



Holley GM Gen V LT1 Hi-Ram Modular Intake Manifold Kits

Holley P/N	Engine Application & Induction Configuration
300-140	LT1 Hi-Ram, 1 x 105mm LS Throttle Body (longitudinal mount) w/ port EFI provisions & fuel rails
300-141	LT1 Hi-Ram, 1 x 92mm LS Throttle Body (longitudinal mount) w/ port EFI provisions & fuel rails
300-142	LT1 Hi-Ram, 1 x 105mm LS Throttle Body (longitudinal mount) w/out port EFI provisions
300-143	LT1 Hi-Ram, 1 x 92mm LS Throttle Body (longitudinal mount) w/out port EFI provisions
300-236	LT1 Hi-Ram, Base Manifold Only w/ port EFI provisions & fuel rails (plenum top fab. flange available)
300-237	LT1 Hi-Ram, Base Manifold Only w/out port EFI provisions (plenum top fab. flange available)

INSTALLATION INSTRUCTIONS 199R10910

(Before installation, please read these instructions completely.)

APPLICATIONS:

This Holley Hi-Ram intake manifold series is designed for GM Gen V LT1 engines. This intake manifold will work with OE or aftermarket cylinder heads as long as the head is configured with the intake flange angle, mounting bolt pattern and intake port opening locations matching the OE design.

This Hi-Ram style intake manifold is designed for high performance engine applications up to 427-440 cubic inch displacement and maximum engine speeds of 7500-8500 rpm, depending on the engine combination. The Hi-Ram intake manifold is intended for maximum performance applications and will not accept stock components and hardware. A modified hood will be required for most vehicle applications.

NOTE: The versions of the LT1 Hi-Ram intake manifold with port EFI provisions and fuel rails are designed to accept Bosch Style EV-1 or GM LS7 fuel injectors.

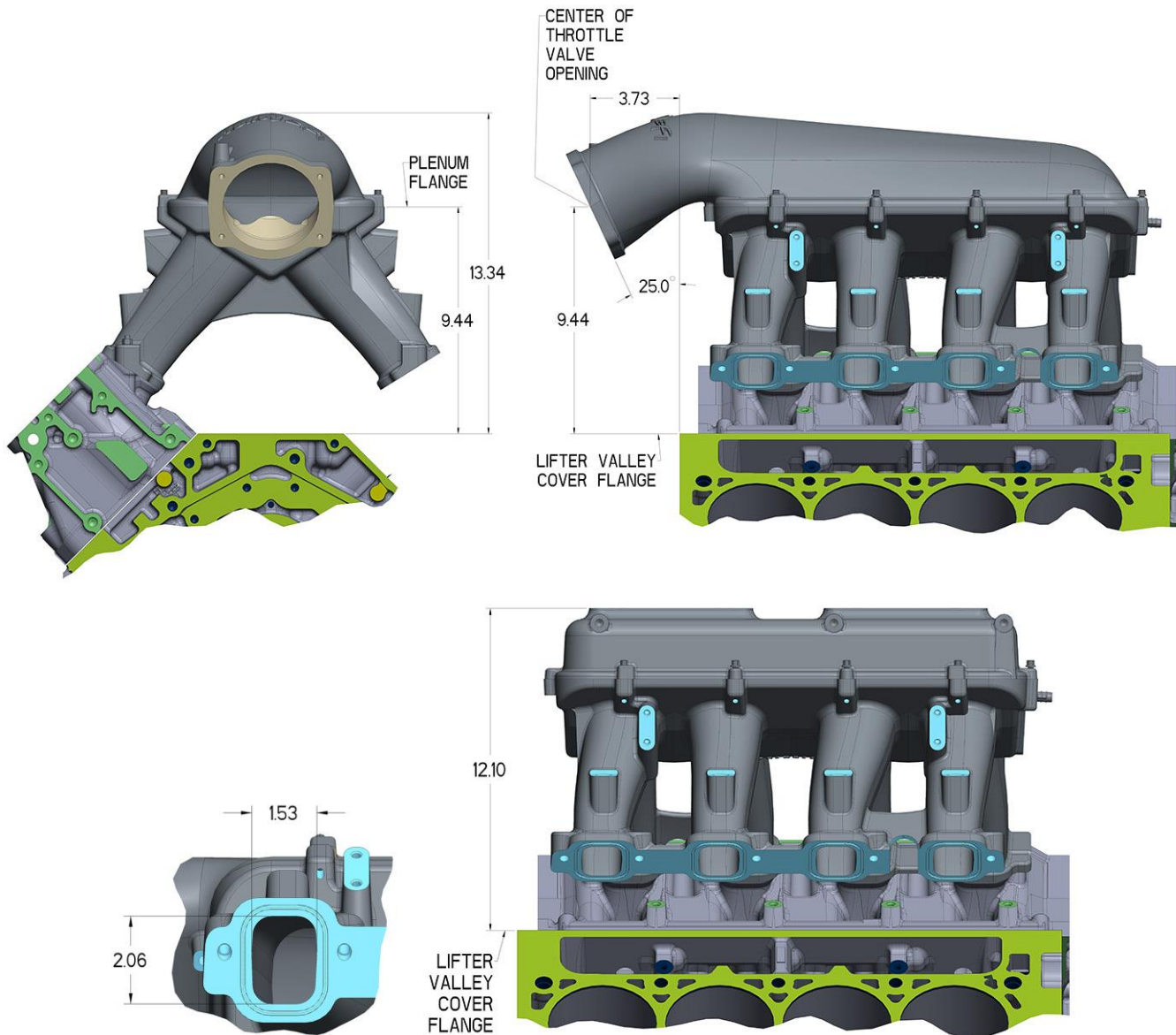
EMISSIONS EQUIPMENT:

