

## ZZ4 Engine (24502609 Base) Long Block Specifications

Specifications Part Number 19172321

This ZZ4 long block specification sheet should be used in conjunction with the ZZ4 short block specification sheet, GM part number 19172279.

Thank you for choosing GM Performance Parts as your high performance source. GM Performance Parts is committed to providing proven, innovative performance technology that is truly.... more than just power. GM Performance Parts are engineered, developed and tested to exceed your expectations for fit and function. Please refer to our catalog for the GM Performance Parts Authorized Center nearest you or visit our website at [www.gmperformanceparts.com](http://www.gmperformanceparts.com).

This publication provides general information on components and procedures which may be useful when installing or servicing a ZZ4 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, ZZ4 engine specifications, additional parts that you may need to purchase, torque specifications, and a service parts list.

The ZZ4 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 ZZ4 engine can be installed, some procedures and recommendations may not apply to specific applications.

The ZZ4 engine is manufactured on current production tooling; consequently you may encounter dissimilarities between the ZZ4 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 ZZ4 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 ZZ4 engine and an older small block V-8 engine. These differences may require modifications or additional components not included with the ZZ4 engine. When installing a ZZ4 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 ZZ4 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.

TITLE <b>ZZ4 Engine Long Block Specifications</b>	IR 02MY07	PART NO. <b>19172321</b>	PAGE <b>1</b> OF <b>30</b>
---------------------------------------------------	-----------	--------------------------	----------------------------

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
	02MY07	Initial Release - Rusty Sampsel	

The information contained 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 the information provided in this publication.

Legal and Emissions Information

This publication is intended to provide information about the ZZ4 engine and related components. This manual also describes procedures and modifications that may be useful during the installation of a ZZ4 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.

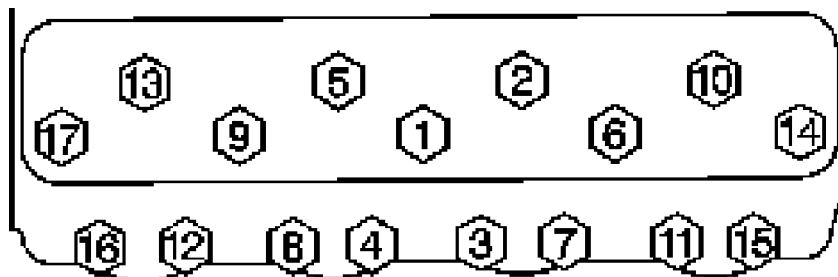
Chevrolet, Chevy, the Chevrolet Bow Tie Emblem, General Motors, and GM are all registered trademarks of the General Motors Corporation.

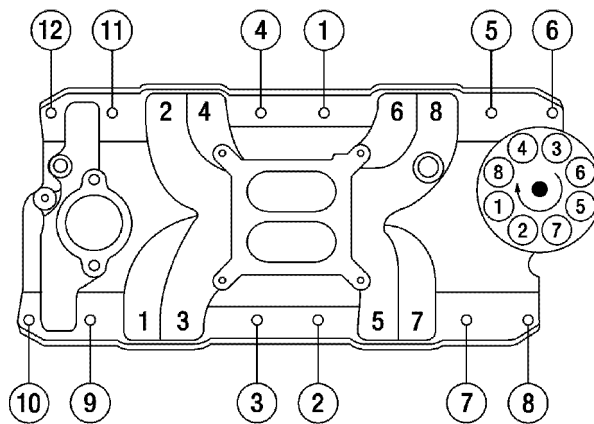
Package contents:

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>GM Part Number</u>
1	Engine Assembly	1	24502609
2	Short Block Instructions	1	19172279
3	Long Block Instructions	1	19172321

ZZ4 Engine Torque Specifications:

Camshaft retainer bolt/screw .....	106 in.-lbs. / 12 N·m
Camshaft sprocket bolt/screw .....	18 ft.-lbs. / 25 N·m
Connecting rod nut .....	.006" bolt stretch preferred 20 ft.-lbs. + additional 55°
.....	(45 ft.-lbs. if no angle gauge is available)/ 27 N·m +
.....	additional 55° (61 N·m if no angle gauge is available)
Crankshaft balancer bolt/screw .....	63 ft.-lbs. / 85 N·m
Crankshaft balancer pulley .....	35 ft.-lbs. / 47 N·m
Crankshaft bearing cap bolt/screw and stud .....	Inner: 70 ft.-lbs. Outer: 65 ft.-lbs. /
.....	Inner: 95 N·m Outer: 88 N·m
Crankshaft rear oil seal housing nut/bolt/screw .....	11 ft.-lbs. / 15 N·m
Cylinder head bolt /screw .....	65 ft.-lbs. / 88 N·m
Distributor bolt/screw .....	25 ft.-lbs. / 34 N·m
Drain plug .....	15 ft.-lbs. / 20 N·m
Engine block oil gallery plug .....	15 ft.-lbs. / 20 N·m
Engine front cover bolt screw .....	97 in.-lbs. / 11 N·m
Flywheel bolt/screw .....	65-70 ft.-lbs. / 88-95 N·m
Intake manifold bolt/screw and stud	
Final pass .....	11 ft.-lbs. / 15 N·m
Oil filter adapter bolt/screw .....	18 ft.-lbs. / 24 N·m
Oil level indicator tube bolt/screw .....	106 in.-lbs. / 12 N·m
Oil pan assembly	
Corner nut/bolt/screw .....	15 ft.-lbs. / 20 N·m
Side rail bolt/screw .....	97 in.-lbs. / 11 N·m
Oil baffle nut .....	30 ft.-lbs. / 40 N·m
Oil pan drain plug .....	15 ft.-lbs. / 20 N·m
Oil pump bolt/screw to rear crankshaft bearing cap .....	66 ft.-lbs. / 90 N·m
Oil pump cover bolt/screw .....	80 in.-lbs. / 9 N·m
Spark plug .....	15 ft.-lbs. / 20 N·m (tapered seat)
Starter motor bolt/screw .....	35 ft.-lbs. / 48 N·m
Valve lifter guide retainer bolt/screw .....	18 ft.-lbs. / 24 N·m
Water pump bolt/screw .....	30 ft.-lbs. / 40 N·m





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

Component Information:

Intake Manifold:

This ZZ4 engine comes with a GM Performance Parts dual plane intake manifold part number 10185063 designed for use on all small blocks through 1986. This intake manifold was designed with a dual pattern carb flange. This intake manifold does have provisions for late model accessory brackets, an exhaust gas recirculation (EGR) valve and an integral hot air choke.

Water Pump:

The ZZ4 engine comes with a long style cast iron water pump Part number 88894341, the water pump includes gaskets. The cooling system has a 180° F thermostat.

Ignition System:

The HEI (High Energy Ignition) distributor Part number 93440806 included with the ZZ4 engine 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 terminals provide a reliable, positive connection for the spark plug leads. However, the HEI's large diameter cap may interfere with other underhood components in vehicles not originally equipped with HEI ignition systems. Check for adequate clearance before installation. The HEI distributor supplied with the ZZ4 has a hardened (melonized) drive gear that is compatible with a steel camshaft. Use of a non-hardened distributor gear will result in excessive wear.

The HEI system requires a 12 volt power supply for proper operation. The HEI ignition system should be connected directly to the battery with 10 or 12 gauge wire through a high quality ignition switch. 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 Part number 12167658, which includes connectors and wires for the HEI's tachometer and 12 volt terminals.

Set spark timing at 32° before top dead center (BTDC) at 4000 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 remain disconnected. This engine is designed to operate using only the internal centrifugal advance to achieve the correct timing curve.

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" dill 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. 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 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.

TITLE <b>ZZ4 Engine Long Block Specifications</b>	IR 02MY07	PART NO. <b>19172321</b>	PAGE <b>5</b> OF <b>30</b>
---------------------------------------------------	-----------	--------------------------	----------------------------

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

ZZ4 Engine Specifications:

Displacement: ..... 350 cubic inches  
 Bore x Stroke: ..... 4.00 inch x 3.48 inch  
 Compression ..... 10:1  
 Block: ..... Cast iron, four-bolt intermediate mains  
 Cylinder Head: ..... Cast aluminum, 23° valve angle  
     Valve Diameter (Intake/Exhaust): ..... 1.94"/1.50"  
 Chamber Volume: ..... 58cc  
 Crankshaft: ..... 1053 Forged steel, 1 piece rear seal  
 Connecting Rods: ..... Forged, powdered metal, 3/8" bolts  
 Pistons: ..... High-Silicon aluminum  
 Rings: ..... Moly coated cast iron  
 Camshaft: ..... Hydraulic roller tappet  
     Lift: ..... .474" intake, .510" exhaust  
     Duration: ..... 208° intake, 221° exhaust @ .050" tappet lift  
     Centerline: ..... 108° ATDC intake, 116° BTDC exhaust  
 Rocker Arm Ratio: ..... 1.5:1  
 Timing Chain: ..... 8 mm single roller design  
 Oil Pan: ..... 4-quart  
 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: ..... 1/8 turn down from zero lash  
 Fuel: ..... Premium unleaded - 92 (R+M/2)  
 Maximum Engine Speed: ..... 5800 RPM  
 Spark Plugs: ..... AC Delco part # MR43LTS  
 Spark Plug Gap ..... .040"  
 Spark Timing: ..... 32° maximum @ 4000 RPM  
 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 ZZ4 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. Due to revisions in the crankshaft design, a ZZ4 engine must have a counterweighted flywheel (or flexplate) for proper balance. The ZZ4 engine includes a flexplate Part number 14088765. Additional flywheels and flexplates are available from the chart below.

