

LS376/480 EFI Crate Engine (19171224) Specifications

Specifications Part Number 19172182

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This publication provides general information on components and procedures which may be useful when installing or servicing an LS376/480 Crate engine. Please read this entire publication before starting work.

This LS376/480 crate engine is assembled using brand new, premium quality components. It is based off of the Gen IV LS Series architecture, and utilizes such modern technologies as fuel injection, individual ignition coil per cylinder, and electronic throttle control. Due to the wide range of small block applications, if you are retrofitting a previous small block application, you may encounter installation differences between the LS376/480 crate engine assembly and the previous version. These differences may require modifications or additional components not included with the LS376/480 engine, including cooling, fuel, electrical, and exhaust systems. Some fabrication work may be required.

The LS376/480 crate engine requires an engine control system and harness which are available from your GM Performance Parts dealer. Check with your dealer or on gmperformanceparts.com for the control system packages that are currently available. Generally, the fuel system requirement is 60 psi (400 kPa) constant fuel pressure, but check the information included in your engine control system for the actual pressure requirement.

User Note: The GM Performance Parts LS 376/480 crate engine (19171224) comes equipped with the LS Hot Cam (88958733) which is an aggressive high performance camshaft that may cause slight surging below 2500 rpm under light load. This should be considered a normal functioning occurrence given the aggressive nature of the LS Hot Cam. This surging can be avoided by increasing either the rpm or throttle of the engine at the same given velocity. Under full throttle usage, you should not experience any surging when using a GMPP engine control system designed for the LS376/480.

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 LS376/480 crate 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
	14SE07	Initial Release - Tony Cubr	

Legal and Emissions Information

This publication is intended to provide information about the LS376/480 crate engine and related components. This manual also describes procedures and modifications that may be useful during the installation of an LS376/480 crate 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.

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.

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Package contents:

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>GM Part Number</u>
1	Engine Assembly	1	19166565
2	Engine Instructions	1	19172182

Component Information:

The LS376/480 crate engine uses stock 2008 LS3 components except as noted below. Additional service information not included in this document can be found from your GM Performance Parts dealer under the LS3 RPO (2008 Corvette) for all components except those noted below. When servicing or replacing items below, use information for a 2006 LS2 (Corvette) engine.

Camshaft

The LS376/480 crate engine uses GM Performance Parts camshaft 88958733, which has a 3-bolt sprocket mounting.

Camshaft Sprocket and Bolts

Camshaft sprocket 12586481 and bolts 12556127 (Qty 3) are used in conjunction with the 3-bolt camshaft design.

Timing Chain Dampener

Timing chain dampener 12588670 and bolts 11588364 (Qty 2) are used in conjunction with this design instead of the LS3-style chain tensioner.

Additional parts that may be needed:

Engine Control System

As indicated above, the LS376/480 crate engine requires an engine control system and harness which are available from your GM Performance Parts dealer. Check with your dealer or on gmperformanceparts.com for the control system packages that are currently available.

Flywheel:

The LS376/480 crate engine includes an original equipment flexplate (12582437) used on 2008 Corvette applications. Flywheel 12571611 is also available from your GM Performance Parts dealer for manual transmission applications.

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. Pilot bearing 12557583 is an original equipment bearing used with this type of engine and is recommended.

Starter:

The LS376/480 crate engine does not include a starter. GM Performance Parts part number 10465385 is matched to this application and is recommended. See your GM Performance Parts dealer for details.

Air Induction:

A foam or paper element, low restriction air filter/cleaner should be used to protect the engine from excessive wear. Additionally, your engine control system may have recommendations for air cleaners and intake systems for best performance.

Fuel Pump:

The LS376/480 engine does not include a fuel pump. Generally, the EFI system requirement is 60 psi constant pressure, but consult the information with your engine control system for the actual recommendation. The fuel pump you choose must be capable of 45 gph @ the recommended pressure. GM Part Number 19151145 is an in-tank unit that meets these requirements, but may not be adaptable for all applications. Numerous aftermarket pumps will meet these requirements as well.