Holley Hi-Ram 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.

DIMENSIONS:

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

- A-B Height, (when used with carb style tops) – 12.10".
- Hi-Ram Base Plenum Top Mounting Flange Height – 9.44"
- Total Height with 92/105mm EFI Plenum Top – 13.34".
- Port Size: 2.06" High x 1.53" Wide
- Mounting Flange Gasket Type:
3/32" Round Viton O-Rings, Size 2-142, 2.36" I.D. (included with the int. man. install kit).
- Plenum Top Gasket Type – 3/32" Round Viton O-ring Cord (included with the intake manifold installation kit).
- Throttle Valve Flange Location, with 92/105mm Long. Mount EFI Plenum Top: Height – 9.44", Longitudinal Location – 3.73" (forward from engine block front flange), Lateral Location – On-Center, Angle – 25 deg. (down from vertical).
- Hi-Ram Runner Length and Runner As-Cast Cross-Sectional Area:
Runner Length - 6.50"
Runner Cross-Sectional Area – Tapered, 5.08 in² at the entry to 2.91 in² at the port flange.



INSTALLATION KIT CONTENTS:

- ❑ 12 – 1/4-20 UNC x 1" Long 12 Point Cap Screws, Zinc Plated, Plenum Attachment Bolts
- ❑ 4.5 ft – O-ring Cord, 3/32" Dia. Round Section Viton, Plenum Flange Seal, Holley Service P/N 508-21
- ❑ 8 – O-Rings, 3/32" Dia. Round Sect. Viton, Size 2-142 2.36" I.D., Port Flg Seals, Holley Service P/N 508-25
- ❑ 10 – Studs, M6 x 1.0 Threads, Intake Manifold to Cylinder Head Mounting
- ❑ 22 – Washers, M6 x 12mm O.D x 1.6mm Thick, Intake Manifold to Cylinder Head Mounting
- ❑ 2 – 1/8 NPT Hex Steel Pipe Plugs
- ❑ 1 – 3/8 NPT Hex Steel Pipe Plug
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card

FUEL RAIL KIT CONTENTS:

Fuel Rail Kit P/N 534-224

- ❑ 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
- ❑ 8 – O-Ring, Fuel Injector to Intake Manifold Seal

EFI PLENUM TOP, 1 x 92mm/105mm LS THROTTLE BODY, KIT CONTENTS:

(included in 300-140, 300-141, 300-142, & 300-143)

- 1 – Gasket, 92mm or 105mm LS Throttle Body, Holley Service (P/N 508-20 for 92mm or 508-24 for 105mm)

INSTALLATION INSTRUCTIONS:

Installation on Modified Engine Components –

The Hi-Ram modular intake manifolds are designed to provide maximum performance for racing engines. 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.

