FORD PERFORMANCE

M-6007-X2347DF(DR)
Engine Manual

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Please visit www.performance.ford.com for the most current instruction information.

! ! ! PLEASE READ ALL OF THE FOLLOWING INSTRUCTIONS CAREFULLY PRIOR TO INSTALLATION. AT ANY TIME YOU DO NOT UNDERSTAND THE INSTRUCTIONS, PLEASE CALL THE FORD PERFORMANCE TECHLINE AT 1-800-367-3788 ! ! !

FORD PERFORMANCE CRATE ENGINE LIMITED WARRANTY

Ford Performance warrants for 24 months or 24,000 miles / 40,000 kilometres, whichever occurs first subsequent to the original retail purchase, that it will repair or replace, at its option, any Ford Performance engine part that, after inspection, is found to have failed due to a defect in factory supplied material or workmanship. Ford Performance may use new or remanufactured parts for replacement.

Covered engine parts include the engine block and cylinder heads, all internally lubricated parts of the engine, including pistons, piston rings, piston pins, crankshaft and main bearings, connecting rods and rod bearings, camshaft and camshaft bearings, timing chain, timing chain gears, intake and exhaust valves, valve springs, oil pump, push rods, rocker arms, valve lash adjusters, hydraulic or mechanical lifters, and valve stem seals, to the extent that the original engine contains the referenced warranted part. Parts that require normal manufacturers recommended replacement intervals are not covered under this warranty.

In the Province of Quebec, none of the limitations and exclusions below will exclude or restrict the warranty provided for in Sections 37 and 38 of the Quebec Consumer Protection Act. This warranty does not preclude the operation of any other provincial statute, which in certain circumstances may not allow some of the limitations and exclusions described in this warranty.

To the extent allowed by law, loss of time, inconvenience, loss of the use of the vehicle, commercial loss and incidental and consequential damages are not covered. There is no other express or implied warranty on these Ford Performance engines including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose.

This warranty does not cover:

- Sealed racing engines and other high-performance engines with mechanical lifter camshafts.
- Parts which are replaced as part of normal maintenance.
- Engine installation or removal costs.
- Damage due to improper engine installation, negligence, alteration or accident, including use related to competition racing, marine or motorcycle applications or for other non-vehicle usage.
- Damage due to addition of power adders such as superchargers, turbochargers or nitrous oxide.
- Engines where the vehicle odometer has been disconnected or the mileage has been altered.
- Damage caused by lack of proper maintenance, failure to follow maintenance schedule intervals or failure to use or maintain proper type and levels of fluids, fuel, oil and lubricants, including accelerated wear from contaminated oil or fuel wash.
- Damage due to engine overheating or oil starvation.
- Damage resulting from improper engine tuning including, piston skirt scuffing, damage indicated by head gaskets exhibiting burned or crushed fire ring(s), or damage caused by improper combustion, detonation or pre-ignition, as indicated by melted, broken or eroded pistons.

- Damage resulting from improper transmission installation, including crankshaft thrust bearing damage on transmission side only.
- Damage caused by foreign objects dropped or drawn into cylinders or the crankcase.
- Towing, shipping, rental vehicles, loss of time, inconvenience, loss of use or other economic loss to the extent allowed by law, except in the Province of Quebec where reasonable costs of towing and shipping are covered.
- Ford Performance engines installed in vehicles registered and/or normally operated outside the United States and Canada.

Proof of proper maintenance is the owner's responsibility. Keep all maintenance receipts and be prepared to make them available.

To obtain warranty repair or replacement, please contact the Ford Performance Tech Line at 1-800-367-3788, fwrnty@ford.com or P.O. Box 490, Dearborn, MI 48121

INTAKE MANIFOLD INSTALLATION INSTRUCTIONS FOR FORD PERFORMANCE CRATE LONG BLOCKS

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN INPROPER ENGINE PERFORMANCE OR ENGINE FAILURE DUE TO:

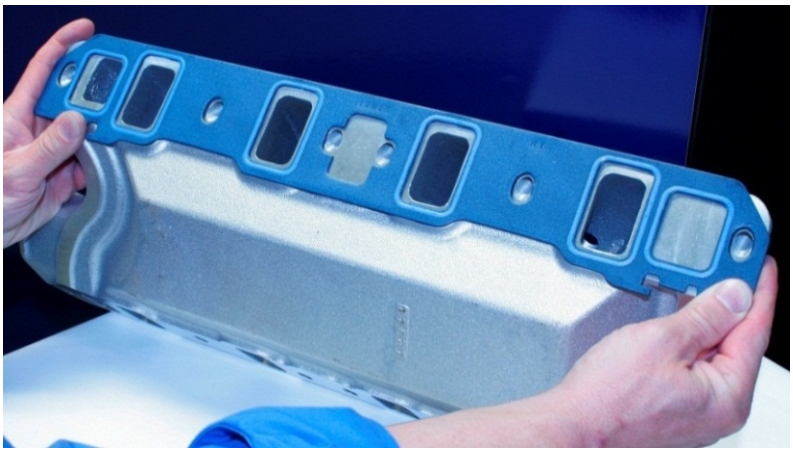
- ***PISTON SCUFFING***
- ***DETONATION – IMPROPER COMBUSTION***
- ***OIL LEAKS***
- ***COOLANT LEAKS***
- ***OIL CONSUMPTION***

NOTE: READ THRU COMPLETE INSTRUCTIONS BEFORE STARTING

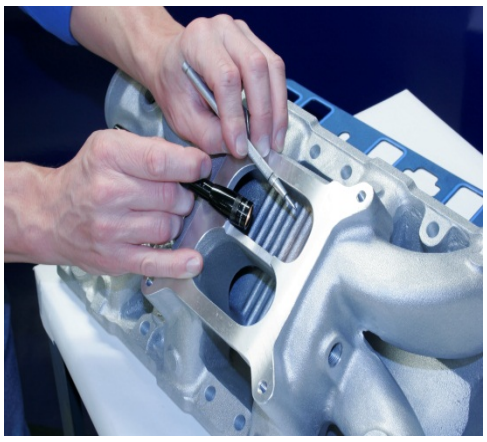
STEP 1: Below is a picture of everything needed to accomplish the installation.

