kits for your throttle body and fuel rails as described in these instructions.

Warning: Please review the packaging contents to ensure you have all hardware and read the complete instructions, especially the torque specs, before installation. **Safety glasses are required throughout this installation.**

Package Contents

Hardware Included In Packet #CF007-678	
4	M6 x 22mm Socket Head Cap Screws (Not used with OEM Throttle Bodies)
4	M6 x 40mm Socket Head Cap Screws (OEM DBW Throttle Bodies)
1	M4 x 20mm T-20 Torx Head Screw (MAP sensor hold down)
1	10mm Hex Self-Tapping Screw And Washer Combo (EGR)
10	M6 x 110mm Socket Head Cap Screws (Bolts manifold to cylinder heads and upper shell)
10	M6 x 16.5mm O.D. x 3.5mm Thick Flat Washer (Manifold to cylinder head bolts)
10	M8 x 30mm Button Head Cap Screws (Replacement OEM valley plate bolts)
2	M6 x 15mm Socket Head Cap Screws (OEM throttle cable attachment)
2	M6 x 10mm Wide x 5mm Tall Hex Nuts (OEM throttle cable attachment)
4	M6 x 12mm Cap Screw Bolts (OEM fuel rail hold down)



FAST®
3400 Democrat Rd.
Memphis, TN 38118
Phone: (901) 260-3278 Fax: (901) 375-3408
www.fuelairspark.com

Part #FAST4-166
Revised 5/17/2018

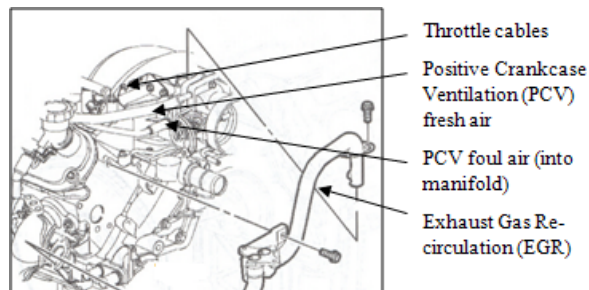
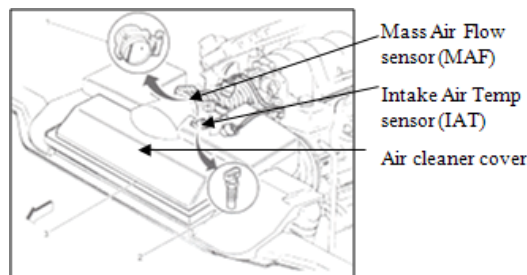


INSTRUCTIONS

Hardware Pre-Installed In LSX _R TM Manifold #146302 / #146302B	
3	M6 x 16mm Socket Head Cap Screws (Rear upper shell hold down)
2	M6 x 40mm Socket Head Cap Screws (Front upper shell hold down)
5	M6 x 10mm Wide x 5mm Tall Hex Nuts (Upper shell hold down)
8	M4 x 20mm T-20 Torx Head Screw (Runner hold down)
5	6mm x 12mm O.D. x 1.5mm Thick Flat Washer (Upper shell front and rear hold downs)
2	Phillips Head Self-Tapping Screw (Vacuum nipple)
O-Ring Gasket Included In Package	
3	Rubber Bumpers (Bottom of manifold)
1	102mm Seal (Throttle Body)
8	Lower Injector O-rings (OEM LS1/LS6 Injectors)

Stock Manifold Disassembly:

1. Allow engine to cool, disconnect the negative battery cable and remove coil (beauty) covers, if applicable. Relieve fuel pressure by depressing the Schrader valve on the end of the rail. Cover with a towel to absorb lost fuel.
2. Clean off any excess dirt and debris around the intake manifold that could become dislodged and fall into your engine during removal.
3. Disconnect fuel line from rail by using quick-connect separator tool (J37088-A). Place shop towels around connection to catch additional fuel.
4. Disconnect the Mass Air Flow (MAF) sensor, located between the air filter and throttle body. Remove the remaining air filter assembly.
5. Disconnect any PCV hoses or vacuum lines on the intake manifold, including the brake booster hose. Take note of positions for reinstallation.





