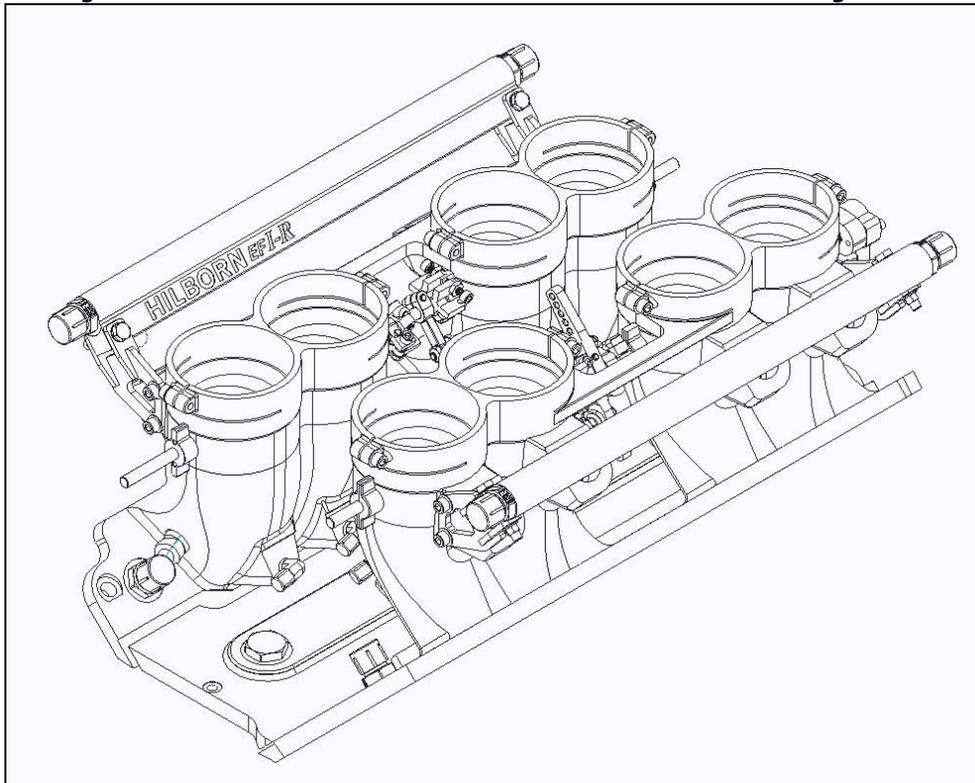




## HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold/Electronic Fuel Injection Kits



199R12112

(Before installation, please read these instructions completely.)

Hilborn P/N	Engine Application & Induction Configuration
300-800	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold Kit, 2-7/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
300-801	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold Kit, 2-5/8" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
300-807	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold Kit, 3" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
300-802	HILBORN Big Block Chevy EFI-R Valley Cover Kit, Standard Deck Height. Engines; 3.50" Throttle Cross-Link Included
300-803	HILBORN Big Block Chevy EFI-R Valley Cover Kit, Tall Deck Height. Engines; 4.00" Throttle Cross-Link Included
300-804	HILBORN Ram Tube Set, Aluminum 3' I.D. x 6" Long, D-Flare (set of 8 ram tubes)
300-805	HILBORN Ram Tube Set, Aluminum 3' I.D. x 8" Long, D-Flare (set of 8 ram tubes)
300-806	HILBORN Ram Tube Set, Aluminum 3' I.D. x 12" Long, D-Flare (set of 8 ram tubes)
550-720	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold & TerminatorX ECU Kit, 2-7/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
550-721	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold & TerminatorX ECU Kit, 2-5/8" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
550-722	HILBORN Big Block Chevy Rectangle Port EFI-R Injector Manifold & TerminatorX ECU Kit, 3" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included

# INSTALLATION INSTRUCTIONS

## MANIFOLD COMPONENTS:

Designed as a three piece manifold, the required components listed are needed to make a complete HILBORN EFI-R BBC Injector Manifold. Complete kit contents are listed at the end of these instructions.

