



# Engine Installation Guide



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## Congratulations!

Your new BluePrint engine is the best performing, best-valued high-performance engine on the market. Whether you're cruising the boulevard, heading to the racetrack, or navigating your favorite off-road trail, your BluePrint engine is built for maximum performance and enjoyment at every turn.

Inside this installation guide you'll find the information and direction you need for proper engine installation, break-in and maintenance—and to ensure years of trouble-free performance and driving pleasure.

Your new BluePrint high-performance engine marks the beginning of a whole new relationship between you and your vehicle. It's in your hands now. Enjoy it!

### **IMPORTANT INFORMATION ONLINE:**

Important details pertaining to your new high-performance BluePrint engine are located online at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) under Engine Installation. These details include what's included with your engine and the list of recommended add-on parts and specifications for your engine.

[www.BluePrintEngines.com](http://www.BluePrintEngines.com)



## Installation Process At-a-Glance

1. Review your Installation Guide carefully before beginning installation.
2. Go to “Engine Installation” at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) to find the list of recommended add-on parts and specifications for your engine.
3. Remove your engine from its crate and check:
  - a. For possible damage during shipping
  - b. For all parts that should be assembled with your engine
4. Read and follow all TAGS attached to your engine.
5. Prepare a complete list of add-ons that you will need to complete your engine installation, including new and existing parts (refer to add-on recommendations for your engine at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) under “Engine Installation”).
6. Be sure all add-on parts are as recommended and properly cleaned prior to installation.
7. Install engine in vehicle, along with the ignition and fuel systems (if not ordered with your engine).
8. Pre-lubricate engine following procedures on Page 4.
9. Follow start-up and break-in procedures, including ignition timing on Page 5.
10. Register your BluePrint Engines warranty online at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) under “Warranty Registration.”

## How to Prevent Engine Failure!

WHY ENGINES FAIL	BEST WAYS TO PREVENT FAILURE
Bearing failure due to improper pre-lubrication.	Follow instructions on Page 4.
Improper break-in and not using oil with a zinc additive for flat tappet cams. Note: Zinc additive not required for engines with roller cams.	For flat tappet cams, we require you use oil containing zinc or a zinc additive during break-in. Follow instructions on Page 5.
Wrong tune-up specifications	Follow instructions and use recommended specifications for correct timing on Page 5.
Overheating	Always install a new thermostat with a by-pass hole for your engine.
Leaking exhaust manifold gasket from inadequate torque on manifold bolts (listen for ticking).	Always re-torque manifold bolts after a heat cycle to ensure proper seal. If using aftermarket headers, contact the manufacturer for proper gaskets.
Poorly cleaned add-on parts that result in premature bearing failure.	Clean all add-on parts professionally to prevent abrasives from getting in oil. Never use abrasive sanding discs or blasting media to clean parts.
Leaking intake manifold and intake vacuum (oil consumption).	Follow the instructions that came with your intake manifold gasket for proper installation.
Excess vibration from improperly installed or incorrect flex-plate and/or harmonic balancer.	Refer to your engine specifications at <a href="http://www.BluePrintEngines.com">www.BluePrintEngines.com</a>

**NOTE: Your BluePrint engine is a high-performance engine with an aggressive cam profile. It is normal for your BluePrint engine to sound different than a regular stock engine.**

# ENGINE INSTALLATION

**IMPORTANT:** Please read **BEFORE** starting installation. To preserve your warranty and ensure years of trouble-free performance, it is critical that you follow the procedures in this installation guide.

## 1 STAGE ONE

### Parts Inventory: Check engine parts and add-on recommendations/specs

Your engine has been assembled with select parts based on the engine configuration you ordered. Prior to installation, check to be sure your engine arrived with the parts you ordered (base, base dressed or fully dressed). Now determine the add-on parts you need to complete your installation. The parts list and add-on recommendations and specifications for your engine

are available at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) under Engine Installation.

Depending on the engine you ordered, add-on recommendations and related specifications may include the harmonic balancer, flex-plate/flywheel, spark plugs, spark plug gap, and water pump.

## 2 STAGE TWO

### Engine Assembly: Assemble all you can before installation

We recommend completing as much assembly of your engine as possible prior to installation, such as the

ignition system, fuel system, water pump, balancer and pulleys, flywheel or flex-plate and engine mounts.