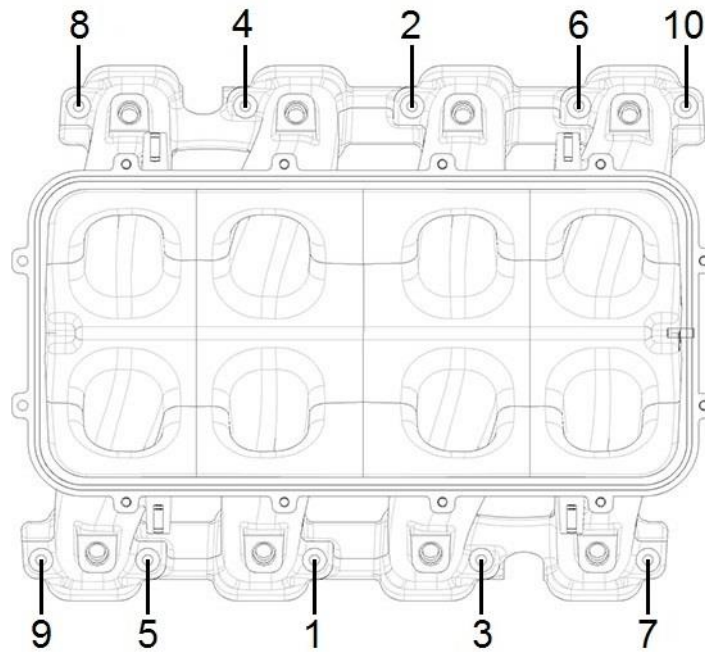
- The bolt holes in the intake manifold would have to be slotted to allow the fastener to properly pass through the manifold mounting holes.
- The mounting fasteners must freely thread into the cylinder head while passing through the mounting holes or the manifold may not seat properly onto the cylinder 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 Base –

1. Before installing the intake manifold base, perform a test fit of the intake manifold without the O-rings installed. Make sure that the mounting studs 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 plenum top, fuel and 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. To help install the O-rings into the grooves, apply a light coat of grease to the O-rings.
4. Install the mounting studs into the cylinder heads. The end with the longer length of thread goes into the cylinder heads. Apply engine oil to the threads and thread in the stud until all of the threads are engaged by hand.
5. Put the manifold base into place on the mounting flange. Be sure that all of the O-rings are still in the grooves and are not being crushed between the flanges.

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. Install the washers and nuts provided (engine oil should be applied to the threads). Gently tighten the nuts working side to side and out from center (see the tightening sequence diagram below), until manifold is seated on the mounting flanges and the O-rings have been compressed. In two steps, tighten the mounting nuts first to 44 in-lbs and then to 89 in-lbs following the tightening sequence diagram below.



Manifold Tightening Sequence

7. There is a flange on the rear of the base manifold for vacuum source. There are two 1/8 NPT ports, 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).

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.

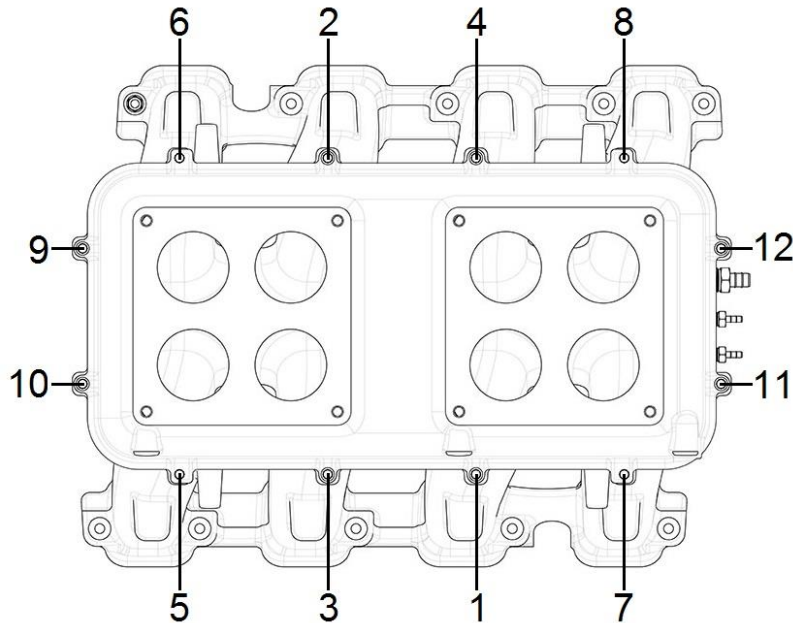
LS3 MAP sensor, GM P/N 12591290, will cover naturally aspirated (1 bar) applications; an LS9 MAP sensor (post blower), GM P/N 12592525 (red label) should cover forced induction applications up to 3 Bar. The LS3 MAP sensor does not have the same absolute pressure measurement to voltage output range as 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.