INSTRUCTIONS

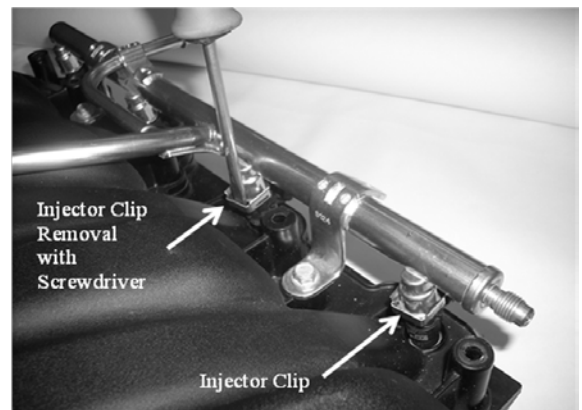
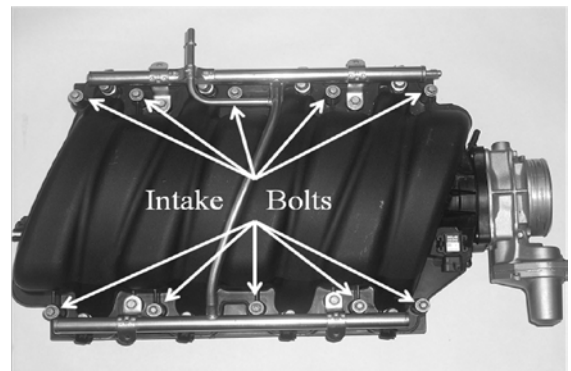
6. Disconnect the Idle Air Control (IAC) and Throttle Position Sensor (TPS) from the throttle body.
7. Disconnect the Intake Air Temperature (IAT) sensor from the intake between the filter and the throttle body.
8. Unplug all eight (8) fuel injector harness clips.
9. Loosen all ten (10) intake manifold bolts (8mm hex). The five (5) rear most bolts cannot be removed in F-body Camaros and Firebirds. To remove the manifold these must be partially lifted out of the way. A simple device (Bond Sleeve) can easily be made to temporarily hold the bolts up. These are made with a 1" piece of 1/4" rubber hose, slit lengthwise.
10. The stock manifold is ready to be removed, however, three (3) hidden connections remain in the rear. They are the MAP sensor connector, a small vacuum line on the RH side and the brake boost vacuum hose on the LH side. On the Camaro and Firebird there is a tall oil pressure sensor that is trapped between the manifold and brake hose. Carefully lift the manifold and move forward until you can reach behind and disconnect the aforementioned items. Clean any remaining dirt and debris that may dislodge and enter the engine.
11. Carefully remove the intake from the engine.
12. Cover the open cylinder head ports with a clean, lint-free rag to prevent anything from entering your engine.
13. Remove the four (4) fuel rail mounting bolts and remove the stock fuel rail and injectors as an assembly. For LS2 applications, skip the next two steps.
14. Remove injector clips on your OEM fuel rail using a screwdriver to gently pry them off.
15. Remove injectors from the OEM fuel rail, remembering that the fuel rail is still full of fuel. Take precautions to contain the excess fuel that will leak out. Rubber gloves and safety glasses are required.



Idle Air Control (IAC)
Throttle Position Sensor (TPS)
Canister Purge fitting
Coolant vent line (connects to throttle body)



Bond Sleeve



Injector Clip Removal with Screwdriver

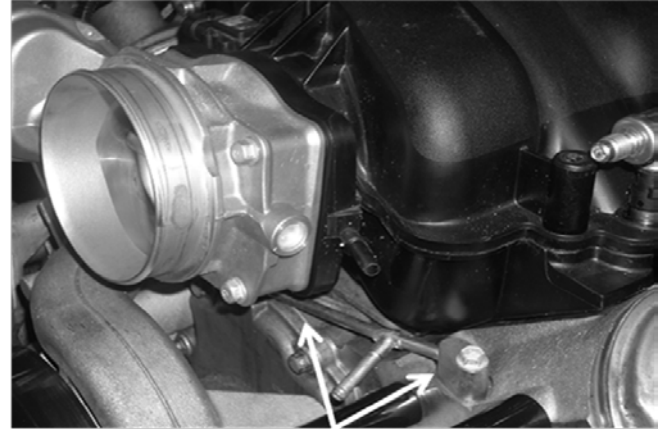
Injector Clip



INSTRUCTIONS

Required Modifications:

- 1. IMPORTANT:** Replace ten (10) valley plate bolts with the button head cap screws provided. Torque to 18 ft./lbs. Failure to replace these bolts could damage the FAST™ manifold.
- The rear coolant vent line on the 1997-2000 Corvette and 1998-2000 Camaro/Firebird, located in the valley, must be replaced to clear your new high performance manifold. Replace with GM Part #12602544 front only crossover, and two (2) of the Part #12602540 plugs. Torque vent pipe bolts to 12 N/m (106 in./lbs.).
- Remove plastic clips from the knock sensor wire harness by unwrapping tape. Discard.
- Due to the wide range of applications the LSXR™ was designed to fit, MAP sensor locations require drilling. There is a front and a rear location provided. Both are intentionally shipped plugged.
- Remove the upper shell from the manifold. There are five (5) upper shell hold-down bolts pre-installed, two (2) in the front near the throttle body and three (3) in the rear of the LSXR™.
- For EGR use you must open the hole in your manifold beneath the front MAP sensor location. (See picture below). Use a large diameter drill and a Dremel type tool to remove the front MAP sensor location and open up the 30mm (1.181") hole. Be careful not to damage the upper diameter where the o-ring seals. If your engine uses EGR you must use the rear MAP sensor location.



Coolant Crossover Tube



EGR



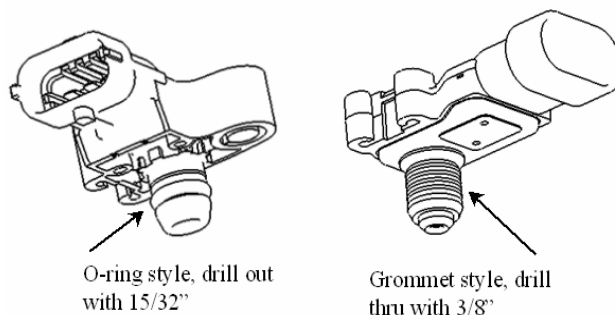
MAP



INSTRUCTIONS

7. Decide which MAP sensor location will work the best for your application. It will need to be drilled all the way through to allow the MAP sensor to read manifold vacuum. Note that the rear MAP location is in the lower shell, you must take extra precaution to ensure that all debris from drilling is completely removed.
8. There are two (2) different MAP sensors that can be used. If your MAP is a grommet style, use a 3/8" drill bit to drill through the front MAP port location. If your MAP sensor is o-ring style you must drill out the front MAP sensor location with a 15/32" drill bit.
9. A MAP sensor hold-down insert and bolt has been added to the LSXR™ intake to help hold the MAP sensor in position. The map sensor should not be torqued past 19 in./lb, when attaching the MAP sensor to the LSXR™ intake.
10. Remove all shavings left over from drilling the MAP sensor & EGR.

