



Holley GM LS1/LS2 Dual-Quad Mid-Rise Dual-Plane Intake Manifold Kits

300-120	LS1/LS2 Dual Quad (2x4160) Intake Manifold, Carbureted
300-121	LS1/LS2 Dual Quad (2x4V throttle body) Intake Manifold, EFI

INSTALLATION INSTRUCTIONS 199R10577

(Before installation, please read these instructions completely.)

APPLICATIONS:

The Holley LS1/LS2 Dual-Quad intake manifold series is designed for GM LS Gen III and IV engines equipped with LS1, LS2, LS6 or any other cathedral-port type cylinder heads. The intake manifold will work with OE or aftermarket cylinder heads as long as the head is configured with the standard LS cathedral-port intake flange bolt pattern and intake port opening locations.

These Dual-Quad style intake manifolds are designed for street and performance engine applications up to 427 cubic inch displacement and maximum engine speeds of 6500-7000 rpm, depending on the engine combination. The Dual-Quad intake manifolds are intended for retro-fit engine swap, street/strip performance (pre-emissions control), and specialty Hot-Rod applications and will not accept stock components and hardware.

NOTE: The 300-121 EFI intake manifold and fuel rail are designed to accept Bosch Style EV-1 or Magneti Marelli Pico fuel injectors. OE LS fuel injectors may not fit properly in the 300-121 intake manifold fuel rail assembly.

EMISSIONS EQUIPMENT:

Holley Dual-Quad 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.

IGNITION CONTROL:

For intake manifold P/N 300-120, a retrofit carbureted application, ignition control will need to be accomplished with a separated ignition control module. It is recommended to use a MSD 6LS ignition controller, MSD P/N 6010 for LS1/LS6 (24 tooth crank trigger engines), MSD P/N 6012 for LS2/LS7 (58 tooth crank trigger engines). The MSD ignition controller will function with the OE crank trigger, cam timing sensor, and coils; go to www.msdisignition.com for more information. A separate map sensor will need to be used if vacuum timing advance is desired with MSD ignition controller. Holley 1bar MAP sensor P/N 538-24 is recommended.

ELECTRONIC FUEL INJECTION:

Intake manifold P/N 300-121 is intended for use with electronic fuel injection. Holley EFI has a full line of engine management systems, throttle bodies, fuel injectors, and other installation components required to successfully set-up and operate an electronically fuel injected engine for applications ranging from street to heads-up competitive racing with forced induction or nitrous. Go to the Holley EFI home page within www.holley.com for a full description of EFI engine management systems and EFI components and accessories available for your GM LS engine and the Holley LS Dual-Quad EFI intake manifold.

DIMENSIONS:

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

- A-B Height (Carbureted or EFI) – A-4.46" (front), B-5.53" (rear).
- Port Size – 2.68" Height x 0.97" Wide.
- Mounting Flange Gasket Type – 3/32" Round Viton O-Rings, Size 2-151, 3" I.D. (included with the int. man. install kit).
- Carburetor Flange Front-to-Rear Spacing – 8-5/8"
- As-Cast Runner Cross-Sectional area – Constant, 2.50 in².
- Runner Length – Avg - 3.73", Longest - 4.56", Shortest - 3.14".
- Machined Throttle Bore Diameter – 1-11/16"
- Vacuum Port Size and Thread – 3/8 NPT
- Mounting Bolt Thread and Length – M6 x 1.0 x 50mm Long (bolts and washers included with the int. man. install kit)

INSTALLATION KIT CONTENTS:

- ❑ 10 – M6 x 1.0 x 50mm Long Hex Head Cap Screws, Zinc Plated, Class 10.9, Mounting Bolts
- ❑ 10 – Washer, M6 x 12mm O.D x 1.6mm Thick, Intake Manifold to Cylinder Head Mounting
- ❑ 8 – O-Ring, 3/32" Dia. Round Sect. Viton, Size 2-151, 3" I.D., Port Flg Seals, Holley Service P/N 508-23
- ❑ 1 – 3/8 NPT Hex Steel Pipe Plug
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card
- ❑ 2 – Holley Decals

FUEL RAIL KIT CONTENTS: (included in P/N's 300-121):

- ❑ 2 – Fuel Rail, High Volume, Configured with 3/4-16 O-ring Ports (AN-8)
- ❑ 4 – 1/4-20 UNC x 1-3/4" Long Socket Head Cap Screws, Zinc Plated, Fuel Rail Mounting
- ❑ 4 – Washer, 1/4 x .50" O.D x .06" Thick, Fuel Rail Mounting
- ❑ 4 – Spacer, 1/4 I.D. x 1/2" O.D. x 3/8" Thick, Fuel Rail Mounting

INSTALLATION INSTRUCTIONS:

Installation on Modified Engine Components –

The LS Dual-Quad 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.

