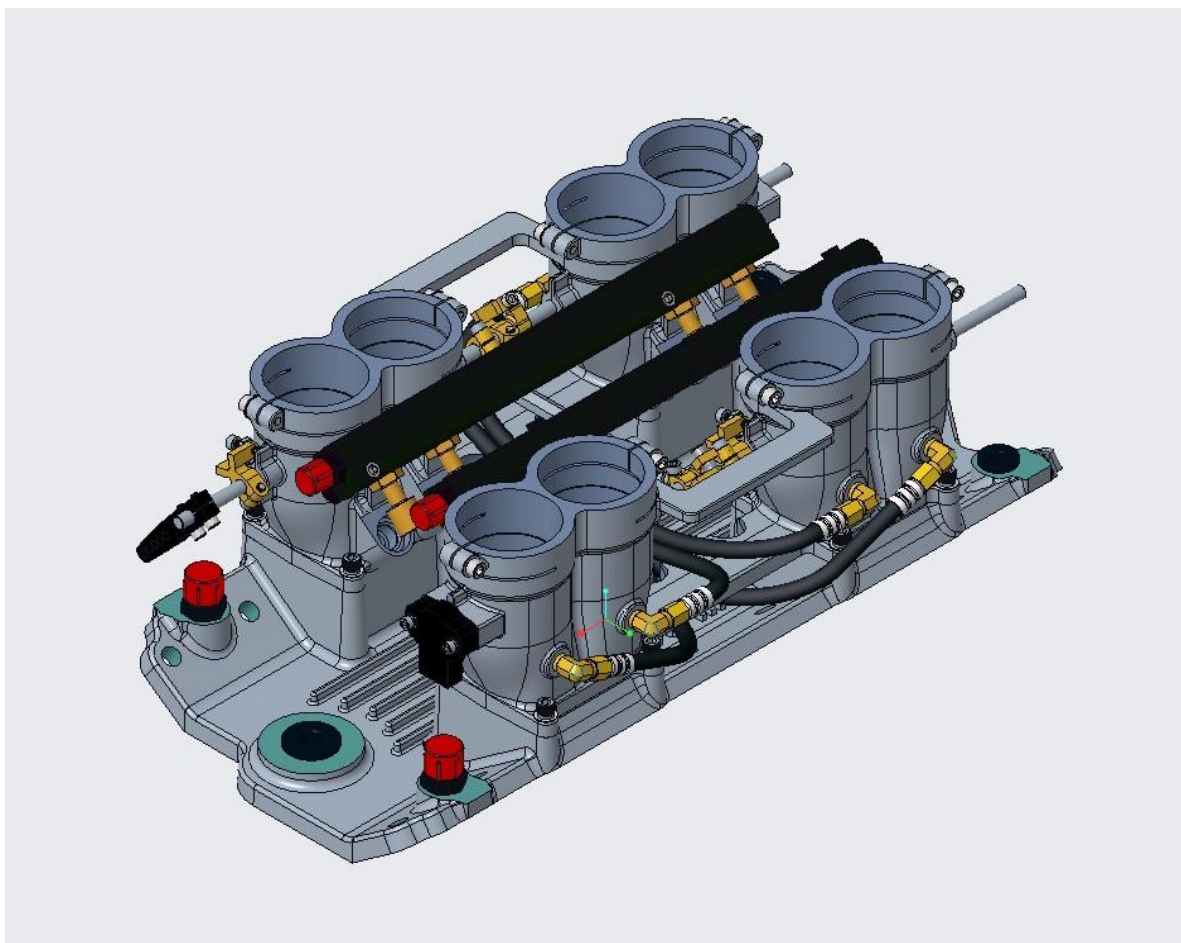




## HILBORN Small Block Chevy RAW EFI-R Injector Manifold/Electronic Fuel Injection Kits



199R12258

(Before installation, please read these instructions completely.)

