



## 300-940/300-940BK Holley GM Gen V LT Single-Plane Intake Manifold Kits



### INSTALLATION INSTRUCTIONS 199R12404

**IMPORTANT: Before installation, please read these instructions completely.**

#### APPLICATIONS:

The Holley LT single-plane intake manifold kits are designed for GM Gen V LT engines equipped with OE type GM Gen V LT cylinder heads. These intake manifolds will work with OE or aftermarket cylinder heads that are made with the intake flange bolt pattern and intake port opening locations matching the OE Gen V LT port configuration. This product is intended for OE direct injection with a 4150 EFI throttle body. There are also other Holley accessories available to allow the installation of a GM LS 92mm or 105mm drive-by-wire throttle body.

The LT single-plane intake manifolds are produced for street and performance engine applications, 5.3 to 6.2+ liter displacement, and maximum engine speeds of 6000-7000 rpm, depending on the engine combination. This single-plane design provides the lowest throttle body flange height possible while providing maximum performance to 7000 rpm. These intake manifolds are sold for (pre-emissions control) applications only and will not accept stock components and hardware.

#### EMISSIONS EQUIPMENT:

Holley LT single-plane intake manifolds do not accept any emission-control devices. This part is not legal for sale or use for motor vehicles with pollution-controlled equipment.

#### HOLLEY GM GEN V LT STAND-ALONE ENGINE MANAGEMENT:

For GM Gen V LT retrofit and engine swap applications using OE direct fuel injection, stand-alone engine management is available from Holley. For more information go to:  
[https://www.holley.com/products/fuel\\_systems/fuel\\_injection/terminator\\_x/terminator\\_x\\_and\\_x\\_max\\_gen\\_v\\_lt\\_direct\\_injection\\_kits/](https://www.holley.com/products/fuel_systems/fuel_injection/terminator_x/terminator_x_and_x_max_gen_v_lt_direct_injection_kits/)

## HOLLEY THROTTLE BODIES, THROTTLE BODY ADAPTERS, AND AIR CLEANERS:

For this intake manifold various Holley 4BBL 4150 flange throttle bodies are available. Go to [https://www.holley.com/products/fuel\\_systems/fuel\\_injection/throttle\\_bodies/4\\_bbl\\_throttle\\_bodies/](https://www.holley.com/products/fuel_systems/fuel_injection/throttle_bodies/4_bbl_throttle_bodies/)

Air cleaners of different styles, shapes, and heights can be seen at: [https://www.holley.com/products/engine/air\\_cleaners/](https://www.holley.com/products/engine/air_cleaners/)

Drive by wire throttle body adapters and air cleaners designed for the drive-by-wire throttle body adapter are available from Holley.

Drive-by-wire throttle body adapters are:

- 17-93 – 4150 to 92mm LS drive-by-wire throttle body adapter
- 17-94 – 4150 to 105mm LS drive-by-wire throttle body adapter

Air cleaner kits for LS drive-by-wire throttle body and adapter:

- 120-500 – 16 in. drive-by-wire air cleaner kit, open element, chrome finish
- 120-501 – 16 in. drive-by-wire air cleaner kit, open element, black finish
- 120-520 – Dual snorkel drive-by-wire air cleaner kit, chrome finish
- 120-521 – Dual snorkel drive-by-wire air cleaner kit, black finish

## DIMENSIONS:

**NOTE:** All heights measure to the lifter valley cover flange on the engine block.

- A-B Height – 6.15" @ Flange Center, 3-degree flange angle
- Port Size: 2.06" Tall x 1.53" Wide
- Mounting Flange Gasket Type – 3/32" round Viton O-rings, size 2-142, 2.362" I.D. (included with the int. man. install kit)
- Throttle Body Flange – Standard 4150 for up to 1-3/4" diameter throttle bores
- As-Cast Runner Cross-Sectional Area: 2.9 in<sup>2</sup>, constant CSA.
- Vacuum Port Sizes and Type – 1/4 NPT, 3/8 NPT, GM MAP sensor port