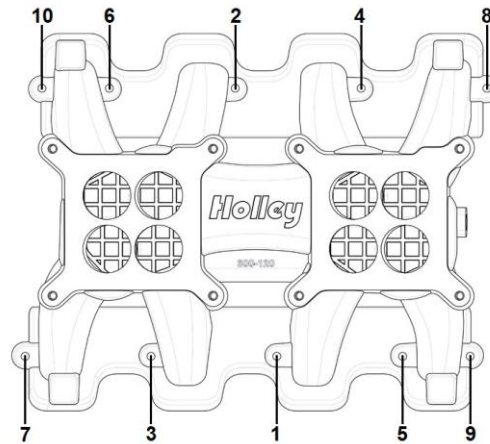
- The bolt holes in the intake manifold would have to be slotted to allow the fastener to properly pass through the manifold mounting holes.
- The mounting fasteners must freely thread into the cylinder head while passing through the mounting holes or the manifold may not seat properly onto the cylinder head surfaces when the fasteners are tightened.
- As the o-ring grooves are located in 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 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 o-rings installed. Make sure that the mounting bolts supplied can thread freely into the cylinder heads through the intake manifold mounting holes. The mounting flange should seat properly.
2. Check the port opening alignment. Test fit the carburetors or throttle bodies, fuel and vacuum plumbing, throttle linkage, wiring, etc to ensure there are not any fit issues before performing the final intake manifold installation. Due to the nature of the design, the clearance of the intake manifold to the lifter valley cover is close. Please ensure that there is no interference with the lifter valley cover that prevents the intake manifold from properly seating on the mounting flanges.
3. For final installation, install the eight o-rings provided in the mounting flange o-ring grooves. To make sure the o-rings do not fall from the grooves apply a light coat of grease to the o-rings.
4. Place the intake manifold on the mounting flanges. Be sure that all of the 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 and washers 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 M6x1 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 following the tighten sequence diagram below.



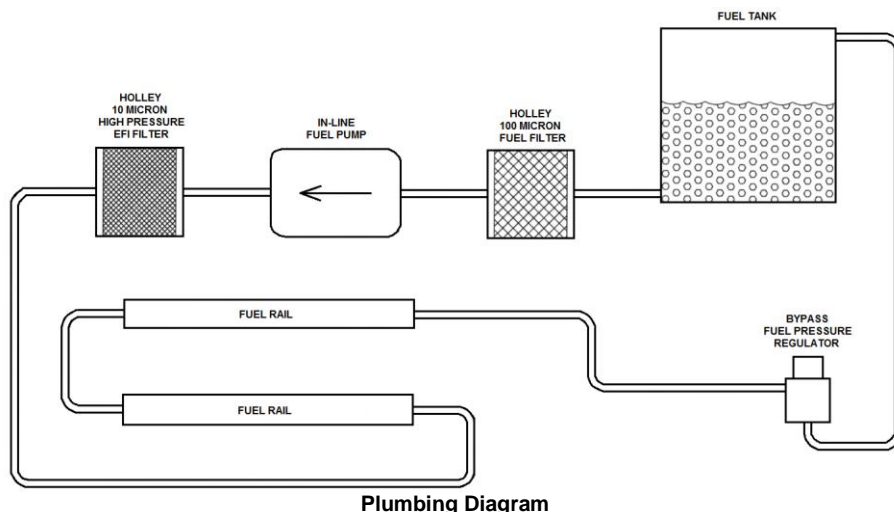
Manifold Tightening Sequence

7. There is a 3/8 NPT port at the rear intake manifold for a vacuum source. This port is connected to both the upper and lower planes of the manifold and can be used for power brakes, vacuum reservoir, MAP sensor, etc. The carburetors or throttle bodies will normally also provide vacuum sources and ports for plumbing PVC (positive crankcase ventilation). If using a vacuum port on a carburetor or throttle valve confirm whether the source is a full vacuum or a timed vacuum source. It is preferable to use the boss on the rear of the intake manifold for the MAP signal and/or the power brake vacuum source and the larger vacuum port on one of the carburetors or throttle bodies for a PVC connection. Confirm that all unused vacuum ports on the intake manifold and the carburetors or throttle bodies are plugged or capped.