If the use of a GM bolt-on type MAP sensor is not desired, the MAP port can be tapped 1/4 NPT, and a fitting used in the port to plumb a hose to a MAP sensor mounted at some other 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.

Installation of the Plenum Top –

1. Before installing the plenum top, the supplied O-ring cord will need to be cut to length and glued together.
2. Lay the O-ring cord into the groove on the plenum flange of the base manifold with the free end overlapped.
3. Mark the position of the cut to be made across both O-ring ends.
4. Lay the O-ring on a flat surface with the ends overlapped and the marks aligned as they were when the marks were made.
5. With a sharp razor blade cut thru both ends of the O-ring at the mark simultaneously.
6. With a drop of super glue (Cyanoacrylate), bond the ends of the O-ring together. The glued joint should be smooth, not offset or kinked.
7. To ensure sealing at the glued joint, apply a thin film of silicone sealer around the O-ring at the glued joint, allowing the silicone to partially cure before installation of the O-ring in the groove.
8. Install the O-ring in the groove on the base manifold plenum flange. Place the plenum top in place.

9. The plenum top flange is symmetrical so all tops will fit in either a forward or rearward orientation. For the carbureted type tops, 2 x 4500 and 2 x 4150, the side with the three bosses would go towards the side for the throttle linkage, normally on the left side of the car. For the EFI top with the LS throttle body flange, the throttle body flange could go to the front or the rear, as desired.
10. Apply a drop of engine oil to the supplied $\frac{1}{4}$ -20 UNC x 1" 12 point cap screws and install finger-tight with a washer.
11. Gently tighten the fasteners evenly - starting from the middle of the sides, crossing side to side, and moving towards the ends until the plenum top is seated and the O-ring is compressed. Tighten the fasteners in two steps using the tightening pattern shown in the figure below. Tighten to 45 in-lbs for the first step and 90 in-lbs for the second step.



Plenum Top Tightening Sequence

Installation of the Fuel Rails –

P/N's 300-140 & 300-141 include a fuel rail kit (P/N 534-224). The fuel rail mounting pads have two sets of holes. The top holes position the fuel rail to install a standard Bosch style EV-1 fuel injector. The bottom set of holes position the fuel rail to install the GM LS7 fuel injector.

1. The provided O-rings are for use with GM LS7 style fuel injectors. If using GM LS7 injectors, remove the O-ring from the outlet end of each injector and replace with the O-ring provided in this kit. If using Bosch EV-1 style injectors, the provided O-rings are not needed.
2. 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.
3. 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. The proper orientation for the fuel rail is with the logo facing outward.
4. Once the injectors are inserted into the intake manifold, place the $\frac{1}{4}$ " washers on the $\frac{1}{4}$ -20 x 1.75" long socket head cap screws.
5. Apply a drop of oil to the socket head cap screws, place the spacers between the fuel rail and the mounting bosses, and thread in the socket head cap screws.
6. Tighten the fasteners in two steps - 75 in-lbs for the first step and 130 in-lbs for the second step.
7. Check and make sure the injector is floating on the O-ring. Rotate the injector back and forth to confirm that there is no load on the injector body.

8. 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.
 - The best configuration for plumbing the fuel rails is to split from the supply line with a "Y" type distribution block or fitting, then feed into the inlet end of each fuel rail. The hoses from the exit end of each fuel rail would then feed into each inlet port of a fuel pressure regulator with two inlet ports or into another "Y" type distribution block or fitting connecting to a hose leading to the fuel pressure regulator.