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Accessory Drive Brackets:

Accessory Drive Kit part 19155067 is available from GM Performance Parts to fit the LS376/480 engine. This contains all components and hardware necessary for installation (includes air conditioning compressor, power steering pump, and alternator). Please see your GM Performance Parts dealer or visit us on the web at www.gmperformanceparts.com.

Start-up and Break-in Procedures

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.

1. This engine assembly needs to be filled with oil. After installing the engine, ensure the crankcase has been filled with the appropriate motor oil to the recommended oil fill level on the dipstick. The LS376/480 crate engine requires a special oil meeting GM Standard GM4718M (this will be specified on the oil label). Mobil 1 is one such recommended oil. Other oils meeting this standard may be identified as synthetic. However, not all synthetic oils will meet this GM standard. Look for and use only an oil that meets GM Standard GM4718M. 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 before starting. Install an oil pressure gauge (the existing oil pressure sensor location at the upper rear of the engine may be used) and disconnect the engine control system (removing power from the engine control module is generally recommended, but check your engine control system information for additional details). Note: Disconnecting only ignition or fuel injector connectors is not recommended – make sure the control system will not provide ignition or fuel to the engine.
3. Once the engine control system has been disconnected, crank the engine using the starter for 10 seconds and check for oil pressure. If no pressure is indicated, wait 30 seconds and crank again for 10 seconds. Repeat this process until oil pressure is indicated on the gauge.
4. Reconnect the engine control system. Start the engine and listen for any unusual noises. If no unusual noises are noted, run the engine at approximately 1000 RPM until normal operating temperature is reached.
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. 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.
7. Run five or six medium throttle (50%) accelerations to about 4000 RPM and back to idle (0% throttle) in gear.
8. Run two or three hard throttle (WOT 100%) accelerations to about 4000 RPM and back to idle (0% throttle) in gear.
9. Change the oil and filter. Replace the oil per the specification in step 1, and replace the filter with a new PF48 AC Delco oil filter. Inspect the oil and the oil filter for any foreign particles to ensure that the engine is functioning properly.
10. Drive the next 500 miles (12 to 15 engine hours) under normal conditions. Do not run the engine at its maximum rated engine speed. Also, do not expose the engine to extended periods of high load.
11. Change the oil and filter. Again, inspect the oil and oil filter for any foreign particles to ensure that the engine is functioning properly.

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LS376/480 Engine Specifications:

Type: 6.2L Gen IV Small Block V8
 Displacement: 376 cubic inches
 Bore x Stroke: 4.065 inch x 3.622 inch
 Compression 10.7:1
 Block: Cast aluminum, six bolt cross-bolted main caps
 Cylinder Head: Cast aluminum rectangle port
 Valve Diameter (Intake/Exhaust): 2.16"/1.59"
 Chamber Volume: 68cc
 Crankshaft: Nodular iron, internally balanced
 Connecting Rods: Powdered metal
 Pistons: Hypereutectic aluminum
 Camshaft: Hydraulic roller tappet
 Lift:525" intake, .525" exhaust
 Duration: 219° intake, 228° exhaust @ .050" tappet lift
 Centerline: 112° LSA
 Rocker Arm Ratio: 1.7:1
 Oil Capacity: 5.5-quart (with filter)
 Oil Pressure (Minimum, with hot oil): 6 psig @ 1000 RPM
 18 psig @ 2000 RPM
 24 psig @ 4000 RPM
 Recommended Oil: 5w30 Mobil 1 motor oil (or others meeting GM4718M Standard,
 which will be specified on the oil label)
 Oil Filter: AC Delco part # PF48
 Fuel: Premium unleaded - 92 (R+M/2)
 Maximum Engine Speed: 6600 RPM
 Spark Plugs: GM 12571164
 AC Delco # 41-985
 Spark Plug Gap040"
 Firing Order: 1-8-7-2-6-5-4-3

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

LS376/480 Crate Engine Torque Specifications:

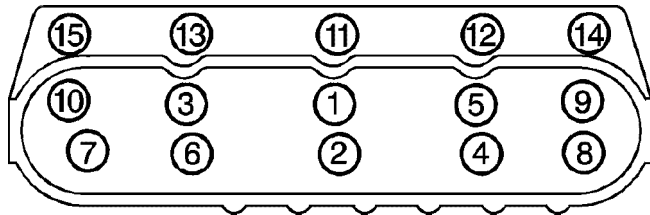
<u>Application</u>	<u>Specification</u>	
	<u>Metric</u>	<u>English</u>
Camshaft Position (CMP) Sensor Bolt	12 N·m	106 lb in
CMP Sensor Wire Harness Bolt	12 N·m	106 lb in
Camshaft Retainer Bolts - Hex Head Bolts	25 N·m	18 lb ft
Camshaft Retainer Bolts - TORX® Head Bolts	15 N·m	11 lb ft
Camshaft Sprocket Bolts	25 N·m	18 lb ft
Connecting Rod Bolts - First Pass	20 N·m	15 lb ft
Connecting Rod Bolts - Final Pass	85 degrees	
Coolant Air Bleed Pipe and Cover Bolts	12 N·m	106 lb in
Coolant Temperature Sensor	20 N·m	15 lb ft
Crankshaft Balancer Bolt - Installation Pass to Ensure the Balancer is Completely Installed	330 N·m	240 lb ft
Crankshaft Balancer Bolt - First Pass - Install a NEW Bolt After the Installation Pass	50 N·m	37 lb ft
Crankshaft Balancer Bolt - Final Pass	140 degrees	
Crankshaft Bearing Cap M10 Bolts - First Pass in Sequence	20 N·m	15 lb ft
Crankshaft Bearing Cap M10 Bolts - Final Pass in Sequence	80 degrees	
Crankshaft Bearing Cap M10 Studs - First Pass in Sequence	20 N·m	15 lb ft
Crankshaft Bearing Cap M10 Studs - Final Pass in Sequence	51 degrees	
Crankshaft Bearing Cap M8 Bolts	25 N·m	18 lb ft
Crankshaft Oil Deflector Nuts	25 N·m	18 lb ft
Crankshaft Position (CKP) Sensor Bolt	25 N·m	18 lb ft
Crankshaft Rear Oil Seal Housing Bolts	30 N·m	22 lb ft
Cylinder Head M11 Bolts - First Pass in Sequence	30 N·m	22 lb ft
Cylinder Head M11 Bolts - Second Pass in Sequence	90 degrees	
Cylinder Head M11 Bolts - Final Pass in Sequence	70 degrees	
Cylinder Head M8 Bolts - in Sequence	30 N·m	22 lb ft
Cylinder Head Coolant Plug	20 N·m	15 lb ft
Engine Block Coolant Drain Hole Plug	60 N·m	44 lb ft
Engine Block Oil Gallery Plug	60 N·m	44 lb ft
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Bolt	50 N·m	37 lb ft
Exhaust Manifold Bolts - First Pass	15 N·m	11 lb ft
Exhaust Manifold Bolts - Final Pass	20 N·m	15 lb ft
Exhaust Manifold Heat Shield Bolts	9 N·m	80 lb in
Exhaust Manifold Studs	20 N·m	15 lb ft
Flywheel Bolts - First Pass	20 N·m	15 lb ft
Flywheel Bolts - Second Pass	50 N·m	37 lb ft
Flywheel Bolts - Final Pass	100 N·m	74 lb ft
Front Cover Bolts	25 N·m	18 lb ft