- M-9439-A50 intake gaskets, these are included with your crate engine, ***note: cork end rail gaskets are not used***
- (12) Intake manifold bolts 5/16-18 UNC grade 8, with flat washers
- Torque wrench
- Motorcraft TA-29 silicone or equivalent RTV high temperature silicone sealer
- 6” Ruler and set of feeler gauges
- Surface cleaner (Brake Cleaner) or lacquer thinner (not pictured)
- A gasket sealer/contact cement: such as Gasgacynch®, High Tack® or Indianhead®

STEP 2: **Check port and gasket alignment to intake manifold and cylinder head.** Some aftermarket intake manifolds do not match Ford Performance cylinder heads. Position the gasket on the manifold where the locating tabs (beneath the water cross over holes) will contact the head gaskets.

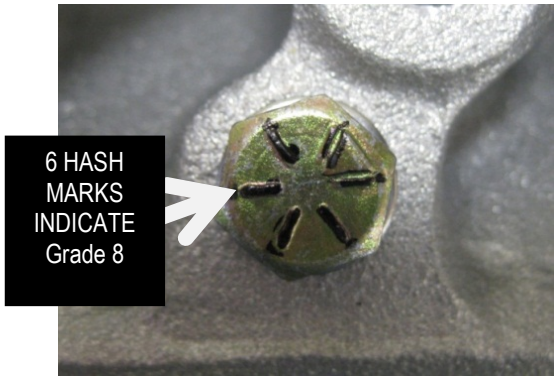


STEP 3: **Inspect intake manifold for debris, and make sure it's clean.** Check all threaded holes and tap deeper if necessary. Check the carburetor/throttle body gasket alignment. Also look at the gasket surfaces for nicks and damage, raised surfaces on the flanges can prevent sealing. Minor raised imperfections can be repaired by wrapping a sheet of 320 grit wet/dry sandpaper around a flat block and lightly sanding the surface (do not be too aggressive as this will cause the surface to become uneven). If installing a used intake manifold it is not recommended to dry blast it to clean it. The media will become imbedded and eventually fall out with heat cycling of the engine. If the manifold is being transferred from a "failed" engine, be sure to inspect all passages for any debris that may have been lodged from the previous engine.



STEP 4: **Test fit the carburetor/throttle body and actuate the linkage. Check to make sure the throttle blades do not contact the manifold.**

STEP 5: Grade 8 bolts are recommended for intake manifold installation. Grade 8 bolts are identified by (6) hash marks on the head of the bolt. The torque specs supplied are for grade 8 fasteners.

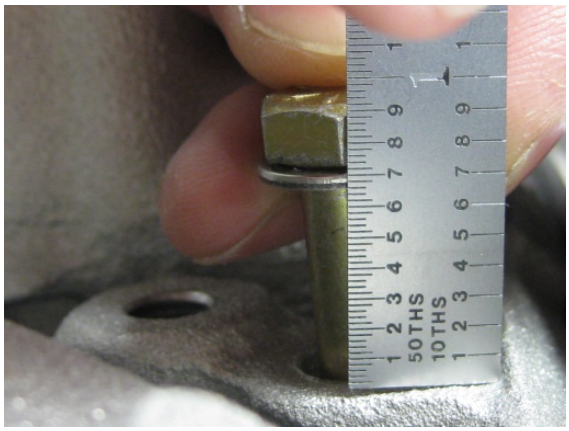


STEP 6: A pre-assembly mock up is required to check the proper fit of the intake manifold to the long block assembly.

- Place the intake manifold on the long block without the intake manifold gaskets
- **The gap at the end rails needs to be .040" minimum.** This check insures that the manifold will not "bottom out" on the end rails of the block. If it bottoms out, there is insufficient clamp load between the intake manifold and cylinder head, and it's likely that oil will be sucked into the intake runners.
- ***If the gap is less than .040" the end rails of the manifold will need to be machined.*** This can be checked with a scale or feeler gauges.

STEP 7: **The minimum thread engagement required for the intake manifold bolts is .625" or 5/8"**.

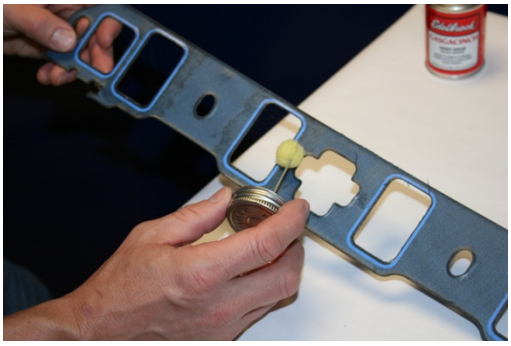
- Too little thread engagement can damage threads and strip out.
- Thread engagement ***must*** be checked on an individual basis due to the variety of intake manifolds available.
- Measure thread engagement from intake manifold to bottom of flat washer.



