502/502 Deluxe and Base Engine Kit (12371204) and (12371171)

Specifications Part Number 12368083

These instructions are intended to be used for both crate engine part numbers 12371171 and 12371204. Some of these instructions will cover items not included in the Base Kit.

***NOT FOR SALE OR USE ON POLLUTION CONTROLLED VEHICLES.**

IMPORTANT: Read ALL of the instructions thoroughly before proceeding with the assembly and the installation. Retain this publication for future reference.

This publication provides general information on components and procedures which may be useful when assembling, installing, or servicing a 502/502 Chevrolet V-8 engine assembly. Topics include assembly notes, installation notes, recommended accessories, parts lists, and engine specifications. Due to the wide variety of vehicles in which 502/502 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.

IMPORTANT SAFETY NOTE

Observe all safety precautions and warnings in the applicable service manuals when installing a 502/502 engine assembly in any vehicle. Always wear protective eye wear 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.

Legal and Emissions Information

This publication is intended to provide information about the 502/502 engine assembly and related components. This publication also describes procedures and modifications that may be useful during the installation of a 502/502 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. Chevrolet, Chevy, the Chevrolet Bow Tie Emblem, General Motors and GM are registered trademarks of the General Motors Corporation.

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	DR
08DE97	Initial Release per ECA P7E00326		
13JA98	Revised descriptions and part numbers pgs 10 & 11		

Installation Notes

The big-block Chevrolet V-8 was introduced in 1965. During this period, there have been numerous revisions and design changes to accommodate various chassis and engine configurations. The 502/502 engine assembly is manufactured on current production tooling; consequently you may encounter dissimilarities between the 502/502 engine assembly and previous versions of the big-block V-8. In general, items such as motor mounts, accessory drives, exhaust manifolds, etc. can be transferred to a 502/502 engine when it is installed in a vehicle originally equipped with a big-block V-8 engine. However, there may be significant differences in the flywheel bolt pattern, water pump, torsional damper, etc., between a 502/502 engine assembly and an older big-block V-8 engine. These differences may require modifications or additional components not included with the 502/502 engine. When installing a 502/502 engine assembly in a vehicle not originally equipped with a big-block V-8 engine, it may necessary to adapt or fabricate various components for the cooling, fuel, electrical, and exhaust systems.

Whether or not your vehicle was originally equipped with a big-block V-8 engine, now would be a good time to check the rest of your drivetrain to ensure that it can handle a 502 horsepower engine.

Tools Needed For Assembly

Torque Wrench	1/2" Drill Motor	Utility Knife	Long Flat Blade Screwdriver
Engine Stand	Engine Hoist	9/16" Wrench	12 point 3/8" Socket
6 point 3/8" Socket	6 point 1/2" Socket	6 point 9/16" Socket	6 point 5/8" Socket
13/16" Spark Plug Socket	1/2" Drive Ratchet	3/8" Drive Ratchet	

Distributor Gear

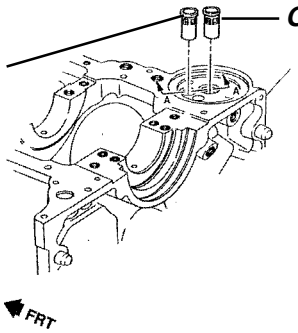
A melonized distributor gear must be used in these 502/502 engine assemblies. The deluxe 502/502 engine assembly comes with a melonized distributor gear. For the base 502/502 engine assembly you must install a GM HEI distributor, GM part number 93440806, with melonized gear or install a melonized gear on your distributor. Use GM part number 10456413 gear for 31/64" diameter distributor shafts or use GM part number 10493532 gear for 27/64" diameter distributor shafts.

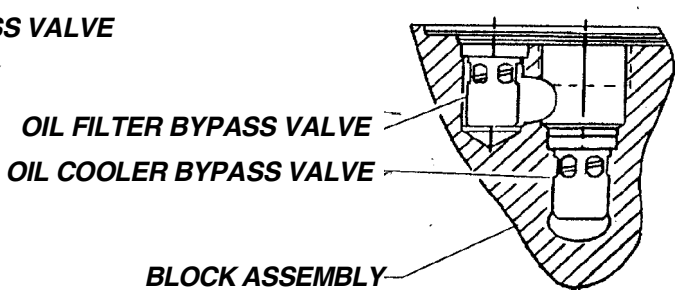
Oil Pressure Bypass Valves

502/502 engines come with two oil pressure bypass valves installed in the engine block. Both valves are rated at 11 psi pressure differential. One valve is for the oil filter and the other valve is for the GM oil cooler. See Figure 1. If an aftermarket oil cooler or remote oil filter is installed that attaches to the oil filter pad on the engine block, change the bypass valve for the oil filter in the engine block. The aftermarket oil lines add resistance which may cause the bypass valve to stay open. The engine oil would bypass the oil filter and the oil cooler. Change the bypass valve to one with a higher differential pressure rating. A good choice would be GM part number 25161284 which is rated at 30 psi. Remove and replace the valve that is closest to the crankshaft with the new valve. Press the new valve into the engine block and stake the new valve in three places. Do not change the bypass valve for the oil filter for an adapter that angles the oil filter for clearance The bypass valve for the GM oil cooler is only used when a GM oil cooler is installed. The GM oil cooler installs into the two ports located on the oil pan rail near the oil filter pad. The lines for the GM oil cooler install with special adapters which contain an oil diverter. The oil diverter diverts engine oil into the oil cooler. The bypass valve for the oil cooler can either be removed or be retained if a GM oil cooler is not used and the ports are plugged. The bypass valve for the oil cooler is located above the adapter for the oil filter. When the bypass valve for the oil cooler is removed the oil flows straight into the engine with less restriction. However, if a GM oil cooler is latter added, install a bypass valve for the oil cooler and use the GM adapters for the lines of the oil cooler.

DATE	REVISION	AUTH	DR
07FE08	Revised - Rusty Sampsel		

FIGURE 1





SECTION A-A

Unpack The Engine

Before unpacking the engine have an area set aside to assemble the engine. This area must be clean, uncluttered, well light, and available for several days to assemble the engine. Read this publication first before opening any boxes or assembling the engine. Carefully unpack the parts from the engine crate. Lay the parts out and verify that no parts are missing. Contact your dealer if something is missing. In order to assemble this engine you will need some special tools; a recently calibrated torque wrench, an engine stand, and an engine hoist. If you don't own these tools you can usually rent them at your local rental center. The other tools that are needed are listed in the tools section of this publication. The list of components contained in this package can be found on pages 14 and 15.

Clean The Engine Parts

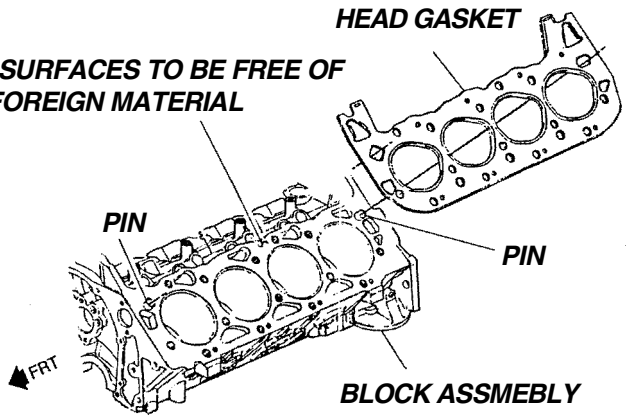
Clean loose parts like the push rods, the rocker arms, the rocker arm nuts, the rocker arm balls, and the oil shield prior to assembly.