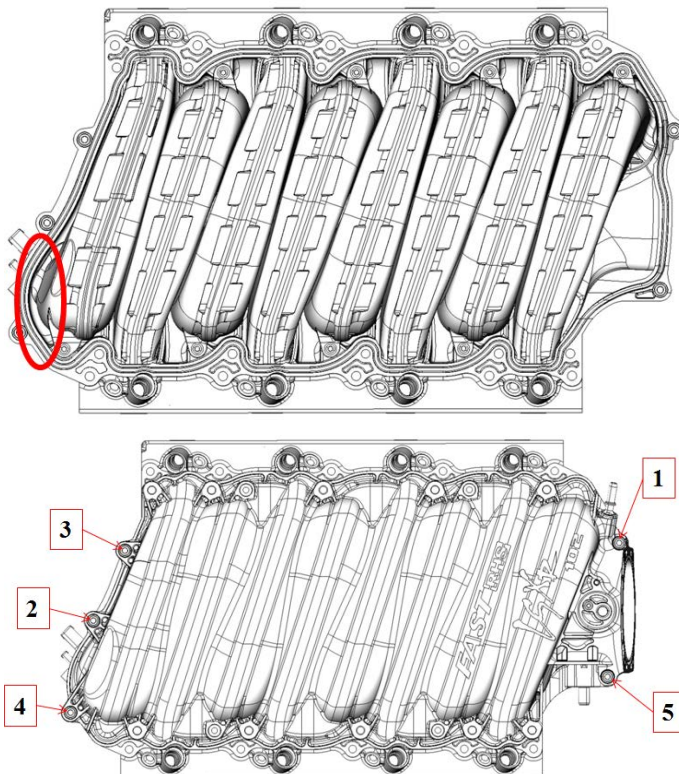
MAP Sensor Identification



Before Installation in Vehicle:

1. Before reassembly reapply a small amount of RTV in the rear seal groove to ensure a proper reseal of the manifold.
2. Carefully reinstall intake upper shell on to LSXR™ Intake Manifold, making sure the upper lid has seated correctly into the lower shell all the way around. There are five (5) upper shell hold down bolts, two (2) in the front near the throttle body and three (3) in the rear of the LSXR™. Tighten using medium strength thread-locker and in the proper sequence as pictured. Torque upper shell bolts to 70-89in./lbs. These were installed prior to shipping and were removed during upper lid removal.

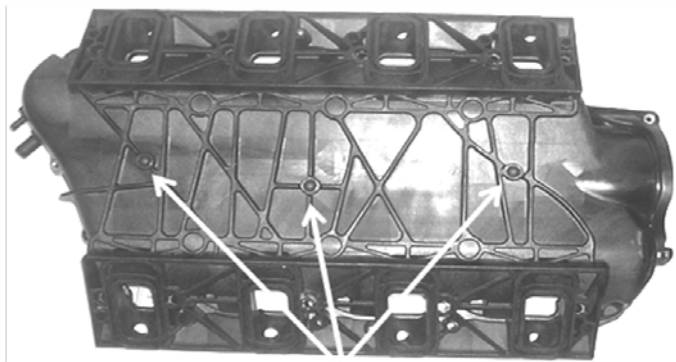
IMPORTANT: Failure to properly align the upper shell to the lower shell could damage the FAST™ manifold.





INSTRUCTIONS

3. Flip the LSX_RTM over, there are three (3) circles molded into the base for rubber bumper installation. Because the bumpers are self-adhesive it is important to pre clean the base of the manifold where the bumpers are to be installed with a cleaner (such as isopropyl alcohol) and allow it to dry. Next, install the three rubber bumpers included to the bottom side of the intake by sticking them onto the clean surface.



Rubber Bumpers Installed

4. Inspect the LSX_RTM Manifold, ensuring that there are not any loose nuts or bolts that may fall into your engine.
5. For LS2 applications, skip to the next step. For LS1/LS6 applications, remove the fuel injector lower o-rings and replace with the new o-rings supplied in the manifold kit, install injectors into the OEM-style fuel rail, and reinstall the injector clips.

NOTE: OEM style fuel rail, bolts, and spacers are provided in Part #146021-KIT.

6. Before reinstalling previously used injectors, inspect injector o-rings for damage. The OEM recommends new o-rings after disassembly, however replacement is not necessary if the seals are not worn or damaged. Lubricate ALL o-rings with clean engine oil.
7. Install injectors into the LSX_RTM manifold. Carefully start all injectors in pockets and then firmly seat one side at a time. Do not reuse the OEM fuel rail hold-down bolts. For LS2 applications, use the four (4) M6 x 12mm bolts that are included in the hardware kit. For LS1/LS6 applications, use the four (4) M6 x 25mm bolts and spacers included in Part #146021-KIT. Add medium strength thread-locker to the four (4) bolts and tighten to 70-89in./lbs.

IMPORTANT: Do not reuse OEM fuel rail mounting bolts! Failure to replace these bolts may damage the FASTTM manifold.

8. Install intake port seals. Failure to install these seals will cause massive vacuum leaks, leading to a rough idle and possibly a dangerously lean condition.

NOTE: You can reuse your OEM LS1/LS2/LS6 port seals or use FASTTM Part #146203-8 intake port seals (sold separately) if you do not have OEM gaskets or need replacements.