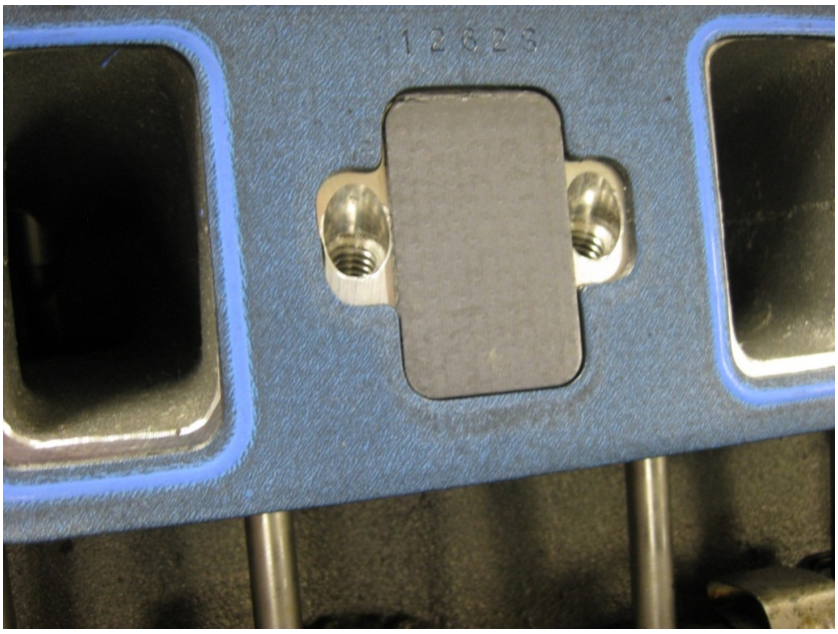
STEP 8: **Apply surface cleaner to a lint free cloth or paper towel, clean all gasket surfaces, manifold and block end rails.**

STEP 9: **Two different types of sealers are used during intake manifold installation: 1) a contact cement type such as Gasgacinch®, or High Tack®, and 2) Silicone. The recommended silicone is Motorcraft TA-29®.**

STEP 10: **Apply a thin coating of Gasgacinch on the head intake port flange and the head side of the intake manifold gasket.** Within a few minutes, the surfaces will start to dry and become tacky. Carefully place the gaskets on the head surface aligning ports and bolt holes.



STEP 11: Install EGR gasket or block-off, depending on intake manifold style. If the manifold does not have an EGR passage (no EGR passage on our example) the block-off is used.



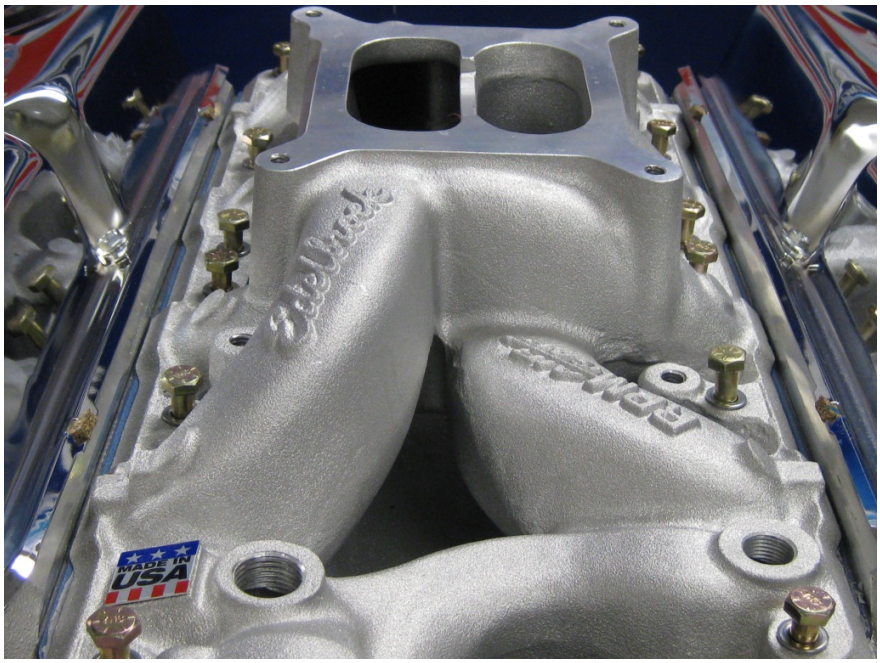
STEP 12: Rub an initial thin layer of silicone onto the end rails of the intake manifold and block.

STEP 13: Apply a thick layer of silicone onto the end rails of the block, be sure to apply in corners.

STEP 14: Apply a thin layer of silicone around the water openings (4 places).

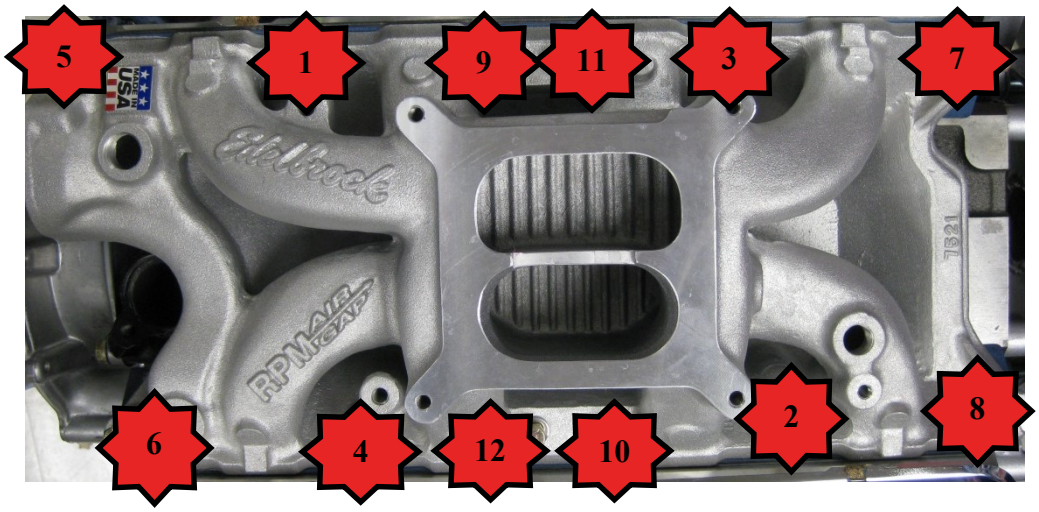
STEP 15: Set intake manifold on engine.