- Injector Manifold Kit, with or without the TerminatorX or X MAX ECU kit – 2-7/16", 2-5/8", or 3" butterfly.
- Valley Cover Kit, standard deck 9.80" or tall deck 10.20"
- Ram Tubes, sold as sets of 8, available in 6", 8", or 12" lengths that can be trimmed for exact height requirements.

HILBORN Big Block Chevy rectangle-port manifolds can be easily adapted to oval port cylinder head configurations by using a rectangular port gasket.

## EMISSIONS EQUIPMENT:

Hilborn induction systems 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 engine block intake manifold end seal surfaces unless otherwise noted.

- A-B Height, (top of the injector manifold) – 7.93" both Standard and tall deck engines.
- Height & Width of Fuel Rail Centers – 7.80" High x 13.51" – Std. Deck; 14.08" – Tall deck
- Fuel Rail Outer Diameter – 1.00"
- Total Height with:
  - 6" Ram Tube – 13.39"
  - 8" Ram Tube – 15.39"
  - 12" Ram Tube – 19.39"
- CNC Profiled Port-Flange Opening Size – 2.50" Height x 1.75" Wide
- Injection Manifold Runner Length with:
  - 6" Ram Tube – 12.16"
  - 8" Ram Tube – 14.16"
  - 12" Ram Tube – 18.16"

## OTHER PARTS & SUPPLIES REQUIRED:

- 1 – Intake Manifold Gasket Set, Mr. Gasket P/N 121, 2.50" x 1.75" Openings, 0.060" Thick
- 1 – Gasket Contact Adhesive, Gasgacinch P/N 440-A, 4 OZ. Can
- 2 – 1/4-20 x 1" Socket Head Capscrews or Reduced-Hex Head Bolts, for Valley Cover Mounting
- 12 – 3/8-16 x 1-1/4" Socket Head Capscrews or Reduced-Hex Head Bolts, for Injector Manifold Mounting
- 12 – 3/8 x .675 O.D. x .120" Thick Hardened Washers, ARP P/N 200-9556 (10-pack), for Injector Manifold Mounting
- 1 – Silicone RTV, O2 Sensor Safe, Mr. Gasket P/N 78080G, Grey, 3 OZ. Tube
- 1 – Thread Sealer, Loctite 565 or Permatex® P/N 56521, for NPT Threads & Threaded Holes that Break into Oil
- AN-8 Hose-Ends, Hose, & AN-8 to 1/2 NPT Adapters, for Engine Coolant Outlet to Remote Thermostat Housing Plumbing
- AN-6 Plumbing to Connect Vacuum Junction Block to MAP Sensor and other Closed Vacuum Requirements
- Fuel Plumbing to and from the Fuel Rails and a Pressure Regulator on the Return Side of the Fuel System, Consult the EFI Install Instructions for Detailed Requirements
- Various Sensors for the EFI system, Consult EFI Install Instructions for More Information

## INSTALLATION INSTRUCTIONS:

### Throttle Linkage/Return Spring Placement:

HILBORN BBC manifolds are supplied with the throttle arm, return spring arm and throttle stop correctly located in the middle of the manifold. If you elect to change this orientation in any way, it is important to design your throttle linkage so both the throttle and the return spring assemblies pull from the same point on the throttle shaft and they should be located right next to a throttle stop. Failure to do so WILL result in bend and twist of the butterfly shaft resulting in poor idle and throttle tip-in performance.

### Manifold Orientation:

HILBORN BBC throats can be positioned on either head allowing customization.