9. Make sure your selected MAP sensor port has been drilled and is all the way through.

Throttle Body Installation Kits:

1. OEM electronic throttle body (LS2) – no extra parts needed.
2. OEM electronic or mechanical throttle body (LS1/LS6) - use Part #146029-KIT (75mm to 102mm adapter plate).



FAST[®]
3400 Democrat Rd.
Memphis, TN 38118
Phone: (901) 260-3278 Fax: (901) 375-3408
www.fuelairspark.com

Part #FAST4-166
Revised 5/17/2018



INSTRUCTIONS

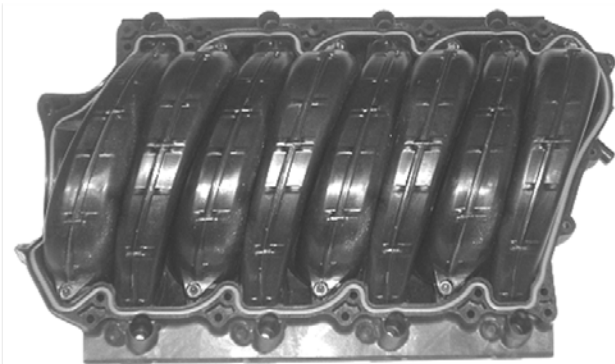
Fuel Rail Installation Kits:

- 1) Short OEM injectors (LS2) – no extra parts needed.
- 2) Tall OEM injectors (LS1/LS6) – use Part **#146021-KIT** (OEM style fuel rail, bolts and spacers.)

NOTE: Part **#146021-KIT** can NOT be used on 1997-1998 Corvettes which utilize a return style fuel system.

Individual Runner Removal (Not Required):

1. Remove intake from engine if installed.
2. Remove the upper shell from the intake (being sure to account for any loose hardware) to expose runners.
3. Using a T-20 Torx, remove the runner hold down bolt for each individual runner.
4. Make sure you notice that the rear-most runner is different from the others and must be reinstalled in the same place! It is labeled “CYL 7.”



Upper Lid Removed with Runners Exposed

Individual Runner Reinstallation:

1. To facilitate assembly of the runner tube and to minimize potential damage to the o-ring apply a light coating of soap-water solution to the o-rings. The soap-water solution can be made with one (1) tablespoon of gentle hand soap in one (1) cup of warm water, which should be mixed well.
2. Identify and install the rear most runner first (it is labeled “CYL 7 ONLY”) while holding the runner tube into the pocket of the lower manifold with light but firm force to install the runner into the pocket.
3. In the same manner install the other seven runners, continuing from the back to the front. They are labeled “CYL 1-2-3-4-5-6-8.”
4. When all eight runners are installed install the M4 bolt using a Torx T-20 bit. Thread-locker has been provided on the M4 fasteners. Additional thread-locker should not be necessary but can be reapplied if the thread-locker is removed through repeat installation/removal of the runners.
5. Make sure not to tighten any individual runner completely before you have started all eight (8) M4 bolts by at least a few turns.



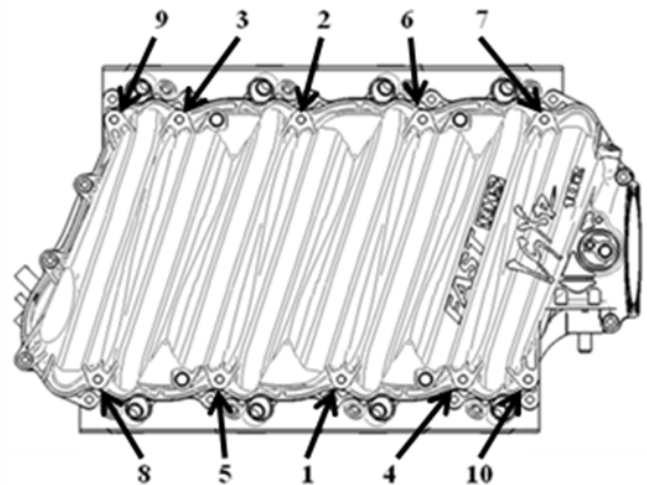
INSTRUCTIONS

6. Once all eight (8) M4 bolts have been started into their place they should be torqued to 19 in./lbs. **(this is less than 2lb./ft.!!)**. Tightening the fasteners beyond this can result in stripping of the fastener or damaging of the inserts, and is not necessary.
7. For best engine performance the runner tube o-ring should always be used. Should your o-ring require replacement, these can be ordered individually- **Part #146006-1**. They can also be ordered as a set of eight (8)- **Part #146006-8**.