Hilborn P/N	Engine Application & Induction Configuration
300-808	HILBORN Small Block Chevy RAW EFI-R Injector Manifold Kit, 2-3/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included, Coated Gray
300-809	HILBORN Small Block Chevy RAW EFI-R Injector Manifold Kit, 2-7/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included, Coated Gray
300-810	HILBORN Ram Tube Set, 2-3/16" I.D. D-Flare, Steel (silver cad. Plated), set of 8
300-811	HILBORN Ram Tube Set, 2-7/16" I.D. D-Flare, Steel (silver cad. Plated), set of 8
300-812	HILBORN Small Block Chevy RAW Base Intake Manifold, 327 (port openings profiled), Satin
300-813	HILBORN Small Block Chevy RAW Base Intake Manifold, 327 (port openings profiled), Coated Gray
300-814	HILBORN Small Block Chevy RAW Base Intake Manifold, 305 (port openings not profiled – as-cast), Satin
300-815	HILBORN Small Block Chevy RAW Base Intake Manifold, 305 (port openings not profiled – as-cast), Coated Gray
550-723	HILBORN Small Block Chevy RAW EFI-R Injector Manifold & Hilborn EFI ECU Kit, 2-3/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included
550-724	HILBORN Small Block Chevy RAW EFI-R Injector Manifold & Hilborn EFI ECU Kit, 2-7/16" Throttle Dia's; Fuel Rails, Vacuum Kit, TPS w/Connector, & Remote Coolant Thermostat Kit Included

# INSTALLATION INSTRUCTIONS

## MANIFOLD COMPONENTS:

Installed on the engine, the base manifold/injector manifold assembly is comprised of three parts, the base intake manifold, and the left and right injector manifolds. In kits 300-808, 300-809, 550-723, and 550-724, the injection manifolds are assembled to the base manifold as delivered. The base intake manifolds are also available separately. A ram tube kit will need to be purchased separately. The various P/N's are shown in the table on the first page and complete kit contents for these P/N's are listed at the end of these instructions.

## 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.

## ENGINE & CYLINDER HEAD APPLICATIONS:

Hilborn SBC EFI-R intake manifold kits are designed for a 265-400cid Small-Block Chevy Gen I engine fitted with cylinders heads using a standard intake manifold flange placement, angle, and medium sized port openings in a standard location.

## 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) – 6.88"
- Total Height with:
  - 6" Ram Tube – 11.76"
  - 8" Ram Tube – 13.76"
  - 12" Ram Tube – 15.76"
- CNC Profiled Port-Flange Opening Size – 2.10" Height x 1.25" Wide
- Injection Manifold Runner Length with:
  - 6" Ram Tube – 11.15"
  - 8" Ram Tube – 13.15"
  - 12" Ram Tube – 17.15"

## OTHER PARTS & SUPPLIES REQUIRED:

- ❑ 1 – Intake Manifold Gasket Set, Mr. Gasket P/N 102G, 2.19" x 1.31" Openings, 0.060" Thick (check the cylinder head openings to determine the best gasket size).
- ❑ 1 – Gasket Contact Adhesive, Gasgacinch P/N 440-A, 4 oz. Can.
- ❑ 12 – 3/8-16 x 1-1/8" Socket Head Capscrews or Reduced-Hex Head Bolts, for Base Intake Manifold Mounting to the Heads.
- ❑ 12 – 3/8 x .675 O.D. x .120" Thick Hardened Washers, ARP P/N 200-9556 (10-pack), for Base Intake 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 SBC injector manifolds are supplied with the throttle arm and throttle stop correctly located at the front of the right injector manifold assembly. 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 the throttle stop idle stop should be located adjacent the input throttle arm. Failure to do so WILL result in bend and twist of the throttle shafts resulting in poor idle and throttle tip-in performance.

## Cooling:

HILBORN manifolds are supplied with two -8AN 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 mounted on the base intake manifold. A -6AN 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 an IAC, or vacuum signal 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 SBC applications require a standard length small cap distributor (not HEI), such as a Holley EFI P/N 565-200. Follow instructions provided with the distributor for proper installation procedures.