STEP 16: Apply a drop of oil to the threads of the intake manifold bolts, and install intake manifold bolts.



STEP 17: Start all bolts by hand and hand tighten. Torque intake manifold bolts in two steps (sequence is shown below):

- Step 1: Tighten to 5-10 lb. ft (6-14 Nm)
- Step 2: Tighten to 15-18 lb*ft (31-34 Nm)
- Note: Repeat step 2 several times until bolt torque is stabilized
- **Re-torque after 10 engine heat cycles – completely cold to full operating temperature**



TECHNICAL SPECIFICATIONS

Crate Engine Part Number	M-6007-X2347DF(DR)
Engine Type	302 Based 347 Cubic Inch Small Block
Displacement (cubic inches)	347
Horsepower Rating	360 HP STP cor. @ 6000 rpm
Torque	400 lb* ft STP cor. @ 4500 rpm
Block M-6010-BOSS302	Cast Iron 4 Bolt Main (center 3)
Bore	4.030
Stroke	3.400
Crankshaft	M-6303-C340 Forged Steel (Flywheel bolts require sealer)/ 0 balance
Vibration Damper	M-6316-D302 Neutral Balance
Connecting Rod	Forged Steel
Piston	Forged Aluminum
Camshaft	Hydraulic Roller
Cam Timing	Position "0" (multi index crank sprocket)
Camshaft Lobe Separation	110°
Camshaft Duration	206°/206° @ .050" lift (int./ex.)
Camshaft Lift	.533/.533” (int./ex.)
Cylinder Head	M-6049-X2 Aluminum
Chamber Volume	63cc
Valve Diameter Int./Ex.	1.940" Int./1.540 Ex.
Compression Ratio	9.8:1
Rocker Arm	Aluminum Roller 1.60:1 Ratio
Intake Manifold	Edelbrock RPM Air Gap
Recommended Timing	34°BTDC Total 4000 rpm (91 octane fuel R+M/2 minimum)
Maximum Rated rpm	6500 rpm
Oil Pan	Champ CP302FS/CP302FOX
Oil Filter	M-6731-FL1A
Oil Pressure	40 psi @ 240° F/ 4000 rpm
Recommended Oil	10w-30 or 10w-40
Max Oil Temperature	240° F
Recommended Coolant Temperature	195° F
Spark Plugs	AGSP-32C
Firing Order	1-3-7-2-6-5-4-8
Fuel Pressure (@ carburetor)	6-7 psi
Distributor	MSD 8598 with steel gear
Carburetor	Holley Street Avenger 570

Recommended Parts Not Included

M-6375-D302	Neutral Balance Flywheel (may require M-6397-A302 metric bolt kit dependent on clutch)
M-4216-A210	Flywheel Bolts (note threads have required sealer pre applied)

*Oil pressure fitting in the left front block is ½ pipe thread, 40 lb*ft. torque max.

ENGINE INSTALLATION AND TUNING TIPS:

Performance engine durability is dependent on several supporting systems including:

- Oiling system
  - Priming
  - Oil pan
  - Oil type
  - Capacity
  - Valve covers
- Ignition system
  - Distributor gear installation
  - Distributor installation
- Fuel delivery system
- Cooling system
- Flywheel, torque converter and transmission
  - Bellhousing alignment

If the support systems are not adequate, poor engine performance and possible engine failure could result.

OILING SYSTEM-CONSIDERATIONS/COMMON PROBLEMS

The M-6007-X2347DF(DR) engine is equipped with a Champ aftermarket oil pan. Both of these oil pans have an ***EIGHT QUART TOTAL CAPACITY INCLUDING OIL FILTER***. Priming the oiling system before starting a new engine is crucial to engine life. This is important on initial start-up of a new engine or, if the engine has not been run for an extended period of time.

PRIMING

Initial priming is done before installing the engine into the vehicle. Additionally, prime the engine prior to installing the transmission. If there are any oiling system problems, it is easier to fix them with the engine out of the car. The engine should be primed once more after installation before starting the engine. This is very important if hooking up a remote filter and/or oil cooler.

IMPORTANT: For engines that have not been run for a long period of time, priming alone may not provide enough lubrication. Removal of lifters and lubricating the cam lobes and lifters with engine oil may be necessary.

DO NOT PRIME BY CRANKING ENGINE! Check oil level after priming engine and before starting.

STEP 1: Use ¼” priming tool or ¼" drive, ¼” deep-well socket with extension for M-6007-X2347DF(DR)

STEP 2: Install mechanical oil pressure gauge.

STEP 3: Remove valve covers.

STEP 4: Rotate priming tool counterclockwise using an electric drill.

STEP 5: Observe oil pressure achieved on gauge.

STEP 6: Prime until oil comes up through the rocker arms. This may require rotation of the crankshaft to obtain oil flow through all the rocker arms.

STEP 7: Look for external oil leaks.

STEP 8: Reinstall valve covers.

STEP 9: After installing the engine into the vehicle and just before starting it, prime the engine again using above procedure. Valve covers do not have to be removed on 2nd prime if not hooking up an oil cooler or remote filter. Prime for 1 minute after reaching oil pressure. If you have added a remote filter or oil cooler, remove the valve covers and verify oil flow to the rocker arms.

STEP 10: **Check oil level after priming engine and before starting.**

Oil Pan General Information

If the particular application requires changing the oil pan, check the following. Does the oil pan have adequate capacity? Most performance vehicles require a 7-qt minimum capacity.