<u>Application</u>	<u>Specification</u>	
	<u>Metric</u>	<u>English</u>
Fuel Injection Fuel Rail Bolts	10 N·m	89 lb in
Ignition Coil Bracket-to-Valve Rocker Arm Cover Stud	12 N·m	106 lb in
Ignition Coil-to-Bracket Bolts	10 N·m	89 lb in
Intake Manifold Bolts - First Pass in Sequence	5 N·m	44 lb in
Intake Manifold Bolts - Final Pass in Sequence	10 N·m	89 lb in
J 41798 M8 Bolt	25 N·m	18 lb ft
J 41798 M10 Bolts	50 N·m	37 lb ft
Knock Sensor Bolts	20 N·m	15 lb ft
Motor Mount Bracket Bolts	50 N·m	37 lb ft
Oil Filter	30 N·m	22 lb ft
Oil Filter Fitting	55 N·m	40 lb ft
Oil Level Indicator Tube Bolt	25 N·m	18 lb ft
Oil Level Sensor	20 N·m	15 lb ft
Oil Pan Closeout Cover Bolt - Left Side	9 N·m	80 lb in
Oil Pan Closeout Cover Bolt - Right Side	9 N·m	80 lb in
Oil Pan Cover Bolts	12 N·m	106 lb in
Oil Pan Drain Plug	25 N·m	18 lb ft
Oil Pan M6 Bolts - Oil Pan-to-Rear Oil Seal Housing	12 N·m	106 lb in
Oil Pan M8 Bolts - Oil Pan-to-Engine Block and Oil Pan-to-Front Cover	25 N·m	18 lb ft
Oil Pressure Sensor	35 N·m	26 lb ft
Oil Pump Cover Bolts	12 N·m	106 lb in
Oil Pump Relief Valve Plug	12 N·m	106 lb in
Oil Pump Screen Nuts	25 N·m	18 lb ft
Oil Pump Screen-to-Oil Pump Bolt	12 N·m	106 lb in
Oil Pump-to-Engine Block Bolts	25 N·m	18 lb ft
Spark Plugs	15 N·m	11 lb ft
Throttle Body Bolts	10 N·m	89 lb in
Timing Chain Dampener Bolts	25 N·m	18 lb ft
Valley Cover Bolts	25 N·m	18 lb ft
Valve Lifter Guide Bolts	12 N·m	106 lb in
Valve Rocker Arm Bolts	30 N·m	22 lb ft
Valve Rocker Arm Cover Bolts	12 N·m	106 lb in
Water Inlet Housing Bolts	15 N·m	11 lb ft
Water Pump Bolts - First Pass	15 N·m	11 lb ft
Water Pump Bolts - Final Pass	30 N·m	22 lb ft

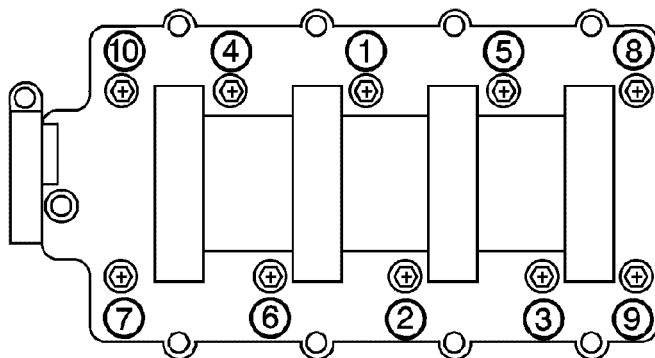
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LS376/480 Crate Engine Torque Sequences

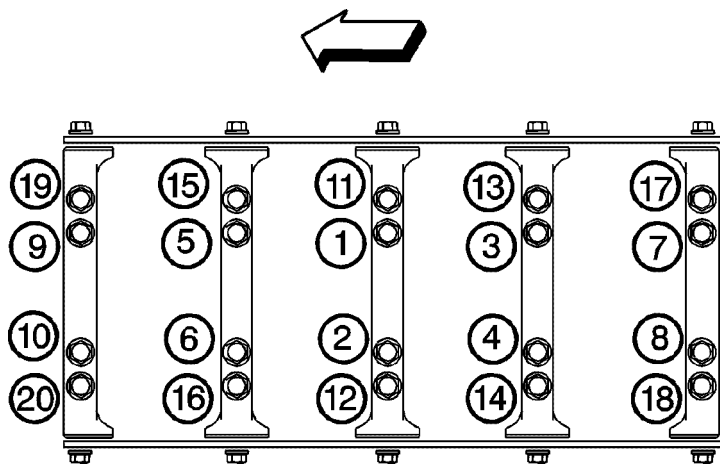
Cylinder Head Bolts



Intake Manifold Bolts (arrow indicates front of engine)