Installation of the Fuel Rails –

The EFI version of the Dual-Quad intake manifold, 300-121, includes a fuel rail kit. The fuel rail mounting pads have two sets of holes. The top holes position the fuel rail to install a standard Bosch style fuel injector. The bottom set of holes position the fuel rail to install the shorter Pico style fuel injector.

1. Apply a silicone lubricant to the o-ring on the inlet end of fuel injectors and insert the fuel injectors into the ports in the fuel rail. To insert the injector without tearing the o-ring, gently rock the injector in the inlet of the port while applying pressure to insert the injector.
2. Position the injectors to properly orient the wiring plugs, apply silicone lubricant to the injector outlet o-rings, and insert all four injectors into injector bosses in the base intake manifold applying gentle downward pressure on the fuel rail.
3. Once the injectors are inserted into the intake manifold, place the 1/4" washers on the 1/4-20 x 1.75 long socket head capscrews.
4. Apply a drop of oil to the socket head capscrews, place the spacers between the fuel rail and the mounting bosses, and thread in the socket head capscrews.
5. Tighten the fasteners in two steps, 75 in-lbs for the first step and 130 in-lbs for the second step.
6. Check and ensure the injector is floating on the o-rings; rotate the injector back and forth to confirm that there is no load on the injector body.
7. The fuel rail is designed to provide enough flow and volume to dampen fuel pressure oscillations and variations at the inlet of the fuel injectors. The fuel rails are machined to receive an adapter fitting for 3/4-16 (AN-8) o-ring port.
 - For power levels below 700-750HP AN-6 (3/8") plumbing to and from the fuel rails should be sufficient.
 - For power levels above 750Hp AN-8 (1/2") plumbing is recommended.
 - It is always recommended to only use tubular hose ends when a non-straight hose end is required.



Installation of the Carburetors or Throttle Bodies –

1. When installing the carburetors or throttle bodies and the connecting throttle linkage, check to be sure that all throttle levers and linkage components have adequate clearance from the intake manifold.
2. The intake manifold is designed for carburetors and throttle valves with a maximum throttle bore diameter of 1-11/16". The 8-5/8" carburetor flange spacing is designed to receive two square bowl 4160 Holley or square-bore AFB style carburetors mounted inline. V-bowl 4150 Holley carburetors may not be used. For best results use carburetors with primary and secondary throttle bores and venturis of equal diameter.
3. It is recommended that a progressive linkage be used for carbureted applications. Vacuum operated secondaries should have a balance tube between the diaphragm covers to ensure synchronized and equal secondary throttle opening. Diaphragm cover kits P/N 20-28 (standard covers) and P/N 20-73 (quick-change covers) are available to provide the connections for a vacuum balance hose.

Carburetor and Throttle Body Recommendations:

Carburetor Recommendations:

- **5.3- 6.0 liters, stock engine street application** – 390 CFM Carburetors, P/N 0-8007 (1-7/16" throttle bores, 1-1/16" venturis)
- **5.3 -6.0+ liters, mildly modified engine** – 465 CFM Carburetors, P/N 0-1848-1 (1-1/2" throttle bores, 1-3/32" venturis)
- **6.0+ liters, modified engine, hi-perf street/strip** – 660 CFM Center-Squirter Carburetors, P/N 0-4224 (1-11/16 throttle bores, 1-1/4" pri & 1-5/16" sec venturis)

For more carburetor configuration, tuning, linkage, fuel line recommendations and testing results go to <http://www.holley.com> . As new dual quad products or information becomes available the information will be posted on the Holley website.

Throttle Body Recommendations:

- **All EFI street and performance applications** – Holley P/N 112-578, Dual-Quad Throttle Body Kit, 1-3/4 throttle bores

Throttle Linkage, Cable Brackets, and Fuel Line Recommendations:

- Throttle linkage, cable brackets, fuel line kits, and other accessories are under development at this time. For news on the development, testing and availability of these products please consult the Holley website, <http://www.holley.com> .

Service Parts:

- 508-23 – Dual-Quad Intake Manifold Port Flange O-Rings, 3/32" Round, Size 2-151, Viton, set of 8

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