## INTAKE MANIFOLD ASSEMBLY CONTENTS:

- ❑ 1 – Machined Intake Manifold, GM GEN V LT Single-Plane
- ❑ 1 – MAP Sensor Port Cover, w/O-ring
- ❑ 1 – 1/4 – 20 x .675" Button Head Screw, MAP Sensor Port

## INSTALLATION KIT CONTENTS:

- ❑ 10 – M6 x 1.0 x 40mm Long Hex Head Flange Screws, Automotive Gray, Mounting Bolts
- ❑ 1 – 1/4 NPT Hex Socket Steel Pipe Plug
- ❑ 1 – 3/8 NPT Hex Socket Steel Pipe Plug
- ❑ 1-1/4 – 20 x .875" Button Head Screw, MAP Sensor Attachment Screw
- ❑ 1 – Installation Instructions

## MOUNTING FLANGE GASKET KIT CONTENTS:

- ❑ 8 – O-Ring, 3/32" Round Viton O-Rings, Size 2-142, 2.362" I.D. Port Flange Seals

## **INSTALLATION INSTRUCTIONS:**

### **Installation on Modified Engine Components –**

The LT single-plane intake manifolds are designed to provide maximum performance for street/performance engine applications. The intake manifold will have the best fitment when the engine block and cylinder heads are machined to standard OE dimensions. If the engine block or cylinder head deck surfaces have been milled significantly, the alignment of the mounting bolt holes and the port flange openings to the cylinder head may be shifted and not match-up satisfactorily. If your engine has had the cylinder head or engine block deck surfaces milled, the following may be necessary for proper intake manifold installation.

- The bolt holes in the intake manifold would have to be slotted to allow the fastener to properly pass through the manifold mounting holes. The mounting fasteners must freely thread into the cylinder head while passing through the mounting holes or the manifold may not seat properly onto the cylinder head surfaces when the fasteners are tightened.
- The mounting flange O-ring seal grooves are located on the intake manifold mounting flanges. Material may not be removed from the intake manifold mounting flanges without jeopardizing the sealing of the manifold. Any material removal required to align the port flange openings should be removed from the cylinder head, not the intake manifold.
- When port matching the intake manifold port openings to the cylinder head openings, care should be taken not to break into or damage the O-ring groove, or the O-ring seal will not be effective. The intake manifold mounting surfaces on the cylinder heads should be in good condition (free of nicks or scratches) where the sealing O-rings will seat to ensure proper sealing.

## Installation of the Intake Manifold –

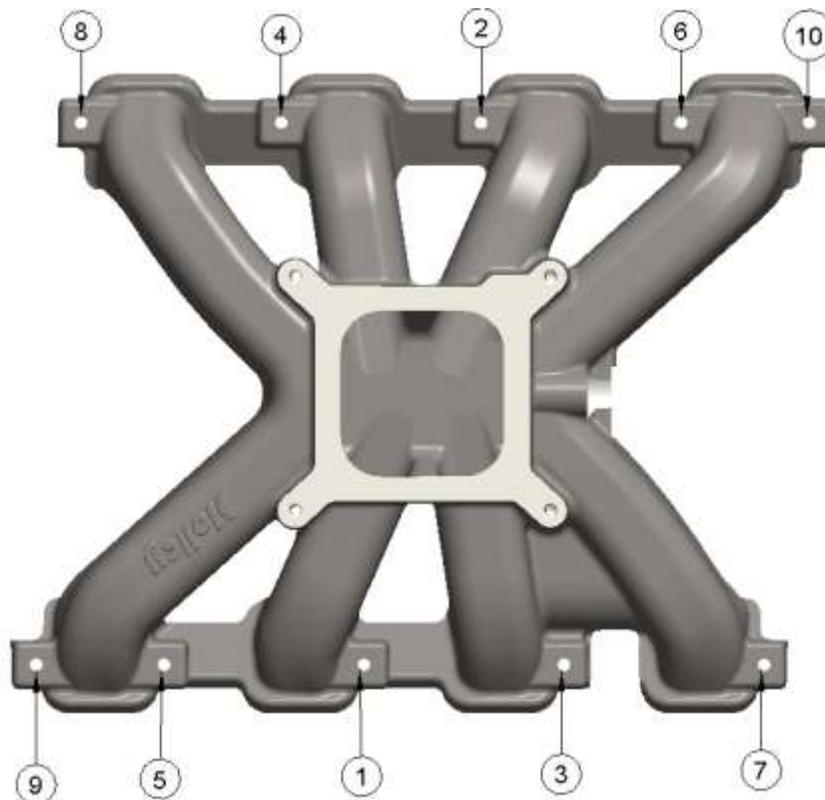
1. Before installing the intake manifold, perform a test fit of the intake manifold without the mounting flange O-rings installed.