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 and plenum top components.
2. The plenum tops for the 2 x 4500 and 2 x 4150 carburetor configurations have bosses for the mounting of throttle linkage. The three bosses are positioned for the mounting of heim joints that would carry a throttle linkage motion transfer shaft.
3. The EFI 1 x 92mm and 1 x 105mm LS throttle body plenum tops provide bosses near the throttle body flange for the mounting of a throttle cable bracket. The bracket will need to be fabricated by the user for each individual throttle cable and throttle body application. It should be noted that the throttle body flange on this plenum top may fit with a GM LS3 drive by wire throttle body.

LT1 HI-RAM PLENUM TOPS AND SERVICE PARTS AVAILABLE SEPARATELY:

Plenum Tops

300-207 – 2 x 4150, up to 1.75" bores, (sideways mount 4150, inline mount 4160)
300-208 – Blank Flange Configurable Top
300-245 – 1 x 95mm LS Throttle Body, Longitudinal Mount
300-246 – 1 x 105mm LS Throttle Body, Longitudinal Mount

Fuel Rail Kits

534-224 – LT1 Hi-Ram Fuel Rail Kit, High Volume, 3/4-16 O-ring Port (AN-8) Connection
534-206 – Fuel Rail Extrusion, Raw, 12" Long, High Volume
534-207 – Fuel Rail Extrusion, Raw, 18" Long, High Volume
534-208 – Fuel Rail Extrusion, Raw, 36" Long, High Volume

Fabrication Flanges

300-211 – LT1 Hi-Ram Plenum Fabrication Flange, 0.50" Billet Machined Aluminum Plate
300-221 – Hi-Ram 92mm LS Throttle Body Fabrication Flange, 0.50" Billet Machined Aluminum Plate
300-222 – Hi-Ram 102mm LS Throttle Body Fabrication Flange, 0.50" Billet Machined Aluminum Plate

Service Parts

508-20 – Throttle Body Gasket, 92mm or 102mm LS Throttle Body
508-24 – Throttle Body Gasket, 105mm LS Throttle Body
508-21 – Hi-Ram Plenum O-Ring Cord, 3/32" Round, Viton, 4.5' Long
508-25 – LT1 Hi-Ram Port Flange O-Rings, 3/32" Round, Size 2-142, Viton, set of 8
300-224 – Stud Kit, LT1 Hi-Ram Base Intake Manifold Mounting
534-104 – Fuel Injector O-rings, set of 16 (for use with GM LS7 injector)

Holley Technical Support: 1-866-464-6553

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Throttle Body Installation Instructions for GM LS Race Series

860007-1 (Silver) & 860008-1 (Black) – 90MM
860001-1 (Silver) & 860004-1 (Black) – 92MM
860002-1 (Silver) & 860005-1 (Black) – 102MM

Kit Contents:

- Throttle Body
- (4) Throttle Body Mounting Bolts
- Installation Instructions

Installation Instructions:

1. Please read through the entire instruction sheet to familiarize yourself with the parts of the vehicle the installation will cover.
2. Disconnect the negative battery terminal.
3. Remove the air inlet tube, all vacuum hoses, and electrical connectors from the stock throttle body. Mark all hoses and wires to ensure that they are installed correctly on the new throttle body.
4. Disconnect the throttle linkage by opening the throttle manually and slipping the cable from the cam groove on the linkage.
5. Remove the (x4) nuts securing the throttle body to the intake manifold and remove it.
6. Attach the IAC (**Holley replacement part # 543-34**) and TPS (**Holley replacement part # 870001**) to the new throttle body. Make sure each O-ring is in the groove and does not slip out while installing. Torque bolts to **18 in/lbs (1.5 ft/lbs)**.
7. Make certain the gasket-mating surface on the intake manifold is clean and free of debris. Using the included bolts, attach the throttle body to the intake manifold. Torque nuts and bolts down to **89 in/lbs (7 ft/lbs)**.
8. Slip the throttle cable on the linkage arm.
9. Observe the throttle body (while an assistant presses and releases the gas pedal) to ensure that the throttle blade opens and closes while also operating smoothly.
10. Re-attach the air inlet tube, all vacuum hoses, and electrical connectors on the new throttle body.
11. Re-connect the negative battery terminal.
12. Start the engine and check for loose connections or vacuum leaks, etc.
13. After the engine is warmed up, check the idle speed (refer to owner's manual).
14. Double-check all fasteners, clamps, and electrical connections to ensure they are all secure.

