

ZZ383 Engine (12498772 Base) Long Block Specifications

Specifications Part Number 88962517

This ZZ383 long block specification sheet should be used in conjunction with the 383 short block specification sheet, GM part number 19172223.

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This publication provides general information on components and procedures which may be useful when installing or servicing a ZZ383 engine. Please read this entire publication before starting work. Also, please verify that all of the components listed in the Package Contents section below were shipped in the kit.

The information below is divided into the following sections: package contents, component information, ZZ383 engine specifications, additional parts that you may need to purchase, torque specifications, and a service parts list.

The ZZ383 engine incorporates modern technology in a package that can be installed in applications where 265-400ci small block Chevrolet V-8's were originally used. This complete engine is assembled using brand new, premium quality components. Due to the wide variety of vehicles in which a ZZ383 engine can be installed, some procedures and recommendations may not apply to specific applications.

The ZZ383 engine consists of a cast iron engine block, cast aluminum "Fast Burn" cylinder head assemblies, forged steel crankshaft, hypereutectic pistons, powder metal connecting rods, performance camshaft, and hydraulic roller lifters.

The ZZ383 engine is manufactured on current production tooling; consequently you may encounter dissimilarities between the ZZ383 engine assembly and previous versions of the small block V-8. In general, items such as motor mounts, accessory drives, exhaust manifolds, etc. can be transferred to a ZZ383 when it is installed in a vehicle originally equipped with a small block V-8 engine. However, as noted in the following sections, there may be minor differences between a ZZ383 engine and an older small block V-8 engine. These differences may require modifications or additional components not included with the ZZ383 engine. When installing a ZZ383 engine in a vehicle not originally equipped with a small block V-8, it may be necessary to adapt or fabricate various components for the cooling, fuel, electrical, and exhaust systems.

It is not the intent of these specifications to replace the comprehensive and detailed service practices explained in the GM service manuals.

For information about warranty coverage, please contact your local GM Performance Parts dealer.

Observe all safety precautions and warnings in the service manuals when installing a ZZ383 engine in any vehicle. Wear eye protection and appropriate protective clothing. When working under or around the vehicle support it securely with jackstands. 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.

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ALL INFORMATION WITHIN ABOVE BORDER TO BE PRINTED EXACTLY AS SHOWN ON 8 1/2 x 11 WHITE 16 POUND BOND PAPER. PRINT ON BOTH SIDES, EXCLUDING TEMPLATES. TO BE UNITIZED IN ACCORDANCE WITH GMSPO SPECIFICATIONS.	DATE	REVISION	AUTH
	21MY07	Initial Release - Rusty Sampsel	
	27MR08	Revised - Rusty Sampsel	

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Legal and Emissions Information

This publication is intended to provide information about the ZZ383 engine and related components. This manual also describes procedures and modifications that may be useful during the installation of a ZZ383 engine. It is not intended to replace the comprehensive service manuals and parts catalogs which cover General Motors engines and components. Rather, it is designed to provide supplemental information in areas of interest to "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 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.

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Package contents:

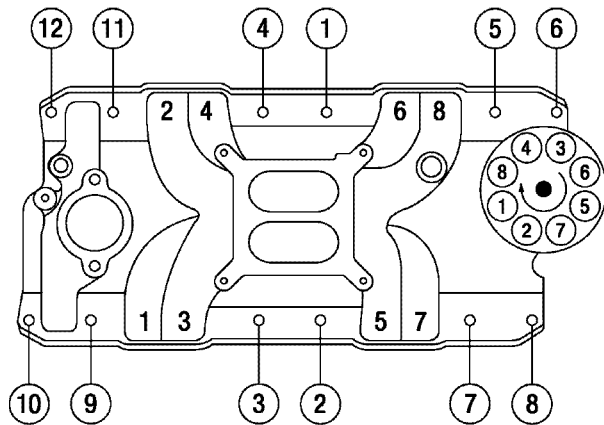
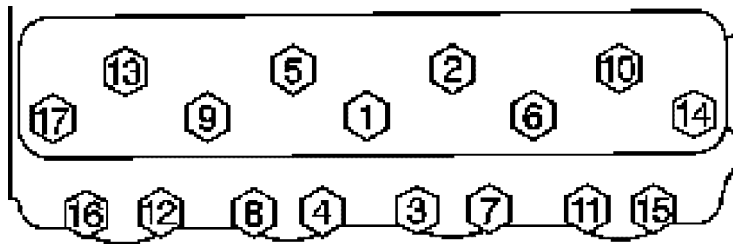
<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>GM Part Number</u>
1	Engine Assembly	1	12498772
2	Long Block Instructions	1	88962517
3	Short Block Instructions	1	19172223

