



SystemMAX II™

FORD ENGINE SYSTEM, NON-EMISSION
1986 - 1993 5.0L H.O. ENGINE
Part Number 300-501-1



FORD ENGINE SYSTEM
1986 - 1993 5.0L H.O. ENGINE
Part Number 300-505

Installation Instructions P/N 199R-9920-2

NOTE: These instructions must be read and fully understood before beginning installation. If this manual is not fully understood, installation should not be attempted.

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INTRODUCTION:

SystemeMAX engine systems offer a new approach to street performance. These systems come in three levels of performance. Each system component is designed in conjunction with the others to provide an unmatched level of performance.

SystemeMAX engine systems are engineered to produce maximum power. A "system-designed" approach was considered from the beginning as the only logical and practical way to proceed with the development. The performance results attained have confirmed this was the correct approach. Using race-bred experience and technology, Holley engineers have developed a powerful package for the 5.0L Ford High Output engine. Simply stated, **SystemeMAX** offers total airflow management.

The **SystemeMAX II** package, part number 300-501-1, contains a camshaft, upper and lower intake manifolds, timing chain and gear set, push rods, cylinder heads and head bolts.

The **SystemeMAX** package, part number 300-505, contains an emission legal camshaft, lower intake manifold, and a timing chain and gear set.

Holley Performance Products has written this manual for the installation of the Ford **SystemeMAX II** and **SystemeMAX 50 state legal** engine systems. This manual contains all the information needed to install these systems. Please read all the **WARNINGS** and **NOTES**, they contain valuable information that can save you time and money.

It is our intent to provide the best possible products for our customer; products that perform properly and satisfy your expectations. Should you need information or parts assistance, please do not return the unit to the store without first contacting technical service at 1-270-781-9741, Monday through Friday, 7 a.m. to 5 p.m. Central Time. By using this number, you may obtain any information and/or parts assistance that you may require. Please have the part number of the product you purchased when you call.

IMPORTANT INSTALLATION NOTES:

This instruction manual will take the installer through a step by step process to install the engine systems with the engine in the vehicle. Before beginning the installation of the engine systems, several things must be considered:

1. The vehicle will be out of service for a few days while the system is being installed. Considerations should be taken accordingly.
2. Prior to installation, be sure the vehicle is in good running and mechanical condition. Retrieve all trouble codes from the vehicle's computer, following the manufacturer's procedure. All computer codes must be corrected **BEFORE** installation of the **SystemeMAX** package. Failure to do so may result in driveability problems not associated with the **SystemeMAX** installation, and in the event of problems, will make diagnosis more difficult.
3. The installation should only be performed by those individuals that are familiar and comfortable enough with intake manifold, camshaft, and cylinder head changes on fuel injected vehicles. Inexperience with critical necessary procedures will cause poor vehicle performance and/or engine damage.
4. If the vehicle is equipped with air conditioning, carefully inspect the amount of room available for removal of the camshaft with respect to the condenser, and cylinder head removal with respect to the air compressor. If removal and installation of **SystemeMAX** components requires removal of either the condenser or air compressor, the air conditioning system must first be evacuated. Take the vehicle to a certified air conditioning technician to recover and evacuate the air conditioning system.

DANGER! THIS TYPE OF WORK MUST BE PERFORMED IN A WELL-VENTILATED AREA. DO NOT SMOKE OR HAVE AN OPEN FLAME NEAR GASOLINE VAPORS OR AN EXPLOSION MAY RESULT CAUSING SERIOUS PERSONAL INJURY, PROPERTY DAMAGE, AND/OR DEATH.

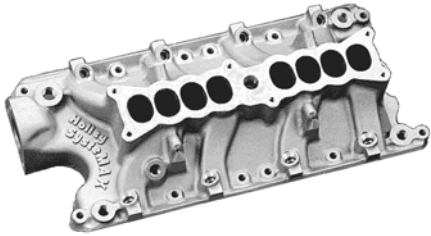
DANGER! ALWAYS WEAR SAFETY GLASSES WHEN WORKING ON A VEHICLE. FAILURE TO WEAR EYE PROTECTION MAY RESULT IN SERIOUS EYE INJURY.

DANGER! DO NOT SMOKE OR HAVE AN OPEN FLAME PRESENT NEAR GASOLINE VAPORS OR AN EXPLOSION MAY RESULT CAUSING SERIOUS PERSONAL INJURY, DEATH AND/OR PERSONAL PROPERTY DAMAGE.

WARNING! FOR A SAFE AND RELIABLE INSTALLATION OF THE SYSTEMAX ENGINE SYSTEMS, A THOROUGH KNOWLEDGE OF THE VEHICLE'S MECHANICAL AND ELECTRICAL SYSTEMS IS NECESSARY. OTHERWISE, ONLY A PROFESSIONAL MECHANIC SHOULD DO THE INSTALLATION. AN IMPROPERLY INSTALLED MANIFOLD CAN CAUSE POOR PERFORMANCE, PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

NOTE: If the condenser needs to be removed, the air conditioning system will need to be evacuated. This procedure has to be done by a certified air conditioning technician with the proper recovery equipment. Releasing freon gas into the atmosphere is illegal.

PARTS IDENTIFICATION:



Lower Manifold
(SystemMAX)



Upper Manifold
(SystemMAX II)



Lower Manifold
(SystemMAX II)



EGR Splash Guard



.3125 - 18 x 6.5 SHCS



.500 - 14 NPT Plug



.375 - 18 NPT Plug
(SystemMAX II)



.375 - 18 NPT Plug



Manifold Flange Stud
(SystemMAX II)



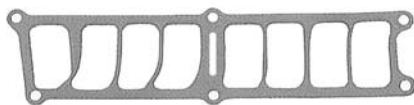
Cap Screws .3125 - 18 x 1.5
(SystemMAX II)



Cap Screw .3125 - 18 x 1



.3125 Nut
(SystemMAX II)



Upper to Lower Manifold Gasket
(SystemMAX II)



Rivets



.625 Compression Fitting
(SystemMAX II)

ADDITIONAL PARTS REQUIRED:

- Lunati 1.60:1 Roller Rocker, P/N 84160 or equivalent
- Ford Motorsport 70 mm Mass Air Flow Sensor, #M-12579-A70 or Equivalent (SystemAX II)
- Ford Motorsport 30 pph Injectors, #M-9593-B302 or Equivalent (SystemAX II)
- Ford Motorsport Exhaust Headers, #M-9430-SSC, or #M-9430-G50, or Equivalent (SystemAX II)
- Holley 65 mm Throttle Body, P/N 112-539 or Equivalent (SystemAX II)
- Holley 65 mm EGR Spacer, P/N 112-561 or Equivalent (SystemAX II)
- Ford late model Valve Covers, F2ZZ-6582-B-C or Equivalent (SystemAX II)
- Holley High-Flow In-Tank Fuel Pump, P/N 12-901 or Equivalent (SystemAX II)
- EGR Spacer to Intake Gasket, Ford #M9464-A50 (SystemAX II)
- Throttle Body to EGR Spacer, Ford #M9933-A50 or Equivalent (SystemAX II)
- Cylinder Head Gaskets (Felpro gasket, #1011-1 or Equivalent) (SystemAX II)
- Intake Manifold Gaskets (Felpro gasket, #1250 or Equivalent) (SystemAX I and II)
- Exhaust manifold gaskets (Felpro gasket, #1415 or Equivalent) (SystemAX II)
- Timing Cover Gasket Set (Felpro gasket, #TCS 45449 or Equivalent) (SystemAX I and II)
- Valve Cover Gaskets (Felpro gasket, #VS 50029 C or Equivalent) (SystemAX I and II)
- Water Outlet Gasket (Felpro gasket, #35440 or Equivalent) (SystemAX I and II)
- Permatex Ultrablue Sealer
- Antifreeze
- Oil and Oil Filter
- Anti-seize Compound
- Camshaft Lubricant

TOOLS REQUIRED:

- 3/8" ratchet and extensions
- 3/8" deep standard and metric socket sets
- Standard and Phillips screwdrivers
- 1/2" breaker bar
- 1/2" deep standard and metric socket sets
- Torque wrench
- Distributor wrench
- Gasket scraper
- Spring lock coupler disconnect tool for fuel lines
- Hacksaw
- 3/8" standard and metric socket sets
- Combination wrench set, standard and metric
- 1/2" ratchet and extensions
- 1/2" standard and metric socket sets
- Camshaft installation tool
- Harmonic Balancer removal and installation tool
- Timing Light
- Oil filter wrench
- Fuel pressure gauge

REMOVAL OF RADIATOR AND ENGINE ACCESSORIES:



Figure 1

1. Disconnect the negative cable from the battery.
2. Drain the coolant from the radiator. If you are installing the **SystemMAX II** package, remove the block drain plugs to drain the coolant from the block.

DANGER! COOLANT INSIDE A HOT ENGINE WILL BE UNDER PRESSURE. ALLOW ENGINE TO COOL BEFORE DRAINING COOLANT. FAILURE TO FOLLOW THIS PROCEDURE MAY RESULT IN SEVERE PERSONAL INJURY.

3. Remove the fan shroud and fan.
4. For vehicles with automatic transmissions, the transmission lines need to be disconnected from the radiator. Follow the manufacturer's instructions on using the spring lock disconnect tools.
5. Remove the radiator.

NOTE: While the radiator is removed, it is recommended that a reputable radiator shop service the radiator. Higher horsepower engines require greater cooling capacity than lower horsepower engines. Inadequate cooling can lead to engine failure.

6. For vehicles with air conditioning, the condenser will need to be loosened or removed to facilitate camshaft removal and installation.

NOTE: If the condenser needs to be removed, the air conditioning system will need to be evacuated. Releasing freon gas to the atmosphere is illegal. This procedure has to be done by certified air conditioning technicians with the proper recovery equipment.

7. Rotate the tensioner pulley and remove the belt.
8. Remove the large bracket holding the air conditioning compressor and the power steering pump.
9. Disconnect and remove air flow sensor and ductwork.

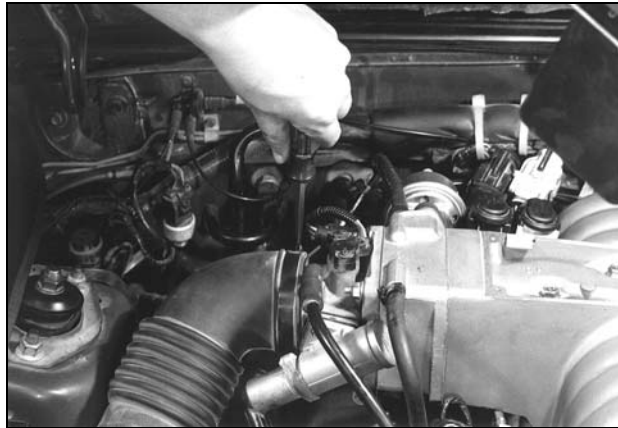


Figure 2

10. Using the spring lock coupler disconnect tools, disconnect the fuel lines. The fuel pressure must be released prior to disconnecting the fuel lines or hoses. Remove the Schrader valve cap from the fuel pressure port. Attach a fuel pressure gauge to the Schrader valve. Release the fuel pressure through the gauge and into a container.

DANGER! FAILURE TO RELEASE FUEL PRESSURE COULD RESULT IN UNINTENTIONAL FUEL SPRAY, WHICH COULD CAUSE A FIRE HAZARD OR SERIOUS PERSONAL INJURY. ALWAYS WEAR SAFETY GLASSES WHEN RELEASING FUEL PRESSURE.

DANGER! BEFORE DISCONNECTING OR REMOVING FUEL LINES, MAKE SURE THE ENGINE IS COLD. DO NOT SMOKE. EXTINGUISH ALL OPEN FLAMES. AN OPEN FLAME, SPARK, OR EXTREME HEAT NEAR GASOLINE COULD RESULT IN A FIRE AND/OR EXPLOSION CAUSING SERIOUS INJURY OR DEATH!

DANGER! USE ONLY A CLEAN METAL CONTAINER TO CAPTURE FUEL. DO NOT USE GLASS, STYROFOAM, OR PLASTIC. FAILURE TO USE A METAL CONTAINER MAY RESULT IN ACCIDENTAL FUEL SPILLAGE, WHICH COULD CAUSE A FIRE OR EXPLOSION HAZARD RESULTING IN SERIOUS INJURY OR DEATH.

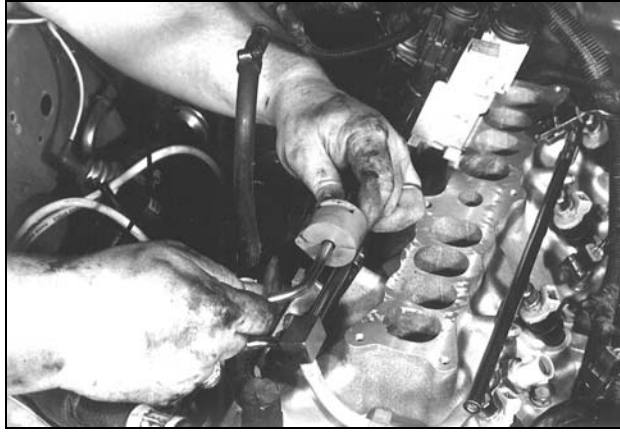


Figure 3

11. Carefully mark all linkages and cables and remove.
12. Carefully mark and disconnect the vacuum hoses connected to the upper and lower intake manifolds.
13. Remove the coolant hoses from the upper and lower manifolds.