Confirm that the mounting bolts (supplied) thread freely into the cylinder heads through the intake manifold mounting holes. The mounting flanges should seat properly, and the mounting bolts should not bottom in the threaded holes with the bolts installed during the test fit.

2. Check the port opening alignment. Test fit the throttle body, vacuum plumbing, throttle linkage, wiring, etc. to ensure there are not any fit issues before performing the final intake manifold installation.
3. For final installation, install the eight O-rings (provided) in the mounting flange O-ring grooves.
4. Place the intake manifold on the mounting flanges. Be sure that the mounting flange O-rings are still in the grooves and are not being crushed between the flanges.
5. Apply engine oil to the threads of the bolts. Install the mounting bolts into the manifold mounting holes and thread into the cylinder heads. Tighten the bolts lightly per the tightening sequence (see the tightening sequence diagram below), until the O-rings are compressed, and the bolts are seated.

**WARNING! The M6 x1 threads in the aluminum cylinder head will not withstand abuse. Care must be taken to have proper thread engagement and to tighten the fasteners to the proper specifications.**

6. In two steps, tighten the mounting bolts first to 50 in./lbs. and then to 106 in./lbs. (8.8 ft./lbs.) following the tightening sequence diagram below.



**Manifold Tightening Sequence**

7. There is a 1/4 NPT port on the passenger's side of the throttle body flange. A 3/8 NPT port and a port for a GM LS3 style MAP sensor (O-ring seal on the nipple and retained with a single bolt) are located at the rear of the throttle body flange. NPT plugs are supplied if the NPT ports are not required for use. Install the NPT plug or adapter fittings with pipe thread sealant applied to the threads of the plug or adapter fitting used. If the MAP sensor port is not to be used, keep the MAP sensor port plug in place. If installing a GM LS type MAP sensor, remove the MAP sensor port plug and install the GM LS type MAP sensor using the supplied 1/4-20 X .875" button head screw to retain the MAP sensor.

If the use of a GM bolt-on type MAP sensor is not desired, the MAP port can be tapped 1/4 NPT, and an adapter fitting used in the port to plumb a hose to a MAP sensor mounted at another location. The LS1 or LS2 MAP sensor can be mounted with a simple hand-made sheet metal bracket and a hose connected to the nipple that is on the MAP sensor with the grommet seal removed.

**NOTE:** If using a harness designed for an LS1/2 style map sensor, Holley P/N 558-416 can be used to adapt to an LS3 MAP, which is recommended for this manifold.

LS3 MAP sensor, GM P/N 12591290, will cover naturally aspirated (1 bar) applications; an LS9 MAP sensor (post blower), GM P/N 12592525 (red label) should cover forced induction applications up to 3 Bar. The LS3 MAP sensor does not have the same absolute pressure measurement to voltage output range as a LS1 or LS2 MAP sensor. An ECU set up for the manifold absolute pressure to voltage output of the LS1 or LS2 MAP sensor will need to recalibrate to properly operate the engine with the LS3 MAP sensor. Consult the ECU manufacturer or tuner for the proper ECU MAP sensor calibration for the MAP sensor that you plan to use.

