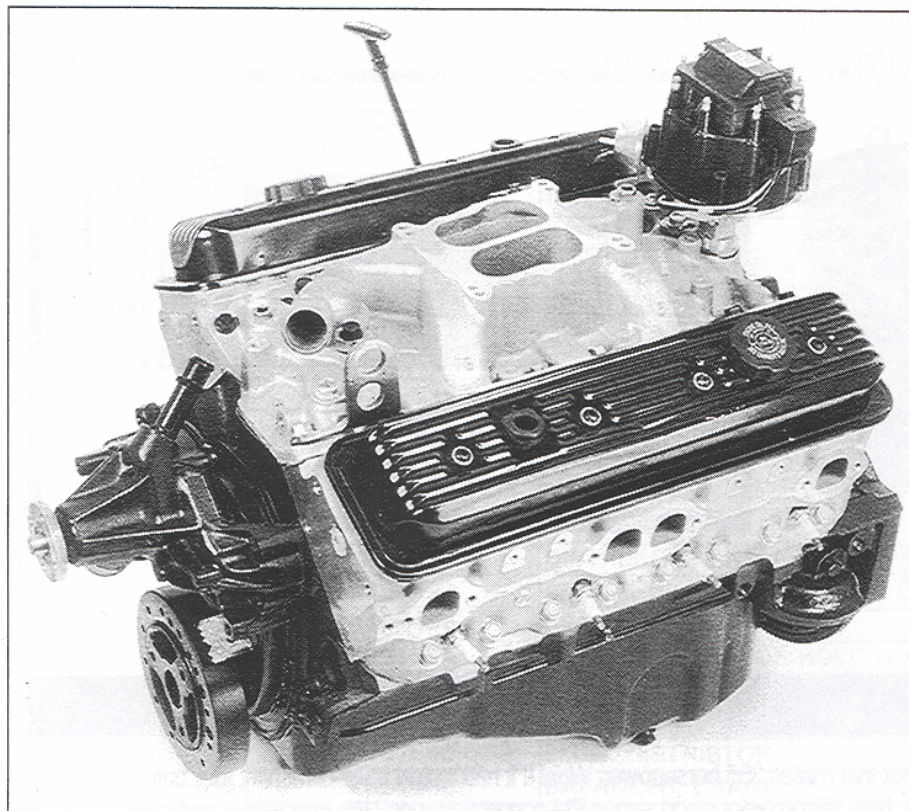


# H.O. 350

## Installation and Service Information



The H.O. 350 engine assembly is a high-performance replacement for many small-block Chevrolet V8s. Components include aluminum cylinder heads, a hydraulic roller camshaft, and a block with four-bolt main bearing caps.

This publication provides general information on components and procedures which may be useful when installing or servicing an H.O. 350 Chevrolet V8 engine assembly. Topics include installation notes, recommended accessories, parts lists, and engine specifications.

Due to the wide variety of vehicles in which H.O. 350 engines can be installed, some procedures and recommendations may not apply to specific applications.

This publication is **not** intended to replace comprehensive service manuals and parts catalogs which cover General Motors engines and components. Service manuals and other service literature are available for purchase for all current and many past model General Motors vehicles. Toll-free telephone numbers for ordering information are:

**U.S. 1-800-551-4123**  
**Canada 1-800-668-5539**

Please read this entire publication before starting work to familiarize yourself with instal-

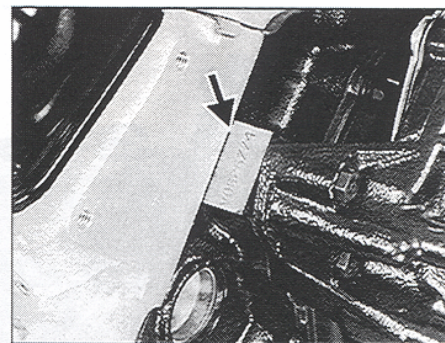
lation procedures. The information is organized by major component groups, such as "Exhaust System" and "Fuel System." Planning ahead will make it easier to complete an H.O. 350 installation successfully.

### ABOUT THE H.O. 350

The H.O. 350 Chevrolet small-block V8 engine assembly is designed to offer outstanding performance at an affordable price. The H.O. 350 is a bolt-in replacement for all 265-400ci small-block Chevrolet V8s. This fully assembled "crate motor" combines proven components with modern engine technology, including lightweight aluminum cylinder heads, high-tech valvesprings and low-friction hydraulic roller tappets.

H.O. 350 engines are assembled using brand new, premium quality components. All H.O. 350 engines are fire-tested and final balanced at the factory to ensure their quality and performance.

The H.O. 350 engine assembly is intended for emission-exempt and off-highway applica-



An H.O. 350 engine assembly can be identified by the three-letter manufacturing code stamped on the pad above the water pump. Five versions of the H.O. 350 engine assembly have been released: ZZZ, ZZ1, ZZ2, ZZ3, and ZZ4.

### Important Safety Notice

Observe all safety precautions and warnings in the applicable service manuals when installing an H.O. 350 engine assembly in any vehicle. Wear eye protection and appropriate protective clothing. Support the vehicle securely with jackstands when working under or around it. Use only the proper tools. Exercise extreme caution when working with flammable, corrosive, and hazardous liquids and materials.

Some procedures require special equipment and skills. If you do not have the appropriate training, expertise, and tools to perform any part of this conversion safely, this work should be done by a professional.

tions. However, when installed with a complete H.O. 350 Performance Package described elsewhere in this manual, the H.O. 350 meets emission requirements for all 50 states.

### H.O. 350 DEVELOPMENT

The H.O. 350 small-block V8 was introduced in 1989. The original H.O. engine was designated "ZZZ." This designation refers to the manufacturing code stamped on the serial number pad above the water pump.

The H.O. 350 engine package was subsequently revised and updated, with later versions designated "ZZ1," "ZZ2," "ZZ3," and "ZZ4." (See "H.O. 350 Evolution" chart for components used in various versions.) The ZZ4 version of the H.O. 350 is available as PN 24502609.



The ZZ4 is the most powerful version of the H.O. 350 engine assembly. The ZZ4 H.O. 350 engine produces 355 horsepower at 5250 rpm (ten more horsepower than the ZZ3 which preceded it) and 405 lb-ft of torque at 3500 rpm (a gain of 18 lb-ft of torque).

The ZZ4 has a higher compression ratio than previous versions of the H.O. 350 (10:1 vs. 9.8:1). The ZZ4 is equipped with a rolled and undercut crankshaft developed for the LT4 Corvette, lightweight LT4 valvespring retainers, and valvesprings wound from ovoid (egg-shaped) wire. The ZZ4 H.O. 350 crate motor also has a composite front cover and a degreed 8" diameter torsional damper.

The H.O. 350 engine assembly does **not** include spark plug wires, pulleys, exhaust manifolds, a starter motor, an oil filter, an oil filter adapter, a fuel pump, or external accessories. Recommendations on these components are included in this publication.

### INSTALLATION NOTES

The small-block Chevrolet V8 was introduced in 1955. Since then, General Motors has manufactured more than 65 million small-block V8 engines. During this period, there have been numerous revisions and design changes to accommodate various chassis and engine configurations.

The H.O. 350 engine assembly is manufactured on current production tooling; consequently you may encounter dissimilarities between the H.O. 350 engine assembly and previous versions of the small-block V8. In general, items such as motor mounts, accessory drives, exhaust manifolds, etc. can be transferred to an H.O. 350 engine when it is installed in a vehicle originally equipped with a small-block V8 engine. However, as noted in the following sections, there may be significant differences in the flywheel bolt pattern,

water pump, torsional damper, etc., between an H.O. 350 engine assembly and an older small-block V8 engine. These differences may require modifications or additional components not included with the H.O. 350 engine.

When installing an H.O. 350 engine assembly in a vehicle not originally equipped with a small-block V8 engine, it may necessary to adapt or fabricate various components for the cooling, fuel, electrical, and exhaust systems.

### H.O. 350 ENGINE SPECIFICATIONS

<b>Part Number:</b>	24502609 ("ZZ4")
<b>Displacement:</b>	5.7-liters (350 cubic inches)
<b>Horsepower:</b>	355 @ 5,250 rpm
<b>Torque:</b>	405 lb-ft @ 3,500 rpm
<b>Bore/Stroke:</b>	4.00" x 3.48"
<b>Compression Ratio:</b>	10:1
<b>Engine Block:</b>	Cast iron with four-bolt intermediate main bearing caps (PN 10105123)
<b>Crankshaft:</b>	Nodular iron LT4 Corvette with rolled fillets (PN 12551485)
<b>Connecting Rods:</b>	Forged powdered metal (PN 10108688)
<b>Pistons:</b>	Cast aluminum with offset pins (PN 10159436)
<b>Camshaft:</b>	Hydraulic roller tappet (PN 10185071)
<b>Valve Lift (Intake/Exhaust):</b>	.474"/.510"
<b>Duration (Intake/Exhaust):</b>	208°/221° @ .050" tappet lift
<b>Cylinder Heads:</b>	Cast aluminum (PN 12556463)
<b>Valve Diameter (Intake/Exhaust):</b>	1.94"/1.50"
<b>Valve Springs:</b>	Ovoid wire, single coil (PN 12551483)
<b>Rocker Arm Ratio:</b>	1.5:1
<b>Distributor:</b>	High Energy Ignition with centrifugal and vacuum advance (PN 1104067)
<b>Spark Plugs:</b>	AC MR43LTS (.035"-.040" gap)
<b>Spark Timing:</b>	10° BTDC @650 rpm with vacuum advance disconnected and plugged
<b>Max. Engine Speed:</b>	5800 rpm
<b>Fuel Requirement:</b>	Premium unleaded 92 octane (R+M/2)

### LEGAL AND EMISSIONS INFORMATION

This publication is intended to provide information about the H.O. 350 engine assembly and related components. This manual also describes procedures and modifications that may be useful during the installation of an H.O. 350 engine assembly. It is not intended to replace comprehensive service manuals and parts catalogs which cover Chevrolet engines and components. Rather, it is designed to provide supplemental information in areas of interest to knowledgeable "do-it-yourself" enthusiasts and mechanics.

This publication pertains to engines and vehicles which are used off the public highways except where specifically noted otherwise. Federal law restricts the removal or modification of any part of a federally required emission control system on motor vehicles. Further, many states have enacted laws which prohibit tampering with or modifying any required emission or noise control system. Vehicles which are not operated on

public highways are generally exempt from most regulations, as are some special interest and pre-emission vehicles. The reader is strongly urged to check all applicable local and state laws.