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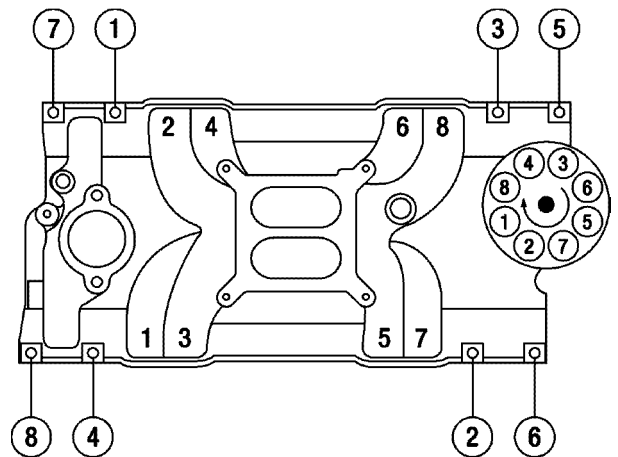
ZZ383 Engine Torque Specifications:

- Camshaft retainer bolt 106 in.lbs. / 12 Nm (Blue Loctite)
- Camshaft sprocket bolt 22 ft.lbs. / 30 Nm (Blue Loctite)
- Connecting rod bolt 55 ft.lbs. / 75 Nm (30 weight oil)
- Carburetor nut
 - First pass 5 ft.lbs. / 7 Nm (30 weight oil)
 - Second pass 10 ft.lbs. / 14 Nm
 - Final pass 12 ft.lbs. / 16 Nm
- Crankshaft balancer bolt 63 ft.lbs. / 85 Nm (Blue Loctite)
- Crankshaft balancer pulley 35 ft.lbs. / 47 Nm (Blue Loctite)
- Crankshaft bearing cap bolt (inner) 70 ft.lbs. / 95 Nm (30 weight oil)
- Crankshaft bearing cap bolt (outer) 65 ft.lbs. / 88 Nm (30 weight oil)
- Crankshaft rear oil seal housing nut/bolt 11 ft.lbs. / 15 Nm (30 weight oil)
- Cylinder head bolt (sequenced). Re-torque bolt after running engine for 10 hours.
 - First pass 25 ft.lbs. / 34 Nm (Teflon pipe sealant)
 - Second pass 40 ft.lbs. / 54 Nm
 - Final pass 65 ft.lbs. / 88 Nm
- Distributor bolt 25 ft.lbs. / 34 Nm (None)
- Engine block oil gallery plugs
 - 1/8" NPT/cast iron 15 ft.lbs. / 20 Nm (Teflon pipe sealant)
 - 1/4" NPT/cast iron 20 ft.lbs. / 27 Nm (Teflon pipe sealant)
 - 3/8" NPT/aluminum 20 ft.lbs. / 27 Nm (Teflon pipe sealant)
 - 1/2" NPT/aluminum 25 ft.lbs. / 34 Nm (Teflon pipe sealant)
- Engine front cover bolt 97 in.lbs. / 11 Nm (Blue Loctite)
- Flywheel bolt 65-70 ft.lbs. / 88-95 Nm (Blue Loctite)
- Fuel pump cover
 - 1/4" bolt 97 in.lbs. / 11 Nm (Blue Loctite)
 - 3/8" bolt 30 ft.lbs. / 40 Nm (Blue Loctite)
- Intake manifold bolt (sequenced). Re-torque bolt after running engine for 10 hours.
 - First pass 97 in.lbs. / 11 Nm (Teflon pipe sealant)
 - Final pass 11 ft.lbs. / 15 Nm
- Oil filter adapter bolt 18 ft.lbs. / 24 Nm (Blue Loctite)
- Oil level indicator tube bolt 106 in.lbs. / 12 Nm (Blue Loctite)
- Oil pan assembly
 - Corner nut/bolt 15 ft.lbs. / 20 Nm (Blue Loctite)
 - Side rail bolt 97 in.lbs. / 11 Nm

