

VORTEC 5300 GEN III (L33/LM7/L59) V-8 TRUCK ENGINE

2006 model year summary

- Close-coupled catalytic converter system
- Virtual fuel sensor for E85 flexible fuel (L59)

Full descriptions of new or changed features

Close-coupled catalytic converter system

The Vortec 5300 V-8 L33, LM7 and L59 are equipped with a new close-coupled catalytic converter system, which helps to reduce emissions and provide more customer value. The system consists of two 102-cubic-inch (1.7 liters of volume per bank) converters, placed five inches from the exhaust manifold, and a close-coupled Y-pipe. The converters are bolted (rather than welded) to the exhaust manifold flange. They have a standard construction, consisting of a ceramic substrate, insulating blanket material and a steel shell. The new architecture replaces two previous mid-coupled converters.

The Vortec 5300 engines meet federal emissions requirements and California Low Emissions Vehicle (LEV I) requirements. They also meet near-zero evaporative emissions standards in all states.

Virtual fuel sensor for E85 flexible fuel (L59)

Light duty GM trucks equipped with the flexible fuel-capable L59 version of the Vortec 5300 use a new virtual fuel sensor, replacing their previous physical fuel sensor, for improved quality, reliability and dependability and increased customer value.

Essentially, control for the fuel sensor has up-integrated into the Powertrain Control Module (PCM). Based on input readings primarily from the O² (oxygen) sensor, fuel level sensor and vehicle speed sensors and using a new algorithm, the PCM adjusts the length of time the fuel injectors are open (duration) to adjust fuel control in accordance with the different compositions of the fuel being used. The flexible fuel L59 allows its GM trucks to run on any combination of gasoline or E85 ethanol-based fuel, offering an

environmentally friendly companion or alternative to gasoline. Its environmental/gasoline-saving benefits are available in light duty Chevrolet Silverado, Suburban, Avalanche and Tahoe; and GMC Sierra, Yukon and Yukon XL.

Overview

With an outstanding balance of torque, free-breathing horsepower, fuel efficiency, low maintenance and low cost of ownership, the Vortec 5300 precisely suits the needs of working truck owners and vehicle platform teams alike. This versatility makes the Vortec 5300 the most widely applied of GM Powertrain's Vortec V-8s.

The 5.3L LM7 V-8 was introduced in the 1999 Chevrolet Silverado and GMC Sierra, and developed in the tradition of the original Chevrolet small block using the latest, best overhead-valve technology available. A lighter valvetrain reduced friction and increased efficiency. A steel camshaft reduced mass while maintaining truck-grade durability. Steel roller rockers added stiffness, allowing greater engine speed with less vibration. Hydraulic roller lifters reduced friction for better fuel economy and wear resistance. The standard spark plugs extend anticipated plug life to 100,000 miles, while the coolant maintains its cooling and corrosion-inhibiting properties for 150,000 miles. Scheduled maintenance was limited to oil changes.

The Gen III Vortec 5300s share their engine block and, in most cases their cylinder heads, with the Vortec 4800 (RPO LR4,). The Vortec 5300s have nine mm greater stroke for an additional 520 cubic centimeters displacement. RPO L33, a lighter, higher output variant of the Vortec 5300 that became available on short bed, extended cab Silverado and Sierra models in 2005, features an aluminum engine block; cylinder heads from the LS6 that were originally developed for the Z06 Corvette; and a high-lift cam.

In 2002, GM Powertrain launched RPO L59 – the first flexible-fuel V8 for full-size sport utility vehicles. With the 5.3L LM4 in 2003, Powertrain offered the first all-aluminum Vortec V8. Continuous improvement has been the guiding principal for all of the Vortec 5300s. Since launch, virtually every component or system has been reviewed to increase value for the customer: management electronics, NVH control, materials, build tolerances, performance and efficiency have been enhanced annually, all with an eye toward conserving valuable resources and protecting the environment. Even required

maintenance has been reduced. The industry's best oil-monitor system records engine temperature, length of operation at a given temperature and several other operating parameters, then indicates an oil change when it's actually needed, rather than according to a predetermined interval.

Among 2005 upgrades, the Vortec 5300 was equipped with floating pin pistons, allowing tighter wrist pin to pin bore tolerances, quieter engine operation and enhanced durability. With the Vortec 5300, Chevrolet Silverado and Tahoe and GMC Sierra and Yukon models also received a Regulated Voltage Control (RVC) charging system to reduce wear on the alternator and improve fuel economy and electrically operated cooling fans for greater efficiency. In addition, Silverados and Sierras got a more powerful 145-ampere generator; Tahoes and Yukons, a more powerful 165 ampere generator. All vehicles with the Vortec 5300 also received a new accessory drive belt. Four-wheel-drive Silverados and Sierras with the Vortec 5300 received a new throttle progression in their Electronic Throttle Control (ETC), allowing more precise throttle modulation during severe off-road use. The Vortec 5300 also received an improved Throttle Actuator Control (TAC) module. Its PCM began using a rate-based diagnostics monitoring protocol to improve the robustness of the Onboard Diagnostics System (OBD II) and ensure optimal emissions control performance. Iridium-tip sparkplugs began being used to reduce potential maintenance and help maximum fuel economy and minimize emissions. And all Vortec 5300s began being shipped with GF-4 engine oil, which reduces deposits, extended oil change intervals, improved fuel economy and extended life of emissions control systems.

The Gen III Vortec 5300 has refined overhead-valve technology to unprecedented levels, exceeding customer expectations and keeping the cost of ownership low in the process. It has also provided the foundation for an even more technically sophisticated truck V8: the new Gen IV Vortec 5300 with Displacement on Demand.