## 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. Cables and 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 must 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 attaching throttle linkage to the hex link as it must be free 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 SBC RAW EFI-R MANIFOLD INSTALLATION

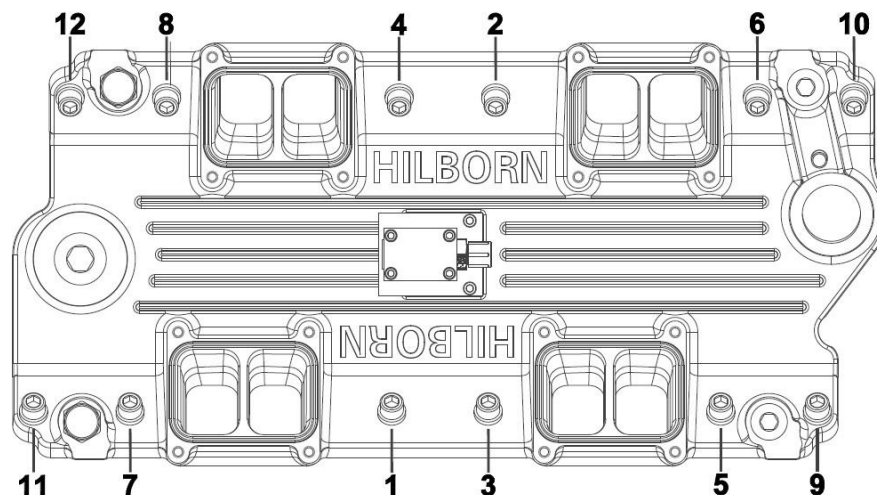
### Manifold Installation:

A dry run of the intake installation on the engine is recommended. A mock up installation will allow the areas for RTV application to be identified and give an opportunity to work out fuel & coolant plumbing along with the throttle linkage routing & mounts before final installation. 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 Gasgacinch® contact adhesive. Trim the gaskets to the cylinder head 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. After applying a 1/4 to 5/16 inch bead of RTV silicone to the engine block end seal, place the intake/injector manifold assembly in place making sure that the distributor body will insert properly through the base manifold before installing and tighten the manifold to head fasteners lightly making sure the manifold assembly is positioned properly.

3. Following the tighten sequence shown below, torque the bolts for the base manifolds in three steps – 10, 18, and 25 ft-lbs.



### BASE MANIFOLD BOLT TIGHTENING SEQUENCE

### 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 rail assemblies from the injector manifolds, this is best done by removing the two fasteners attaching the fuel rail to the brackets mounted to the injector manifolds.
2. Apply a silicone brake lubricant to the O-ring on the inlet end of fuel injectors and insert the fuel injectors into the ports in the fuel rail assembly. 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 brake lubricant to the injector outlet O-rings, and insert all four injectors into injector bosses in the opposite injector manifold applying gentle downward pressure on the fuel rail assembly.
4. Once the injectors are inserted into the injector manifold and the fuel rails are in position, re-install and tighten the fuel rail assembly fasteners.
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 9/16-18 (AN-6) O-ring port, adapter fittings with an AN-6 male flare are installed in the front end of the fuel rails, AN-6 port plugs are installed in the rear end of 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.

- Due to the position of the fuel rails in relation to the distributor, if a typical standard type distributor is used, the lack of access to the rear ends of the fuel rails does not allow plumbing to be routed in or out the rear fuel rail ports. Fuel may only be routed into the front fuel rail ports. To have access to the rear fuel rail ports a non-standard distributor that provides adequate access or a coil-on-plug ignition system to eliminate the distributor cap will need to be used.

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.

Go to [https://www.holley.com/products/fuel\\_systems/fuel\\_injection/efi\\_distributors/](https://www.holley.com/products/fuel_systems/fuel_injection/efi_distributors/) for EFI Distributors.

## 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 SBC RAW 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 Hilborn EFI system ECU included in P/N's 550-723, and 550-724.