- Oil pan drain plug 15 ft.lbs. / 20 Nm (30 weight oil)
- Oil pump bolt to the rear crankshaft bearing cap 66 ft.lbs. / 90 Nm (30 weight oil)
- Oil pump cover bolt 80 in.lbs. / 9 Nm (Blue Loctite)
- Rocker arm stud 50 ft.lbs. / 68 Nm (Blue Loctite)
- Rocker cover bolt 106 in.lbs. / 12 Nm (30 weight oil)
- Spark plug 15 ft.lbs. / 20 Nm (30 weight oil)
- Starter motor bolt 35 ft.lbs. / 48 Nm (Blue Loctite)
- Thermostat housing bolt 25 ft.lbs. / 34 Nm (Blue Loctite)
- Valve lifter guide retainer bolt 18 ft.lbs. / 24 Nm (Blue Loctite)
- Water pump bolt 30 ft.lbs. / 40 Nm (30 weight oil)
- Windage tray nut 30 ft.lbs. / 40 Nm (30 weight oil)



FIRING ORDER: **1-8-4-3-6-5-7-2**



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Component Information:

Block

The ZZ383 Block is a 1986 and later (1 piece rear main seal) design. The block is bored and block deck plate honed to a finished size of 4.005". Features include 4 bolt intermediate mains, clearanced for a 3.80" stroker crankshaft, and machined for hydraulic roller or flat tappet lifters.

Crankshaft

The ZZ383 Engine comes with forged crankshaft part number 12489436. The crankshaft features are outlined below:

- ◆ 3.800" stroke
- ◆ Externally balanced
- ◆ 2.45" main journals/2.10" rod journals
- ◆ Radii on main and rod journals
- ◆ One-piece style rear main
- ◆ Number 1 and 4 crank pins hollowed
- ◆ Rod and main oil hole chamfered
- ◆ 3.000" crank flange bolt circle
- ◆ 4340 steel alloy, nitride treated

Connecting Rods

Steel powdered metal connecting rod with the centerline of crank pin bore to centerline of piston pin bore is 5.700". It has been machined to clear camshafts in most small block stroker applications.

Engine Bearings

Main engine bearings, part number 12499102, are a 3/4 groove design which maintains the full surface area in the most highly loaded portion of the lower main bearing, while permitting improved oil flow to the rod bearing. Main bearings #1-4 are manufactured from an H-14 (four metals) alloy and have a hardened steel backing made from SAE 1020 steel. The #5 flange bearing is manufactured from an H-24 (tri-metal) alloy and has a hardened steel backing made from SAE 1008-1010 steel.

Rod bearings, part number 12499108, feature a full chamfer on one side to accommodate the radius on the crankshaft journal. Rod bearings are manufactured from H-14 (four metals), and have a hardened steel backing made from SAE 1020 steel.

Pistons

New high performance hypereutectic flat top pistons featuring a special skirt coating designed to run with a piston to cylinder wall clearance of .0010"-.0015" including the coating. These pistons were designed to take full advantage of the deck plated and precisely honed engine block. They also feature a pressed piston pin.