Crankshaft Bearing Cap Bolts and Studs (arrow indicates front of engine)



DATE	REVISION	AUTH

LS376/480 Service Parts List:

<u>Part Number</u>	<u>Qty</u>	<u>Name</u>
12569167	8	ARM ASM,INTAKE VALVE ROCKER
10214664	8	ARM ASM,VALVE ROCKER
12601402	1	BALANCER,CRANKSHAFT
89017572	1	BEARING KIT , CRANKSHAFT (POSITION 3)
89017571	4	BEARING KIT, CRANKSHAFT (POSITIONS 1,2,4,5)
89017573	8	BEARING KIT,CONNECTING ROD
12558539	1	BEARING,CAMSHAFT (POSITION 3)
12574413	2	BEARING,CAMSHAFT (POSITIONS 1,5)
12574414	2	BEARING,CAMSHAFT (POSITIONS 2,4)
12584727	1	BLOCK ASM,ENGINE
12570790	1	BODY ASM,THROTTLE
12551177	4	BOLT/SCREW,CAMSHAFT RETAINER
12556127	3	BOLT/SCREW,CAMSHAFT SPROCKET
11561455	4	BOLT/SCREW,CAMSHAFT THRUST PLATE
11570662	16	BOLT/SCREW,CONNECTING ROD
12557840	1	BOLT/SCREW,CRANKSHAFT BALANCER
12560272	10	BOLT/SCREW,CRANKSHAFT BRG CAP
12556127	10	BOLT/SCREW,CRANKSHAFT BRG CAP (SIDE)
11588723	12	BOLT/SCREW,CRANKSHAFT RR OIL SEAL
11588723	12	BOLT/SCREW,CRANKSHAFT RR OIL SEAL
12551177	1	BOLT/SCREW,CRANKSHAFT POSITION SENSOR
11562524	20	BOLT/SCREW,CYLINDER HEAD
12558840	10	BOLT/SCREW,CYLINDER HEAD
11519978	11	BOLT/SCREW,ENG BLOCK VALLEY
11516486	4	BOLT/SCREW,ENG COOLANT AIR BLEED PIPE
12551187	8	BOLT/SCREW,ENG FRT COVER
11588712	2	BOLT/SCREW,ENG FRT COVER
11588739	4	BOLT/SCREW,ENG LIFT BRACKET
11588736	1	BOLT/SCREW,EVAPORATIVE EMISSION CANISTER
11519840	6	BOLT/SCREW,EXH MANIFOLD HEAT SHIELD
11519840	6	BOLT/SCREW,EXH MANIFOLD HEAT SHIELD
11518860	12	BOLT/SCREW,EXHAUST MANIFOLD FLANGE
12554211	4	BOLT/SCREW,F/INJECTION FUEL RAIL
12553332	6	BOLT/SCREW,FLYWHEEL
11516424	8	BOLT/SCREW,IGNITION COIL
11900243	8	BOLT/SCREW,IGNITION COIL
12552344	10	BOLT/SCREW,INTAKE MANIFOLD
11562253	1	BOLT/SCREW,MAP SENSOR
12551187	13	BOLT/SCREW, OIL PAN
12554900	2	BOLT/SCREW, OIL PAN
12551187	4	BOLT/SCREW,OIL PUMP

