

454 (12498778) Short Block Specifications

Specifications Part Number 19172101

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This publication provides general information on components and procedures that may be useful when installing or servicing a 454 engine. Please read this entire publication before starting work. Also, please verify that all of the components listed in the Package Contents section below were shipped in the kit.

The information below is divided into the following sections: package contents, component information, 454 engine specifications, additional parts that you may need to purchase, torque specifications, start-up and break-in procedures, and a service parts list.

This brand new partial engine includes forged premium quality reciprocating components as well as the balancer, oil pan, flexplate and front cover. This partial engine does not include a camshaft, lifters, timing chain, or cam sprocket. Just add all the parts to complete this engine from GMPP such as cylinder heads, camshaft and valvetrain, intake, carburetor and ignition system. Use externally balanced flywheel for manual transmission applications.

The 454 engine is manufactured on current production tooling; consequently you may encounter dissimilarities between the 454 engine assembly and previous versions of the big block V8. In general, items such as motor mounts, accessory drives, exhaust manifolds, etc. can be transferred to a 454 engine when installed in a vehicle originally equipped with a big block V8 engine. However, as noted in the following sections, there may be significant differences in the water pump, torsional damper, etc., between a 454 engine and an older big block V8 engine. These differences may require modifications or additional components not included with the 454 engine. When installing the 454 engine in a vehicle not originally equipped with a big block V8, it may be necessary to adapt or fabricate various components for the cooling, fuel, electrical, and exhaust systems. Due to the wide variety of vehicles in which a 454 engine can be installed, some procedures and recommendations may not apply to specific applications.

It is not the intent of these specifications to replace the comprehensive and detailed service practices explained in the GM service manuals.

For information about warranty coverage, please contact your local GM Performance Parts dealer.

Observe all safety precautions and warnings in the service manuals when installing a 454 BBC short block assembly in any vehicle. Wear eye protection 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.

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	16AP07	Initial Release - Rusty Sampsel	
	15JA08	Revised - Rusty Sampsel	

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Legal and Emissions Information

This publication is intended to provide information about the 454 engine and related components. This manual also describes procedures and modifications that may be useful during the installation of a 454 engine. It is not intended to replace the comprehensive service manuals and parts catalogs which cover General Motors engines and components. Rather, it is designed to provide supplemental information in areas of interest to do-it-yourself-enthusiasts and mechanics.

This publication pertains to engines and vehicles which are used off the public highways except where specifically noted otherwise. Federal law restricts the removal of any part of a federally required emission control system on motor vehicles. Further, many states have enacted laws which prohibit tampering with or modifying any required emission or noise control system. Vehicles which are not operated on public highways are generally exempt from most regulations, as are some special interest and pre-emission vehicles. The reader is strongly urged to check all applicable local and state laws.

Many of the parts described or listed in this manual are merchandised for off-highway application only, and are tagged with the %Special Parts Notice+reproduced here:

Special Parts Notice

This part has been specifically designed for Off-Highway application only. Since the installation of this part may either impair your vehicle's emission control performance or be uncertified under current Motor Vehicle Safety Standards, it should not be installed in a vehicle used on any street or highway. Additionally, any such application could adversely affect the warranty coverage of such an on-street or highway vehicle.

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Package contents:

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>GM Part Number</u>
1	Short Block Assembly (454)	1	12498778
2	Short Block Instructions	1	19172101

Caution

This engine assembly needs to be filled with oil and primed. You should add the specified oil (see start-up instructions) to your new engine. Check the engine oil level on the dipstick and add accordingly.

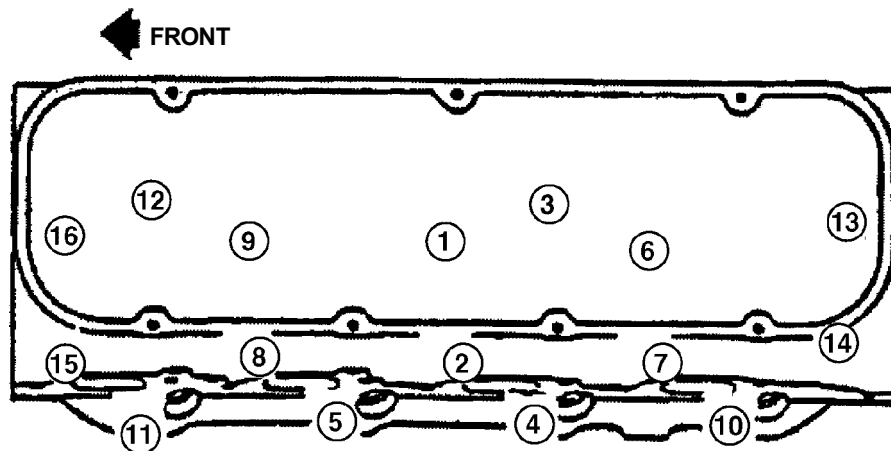
Start-up and Break-in Procedures

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 with 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" drill 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 surfaces 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 extended periods 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 and nothing was missed.
4. Start the engine and adjust the initial timing. If using the HEI distributor P/N 93440806 in combination with the 454HO or ZZ454 Base Engine, set the ignition timing to 4° before top dead center (BTDC) at 650 rpm with the vacuum advance line to the distributor disconnected and plugged. This setting will produce 26° of total advance at wide-open throttle (WOT) when using the HEI distributor P/N 93440806. 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 should always allow the engine to warm up prior to driving. It is a good practice to allow the oil sump and water temperature to reach 180°F before towing heavy loads or performing hard acceleration runs.
6. Once the engine is warm, Double check the total advance timing is 26° at 4000 RPM if using the engine configuration from step 4.
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 with 5W30 motor oil (non synthetic) and a PF1218 AC Delco oil filter. Inspect the oil and the oil 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 particles to ensure that 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.