## KIT CONTENTS:

### 300-808 EFI-R INJECTION MANIFOLD KIT, SBC RAW 2-3/16", GRAY:

- ❑ 1 – Base Manifold/Injection Manifold Assembly w/Fuel Rail & Vacuum Plumbing, 2-3/16" Throttle Bores
- ❑ 1 – Remote Thermostat Housing, Polished, P/N 7134P
- ❑ 1 – Air Flow Synchrometer, P/N STEBKM-HIL
- ❑ 1 – Throttle Opening Set Gauge Set, P/N H100-HIL
- ❑ 1 – Installation Instructions
- ❑ 1 – Warranty Card

### 550-723 INJECTION MANIFOLD and ECU KIT, SBC RAW 2-3/16", GRAY:

- ❑ 1 – 300-808 EFI-R Injection Manifold Kit, 2-3/16" Throttle Bores, Dark Gray
- ❑ 1 – 554-152H Hilborn X ECU Kit

### 300-809 EFI-R INJECTION MANIFOLD KIT, SBC RAW 2-7/16", GRAY:

- ❑ 1 – Base Manifold/Injection Manifold Assembly w/Fuel Rail & Vacuum Plumbing, 2-7/16" Throttle Bores
- ❑ 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 – Installation Instructions
- ❑ 1 – Warranty Card

### 550-724 INJECTION MANIFOLD and ECU KIT, SBC RAW 2-7/16", GRAY:

- ❑ 1 – 300-809 EFI-R Injection Manifold Kit, 2-7/16" Throttle Bores, Dark Gray
- ❑ 1 – 554-152H Hilborn X ECU Kit

### 300-810 RAM TUBE KIT, 2-3/16" D-FLARE:

- ❑ 8 – Ram Tube, 2-3/16 I.D. X 12" Long D-Flare, CAD Plated Steel

**300-811 RAM TUBE KIT, 2-7/16" D-FLARE:**

- ❑ 8 – Ram Tube, 2-7/16 I.D. X 12" Long D-Flare, CAD Plated Steel

**300-812 BASE INTAKE MANIFOLD KIT, SBC RAW, SATIN, PROFILED FLG OPENINGS:**

- ❑ 1 – Base Intake Manifold Assembly – Hilborn SBC RAW 327, Profiled Port Flange Openings, Satin
- ❑ 1 – Installation Instruction Sheet
- ❑ 1 – Warranty Card

**300-813 BASE INTAKE MANIFOLD KIT, SBC RAW, GRAY, PROFILED FLG OPENINGS:**

- ❑ 1 – Base Intake Manifold Assembly – Hilborn SBC RAW 327, Profiled Port Flange Openings, Coated Gray
- ❑ 1 – Installation Instruction Sheet
- ❑ 1 – Warranty Card

**300-814 BASE INTAKE MANIFOLD KIT, SBC RAW, SATIN, AS-CAST FLG OPENINGS:**

- ❑ 1 – Base Intake Manifold Assembly – Hilborn SBC RAW 305, As-Cast Port Flange Openings, Satin
- ❑ 1 – Installation Instruction Sheet
- ❑ 1 – Warranty Card

**300-813 BASE INTAKE MANIFOLD KIT, SBC RAW, GRAY, AS-CAST FLG OPENINGS:**

- ❑ 1 – Base Intake Manifold Assembly – Hilborn SBC RAW 305, Profiled Port Flange Openings, Coated Gray
- ❑ 1 – Installation Instruction Sheet
- ❑ 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
AT985006ERL	ADAPTER FITTING, EARLS AN-6 MALE TO 9/16-18 (AN6) O-RING PORT, BLACK
AT581308ERL	LOW PROFILE PORT PLUG, EARLS 3/4-16 (AN8) O-RING PORT, BLACK
AT581306ERL	LOW PROFILE PORT PLUG, EARLS 9/16-18 (AN6) 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, REMOVABLE, 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
F60-0513-HIL	HEX LINK ASSY, HILBORN, 3/16 X 3/16 X 5.13" (SBC RAW)
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
H3AB-300-808-HIL	#3 HOSE KIT, SBC RAW EFI-R, 2-3/16" & 2-7/16"
STEBK-HIL	SYNCHROMETER, AIR FLOW, 2-7/16" TO 2-5/8"

**Holley Technical Support**  
**1801 Russellville Road**  
**Bowling Green, KY 42101**  
**1-866-464-6553**  
[www.holley.com](http://www.holley.com)

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