Caution: Do NOT remove the upper lid to expose the individual runners while the intake is still on the engine. The nuts that were previously installed to hold the upper and lower together may fall into your engine and cause catastrophic engine failure!

Manifold to Engine Assembly:

1. Uncover cylinder head ports
2. Place manifold in valley but do not place all the way rearward. Attach the brake booster hose and push in the MAP sensor, if using the rear MAP sensor location. MAP sensor bolt-down insert threads and bolt are provided with the LSXR™. Reconnect the MAP sensor to the harness.
3. Install the five (5) rear-most bolts using the bond sleeves used during intake removal, if applicable. Remember to apply medium strength thread-locker.
4. Move manifold into position. **DO NOT SLIDE THE MANIFOLD ON THE CYLINDER HEAD** because seals could be damaged or become dislodged. Once in correct position, the bolt bosses will find counter bores in the cylinder heads.



Manifold cylinder head fastener torque sequence for #146302

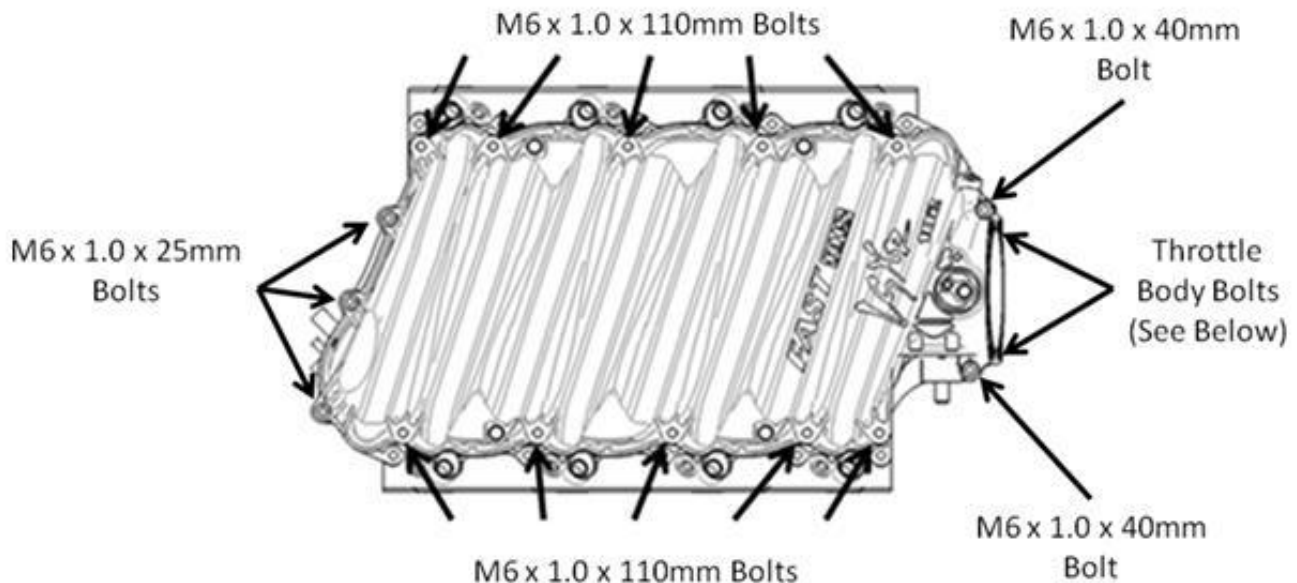
5. Reconnect the coolant crossover line hose. Torque crossover pipe bolts to 70-89 in./lbs.
6. Add medium strength thread-locker to all ten (10) intake bolt threads hand-start all ten (10) fasteners. If using the bond sleeves there will only be five (5) bolts at this point. Don't forget the fuel rail stop bracket(s), if required.
7. Make two passes in the sequence shown below. First pass (45in./lbs.), final pass (70-89in./lbs.). **CAUTION: Over-torquing will damage the manifold and cause improper sealing!**