Does the oil pan have proper oil control baffling for the vehicle's braking, acceleration, and cornering capabilities? Road Race cars need oil control in four directions: braking, acceleration, LH cornering and RH cornering. Drag race cars need oil control in two directions, braking and acceleration. Baffles must be designed to keep oil over the pickup screen at all times.

Is the pickup screen the proper distance from the bottom of the oil pan? If the oil pickup screen is too close to the bottom of the oil pan, it can cause cavitation. If it is too far away, it will cause the pump to draw air and cause aeration. The pickup screen should be located 3/8" to 7/16" from the bottom of the pan.

Does the design of the screen on the pickup tube create restrictions? Inspect the pickup tube screen. Some aftermarket designs restrict oil flow as much as 75%. Wire mesh is good. Perforated metal is usually restrictive. Measure the wire size and calculate the open surface area. Most aftermarket screens have less open surface area than stock screens.

If using a remote oil filter mount or oil cooler, make sure that all of the components are large enough to eliminate any restrictions to oil flow. Many Cobra replica kit cars use components that are undersize or, incorporate components that are restrictive.

- Undersized oil lines commonly restrict oil flow.
- Bends and turns in an oiling system create restriction.
- Poorly designed remote filter mounts and adapters can create restrictions.
- Be sure that the oil cooler flows enough oil to meet the engine's requirements.
- Never reuse a used oil cooler. Debris can become trapped and cannot be cleaned out.
- Poorly designed oil filters can cause a restriction.
- Many oil systems only flow one way. Connecting the remote oil filter or oil cooler lines backwards can cause engine damage/failure.

ENGINE OIL

Use 10W30 or 10W40.

OIL CAPACITY

8 quarts total, with M-6731-FL1A oil filter or equivalent. Any external coolers or remote filter assemblies will require incremental oil.

VALVE COVERS

The M-6007-X23347DF(DR) comes with M-6582-A301R valve covers. Make sure the valve covers are correct for your PCV system.

IGNITION SYSTEM CONSIDERATIONS/COMMON PROBLEMS

The ignition system must deliver a properly timed, high voltage spark. Many factors determine spark timing. The most common factors include compression ratio, fuel quality, fuel octane rating, combustion chamber design, engine operating temperature, inlet air temperature, altitude, and load.

- Avoid too much or too little timing for your engine combination.
- Avoid hooking up the vacuum advance to intake manifold vacuum instead of ported vacuum.
- Avoid inductive crossfire created by improper plug wire routing. When routing plug wires keep them separated.
- Improper timing can damage pistons, rod bearings, head gaskets, and many other engine parts.
- Typical total mechanical advance timing at 4000 rpm for Ford Performance crate engines: M-6007-X2347DF(DR) is 34° BTDC (91 octane R+M/2 minimum fuel requirement.).

DISTRIBUTOR GEAR INSTALLATION INSTRUCTIONS:

The M-6007-X2347DF(DR) comes with a billet steel hydraulic roller camshaft. **8598 MSD distributor with steel gear included. Use these instructions if replacing distributor.**

STEP 1: Remove roll pin from distributor gear and shaft. Save pin for re-assembly.

STEP 2: Verify that the shaft endplay is .024" to .035". Modify collar if necessary. Some aftermarket distributors may be constructed in a manner that does not allow you to achieve .024" to .035" of endplay. See “Alternative method of verifying correct distributor gear installation” if your distributor does not have .024" to .035" endplay.

STEP 3: Press original distributor gear off shaft.

STEP 4: Mark location of original roll pinhole on the shaft by drawing a vertical line along the shaft that intersects the hole. Measure from the centerline of the roll pinhole to a fixed point above it. Note that dimension.

STEP 5: Press new distributor gear onto shaft.

NOTE: Replacement distributor gear does not have roll pinhole.

STEP 6: Pull distributor shaft out of distributor housing to eliminate endplay (see Fig. 1).

STEP 7: Check location of distributor gear on distributor shaft (see Fig. 1). If it is not in the correct location, use a press to move the gear to the correct location.

STEP 8: Using the vertical line on the distributor shaft and the noted dimension (see **STEP 4**), roughly plot where the original roll pinhole is located. Drill a new .125" hole 90˚ from the original hole, above or below it, through the gear and the shaft.
NOTE: It is important that the dimensions called out in Fig. 1 are maintained while drilling.

STEP 9: Insert roll pin and check dimensions (see Fig. 1).

WARNING: Improper installation may force the gear down against the block or it may be held up away from the support in the block. Both conditions will cause damage to the block and or the block and gears. Proper installation and the cut on the gears will pull the distributor gear down against the support (distributor gear thrust face) in the block.

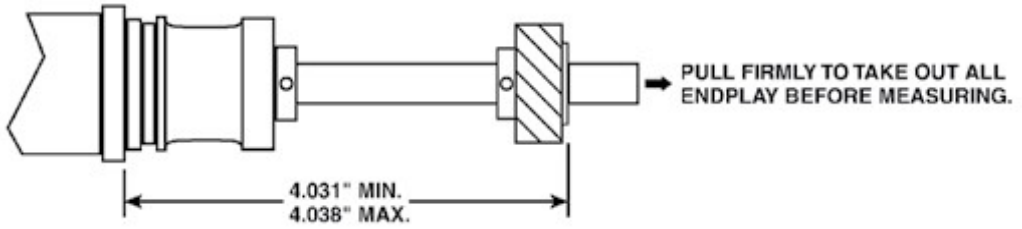


Fig. 1

ALTERNATIVE METHOD OF VERIFYING CORRECT DISTRIBUTOR GEAR INSTALLATION:

After **STEP 7**, install distributor assembly in the block you are using. Timing chain set and camshaft must be removed. With the aluminum distributor housing fully seated against the block, verify that the distributor gear can be lifted off the support in the block at least .005". Next pull the distributor gear down against the support in the block and hold it there. Pull up on the aluminum distributor housing and verify that you can lift it up at least .005" while holding the gear against the support in the block. This procedure will confirm that the gear is not being forced down against the support and not being held up off the support in the block.

