07/07/2026

GM LS CNC Billet Intake Installation Instructions

Parts List:

- Intake Manifold
- O-ring seals, mounting bolts, vacuum fittings & hardware
- 8AN Fuel rail kit including mounting brackets, fittings and necessary hardware

PLEASE READ THROUGH THESE INSTRUCTIONS BEFORE STARTING INSTALLATION

Flow EFI has manifolds available for GM LS Gen III & IV engines with either cathedral port (LS1/2/6) or rectangle port (LS3). They are designed to work with OE or aftermarket cylinder heads. They are designed for high performance engines and perfect for boosted applications. Check for hood & accessory clearance (alternator location etc.) on all vehicles **BEFORE** your start your installation. Adapters and fittings are available to fit most configurations.

Modified engines/blocks:
If your block has been milled or has had any deck modifications, you will need to take steps to align the ports and mounting points as required.
1) Check for intake mounting bolt hole alignment. The fasteners must thread easily into the cylinder head or improper sealing may result.
2) DO NOT remove material from the intake flanges as the o-rings need to seat correctly. Any modifications should be done on the cylinder head, not the manifold.
3) Use caution when port matching on the intake to not damage the o-ring grooves.

Installation:

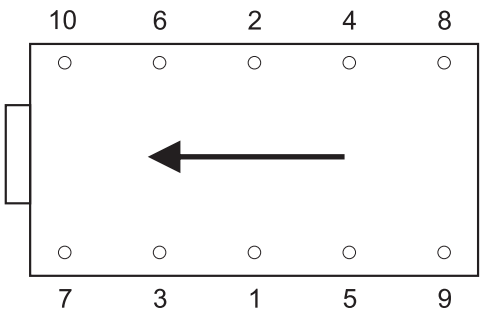
1) Before installation, test fit the manifold without o-rings to ensure the mounting bolts thread in easily and the surfaces mate appropriately.

2) Test fit all vacuum lines, fuel line plumbing, throttle body linkage and cable and other wiring and sensors to ensure there will be no issues after the manifold has been mounted in position. Decide which vacuum ports on the intake will be used (or not) and thread in fittings or plugs accordingly using PTFE thread sealer. Intake has 3 x 1/8"npt and 1 x 1/4"npt ports. There is also a provision for a Map Sensor (LSA/LS9 style) at rear of intake = Use GM#55567257 (2.7-Bar) or 12591290 (1-Bar)

3) Install the eight o-rings using a small amount of grease to hold them in position during installation.

4) Apply lubricant to the mounting bolts and thread them all the way in by hand.

5) Tighten the bolts in the correct factory sequence as shown in two stages. First to 44 in/lbs., then to 89 in/lbs.



Fuel Rails:

1) The 646401-1/411-1 and 646403-1/413-1 CNC LS intakes have .530" rail and .540" manifold bungs. Use 1.48" LS3 EV6 injectors. LS2 (2.08”) injectors can be used by spacing the fuel rail mount up 1/2" (spacers not supplied)

2) Apply silicone lubricant the top o-rings (inlets) of the injectors and gently rock back and forth to install them into the fuel rails.

3) Position the injectors correctly as to the connector locations.

4) Apply silicone lubricant to the bottom o-rings (outlet) of the injectors and gently insert into the manifold using slight pressure on the rail. Note: The rails have countersunk mounting holes that should be facing outwards. (Flow EFI logo faces outward)

5) Attach rail mounting brackets using the screws and lock washers supplied. After tightening (DO NOT OVERTIGHTEN!) check that the injectors twist within their seated positions and there is no load on the injector bodies.

6) Attach fuel lines according to your application. The fuel rail is equipped with 8AN ORB threads for 8AN fuel lines. The kit is also supplied with a 8AN rail connector fuel line. It may or may not be used depending on how your regulator(s) are mounted. If you wish to run 6AN lines, adapters and fittings are available separately.

Manifolds:
646401-1/646411-1 - LS1/2/6 102mm Silver/Black (Low Profile with straight throttle body)
646403-1/646413-1 - LS3 102mm Silver/Black (Low Profile with straight throttle body)

Throttle Bodies:
646300 - 102mm Silver
646310 - 102mm Black
646300E - 102mm DBW Silver
646310E - 102mm DBW Black

Replacement 8/pk O-Rings
646121 - LS1 (Cathedral)
646123 - LS3 (Rectangle)

Steam Port Fittings/Kits:
82004 - 2/pk 4AN, 82000 - 2 port kit, 82001 - 4 port kit

Questions? Please e-mail us at sales@performance-world.com