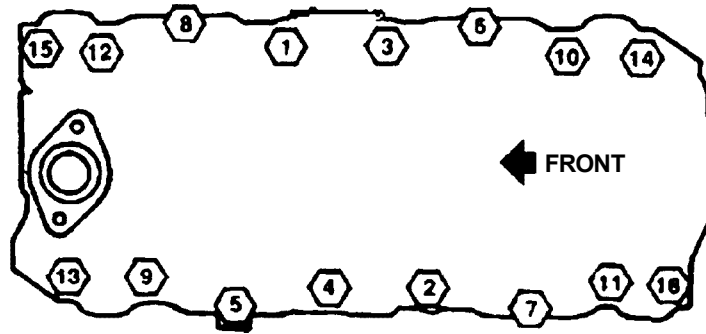
454 High Performance Engine Torque Specifications:

NOTE: These specifications are correct for the ZZ454 or 454HO Base engine. If using components different from that configuration, the specifications may be different.

Camshaft retainer bolt/screw	10 ft.-lbs. / 14 N·m
Camshaft sprocket bolt/screw	25 ft.-lbs. / 34 N·m
Connecting rod nut	70 ft.-lbs. / 95 N·m
Crankshaft balancer bolt	110 ft.-lbs. / 149 N·m
Crankshaft bearing cap bolt/screw and stud	100 ft.-lbs. / 135 N·m
Crankshaft rear oil seal housing nut/bolt/screw	11 ft.-lbs. / 15 N·m
Cylinder head bolt /screw	Long / Short Bolts
First pass	25/20 ft.-lbs. / 34/27 N·m
Second pass	50/40 ft.-lbs. / 68/54 N·m
Final pass	75/65 ft.-lbs. / 102/88 N·m
Distributor bolt/screw	18 ft.-lbs. / 25 N·m
Engine block oil gallery plug	15 ft.-lbs. / 20 N·m
Engine front cover bolt screw	106 in.-lbs. / 12 N·m
Flywheel bolt/screw	65 ft.-lbs. / 90 N·m
Intake manifold bolt/screw	
First pass	10 ft.-lbs. / 14 N·m
Second pass	25 ft.-lbs. / 34 N·m
Oil filter adapter bolt/screw	18 ft.-lbs. / 25 N·m
Oil level indicator tube bolt/screw	106 in.-lbs. / 12 N·m
Oil pan assembly bolt/screw	18 ft.-lbs. / 25 N·m
Oil baffle nut	30 ft.-lbs. / 40 N·m
Oil pan drain plug	15 ft.-lbs. / 20 N·m
Oil pump bolt/screw to rear crankshaft bearing cap	66 ft.-lbs. / 90 N·m
Oil pump cover bolt/screw	106 in.-lbs. / 12 N·m
Spark plug	22 ft.-lbs. / 30 N·m
Starter motor bolt/screw	35 ft.-lbs. / 48 N·m
Valve lifter guide retainer bolt/screw	18 ft.-lbs. / 25 N·m
Water pump bolt/screw	30 ft.-lbs. / 40 N·m



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454 High Performance Engine Specifications:

- Displacement: 454 cubic inches
- Bore x Stroke: 4.25 inch x 4.00 inch
- Deck Height: 9.800+from C/S centerline
- Block: Cast iron, four-bolt main caps
- Crankshaft: Forged steel, one piece rear seal
- Connecting Rods: Forged steel, 7/16" bolts
- Pistons: Forged aluminum
- Rings: Chrome Moly
- Oil Pan: 6 . quart
- Recommended Oil: 5W30 synthetic oil (after break-in)
- Oil Pressure (Minimum): 6 psig @ 1000 RPM
- 18 psig @ 2000 RPM
- 24 psig @ 4000 RPM
- Oil Filter: AC Delco part # - PF1218
- Maximum Engine Speed: 5500 RPM
- Firing Order: 1-8-4-3-6-5-7-2

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

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454 Service Parts List:

<u>Part Number</u>	<u>Quantity</u>	<u>Name</u>
6264902	1	Seal-Cr/Shf #5 Brg Cap Oil
10181306	1	Bearing-Cr/Shf Upr/Lwr #1
12529885	3	Bearing-Cr/Shf Upr/Lwr #2-3-4
10181307	1	Bearing-Cr/Shf Upr/Lwr Thrust
14096983	1	Crankshaft Asm
10101164	1	Seal Asm-Cr/Shf Rr Oil
14097040	1	Deflector Asm-Cr/Shf Oil
10216339	1	Balancer Asm-Cr/Shf
10114166	1	Key-Cr/Shf Bal
10126796	1	Bolt/Screw-Cr/Shf Bal
3864814	1	Washer-Cr/Shf Bal
10185034	1	Flywheel Asm
3727207	6	Bolt/Screw-Flywhl
10198922	8	Rod Asm-Conn
10215228	8	Piston Asm,Std (W/Pin)
14089095	8	Ring Kit, Pstn
10181277	16	Bearing-Conn Rod
10240721	1	Pan Asm-Oil
10106407	1	Gasket-Oil Pan
12555167	1	Pump Asm-Oil (W/Scrn)
3998289	1	Shaft-O/Pmp Drv
3764554	1	Retainer-O/Pmp Drv Shf
10105879	2	Pin-O/Pmp Loc
10230954	1	Cover Asm-Eng Frt (W/ Tmg Ind)
10191640	1	Seal Asm,Cr/Shf Frt Oil
10198910	1	Gasket,Eng Frt Cvr