

Anniversary Edition 427 (19166392) Specifications

Specifications Part Number 19211812

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This publication provides general information on components and procedures that may be useful when installing or servicing an ANNIVERSARY EDITION 427 engine assembly. Please read this entire publication before starting work. Also, please verify that all of the components listed in the Package Contents section below were in fact shipped in the kit.

The information below is divided into the following sections: Package contents, torque information, ANNIVERSARY EDITION 427 engine assembly specifications, and engine start up procedures, component information and a service parts list.

The ANNIVERSARY EDITION 427 engine assembly incorporates modern technology in a package that can be installed in applications where 366cid and up Big Block Chevrolet (BBC) V-8s were originally used. This engine is assembled using brand new, premium quality components. Due to the wide variety of applications in which a ANNIVERSARY EDITION 427 engine assembly can be used, some procedures and recommendations may not apply to specific applications.

The ANNIVERSARY EDITION 427 engine assembly in an all new Gen VI iron cylinder block manufactured on new production tooling; consequently you may encounter dissimilarities between the ANNIVERSARY EDITION 427 engine assembly and previous versions of the BBC V-8. The ANNIVERSARY EDITION 427 engine is internally balanced and only should be used with an internally balanced flywheel, flexplate, and harmonic damper. In general, items such as motor mounts, bell housing, starters, etc. can be transferred to this ANNIVERSARY EDITION 427 engine assembly when it is installed in a vehicle originally equipped with a BBC V-8 engine. When installing a ANNIVERSARY EDITION 427 engine assembly in a vehicle not originally equipped with a BBC V-8 it may be necessary to adapt or fabricate various components for the cooling, fuel, electrical, accessory drive system and exhaust systems.

GM recommends that you use a minimum octane rating of 92 (R+M/2) fuel in the ANNIVERSARY EDITION 427 (10:1 compression ratio) to prevent pre-ignition and detonation.

Observe all safety precautions and warnings in the service manuals when installing a ANNIVERSARY EDITION 427 engine assembly in any vehicle. Wear eye protection and appropriate protective clothing. Support the vehicle securely with jack stands 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.

TITLE Anniversary Edition 427 Specifications	IR24JN08	PART NO. 19211812	PAGE 1 OF 24
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	24JN08	Initial Release - Shawn Smith	

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Legal and Emissions Information

This publication is intended to provide information about the Anniversary Edition 427 engine and related components. This manual also describes procedures and modifications that may be useful during the installation of an Anniversary Edition 427 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	Engine Assembly	1	19166392
2	Instructions	1	19211812

DATE	REVISION	AUTH

ANNIVERSARY EDITION 427 High Performance Engine Specifications and Key Component Details:

Displacement:	427 cubic inches
Bore x Stroke:	4.250" diameter x 3.766" stroke
Deck Height:	9.80" from crankshaft centerline
Horsepower Rating	430 HP @ 5800 RPM
Torque Rating	444 ft.lbs. @ 3800 RPM
Block:	Cast aluminum with steel liners, four-bolt intermediate mains with splayed outers, one piece rear seal
Crankshaft:	4340 forged steel with a one-piece rear seal design. Internally balanced with 3.766" stroke
Balancer:	SFI approved high performance
Connecting Rods:	6.135" center to center. Forged 4340 steel
Pistons:	Forged aluminum with dome
Piston rings:	Plasma-moly ring top ring, cast iron 2nd ring, standard tension oil ring
Compression Ratio:	10:1
Intake Manifold	Aluminum dual plane for 4150 series carburetors
Cylinder Heads:	Aluminum oval port with stainless steel valves
Valve Diameter (Intake/Exhaust):	2.19"/1.88"
Chamber Volume:	110cc
Ovate (Beehive) Valve Springs	155 lbs. seat pressure at 1.880" installed height
Camshaft:	Hydraulic roller tappet
Valve Lift:527" intake and .544" exhaust
Duration:	224° intake, 234° exhaust @ .050" lift
Centerline:	110° LSA
Rocker Arm Ratio:	1.7:1, Aluminum roller rocker
Timing Chain:	Heavy duty single roller design
Oil Pan:	6 - quart Gen VI
Oil Filter:	AC Delco part # - PF35L
Valve Lash	1/8 to 1/4 turn down from zero lash
Carburetor	770cfm four-barrel with vacuum secondary circuit and electric choke
Fuel:	Premium unleaded - 92 (R+M/2)
Oil Pressure (Normal):	50-55 psi @ 1500 RPM
Firing Order:	1-8-4-3-6-5-7-2
Maximum Engine Speed:	6500 RPM
Spark Plugs:	AC Delco R45XLS, .035" gap
Distributor	High Energy Ignition (HEI) billet aluminum
Ignition Timing	10°-12° base timing
.....	34°-36° total timing
Water Pump	Short leg aluminum pump
Flex plate	14" automatic transmission flexplate (internal balance)