11509800	7	BOLT/SCREW,OIL PUMP COVER
11588712	1	BOLT/SCREW,OIL PUMP SUCTION PIPE
11588736	1	BOLT/SCREW,OIL LVL IND
3531733	8	BOLT/SCREW,PCV BFL
11519971	4	BOLT/SCREW,THROT BODY
11588364	2	BOLT/SCREW,TIMING CHAIN DAMPENER
12551163	4	BOLT/SCREW,VALVE LIFTER GUIDE
12560961	16	BOLT/SCREW,VALVE ROCKER ARM
12577215	8	BOLT/SCREW,VALVE ROCKER ARM
12551926	6	BOLT/SCREW,WATER PUMP
11516480	2	BOLT/SCREW,WATER PUMP INLET
12577830	1	BRACKET,EVAPORATIVE EMISSION CANISTER
12574634	1	BRACKET,F/INJECTION FUEL RAIL
12580353	2	BRACKET,IGNITION COIL
88958733	1	CAMSHAFT ASM
12577268	1	CAP ASM,OIL FIL
25532662	1	CAP,FUEL PRESS SERV VALVE
10166344	16	CAP,VALVE SPRING
12586482	1	CHAIN ASM,TIMING
12573190	4	COIL ASM,IGNITION (ROUND SHAPED COIL)
12570616	8	COIL ASM,IGNITION (SQUARE SHAPED COIL)
12599296	1	COVER ASM,ENG BLK VALLEY
12602540	2	COVER ASM,ENG COOL AIR BLD PIPE HOLE
12600325	1	COVER ASM,ENG FRT
12570427	1	COVER ASM,VALVE ROCKER ARM (LEFT)
12582224	1	COVER ASM,VALVE ROCKER ARM (RIGHT)
12604708	1	COVER,INTAKE MANIFOLD
12597569	1	CRANKSHAFT ASM
12588670	1	DAMPENER ASM,TIMING CHAIN
12558189	1	DEFLECTOR,CRANKSHAFT OIL
12567915	1	FITTING,PCV
89017839	4	GASKET KIT,INT MANIFOLD (2 PER KIT)
12574293	1	GASKET,CRANKSHAFT RR OIL SEAL
12610046	2	GASKET,CYL HD
12610141	1	GASKET,ENG BLK VALLEY COVER
12574294	1	GASKET,ENG FRT COVER
12610305	2	GASKET,EXHAUST MANIFOLD
12558760	1	GASKET,OIL PAN
12560696	2	GASKET,VALVE ROCKER ARM COVER
12610311	2	GASKET,WATER PUMP
12595365	2	GUIDE,VALVE LIFTER
12600825	2	HEAD ASM,CYL
12600254	1	HOSE,ENG COOL AIR BLEED PIPE

12615666	1	HOUSING ASM,CRANKSHAFT RR OIL SEAL
12614813	1	HOUSING ASM,CRANKSHAFT RR OIL SEAL
12570788	1	INDICATOR ASM,OIL LVL
12576341	8	INJECTOR ASM,SEQ M/PORT
12600172	1	INLET ASM,WATER PUMP
12561513	1	KEY,CRANKSHAFT BALANCER
10166345	16	KEY,VALVE STEM
17122490	8	LIFTER ASM,VALVE
12603758	1	MANIFOLD,EXHAUST (LEFT)
12603760	1	MANIFOLD,EXHAUST (RIGHT)
12602477	1	MANIFOLD,INTAKE
11516076	9	NUT,CRANKSHAFT OIL DEFLECTOR
11516076	1	NUT,OIL PUMP SUCTION PIPE
12598186	1	PAN ASM, OIL
24575061	1	PIN,CAMSHAFT SPROCKET LOC
12570326	4	PIN,CYL HD LOC
3736406	2	PIN,TRANS LOC
12602548	1	PIPE ASM,ENG COOL AIR BLEED
19168089	8	PISTON ASM,(W/ PIN)
12582437	1	PLATE ASM,A/TRNS FLEX (W/HUB)
11610259	1	PLUG ASM,CYL HD CORE HOLE
9427693	1	PLUG ASM,ENG BLK OIL GALLEY
12573460	1	PLUG ASM,ENG BLK OIL GALLEY
11569958	2	PLUG ASM,ENG BLK OIL GALLEY
24502262	1	PLUG,CYL HD CORE HOLE
11569958	1	PLUG,ENG BLK COOL DRN HOLE
11609289	1	PLUG,ENG BLK COOL DRN HOLE
12602048	2	PLUG,ENG COOL AIR BLEED
12579145	1	PLUG,PCV VALVE COVER
12586665	1	PUMP ASM,OIL
12600465	1	PUMP ASM,WATER
12572174	1	RAIL ASM,M/PORT F/INJECTION
12589016	1	RETAINER,CAMSHAFT
24503227	8	RETAINER,FUEL INJECTOR
12569638	16	RETAINER,PISTON PIN
19168090	8	RING KIT,PISTON
12586768	1	RING,CRANKSHAFT POSITION SENSOREXCITER
12617570	8	ROD ASM,CONNECTING
10238852	16	ROD ASM,VALVE PUSH
12558750	1	SCREEN ASM,OIL PUMP (W/ SUCTION PIPE)
12561244	1	SEAL ASM,CRANKSHAFT FRT OIL
12602972	1	SEAL ASM,CRANKSHAFT RR OIL
89017587	8	SEAL KIT,FUEL INJECTOR (INJECTOR AND RAIL)
12610160	8	SEAL,ENG BLOCK VALLEY COVER