Cylinder Heads

Aluminum "Fast Burn" cylinder heads, part number 12464298, have the highest performance potential of any 23° small block cylinder head developed by GM. The name "Fast Burn" refers to the cylinder head's ability to quickly and completely burn the air fuel mixture, resulting in higher cylinder pressures and more power. The shape of the combustion chamber is designed to accomplish this "Fast Burn" with flat top pistons. Like those supplied with the engine package. The "Fast Burn" head accepts both center bolt and early style four bolt flange mount rocker covers. Intake manifold mating surfaces are drilled and tapped for both Vortec and conventional raised port style intake manifolds. Vortec style manifolds are recommended.

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Caution

This engine assembly needs to be filled with oil and primed. You should add the specified oil (see start-up instructions) to your new engine. Check the engine oil level on the dipstick and add accordingly.

Start-up and Break-in Procedures

1. After installing the engine, ensure the crankcase has been filled with 10w30 motor oil (non-synthetic) to the recommended oil fill level on the dipstick. Also check and fill as required any other necessary fluids such as coolant, power steering fluid, etc.
2. The engine should be primed with oil prior to starting. Follow the instructions enclosed with the tool. To prime the engine, first remove the distributor to allow access to the oil pump drive shaft. Note the position of the distributor before removal. Install the oil priming tool, GM part number 12368084. Using a 1/2" drill motor, rotate the engine oil priming tool clockwise for three minutes. While you are priming the engine, have someone else rotate the crankshaft clockwise to supply oil throughout the engine and to all the bearing surfaces before the engine is initially started. This is the sure way to get oil to the bearings before you start the engine for the first time. Also, prime the engine if it sits for extended periods of time. Reinstall the distributor in the same orientation as it was removed.

After the engine has been installed in the vehicle, recheck the oil level and add oil as required. It is also good practice to always recheck the ignition timing after removal and reinstallation of the distributor. See step 4 or engine specifications for the proper timing information.

3. Safety first. If the vehicle is on the ground, be sure the emergency brake is set, the wheels are chocked and the car cannot fall into gear. Verify everything is installed properly and nothing was missed.
4. Start the engine and adjust the initial timing. If using the HEI distributor P/N 93440806, set the ignition timing to 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) when using the HEI distributor P/N 93440806. The HEI vacuum advance canister should remain disconnected. This engine is designed to operate using only the internal centrifugal advance to achieve the correct timing curve. Rotate the distributor counterclockwise to advance the timing. Rotate the distributor clockwise to retard the timing.
5. When possible, you should always allow the engine to warm up prior to driving. It is a good practice to allow the oil sump and water temperature to reach 180°F before towing heavy loads or performing hard acceleration runs.
6. Once the engine is warm, set the total advance timing to 32° at 4000 RPM.
7. The engine should be driven at varying loads and conditions for the first 30 miles or one hour without wide open throttle (WOT) or sustained high RPM accelerations.
8. Run five or six medium throttle (50%) accelerations to about 4000 RPM and back to idle (0% throttle) in gear.
9. Run two or three hard throttle (WOT 100%) accelerations to about 4000 RPM and back to idle (0% throttle) in gear.
10. Change the oil and filter. Replace with 10w30 motor oil (non synthetic) and a PF25 AC Delco oil filter. Inspect the oil and the oil filter for any foreign particles to ensure that the engine is functioning properly.
11. Drive the next 500 miles under normal conditions or 12 to 15 engine hours. Do not run the engine at its maximum rated engine speed. Also, do not expose the engine to extended periods of high load.
12. Change the oil and filter. Again, inspect the oil and oil filter for any foreign particles to ensure that the engine is functioning properly.
13. Do not use synthetic oil for break-in. It would be suitable to use synthetic motor oil after the second recommended oil change and mileage accumulation. In colder regions, a lower viscosity oil may be required for better flow characteristics.

