2009 GM 3.6L V-6 VVT (LY7)
3.6L V-6 VVT (LY7) CAR AND TRUCK ENGINE

Carryover Features and benefits from 2008 model year

The 3.6L V-6 VVT is available as an option on the Chevrolet Malibu, Pontiac G6 coupe and sedan, and the Saturn Aura sedan as a transverse installation, and is teamed up with the Hydra-Matic 6T70 (MH2) six-speed automatic transmission. Also, in the Chevrolet Equinox, Pontiac Torrent, and Saturn VUE, the (LY7) is mated with the same six-speed in both FWD and AWD models. In the Pontiac G8, and Cadillac SRX, the 3.6L V-6 VVT teams up with the Hydra-Matic 5L40 (M82) five speed automatic. The SRX also has an AWD variant. In the Cadillac CTS, the (LY7) teams up with the Hydra-Matic 6L50 (MYB) six –speed transmission to round out the 2009 model year lineup for this engine option.

Smaller Pitch Timing Chain
The 3.6L V-6 VVT in the Cadillac CTS has a new timing chain with a smaller pitch (7.7 mm compared to 9.5mm previously) and more links. The chain features an inverted tooth design. The smaller links engage at a lower impact speed, which decreases the noise generated. In conjunction with the new chain, the number of teeth on the sprockets is also increased, increasing the meshing frequency and further reducing noise and vibration.

The new timing chain is a running change that will occur in all of GM Powertain's V-6 VVT engines through the course of the 2007 model year.

Dual-Spray Fuel Injectors
Fuel injectors on the 3.6L V-6 VVT now have two tiny spray nozzles. Developed with Bosch, the dual-spray injectors improve fuel atomization in the combustion chambers compared to single-tip injectors, allowing more complete combustion. The new injectors allow better emissions management. All 3.6L V-6 VVTs except those built for the Buick LaCrosse are equipped with the dual-spray fuel injectors.

Improved Oil Pan
The oil pan on 3.6L V-6 VVTs built for the Cadillac CTS, SRX and STS have been stiffened to improve powertrain rigidity and reduce vehicle vibration. The oil pan bolts to the transmission bell housing as well as the engine block, eliminating points of vibration.

Overview
Introduced in the 2004 Cadillac CTS and SRX, the 3.6L V-6 VVT (RPO LYZ) was the first in GM Powertrain's global family of high-feature V-6 engines. Its architecture was jointly developed by GM technical centers in Australia, Germany, the United States and Sweden. The 3.6L VVT V-6 is based on the philosophy that a true family of global engines provides the best value and performance for the customer and the best return on investment for General Motors. It applies the most advanced automotive engine technology available, from state-of-the-art casting processes to full four-cam phasing to ultra-fast data processing and torque-based engine management. Since its launch, application has spread to an expanding number of vehicles for one primary reason. The 3.6L V-6 VVT delivers a market-leading balance of good specific output, high torque over a broad rpm band, fuel economy, low emissions and first-rate noise, vibration and

harshness control, with exclusive durability enhancing features and very low maintenance.

The 3.6L V-6 VVT's engine block is cast with sand molds from A319 aluminum, with strong cast-in iron bore liners, six-bolt main bearing journals and inter-bay breather vents. Cylinder heads are also aluminum. Four valves per cylinder and a silent chain valvetrain contribute to both smoothness and high output. Four-cam phasing changes the timing of valve operation as operating conditions such as rpm and engine load vary. That means smooth, even torque delivery with high specific output (horsepower per liter of displacement) and excellent specific fuel consumption. Cam phasing also pays big dividends in reducing exhaust emissions. By closing the exhaust valves late at appropriate times, the cam phasers create an internal exhaust-gas recirculation system. The 3.8L V-6 VVT meets all emissions mandates without complex, weight-increasing emissions control systems such as EGR and air injection reaction (AIR).

Aluminum-intensive construction extends to the pistons, which are manufactured as cast aluminum polymer coated oil cooled pistons, with a fully floating wristpin, and these pistons are considerably lighter than conventional pistons. Less weight means less reciprocating mass in the engine, which in turn means less inertia and greater operating efficiency. Moreover, the V-6 VVT pistons are crafted with a number of features that enhance durability and reduce noise and harshness, including a high-tech polymer coating and floating wrist pins. The V-6 VVT engine family was developed with pressure-actuated oil squirters in all applications. Three jet assemblies in the block hold a pair of oil-squirting nozzles that drench the underside of each piston and the surrounding cylinder wall with an extra layer of cooling, friction-reducing oil. The jets reduce piston temperature, which in turn allows the engine to produce more power without reducing long-term durability. The extra layer of oil on the cylinder walls and wristpin further dampens noise emanating from the pistons.

The oil pan provides another example of extensive efforts to minimize noise and vibration in the 3.6L V-6 VVT. Cast aluminum dampens internal engine noise better than a conventional stamped steel pan. Structurally, it is considerably stiffer. The design was optimized with math-based analysis and carefully crafted curves in the pan's sides and bottom. These reduce the broadcasting or "drumming" of noise created as oil flows through the crankcase, and they increase bending stiffness in the pan.

The 3.6L V-6 VVT is managed the Bosch Motronic controller. This sophisticated electronic control module (ECM) uses a torque-based control strategy, which improves upon throttle-based management systems that rely exclusively on a throttle position sensor to manage electronic throttle control. The torque-based strategy measures the position of the intake plenum plate, cam phasing positions and other operational parameters and translates that data into an ideal throttle position and engine output, based on the driver's positioning of the gas pedal. The ECM and a wide range of sensors allow failsafe systems, including ignition operation in the event of timing sensor failures. The control software protects the V-6 VVT from permanent damage in the event of complete coolant loss, and allows the engine to operate at reduced power for a prescribed distance sufficient for the driver to find service. It also allows a number of other customer-friendly features, including GM's industry-leading Oil Life System, which determines oil change intervals by actual operation parameters, rather than a preset mileage limit.

The cam drive and valvetrain components require no scheduled maintenance. A sophisticated cam-chain tensioner, high-quality cam phasing components and hydraulic lash adjusters are designed to ensure optimal valvetrain performance for the life of the engine with no adjustment. Even perishable components provide extended useful life. The spark plugs have dual-platinum electrodes and a service life of 100,000 miles without degradation in spark density. The plugs are easy to remove because they are located in the center of the cam cover. Extended life coolant retains its cooling and corrosion-inhibiting properties for 100,000 miles in normal use. The accessory-drive belt was specified primarily for low-noise operation, yet it is manufactured of EPDM rather than neoprene and should last the same 100,000 miles before replacement is recommended. The oil filter requires only element replacement, and it's designed to virtually eliminate spillage when the cartridge is removed.

The V-6 VVT development and production teams made assembly efficiency a priority. All global V-6 variants can be built with no significant casting changes to major components. Core engine components are designed to be common whenever possible. The basic V-6 block is used in all vehicle applications, with differences limited to machining. While different vehicles require different oil pans, the pan's mating surfaces with the engine block and transmission are common in all cases, allowing considerable assembly efficiencies. The net result is streamlined procurement practices, fewer tool changes in the plant, shorter assembly time and improved quality for the customer.

Production for the 3.6L V-6 VVT is located in St. Catharines, Ontario, Canada and Port Melbourne, Australia.