• **For SystemMAX II Installation Only.**

14. Remove the accessories bolted to the cylinder heads.
15. On air conditioned vehicles, the air conditioning compressor can usually be moved and secured near an inner fender.

DANGER! FAILURE TO PROPERLY EVACUATE THE AIR CONDITIONING SYSTEM COULD CAUSE SERIOUS INJURY UPON OPENING OF THE SYSTEM.

NOTE: If the compressor needs to be removed, the air conditioning system will need to be evacuated. Releasing freon gas to the atmosphere is illegal. This procedure has to be done by certified air conditioning technicians with the proper recovery equipment.

DISTRIBUTOR REMOVAL:

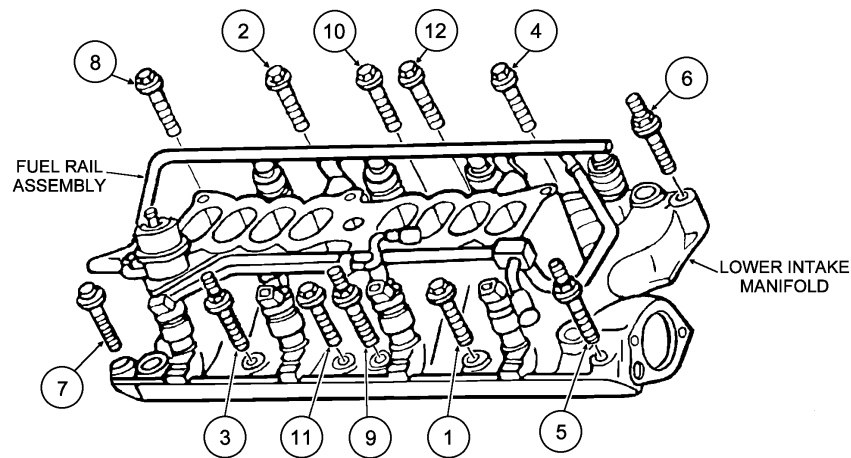
1. Identify and mark each spark plug wire and remove from all eight spark plugs. Leave wires attached to distributor cap.
2. Locate the #1 cylinder spark plug wire.
3. Using a scribe or permanent marker, make a mark **on the distributor**, not the cap, under #1 spark plug terminal.
4. Remove the distributor cap with the plug wires attached, and all eight spark plugs.
5. Using the appropriate socket, rotate the crankshaft clockwise until the rotor is pointing at the mark made in step 3 on the distributor to identify #1 cylinder. The timing mark on the harmonic balancer should also be on zero on the timing tab. Make sure to note and remember where the rotor physically is pointing for reassembly. It is helpful to place marks on the firewall and the distributor shaft with a marker to aid in distributor placement during reassembly.
6. Remove the distributor hold down and bolt and the hold down clamp.
7. Remove the distributor.

INTAKE MANIFOLD REMOVAL:

NOTE: It may be necessary to loosen or remove the accessories or accessory brackets to perform these steps.

1. Remove the cover from the top of the upper intake manifold to expose the center bolts.
2. Remove the 6 bolts and lift the upper intake from the lower intake. Some models have a support bracket on the rear of the upper intake assembly. This bracket must be removed to separate the upper intake manifold from the lower intake manifold.
3. Unplug the electrical connections from the sensors and the injectors located on the lower intake manifold. The harness can be tied to the firewall to keep the harness out of the way.
4. Disconnect the coolant lines from the heater at the firewall.
5. Remove the upper radiator hose water neck and thermostat. The water neck and thermostat will need to be installed on the new intake manifold.
6. Loosen the lower intake bolts 1/2 of a turn in reverse torque sequence. After loosening all the lower intake bolts, the bolts can be removed.

WARNING! DURING REASSEMBLY, USE THE TORQUE SPECS AND TIGHTEN IN SEQUENCE. FAILURE TO DO SO CAN RESULT IN PARTS OR ENGINE DAMAGE.



5.0L, 5.0L HO & 5.8L TIGHTENING SEQUENCE

Figure 4

7. Remove the lower intake manifold and place a towel or clean shop rags over the engine valley to prevent dirt and contaminants from getting into the engine.

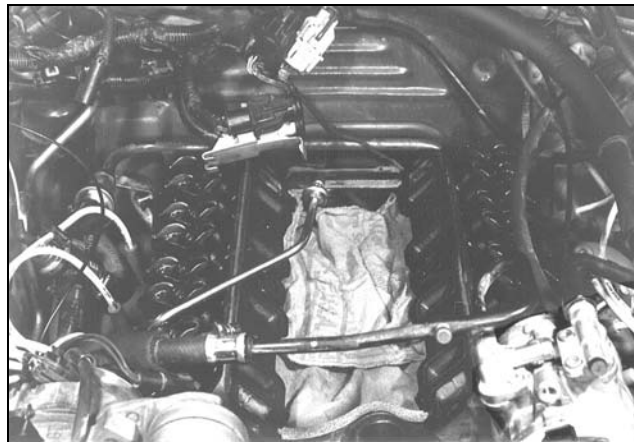


Figure 5

CAMSHAFT REMOVAL:

1. Remove the valve covers.
2. Remove the rocker arms, rocker arm bolts, and push rods and mark each item as to which cylinder and valve they were removed.
3. Remove the lifter retainer and remove the lifters. Note the location of the lifters to be sure they are reinstalled in the same location. Place the lifters in a tray of oil to prevent bleed-down.
4. Remove the water pump.
5. Remove the harmonic balancer using a harmonic balancer removal tool.
6. Remove the timing cover bolts and remove the timing cover.

NOTE: Four bolts must be removed from the bottom of the engine that goes through the oil pan into the timing cover.

7. Before removing the timing chain and gears, be sure the timing marks are aligned as shown below. If the marks are not aligned as in the Figure below, rotate the crankshaft until the marks are aligned. This corresponds to #1 TDC. Remove the timing chain and gears and discard.