Any questions?

Please contact Technical Service: **1-866-464-6553** or **270-781-9741**.

For online help, please refer to the website: **www.holley.com**.

LIMITATION OF LIABILITY – DISCLAIMER:

The regulation of emissions production, noise levels, and safety standards is undertaken by the federal government, each of the fifty state legislatures, and by many local municipalities, towns, and counties.

Holley Sniper EFITM makes no warranties of merchantability, of fitness for particular purpose, or that its products are approved for general use, or that its products are approved for general use, or that its products comply with laws, regulations, or ordinances in the state where they may be sold to the ultimate purchaser, the consumer. Unless expressly stated to the contrary in the catalog, instruction sheet; or price list, the entire risk as to the conformity of any company product in any such state and as to repair should the product prove to be defective or non-conforming, is on the retail purchaser, the buyer, the ultimate consumer, of such product and it is not upon the seller, distributor, or manufacturer. In this connection, the retail purchaser, the buyer, the ultimate consumer assumes the burden of the entire cost of any and all necessary service, alterations, or repair.

199R11409

Revision Date: 4-3-18



Injector Off Times to use with Terminator X and Terminator X Max ECUs

MPFI Injectors	Rated Flow per Injector (lb/hr)	Rated Injector Pressure (psi)	Minimum Injector Opening Time (msec)	Injector Off Time (msec)																
				8.0V	8.8V	9.6V	10.4V	11.2V	12.0V	12.8V	13.6V	14.4V	15.2V	16.0V	16.8V	17.6V	18.4V	19.2V	20.0V	
Term X 42 lb/hr	42.5	60.0	1.20	1.35	1.17	0.90	0.82	0.69	0.51	0.43	0.35	0.34	0.23	0.21	0.11	0.09	0.05	0.02	0.00	
Term X 76 lb/hr	76.2	60.0	1.20	2.12	1.85	1.39	1.20	0.96	0.86	0.71	0.65	0.57	0.50	0.38	0.35	0.33	0.26	0.24	0.21	
Term X 100 lb/hr	100.0	60.0	1.20	3.05	2.18	1.73	1.34	1.17	0.99	0.83	0.74	0.63	0.56	0.49	0.42	0.37	0.30	0.26	0.23	
Term X 120 lb/hr	120.0	60.0	1.20	2.78	2.21	1.94	1.65	1.43	1.30	1.15	0.99	0.92	0.88	0.81	0.73	0.70	0.67	0.64	0.62	
Term X 220 lb/hr	220.0	43.5	1.20	2.96	2.19	1.84	1.56	1.32	1.12	0.96	0.83	0.72	0.63	0.55	0.47	0.41	0.35	0.30	0.25	
Accel 150830 30 lb/hr	28.8	43.5	1.00	1.85	1.42	1.16	0.98	0.83	0.71	0.60	0.50	0.42	0.34	0.28	0.23	0.18	0.13	0.09	0.04	
Accel 150832 32 lb/hr	31.5	43.5	1.00	1.98	1.51	1.23	1.04	0.89	0.76	0.63	0.54	0.46	0.37	0.30	0.23	0.17	0.12	0.08	0.03	