ZZ4 Engine - Manual Transmission Flywheels

<u>Part #</u>	<u>Outside Dia.</u>	<u>Clutch Dia.</u>	<u>Starter Ring Gear Teeth</u>	<u>Notes</u>
14088648	14"	11.0,11.58"	168	For one-piece crank seal
14088646	12 3/4"	10.4,11.0"	153	Lightweight nodular iron flywheel, weighs approximately 15 lbs.; for one-piece crank seal
14088650	12 3/4"	10.4"	153	Standard weight flywheel; for one-piece crank seal

ZZ4 Engine - Automatic Transmission Flexplates

<u>Part #</u>	<u>Outside Dia.</u>	<u>Conv Bolt Pat.</u>	<u>Starter Ring Gear Teeth</u>	<u>Notes</u>
14088765	12 3/4"	10.75"	153	For one-piece crank seal
12554824	14"	11.50"	168	Heavy-duty flexplate with increased thickness for one-piece crank seal
14088761	14"	10.75,11.50"	168	For one-piece crank seal

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:

The ZZ4 does not include a starter. The starter must be matched to flywheel (or flexplate) diameter when installing a ZZ4 engine. Small diameter flywheels are 12 3/4" in diameter, and have starter ring gears 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 housings. Starter noses used with 14" diameter flywheels 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 ZZ4 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
- 14097279 Bolt, starter mounting, short, for heavy-duty starter
- 10455709 Remanufactured permanent magnet gear reduction (PMGR) starter for 12 3/4" diameter flywheel/flexplate (10 lb.)
- 12606096 Permanent magnet gear reduction (PMGR) starter for 14" diameter flywheel/flexplate (10 lb.)
- 14037733 Bolt, starter mounting, inner for 12 3/4" PMGR starter
- 12338064 Bolt, starter mounting, outer for 12 3/4" PMGR starter; also for 14" PMGR starter (2 required)

Oil Pan / Filter / Adapter / Dipstick:

The ZZ4 engine includes an oil pan part number 12557558. This is a four quart, right-hand dipstick oil pan and gasket.

The ZZ4 engine assembly includes an oil filter adapter and oil filter element (AC # PF 25). A premium oil filter (AC # UPF25) is available for your ZZ4 engine. This has a 100% wire backed synthetic media with 6 micron filtration. An offset oil filter adapter may 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.

- 12556204 Offset oil filter adapter
- 88893990 Gasket and seal, oil filter adapter
- 11610405 Washer, oil filter adapter (2 required)
- 14092398 Bolt, oil filter adapter (2 required)
- AC PF52 Filter to fit adapter, spin-on

The oil dipstick for the ZZ4 engine is on the right-hand (passenger) side of the block. A dipstick for the left-hand (driver) side of the block is available. Check for clearance when replacing the dipstick of an early-model block with a left-hand dipstick. The recommended oil dipstick and oil dipstick tube are Part number 12551144 and Part number 12551154 respectively. This oil dipstick tube bolts to the engine block below the deck surface, and can be used with header-type exhaust systems.

Carburetor / Air Cleaner:

A 750 cfm Holley four-barrel carburetor with either mechanical or vacuum operated secondaries and electric choke is recommended for the ZZ4 engine. GM Performance Parts has a 750 cfm Holley four-barrel carburetor Part number 12485506 with vacuum secondaries available.

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 chrome 14" air cleaner assemblies for single 4 barrel engines. 12342071 is the Classic design and 123420280 is the high performance design.



Fuel Pump:

The ZZ4 engine does not include a fuel pump. However, it does have a mechanical fuel pump boss with a block off plate installed. 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 25115899. This heavy duty pump flows 72 gallons per hour at 6-8 psi outlet pressure.

Headers:

A ZZ4 engine can be equipped with a header exhaust system for maximum performance in applications where a nonproduction exhaust system is legal. For street performance and limited competition applications, the recommended header configuration is 1 3/4" diameter primary pipes, 32 to 36 inches long, with 3" diameter collectors. Use 2 1/2" diameter tailpipes with a balance tube ("H" pipe) and low restriction mufflers.

Accessory Drive Brackets:

Two Accessory Drive Kits are available from GM Performance Parts to fit the ZZ4 engine. P/N 12497698 is used for vehicles with air conditioning and P/N 12497697 is used for vehicles without air conditioning. Please see your GM Performance Parts dealer or visit us on the web at [www.gmperformanceparts.com](http://www.gmperformanceparts.com).