Many of the parts described or listed in this manual are merchandised for off-highway application only, and are tagged with the "Special Parts Notice" reproduced here:

#### SPECIAL PARTS NOTICE

This part has been specifically designed for Off-Highway application only. Since the installation of this part may either impair your vehicle's emission control performance or be uncertified under current Motor Vehicle Safety Standards, it should not be installed in a vehicle used on any street or highway. Additionally, any such application could adversely affect the warranty coverage of such an on-street or highway vehicle.

The information contained in this publication is subject to change. General Motors also reserves the right to make changes at any time, without notice, in equipment, manufacturers, specifications, and materials, or to discontinue items.

The information in this publication is presented without any warranty. All the risk for its use is entirely assumed by the user. Specific component design, mechanical procedures, and the qualifications of individual readers are beyond the control of the publisher, and therefore the publisher disclaims all liability incurred in connection with the use of information contained in this publication.

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## FLYWHEEL/FLEXPLATE

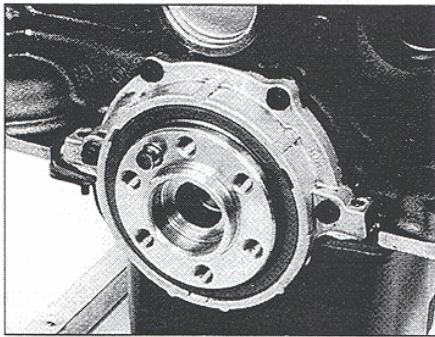
Like all Chevrolet small-block V8 engines produced since 1986, the H.O. 350 engine has a 3.00" diameter flywheel flange bolt pattern. Small-block V8 engines produced from 1955 through 1985 had a 3.58" diameter flywheel flange bolt pattern. This change in the bolt circle diameter was made to accommodate a leak-resistant one-piece rear main seal. Due to revisions in the crankshaft de-

sign, an H.O. 350 engine must have a counterbalanced flywheel (or flexplate) for proper engine balance.

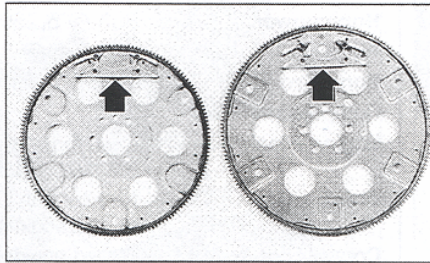
The H.O. 350 engine assembly includes a 12 $\frac{3}{4}$ " diameter automatic transmission flexplate (PN 14088765) with the correct counterweight. If you are installing an H.O. 350 engine with a manual transmission or a 14" diameter flexplate, select one of the flywheels

or flywheels listed in the accompanying chart. These flywheels and flexplates have the correct bolt pattern and counterweight for H.O. 350 engine installations.

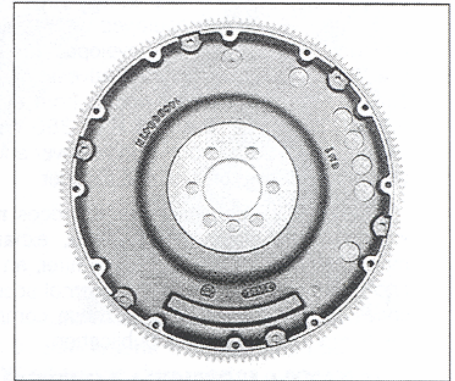
Use flywheel bolt PN 839756 (6 required) or flexplate bolt PN 3727207 (6 required).



The H.O. 350 engine assembly has a one-piece rear crankshaft seal and 3.00" diameter flywheel flange bolt pattern.



The H.O. 350 is externally balanced, and requires a flywheel or flexplate with a counterweight. A 12 $\frac{3}{4}$ " diameter flexplate (PN 14088765—left) is included with the assembly; two 14" diameter flexplates are available (see chart).

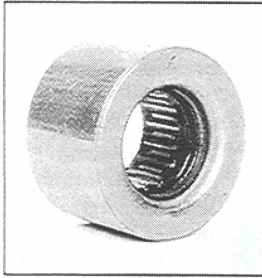


A lightweight nodular iron flywheel (PN 14088646) with a 3.00" bolt pattern and the correct counterweight is available for the H.O. 350 engine assembly.

### H.O. 350 EVOLUTION

	ZZZ	ZZ1	ZZ2	ZZ3	ZZ4
Part No.	10134338	10185025	10185025	10185072	24502609
Year Introduced	1989	1991	1992	1993	1996
Horsepower	345	345	345	345	355
Torque	387	387	387	387	405
Compression Ratio	9.8:1	9.8:1	9.8:1	9.8:1	10.0:1
Piston Pins	No offset	Offset	Offset	Offset	Offset
Camshaft	Single pattern, 235/235° .480"/.480" lift	Same as ZZZ	Same as ZZZ	Dual pattern, 208/221° .474"/.510" lift	Same as ZZ3
Timing Chain	Single roller, $\frac{1}{2}$ " pitch	Butt link	Butt link	Single roller, $\frac{1}{2}$ " pitch	Single roller, $\frac{1}{2}$ " pitch
Cylinder Head	10185087	Same as ZZZ	Same as ZZZ	Same as ZZZ	12556463
Valvetrain	Chrome silicon springs, 85 lbs. seat pressure	Same as ZZZ	Same as ZZZ	Same as ZZZ with reduced mass retainers, exhaust valve stem seals	LT4 lightweight retainers, ovoid springs, 100 lbs. seat pressure
Pushrod Guideplates	Non-hardened	Same as ZZZ	Same as ZZZ	Same as ZZZ	No guideplates
Rocker Covers	Silver stamped steel	Same as ZZZ	Black stamped steel, revised PCV location	Same as ZZ2	Same as ZZ2
Intake Manifold	Dual-plane, high-rise Holley 4-bbl., 4.5" overall height	Same as ZZZ with oil filler hole revision	Same as ZZ1 with accessory bracket mounts	Dual-plane, high-rise with dual pattern carb flange for Holley and Q-Jet, EGR, 4.0" overall height	Same as ZZ3
Connecting Rods	1053 Forged steel "pink"	Same as ZZZ	Same as ZZZ	Same as ZZZ (some forged PM)	Forged powdered metal
Crankshaft	1053 Forged steel	Same as ZZZ	Same as ZZZ	Same as ZZZ	LT4 nodular iron with rolled fillets
Front Cover	Stamped steel, 10 bolts, bolt-on timing tab	Same as ZZZ	Same as ZZZ	Same as ZZZ	Composite, 8 bolts, integral pointer
Torsional Damper	6.75" diameter	Same as ZZZ	Same as ZZZ	8" diameter	8" diameter, degreed





A roller pilot bearing (PN 14061685) is recommended for manual transmission applications.

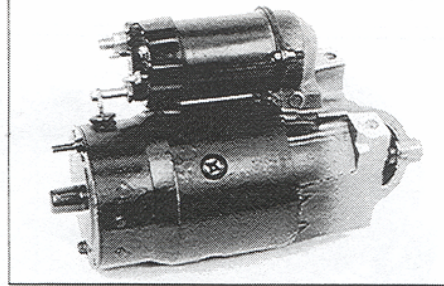
**Pilot Bearing.** You must install a pilot bearing in the rear of the crankshaft if the H.O. 350 engine will be used with a manual transmission. The pilot bearing aligns the transmission input shaft with the crankshaft centerline. A worn or misaligned pilot bearing can cause shifting problems and rapid clutch wear.

A roller pilot bearing (PN 14061685) is recommended for H.O. 350 engines. This heavy-duty bearing adds an extra margin of reliability to a high-performance drivetrain.

### STARTER

The starter must be matched to the flywheel (or flexplate) diameter when installing an H.O. 350 engine assembly. Flywheels with two different diameters are used with Chevrolet small-block V8 engines. Small diameter flywheels are 12 $\frac{3}{4}$ " in diameter, and have starter ring gears with 153 teeth. Large flywheels are 14" in diameter, and have 168 teeth on their starter ring gear.

This difference in flywheel diameters requires two different starter housings. Starter noses used with 14" diameter flywheels have two offset bolt holes; starters used with 12 $\frac{3}{4}$ " flywheels have bolt holes that are straight across from each other. Note that Chevrolet starter motors use special shouldered mounting bolts which register the starter on the block.



Heavy-duty starters are available for both 12 $\frac{3}{4}$ " and 14" diameter flywheels.

The following starters can be used with H.O. 350 engine assemblies:

- 10496870** Starter, remanufactured heavy-duty, for 12 $\frac{3}{4}$ " diameter flywheel/flexplate
- 1876552** Starter, heavy-duty, for 14" diameter flywheel/flexplate
- 14097278** Bolt, starter mounting, long (3 $\frac{3}{8}$ -16 x 4 $\frac{23}{64}$ "), for heavy-duty starter
- 14097279** Bolt, starter mounting, short (3 $\frac{3}{8}$ -16 x 1 $\frac{27}{32}$ " ), for heavy-duty starter
- 10465293** Starter, remanufactured permanent magnet gear reduction (PMGR), for 12 $\frac{3}{4}$ " diameter flywheel/flexplate (10 lb.)
- 9000852** Starter, permanent magnet gear reduction (PMGR), for 14" diameter flywheel/flexplate (10 lb.)
- 14037733** Bolt, starter mounting, inner, for 12 $\frac{3}{4}$ " PMGR starter (3 $\frac{3}{8}$ -16 x 1.33"), inner
- 12338064** Bolt, starter mounting, outer, for 12 $\frac{3}{4}$ " PMGR starter (3 $\frac{3}{8}$ -16 x 4.33"); also for 14" PMGR starter (2 req.)

### LUBRICATION SYSTEM

**Oil.** The H.O. 350's oil capacity is approximately five quarts—four in the oil pan and one in the filter (depending on filter size). Fill the pan to the "Full" indicator on the dipstick, and recheck the oil level regularly.

A 10W-30 petroleum or 5W30 synthetic oil is suitable for most operating conditions. Operation in extreme heat or cold may require oil with higher or lower viscosity respectively.



The H.O. 350 engine does not include an oil filter or oil filter adapter. A large spin-on filter should be installed if there is adequate clearance.