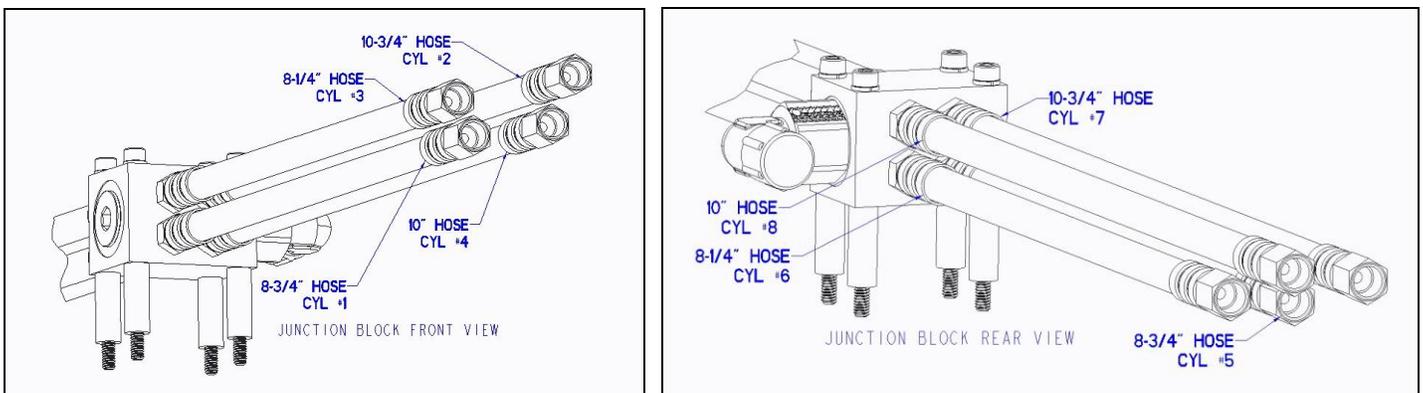
### Cooling:

HILBORN manifolds are supplied with (2) -8 nipples for coolant flow out of the engine. These nipples must be positioned at the front of the engine or engine damage may result. If additional coolant flow is required larger nipples may be substituted. Additional nipples may be added to the rear of the manifold to help cool the rear of the engine.

The supplied remote thermostat housing requires a Chevy based thermostat and water neck. It is recommended that up to three 1/8 holes be drilled in the flange of the thermostat to allow for correct coolant system operation.

### Vacuum Kit:

The supplied vacuum kit is comprised of the rubber lines attached to the junction block which is to be mounted on the valley cover. A -6 AN fitting is provided to supply vacuum to closed vacuum accessories such as the MAP sensor. Do not attach open vacuum accessories such as a PCV valve or IAC, or vacuum resolution for the MAP sensor will be adversely affected.



### Idle Speed:

Idle speed is adjusted using the idle stop next to the throttle arm/return spring arm assembly. If supplied, the secondary stop is correctly adjusted when light closing pressure is applied by hand to the throttle stop and the throttle blades move slightly.

### Distributor:

Standard deck applications require a standard length small cap distributor such as a Holley EFI P/N 565-200. For tall deck applications, a slip collar equipped distributor is required. Holley EFI slip-collar equipped tall deck Chevy distributor is P/N 565-204.

### Throttle Linkage:

Throttle arms are provided as a means to attach your vehicles linkage or cable to the injector. Brackets may need to be constructed.

When constructing your linkage please remember:

1. Cable linkage, such as those available from Lokar Products or Control Cables Inc., provide the greatest flexibility.
2. There should not be any bind in your throttle linkage system.
3. A mechanical wide open throttle stop on the throttle pedal should be used. Do not use the manifold's throttle stop as the pedal stop or damage to the shafts and couplers could result.

4. It is recommended that the throttle return spring be attached to the same point on the injector as the throttle linkage.
5. Avoid using the hex link as it is needed for adjustment.
6. Throttle shafts and couplers can be easily bent and care should be taken not to introduce twist into these assemblies. Design your linkage and throttle springs arrangements accordingly.