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ZZ383 Engine Specifications:

Displacement: 383 cubic inches
 Bore x Stroke: 4.005 inch x 3.80 inch
 Compression 9.7:1
 Block: Cast iron, four-bolt intermediate mains
 Cylinder Head: Aluminum "Fast Burn"
 Valve Diameter (Intake/Exhaust): 2.00"/1.55"
 Chamber Volume: 62cc
 Crankshaft: 4340 Forged steel, 1 piece rear seal
 Connecting Rods: 5.7" Forged, powdered metal, 3/8" studs
 Pistons: Hypereutecic, 244-T5 aluminum alloy
 Rings: Plasma Moly
 Camshaft: Hydraulic roller tappet
 Lift:509" intake, .528" exhaust
 Duration: 222° intake, 230° exhaust @ .050" tappet lift
 Centerline: 107° ATDC intake, 117° BTDC exhaust
 Rocker Arm Ratio: 1.5:1
 Timing Chain: 8 mm single roller design
 Oil Pan: 5-quart (w/ new filter)
 Oil Pressure (Normal): 40 psi @ 2000 RPM
 Recommended Oil: 10W30 Synthetic (after break -in)
 Oil Filter: AC Delco part # PF25
 Premium AC Delco part # UPF25
 Valve Lash: 1/2 turn down from zero lash
 Fuel: Premium unleaded - 92 (R+M/2)
 Maximum Engine Speed: 6000 RPM
 Spark Plugs: R44LTS for general usage: R42LTS for racing
 Spark Plug Gap040"
 Spark Timing: 32° maximum @ 4000 RPM with vacuum advance disconnected
 Firing Order: 1-8-4-3-6-5-7-2

Information may vary with application. All specifications listed are based on the latest production information available at the time of printing.

Additional parts that may be needed:

Flywheel / Flexplate:

Like all small block V-8 engines produced since 1986, the ZZ383 engine has a 3.00" diameter flywheel flange bolt pattern. Small block V-8 engines produced from 1958 through 1985 had a 3.58" diameter flywheel flange bolt pattern. This change in bolt circle diameter was made to accommodate a leak-resistant one-piece rear main seal. This ZZ383 engine includes a 12 3/4" diameter flexplate, part number 14088765. Use flywheel, part number 14088650, with manual transmissions. Also, if using a manual transmission, six bolts, part number 12337973, will be required.

Pilot Bearing:

You must install a pilot bearing in the rear of the crankshaft if the 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, part number 14061685, is recommended for this engine. This heavy-duty bearing adds an extra margin of reliability to a high performance drivetrain.

Starter:

This ZZ383 engine does not include a starter. The starter must be matched to the flywheel or flexplate diameter when installing the ZZ383 engine. Small diameter flywheels are 12-3/4" in diameter and have a starter ring gear with 153 teeth. Large diameter flywheels are 14" in diameter and have 168 teeth on the starter ring gear. This difference in flywheel diameters requires two different starter housing. Starter noses used with 14" diameter flywheel have two offset bolt holes; starters used with 12-3/4" diameter flywheels have bolt holes that are straight across from each other.

Note: Chevrolet starter motors use special shouldered mounting bolts which register the starter on the block.

The following starters and hardware can be used with the HT383 engine:

- 10496870 Heavy-duty, remanufactured starter for 12-3/4" diameter flywheel/flexplate
- 1876552 Heavy-duty starter for 14" diameter flywheel/flexplate
- 14097278 Bolt, starter mounting, long, for heavy-duty starter, 3/8"-16 x 4.65" long
- 14097279 Bolt, starter mounting, long, for heavy-duty starter, 3/8"-16 x 1.85" long
- 10455709 Remanufactured permanent magnet gear reduction (PMGR) starter for 12-3/4" diameter flywheel/flexplate (10 lb.)
- 9000852 Permanent magnet gear reduction (PMGR) starter for 14" diameter flywheel/flexplate (10 lb.)
- 14037733 Bolt, starter mounting, inner for 12-3/4" PMGR starter

Carburetor/Air cleaner:

A 750 or 770 cfm four-barrel carburetor with vacuum operated secondaries and electric choke is recommended for the ZZ383 engine. A foam or paper element, low restriction air cleaner should be used to protect the engine from excessive wear and 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. GM Performance Parts has two chromed, 14-inch diameter, open element air cleaner assemblies for single four-barrel carburetors. Part number 12342079 has a plain top and part number 12342071 has a Chevrolet logo. Both of these assemblies are supplied with a 3-inch tall filter element, part number 6421746 (AC# A212cw). A taller 4-inch element is available, part number 8997189 (AC# A698c).