Assemble The Base Engine And The Deluxe Engine Common Components

Install The Cylinder Heads

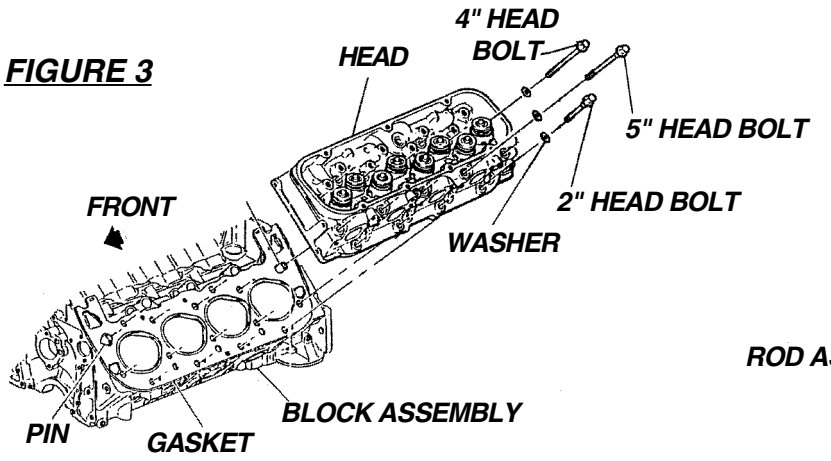
1. *Bolt the short block to an engine stand or use the shipping crate as an engine stand.*
2. *Place the head gaskets on engine. See Figure 2.*
3. *Separate the cylinder bolts and the washers for the cylinder heads on your workbench. You will need four 2"bolts, eight 4"bolts, four 5"bolts, and 16 washers for each side. Put one washer on each bolt. There will be eight extra washers and eight extra 4" bolts.*
4. *Install one cylinder head at a time to the engine short block.*
5. *Lightly coat the threads of the cylinder head bolts with oil as you use them to attach the cylinder head. Thread sealer is not needed for this engine because all of the head bolt holes are blind tapped holes*
6. *The 2"bolts are used in the holes along the bottom edge of the head. The 5"bolts are used in the holes near the exhaust ports. Use the 4"bolts in the remaining holes. Hand tighten all of the bolts. See Figure 3.*
7. *Tighten the bolts alternately per the sequence and pattern shown in Figure 4. Apply torque in 25 ft-lbs increments over two repetitions with the third repetition to the final tightening specification. The final tightening specification for the 2" bolts is 65 ft-lbs. The final tightening specification for the 4" and 5" bolts is 75 ft-lbs. A re-torque is recommended after the initial warm-up and cool-down.*
8. *Repeat steps 4-7 for the opposite cylinder head.*

FIGURE 2



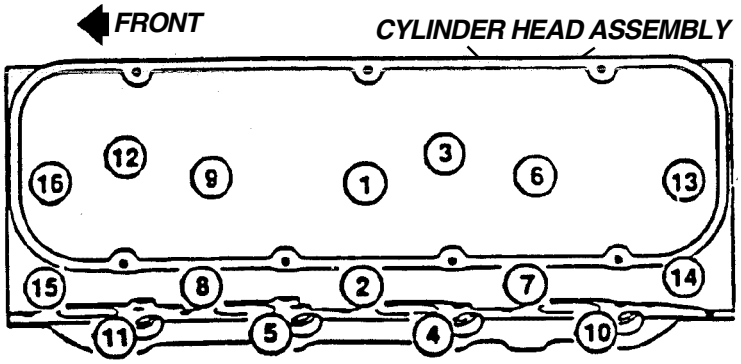
LEFT HAND SHOWN
RIGHT HAND TYPICAL

FIGURE 3



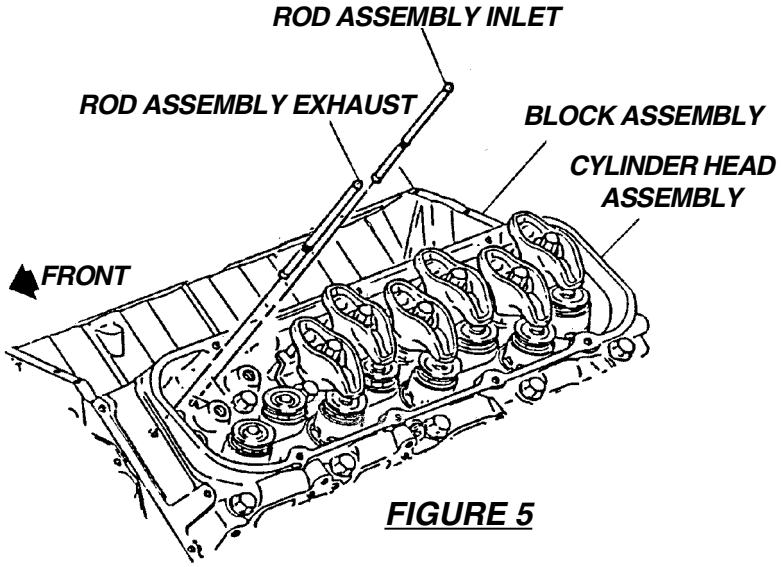
LEFT HAND SHOWN
RIGHT HAND TYPICAL

FIGURE 4



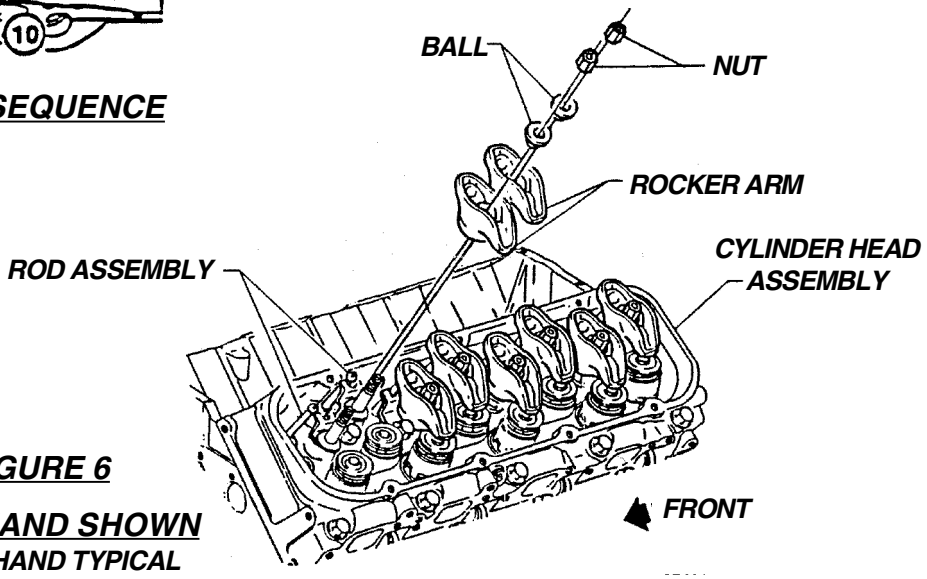
HEAD BOLT TORQUE TIGHTENING SEQUENCE

FIGURE 5



LEFT HAND SHOWN
RIGHT HAND TYPICAL

FIGURE 6



LEFT HAND SHOWN
RIGHT HAND TYPICAL

Install The Push Rods And The Rocker Arms

1. *Install the push rods in engine. The exhaust push rods are longer than the intake push rods. Ensure that the push rods are seated properly in the lifters. See Figure 5.*
2. *Apply grease to the rocker arm balls and the rocker arms.*
3. *Hand tighten the rocker arms, the rocker arm balls, and the rocker arm nuts onto the rocker arm studs. See Figure 6.*

Set The Lifter Preload

1. *Rotate the crankshaft with a wrench until the "0" mark on the vibration damper lines up with the timing tab and the engine is in the number one firing position. This may be determined by placing fingers on the number one rocker arms as the "0" mark on the damper comes near the timing tab. If the rocker arms are not moving, the engine is in the number one firing position. If the rocker arms move as the mark comes up to the timing tab, the engine is in the number six firing position and the crankshaft should be turned over one more time to reach the number one position.*
2. *With the engine in the number one firing position as determined above, the following valves may be adjusted:*

   Exhaust: 1, 3, 4, 8

   Intake: 1, 2, 5, 7

(Even numbered cylinders are in the right bank; odd numbered cylinders are in the left bank, when viewed from the rear of the engine).

3. *Loosen the adjusting nut until lash is felt at the pushrod then tighten the adjusting nut until all lash is removed. This can be determined by rotating the pushrod while turning the adjusting nut. See Figure 7. When the lash has been removed, tighten the adjusting nut an additional 1/8 turn to center the lifter plunger.*
4. *Rotate the crankshaft with a wrench one revolution until the vibration damper "0" mark and the timing tab are again in alignment. This is the number six firing position. The following valves may be adjusted:*

   Exhaust: 2, 5, 6,7

   Intake: 3, 4, 6, 8

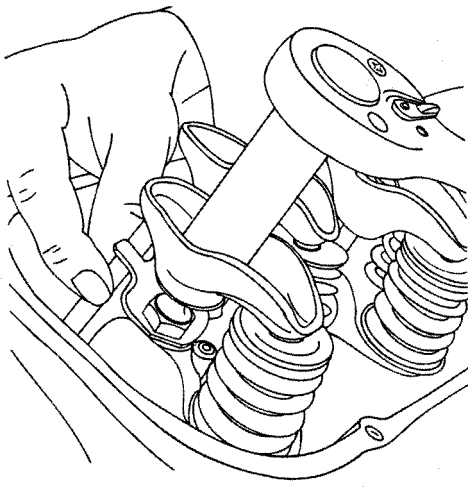


FIGURE 7

Install The Rocker Arm Covers

1. *Pour EOS over the lifters, the rocker arms, and the drain holes over the camshaft.*
2. *Install the grommets and the oil fill cap to the rocker arm covers.*
3. *Install the engine identification decals on the covers if desired.*
4. *Install the rocker arm cover gaskets to the cylinde*
5. *Install the rocker arm covers using the 14 1/4"-20*
6. *Torque the bolts to 70 in-lbs. See Figure 8.*