TITLE Anniversary Edition 427 Specifications	IR24JN08	PART NO. 19211812	PAGE 3 OF 24
---	-----------------	--------------------------	----------------------------

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ANNIVERSARY EDITION 427 High Performance Engine Torque Specifications:

Fastener	Torque (Nm)	Torque (lb.ft.)	Thread Treatment	Notes
Cam sprocket bolt	27	20	Blue Loctite	
Cam thrust plate bolt	14	10	Blue Loctite	
Carburetor nut	16	12		3 steps - 5#,10#,12#
Connecting rod bolt	95	70	30 weight oil	
Coolant plug, 3/4" npt	65	48	Teflon pipe sealant	
Damper bolt	149	110	Blue Loctite	
Distributor clamp	34	25		
Flywheel bolt	88	65	Blue Loctite	Note sequence
Front cover bolt	14	10	Blue Loctite	
Fuel pump cover bolt	27	20	Blue Loctite	
Galley plug, 1/2"npt	54	40	Teflon pipe sealant	
Galley plug, 3/8"npt	41	30	Teflon pipe sealant	
Galley plug, 1/4"npt	27	20	Teflon pipe sealant	
Galley plug, 1/8"npt	20	15	Teflon pipe sealant	
Head studs/nuts	-	-	-	See Figure 2
Intake bolt (all)	34	25	Teflon pipe sealant	Note sequence
Lift hooks	34	25		
Main bolt (1-10)	129	95	30 weight oil	Note sequence
Main bolt (11-20)	109	80	30 weight oil	Note sequence
Oil drain plug	20	15	MolyLube	
Oil filter adapter	68	50	Blue Loctite	
Oil pan bolt	27	20	Blue Loctite	
Oil pump bolt	88	65	30 weight oil	
Rocker arm stud	68	50	Blue Loctite	
Rocker cover bolt	14	10	30 weight oil	
Spark plug	27	20	30 weight oil	
Starter motor	47	35		
Thermostat housing bolt	41	30	Blue Loctite	
Water jacket plugs	12	9	None	
Water pump bolt	34	25	30 weight oil	
Windage tray Spacer Stud	34	25		
Windage tray nut	34	25	30 weight oil	