**Oil Filter.** The H.O. 350 engine assembly does not include an oil filter adapter or oil filter element. The following long-style oil filter and adapter are recommended if there is sufficient chassis clearance:

- 3952301** Oil filter adapter, spin-on
- 3951644** Bolt, oil filter adapter (2 req.)
- AC PF35L** Filter, spin-on, long style, synthetic element

### H.O. 350 MANUAL TRANSMISSION FLYWHEELS

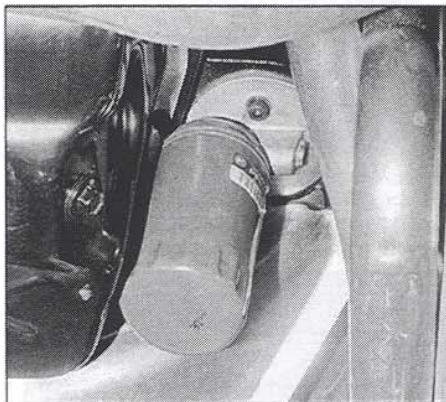
Part Number	Outside Diameter	Year	Crank Flange Bolt Pattern	Clutch Diameter	Starter Ring Gear Teeth	Notes
10105832	14"	1986 up	3.00"	11.0, 11.85"	168	For one-piece crank seal.
14088646	12 $\frac{3}{4}$ "	1986 up	3.00"	10.4, 11.0"	153	Lightweight nodular iron flywheel; weighs approximately 15 lbs.; for one-piece crank seal.
14088650	12 $\frac{3}{4}$ "	1986 up	3.00"	10.4"	153	Standard weight flywheel for one-piece crank seal.

### H.O. 350 AUTOMATIC TRANSMISSION FLEXPLATES

Part Number	Outside Diameter	Year	Crank Flange Bolt Pattern	Converter Bolt Pattern*	Starter Ring Gear Teeth	Notes
14088765	12 $\frac{3}{4}$ "	1986 up	3.00"	10.75"	153	For one-piece crank seal; used with H.O. 350 engine.
14088767	14"	1986 up	3.00"	11.50"	168	Heavy-duty flexplate with increased thickness for one-piece crank seal.
14088761	14"	1986 up	3.00"	10.75, 11.50"	168	For one-piece crank seal.

\*NOTE: Torque converters for TH350 and TH400 transmissions are produced with both 10.75" and 11.50" diameter converter bolt patterns. To identify the correct pattern, measure from the converter center to an attaching bolt hole and then multiply this dimension by 2.

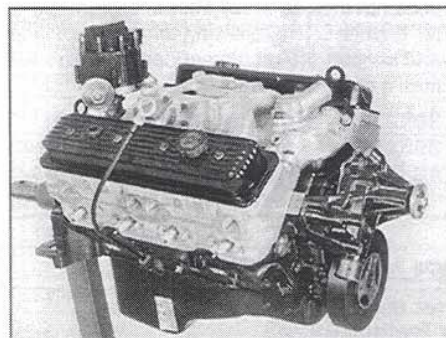




An offset oil filter adapter will provide additional clearance for exhaust systems and chassis components.

**Offset Oil Filter Adapter.** An offset oil filter adapter can be installed to provide additional clearance for headers, clutch linkage, and suspension components. This offset oil filter adapter uses a small diameter spin-on filter element.

- |                 |                                     |
|-----------------|-------------------------------------|
| <b>12556204</b> | Oil filter adapter, offset          |
| <b>12551589</b> | Gasket, oil filter adapter          |
| <b>10244495</b> | Seal, oil filter adapter            |
| <b>120392</b>   | Washer, oil filter adapter (2 req.) |
| <b>14092398</b> | Bolt, oil filter adapter (2 req.)   |
| <b>AC PF52</b>  | Filter, spin-on, small diameter     |

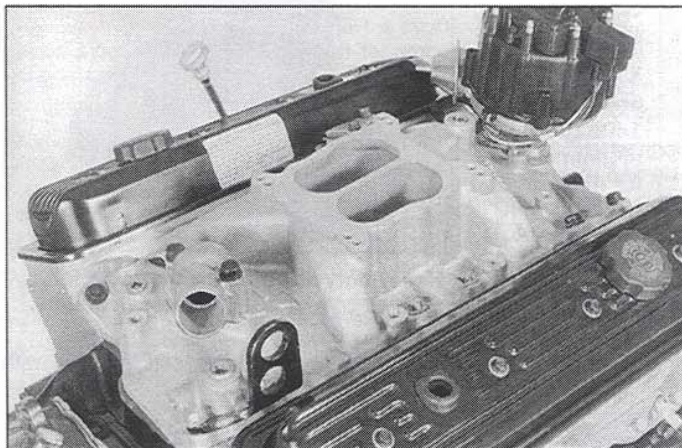


The ZZ4 version of the H.O. 350 has a right-hand dipstick tube that bolts to the block below the deck surface.

**Oil Dipstick.** The oil dipstick for an H.O. 350 engine is on the right-hand (passenger) side of the block. Check for clearance when replacing an early-model block with a left-hand dipstick.

The oil dipstick tube supplied with the ZZ4 version of the H.O. 350 bolts to the engine block below the deck surface. This tube and dipstick are recommended for use with header-type exhaust systems.

Previous versions of the H.O. 350 used a dipstick tube that attached to the exhaust manifold; this tube may not be compatible with some exhaust headers. A ZZ4 dipstick tube (PN 12551154) and dipstick (PN 12551144) can be installed on earlier H.O. 350 engines equipped with headers.

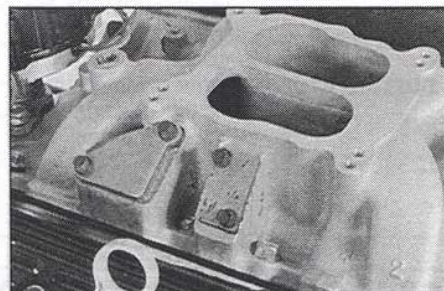


The dual-plane aluminum intake manifold installed on ZZ3-ZZ4 H.O. 350 engines has a dual-pattern carburetor mounting pad for standard-flange Holley and spread-bore Quadrajet carburetors.

## INDUCTION SYSTEM

The H.O. 350 engine assembly is equipped with a low-profile dual-plane aluminum intake manifold (PN 10185063). This manifold produces horsepower that is equivalent to the high-rise intake manifold used on ZZ3-ZZ2 engines, but provides approximately  $\frac{1}{2}$ " more hood clearance.

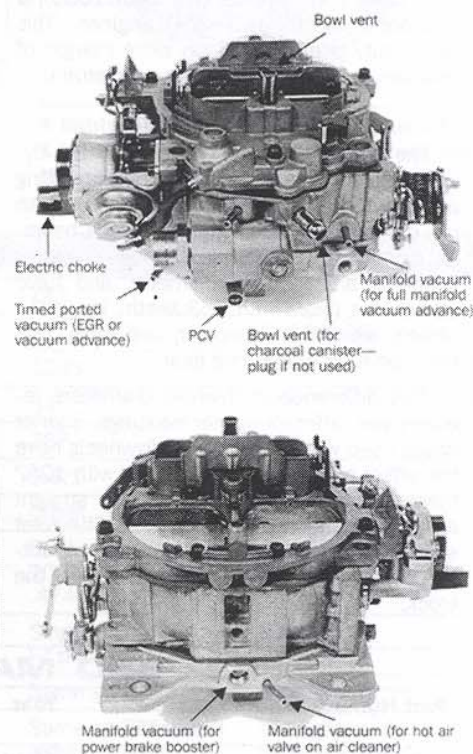
The H.O. 350 intake manifold has a dual-pattern carburetor mounting pad that accommodates both standard-flange Holley and spread-bore Quadrajet four-barrel carburetors. The H.O. 350 intake manifold has bosses for most late-model accessory brackets.



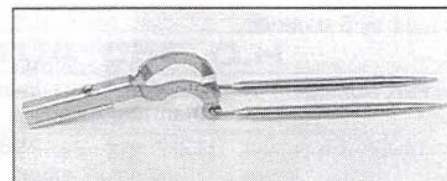
**EGR and Choke.** The H.O. 350's intake manifold has provisions for an exhaust gas recirculation (EGR) valve and a hot air choke. Block-off plates are installed on the EGR and choke mounts because the H.O. aluminum cylinder heads do not have heat riser passages to supply exhaust gas to the manifold. A manual or electric choke is recommended for street-driven engines.

**Quadrajet Carburetor.** The recommended Quadrajet carburetor for H.O. 350 engines is PN 17066422. This service replacement carburetor has adjustable idle mixture screws and an electric choke. Secondary metering rods should be changed to AH (PN 7033812). Use wiring harness PN 12085480 to connect the electric choke. Vacuum line connections for the Quadrajet carburetor are shown in the accompanying photographs.

Quadrajet carburetors require special mounting bolts. Use PN 9419047 (front—2 required) and PN 9440181 (rear—2 required).



Quadrajet carburetor PN 17066422 is recommended for the H.O. 350 engine assembly. Unused vacuum ports should be plugged.



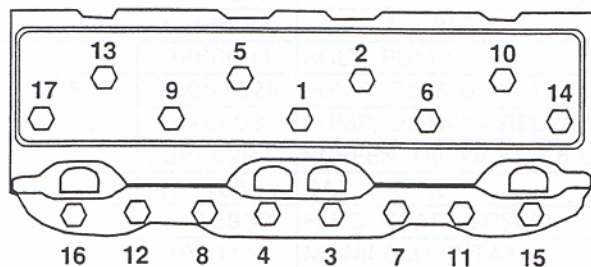
Calibrate the recommended Quadrajet carburetor for the H.O. 350 engine assembly by installing "AH" secondary metering rods (PN 7033812).





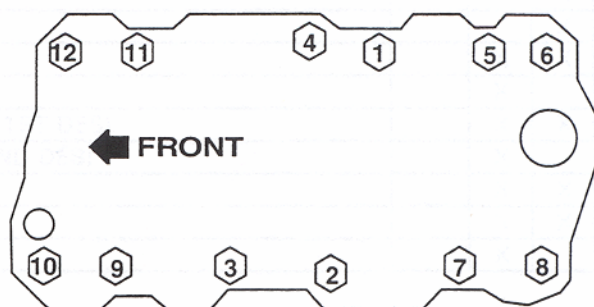
## H.O. 350 TORQUE SPECIFICATIONS

Camshaft Retainer Bolt/Screw	106 in.-lbs.
Camshaft Sprocket Bolt/Screw	18 ft.-lbs.
Connecting Rod Nut	.006" bolt stretch preferred 20 ft.-lbs. + additional 55° (45 ft.-lbs. if no angle gauge available)
Crankshaft Balancer Bolt/Screw	63 ft.-lbs.
Crankshaft Balancer Pulley	35 ft.-lbs.
Crankshaft Bearing Cap Bolt/Screw and Stud	Inner: 70 ft.-lbs. Outer: 65 ft.-lbs.
Crankshaft Rear Oil Seal Housing Nut/Bolt/Screw	11 ft.-lbs.
Cylinder Head Bolt/Screw	65 ft.-lbs.
Distributor Bolt/Screw	25 ft.-lbs.
Drain Plug	15 in.-lbs.
Engine Block Oil Gallery Plug	15 ft.-lbs.
Engine Front Cover Bolt/Screw	97 in.-lbs.
Exhaust Manifold Stud and Bolt/Screw	26 ft.-lbs.
Flywheel Bolt/Screw	65-70 ft.-lbs.
Front Cover	10 ft.-lbs.
Intake Manifold Bolt/Screw and Stud	
First Pass	15 ft.-lbs.
Final Pass	35 ft.-lbs.
Oil Filter Adapter Bolt/Screw	17 ft.-lbs.
Oil Level Indicator Tube Bolt/Screw	106 in.-lbs.
Oil Pan Assembly	
Corner Nut/Bolt/Screw	15 ft.-lbs.
Side Rail Bolt/Screw	97 in.-lbs.
Oil Pan Baffle Nut	30 ft.-lbs.
Oil Pan Drain Plug	15 ft.-lbs.
Oil Pump Bolt/Screw-to-Rear Crankshaft Bearing Cap	66 ft.-lbs.
Oil Pump Cover Bolt/Screw	80 in.-lbs.
Spark Plug	15 ft.-lbs. (tapered seat)
Starter Motor Bolt/Screw	35 ft.-lbs.
Valve Lifter Guide Retainer Bolt/Screw	18 ft.-lbs.
Valve Rocker Arm Ball Stud	50 ft.-lbs.
Valve Rocker Arm Cover Bolt/Screw	106 in.-lbs.
Water Pump Bolt/Screw and Stud	30 ft.-lbs.