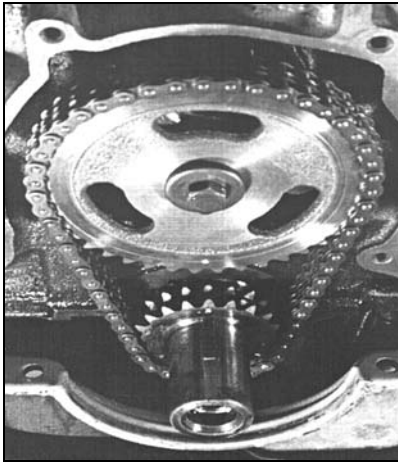


Figure 6

8. For vehicles with air conditioning, the condenser will need to be loosened or removed to facilitate camshaft removal and installation.

NOTE: If the condenser needs to be removed, the air conditioning system will need to be evacuated. Releasing freon gas to the atmosphere is illegal. This procedure has to be done by certified air conditioning technicians with the proper recovery equipment.

9. Using a camshaft installation and removal tool, carefully remove the camshaft so as not to nick or damage the cam bearings. At this time clean up all gasket-sealing surfaces on the engine. Do not allow debris to enter the engine during cleaning.

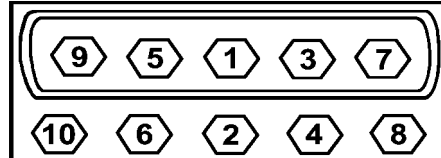


Figure 7

CYLINDER HEAD REMOVAL: (SystemMAX II Package)

NOTE: For those installing the **SystemMAX** package, please skip this section and go to the **SystemMAX CAMSHAFT INSTALLATION** section.

1. Loosen and remove the exhaust manifold / header bolts from the cylinder heads.
2. Loosen or remove the collector bolts to gain access to the cylinder head bolts. It may be necessary on some vehicles to completely remove the exhaust manifolds / headers.
3. Disconnect the AIR injection tube from the rear of the cylinder heads.
4. Loosen and remove the cylinder head bolts. Loosen **all** the cylinder head bolts 1/4 turn in a reverse torquing sequence before removing.



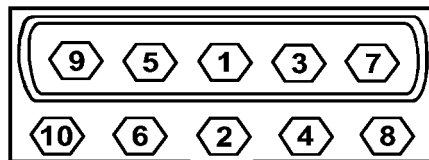
Cylinder Head Bolt Tightening Sequence
Figure 8

5. Remove the cylinder heads.
6. Take time now to transfer any sensors and brackets from the original cylinder heads to the Holley SystemMAX cylinder heads. Use thread sealant on all fittings.

SystemMAX CYLINDER HEAD INSTALLATION:

1. Be sure the block deck surfaces are clean and free from oils or cleaning solutions.
2. Install the head gaskets (Felpro gasket, #1011-1 or equivalent).
3. Install the **SystemMAX** cylinder heads with all parts transferred from the original cylinder heads. Use the supplied cylinder head bolts.
4. Apply Permatex Ultrablue sealer to the threads of the new head bolts as they are installed.
5. Sequentially torque all bolts as shown in the following Figure. Torque the cylinder head bolts to 35 ft./lb., then to 55 ft./lb., and finally to 75 ft./lb.

WARNING! BE SURE TO TORQUE BOLTS IN THE DESIGNATED SEQUENCE TO THE CORRECT TORQUE. FAILURE TO DO SO CAN RESULT IN ENGINE DAMAGE.



Cylinder Head Bolt Tightening Sequence
Figure 9

6. Install the fresh air plugs (provided in kit) into the passages on the front of each cylinder head.
7. Using a hacksaw, cut the AIR crossover tube in the straight section as shown.

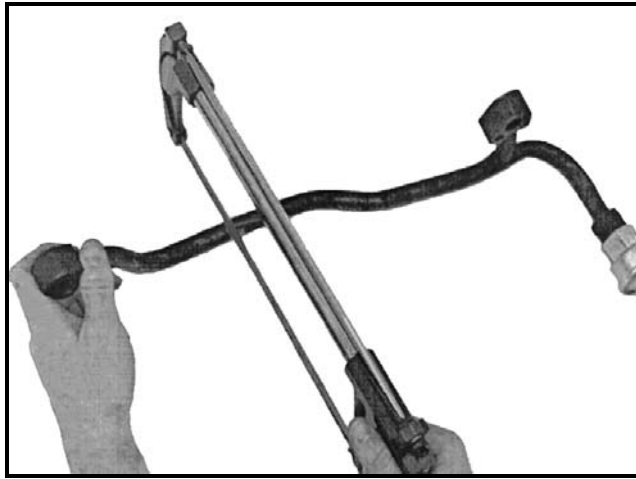


Figure 10

8. Slip the compression nut over the cut AIR crossover tube, then install the compression ring. Do this on each end of the tube as shown.

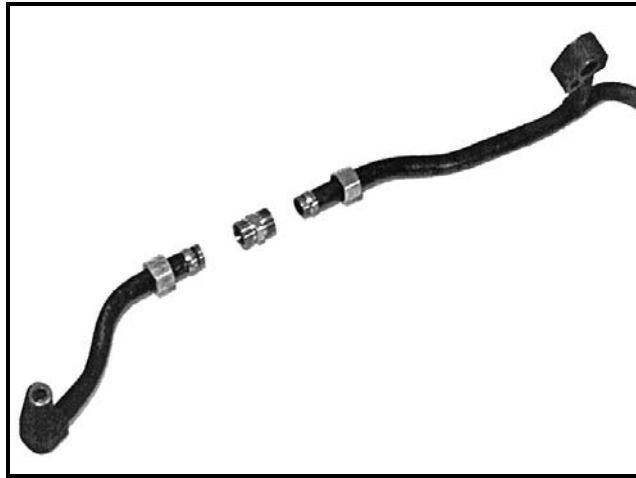


Figure 11

9. Install the fitting and tighten the compression nuts finger tight.

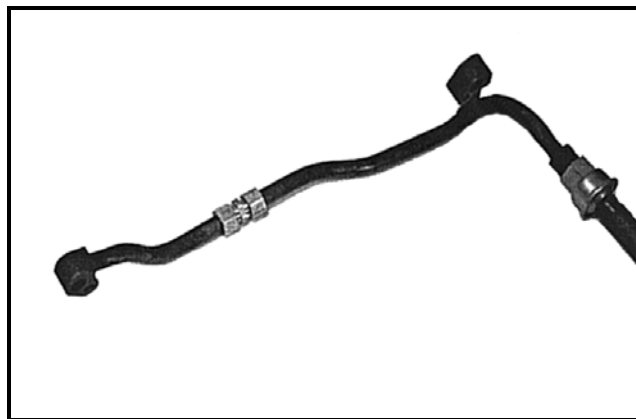


Figure 12

10. Install the AIR crossover tube to the cylinder heads using the original hardware.
11. Tighten the bolts securing the AIR crossover tube to the cylinder heads.
12. Securely tighten the compression nuts of the fitting on the AIR crossover tube as shown.