INSTRUCTIONS

8. Ensure that the throttle body seal is installed. For LS2 applications, install the throttle body using four (4) supplied M6 x 40mm bolts. For LS1/LS6 applications, use the hardware supplied in Part #146029-KIT. Torque to 70-89 in./lbs. **IMPORTANT: Do not reuse your OEM throttle body bolts. Failure to replace these bolts could damage the FAST™ manifold.**
9. Reconnect any PCV hose on the manifold that was previously removed and reconnect all eight (8) fuel injector wire connectors. Finally reconnect MAF, IAC, TPS, brake booster, PCV and induction system.
10. If using the front MAP sensor location, push in the MAP sensor. MAP sensor bolt-down insert threads and bolt are provided with the LSXR™. Reconnect the MAP sensor to the harness.
11. Add a few drops of clean engine oil to the male end and securely reconnect the fuel line to the rail.
12. Reconnect the battery and check for fuel leaks before starting the engine by cycling the key a few times to build pressure in the fuel system.
13. After the engine has started, again recheck for any fuel leaks.

FAST 102mm LSXR Intake Manifold Bolt Placement For #146302 (LS1/LS2/LS6)



Throttle Body Bolts

OEM Drive By Wire 90mm Throttle Body use M6 x 1.0 x 40mm



INSTRUCTIONS

Replacement Parts:

The FAST[®] LSX_R[™] manifold can be purchased in individual components.

FAST [™] Part #	Description	QTY
146001	Lower Shell	1
146353	LS1/LS2/LS6 Runner Set	8
146000	Upper Shell – 102mm	1
146004	Throttle Body Seal – 102mm	1
146203-1	Cylinder Head Port Seal	1
146203-8	Cylinder Head Port Seals	8
146006-1	Runner Seal	1
146006-8	Runner Seals	8

Social Media

Stay up-to-date with the latest FAST[™] and COMP Performance Group[™] company and product information by following us on any of our social media platforms.

 facebook.com/FASTWins

 twitter.com/FASTEFI

 cpgnation.com



FAST[®]
3400 Democrat Rd.
Memphis, TN 38118
Phone: (901) 260-3278 Fax: (901) 375-3408
www.fuelairspark.com

Part #FAST4-166
Revised 5/17/2018



INSTRUCTIONS

FAST® LIMITED LIFETIME WARRANTY AND LIMITED WARRANTY

FAST® warrants that its EZ-EFI™ products are free from defects in material and workmanship for the lifetime of the product. This **Limited Lifetime Warranty** shall cover **only** the original purchaser. All other FAST™ products are covered by a **Limited Warranty** which covers defects in material and workmanship for a period of **one year** from the date of purchase.

FAST's obligation under this warranty is limited to the repair or replacement of its product. To make a warranty claim, the part must be returned directly to FAST® at the address listed below with a valid Return Merchant Authorization Number (RMA), freight prepaid. Items covered under warranty will be returned to you freight collect. To obtain an RMA, call 877-334-8355 to report the issue you are experiencing. At that time, FAST® will attempt to trouble shoot your issue.

It is the responsibility of the installer to ensure that all of the components are correct before installation. We assume no liability for any errors made in tolerances, component selection or installation.

There is absolutely no warranty on the following:

- A. Any parts used in racing applications or subject to excessive wear;**
- B. Any product used in marine applications, unless that product is listed by FAST® as a specific marine product;**
- C. Any product that has been physically altered improperly installed or maintained;**
- D. Any product used in improper applications, abused, or not used in conjunction with the proper parts.**

There are no implied warranties of merchantability or fitness for a particular purpose. There are no warranties which extend beyond the description of the face hereof. **FAST® will not be responsible for incidental and consequential damages, property damage or personal injury damages.** Where required by law, implied warranties or merchantability and fitness are limited to terms outline above.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.



FAST®
3400 Democrat Rd.
Memphis, TN 38118
Phone: (901) 260-3278 Fax: (901) 375-3408
www.fuelairspark.com

**Part #FAST4-166
Revised 5/17/2018**