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Fuel Pump:

This ZZ383 engine 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). A high volume, in-line electric fuel pump is available from GM Performance Parts, part number 251 15899. This heavy duty pump flows 72 gallons per hour at 6-8 psi outlet pressure.

Also, the ZZ383 engine has a provision for a mechanical fuel pump. There are two mechanical fuel pumps available from GM. Part number 12355612 is recommended for street performance. Part number 12355613 is recommended for competition.

Spark Plugs/Spark Plug Wires:

The recommended spark plugs for the ZZ383 engine are part number 5613611 (AC# R44LTS). These are for general street and performance use. If you plan to use this engine mostly for competition racing, you may want to change to a colder spark plug such as R42LTS. If you are installing the engine in a vehicle originally equipped with a small block V-8 with high energy ignition (HEI), standard replacement spark plug wires can be used. High performance 8mm diameter wire sets with the Chevrolet Bow Tie logo or with the GM Performance Parts logo are available from GM Performance Parts for custom installations. The GM Performance Parts logo wire sets are available as part number 12361056 (135° spark plug boots) and part number 12361057 (90° spark plug boots). The Chevrolet logo wire sets are part number 12361050 (135° spark plug boots) and 12361051 (90° spark plug boots). The 135° spark plug boot sets are recommended for routing the spark plug wires over the valve covers; 90° spark plug boot sets are recommended for routing the spark plug wires under the exhaust headers. Spark plug wire looms, part number 12496806, are also available. These six supports are stainless steel with a laser etched Bow Tie and they bolt to the sides of the cylinder heads.

Rocker Covers:

This ZZ383 Engine comes equipped with black stamped steel, center hold-down bolt rocker covers. A black composite center hold-down bolt LT4 type rocker cover is available, part number 12552321-left hand and 12552322-right hand. Also, chrome center hold-down bolt rocker covers with a red Chevrolet Bow Tie logo are available, part number 12355350-left and right hands. Pre-1987 flange mount rocker covers can be installed using adapter part number 24502540. This adapter is machined from billet aluminum and uses an O-ring seal between the adapter and cylinder head rocker cover rail. Please check fitment of rocker covers for clearance between the cover and the roller rocker arm. Not all covers will work with roller rocker part number 12310838.

Rocker Cover Grommets:

The ZZ383 engine does not come with rocker cover grommets. It is recommended to use grommet part number 3989350 with these rocker covers.

1. Install PCV valve, part number 6487779, into the grommet in the rocker cover on the left hand side of the engine.
2. Attach one end of the PCV hose, part number 9438373, to the PCV valve. Attach the other end of the hose to the rear port on the carburetor.

Intake Manifold

This ZZ383 High Performance engine does not come with an intake manifold installed. GM performed testing of the ZZ383 High Performance Engine using a single plane GM Vortec Intake Manifold, part number 12496822. The advertised power and torque was achieved using this single plane intake manifold. This manifold was designed for optimum horsepower and torque. Also available is a dual plane intake manifold, part number 12366573, that will provide more under hood clearance as it is a shorter manifold. Use intake gasket, part number 89017465, with either intake manifold. Use 8 intake manifold fasteners, part number 12550027.

Thermostat:

It is recommended that the cooling system have a 180°F thermostat, part number 10202456. Also, use thermostat housing, part number 10108470, and gasket, part number 10105135.

Distributor:

GM recommends the use of the HEI distributor, part number 93440806, on the ZZ383 engine. It was used throughout the testing on this and many of their other crate engines and has passed various tests. The HEI Distributor incorporates a hardened (melonized) drive gear that is compatible with a steel camshaft. Use of a non-hardened gear will result in excessive wear.