## 3 STAGE THREE

### Pre-Lubrication: Follow these essential pre-lube steps

1. Fill the crankcase & oil filter with the recommended oil and amount, based on the type of cam your engine has:
  - a. **For engines with flat tappet cams:** Use an O.E. recommended or API SN service-rated multi-viscosity (non-synthetic) oil containing zinc or use a zinc additive for cam break-in. Common break-in oils with high zinc content are: Torco "ZEP" Zinc Enhanced Engine Protector, ZDDPlus, GM EOS, Joe Gibbs Break-In Oil, and Lucas #10063 Break-In Additive.
  - b. **For engines with roller cams:** Oil containing zinc or a zinc additive is not required. Use an O.E. recommended or API SN service-rated multi-viscosity (non-synthetic) oil.
2. Your engine has been pre-lubed and dyno tested but requires additional preventative maintenance before initial startup. Fill oil filter and oil pan to recommended capacity. Verify the ignition source does not have power. This will eliminate the possibility of any fuel in the cylinders igniting prematurely. Remove spark plugs and proceed to crank engine over with starter until oil pressure is visible on manual gauge. Do not supply fuel to the engine during this process.  
**WARNING:** Failure to prime this engine can cause premature bearing damage. Reinstall spark plugs and proceed with initial startup.

### Cooling System: Add coolant and install new thermostat

**Coolant:** We recommend you use a quality name brand extended-life coolant. Check the label of the brand you choose to ensure the compatibility of the coolant with your engine metals (cast iron, or cast iron and aluminum) and radiator material.

Use a 50/50 mix of antifreeze and distilled water to fill the radiator and engine. Fill the engine with the thermostat housing removed to help prevent air pockets from developing in the cooling system.

**Thermostat:** Install a new performance thermostat equipped with a by-pass hole, such as a Stant Super Stat or similar brand. As a general rule, we recommend a thermostat that will keep your cooling system in the 180° to 190° F range.

### Fuel Requirements: Use premium gasoline or a gas/ethanol blend

We recommend you use a premium gasoline with a minimum octane rating of 91 for your high performance engine. Fuel requirements may vary for engine types. For more information on engine fuels, go to Engine Installation at [www.BluePrintEngines.com](http://www.BluePrintEngines.com).



## STAGE FOUR

### Start-Up & Initial Break-In

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**SAFETY FIRST: Before starting your engine, be sure to set the emergency brake if the vehicle is on the ground, chock the wheels, and make sure the vehicle cannot slip into gear.**

For the start-up and initial break-in process, total timing was set at the factory if your engine was ordered with a distributor. If your engine was not ordered with a distributor, total timing should be adjusted to 22° to 24° at 2,000 rpm to reduce excessive heat or load during break-in. If the distributor is removed during installation, total timing must be re-set. Total timing set at the factory will also need to be verified.

**For engines with flat tappet cams:** Start the engine and bring it to 2,000 RPM. Get the engine running smoothly. Then vary the engine speed from 1,800-2,200 RPM in a slow acceleration/deceleration cycle for 30 minutes. This is necessary to provide adequate oil splash and lifter rotation to properly mate each lifter to its lobe.

While the engine is running, be sure to check oil pressure and coolant temperature, and check for fluid leaks, such as oil, transmission fluid, fuel, and coolant/antifreeze. Also listen for any unusual sounds. Should you hear an unusual sound, shut the engine off and check for the source. Once resolved, restart the engine, bring its speed immediately to 2,000 RPM, and resume the acceleration/deceleration cycle for a total run time of 30 minutes.

**For engines with roller cams:** Roller cams do not require a break-in period. Start your engine. Bring it to 2,000 RPM and get it running smoothly. While the engine is running, be sure to check oil pressure and coolant temperature, and check for fluid leaks, such as oil, transmission fluid, fuel, and coolant/antifreeze. Also listen for any unusual sounds. Should you hear an unusual sound, shut the engine off, check for the source, and correct it.

## STAGE FIVE

### Engine Timing

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After start-up and the initial break-in period, verify the engine's initial timing (10-16°) and total timing (32-34°) and adjust if necessary. For computer-controlled engines, the timing instructions sent with the engine must be followed. If additional assistance is required contact a performance technician at BluePrint Engines at 1-800-483-4263.

**CAUTION: Improper timing can lead to abnormal combustion and/or detonation. Neither condition is covered under warranty. No exceptions.**

**Setting timing by the "total" timing method:** Total timing of 32° to 34° must be set first, and this will determine initial timing. For accurate results, we recommend using a timing light without a built-in advance. Failure to set the recommended total timing will result in engine damage not covered by your warranty. If your engine was ordered with a distributor, the total timing was set at the factory, but it **must be verified** during installation. If it was ordered without a distributor or the distributor had to be removed during installation, total timing must be set or re-set.

Some engines are ordered with a harmonic balancer. If your engine was not, we recommend using a harmonic balancer with the degrees marked on it (typically from 0° to 60°). Start by using a paint stick, chalk or other marker to mark a line on the 34° mark. When checking total timing, this mark will line up with the zero on your timing pointer when total advance is obtained with engine at 3,500 RPM.