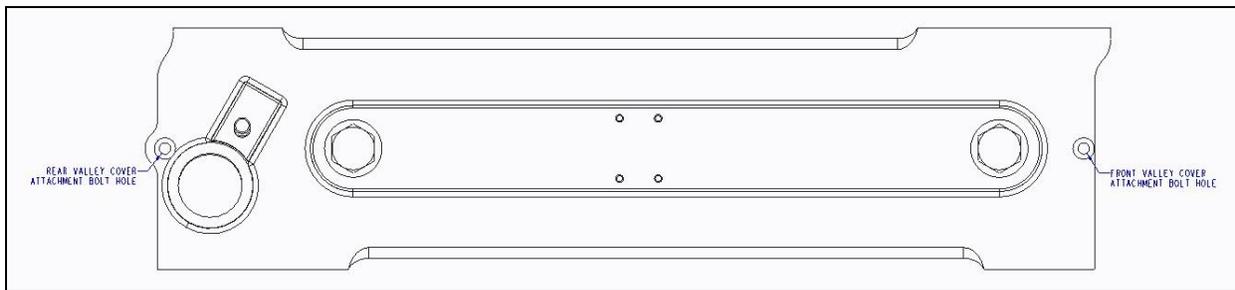
## Manifold Adjustment Videos

Correct synchronization of the butterflies is crucial for correct idle and part throttle operation of your HILBORN Injector Manifold. Videos detailing manifold adjustments are available on YouTube or our web site: [www.hilborninjection.com](http://www.hilborninjection.com). Click on Video Gallery and scroll down to view.

## HILBORN BBC EFI-R MANIFOLD INSTALLATION

Installation of this three piece manifold will require drilling and tapping of the lifter valley rails. Correct centering of the valley cover is important for distributor fitment. Two 1/4-20 x 1" long Allen head bolts are needed to complete the installation. It's advisable to mock up the vacuum kit and the fittings on the throats before final installation.

### Valley Plate Set-Up



If using an OEM block, the lifter valley rail may have the holes for end rail gasket alignment. If so, verify that the valley cover bolts holes are centered on the end rail gasket holes, and then drill and tap for the 1/4-20 x 1" long Allen bolts. Ensure they bottom out on the plate during mock up (see below for drill and tap technique). If they do not line up, see below.

On blocks without the end rail gasket holes, the exact center of each lifter valley rail will need to be measured and marked. See instructions and pictures below.

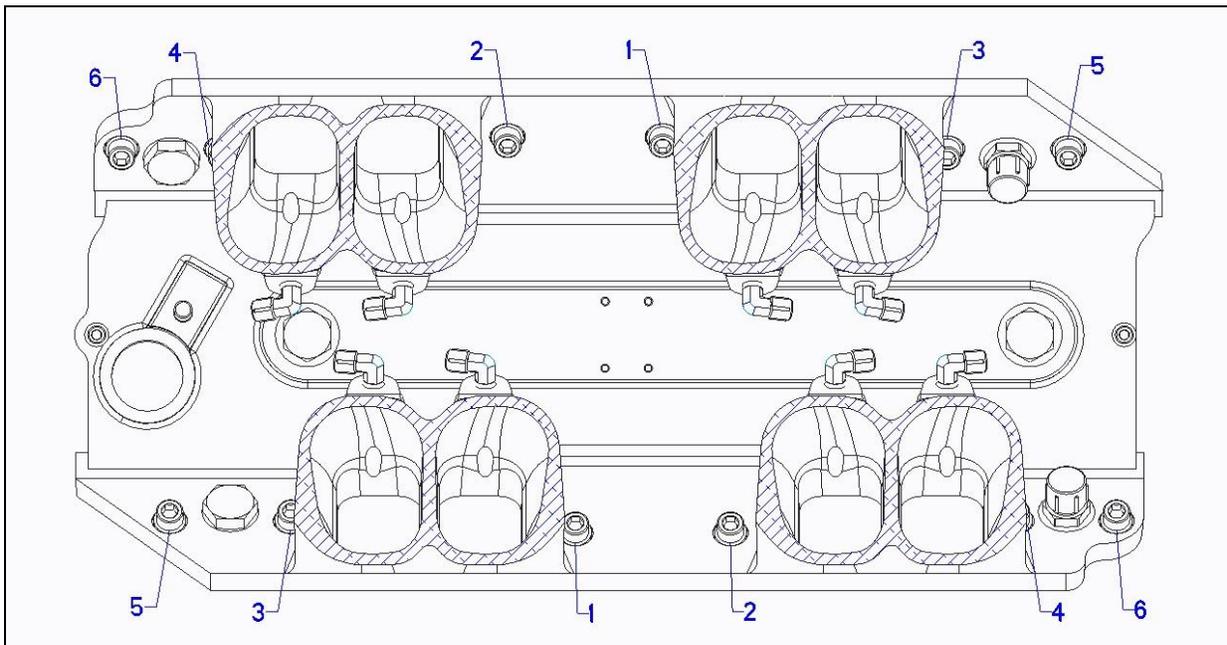
- Place tape on the valley rails and measure to find the exact center (front to rear/side to side) of each rail. Mark an (+) to indicate that exact center for each rail.
- Mock up the valley plate to ensure the bolt holes in the plate line up with the crosses marked on valley rails. If not exact, they need to be really close.
- Remove valley plate and tape off engine. Starting with the most difficult bolt, typically the rear if the engine is installed, center punch then drill and tap the rail. A simple tap block made from 1 inch aluminum will help keep the drill and tap square. (One inch thick aluminum can be sourced from supply companies such as McMaster-Carr).
- Install valley cover by screwing it down in the now completed threaded hole. Center the plate on the other cross and using a transfer punch (a transfer punch set can be purchased inexpensively at a home improvement or discount tool store), mark for the second bolt hole. Remove plate, drill, and tap like the previous hole.
- Mock up the valley cover installing the bolts and ensuring the bolts do not bottom out. Ensure the correct distributor fitment, including the oil pump drive and cam gear engagement. Consult the distributor manufacturer's directions for the correct fitment procedure. If you are not able to perform this operation, please consult a qualified engine builder.