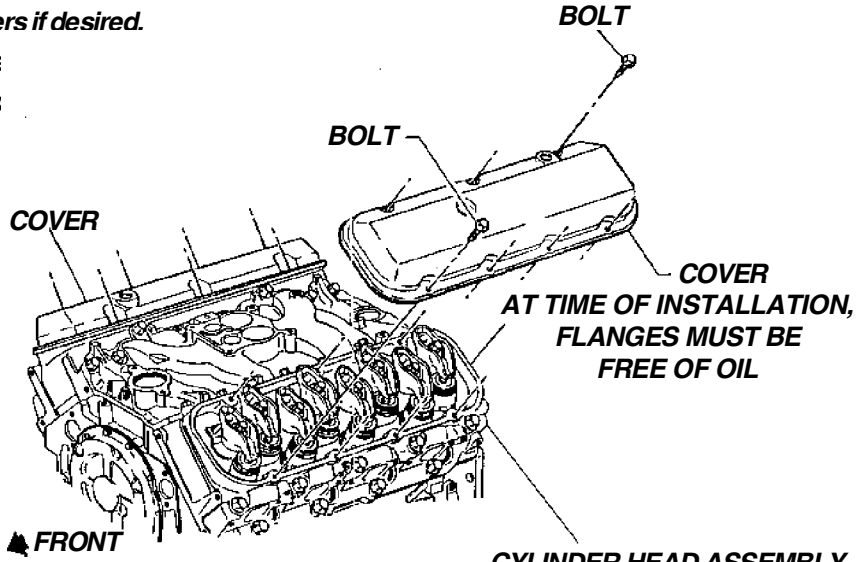


FIGURE 8

Install The Oil Level Indicator

1. *Place the seal on the end of the indicator tube and press the tube into the fitting in the oil pan. See Figure 9.*
2. *Bolt the indicator tube assemble to the exhaust manifold bolt hole.*
3. *Insert the indicator into the indicator tube.*

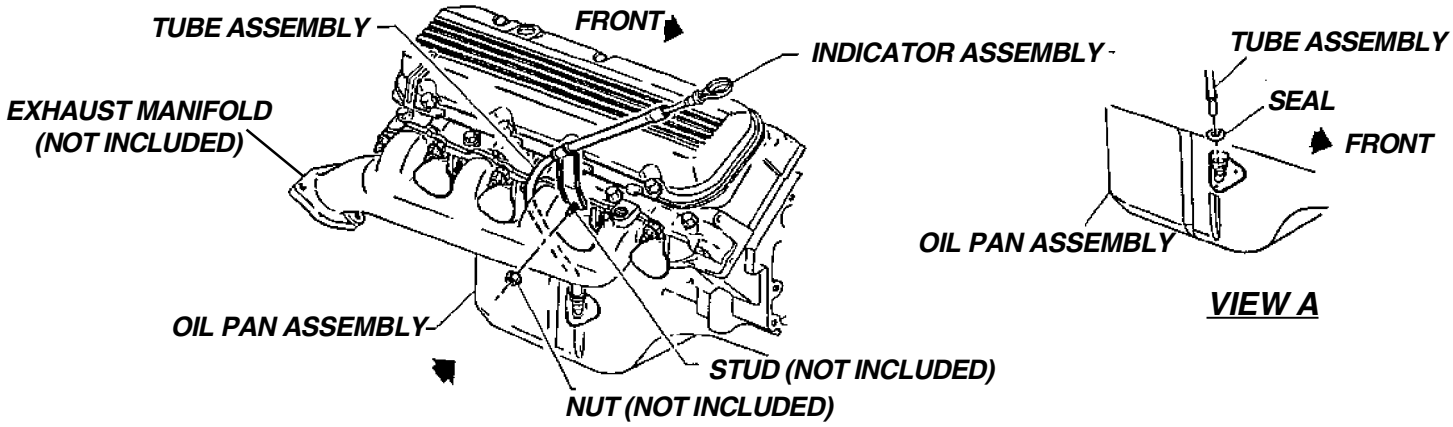


FIGURE 9

Install The Engine Lift Hooks

1. *Install the engine lift hooks to the top holes of the cylinder heads on the rear corner of the passenger side and the front corner of the driver side of the engine.*
2. *Torque the bolts of the engine lift hooks to 35 ft-lbs. See Figure 10.*

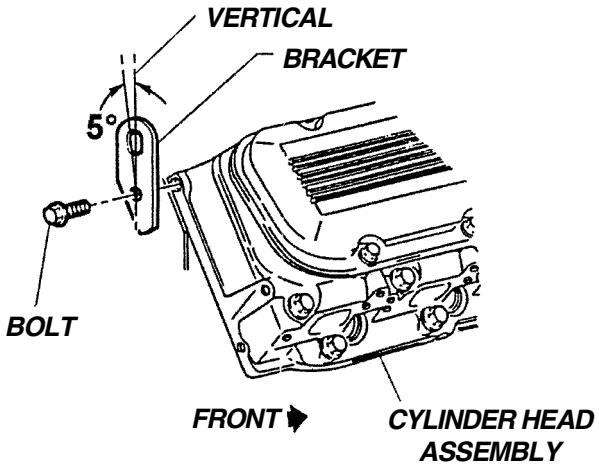


FIGURE 10

Install A Pipe Plug Or A Temperature Sender In The Cylinder Heads

1. *Apply thread sealer to the threads of the pipe plugs.*
2. *Install the pipe plugs into the coolant holes on the side of the heads. Torque the plugs to 15 ft-lbs. See Figure 11.*
3. *A temperature sender can be installed in one of the coolant holes in the heads or in one of the coolant holes in the intake manifold instead of a pipe plug.*

NOTE: The remaining instructions are for the Deluxe Engine, but Base Engine buyers should review the instructions.

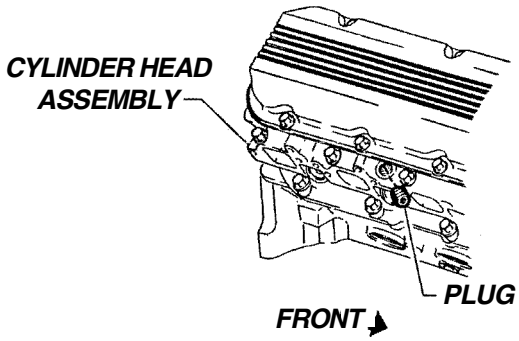


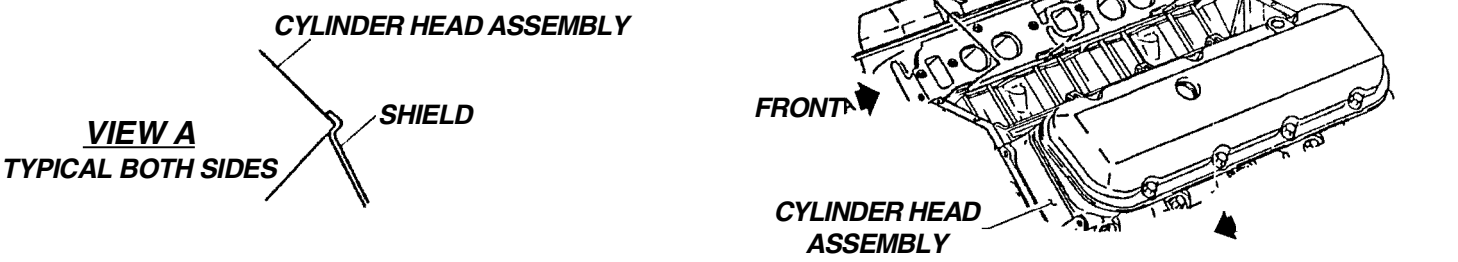
FIGURE 11

Assemble The Unique Components Of The Deluxe Engine

Install The Oil Shield

1. *Install the oil shield into the lifter valley. See Figure 12.*
2. *Ensure the shield snaps into place. See View A in Figure 12.*

FIGURE 12



Install The Intake Manifold Gaskets

1. *Place the intake gaskets with the part number side facing up on the cylinder heads. The three cutouts for the oil shield will be on the bottom of the gasket. Verify that the gaskets do not obstruct the port openings of the cylinder heads. No trimming should be necessary on the gaskets. However, if some trimming is necessary mark the parts of the gaskets that need trimming. Remove the gaskets from the heads. Trim the gaskets with an utility knife. Place the gaskets on the intake manifold with the part number side facing the manifold. Verify that the gaskets do not obstruct the port openings of the manifold. If necessary, trim the gaskets with an utility knife. Install the gaskets on the heads with the part number side facing up. Slide the oil shield forwards or backwards to ensure that the cutouts in the gaskets fit around the tabs on the oil shield. See Figure 13.*
2. *Do not use end seals across the end seal surface of the engine block. Instead apply a 3/8"bead of RTV sealer. Overlap the four corners of the intake gaskets with the sealer. See View A in Figure 13.*