FIGURE 1

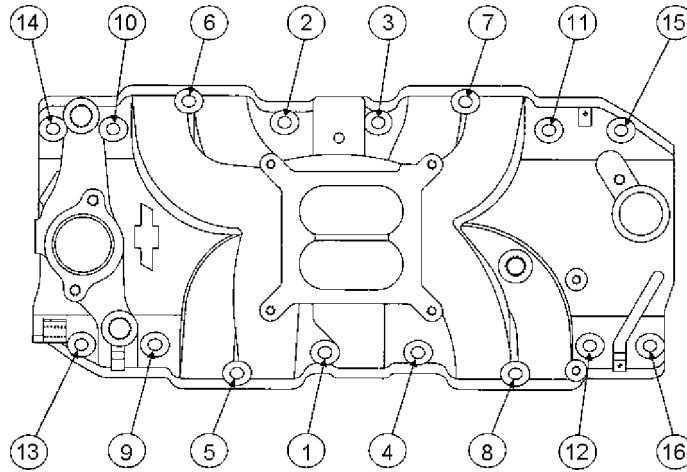
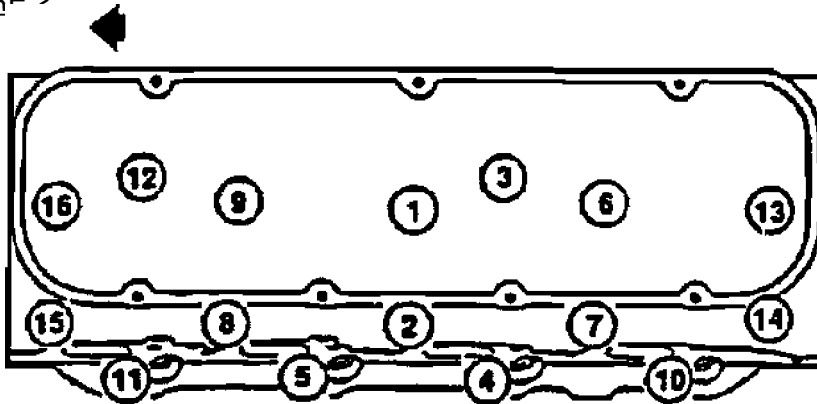
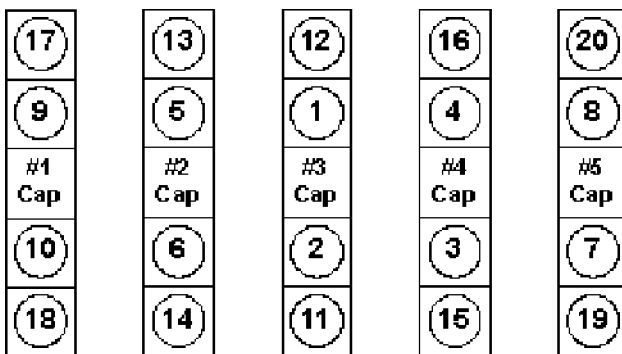


FIGURE 2



Install all cylinder head studs with oil finger tight only. ALUM - same as above but tighten studs to 100 in-lbs before tightening nuts to 25 / 70 ft-lbs in two repetitions.

FIGURE 3



Apply oil to studs. Install into block to with 100 inch-pound torque. Apply 50 ft-lbs to nuts 1-10 then apply 95 ft-lbs to nuts 1-10. Then apply 85 ft-lbs torque to nuts #11 through #20. Assembly lube provided with aluminum block.

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

DATE	REVISION	AUTH

ANNIVERSARY EDITION 427 and Component Information

Ignition System

The high energy ignition (HEI), GM part number 88961867, included with the ANNIVERSARY EDITION 427 is a self-contained ignition system that includes a magnetic pick up, a module, coil, rotor, and cap. The HEI's large diameter cap minimizes arcing and cross-firing between adjacent spark plug terminals. The cap's male terminals provide a reliable, positive connection for the spark plug leads. However, the HEI's large diameter cap may interfere with other under hood components in vehicles not originally equipped with HEI systems. Check for adequate clearance before installation. The HEI distributor incorporates a hardened alloy drive gear that is compatible with a steel cam gear. Use of a non-hardened distributor gear will result in excessive wear.

The HEI system requires a 12-volt power supply for proper operation. The HEI system should be connected directly to the battery with a 10 or 12 gauge wire through a high quality ignition switch. If you are installing an HEI in an early-model vehicle originally equipped with a point-type ignition, be sure to remove or bypass the resistor in the wiring harness to ensure the HEI receives 12-volts continuously. Use distributor connector package, GM part number 12167658, which includes connectors and wires for the HEI's tachometer and 12-volt terminals.

Please be advised that the distributor included with this engine is now equipped with an alternative tachometer feed (green wire) and a rev limiter. The rev limiter has been pre-set to the recommended MAX RPM for the engine (6500 RPM).