#### Now set your timing:

1. Hook timing light to the number one spark plug wire and bring the engine up to 3,500 RPM.
2. At 3,500 RPM, turn the distributor to align the 34° mark on the balancer with the 0° mark on the timing pointer, and lock down the distributor.
3. Let the engine idle down and then bring the RPM back up to verify the distributor is still set at 32° to 34° total advance. If needed, loosen and adjust again.
4. After total advance of 32° to 34° is set, let the engine idle down again and re-check the initial timing. If initial timing (advance at idle) is between 10° and 16°, the vacuum line can be hooked up and the idle adjusted. The total advance setting is now complete.

**CAUTION: If the initial timing is not between 10° and 16°, contact a technician at BluePrint Engines for assistance (1-800- 483- 4263) or have total advance verified by a shop.**

**NOTE: Keep a record of the initial timing for later reference. This will allow the timing to be set again if needed without verifying the total advance.**

The initial break-in process is complete. Your engine is now ready for the road and its 500-mile break-in.



## 6 STAGE SIX Five Hundred Mile Break-In

For your engine's first 500 miles, avoid hard acceleration for sustained periods. Periodically change the engine speed while driving to help seat the rings. After the first 500 miles, change the oil and the oil filter. For flat tappet cam engines, we recommend the continued use of oil with zinc or a zinc additive for the life of your engine.

**NOTE:** Do NOT use synthetic oil during the break-in period!!! After 6,000 miles, synthetic oils can be used in your engine thereafter.

## 7 STAGE SEVEN Warranty Registration: Register your engine online

To activate your BluePrint Engines Limited Warranty, go to [www.BluePrintEngines.com](http://www.BluePrintEngines.com) and complete the registration form as soon as your engine is installed.

**NOTE:** With proper installation, break-in and maintenance, you can look forward to years of trouble-free performance. Be sure to register your warranty at [www.BluePrintEngines.com](http://www.BluePrintEngines.com)!



## 8 STAGE EIGHT Maintenance

- Do NOT use synthetic oil during the break-in period!! After 6,000 miles, synthetic oils can be used in your engine thereafter.
- During the break-in period, check all fluid levels frequently.
- Change the oil and oil filter every 3,000 miles. If your engine is used in a heavy duty or dusty environment, the oil and oil/air filters should be changed more frequently.
- In colder regions, lower viscosity oil may be required for better flow characteristics.
- Use premium gasoline as recommended for your engine at [www.BluePrintEngines.com](http://www.BluePrintEngines.com) under Engine Installation.



### Contact Information

Sales and Technical Assistance  
Warranty Department  
E-Mail  
Website

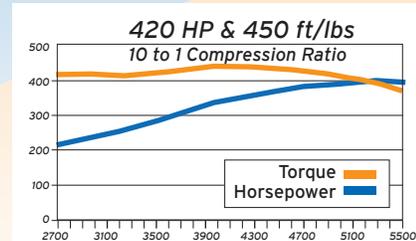
1-800-483-4263  
1-800-483-4263  
[info@BluePrintEngines.com](mailto:info@BluePrintEngines.com)  
[www.BluePrintEngines.com](http://www.BluePrintEngines.com)

# Dyno Testing

## Dyno Tested for Performance

Your BluePrint engine has been dyno tested to confirm its readiness to deliver maximum horsepower and torque as designed. For bragging rights, we have included your dyno sheet with actual results from your engine.

To test your engine, we ran it up to correct operating temperature and before checking the oil pressure readings, setting the timing, and adjusting the carburetor. We then made multiple pulls on the dynamometer to determine and record the torque and horsepower readings over a range of RPM readings—and to ensure your engine met or exceeded its design specifications. The crankcase was then drained and your engine was approved and prepared for shipping.



**CAUTION: Your engine's assembly lube was washed away during dyno testing. Be sure to PRE-LUBE YOUR ENGINE before start-up/break-in. Failure to do so will void your warranty.**

## Show us your muscle!

We love seeing where our engines show up, so we're always on the hunt for customer photos and stories. After you've installed your beast, take a couple snapshots and upload them to our Photo Gallery at BluePrintEngines.com. We'll post them online with a few details for others to see—and enjoy!

So what are you waiting for? Send us your photos!





## We Build It For You

With more than 30,000 high-performance BluePrint engines sold worldwide, we're proud to be large enough to build engines by the thousands, and prouder still to be small enough to build one just for you!



**Brute, honest horsepower from the leader  
in high-performance engines.**

BluePrint Engines

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