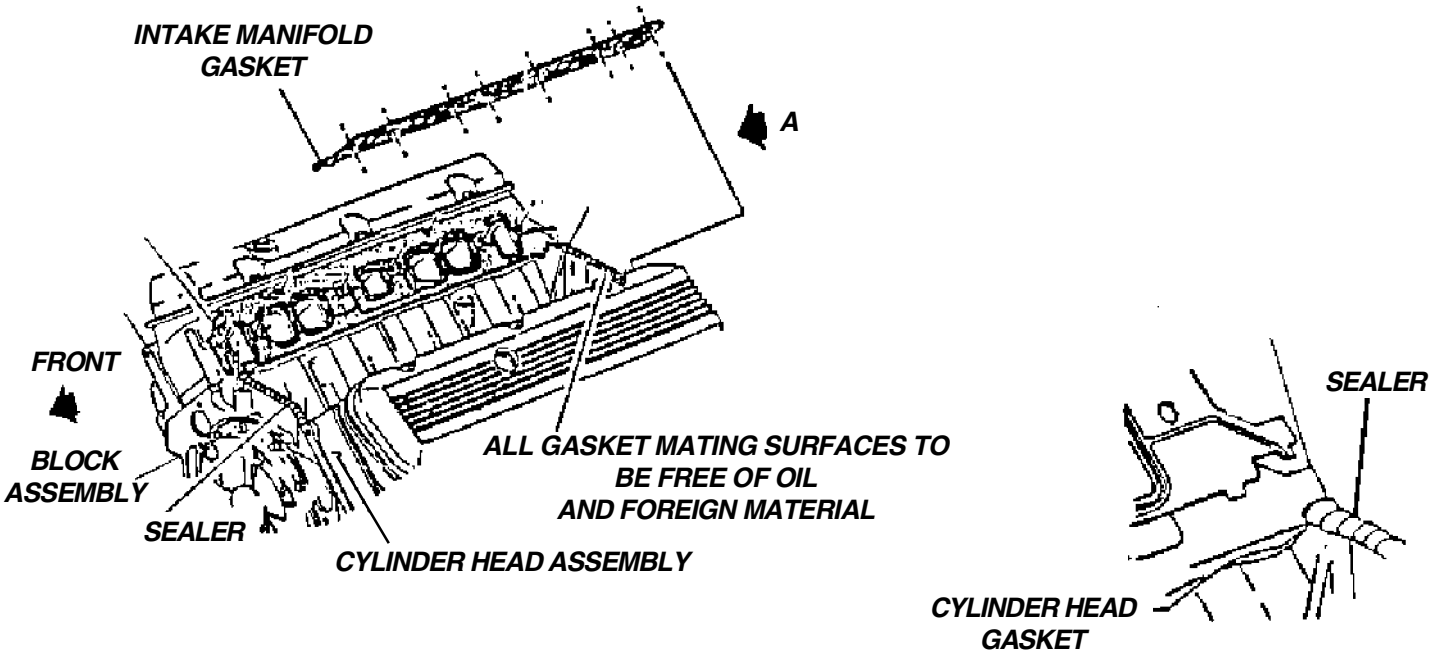


FIGURE 13

Install The Intake Manifold

1. Carefully position the intake manifold on the engine. Align the bolt holes in the manifold with the bolt holes in the cylinder head. See Figure 14.
2. Apply thread sealer to the threads of the bolts that are exposed to water or oil.
3. Insert and start the intake manifold bolts by hand. See Figure 15 for the bolt tightening sequence. Torque the intake manifold bolts to 25 ft-lbs.

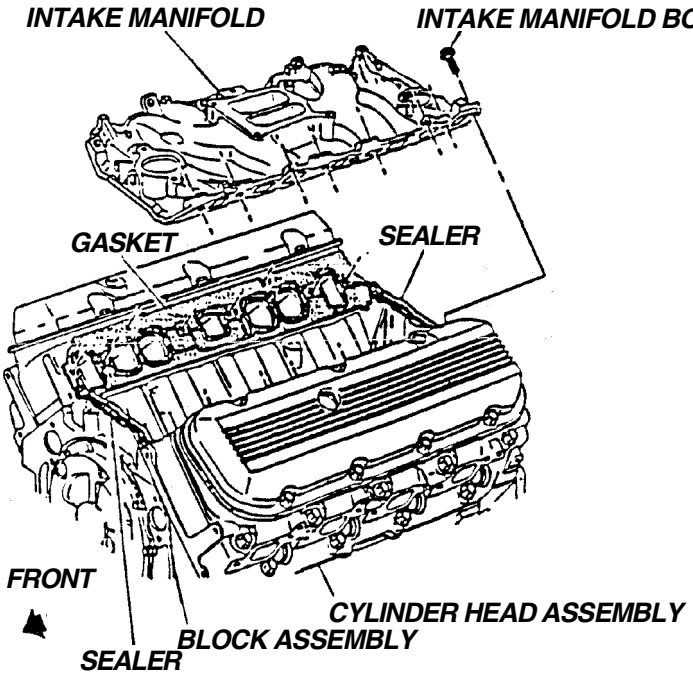


FIGURE 14

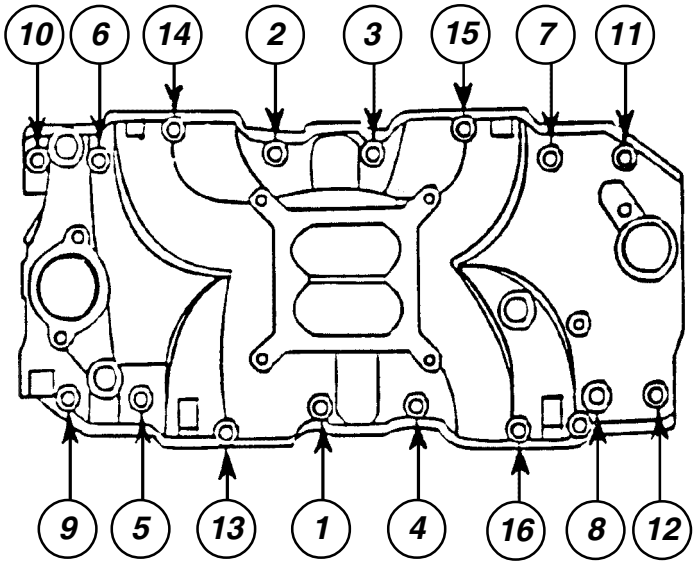


FIGURE 15

Install The Pipe Plugs Or A Temperature Sender In the Intake Manifold

1. *Use caution when installing fittings, pipe plugs, studs or bolts that screw into the aluminum intake manifold to avoid damaging threads or cracking mounting bosses.*
2. *Use thread sealer on all threads that go into coolant, oil, or port passages. See Figure 16.*
3. *Install a heater hose nipple and a vacuum line nipple at this time if needed.*

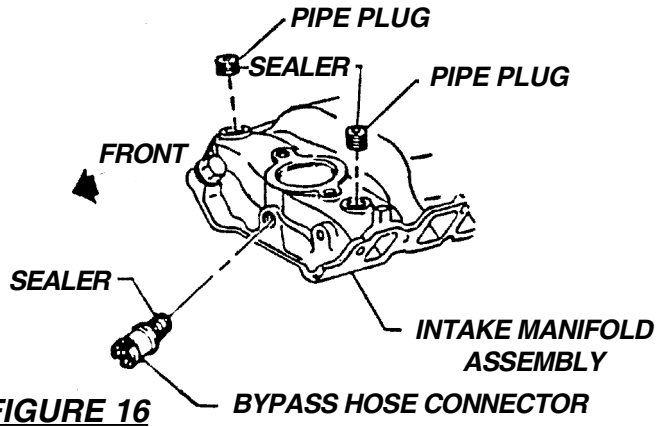


FIGURE 16

Install The Carburetor

1. *The carburetor is calibrated for this engine. The carburetor needs no major adjustment. However, the jets may need to be changed for high altitude or for extremely hot or cold weather. If you have any tuning question about the carburetor please call Holley's tech line (270) 781-9741.*
2. *The carburetor needs seven psi of fuel pressure at idle and a minimum of four psi at wide open throttle. Use 3/8"ID or larger fuel lines. Install a quality in-line fuel filter between the fuel pump and the carburetor.*
3. *Screw the carburetor mounting studs into the carburetor mounting bolt holes of the intake manifold.*
4. *Install the carburetor mounting gasket over the studs and onto the intake manifold flange.*
5. *Install the carburetor to the intake manifold.*
6. *Torque the mounting nuts in a "crisscross" pattern to 20 ft-lbs.*
7. *Connect all the fuel lines, linkages, throttle springs, and vacuum lines after the engine has been installed in the vehicle.*
8. *Connect a ground wire and a power wire to the electric choke.*