To install the distributor use connector, part number 8917052, to attach the tachometer wire to the distributor. You will also need a distributor hold-down clamp, part number 10096197, and fastener, part number 9442963, to secure the distributor to the intake manifold. When installing the distributor it is recommended to use a "Moly-Lube" type lubricant applied to the distributor gear. Coat the gear generously with the Moly-Lube using a small brush. This lube will aid in the break-in of the distributor gear and camshaft gear upon start up.

Headers

The ZZ383 High Performance engine should be installed with a pair of high performance headers for maximum performance. The headers used during development of the ZZ383 had 1.75" diameter primary tubes. Primary tubes were approximately 32.00" in length and had 3.00" diameter collectors. Using a similar combination in your application, along with a performance exhaust system with a balance tube ("H" pipe) and low restriction mufflers, will provide you with optimum performance from your ZZ383 High

Performance engine.

ZZ383 Service Parts List:

Part #	Quantity	Name	Part #	Quantity	Name
88962516	1	Block Asm, Eng	12554816	1	Deflector-Cr/Shf Oil
12464298	2	Head Asm, Cyl W/Vlvs	14088765	1	Flywheel Asm
10212809	16	Shim-Vlv Spr	12498008	1	Dampener, Torsional
12551483	16	Spring-Vlv	12557558	1	Pan, Oil
10212810	16	Seal, Vlv Stem Oil	12553058	1	Reinforcement-Oil Pan
10212808	16	Cap-Vlv Spr	12553059	1	Reinforcement-Oil Pan
24503856	32	Key, Vlv Stem	93442037	1	Pump Asm-Oil
12555331	8	Valve-Int	12550042	1	Screen Asm-O/Pmp
12551313	8	Valve-Exh	3998287	1	Shaft, O/Pmp Drv
12552126	16	Stud-Vlv Rkr Arm Ball	3764554	1	Retainer-O/Pmp Drv Shf
12499103	1	Piston Kit, W/Pin (.005" O/S) Set Of 8	10055724	1	Tube Asm-Oil Lvl Ind
12499107	1	Ring Kit, Pstn (0.005" O/S) Set Of 8	10077153	1	Indicator Asm-Oil Lvl
17803091	8	Rod Asm,C onn	14001829	1	Washer-Cr/Shf Pul Hub
12489436	1	Crankshaft, 3.800 Forged Steel	88894341	1	Pump Kit, Wat
12499102	1	Bearing Kit, Cr/Shf Main (Std)	12603957	2	Gasket-W/Pmp
17800761	1	Bearing Kit, Conn Rod (Std)	10241740	16	Rod Asm-Vlv Push
10168527	16	Bolt/Screw-Cyl Hd (Short)	12370838	1	Arm Kit, Vlv Rkr
10168526	4	Bolt/Screw-Cyl Hd (Med)	10168501	1	Retainer-Cm/Shf
10168525	14	Bolt/Screw-Cyl Hd (Long)	12370846	1	Camshaft
14088764	6	Bolt/Screw-Flywhl	17120735	16	Lifter, Vlv
10105117	2	Gasket-Cyl Hd	12550002	8	Guide-Vlv Lftr
12555771	1	Gasket-Cr/Shf Rr Oil Seal Hsg	12562818	1	Cover Asm-Eng Frt
10108676	1	Gasket-Oil Pan	10228655	1	Seal Asm, Cr/Shf Frt Oil
10046089	2	Gasket-Vlv Rkr Arm Cvr	10213294	8	Grommet, Eng Frt Cvr
12561389	3	Stud-Cr/Shf Brg Cap	12555269	2	Cover Asm-Vlv Rkr Arm
14101058	1	Stud-Cr/Shf Rr Oil Seal Ret	12552129	1	Sprocket-Cm/Shf
14088556	1	Housing, Cr/Shf Rr Oil Seal	14088784	1	Sprocket-Cr/Shf
			14088783	1	Chain-Cm/Shf Timing

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