← FRONT

CYLINDER HEAD TORQUE PATTERN

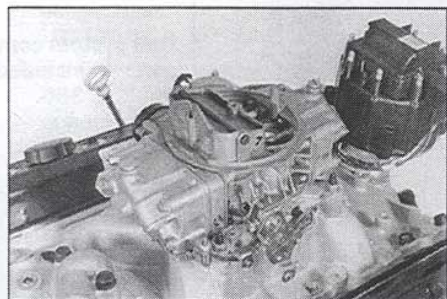


← FRONT

INTAKE MANIFOLD TORQUE PATTERN

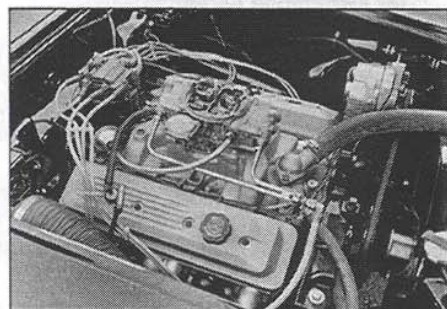


**Holley Carburetor.** A 750 cfm Holley four-barrel carburetor with either mechanical or vacuum-operated secondaries is recommended for the H.O. 350 engine assembly. A Holley "double-pumper" (PN 0-4779) is a good choice for applications which require a mechanically operated secondaries. Holley PN 0-3310 is recommended for applications which require vacuum-operated secondaries. The stock jetting in both Holley carburetors is suitable for use with an H.O. 350 engine.



A Holley 750 cfm four-barrel with either mechanical or vacuum-operated secondaries will perform well on an H.O. 350 engine with stock jetting.

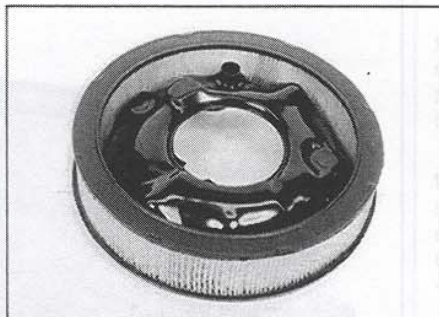
The recommended Holley carburetors have manual chokes. To convert to an electric choke, use Holley PN 45-223 (for 0-3310 vacuum secondary) or Holley PN 45-224 (for 0-4779 mechanical secondary). Do not use a hot air choke; the H.O. 350 cylinder heads do not have heat riser passages, and will not supply exhaust heat to the choke stove.



This H.O. 350 installation in a 1959 Corvette illustrates PCV and vacuum line routing with a Holley carburetor. Late-model Corvette valve covers and a water pump with short mounting legs were added by the owner.

Throttle linkages are specific to each installation. A TV throttle cable kickdown bracket that mounts to the two rear bolts on a Quadrajet carburetor is available as PN 22504927. A throttle/transmission kickdown cable bracket for TH-700R4 transmissions is available as Holley PN 20-95.

When installing the throttle linkage, check that the carburetor blades open completely at wide open throttle (WOT). Make sure that the linkage does not bind or stick, and use dual throttle return springs to ensure that the throttle closes completely.

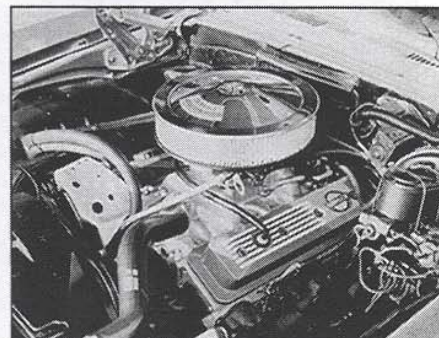


A painted steel open-element L88 air cleaner with a chrome-plated lid (PN 6423907) can be used with a Holley or Quadrajet four-barrel carburetor.

**Air Cleaner.** A foam or paper element low-restriction air cleaner element should be used to protect the engine from excessive wear and to diffuse the air entering the carburetor. The fuel mixture distribution can be upset if no diffuser is used, causing poor power and misfiring at high engine speeds. Always check for adequate hood clearance when installing a new air cleaner.

Two 14" diameter open-element chromed air cleaner assemblies for single four-barrel carburetors are available from GM Performance Parts. PN 12340279 has a plain top, and PN 12342071 has a Chevrolet logo. These air cleaners require a minimum of 3 3/4" clearance from the top of the carburetor gasket pad to the underside of the hood.

Both of these air cleaner assemblies are supplied with a 3" tall filter element (PN 6421746, AC #A212CW). A taller 4" element is available as PN 8997189 (AC #A697C).



Two 14" diameter open-element air cleaner assemblies are available from GM Performance Parts. Check for adequate hood clearance before installing a new air cleaner.

1983-86 Camaros equipped with 305ci L69 engines had dual snorkel air cleaners with cold air ducts as original equipment. This "ram air" system improves performance by supplying cool outside air to the carburetor. The L69 air cleaner assembly can be adapted to other vehicles equipped with Quadrajet carburetors for improved off-highway performance.

The components of the L69 cold air intake package are:

<b>25043641</b>	Air cleaner assembly
<b>14070917</b>	Left-hand duct
<b>14070918</b>	Right-hand duct
<b>14073299</b>	Left-hand hose
<b>14083990</b>	Right-hand hose
<b>14088760</b>	Stud
<b>14075681</b>	Wing nut
<b>469506</b>	Hot air tube
<b>3970070</b>	Fresh air elbow



A dual-snorkel air cleaner assembly from a 1983-86 L69 Camaro can be adapted to other vehicles for improved off-highway performance with a Quadrajet-equipped H.O. 350 engine.

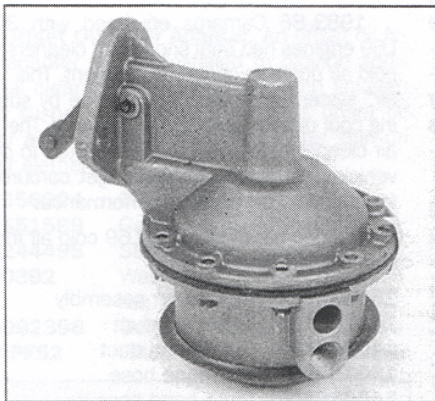


## FUEL SYSTEM

The H.O. 350 engine assembly does not include a fuel pump. The fuel system must be capable of supplying adequate fuel volume at a minimum of 6 psi pressure when the engine is operating at wide open throttle (WOT).

**Fuel Pump Block-off.** The ZZ4 version of the H.O. 350 does not have a block-off plate for the mechanical fuel pump boss. If you are using an electric fuel pump, you must seal the mechanical fuel pump opening with the following parts:

<b>14094069</b>	Cover, fuel pump opening
<b>12551502</b>	Gasket, fuel pump plate
<b>9442963</b>	Bolt, fuel pump plate, upper (2 req.)
<b>9440033</b>	Bolt, fuel pump plate, lower (2 req.)



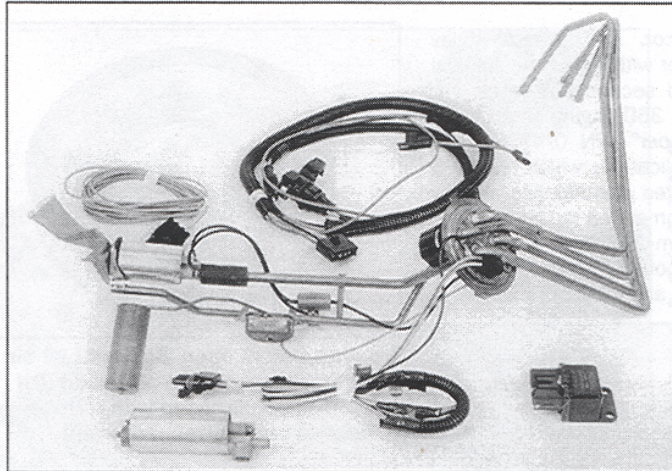
The H.O. 350 engine assembly does not include a fuel pump; heavy-duty mechanical fuel pump PN 6415325 is recommended for H.O. 350 engines.

**Mechanical Fuel Pump.** A heavy-duty mechanical fuel pump is available for H.O. 350 engines as PN 6415325. This high-capacity pump has a removable lower housing that can be rotated to position the inlet and outlet fittings as required by the chassis and plumbing. The following parts are required to install a mechanical fuel pump on an H.O. 350 engine:

<b>3704817</b>	Pushrod, fuel pump
<b>3719599</b>	Plate, fuel pump mounting
<b>10114141</b>	Gasket, fuel pump
<b>14081295</b>	Bolts, fuel pump
<b>12551502</b>	Gasket, fuel pump plate
<b>9440033</b>	Bolt, fuel pump plate, lower (2 req.)

**Electric Fuel Pump.** A high-volume electric fuel pump can be used instead of a mechanical fuel pump. An in-tank electric pump is recommended for use with the H.O. 350 engine. This pump, which is included with the H.O. 350 Performance Package described elsewhere in this publication, produces 14 psi pressure, and has a built-in check valve to prevent reverse flow.

If you are converting a late-model vehicle that was originally equipped with an in-tank



Fuel system components included in the H.O. 350 Performance Package.

fuel pump, it may be possible to replace the original pump with the high-volume pump specified above. If you are converting a vehicle that was originally equipped with a mechanical (engine-mounted) fuel pump, you must install in-tank fuel pump components. Refer to the instructions included for installation procedures.