Spark Plugs / Spark Plug Wires:

The ZZ4 engine comes with spark plugs part number 5614210 (AC # MR43LTS).

When installing the engine in a vehicle originally equipped with a small block V-8 with HEI ignition, 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.

Rocker Covers:

The ZZ4 engine comes equipped with black stamped steel, center hold-down bolt rocker covers. A wide variety of valve cover choices are available at your GM Performance Parts dealer or visit us on the web at [www.gmperformanceparts.com](http://www.gmperformanceparts.com). Pre-1987 flange mount rocker covers can be installed on the FB385 engine 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.

ZZ4 Service Parts List:

<u>Part #</u>	<u>Quantity</u>	<u>Name</u>	<u>Part #</u>	<u>Quantity</u>	<u>Name</u>
12531215	4	Bearing, Cr/Shf Upr/Lwr	12553059	1	Reinforcement, Oil Pan
12528826	1	Bearing, Cr/Shf Upr/Lwr (Thrust)	12550042	1	Shaft, O/Pmp Drv
12453172	2	Bearing, Cm/Shf #3 And #4	93442037	1	Pump Asm, Oil
12453170	1	Bearing, Cm/Shf #1	3998287	1	Shaft, O/Pmp Drv
12453171	2	Bearing, Cm/Shf #2 And #5	3764554	1	Retainer, O/Pmp Drv Shf
12561388	10	Bolt/Screw, Cr/Shf Brg C	10046007	1	Bolt/Screw, O/Pmp
3877669	6	Bolt/Screw, Cr/Shf Brg C	12554553	2	Pin, O/Pmp Loc
12561389	3	Stud, Cr/Shf Brg Cap	12562818	1	Cover Asm, Eng Frt
12556307	1	Crankshaft	10228655	1	Seal Asm, Cr/Shf Frt Oil
12556463	2	Head Asm, Cyl (W/ Valves)	88894341	1	Pump Asm, Wat
12557236	2	Gasket, Cyl Hd	12603957	1	Gasket, W/Pmp
10168525	14	Bolt/Screw, Cyl Hd (Long)	10202456	1	Thermostat Asm, Eng Cool
10168526	4	Bolt/Screw, Cyl Hd (Medium)	10108470	1	Outlet, Wat
10168527	16	Bolt/Screw, Cyl Hd (Short)	10105135	1	Gasket, Wat Otlt
12554314	1	Seal Asm, Cr/Shf Rr Oil	10185063	1	Manifold Asm, Int
12555771	1	Gasket, Cr/Shf Rr Oil Se	14091544	4	Bolt/Screw, Int Manif
12554816	1	Deflector, Cr/Shf Oil	14091544	1	Bolt/Screw, Int Manif
88960604	1	Balancer Asm, Cr/Shf	12525810	1	Gasket Kit-Int Manif (Foa)
106751	2	Key, Cr/Shf Balr	10185071	1	Camshaft Asm
14088765	1	Flywheel Asm	12552129	1	Sprocket, Cm/Shf
14088764	6	Bolt/Screw, Flywhl	14088784	1	Sprocket, Cr/Shf
10108688	8	Rod Asm, Conn	9424877	3	Bolt/Screw, Cm/Shf Spkt
461372	16	Bolt/Screw, Conn Rod	14088783	1	Chain Asm, Tmg
3866766	16	Nut, Conn Rod	10241740	16	Rod Asm, Vlv Push
10159436	8	Piston With Pin (Std)	17120735	16	Lifter Asm, Vlv
10159437	AR	Piston With Pin (.005)	12550002	8	Guide, Vlv Lftr
10159438	AR	Piston With Pin (.030)	10089648	16	Ball, Vlv Rkr Arm
12528817	8	Ring Kit, Pstn (Std)	10066063	16	Arm, Vlv Rkr
12528818	AR	Ring Kit, Pstn (.005)	12557390	16	Nut, Vlv Rkr Arm
12528819	AR	Ring Kit, Pstn (.030)	12555269	2	Cover Asm, Vlv Rkr Arm
12523924	16	Bearing, Conn Rod	10046089	2	Gasket, Vlv Rkr Arm Cvr
12557558	1	Pan Asm, Oil	93440806	1	Distributor Asm
11518377	1	Plug Asm, Oil Pan Drn	1894379	1	Shaft Asm, Distr (W/ Rot)
10108676	1	Gasket, Oil Pan	10456413	1	Gear, Distr Shf
12553058	1	Reinforcement, Oil Pan	5614210	8	Spark Plug Asm

DATE	REVISION	AUTH