Install The Thermostat

1. *The thermostat, the thermostat gasket, the thermostat housing, and the thermostat housing bolts are not included with this engine package. Please see your dealer for the proper thermostat, gasket, and housing for your vehicle. A 180° thermostat is recommended for this engine.*
2. *Install a thermostat in the intake manifold. Place a new thermostat housing gasket onto the intake manifold. Align the bolt holes on the gasket with the bolt holes in the intake manifold. Install a thermostat housing on the thermostat and the gasket. Apply thread sealer to the threads of the thermostat housing bolts. Torque the bolts to 25 ft-lbs. See Figures 17 and 18.*

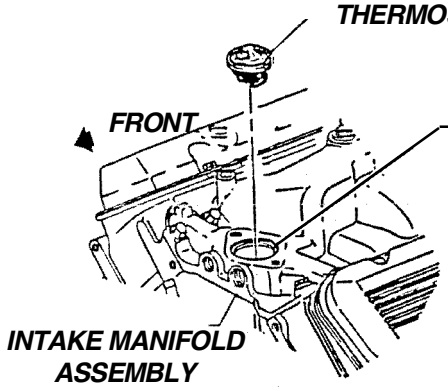


FIGURE 17

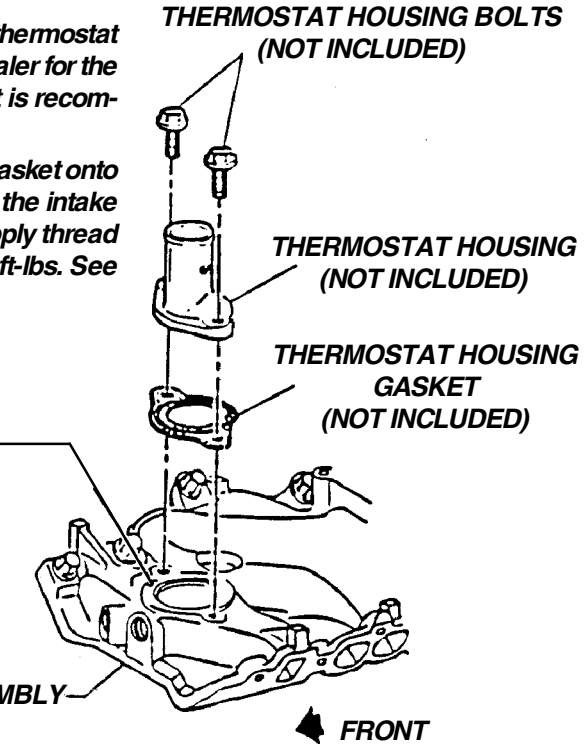
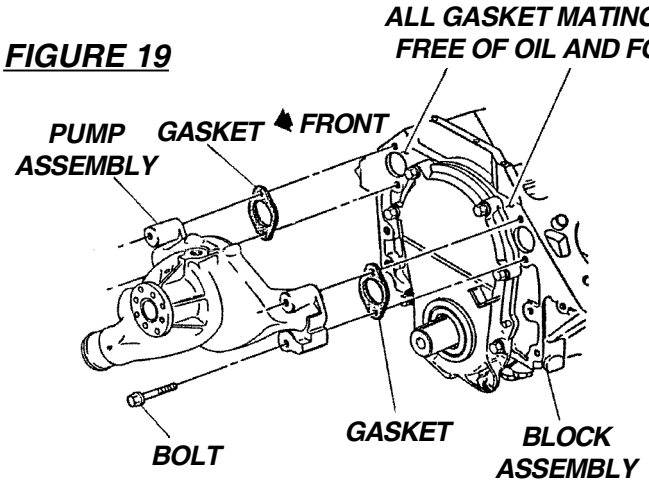


FIGURE 18

Install The Coolant Pump

1. *Align the coolant pump gaskets with the coolant holes and the bolt holes on the engine block. At the same time place the coolant pump over the gaskets and insert the coolant pump bolts. The 3.5" bolt goes in the bottom passenger side bolt hole of the coolant pump. The three 1.75" bolts go in the remaining bolt holes of the coolant pump. See Figure 19. Torque the bolts to 30 ft-lbs.*
2. *Coat the threads of the thermo bypass connectors with thread sealer. Install the connectors into the top of the coolant pump and the front of the intake manifold. See Figure 20. Torque the connectors to 25 ft-lbs.*
3. *Cut the thermo bypass hose to the desired length using a sharp utility knife. Place hose clamps onto both ends of the hose. Install the hose onto the connectors and tighten the hose clamps. Torque the clamps to 35 in-lbs. See Views A and B in Figure 20 for proper alignment of the hose clamps.*
4. *If the heater will not be used, plug the heater hose outlet on the coolant pump. Coat a 1/2"-14 pipe plug with thread sealer and install the pipe plug into the heater hose outlet on the coolant pump. There are only four 1/2"-14 pipe plugs supplied with this engine package. Additional pipe plugs can be purchased from your dealer. See Figure 21. If the heater will be used, install a heater hose fitting into the heater hose outlet on the coolant pump. Purchase a heater hose fitting from your dealer. Coat the threads of the fitting with thread sealer and install the fitting into the heater hose outlet on the coolant pump. Connect the heater hose with a hose clamp to the fitting after the engine is installed in the vehicle.*

FIGURE 19



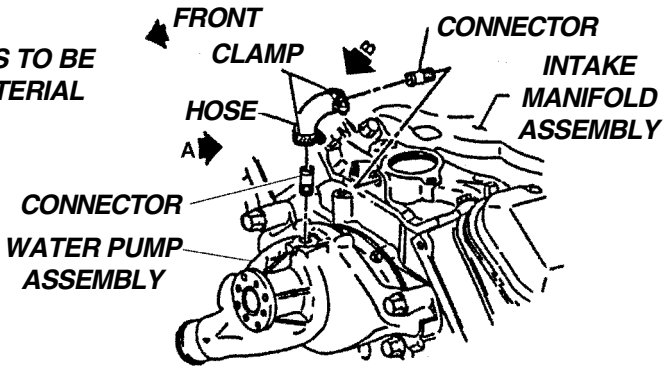
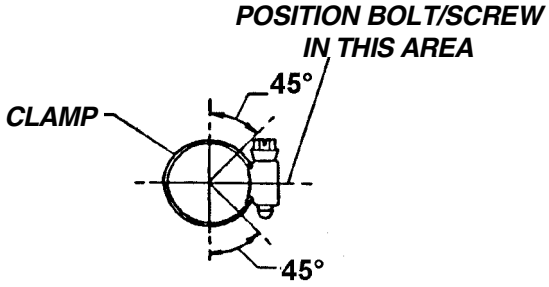


FIGURE 20



VIEW A REAR CLAMP

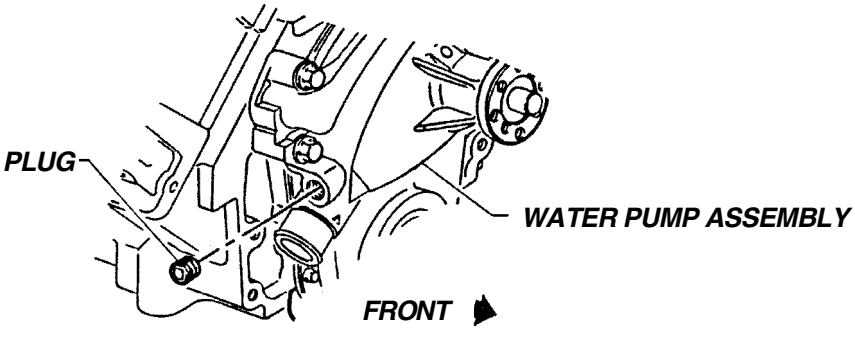
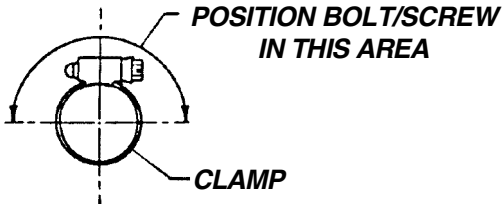


FIGURE 21



VIEW B FRONT CLAMP

Install The Engine In The Vehicle

1. *Verify that the engine mounts, the engine mount bolts, the belts, the pulleys, the hoses, and the cooling system are in proper working condition. Replace any component that is not in proper working condition.*
2. *Please see your local GM dealer for any additional components that maybe needed to complete this engine installation.*
3. *Review your vehicles cooling system to ensure that it has enough capacity for this engine.*