Accel 150844 44 lb/hr	43.5	43.5	1.00	1.63	1.33	1.08	0.92	0.81	0.75	0.59	0.51	0.43	0.35	0.29	0.23	0.18	0.14	0.16	0.06	
Accel 151845 45 lb/hr	47.0	43.5	1.00	1.98	1.04	0.81	0.74	0.63	0.54	0.45	0.37	0.31	0.25	0.20	0.15	0.11	0.08	0.05	0.02	
Accel 151848 48 lb/hr	49.8	43.5	1.00	2.52	0.81	0.62	0.53	0.44	0.34	0.25	0.18	0.13	0.08	0.04	0.00	-0.04	-0.07	-0.09	-0.12	
Accel 151853 53 lb/hr	58.1	43.5	1.00	2.99	2.14	1.75	1.50	1.29	1.12	0.98	0.86	0.75	0.65	0.58	0.51	0.45	0.38	0.31	0.25	
Accel 151861 61 lb/hr	63.9	43.5	1.00	1.89	1.45	1.21	1.03	0.87	0.73	0.62	0.55	0.48	0.39	0.31	0.23	0.16	0.10	0.05	0.02	
Accel 74620L 62 lb/hr	64.0	43.5	1.00	1.63	1.29	1.12	0.93	0.77	0.65	0.55	0.45	0.37	0.28	0.21	0.15	0.10	0.06	0.02	-0.02	
Accel 151880 80 lb/hr	77.0	43.5	1.00	1.74	1.41	1.21	1.03	0.87	0.75	0.67	0.59	0.50	0.43	0.35	0.28	0.23	0.18	0.13	0.10	
19LB Holley 522-198	19.0	43.0	1.00	1.48	1.24	1.02	0.85	0.72	0.62	0.53	0.46	0.40	0.35	0.30	0.26	0.22	0.19	0.15	0.12	
24LB Holley 522-248	24.0	43.0	1.00	1.33	1.09	0.87	0.70	0.56	0.46	0.37	0.29	0.22	0.16	0.10	0.06	0.01	0.01	0.01	0.01	
30LB Holley 522-308	30.0	43.0	1.00	1.73	1.46	1.22	1.03	0.87	0.75	0.65	0.56	0.49	0.43	0.37	0.32	0.26	0.22	0.19	0.16	
36LB Holley 522-368	36.0	43.0	1.00	1.59	1.34	1.12	0.93	0.79	0.67	0.57	0.48	0.41	0.35	0.31	0.27	0.23	0.19	0.15	0.11	
42LB Holley 522-428	42.0	43.0	1.00	1.69	1.42	1.18	0.98	0.83	0.72	0.61	0.51	0.43	0.36	0.30	0.24	0.20	0.15	0.11	0.07	
48LB Holley 522-488	48.0	43.0	1.00	1.47	1.24	1.02	0.84	0.70	0.59	0.50	0.42	0.35	0.29	0.23	0.18	0.13	0.09	0.06	0.03	
Mopar - RL032713AB	27.3	43.5	1.00	2.43	2.01	1.70	1.45	1.28	1.13	0.98	0.86	0.78	0.70	0.63	0.55	0.48	0.41	0.34	0.29	
Mopar - 4591851AB	26.8	43.5	1.00	2.53	2.08	1.75	1.50	1.33	1.17	1.04	0.91	0.83	0.75	0.69	0.62	0.56	0.49	0.43	0.37	
Mopar - 5037479AA	31.5	43.5	1.00	2.40	2.03	1.74	1.51	1.32	1.16	1.01	0.92	0.84	0.75	0.67	0.60	0.52	0.44	0.38	0.33	
Mopar - 5038337AB	35.0	43.5	1.00	2.65	2.12	1.81	1.54	1.34	1.19	1.04	0.92	0.83	0.74	0.67	0.59	0.52	0.45	0.39	0.33	
Mopar - 68170238AB	52.0	43.5	1.00	1.35	1.10	0.89	0.70	0.62	0.53	0.44	0.37	0.32	0.26	0.21	0.16	0.11	0.07	0.03	0.00	
Mopar - 5038838AA	61.0	43.5	1.00	2.00	1.83	1.53	1.32	1.15	1.01	0.89	0.79	0.70	0.63	0.56	0.51	0.45	0.40	0.36	0.32	
Ford 19 lb/hr Yellow Big Body	19.0	43.5	1.00	1.83	1.46	1.24	1.06	0.93	0.82	0.73	0.65	0.58	0.51	0.45	0.40	0.36	0.30	0.25	0.21	
Ford 24 lb/hr Blue Big Body	24.0	43.5	1.00	1.78	1.40	1.17	0.99	0.86	0.73	0.65	0.58	0.51	0.45	0.40	0.35	0.30	0.26	0.21	0.18	