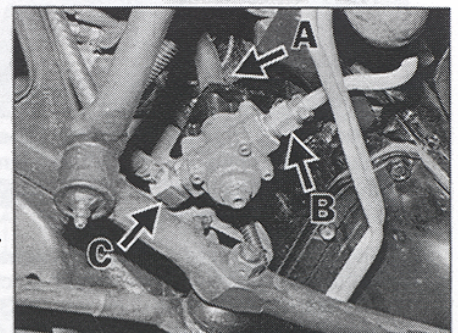
The high-volume in-tank electric fuel pump specified above must be used with a fuel pressure regulator when used with a carburetor. A fuel pressure regulator (PN 10185094) included with the H.O. 350 Performance Package can be used to reduce the 14 psi fuel pressure produced by the in-tank electric fuel pump to 6 psi at the carburetor needle and seat.

The following electric fuel pump components are included in the H.O. 350 Performance Package for 1984-97 Camaros and Firebirds; they may be adaptable to custom installations.

<b>25027221</b>	Fuel sender
<b>25166252</b>	Fuel pump, in-tank, high volume
<b>25055458</b>	Strainer, fuel pump
<b>10201491</b>	Oil Pressure Switch
<b>14089936</b>	Relay, Fuel Pump
<b>14078987</b>	Fitting, Oil Switch
<b>14078988</b>	Fitting, Oil Switch
<b>10185080</b>	Hose Assembly
<b>10185094</b>	Regulator, fuel pressure
<b>10185069</b>	Bracket, fuel pressure regulator
<b>9432267</b>	Fitting, outlet, $\frac{3}{8}$ " NPT to $\frac{3}{8}$ " inverted flare
<b>10185093</b>	Fitting, return
<b>10185096</b>	Fitting, $\frac{3}{8}$ " NPT to $\frac{3}{8}$ " hose

The following fuel regulator installation notes apply specifically to 1984-87 Camaros and Firebirds (installation in other vehicles may require additional or alternative procedures):

Attach the regulator mounting bracket to the H.O. 350 engine's mechanical fuel pump block-off plate using the original fasteners. Mount the regulator beneath the bracket with the screws supplied.



A fuel pressure regulator (PN 10185094) must be used to reduce the fuel pressure produced by an in-tank electric fuel pump to 6 psi at the carburetor. See text for installation notes.

Install a  $\frac{3}{8}$ " NPT x  $\frac{3}{8}$ " hose fitting (PN 10185096) in the regulator inlet (arrow A). Connect this fitting to the fuel tank line with  $\frac{3}{8}$ " fuel hose included with the in-tank electric fuel pump kit.

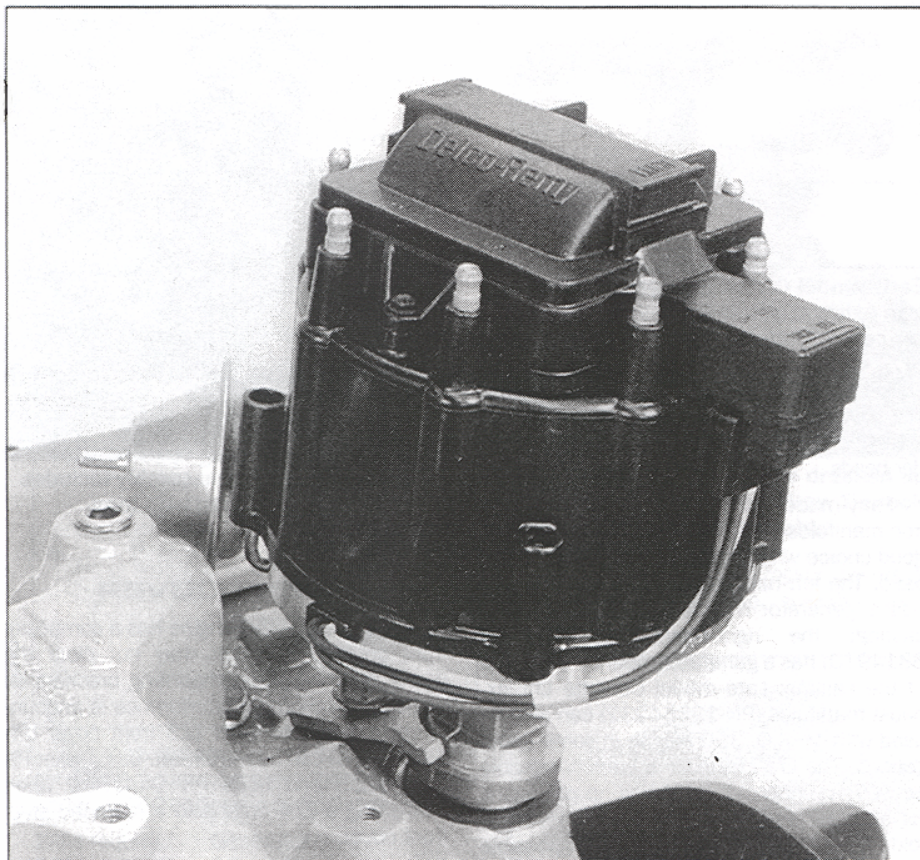
Install a  $\frac{3}{8}$ " NPT x  $\frac{3}{8}$ " inverted flare fitting (PN 9432267) in the front regulator outlet (arrow B). Connect this fitting to the original steel fuel line that feeds the carburetor.

Install a  $\frac{3}{8}$ " NPT x  $\frac{1}{4}$ " hose fitting (PN 10185093) to the rear regulator outlet (arrow C). Connect this fitting to the fuel return line. **Note:** Use only the  $\frac{3}{8}$ " NPT x  $\frac{1}{4}$ " fitting specified. It has a .042" restriction which is critical to the proper operation of the fuel system.

Refer to the instruction sheet included with the fuel pressure regulator for fuel pressure adjustment procedures. Set the fuel pressure with the engine hot and idling at 6 psi.

**CAUTION:** Observe all safety precautions outlined in the vehicle service manual when working around flammable liquids. Use only hose approved for use with gasoline. Use only the worm-type hose clamps included with the regulator kit. The use of other types of hose clamps may cause a gasoline leak that could result in a fire. Apply pipe sealant (such as Loctite® PST) to all fitting threads to prevent fuel leaks.





The H.O. 350 engine's HEI distributor is a self-contained ignition system. The system requires a continuous 12-volt power supply for proper operation.

### IGNITION SYSTEM

The HEI distributor (PN 1104067) included with the H.O. 350 engine assembly is a self-contained ignition system that includes a magnetic pickup, a module, a coil, a rotor, and a cap.

The HEI's large diameter cap minimizes arcing and cross-firing between adjacent spark plug terminals. The cap's male wire terminals provide a reliable, positive connection for the spark plug leads.

The large diameter of the HEI distributor may interfere with other underhood components in vehicles not originally equipped with HEI ignitions. Check for clearance before installation.

The HEI distributor supplied with the H.O. 350 engine assembly has a hardened drive gear that is compatible with a steel camshaft. Use of a non-hardened distributor gear will result in excessive wear.

**Ignition Wiring.** The HEI ignition system requires a 12-volt power supply for proper operation. The HEI ignition should be connected directly to the battery with 10 or 12 gauge wire through a high-quality ignition switch as shown in the wiring diagram. If you are installing an HEI ignition in an early-model vehicle originally equipped with a point-type ignition, be sure to remove or bypass the resistor in the wiring harness to ensure the HEI receives 12

volts continuously. Use distributor connector package PN 12167658, which includes connectors and wires for the HEI's tachometer and 12-volt terminals.

**Spark Timing.** Set initial spark timing at 10° before top dead center (BTDC) at 650 rpm with the vacuum advance line to the distributor disconnected and plugged. This setting will produce 32° of total advance at wide open throttle (WOT).

The HEI vacuum advance canister should be connected to a ported vacuum source (no vacuum at idle).

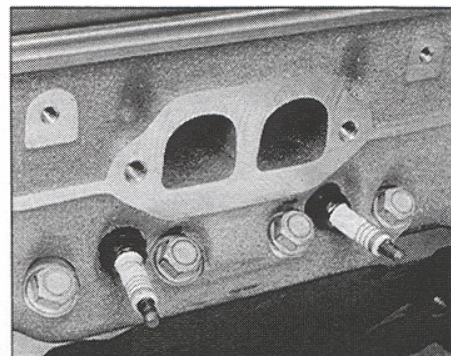
**Advance Curves.** The HEI distributor supplied with the H.O. 350 engine assembly has mechanical centrifugal and vacuum spark advance with the following curves:

#### Mechanical Advance:

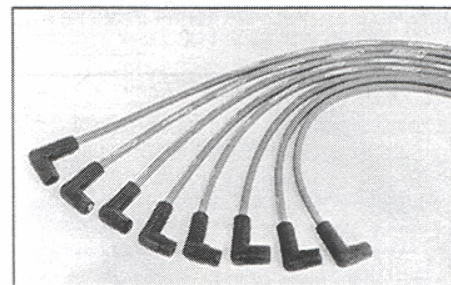
RPM	Advance
1100	0.0°
1600	12.0°
2400	16.0°
4600	22.0°

#### Vacuum Advance:

Vacuum (in. Hg)	Advance
3.00"	0.0°
7.50"	20.0°



The H.O. 350 engine has angled spark plugs; check for clearance with exhaust manifolds or headers.



High-performance spark plug wire sets are available from GM Performance Parts with 135° and 90° spark plug boots.

**Spark Plugs.** The H.O. 350 engine's aluminum cylinder heads have angled spark plugs. Check for spark plug and wire clearance when using exhaust manifolds or aftermarket headers designed for straight spark plugs.

The H.O. 350 is supplied with AC MR43LTS spark plugs. When servicing an H.O. 350, use AC FR5LS, 904, or MR43LTS spark plugs. Set the plug gap at .035"-.040". If a colder plug is required for moderate competition or sustained high-speed operation, FR3LS or FR2LS plugs are recommended.

**Spark Plug Wires.** The H.O. 350 engine assembly does not include spark plug wires. If you are installing the engine in a vehicle originally equipped with a small-block V8 with HEI ignition, standard replacement spark plug wires can be used.

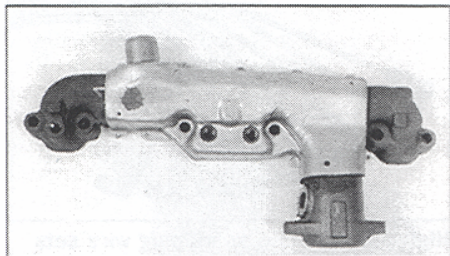
High-performance 8mm diameter wire sets with the Chevrolet Bow Tie logo are available from GM Performance Parts for custom installations. A wire set with 135° spark plug boots is available as PN 12361050 (recommended for routing over valve covers). PN 12361051 has 90° boots, and is recommended for routing under exhaust headers.