Timing Information

Set base timing spark timing at 10°-12° BTDC at 1000 RPM with the vacuum advance line to the distributor disconnected and plugged. This setting will produce 34°-36° of total advance at wide open throttle (12° base timing + 24° centrifugal timing = 36° total timing above 4000 RPM).

Flexplate

The ANNIVERSARY EDITION 427 has an automatic transmission flexplate included with the engine assembly, GM part number 12561217. If a manual transmission is to be used, a manual flywheel, GM part number 12582964, must be purchased separately.

Important

Both engines are internally balanced and require internally (zero) balance mating components. Always tighten the fasteners in a "star" pattern to 30 ft.lbs. first then to final torque value.

Pilot Bearing

You must install a pilot bearing in the rear of the crankshaft if the engine will be used with a manual transmission. The pilot bearing aligns the transmission input shaft with the crankshaft centerline. A roller pilot bearing, GM part number 14061685, is recommended for this engine. The heavy duty bearing adds an extra margin of reliability to a high performance drive train.

Indicator Tube

The indicator and indicator tube come installed on the engine. One end is pushed into the hole on the oil pan and sealed with an o-ring. The other end is fastened to the block using a bolt and a spacer. When removing the dipstick to install the engine or headers, be sure not to loose the small o-ring which seals the dipstick tube to the pan. The o-ring must be reinstalled on the dipstick tube before inserting it into the pan. Make sure the tube is bottomed out in the pan before tightening the dipstick tube to the header bolt. Also, the spacer and fastener that were attaching the dipstick tube to the engine will not be required once the headers are installed. They were for shipping purposes only.

Carburetor

Please refer to the documentation supplied with the carburetor for installation and tuning instructions. There is also an informative DVD included with the carburetor package that will be helpful for tuning the carburetor based on your intended application and environmental conditions. If you have technical questions regarding the carburetor or cannot locate the instructions, please contact the carburetor manufacturer. The air cleaner size should be at least 14.0" in diameter and a minimum of 3" tall or with equivalent surface area to allow adequate air flow to the engine.

TITLE	Anniversary Edition 427 Specifications	IR24JN08	PART NO.	19211812	PAGE	6	OF	24
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Exhaust Header Information

The engines were developed using 2-1/8" diameter x 34" long primary tube headers with 3.00" diameter collectors.

Starter:

The starter recommended by GM is a high-torque mini starter. It is a compact starter that delivers plenty of torque in a small package which offers increased clearance for extended oil pans and exhaust systems. It is available either black, GM part number 12361146, or chrome, GM part number 12363128.

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.

To prime the engine, first remove the distributor to allow access to the oil pump drive shaft. Note the position of the distributor before removal. Install the oil priming tool, GM part number 12368084. Using a 1/2" dill motor, rotate the engine oil priming tool clockwise for two to 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 fired. Reinstall the distributor in the same orientation as it was removed.

After the engine has been installed in the vehicle, recheck the oil level and add oil as required. It is also good practice to always recheck the ignition timing after removal and reinstallation of the distributor. See the section on the engine specifications for the proper timing information.

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. Do this by using an engine oil priming tool. If you do not have one, one can be obtained through GM, part number 12368084. Follow the instructions enclosed with the tool. 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.
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. Set the ignition timing to 10-12° before top dead center (BTDC) and the engine idle to 950 RPM (ANNIVERSARY EDITION 427) with a timing light and the vacuum disconnected and plugged. Rotate the distributor counter-clockwise 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, set the total advance timing to 34-36°F at 4000 RPM.
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 5000 RPM , and back to idle (0% throttle) in gear.
9. Run two or three hard throttle (WOT 100%) accelerations to about 5000 RPM, and back to idle (0% throttle) in gear.
10. Change the oil and filter. Replace with 5w30 racing motor oil (not synthetic) and a PF35L 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 only be suitable to use synthetic motor oil after the second recommended oil change and mileage accumulation.

TITLE Anniversary Edition 427 Specifications	IR24JN08	PART NO. 19211812	PAGE 7 OF 24
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