Continue with **STEP 8**.

COMMON DISTRIBUTOR PROBLEMS

Distributors with very little or no shaft endplay. This condition may force the gear against the support in the block or hold it up off the support, causing damage.

Distributors that have a different material gear than advertised. It is important to run the correct distributor gear for the camshaft that you are using. The M-6007-X23347DF(DR) includes a MSD 8598 distributor with a steel gear.

Some heavy-duty oil pump drive shafts may not allow an EFI distributor to slide down far enough over the oil pump drive shaft. EFI distributors have a longer shaft below the gear.

Running an high volume oil pump with production bearing clearances can cause excessive oil pressure and possible premature distributor gear wear.

Inspect the surface finish on the gear teeth, a rough surface finish will cause premature distributor gear wear.

DISTRIBUTOR INSTALLATION:

STEP 1: To install the distributor correctly, the #1 piston must be at T.D.C. (top dead center), with the intake and exhaust valves closed.

STEP 2: Before removing distributor cap, mark the #1 post location on the distributor or cap adapter. Remove the distributor cap.

STEP 3: Rotate distributor shaft so the blade on the rotor is to the left of the mark, but as close to the mark as possible. As the distributor gear engages the teeth on the camshaft, the rotor will turn clockwise.

STEP 4: Install the distributor into the engine block opening. It may be necessary to slightly rotate the rotor/shaft assembly, until the drive gear "drops" into position. Sometimes rotation of the oil pump driveshaft is required to allow the distributor to drop all the way.

STEP 5: Verify rotor blade is pointing at the #1 mark on the distributor base.
NOTE: If rotor blade and magnetic pickup cannot be aligned by rotating the distributor in the engine block, remove the distributor enough to disengage distributor drive gear from camshaft gear. Rotate rotor enough to engage distributor gear on another camshaft gear tooth.

STEP 6: Repeat steps 3 and 4 if needed.

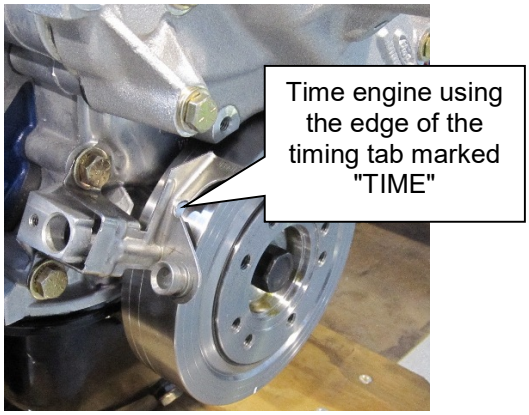
STEP 7: Install distributor hold-down clamp and bolt. Snug distributor hold down bolt, but leave it loose enough to rotate the distributor.

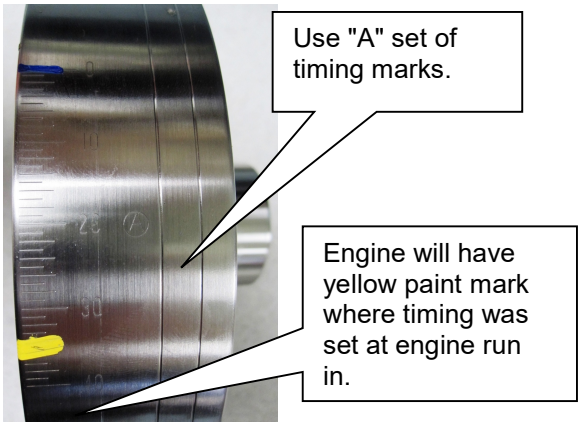
STEP 8: Install distributor cap and wires.

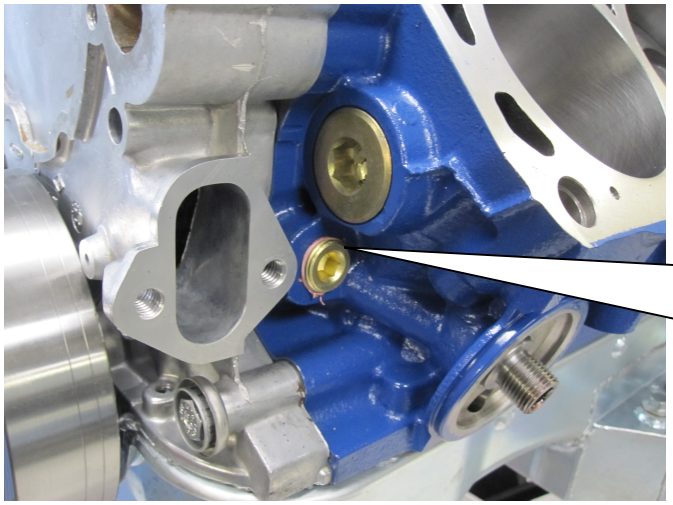
STEP 9: Set timing. Tighten hold-down bolt.

Setting the Timing

- Dyno testing has shown that 34 degrees of total timing produces the best overall performance.
- Check total timing at 4,000 RPM to make sure the full mechanical advance has been achieved







Use caution when tightening ½ NPT oil galley plug. 40 Ft. Lbs. MAX. *Overtighening can cause cracking in this area.*

FUEL DELIVERY CONSIDERATIONS

Size of fuel pump, size of fuel line, fuel pump placement, fuel filter placement, fuel filter size, injector size, fuel rail size, fuel pressure, jet size, and baffling in the fuel tank.