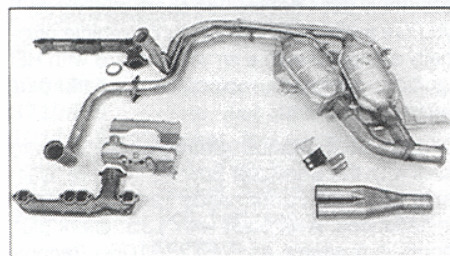
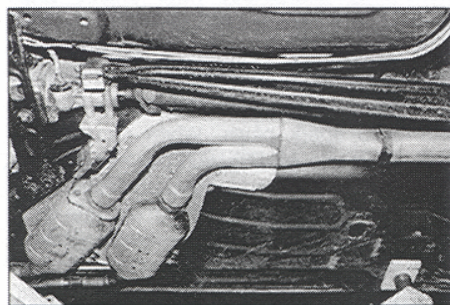
## EXHAUST SYSTEM

The D-shaped exhaust ports in the H.O. 350's aluminum cylinder heads are approximately .100" higher than the port exits in conventional cast-iron heads. Tests have shown that minor misalignment between the raised exhaust port exits and the exhaust manifolds (or headers) will not adversely affect engine performance.

**Exhaust Manifolds.** A variety of production exhaust manifolds can be used with H.O. 350 engines. Note that the H.O. 350 cylinder heads have raised rocker cover rails which may interfere with some exhaust manifolds; check for clearance before installation. As noted previously, the H.O. 350's angled spark plugs may not be compatible with some exhaust manifolds designed for use with straight spark plugs.

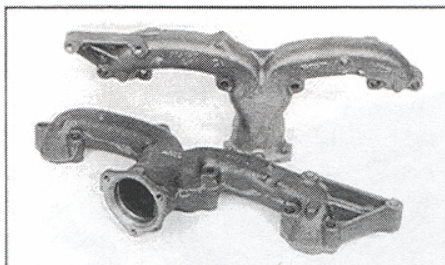


**IROC-Z Camaro cast iron exhaust manifolds with 2 $\frac{1}{4}$ " diameter outlets will clear the raised rocker cover rails on H.O. 350 aluminum cylinder heads.**



**The H.O. 350 Performance Package includes a low-restriction exhaust system.**

A low-restriction exhaust system for 1982-87 Camaros and Firebirds is available as part of the H.O. 350 Performance Package. This system includes IROC-Z Camaro cast iron exhaust manifolds with 2 $\frac{1}{4}$ " outlets (PN 14094063—left and PN 14094064—right). These manifolds have higher airflow potential than the manifolds with 1 $\frac{7}{8}$ " outlets originally in-



**Early-model Corvette "ram's horn" cast iron exhaust manifolds have 2 $\frac{1}{2}$ " diameter center outlets.**

stalled on many production Chevrolet engines. The IROC-Z manifolds will also clear the raised rocker cover rails on H.O. 350 aluminum cylinder heads.

Early-model Corvette "ram's horn" cast iron manifolds with 2 $\frac{1}{2}$ " diameter outlets are a good choice when tubular headers cannot be used. The left-hand manifold (PN 3797901) has a generator mount on the side of the casting; the right-hand manifold (PN 3814970) has a generator mount on the side of the casting. Late-model Corvette LT1 exhaust manifolds (PN 12554232) can also be used with an H.O. 350 engine in some applications. The LT1 manifold is interchangeable between cylinder banks; it has no provisions for an alternator mount. **Note:** These manifolds have center outlets. Check for possible interference with chassis, steering, and suspension components when using these exhaust manifolds in other applications.

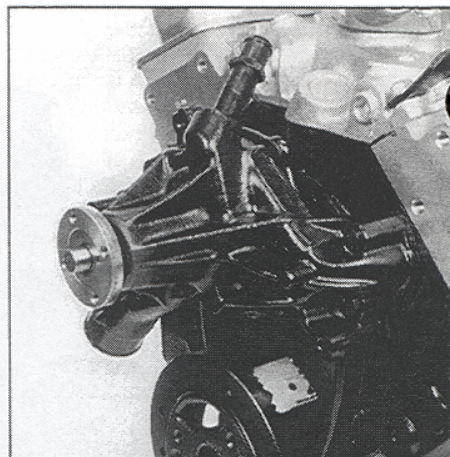
**Headers.** An H.O. 350 engine assembly should be equipped with a header exhaust system for maximum performance in applications where a non-production exhaust system is legal. For street performance and limited competition applications, the recommended header configuration is 1 $\frac{3}{4}$ " diameter primary pipes, 32 to 36 inches long, with 3" diameter collectors. Use 2 $\frac{1}{2}$ " diameter tailpipes with a balance tube ("H" pipe) and low-restriction mufflers.

## COOLING SYSTEM

The H.O. 350 engine assembly includes a cast-iron water pump with long mounting legs (PN 12529305) and a 180° thermostat (PN 12555290). This water pump has a standard-rotation impeller that is used with conventional accessory drives. Some serpentine belt systems require a water pump with a reverse-rotation impeller. In these instances, install a water pump specified for the original application.

Early-model vehicles and Corvette installations which require a water pump with short mounting legs can use PN 12522037.

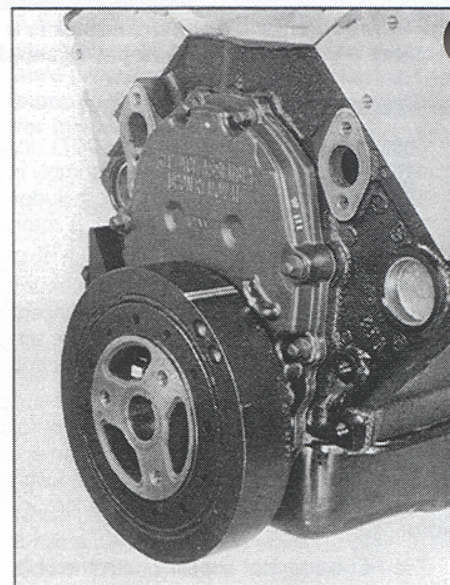
When installing water pump with short mounting legs on a ZZ4 engine with a composite front cover, it may be necessary to grind the front cover bolt head near the lower part of the pump's right-hand mounting leg for clearance.



**The H.O. 350 engine assembly includes a cast-iron water pump with long mounting legs.**

## FRONT COVER

The ZZ4 H.O. 350 engine has a composite front cover. This cover may not clear the power steering pump mounting brackets on some installations. If interference is encountered, a stamped steel ZZ3 front cover (PN 12523973) can be retrofitted. Use gasket PN 10108435 and bolts PN 9442895 when converting a ZZ4 engine to a stamped steel front cover.



**The 8" diameter torsional damper included with the ZZ4 H.O. 350 engine assembly is degreed to simplify ignition timing. Set the spark advance at 10 degrees BTDC with the distributor vacuum line disconnected and plugged.**

## TORSIONAL DAMPER

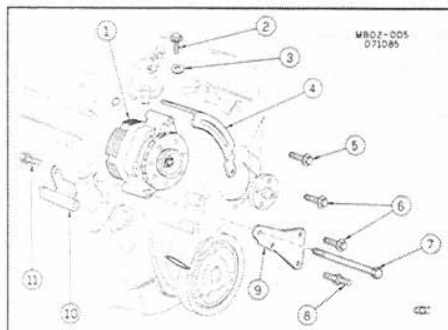
The ZZ4 H.O. 350 engine assembly includes an 8" diameter torsional damper. The damper is degreed to simplify timing adjustments.



The 8" diameter ZZ4 damper does not have sufficient chassis clearance for 1984-96 Corvettes and some other vehicles. A 6 $\frac{3}{4}$ " diameter damper (PN 12551537) used on ZZ4-ZZ2 versions can be substituted; however, high-speed torsional damping will be affected. A 7 $\frac{1}{4}$ " diameter GM Performance Parts Fluid-damper (PN 10051170) can also be used when additional chassis clearance is required.

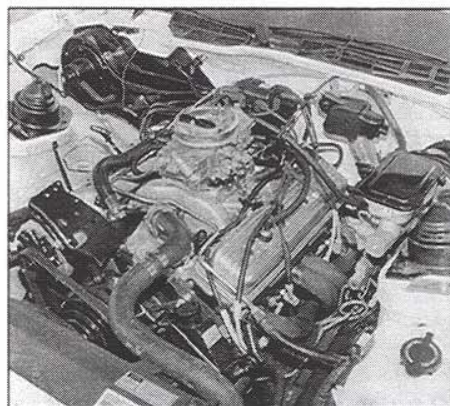
Use crankshaft bolt PN 3815933 and washer PN 14001829 to retain the damper on the crankshaft snout.

## GENERATOR MOUNTING



The following are part numbers for a typical generator mounting system that can be used with H.O. 350 engines in custom installations:

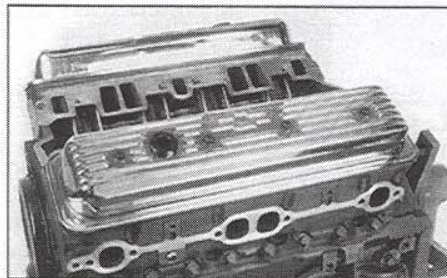
- |                |  |
|----------------|--|
| 1. As required | Generator                                  |
| 2. 15521977    | Screw, $\frac{3}{8}$ -16 x $\frac{3}{4}$ " |
| 3. 120395      | Washer, flat                               |
| 4. 14081227    | Bracket, generator adjusting               |
| 5. 10008893    | Bolt, M8 x 1.25"                           |
| 6. 9439905     | Bolt, $\frac{3}{8}$ -16 x $\frac{3}{4}$ "  |
| 7. 9440170     | Bolt, $\frac{3}{8}$ -16 x 7"               |
| 8. 9439905     | Bolt, $\frac{3}{8}$ -16 x $\frac{3}{4}$ "  |
| 9. 14037743    | Brace, generator                           |
| 10. 14079285   | Spacer                                     |
| 11. 25534835   | Bolt, M8 x 1.25"                           |



This H.O. 350 engine assembly was installed in a 1989 Camaro using the accessory drive components listed above.

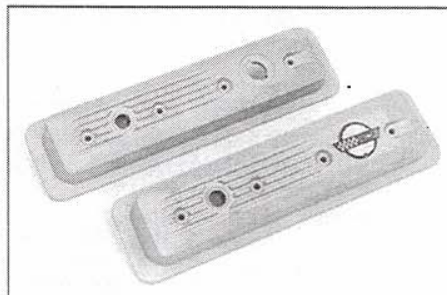
## ROCKER COVERS

H.O. 350 engines are equipped with stamped steel rocker covers with central hold-down bolts. Use PCV valve PN 8995284 (AC CV789C).