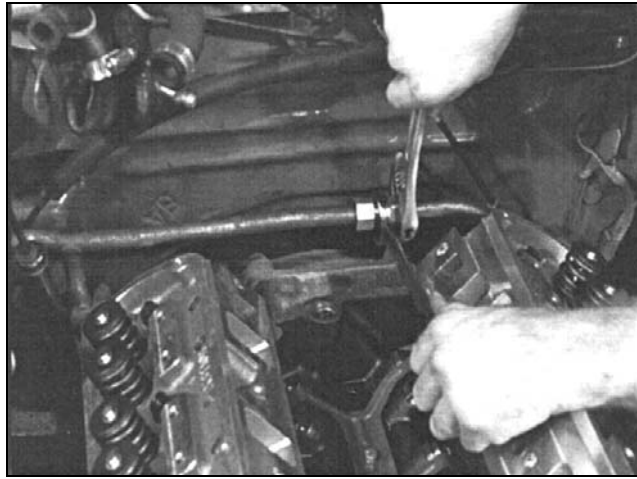


Figure 13

SystemMAX CAMSHAFT INSTALLATION:

WARNING! NEVER INSTALL A CAMSHAFT AND LIFTERS WITHOUT LUBRICATING THEM BEFORE INSTALLATION. USE AN ASSEMBLY LUBE TO COMPLETELY LUBE THE LIFTERS AND CAMSHAFT BEFORE ASSEMBLY. FAILURE TO DO SO WILL RESULT IN PREMATURE CAMSHAFT FAILURE.

NOTE: There are differences in the **SystemMAX II** and **SystemMAX 50 state legal** camshafts. These differences will not change installation procedures.

1. Install the short cam gear roll pin into the camshaft by tapping the roll pin into place with a small hammer, if it is not already installed.

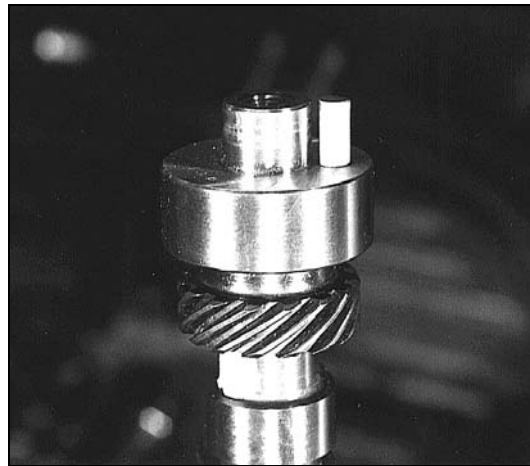


Figure 14

2. Lube the camshaft bearing journals, camshaft lobes, and distributor gear with an assembly lube. Be sure to completely lube the bearing journals and lobes. Failure to do so will result in premature camshaft failure.
3. Using a camshaft installation tool, install the camshaft into the engine block. Take care not to damage the camshaft bearings.
4. Install the camshaft thrust plate retainer and torque the thrust plate retainer bolt to 9-12 ft./lbs.
5. Install the timing chain and gear set with the crankshaft gear in the "0" position.

WARNING! DO NOT INSTALL THE CRANKSHAFT GEAR IN THE "R" OR "A" POSITION OR POOR ENGINE PERFORMANCE WILL RESULT. THE TIMING MARKS SHOULD BE AS SHOWN BELOW.

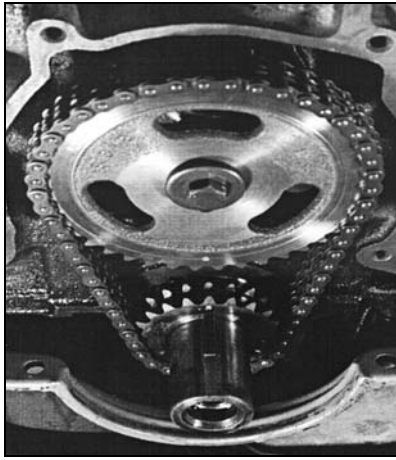


Figure 15

6. Install the cam gear and the camshaft gear bolt and torque to 45 ft./lbs.
7. Install the front timing cover with the appropriate gaskets. Use Permatex Ultrablue sealant on bolts that enter the coolant passages to prevent leaks. Torque the timing cover bolts to 12-18 ft./lbs.
8. Lubricate the harmonic balancer seal with cam assembly lube before installing the harmonic balancer. Install the harmonic balancer using a harmonic balancer installation tool. Torque the harmonic balancer to 70-90 ft./lbs.
9. Install the water pump using new gaskets. Use Permatex Ultrablue sealant on bolts that enter the coolant passages to prevent leaks. Torque the water pump bolts to 12-18 ft./lbs.
10. Lube the entire lifter and install the lifters into the original lifter bores. Do not leave any dry areas on the lifter.



Figure 16

11. Install the lifter retainer and tighten the lifter retainer bolts securely.
12. For **SystemAX** installations, install the push rods that were removed from the engine. Install the push rods in their original location. Be sure to lube both ends of the push rods with cam assembly lube. For **SystemAX II** installations, install the push rods, supplied with the **SystemAX II** kit. Be sure to lube both ends of the push rods with cam assembly lube.
13. Install the rocker arms and finger tighten only.

WARNING! PRIOR TO THE INSTALLATION OF THE SYSTEMAXS CYLINDER HEADS, ROCKER ARM RATIOS AND PUSH ROD LENGTH WILL NEED TO BE DETERMINED BASED ON YOUR ENGINE REQUIREMENTS. FAILURE TO CALCULATE YOUR ENGINE GEOMETRY FOR THESE TWO ITEMS COULD RESULT IN POOR PERFORMANCE, PERSONAL INJURY, AND/OR SEVERE ENGINE DAMAGE.