Does the fuel system maintain full pressure at peak engine horsepower in high gear? Altitude, air temperature, and fuel characteristics including quality, specific gravity, and octane rating, will affect your jetting requirements. Engine efficiency and Brake Specific Fuel Consumption (BSFC) also have an effect. Here are some examples of a Holley 750 CFM 4V.

Jetting example:

Octane	Temp.	Elevation	Jetting Front	Jetting Rear
94	80 F	Sea level	81	86
Aviation 100LL	80 F	Sea level	81	84
110 Race	80 F	Sea level	78	83
94	80 F	3000 ft.	76	81
94	80 F	6000 ft.	73	77
94	40 F	Sea level	84	89
94	120 F	Sea level	78	83

As you can see by these examples, jet requirements can vary a lot depending on fuel, altitude, and temperature. Oxygenated fuels are available in some states and can dramatically affect your jetting requirements. Make sure you get your jetting correct.

COMMON PROBLEMS WITH FUEL DELIVERY SYSTEMS

Do not mount an EFI electric fuel pump so it has to draw fuel from the tank. This creates a negative pressure in the fuel line allowing the fuel to boil at a lower temperature (vapor lock).

Mount the pump in the tank or in a location so that it is gravity fed.

If the fuel rail is too small and you have large injectors, this can create a pulse or wave in the fuel rail allowing fuel starvation on some cylinders.

Plumb the fuel system such that fuel is pushed through the filter (pressure side of the pump). Pulling fuel through a filter can cause cavitation. If a filter is used on the inlet side of a rail-mounted fuel pump, a filter rating of 160 microns MINIMUM should be used.

It takes approximately ½ lb of gasoline per hour to support 1 hp. This is “Brake Specific Fuel Consumption” (BSFC). For example if the engine is making 340 peak HP, and the fuel flow is 170 pounds per hour, the BSFC is .5. Select fuel pumps and injectors with a 20% safety factor over peak HP.

FUEL DELIVERY

1. M-6007-X2347DF(DR) is equipped with a 570 CFM Holley Street Avenger carburetor outfitted with 69 jets in the primary circuit and 73 jets in the secondary circuit.

COOLING SYSTEM CONSIDERATIONS/COMMON PROBLEMS

Engines that make higher horsepower create more heat.

Fill the cooling system at the highest point in the cooling system. Failure to do so will create air pockets. These air pockets can then create hot spots. Hot spots will promote improper combustion, which can cause engine failure.

Improper pulley size makes the fan and water pump turn too slow or too fast. Production water pumps normally run at 20% over engine speed and do not perform well over 5000 engine rpm. Underdrive pulleys generally reduce water pump speed to 85% of engine rpm and may not provide enough water flow to cool the engine.

The radiator must have enough area to dissipate the heat created by the engine.

If the fan size is too small, it will not flow enough air across the radiator to properly dissipate heat. Fan shrouds increase the effectiveness of the fan significantly.

Location can also affect airflow through the radiator at different vehicle speeds.

COOLING SYSTEM

STEP 1: Fill cooling system (distilled/deionized water recommended).

STEP 2: The fill point of the cooling system must be the highest level of the cooling system.

STEP 3: Check for leaks.

STEP 4: After running engine and the cooling system is leak free, drain water and add appropriate amount of water/coolant.

FLYWHEEL, CONVERTER, AND TRANSMISSION CONSIDERATIONS

Installing the wrong flywheel for the balance factor of the engine will cause vibration and engine damage.

Measure the input shaft length. Input shaft length that is too long can force the crank forward and damage the engine thrust bearing. Input shaft length too short will not have enough engagement.

Improperly installing the torque converter can force the crank forward damaging the engine thrust bearing. This is most commonly caused by not locating the torque converter drain plug properly in the flexplate.

Warning excessive torque converter charge pressure can force the crank forward, damaging the engine thrust bearing and the transmission. Damage to the thrust bearing can happen in seconds!

TRANSMISSION

The M-6007-X2347DF(DR) requires a 157-tooth manual transmission flywheel for most applications.

Sealer is required on the small block flywheel to crankshaft bolts. Torque to 75-85 ft-lb. Over torqueing will distort rear main seal area and cause leakage.

A starter index plate (included) is required between the block and transmission bell housing (all applications).

Be sure to install pressure plate alignment dowels if your pressure plate requires them.

For other transmission applications requiring different flywheels, see catalog or call the Techline for other applications.

Verify that a pilot bearing is installed for all manual transmission applications. If using an automatic transmission, be sure the pilot bearing is removed.

Verify proper bellhousing alignment on manual transmission applications. See bellhousing alignment.

Check crankshaft endplay of your engine before installing the transmission. After installing the transmission, check crankshaft endplay. The number before and after installation should be the same. If endplay number is not the same, this indicates that the components are incorrect, or improperly installed or damaged.

HOW TO CHECK BELLHOUSING ALIGNMENT:

The first step is to check bellhousing face runout. You are checking for parallelism of the back of the bellhousing to the back of the block. Install the dial indicator (as shown in Fig. 2). Rotate the crankshaft and mark down the reading. Be sure to push the crankshaft against the thrust bearing for an accurate reading. Maximum runout is .010.

The next step is checking bellhousing bore runout. You are checking to see if the bellhousing bore centerline is aligned with crankshaft centerline. Reposition the dial indicator in the bellhousing bore (as shown in Fig. 3). Rotate the crankshaft and mark down the readings. Maximum out of concentricity is .015. If the bore runout is out of spec., install appropriate offset dowels.