12602541	2	SEAL,ENG COOLANT AIR BL PIPE (O RING)
12585673	1	SEAL,ENG FRT COVER
12565209	8	SEAL,EXH VALVE STEM OIL
12560251	2	SEAL,INT MANIFOLD
12565208	8	SEAL,INT VALVE STEM OIL
12557752	1	SEAL,OIL PUMP SUCTION PIPE (O RING)
24100002	1	SEAL,OIL FIL TUBE (O RING)
24504031	2	SEAL,OIL LVL IND TUBE (O RING)
12576549	1	SEAL,THROT BODY
12570307	1	SEAL,WAT INLET
12585545	1	SENSOR ASM,CAMSHAFT POSITION
12585546	1	SENSOR ASM,CRANKSHAFT POSITION
12608814	1	SENSOR ASM,ENG COOLANT TEMPERATURE
12603781	1	SENSOR ASM,ENG OIL LEVEL
12573107	1	SENSOR ASM,ENG OIL PRESSURE
12570125	2	SENSOR ASM,KNOCK
12591290	1	SENSOR ASM,MAP
12576823	1	SHIELD,EXHAUST MANIFOLD HEAT (LEFT)
12576822	1	SHIELD,EXHAUST MANIFOLD HEAT (RIGHT)
15336959	1	SHIELD,SPARK PLUG WIRE
12586484	16	SPRING ASM,VALVE
12586481	1	SPROCKET,CAMSHAFT
12556582	1	SPROCKET,CRANKSHAFT
12594090	1	STOP,FUEL INJECTION FUEL RAIL
12608381	1	STOP,FUEL INJECTION FUEL RAIL
12560273	10	STUD,CRANKSHAFT BRG CAP
11518424	4	STUD,EXHAUST MANIFOLD
12554211	10	STUD,IGNITION COIL BRKT
12600936	2	SUPPORT,VALVE ROCKER ARM PIVOT
12600171	1	THERMOSTAT ASM,ENG COOL
12570787	1	TUBE ASM,OIL LEVEL INDICATOR
12607115	1	TUBE,EVAPORATIVE EMISSION CANISTER PURGE
12559505	1	TUBE,OIL FILL
12599298	1	TUBE,PCV
12597341	1	VALVE ASM,EVAPORATIVE EMISSION CANISTER PURGE
12574525	1	VALVE ASM,FUEL PRESS SERVICE
12582719	8	VALVE,EXHAUST
12569427	8	VALVE,INTAKE
12603843	1	WASHER,CRANKSHAFT BALANCER
12600525	1	WASHER,CRANKSHAFT BALANCER
12593593	1	WIRE ASM,CAMSHAFT POSITION SENSOR
12579355	2	WIRE ASM,IGNITION COIL
89018057	8	WIRE ASM,SPARK PLUG (1 WIRE)
89018058	1	WIRE KIT,SPARK PLUG (8 WIRES)