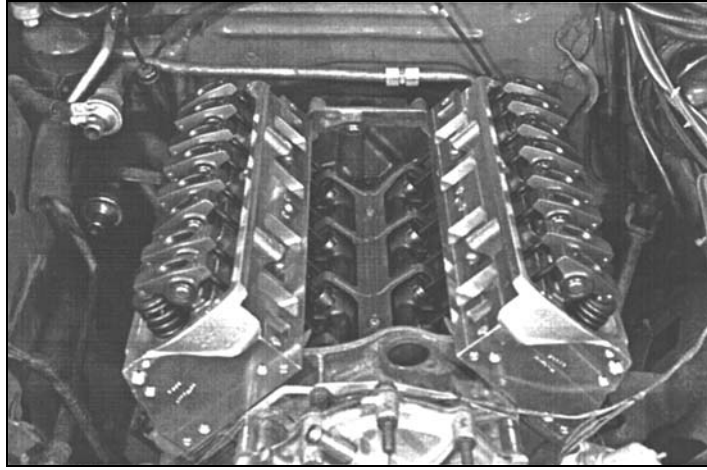


Figure 17

14. Rotate the crankshaft to TDC for #1 cylinder firing position. Both valves—intake and exhaust—should be fully closed.
15. Slowly tighten the intake and exhaust rocker arm bolts for the #1 cylinder until the push rod to rocker arm just touch, or has zero lash. Tighten with 1/4 to 1/2 turns.
16. Rotate the crankshaft pulley 90 clockwise and repeat for the second cylinder in the firing order.
17. Continue to rotate the crankshaft in 90 increments and torque the intake and exhaust valve rockers for each remaining cylinder. The firing order on a Ford 5.0L H.O. is 1-3-7-2-6-5-4-8.
18. After completing this sequence, it is always a good idea to recheck the valve adjustment by repeating steps 14-17.

WARNING! PISTON TO VALVE CLEARANCE SHOULD BE CHECKED PRIOR TO INSTALLING THE HEADS. MINIMUM INTAKE VALVE CLEARANCE SHOULD BE .080". MINIMUM EXHAUST VALVE CLEARANCE SHOULD BE .110". CYLINDER HEADS WITH 2.020" INTAKE VALVES MAY REQUIRE REMACHINING OF THE PISTON TOP EYEBROWS.

SystemAX LOWER INTAKE MANIFOLD INSTALLATION:

1. Be sure all gasket surfaces are clean and free of oils and cleaning solutions. Remove valley rags.
2. Remove the water lines, sensors, fuel rails, and plugs from the lower manifold.
3. Remove the injectors from the original manifold.
4. Install the EGR heat shield and the PCV splashguard to the **SystemAX II** lower manifold using the rivets provided.
5. Install the PCV screen filter in the new lower manifold.
6. Install new intake gaskets on the cylinder heads. If the front and rear seals do not have an adhesive backing, it is recommended that you use a thick bead of RTV silicone sealer instead of the gasket.
7. If you are using the front and rear end seals with the adhesive back as the front and rear seals, apply a small amount of RTV silicone sealer in the corners where the cork gasket and intake gaskets intersect. Follow the instructions on the sealer before assembling.
8. Apply a small amount of anti-seize compound to each intake bolt and install.
9. Torque the lower intake bolts in the sequence shown in Figure 18. Torque the lower intake bolts to 15 ft./lbs., and repeat the torque sequence to a final torque of 22-24 ft./lbs.

WARNING! BE SURE TO TORQUE THE BOLTS IN THE DESIGNATED SEQUENCE TO THE CORRECT TORQUE. FAILURE TO DO SO CAN RESULT IN ENGINE DAMAGE.

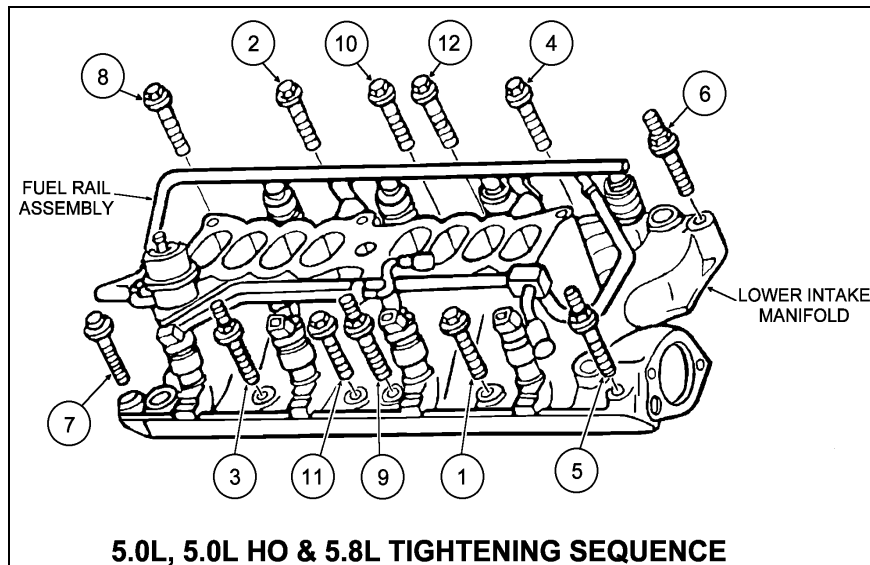


Figure 18

10. Install new O-rings on the original injectors. Install the injectors in the new manifold.

DANGER! FAILURE TO INSTALL NEW O-RINGS ON THE INJECTORS COULD CREATE A FUEL LEAK, RESULTING IN AN ENGINE FIRE, EXPOSURE, PROPERTY DAMAGE, AND/OR PERSONAL INJURY.

11. Install the water lines, sensors, fuel rails, and plugs that were removed from the old manifold. See Figure 19.

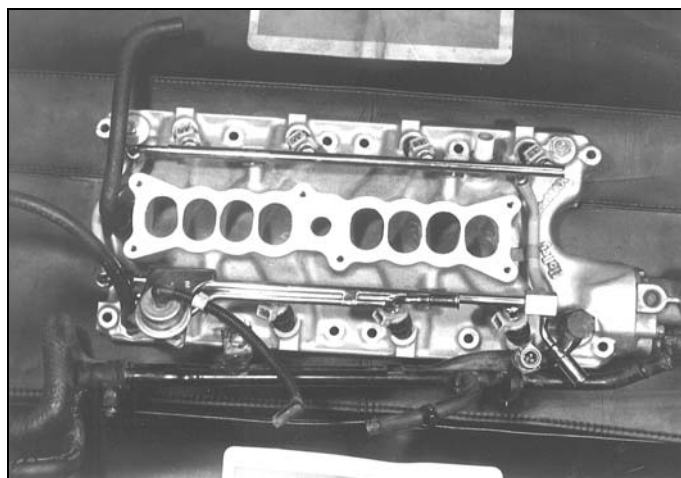


Figure 19

12. Install the fuel pressure regulator from the old manifold on to the new manifold.

13. Install the thermostat and water neck outlet removed from the original intake manifold with a new gasket. It is highly recommended that a new thermostat be installed during this procedure. Use anti-seize compound on the bolts securing the water neck. Torque the water neck bolts to 30 ft./lbs.

14. Plug any unused ports on the manifold.

15. Reconnect the wiring harness to the injectors and sensors on the lower manifold.

16. Reconnect the fuel lines, ensuring the connections snap together tightly. Reattach the safety clamps to the lines. Double check to ensure that all lines are properly connected and secure. See Figure 20.