## Manifold Installation:

As a two person job, a dry run of intake installation is recommended. A mock up installation will allow the areas for RTV to be identified and to mock up the vacuum kit on the valley cover and the 90 degree fittings on the throats. The intake bolts, vacuum block bolts, and 90 degree vacuum fitting NPT threads should be lubricated with a PTFE thread sealant.

1. Glue intake gaskets to the heads using Gasegacinch® contact adhesive. Trim the gaskets to the port openings as needed.
2. Source an Allen head or reduced-hex head bolt that allows tool access at all of injector manifold bolt locations. It is best to be able to tighten the bolts using a torque wrench and to be able to re-torque the bolts after the injector manifolds are fully installed. Lubricate the bolts with PTFE sealant and install one throat. Use silicone on the head to valley rail transition under the throat. Torque in the sequence shown below.
3. Prep the valley cover by laying a 1/4 to 5/16 inch bead of silicone on the sides only. The valley cover will touch the block so apply no more than a 1/8 bead on the front/rear of the cover. (Gluing the plate will ensure that the bead of silicone stays below the surface of the plate while providing a good seal).
4. Prep for the loose throat by applying silicone on the head and block for the lifter rail transition.
5. With one person holding the valley cover off the installed throat, centered on the engine, and angled up to accept the loose throat, the second person will slide the loose throat across the intake gasket while the valley cover is lowered at the same time. Tighten the throat down and then the valley cover.
6. Torque the bolts for both the injector manifolds in three steps – 10, 18, and 25 ft-lbs. Tighten the valley plate bolts to 130 in-lbs (11 ft-lbs).



## Installation of the Fuel Injectors and Fuel Plumbing –

The injector manifolds come with the fuel rails mounted, but no fuel injectors are installed or included with the injector manifold kit. The choice of fuel injectors is dependent on the engine combination and the fuel being used. The full range of fuel injectors available from Holley EFI are shown at [https://www.holley.com/brands/holley\\_efi/products/fuel\\_systems/fuel\\_injection/injectors/](https://www.holley.com/brands/holley_efi/products/fuel_systems/fuel_injection/injectors/). To determine which injector to use, it is best to consult with your Holley EFI dealer. The fuel rail mounting is designed to use a standard length injector similar to a Bosch style EV-1 fuel injector. Follow the steps below for the injector installation and fuel plumbing recommendations.

1. Remove the fuel rails from the injector manifolds, this is best done by removing the fasteners mounting the fuel rail brackets to the injector manifolds.
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.
4. Once the injectors are inserted into the injector manifold and the fuel rails are in position, re-install and tighten the mounting bracket fasteners. Also tighten the fasteners attaching the fuel rails to the brackets.
5. Check and make sure the injectors are floating on the O-rings. Rotate the injector back and forth to confirm that there is no load on the injector body.
6. 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, and adapter fittings with an AN-8 male flare are installed in the fuel rails.

#### **GENERAL FUEL PLUMBING RECOMMENDATIONS:**

- 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.

Go to <https://www.holley.com/brands/earls/> for fuel system plumbing components.