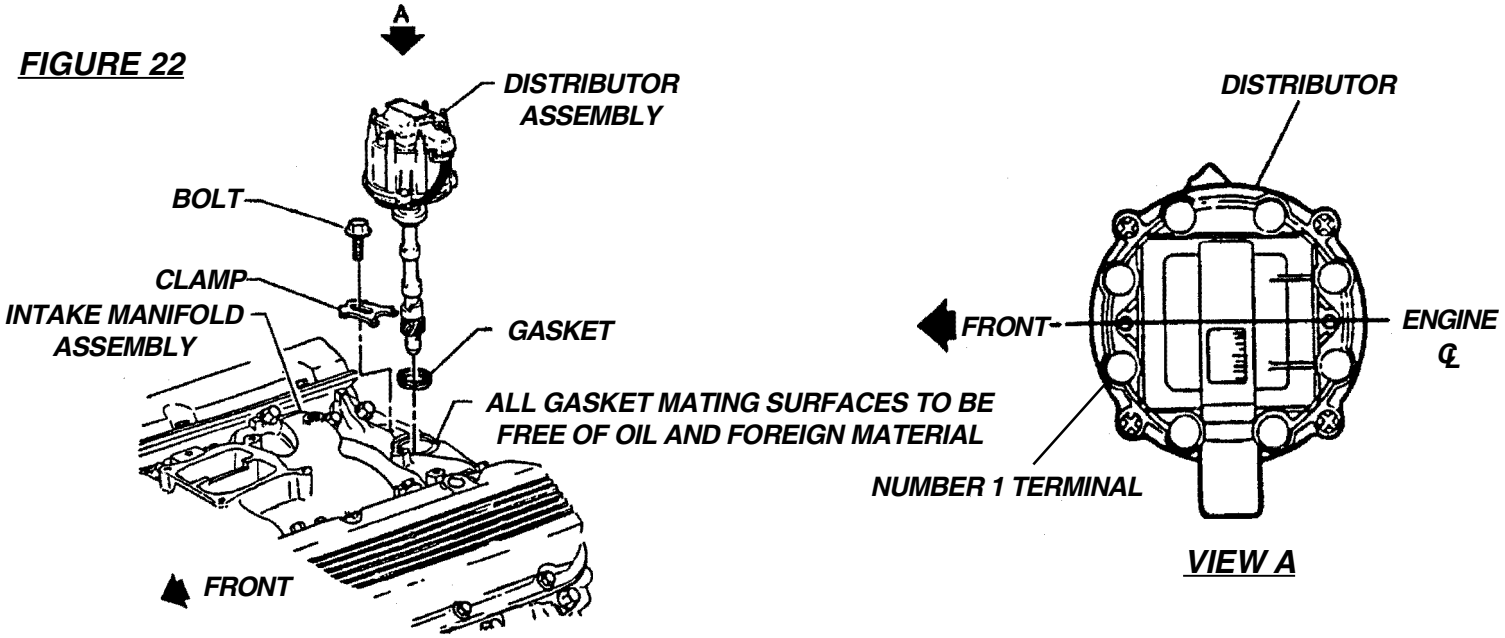
Prime The Engine

1. *Install a PF1218 ACDelco oil filter, GM part number 25160561, purchased separately.*
2. *Check the engine oil level prior to priming the engine. Add 10W30SG oil if needed.*
3. *Insert the oil pump priming tool into the distributor hole of the intake manifold. Connect the priming tool to the oil pump shaft.*
4. *Connect a 1/2" drill motor to the top of the priming tool.*
5. *Use the drill motor to rotate the priming tool clockwise. Prime the engine for a couple of minutes while a helper uses a wrench to rotate the crankshaft clockwise.*

Install The Ignition System

1. *Check the vehicle's power and tachometer leads to see if they are the correct connectors to mate with the 502 distributor cap and will be long enough to reach the cap when the distributor is installed. Remove the ballast resistor or resistance wire, if your vehicle as it, to ensure a full 12 volts to the ignition from the ignition switch. If your existing power and tachometer leads are not long enough or if they are the wrong type of connectors, the pigtail connectors supplied with the engine package will be needed. Before soldering the wires to your vehicle's existing wiring ensure that the wires will be long enough to reach the distributor cap when installed. If the wires will not be long enough add wires of the same gage and color and splice them into the wires.*
2. *This step maybe easier to do with a helper. Rotate the engine crankshaft clockwise with a wrench and socket while holding a finger over the number one spark plug hole until compression is felt. Continue to rotate the crankshaft until the timing mark on the balancer shows approximately 8° before top dead center.*
3. *Remove the distributor cap from the distributor. Place the distributor gasket onto the distributor shaft.*
4. *Hold the distributor cap in the installed position above the distributor to verify that the rotor is aligned with the number one terminal on the distributor cap. The number one terminal on the distributor cap is the second terminal clockwise, when viewed from the top, from the power and the tachometer connectors. See View A in Figure 22. If necessary rotate the distributor shaft by hand to align the rotor with the number one terminal.*
5. *Pour EOS over the distributor gear. Install the distributor into the engine, so that when the distributor cap is installed the power and the tachometer connectors are perpendicular to the center line of the engine. See Figure 22. The distributor must be installed in this position to ensure that the supplied spark plugs wires will fit properly.*

FIGURE 22



6. The collar of the distributor shaft will rest on the intake manifold when the distributor is install correctly and fully engages the oil pump drive. If the collar does not touch the manifold the distributor is not engaging the oil pump drive. Remove the distributor. Insert a long flat blade screwdriver into the oil pump drive and rotate the drive slightly. Reinstall the distributor. Repeat this procedure until the collar rests on the manifold.
7. Install the hold down clamp and the bolt of the hold down clamp. See Figure 22. Torque the bolt to 25 ft-lbs.
8. Install the distributor cap.
9. Plug the power and the tachometer connectors into the distributor cap. They will only go in one way.
10. Gap the spark plugs to 0.040". Apply anti-seize, GM part number 12371386, to the threads of the spark plugs. Install and torque the spark plugs to 20 ft-lbs.
11. Remove the lower bolts from both of the rocker arm covers. Install the supports for the spark plug wires with the removed bolts. Torque the bolts to 70 in-lbs. Starting at the front of the engine install the smallest retainers first then install progressively larger retainers towards the back of the engine. Slide the retainers on to the supports so that the detents of the supports snap into the holes in the retainers. See Figures 23-24.
12. Identify the spark plug wires from the chart below.

CYLINDER 1	34"	CYLINDER 2	43.75"
CYLINDER 3	37"	CYLINDER 4	35.5"
CYLINDER 5	29"	CYLINDER 6	30.5"
CYLINDER 7	23.5"	CYLINDER 8	28.5"

The 90° boots go on the distributor cap terminals and the 135° boots go on the spark plugs. Install the spark plug wires one at a time by pushing and twisting the boots to ensure that the terminals snap securely over the spark plugs and the distributor cap terminals. Start with cylinder number one and install the remaining spark plug wires in the firing order of 1-8-4-3-6-5-7-2 clockwise around the distributor cap. See Figures 25-26.