DANGER! FAILURE TO CONNECT FUEL LINE CONNECTIONS PROPERLY MAY RESULT IN GASOLINE LEAKS, WHICH COULD CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, SERIOUS INJURY, AND/OR DEATH.

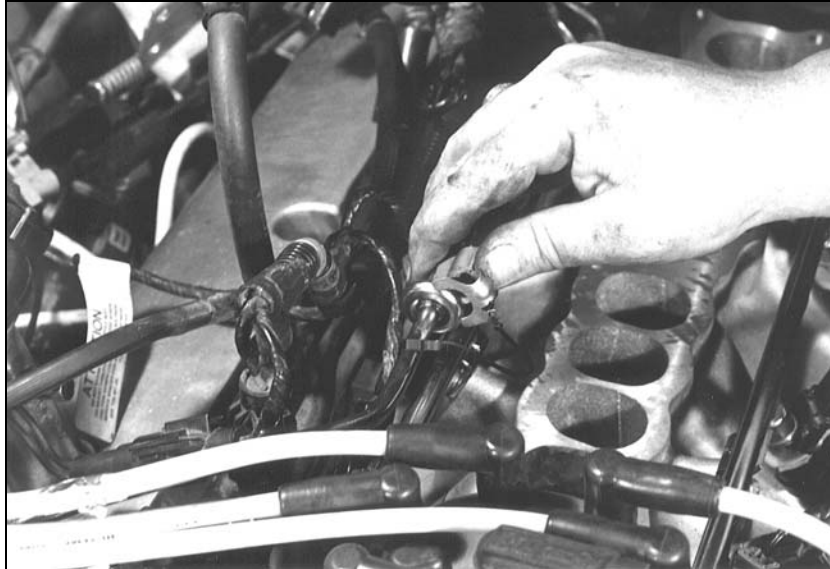


Figure 20

17. Check the condition of the bypass hose and heater hoses, and replace if necessary. Connect the bypass hose and heater hoses and tighten securely.
18. Go to the section on **DISTRIBUTOR INSTALLATION**.

SystemeMAX II UPPER INTAKE INSTALLATION:

1. If your SystemeMAX II manifold is equipped with an internal EGR passage and the side of the lower manifold has a large drilled and tapped hole on the side, plug it with the supplied 1/2" pipe plug.
2. Using the gasket provided, install the upper manifold to the lower manifold. Torque to 12-18 ft./lbs.
3. Remove the 4 nuts that secure the throttle body and EGR spacer to the stock or old upper intake manifold. Remove the throttle body and EGR spacer.
4. Remove the 4 studs from the old upper intake manifold.
5. Install the 4 studs removed from the old upper intake into the new **SystemeMAX II** upper intake.
6. Install the gasket and the EGR spacer onto the studs.
7. Install the gasket and the throttle body onto the studs.
8. Install the nuts and torque to 20 ft./lbs.
9. Reconnect the throttle linkage. Check for any binding by opening and closing the throttle completely. If *any* binding is present, do not proceed any further until it is corrected.

DANGER! FAILURE TO PROPERLY REATTACH ALL THROTTLE LINKAGE CONNECTIONS MAY RESULT IN UNCONTROLLED ENGINE OR VEHICLE SPEED, WHICH COULD CAUSE PERSONAL PROPERTY DAMAGE, SERIOUS INJURY, AND/OR DEATH.

10. Install the 3/8" vacuum fitting (straight fitting) on the front side of the upper intake.

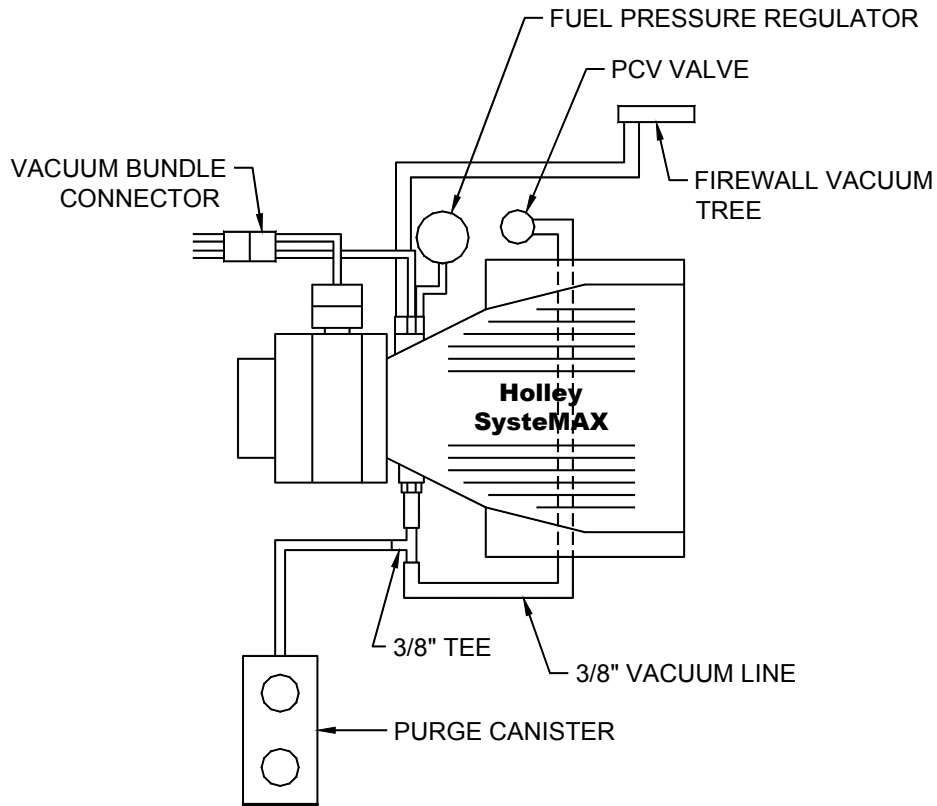


Figure 21

11. Using Figure 21 as a guide, connect the vacuum lines to the upper intake manifold. Some trimming or extension of the vacuum lines may be necessary. Connect the lines from the vacuum bundle connector to the EGR valve and the ports on the back of the manifold. Connect the fuel pressure regulator and large line from the firewall vacuum tree to the back of the manifold. Connect the PCV valve and purge canister to the front of the manifold using a 3/8" vacuum line and the supplied 3/8" Tee.
12. Connect the coolant hoses to the EGR spacer. Securely tighten all clamps.
13. Install the air intake hose and mass air flow sensor and reconnect all electrical connections. Securely tighten all fasteners.