Go to [https://www.holley.com/brands/holley/products/fuel\\_systems/fuel\\_pumps\\_regulators\\_and\\_filters/regulators/efi\\_regulators/](https://www.holley.com/brands/holley/products/fuel_systems/fuel_pumps_regulators_and_filters/regulators/efi_regulators/) for EFI fuel pressure regulators.

#### **Installation of the Inlet Ram Tubes –**

The ram tubes will be the last components to be installed, likely after the throttle linkage and idle airflow synchronization tuning is completed. Along with the desired ram tube length, one thing to consider is the installation of the EFI air temperature sensor (ATS) which may be in a ram tube.

1. Slip the ram tubes in the inlet bores in the injector manifolds and make sure the ram tubes are fully seated in the bore. The ram tubes will need to be oriented so the flat side on the inlet flare mates with each adjacent ram tube.
2. Gently tighten the ram tube clamp screws tight enough to clamp the ram tubes in place, but not so tight as to crush the ram tube or bend/break the ears on ram tube clamp.

#### **Installation of the EFI System –**

These install instructions are an overview of the mechanical component installation for the BBC EFI-R kit. For installation of the EFI system, ECU, wiring, sensors, tuning etc., please follow the manufacturer instructions, and consult your EFI dealers and tech resources. This would also apply to the Holley EFI system included in P/N's 550-720, 555-721, and 550-722.

#### **KIT CONTENTS:**

##### **300-800 INJECTION MANIFOLD KIT:**

- ❑ 1 – LH Injection Manifold Assembly w/Fuel Rail, 2-7/16" Throttle Bores
- ❑ 1 – RH Injection Manifold Assembly w/Fuel Rail, 2-7/16" Throttle Bores
- ❑ 1 – Vacuum Plumbing Assembly, BBC EFI-R
- ❑ 1 – Remote Thermostat Housing, Polished, P/N 7134P
- ❑ 1 – Air Flow Synchrometer, P/N STEBK-HIL
- ❑ 1 – Throttle Opening Set Gauge Set, P/N H100-HIL
- ❑ 1 – Synchrometer Adapter Grommet to 3", P/N STEBK-1-HIL
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card

### **300-801 INJECTION MANIFOLD KIT:**

- ❑ 1 – LH Injection Manifold Assembly w/Fuel Rail, 2-5/8" Throttle Bores
- ❑ 1 – RH Injection Manifold Assembly w/Fuel Rail, 2-5/8" Throttle Bores
- ❑ 1 – Vacuum Plumbing Assembly, BBC EFI-R
- ❑ 1 – Remote Thermostat Housing, Polished, P/N 7134P
- ❑ 1 – Air Flow Synchrometer, P/N STEBK-HIL
- ❑ 1 – Throttle Opening Set Gauge Set, P/N H100-HIL
- ❑ 1 – Synchrometer Adapter Grommet to 3", P/N STEBK-1-HIL
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card

### **300-807 INJECTION MANIFOLD KIT:**

- ❑ 1 – LH Injection Manifold Assembly w/Fuel Rail, 3" Throttle Bores
- ❑ 1 – RH Injection Manifold Assembly w/Fuel Rail, 3" Throttle Bores
- ❑ 1 – Vacuum Plumbing Assembly., BBC EFI-R
- ❑ 1 – Remote Thermostat Housing, Polished, P/N 7134P
- ❑ 1 – Air Flow Synchrometer, P/N STEBK-HIL
- ❑ 1 – Throttle Opening Set Gauge Set, P/N H100-HIL
- ❑ 1 – Synchrometer Adapter Grommet to 3", P/N STEBK-1-HIL
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card

### **550-720 INJECTION MANIFOLD and ECU KIT:**

- ❑ 1 – 300-800 Injection Manifold Kit, 2-7/16" Throttle Bores
- ❑ 1 – 550-936 Terminator X MPFI Universal Kit

### **550-721 INJECTION MANIFOLD and ECU KIT:**

- ❑ 1 – 300-800 Injection Manifold Kit, 2-5/8" Throttle Bores
- ❑ 1 – 550-936 Terminator X MPFI Universal Kit