Offset alignment dowels are available from Lakewood.
.007 PN 15950
.014 PN 15960
.021 PN 15970

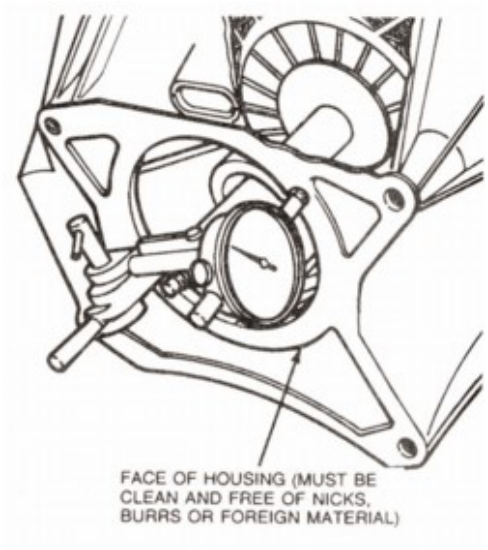


Fig. 2

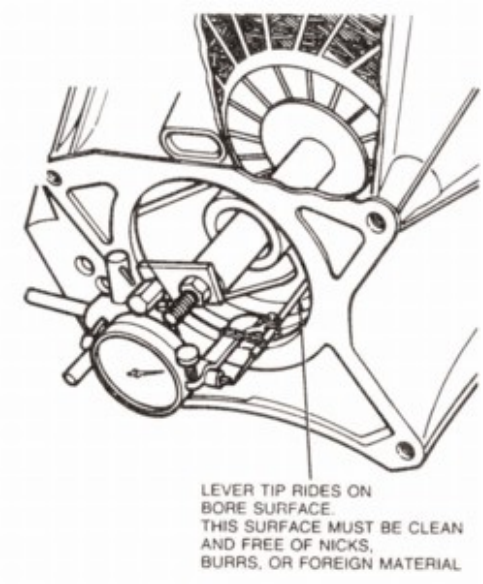


Fig. 3

FLYWHEELS/FLEXPLATES

The M-6007-X2347DF(DR) requires a neutral balance flywheel. If using an automatic transmission a neutral balance flexplate is required.

MISCELLANEOUS PROBLEMS THAT CAN DAMAGE AN ENGINE

Nuts, bolts, washers, or foreign materials dropped down the intake.

If reusing an intake manifold that had broken internal parts, visually inspect that all debris has been removed. These broken parts often end up in the intake manifold, carburetor, or air cleaner (pieces of piston or piston rings, etc.). This debris will cause engine failure if not removed.

If you change the intake manifold, do not install a manifold that was media blasted. You will NEVER get all the blasting media out. Any media remaining will be drawn out and destroy the engine.

Properly torque **all** fasteners when installing new parts to your engine. Do not over torque the intake manifold bolts. Proper torque is 15-18 lb.*ft. Intake bolts must have 5/8” of thread engagement.

If changing the distributor, select a distributor with a steel distributor gear. The M-6007-X2347DF(DR) is equipped with a MSD 8598 steel gear distributor.

HEADERS

The horsepower numbers shown for the Ford Performance engines were obtained using long tube headers.

Quick Info

New BOSS 302 based crate engines feature race quality components at competitive pricing. Utilizing all forged internals the X2347DF(DR) crate engines are an excellent value and a solid foundation for any performance combination.

- 347 cubic inches
- 9.8:1 compression ratio (nominal)
- Forged pistons
- Forged steel connecting rods
- BOSS 4-bolt main block M-6010-BOSS302
- Hydraulic roller camshaft
- Double roller timing chain set M-6268-A302
- Forged steel crankshaft
- Available with front and rear sump pans
- Ford Performance aluminum GT-40 "X2" cylinder heads M-6049-X2 with 1.94" intake valves and 1.54" exhaust valves
- Roller rocker arms
- MSD distributor part no: M8598 included
- Built with all NEW parts
- Can be used in kit cars, street rods, Mustangs, Fox-bodied cars, and trucks

Some or all of the following items may need to be changed from your original engine or modified for proper installation:

- A different performance oil pan and pickup may be required for your application. Call the Techline at 1-800-367-3788 for more information
- The timing chain cover will work with most standard rotation water pumps
- Fuel pump eccentric M-6287-B302 installed, allows use of mechanical fuel pump
- For other transmission applications use the proper neutral balance flywheel
- If changing intake manifold use M-9439-A50 gaskets
- Firing order 1-3-7-2-6-5-4-8 (5.0L HO and 351W order)
- Built with current available parts. Photo and specs may vary

- Shipping weight approximately 525 lbs
- Intake bolt torque: 15 to 18 ft-lb in 2 steps. **Re-torque after 10 engine heat cycles – completely cold to full operating temperature (see installation instructions)**
- Oil: 8 qts 10W30 or 10W40
- Timing 34° BTDC total (with 91 R+M/2 octane fuel minimum)
- Fuel delivery: 570cfm carburetor
- Distributor gear: steel

GENERAL ENGINE SPECIFICATIONS

Bolt Torques

Size	Torque
Main bolt 1/2-13 UNC	100 lb*ft lightly oiled
Main bolt (splayed) 3/8-16 UNC	35 lb*ft lightly oiled
Rod bolt torque	7/16-20 UNF 63 lb*ft with ARP moly lube
Head bolt torque	1/2-13 UNC 100 lb*ft lightly oiled
Damper	5/8-18 UNF 95 lb*ft

General Torques

5/16-10 UNC	18 lb*ft
1/4-20 UNC	9 lb*ft

Clearances

Main bearing clearance	.0020-.0025
Rod bearing clearance	.0020-.0025
Piston to wall	.0040-.0050
Piston pin to piston	.0010-.0013
Piston pin to rod	.0010-.0013
Piston ring end gap	.020 top/.018 second (+/-.002)
Crank end float	.004-.008
Valve spring installed height	1.800-1.820 (145 lb. +/- 6)
Coil bind	1.115 solid height

Intake valve guide clearance	.0012-.0024
Exhaust valve guide clearance	.0016-.0028