FIGURE 23

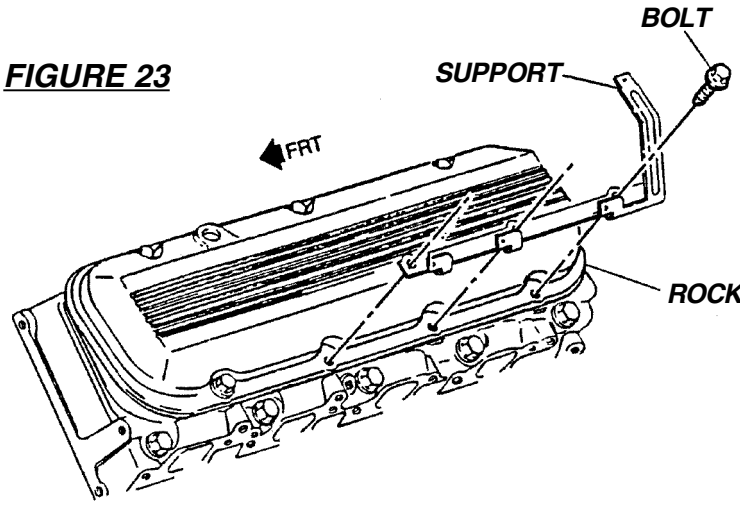


FIGURE 24

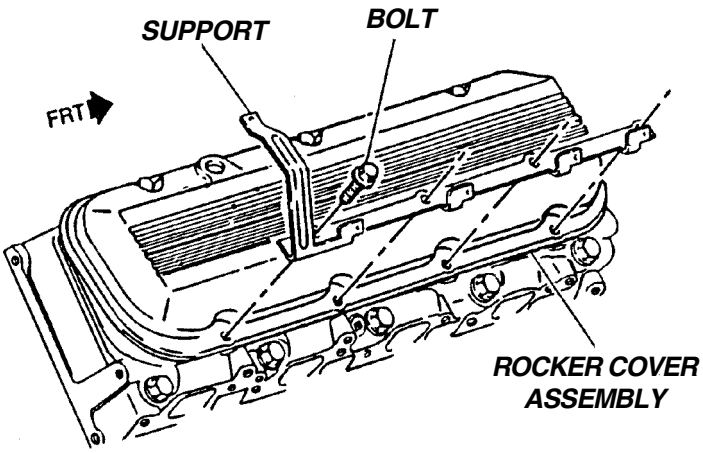


FIGURE 25

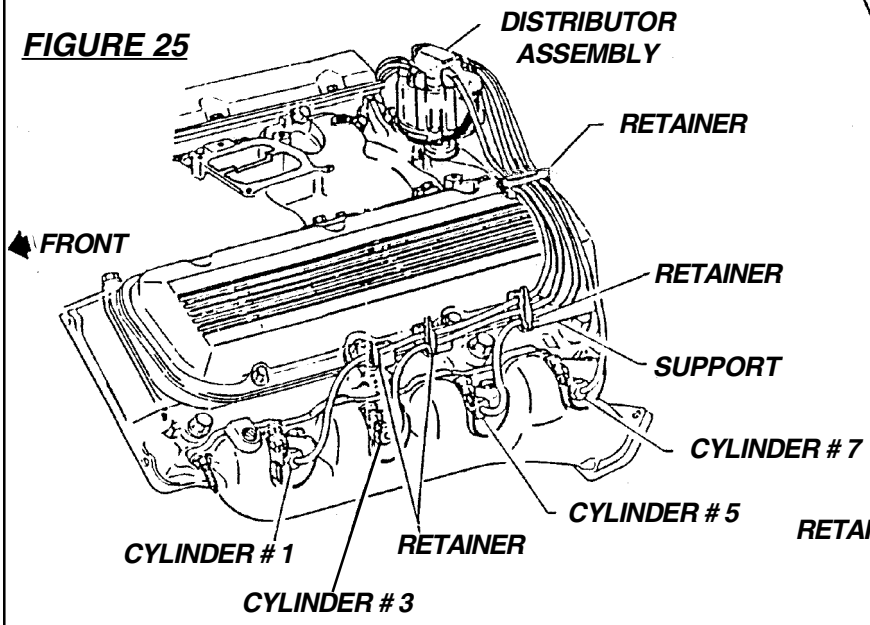
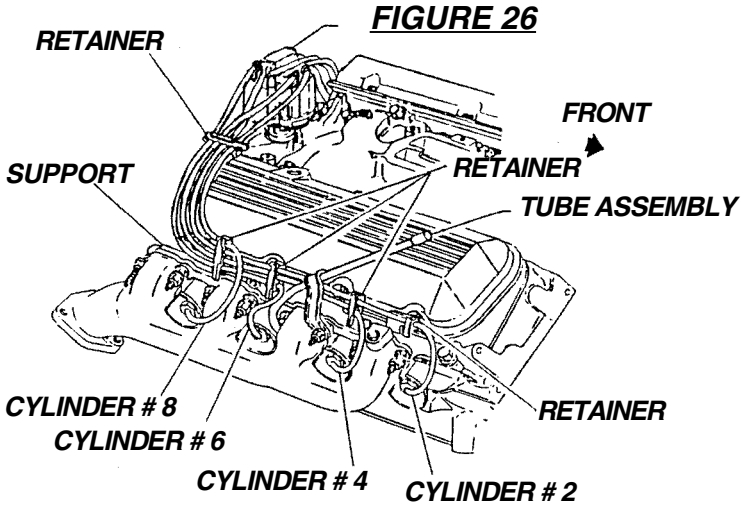


FIGURE 26



Install The Starter Motor

1. *Install the starter motor to the engine.*
2. *Torque the starter motor bolts to 30 ft-lbs.*
3. *Connect the positive battery cable and starter wiring to the starter motor.*

Engine Start-Up and Break-in Procedures:

1. *After installing the engine, ensure the crankcase has been filled with 5W30 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 wtih 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 sufaces 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 an extended period of time. Reinstall the distributor in the same orientation as it was removed.*
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 andnothing was missed.*
4. *Start the engine and adjust the initial timing. Set the ignition timing to 10^0 before top dead center (BTDC) at 650 rpm with the vacuum advance line to the distributor disconnected and plugged. this setting will produce 32^0 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 thould 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 180^0F before towing heavy loads, or performing hard acceleration runs.*
6. *Once the engine is warm, double-check the total advance timing is 32^0 at 4000 RPM if using the deluxe engine configuration.*
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 wtih 5W30motor oil (not synthetic) and a PF454 AC Delco oil filter. Inspect the oil and 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 partricles to ensure 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.*

Components of Base 502/502 Engine Package

Description	Part Number	Quantity
Partial Engine	24502619	1
Cylinder Heads Assembled (each head includes 1/2" pipe plug)	12462899	2
Cylinder Head Gaskets	12363411	2
Rocker Arm Cover Package (contains: covers, bolts, grommets,and cap)	12495488	1
Rocker Arm Cover Gaskets	14085759	2
Rocker Arm Cover Decals	12366994	2
Cylinder Head Bolt and Washer Package (contains: eight 2" bolts, twenty four 4" bolts, eight 5" bolts and forty washers)	12367779	1
Push Rod Package (contains: 8 exhaust push rods and 8 intake push rods)	12368081	1
Rocker Arm Package (contains: 16 rocker arms, 16 rocker arm balls, and 16 rocker arm nuts)	12368085	1
Engine Oil Supplement (EOS) (1 pint)	1052367	1
Engine Lift Brackets (contains: 2 brackets and 2 bolts)	12363238	1
Thread Sealer (50cc tube)	12346004	1
Installation Instructions	12368083	1
Engine Oil Pump Primer	12368084	1
Engine Oil Level Indicator	12557083	1
Engine Oil Level Indicator Tube	12550533	1
Engine Oil Level Indicator Tube Seal	274244	1

Components of Deluxe 502/502 Engine Package

Description	Part Number	Quantity
Base 502-502 Engine Assembly	12371204	1
Intake Manifold Oil Splash Shield	12555320	1
Intake Manifold Bolt Package (contains: 16 bolts and 16 washers)	12367959	1
Intake Manifold Gasket Package (contains: 2 gaskets)	12366985	1
RTV Sealer (3.35 ounce tube)	12346141	1
Coolant Pump (contains: pump, 2 gaskets and 1 thermostat bypass connector)	19168602	1
Coolant Pump Bolt 1.75"	9441560	3
Coolant Pump Bolt 3.5"	9440355	1
Distributor Clamp	10096197	1
Distributor Clamp Bolt	9442963	1
Starter	12606096	1
Starter Bolts	12338064	2
Spark Plugs	19145286	8
Spark Plug Wires (contains: 8 wires, 9 retainers and 2 supports)	12495078	1
Thermostat Bypass Connector	6272959	2
Thermostat Bypass Hose (cut to length)	1485552	1
Thermostat Bypass Hose Clamp	01470030	2
Distributor	93440806	1
Distributor Power and Tach Connector Pigtails Package (contains: 1 power lead connector and 1 tach lead connector)	12167658	1
Intake Manifold (contains: two 1/2" pipe plugs and one 3/8" pipe plug)	12363407	1
Carburetor Package (contains: 1 carburetor, 4 mounting studs, 4 mounting nuts, 1 mounting gasket, 1 air cleaner stud, and 1 air cleaner gasket)	12366996	1

Recommended Accessories

Oil Pan 4 quart	12495360
Rocker Arm Cover, Tall	12371244
Rocker Arms, Aluminum	12361323
Flywheel 14" diameter 168 teeth	14096987
Ignition Multi-Spark Capacitive Discharge	10037378
Coil for 10037378 Ignition	10037380
Distributor for 10037378 Ignition	10134355
Air Cleaner	12342080

502/502 Engine Specifications

Compression:	9.6:1
Cylinder Head:	Cast aluminum, oval port
Valve diameter (Intake/Exhaust)	2.25"/1.88"
Chamber Volume:	110cc
Camshaft:	Hydraulic roller tappet
Lift:	.527" intake, .544" exhaust
Duration:	224 (intake, 234) exhaust @ .050" tappet lift
Centerline:	104 (ATDC intake, 109) BTDC exhaust
Rocker Arm Ratio:	1.7:1, stamped steel
Oil Pressure (Normal):	6 psig@1000 RPM
	18 psig @2000 RPM
	24 psig@4000 RPM
Recommended Oil:	5W30 synthetic racing oil (after break-in)
Oil filter:	AC Delco Part #- PF 454
Valve Lash	1/8 turn down from 0
Fuel	Premium unleaded - 92 (R+M/2)
Maximum Engine Speed:	5800 RPM
Spark Plugs:	AC Delco Rapidfire #4
Spark Plug Gap:	.040"
Firing Order:	1-8-4-3-6-5-7-2