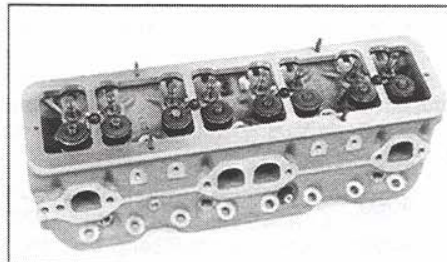
An H.O. 350 engine can be dressed up with chromed center-bolt Bow Tie rocker covers (PN 12355350—pair).

Chromed center-bolt rocker covers with the Bow Tie logo are available as PN 12355350 (pair).



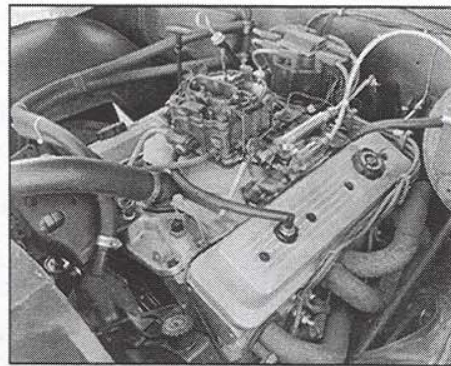
Corvette rocker covers (PN 10055781—left and PN 10055782—right) give an H.O. 350 a high-tech appearance.

Corvette magnesium rocker covers (PN 10055781—left and PN 10055782—right) can be installed on an H.O. 350 engine for a "high-tech" look. The right-hand Corvette cover has an oil filler hole; use screw-in filler cap PN 14100672.



Early-model flange-mount rocker covers can be installed on H.O. 350 center-bolt cylinder heads with adapter PN 24502540.

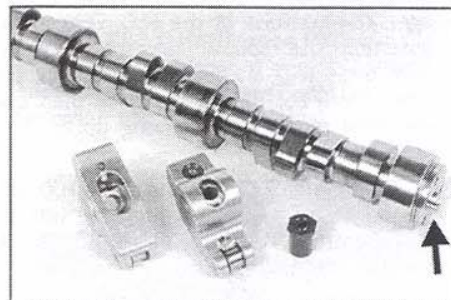
If you want to retain the appearance of an early-model engine, pre-'87 flange-mount rocker covers can be installed on H.O. cylinder heads using adapter PN 24502540. This adapter is machined from billet aluminum, and uses an O-ring seal between the adapter and cylinder head rocker cover rail.



This H.O. 350 installed in a 1965 Chevelle illustrates PCV valve installation and hose routing with a Quadrajet carburetor. Corvette rocker covers were added by the owner.

## HOT CAMSHAFT

A high-performance hydraulic roller camshaft (PN 24502586) is available to upgrade the performance of the H.O. 350 engine assembly. Installation of the HOT camshaft will produce a gain of 23 peak horsepower (379hp @ 5,250 rpm) and 7 lb-ft torque (413.1 lb-ft @ 4,000 rpm). Replacing the production ZZ4 1.5:1 ratio stamped-steel rocker arms with GM Performance Parts 1.6:1 ratio aluminum rocker arms will increase the H.O. 350's peak output to 394 horsepower at 5,750 rpm (a total gain of 38 horsepower) and 417 lb-ft torque at 4,250 rpm.



The installation of a HOT hydraulic roller camshaft and 1.6:1 ratio self-guided aluminum rocker arms will increase a ZZ4 H.O. 350's output by 38 horsepower. The HOT cam's dowel pin must be pressed into the front of the camshaft so that it extends .300".

The HOT camshaft improves engine performance by increasing duration and lift compared to the production ZZ4 profile:

	ZZ4	HOT
Intake Lift	.474"	.525"
Exhaust Lift	.510"	.525"
Intake Duration***	208°	218°
Exhaust Duration***	221°	228°

\*with 1.5:1 rocker arm ratio

\*\*with 1.6:1 rocker arm ratio

\*\*\*Duration in degrees at .050" tappet lift

The HOT cam is specifically designed for use with 1.6:1 ratio rocker arms. A set of 16



aluminum rocker arms and adjusting nuts is available from GM Performance Parts as PN 12370839. These aluminum rocker arms have an extruded aluminum body that is stiffer than comparable designs. Their roller bearing trunions prevent pivot ball galling at high rpm.

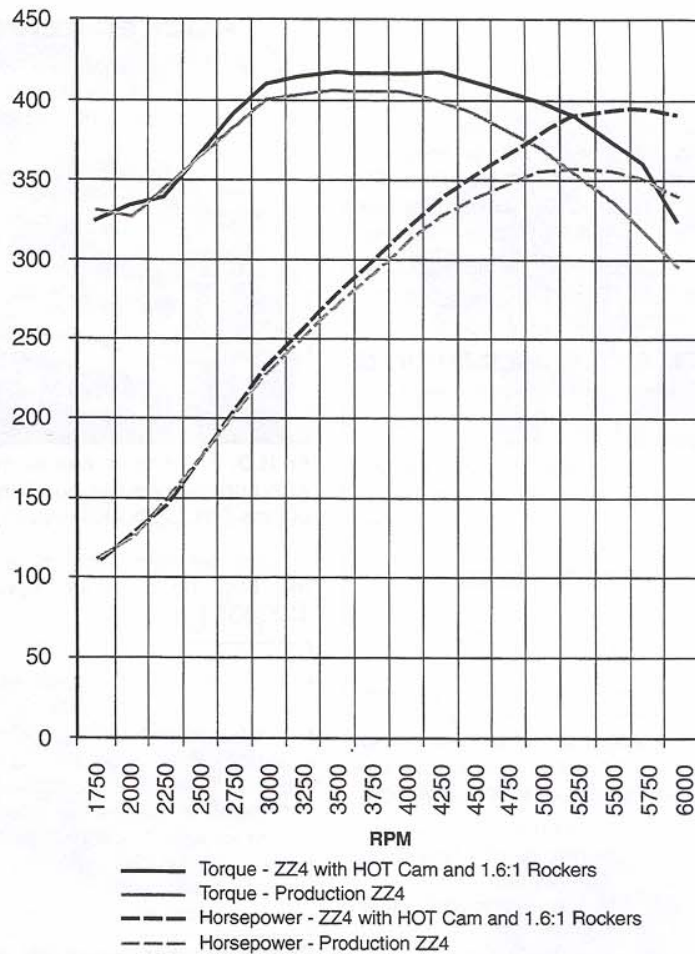
The HOT cam is supplied with a long camshaft sprocket dowel pin for use with 1995-up LT1 and LT4 engines. When installed in an H.O. 350 engine, the camshaft dowel pin must be pressed into the front of the camshaft so that it extends .300" (+/- .010") from the front of the cam, duplicating the production ZZ4 camshaft dowel length.

It is strongly recommended that a roller timing chain be used with the HOT camshaft. When installing an HOT camshaft in a ZZ1-ZZ2 H.O. 350 engine originally equipped with a link-type timing chain, the timing set should be replaced with a roller chain and sprockets as used in ZZ3-ZZ4 versions (PN 14088783—chain; PN 12552129—camshaft sprocket; and PN 14088784—crankshaft sprocket).

**Warning:** Do not use 1.6:1 ratio rocker arms with a production H.O. 350 camshaft! The resulting increase in valve lift will cause the valvesprings to coil bind and produce engine damage. Do not use the HOT camshaft and 1.6:1 ratio rocker arms with the valvesprings installed on ZZ3 through ZZ3 versions of the H.O. 350 engine assembly. The valvesprings will coil bind and cause engine damage. ZZ4 versions of the H.O. 350 engine assembly use special valvesprings wound from ovoid (egg-shaped) wire; this wire provides more coil-to-coil clearance than conventional round wire, allowing up to .525" valve lift.

ZZ3 through ZZ3 versions of the H.O. 350 engine assembly can be upgraded with the HOT Camshaft Kit (PN 12480002). This kit includes the following components:

<b>24502586</b>	HOT Camshaft
<b>12370839</b>	Rocker arms, aluminum, 1.6:1 ratio
<b>12551483</b>	Valvespring, LT4-type, ovoid wire
<b>10212808</b>	Retainer, valvespring, light-weight
<b>24503856</b>	Lock, retainer
<b>10212809</b>	Seat, valvespring



## ZZ4 H.O. 350 DYNO TEST RESULTS

RPM	Production ZZ4		HOT Cam and 1.6:1 Rockers	
	Horsepower	Torque	Horsepower	Torque
1750	110.6	331.8	108.9	326.8
2000	124.9	328.1	127.8	335.6
2250	147.2	343.6	146.3	341.5
2500	173.7	365.0	173.8	365.2
2750	200.6	383.2	204.7	390.9
3000	228.5	400.1	234.1	409.8
3250	250.0	404.0	257.0	415.3
3500	270.5	<b>405.9</b>	278.1	<b>417.3</b>
3750	289.5	405.4	297.7	417.0
4000	308.6	405.2	317.7	417.1
4250	324.2	400.6	337.7	417.3
4500	336.9	393.2	353.8	412.9
4750	345.6	382.1	366.8	405.6
5000	354.1	371.9	380.0	399.2
5250	<b>356.1</b>	356.2	390.2	390.3
5500	354.9	338.9	393.8	376.0
5750	349.2	319.0	<b>394.1</b>	360.0
6000	338.0	295.9	391.2	324.2

**Note:** Engine equipped with 1 $\frac{3}{4}$ " headers with 2.5 dual exhaust system fitted with low restriction mufflers. Results corrected to 29.92" Hg and 60° F.



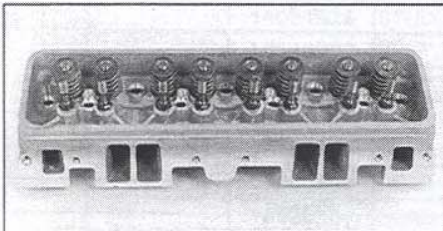
### PUSHROD GUIDEPLATES

All H.O. 350 engine assemblies (ZZ3 through ZZ4) used self-guided rocker arms. These rocker arms have stamped rails that center the rocker tips on the valve stems. Aluminum cylinder heads installed on ZZ3 through ZZ4 H.O. 350 engine assemblies were equipped with non-hardened pushrod guideplates. The sole purpose of these guideplates was to hold the pushrods in position during engine assembly.