Ford 30 lb/hr Red Big Body	30.0	43.5	1.00	2.25	1.73	1.42	1.21	1.06	0.95	0.85	0.76	0.68	0.60	0.53	0.47	0.42	0.37	0.32	0.27	
Ford - BR329F593A	34.0	43.5	1.00	2.02	1.65	1.40	1.20	1.05	0.93	0.82	0.71	0.62	0.55	0.48	0.42	0.36	0.31	0.25	0.27	
FRPP M-9593-LU47	51.0	43.5	1.00	2.31	1.69	1.50	1.35	1.18	1.03	0.82	0.82	0.72	0.64	0.56	0.50	0.44	0.39	0.34	0.29	
FRPP M-9593-G302	51.0	43.5	1.00	2.95	2.10	1.77	1.53	1.33	1.17	1.04	0.92	0.82	0.73	0.65	0.59	0.52	0.47	0.41	0.36	
FRPP M-9593-MU52	59.6	43.5	1.00	3.27	2.21	1.88	1.65	1.44	1.27	1.13	1.01	0.91	0.82	0.73	0.66	0.60	0.54	0.48	0.43	
FRPP M-9593-LU60	64.0	43.5	1.00	1.94	1.46	1.17	0.99	0.85	0.71	0.58	0.49	0.42	0.35	0.29	0.22	0.16	0.10	0.04	0.00	
FRPP M-9593-LU80	77.8	43.5	1.00	1.86	1.54	1.28	1.11	0.97	0.83	0.69	0.62	0.55	0.49	0.42	0.35	0.28	0.22	0.17	0.12	
LS3 12576341	41.1	60.0	1.00	1.80	1.49	1.21	1.00	0.84	0.73	0.63	0.54	0.46	0.40	0.34	0.29	0.24	0.20	0.15	0.10	
GM 12580426 5.3 Flex Fuel	35.9	60.0	1.00	1.67	1.37	1.11	0.90	0.76	0.64	0.54	0.45	0.37	0.32	0.27	0.22	0.18	0.14	0.10	0.05	
GM 12580681	29.6	60.0	1.00	0.95	0.80	0.66	0.54	0.45	0.36	0.32	0.27	0.23	0.20	0.17	0.14	0.12	0.10	0.08	0.06	
GM 17113698	24.4	60.0	1.00	0.70	0.59	0.48	0.38	0.31	0.23	0.19	0.15	0.12	0.09	0.06	0.04	0.02	0.00	-0.02	-0.03	
GM 25317628	24.4	60.0	1.00	0.70	0.59	0.48	0.38	0.31	0.23	0.19	0.15	0.12	0.09	0.06	0.04	0.02	0.00	-0.02	-0.03	
GM 17113553	24.7	60.0	1.00	0.72	0.59	0.46	0.37	0.31	0.25	0.19	0.14	0.10	0.06	0.03	0.01	-0.01	-0.03	-0.05	-0.06	
GM 25323974	24.7	60.0	1.00	0.72	0.59	0.46	0.37	0.31	0.25	0.19	0.14	0.10	0.06	0.03	0.01	-0.01	-0.03	-0.05	-0.06	
GM 25320288	24.7	60.0	1.00	0.72	0.59	0.46	0.37	0.31	0.25	0.19	0.14	0.10	0.06	0.03	0.01	-0.01	-0.03	-0.05	-0.06	
GM 89017586	33.3	60.0	1.00	1.80	1.52	1.24	1.03	0.88	0.74	0.65	0.56	0.48	0.41	0.35	0.30	0.25	0.21	0.18	0.14	
GM LS3 12576341	41.0	60.0	1.00	1.80	1.49	1.21	1.00	0.84	0.73	0.63	0.54	0.46	0.40	0.34	0.29	0.24	0.20	0.15	0.10	
GM 12580426 5.3 Flex Fuel	35.9	60.0	1.00	1.67	1.37	1.11	0.90	0.76	0.64	0.54	0.45	0.37	0.32	0.27	0.22	0.18	0.14	0.10	0.05	
GM 12594512	36.9	60.0	1.00	1.79	1.53	1.26	1.07	0.93	0.79	0.72	0.64	0.57	0.51	0.45	0.40	0.35	0.31	0.28	0.25	
GM 12609749	48.2	60.0	1.00	2.00	1.69	1.39	1.16	1.00	0.84	0.75	0.66	0.58	0.51	0.45	0.40	0.34	0.30	0.26	0.22	
GM 12613411	36.4	60.0	1.00	1.80	1.52	1.24	1.02	0.88	0.74	0.65	0.56	0.48	0.42	0.36	0.32	0.27	0.23	0.19	0.16	
GM 125																				