## Installation of the Throttle Body –

1. When installing the throttle body, consult the manufacturer installation instructions for proper installation and tuning procedures. Confirm that the throttle body to intake manifold gasket to be used will properly seal.
2. With the throttle body mounted on the intake manifold, the throttle linkage connected, and the air cleaner installed, confirm that all throttle levers, linkage components, hoses, and wiring have adequate clearance from the intake manifold, air cleaner, and each other. Confirm that the throttle linkage has adequate return springs and that WOT is achieved when the throttle pedal is fully depressed. It is also recommended that there is a stop on the throttle pedal assembly so that at WOT the throttle linkage is not applying excessive force on the throttle lever arm and throttle body primary shaft.
3. If using a positive crankcase ventilation valve, it will be best to plumb the PCV hose to the intake manifold 3/8 NPT port at the rear of the throttle body flange. If a brake booster engine vacuum source is required, use a fitting or hose barb on the rear of the throttle body.
4. Before starting the engine, run the fuel pump to build fuel pressure and confirm that there are no fuel system leaks. Also check and be alert for fuel leaks in the fuel injection system immediately after starting the engine until there is confidence that there are no fuel leaks.

## Throttle Linkage and Cable Brackets Recommendations:

For throttle linkage and cable bracket recommendations follow that recommended for the 4150 4BBL throttle body that will be used.

Throttle linkage, cable brackets, and other accessories are available or under development currently. To see what parts are available and search for new products, please consult the Holley website, [www.holley.com](http://www.holley.com).

## Tuning with Carburetor/Throttle Body Spacers –

The Holley LT Single-Plane intake manifold is designed to provide minimum throttle body flange height (maximum hood clearance). If there is enough air cleaner to hood clearance available, the use of carb spacers may provide opportunities for performance and/or drivability improvements. Tuning with carb spacers is an easy, usually inexpensive, and interesting exercise that can improve performance. The following carb spacer guidelines are typical, but your results may vary based on your engine combination:

**1" Thick Four-Hole Spacer** – Usually improves fuel distribution and may shield a carburetor from signal pulsations that could disrupt a smooth A/F curve. For a port or direct EFI engine a four-hole spacer may affect cylinder to cylinder air flow distribution positively. While peak horsepower may not be improved, often the torque curve may be broadened, and drivability improved.

**1" Thick Open Spacer** – An open spacer increases the intake manifold plenum volume and depth. Increased plenum volume may change the tuning of the intake manifold to move the torque curve peak to a higher engine RPM. Increased plenum depth may provide the air/fuel charge a better flow path into the runner entries at higher engine RPM. Peak horsepower may be increased, sometimes trading some lower engine RPM torque for higher RPM power improvement.

**2" Thick Open Spacer** – The 2" spacer increases the intake manifold plenum volume and depth more than the 1" open spacer. Larger engine displacement combinations may benefit from a taller open spacer. As the open spacer height is increased, returns may be diminished. If a 2" spacer gives a substantial improvement over a 1" open spacer, the engine combination may benefit from an intake manifold with a larger runner cross-sectional area. Once again, peak power may be increased while low engine RPM performance may be sacrificed.

2" Thick Four-Hole/Open Combo Spacer – This spacer is a four-hole spacer for the first 1" exiting the throttle bores and then is open under the four-hole section. This spacer may combine the effects of the 1" four-hole spacer and the 1" open spacer. If there is space for a 2" spacer, the combo spacer may work well.

Various Height Reverse Taper or Contoured Section Spacers – With the use of current CNC machine technology there are many carb spacer designs available. The results on your engine combination will vary depending on many factors. Testing is the way to determine if a specific design will provide an improvement on a specific engine. Without testing on a specific engine combination, no one can claim with certainty that a given carb spacer will provide a performance improvement.

### **Intake Manifold Service Parts:**

<b>508-25</b>	Port Flange O-Rings, 3/32" Round, Size 2-142, Viton, set of 8
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**Holley Technical Support**  
**1801 Russellville Road, Bowling Green, KY 42101**  
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