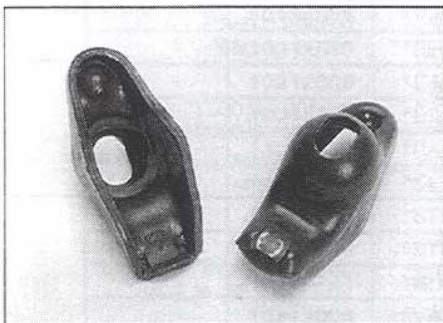
A new head gasket design (PN 12557236) was introduced on the ZZ4 version that eliminated the need for pushrod guideplates. Holes in the lifter valley side of the head gasket hold the pushrods in position. This gasket has the same compressed thickness (.051") as previous H.O. 350 head gaskets.

Some aftermarket roller-tip rocker arms are not self-guiding, and therefore require guideplates to position the rocker arm tips on the valve stems. H.O. cylinder heads can be converted for these applications by installing screw-in studs (PN 3973416) and hardened guideplates (PN 14011051).

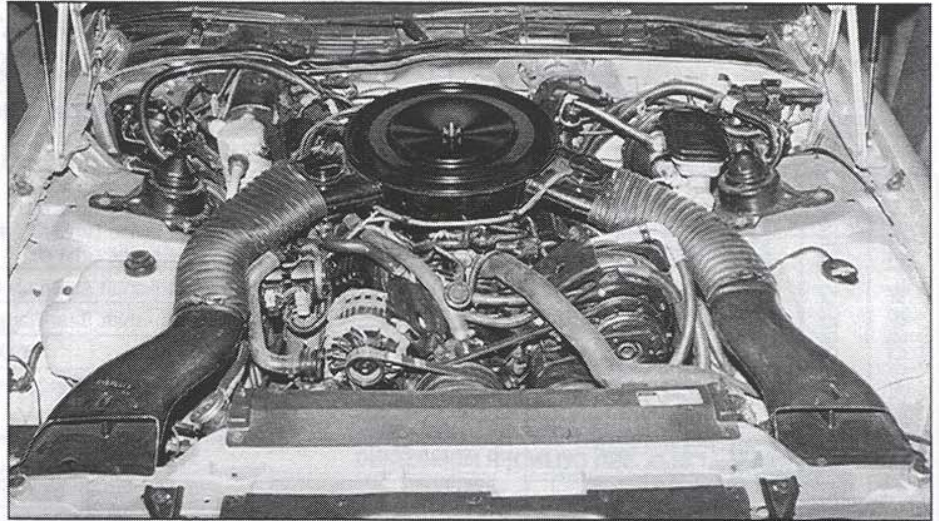
**Warning:** Do not use non-hardened guideplates installed on ZZ3-ZZ4 H.O. 350 engines with rocker arms that require guideplates. The use of non-hardened guideplates in these applications can cause excessive wear and engine damage.



ZZ3-ZZ4 H.O. 350 cylinder heads do not have pushrod guideplates. A composition head gasket holds the pushrods in position during engine assembly.



Guided rocker arms have rails that align the rocker arm tips on the valve stems. Non-guided rocker arms can be installed on H.O. 350 engines using hardened pushrod guideplates (PN 14011051) and rocker arm studs (PN 3973416).



The H.O. 350 Performance Package (PN 10185077) retains all required emission equipment for 1982-87 Camaros and Firebirds originally equipped with an LG4 or L69 305ci V8 engine and a 700R4 automatic transmission.

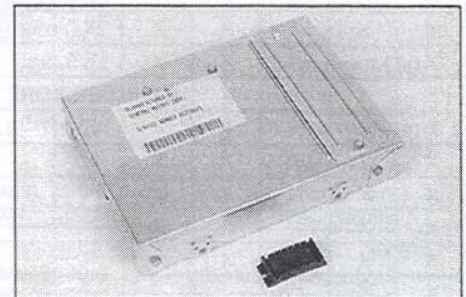
### H.O. 350 PERFORMANCE PACKAGE

The H.O. 350 Performance Package (PN 10185077) is a coordinated assembly of components for 1982-87 Camaros and Firebirds originally equipped with LG4 or L69 305ci small-block engines and 700R4 automatic transmissions. This kit significantly improves vehicle performance while retaining all required emission controls. The H.O. 350 Performance Package conversion is legal for use in all 50 states when the components are installed in accordance with the instruction manual. Note: This conversion is certified only for the specific year models, engines, and transmission listed above.

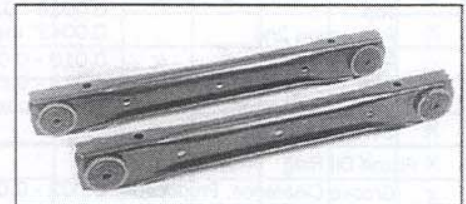
In addition to an H.O. 350 engine assembly, the conversion package includes parts to upgrade the induction system (dual-snorkel air cleaner), exhaust system (low-restriction manifolds, dual catalytic converters, tailpipes, and muffler), calibration (ECM, PROM, and carburetor metering rods), fuel system (high-volume in-tank electric fuel pump and external regulator), transmission (shift firmness modifications), and suspension (rear control arms with high-durometer bushings).

During development of the H.O. 350 Camaro performance package, a prototype H.O. 350 engine equipped with a computer-controlled Quadrajet carburetor and all emission controls required for this application produced 313 horsepower (at 4,750 rpm) and 380 lb-ft torque (at 3,500 rpm). A 1987 Camaro test vehicle equipped with the H.O. 350 Performance Package ran a quarter-mile elapsed time of 13.83 seconds at 98 mph.

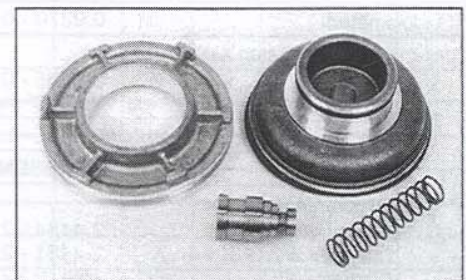
For additional information on the H.O. 350 Performance Package, see the GM Performance Parts catalog. An installation manual for the 350 H.O. Performance Package is available as PN 24502463.



The H.O. 350 Performance Package includes a replacement engine control module (ECM) with a specially programmed PROM chip.



Rear axle control arms with high durometer (50K) bushings reduce wheel hop under acceleration.



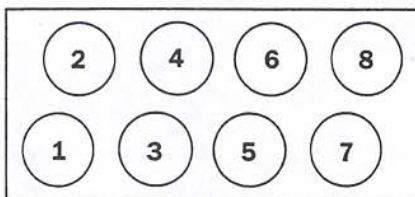
The H.O. 350 Performance Package includes a replacement servo piston, pressure regulator spring, and boost valve to improve the 700R4 transmission's shift firmness and durability.



## H.O. 350 ENGINE SPECIFICATIONS

### GENERAL

Displacement	5.7 L (350 CID)
Bore	4.000"
Stroke	3.480"
Compression Ratio	10:1



← FRONT H.O. 350 CYLINDER NUMBERING

Firing Order	1-8-4-3-6-5-7-2
Spark Plugs	AC MR43LTS
Gap	0.035"
Torque	20 ft.-lbs.
Oil Pressure (minimum)	6.0 psig @ 1,000 rpm 18.0 psig @ 2,000 rpm 24.0 psig @ 4,000 rpm
Oil Filter Torque	15 ft.-lbs.

### CYLINDER BORE

Diameter	4.0007" - 4.0017"
Out-of-Round	
Production	0.001" max.
Service Limit	0.002" max.
Taper	
Production Thrust Side	0.0005" max.
Production Relief Side	0.0010" max.
Service Limit	0.0010" max.

### PISTON ASSEMBLY

Piston Compression Ring	
Groove Clearance, Production	0.0012 - 0.0027"
Top	0.0015 - 0.0031"
Production 2nd	0.0042" max.
Service Limit	0.010 - 0.020"
Gap, Production Upper	0.018 - 0.026" max.
Production Lower	0.035" max.
Service Limit	
Piston Oil Ring	
Groove Clearance, Production	0.002 - 0.007"
Service Limit	0.008" max.
Gap, Production	0.010 - 0.030"
Service Limit	0.065" max.

### PISTON PIN

Diameter	0.9270 - 0.9271"
Clearance in Piston Assembly	
Production	0.0005 - 0.0008"
Service Limit	0.0010" max.
Fit in Connecting Rod Assembly	0.0005 - 0.0020" interference

### CRANKSHAFT ASSEMBLY

Main Journal	
Diameter #1	2.4484 - 2.4493"
Diameter #2, #3, #4	2.4481 - 2.4490"
Diameter #5	2.4479 - 2.4488"
Taper, Production	0.0002" max.
Service Limit	0.0010" max.
Out-of-Round, Production	0.0002" max.
Service Limit	0.0010" max.

### CRANKSHAFT ASSEMBLY

Crankshaft Bearing Clearance	
Production #1	0.0008 - 0.0020"
Production #2, #3, #4	0.0011 - 0.0020"
Production #5	0.0017 - 0.0032"
Service Limit #1	0.0010 - 0.0015"
Service Limit #2, #3, #4	0.0010 - 0.0025"
Service Limit #5	0.0025 - 0.0035"
Crankshaft Assembly End Play	0.001 - 0.007"
Crankshaft Rear Flange Runout	0.0015"

### CONNECTING ROD ASSEMBLY

Connecting Rod Journal	
Diameter	2.0978 - 2.0998"
Taper, Production	0.0003" max.
Service Limit	0.0010" max.
Out-of-Round, Production	0.0003" max.
Service Limit	0.0010" max.
Rod Bearing Clearance	
Production	0.0013 - 0.0035"
Service Limit	0.0030" max.
Rod Side Clearance	0.006 - 0.014"

### CAMSHAFT ASSEMBLY

Journal Diameter	1.8677 - 1.8697"
End Play	0.004 - 0.012"
Lobe Lift ± 0.002"	
Intake	0.316"
Exhaust	0.340"
Centerline	
Intake	109°
Exhaust	115°
Lobe Separation	112°
Duration @ .050" Lift	
Intake	208°
Exhaust	221°

### VALVE SYSTEM

Lifter Assembly	Hydraulic Roller
Rocker Arm Ratio	1.50:1
Valve Lash	1 ± 1/4 turn down from zero lash
Face Angle	45°
Seat Angle	46°
Seat Runout	0.002" max.
Seat Width	
Intake	0.030 - 0.050"
Exhaust	0.060 - 0.080"
Stem Clearance	
Production, Intake	0.0009 - 0.0027"
Exhaust	0.0009 - 0.0027"
Service, Intake	0.0037" max.
Exhaust	0.0047" max.
Valve Spring	
Free Length	2.01"
Pressure, Closed	100 lbs. at 1.78"
Open	252 - 272 lbs. at 1.300"
Installed Height, Intake	1.78"
installed Height, Exhaust	1.78"
Valve Lift	
Intake	0.474"
Exhaust	0.510"