DISTRIBUTOR INSTALLATION:

1. Insert the distributor so the rotor points in the same direction as before it was removed.
2. Install the distributor hold down clamp and hold down bolt. Try to position the distributor housing in same orientation as it was when removed. Do not tighten the distributor hold down bolt at this time.
3. Install the distributor cap and spark plug wires. Firing order is 1-3-7-2-6-5-4-8. The distributor rotates clockwise.
4. Install new spark plugs. Holley recommends the use of Autolite #65 spark plugs. Use anti-seize on the spark plug threads to aid in removal.
5. Install the spark plug wires on the corresponding spark plug. Firing order is 1-3-7-2-6-5-4-8. The distributor rotates clockwise.

INSTALLATION OF ENGINE ACCESSORIES:

1. If the air conditioning compressor was loosened and moved to facilitate cylinder head removal, reattach the air conditioning compressor.
2. Install any accessories that were installed to the cylinder heads if removed during cylinder head installation.
3. Install the large bracket holding the air conditioning compressor and the power steering pump.
4. Using the underhood belt routing decal as a guide, rotate the belt tensioner and reinstall the drive belt. Check condition of the drive belt before installing. If any signs of aging are present, it is recommended the belt be replaced.
5. Reinstall the air conditioning condenser if removed.

NOTE: If the air conditioning system was evacuated, the air conditioning system will need to be recharged. This procedure has to be done by certified air conditioning technicians with the proper recycling and recharging equipment.

6. Reinstall the radiator and fan shroud.
7. For vehicles with automatic transmissions, the transmission lines need to be reconnected to the radiator. Be sure the cooler line connections snap together properly.
8. Install the upper and lower radiator hoses and heater hose. Check condition of all hoses before installing. If any signs of aging is present, it is recommended the hoses be replaced.
9. Fill cooling system with a 50/50 antifreeze and water mix.
10. Inspect the air filter element at this time. Replace if necessary.
11. Drain the oil from the crankcase and remove the old oil filter. Be sure and drain the oil by removing both drain plugs. Reinstall both drain plugs, install a new oil filter and refill the crankcase with fresh motor oil to the manufacturer's specifications.
12. If installing the **SystemMAX II** package, replace the factory installed fuel pump with Ford Motorsports P/N M9407-C50 per the manufacturer's instructions.

SYSTEMS CHECK:

NOTE: Before attempting to start the engine, check the following items:

- Are fuel lines hooked up and securely tightened?
- Are all throttle linkages and return springs connected and working properly?
- Are all vacuum hoses connected?
- Are all radiator and heater hoses connected properly?
- Has the cooling system been filled with a mixture of anti-freeze and water?
- Are all electrical connections that were removed during the installation reconnected:
- Was the crankcase oil and oil filter changed and refilled?

STARTING ENGINE:

1. Reconnect the negative battery cable to the negative battery terminal.
2. Turn the key on a few times to allow the fuel pump to operate and purge the lines of air. Check for fuel leaks at this time. If any fuel leaks are present, do not attempt to start the engine before repairs are made.

DANGER! FAILURE TO REPAIR FUEL LEAKS CAN BE EXTREMELY DANGEROUS. DO NOT SMOKE. EXTINGUISH ALL OPEN FLAMES. AN OPEN FLAME, SPARK, OR EXTREME HEAT NEAR GASOLINE COULD RESULT IN A FIRE AND/OR EXPLOSION CAUSING SERIOUS INJURY OR DEATH!

3. If the area is clear of fuel and/or fuel vapors, start the engine. If the engine turns over excessively or backfires, stop and recheck ignition timing.

DANGER! DO NOT RUN THE ENGINE IN AN ENCLOSED AREA OR AN AREA WITHOUT PROPER VENTILATION. INHALATION OF EXHAUST GASES MAY CAUSE NAUSEA, SLEEPINESS, OR DEATH!

4. After the engine starts, remove the shunt plug from the distributor and set the ignition timing to the specification found on your underhood decal, usually 10° BTDC, with a timing light. Tighten the distributor hold down bolt. Reinstall the shunt plug.
5. After initial start up, and the engine reaching full operating temperature, shut the engine down and allow it to cool for a minimum of 8 hours. Re-torque the lower intake manifold and cylinder heads using the torque sequence from the **SystemAX CYLINDER HEAD INSTALLATION** and **SystemAX INTAKE INSTALLATION** sections of this manual. Re-torque the throttle body nuts at this time.
6. For break in, operate the vehicle safely, changing the engine speed frequently as dictated by driving conditions.
7. After 100 miles of operation, change the oil and oil filter to remove any debris resulting from the break in process.

TUNING SystemAX:

1. Idle speed may have to be increased on the SystemAX package to prevent a surge at idle. Adjust the idle speed by turning the curb idle screw on the lower side of the throttle body. After adjusting idle, reset TPS voltage to 0.90 to 0.95 volts. If equipped with an automatic transmission, the transmission cable will have to be readjusted following the manufacturer's procedure.

NOTE: Some models may have to have the mounting holes of the TPS modified to allow adjustment. If your TPS needs modification, elongate the mounting holes using a Dremel tool and cutter.

TROUBLE SHOOTING:

A	Engine backfires during initial cranking.	<ul style="list-style-type: none"> - Check ignition timing with a timing light during cranking - If the timing marks align, check to see if distributor was installed 180° out. - Check to insure all spark plug wires are located on the appropriate spark plug. - Check for vacuum leaks.
B	Rocker arms making noise.	<ul style="list-style-type: none"> - Readjust the rocker arms following the procedure in this manual.
C	Decked block or milled heads.	<ul style="list-style-type: none"> - If the cylinder heads have been milled or the engine block decked, the cylinder head faces and the end surfaces of the manifold must be milled to compensate. This is necessary to maintain correct port alignment, to minimize the possibility of manifold vacuum and oil leaks, and assure proper engine performance.
D	Bent push rods.	<ul style="list-style-type: none"> - Bent push rods due to mechanical interference. Check for interference or coil binding of the valve springs.
E	Noisy lifters.	<ul style="list-style-type: none"> - Lifter noise may occur for a short time, due to bleed down of the lifters. The noise should diminish and quit after a few minutes.
F	Excessive oil consumption, smoke on coasting.	<ul style="list-style-type: none"> - Oil leaking through rocker arm bolt threads (SystemAX II only) Remove rocker arm bolts and reinstall with Permatex Ultrablue sealant on the threads.
G	Surging idle.	<ul style="list-style-type: none"> - Excessive fuel pressure. See TUNING SystemAX section of this manual. - Idle speed adjusted incorrectly. See TUNING SystemAX section of this manual.

NOTES:

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199R-9920-2

Holley
Performance Products, Inc.

Date: 2-1-02