502/502 Torque Specifications

Carburetor Mounting Nuts	20 ft-lbs	
Camshaft Retainer Bolts	10 ft-lbs	
Camshaft Sprocket Bolts	20 ft-lbs.	
Connecting Rod Nut	70 ft-lbs	
Coolant Pump Bolts	30 ft-lbs	
Coolant Temperature Gauge Sensor or Plug	15 ft-lbs	
Crankshaft Balancer Bolt	110 ft-lbs	
Crankshaft Balancer Pulley	40 ft-lbs	
Crankshaft Bearing Cap Bolts and Studs	110 ft-lbs	
Cylinder Head Bolts	Short Bolts	Long Bolts
First Pass	20 ft-lbs	25 ft-lbs
Second Pass	40 ft-lbs	75 ft-lbs
Final Pass	65 ft-lbs	75 ft-lbs
Distributor Clamp Bolt	25 ft-lbs	
Engine Block Oil Gallery Plug	Front, Left side, Rear 20 ft-lbs, Valley 15 ft-lbs	
Engine Front Cover Bolts	10 ft-lbs	
Engine Lift Hooks	35 ft-lbs	
Exhaust Manifold Stud and Bolt/Screw	40 ft-lbs bolt, 25 ft-lbs nuts and studs	

502/502 Torque Specifications Continued

Flywheel Bolts	65 ft-lbs
Intake Manifold Bolts	25 ft-lbs
Oil Filter Adapter	50 ft-lbs
Oil Filter	30 ft-lbs
Oil Pan Assembly Bolts	20 ft-lbs
Oil Pan Baffle Nut	25 ft-lbs
Oil Pan Drain Plug	15 ft-lbs
Oil Pump Bolt-to-Rear Crankshaft Bearing Cap	65 ft-lbs
Oil Pump Cover Bolts	10 ft-lbs
Spark Plug	20 ft-lbs
Starter Motor Bolts	30 ft-lbs
Thermo Bypass Connectors	25 ft-lbs
Thermo Bypass Hose Clamps	35 in-lbs
Thermostat Housing Bolts	25 ft-lbs
Valve Lifter Guide Retainer Bolts	20 ft-lbs
Valve Rocker Arm Ball Stud	45 ft-lbs
Valve Rocker Arm Cover Bolts	70 in-lbs

Common Service Parts List For Base And Deluxe 502/502 Engines

Description	Part Number	Quantity
Cylinder and case assembly, with bearing caps and cap bolts	10237292	1
Cap, crankshaft bearing	not serviced	--
Bolt, crankshaft bearing cap short	10106460	10
Bolt, crankshaft bearing cap long	10106461	6
Stud, Crankshaft bearing cap	10224104	4
Plug assembly, engine block oil cooler hose hole	14090911	2
Bearing kit, main upper and lower standard number 1	10181306	1
Bearing kit, main upper and lower standard number 2-4	12529885	3
Bearing kit, main upper and lower standard number 5	10181307	1
Crankshaft assembly	10183723	1
Sprocket, crankshaft	12550039	1
Seal assembly, crankshaft rear oil	10101164	1
Seal, rear bearing cap O-ring	6264902	1
Damper assembly, torsional	10216339	1
Key, torsional damper	10114166	1
Bolt, torsional damper	10126796	1
Washer, torsional damper	3864814	1
Piston and pin assembly standard	12533507	8
Piston and pin assembly .030" oversize	12533553	as required
Rod assembly, connecting with/nuts & bolts	10198922	8

Common Service Parts List For Base And Deluxe 502/502 Engines Continued:

Description	Part Number	Quantity
Bearing kit, connecting rod	10181277	8
Bolt, connecting rod	14096148	16
Nut, connecting rod	3942410	16
Ring Kit, Piston Standard	12524293	8
Ring Kit, Piston .030" oversize	12524294	as required
Pan assembly, oil	10240721	1
Baffle assembly, oil pan horizontal upper	14097040	1
Nut, oil pan horizontal upper baffle	9422297	5
Washer, oil pan horizontal upper baffle	382105	5
Gasket, oil pan	10106407	1
Bolt, oil pan	9440224	20
Pump and screen assembly, oil	12555167	1
Shaft, distributor oil pump intermediate with retainer	3998289	1
Retainer, distributor oil pump intermediate shaft	3764554	1
Stud, oil pump and screen	3866604	1
Valve assembly, oil filter bypass	25013759	2
Fitting, oil filter	3853870	1
Indicator, engine oil level	12557083	1
Tube, engine oil level indicator	12550533	1
Seal, engine oil level indicator	274244	1
Cover assembly, crankcase front end	10230954	1
Pin, front cover locating dowel	12554553	2
Bolt, front end cover	10243771	6
Flexplate	10185034	1
Bolt, flexplate	3727207	6
Pin, flywheel housing locating dowel	12338119	2
Plug, engine block oil galley	361997	3
Plug, engine block oil galley	444777	3
Plug, engine block oil galley	3889330	4
Plug, engine block oil galley	444613	3
Plug, engine block oil galley	14090911	3
Plug, rear camshaft bearing	3999200	1
Pin, cylinder head locating dowel	12558081	4
Pin, oil pump locating dowel	12554553	2
Camshaft assembly	12366543	1
Retainer, camshaft thrust plate	10168501	1
Bolt, camshaft thrust plate retainer	14093637	2
Sprocket, camshaft	12551401	1
Bolt, camshaft sprocket	9424877	3
Chain, camshaft drive	10114177	1
Lifter assembly, hydraulic valve	17120061	16

Common Service Parts List For Base And Deluxe 502/502 Engines Continued:

Description	Part Number	Quantity
Restrictor, valve lifter rotation	12551397	8
Retainer, valve lifter	12551399	1
Bolt, valve lifter retainer	9440224	4
Cylinder head assembly complete	12363390	2
Seat, intake valve	12363394	8
Seat, exhaust valve	12363395	8
Guide, intake valve	12363396	8
Guide, exhaust valve	12363397	8
Valve, intake	12366987	8
Valve, exhaust	12366988	8
Seal, valve stem oil	12366993	16
Spring Assembly, valve	12462970	16
Cap, valve spring	12366990	16
Key, valve stem	12366992	16
Shim, valve spring 0.015" thick	12366572	as required
Shim, valve spring 0.030" thick	12366991	as required
Shim, valve spring 0.060" thick	12366571	as required
Stud, rocker arm	3921912	16
Guide, push rod	3860038	8
Plug, coolant passage 1/2"	444746	2
Gasket, cylinder head	12363411	2
Cover package, rocker arm (contains covers,bolts,grommets,cap)	12495488	1
Bolt, rocker arm cover	25520079	14
Cap, oil fill (no markings)	14096998	1
Grommet, crankcase vent tube	10198941	1
Grommet, crankcase vent valve	10198949	1
Gasket, rocker arm cover	14085759	2
Decal, rocker arm cover	12366994	2
Bolt, cylinder head long	12367329	8
Bolt, cylinder head medium	12367330	16
Bolt, cylinder head short	12367331	8
Washer, cylinder head	14011040	32
Rod, intake valve push	10227762	8
Rod, exhaust valve push	10227763	8
Arm kit, valve rocker (contains arm, nut, ball)	12368082	16
Bracket package, engine lift (contains 2 brackets)	12363238	1
Sealant, pipe with/teflon (50cc)	12346004	1
Primer, oil pump	12368084	1
Oil, engine 10W30SG	12345616	7 quarts
Filter, engine oil (PF1218)	25160561	1

Unique Service Parts List For Deluxe 502/502 Engine

Description	Part Number	Quantity
Shield, intake manifold oil splash	12555320	1
Bolt package, intake manifold	12367959	1
Gasket package, intake manifold	12366985	1
Sealant, RTV (3.35 ounce)	12345739	1
Pump assembly, coolant	14058915	1
Bolt, coolant pump short	9441560	3
Bolt, coolant pump long	9440355	1
Clamp, distributor	10096197	1
Bolt, distributor clamp	9442963	1
Motor assembly, starter (reman)	10465167	1
Motor assembly, starter (new)	9000852	1
Bolt, starter motor	12338064	2
Plug assembly, spark	25164642	8
Wire package, spark plug	12368383	1
Retainer package, spark plug wires	12495502	1
Connector, thermostat bypass hose	6272959	2
Hose, thermostat bypass	1485552	1
Clamp assembly, thermostat bypass hose	12337891	2
Distributor assembly	1104067	1
Connector package, distributor	12167658	1
Manifold, intake	12363407	1
Plug, coolant passage 1/2"	444746	2
Plug, coolant passage 3/8"	24572545	1
Carburetor package.	12366996	1
Nut, carburetor mounting	124920	4
Stud, carburetor mounting	22506258	4
Gasket, carburetor mounting	not serviced	–
Stud, carburetor to air cleaner	not serviced	–
Gasket, carburetor to air cleaner	not serviced	–