### **550-722 INJECTION MANIFOLD and ECU KIT:**

- ❑ 1 – 300-800 Injection Manifold Kit, 3" Throttle Bores
- ❑ 1 – 550-936 Terminator X MPFI Universal Kit

### **300-802 VALLEY COVER KIT:**

- ❑ 1 – Valley Cover Assembly, BBC Std. 9.800" Deck Height
- ❑ 1 – Hex Link Assembly, 3/16" x 3/16" x 3-1/2"
- ❑ 1 – Warranty Card

### **300-803 VALLEY COVER KIT:**

- ❑ 1 – Valley Cover Assembly, BBC Tall. 10.200" Deck Height
- ❑ 1 – Hex Link Assembly, 3/16" x 3/16" x 3-1/2"
- ❑ 1 – Warranty Card

### **300-804 RAM TUBE KIT, 3" I.D. X 6" LONG, ALUM. D-FLARE KIT:**

- ❑ 8 – Ram Tube, 3" I.D. X 6" LG, Alum. D-Flare
- ❑ 1 – Warranty Card

### **300-805 RAM TUBE KIT, 3" I.D. X 8" LONG, ALUM. D-FLARE KIT:**

- ❑ 8 – Ram Tube, 3" I.D. X 8" LG, Alum. D-Flare
- ❑ 1 – Warranty Card

### **300-806 RAM TUBE KIT, 3" I.D. X 12" LONG, ALUM. D-FLARE KIT:**

- ❑ 8 – Ram Tube, 3" I.D. X 12" LG, Alum. D-Flare
- ❑ 1 – Warranty Card

## HILBORN SERVICE PARTS AVAILABLE SEPARATELY:

2-11-HIL	O-RING, #2-011, BUNA N, 90 DURO, PKG OF 10
AT985008ERL	ADAPTER FITTING, EARLS AN-8 MALE TO 3/4-16 (AN8) O-RING PORT, BLACK
EL109-3-HIL	PIGTAIL HARNESS, HILBORN TPS
EL109A-HIL	THROTTLE POSITION SENSOR, HILBORN CW
EL708C-HIL	TPS ADAPTER KIT, HILBORN TPS MOUNT
F101-HIL	THROTTLE ARM, 5/16, BRASS, 1-3/16 LONG
F102-HIL	THROTTLE SHAFT STOP, 5/16, BRASS
F104-HIL	THROTTLE ARM, 5/16, REMOVEABLE, 1-3/16 LONG
F105-HIL	THROTTLE ARM, 5/16, REMOVABLE, MULTI LENGTH
F107-HIL	THROTTLE ARM, 5/16, STD, MULTI LENGTH
F113-HIL	THROTTLE SHAFT COUPLER, 5/16, STANDARD ROTATION
F113-R-HIL	THROTTLE SHAFT COUPLER, 5/16, REVERSE ROTATION
F538A-HIL	JUNCTION BLOCK, 8 -3AN FEMALE X 2 -6AN FEMALE
F60-0350-HIL	HEX LINK ASSY, HILBORN, 3/16 X 3/16 X 3.50" (STD DECK BBC)
F60-0400-HIL	HEX LINK ASSY, HILBORN, 3/16 X 3/16 X 4.00" (TALL DECK BBC)
F73A-HIL	ROD END BEARING, 10-32 RH X .190
F74A-HIL	ROD END BEARING, 10-32 LH X .190
H100-HIL	GAUGE SET, THROTTLE OPENING SETTING TOOL
H3AB-0825-HIL	#3 HOSE-ASSY, STRT-STRT, HILBORN, 8.25" LONG
H3AB-0875-HIL	#3 HOSE-ASSY, STRT-STRT, HILBORN, 8.75" LONG
H3AB-1000-HIL	#3 HOSE-ASSY, STRT-STRT, HILBORN, 10.00" LONG
H3AB-1075-HIL	#3 HOSE-ASSY, STRT-STRT, HILBORN, 10.75" LONG
STEBK-HIL	SYNCHROMETER, AIR FLOW, 2-7/16 TO 2-5/8
STEBK-1-HIL	GROMMET ADAPTER, SYNCHROMETER TO 3"

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**199R12112  
Revision Date: 9-17-20**