

Chevrolet



Silverado SS



2005

Table of Contents

Product Information	1
Chevy Silverado: For Every Personal and Professional Truck Need	1
Unmatched power and selection	1
Improved fuel economy	2
Hybrid highlights	2
Safety and security across the range	2
Quadrasteer for added maneuverability	3
Quality entertainment systems	3
Silverado SS, Z71 Off-Road Package	3
Silverado Heavy Duty – For any power and performance need	4
Impressive and tough	4
Capable smooth-shifting transmissions	4
New For 2005	5
Model Lineup – Silverado	6
Model Lineup – Silverado HD	7
Specifications – Silverado	8
Engines	8
Engines (Continued)	9
Estimated Fuel Economy	10
Transmissions	10
Chassis/Suspension	11
Brakes	11
Wheels/Tires	12
Dimensions	12
Specifications – Silverado HD	13
Overview	13
Engines	13
Transmissions	14
Chassis/Suspension	14
Brakes	14
Wheels/Tires	15
Dimensions	15
Vehicle Identification	16
Vehicle Identification Number (VIN)	16
VIN Derivative	17
Engine ID and VIN Derivative Location	18
6.0L V-8 Engines	18
Engine ID Legend	19
Transmission ID and VIN Derivative Location	20
4L60-E Transmission ID Location	20
Bar Code Label Contents(c)	21
Transfer Case Identification	22
Axle Identification – Front	23
Axle Identification – Rear	24
Label - Vehicle Certification, Tire Place Card, Anti-Theft and Service Parts ID	25
Vehicle Certification Label	25
Tire Placard	26
Service Parts ID Label	26
Anti-Theft Label	26
RPO Code List	26

Technical Information	27
Maintenance and Lubrication	27
Capacities - Approximate Fluid	27
Axle Capacities	27
Cooling System	27
Engine Oil with Filter	27
Fuel Tank	27
Transfer Case	27
Transmission	27
Maintenance Items – Gasoline Engine	27
Engine Air Cleaner/Filter	27
Oil Filter	27
Spark Plugs	27
Wiper Blades (ITTA Type)	27
Fluid and Lubricant Recommendations – Gasoline Engine	28
GM Oil Life System - Resetting	29
Descriptions and Operations	30
Power Steering System	30
Without Electro-Hydraulic Steering	30
With Electro-Hydraulic Steering	31
EHPS Module	31
Steering Linkage (Non-Rack and Pinion)	33
Steering Wheel and Column	33
Vehicle Steering	33
Vehicle Security	33
Driver Convenience	33
Driver Safety	34
Rear Wheel Steering Description and Operation	34
Rear Wheel Steering Control Module	34
Important	34
Rear Wheel Steering Mode Switch	35
2-Wheel Steer Mode	35
4-Wheel Steer Mode	35
4-Wheel Steer Tow Mode	35
Rear Wheel Steering Gear Motor	35
Steering Wheel Position Sensor	35
Rear Wheel Steering Position Sensor	35
Combined Yaw Rate Sensor / Lateral Accelerometer Sensor	36
Steerable Rear Axle	36
Suspension Description and Operation	36
Front Suspension	36
Coil Spring	36
Torsion Bar	37
Rear Suspension	37
Selectable Ride Description and Operation	38
Wheels and Tires	38
Fastener Tightening Specifications	38
General Description	38
Tread Wear Indicators Description	38
Metric Wheel Nuts and Bolts Description	39
Tire Inflation Description	39
Tire Description	40

Conditions for Tire Replacement	41
All Seasons Tires Description	41
P-Metric Sized Tires Description	42
Driveline System Description and Operation	43
Driveline/Axle – Propeller Shaft	43
Front Propeller Shaft Description	43
One Piece Propeller Shaft Description	43
Two Piece Propeller Shaft Description	43
Propeller Shaft Phasing Description	43
Universal Joint Description	43
Center Bearing Description	43
Wheel Drive Shafts Description and Operation	44
Front Drive Axle Description and Operation	44
Selectable Four Wheel Drive (S4WD) Front Axle Description and Operation	44
Full-Time Four Wheel Drive (F4WD) Front Axle Description and Operation	44
Rear Drive Axle Description and Operation	45
Locking/Limited Slip Rear Axle Description and Operation	45
Limited-Slip Function	46
Locking Function	46
Locking Differential Torque-Limiting Disc	47
Transfer Case - NVG 149-NP3 (One Speed Automatic)	47
Braking System Description and Operation	48
Hydraulic Brake System Description and Operation	48
System Component Description	48
Hydraulic Brake Master Cylinder Fluid Reservoir	48
Hydraulic Brake Master Cylinder	48
Hydraulic Brake Pressure Balance Control System	48
Hydraulic Brake Pipes and Flexible Brake Hoses	48
Hydraulic Brake Wheel Apply Components	48
System Operation	48
Brake Assist System Description and Operation	48
System Component Description	48
Brake Pedal	48
Brake Pedal Pushrod	48
Vacuum Brake Booster	48
Vacuum Source	48
Vacuum Source Delivery System	49
System Operation	49
Disc Brake System Description and Operation	49
System Component Description	49
Disc Brake Pads	49
Disc Brake Rotors	49
Disc Brake Pad Hardware	49
Disc Brake Caliper Hardware	49
System Operation	49
Park Brake System Description and Operation w/Rear Disc	49
General Description	49
Park Brake Pedal Assembly	49
Park Brake Release Handle Assembly	49
Park Brake Cables	49
Park Brake Cable Equalizer	49
Park Brake Apply Lever	50
Park Brake Actuator/Adjuster	50
Park Brake Shoe	50
System Operation	50

ABS Description and Operation	50
Antilock Brake System	50
Engine Description and Operation.....	51
Engine Mechanical.....	51
General Specifications 6.0L (LQ9 VIN N)	51
General	51
Block	51
Camshaft	51
Connecting Rod	51
Crankshaft	52
Cylinder Head	52
Intake Manifold	52
Lubrication System	53
Oil Pan	53
Piston Rings.....	53
Pistons and Pins	53
Valve System.....	54
Fastener Tightening Specifications	55
Engine Component Description.....	58
6.0 Liter V8 Engines	58
Camshaft and Drive System	58
Crankshaft	58
Cylinder Heads	59
Engine Block.....	59
Exhaust Manifolds	59
Intake Manifold	59
Oil Pan	59
Piston and Connecting Rod Assembly	59
Valve Rocker Arm Cover Assemblies.....	59
Valve Train.....	59
Lubrication Description.....	60
Crankcase Ventilation System Description	60
Engine Cooling	62
Fastener Tightening Specifications.....	62
Cooling System Description and Operation	62
Engine Coolant Indicators	62
ENGINE COOLANT HOT	62
ENGINE OVERHEATED	62
LOW COOLANT LEVEL B.....	62
REDUCED ENGINE POWER	63
Cooling Fan Control - Two Fan System	63
Coolant Level Control (If Equipped)	63
Coolant Heater	64
Cooling System	64
Cooling Cycle	64
Coolant	64
Radiator.....	64
Surge Tank.....	64
Pressure Cap	65
Cooling Fan and Clutch.....	65
Air Baffles and Seals	65
Water Pump.....	65
Thermostat	65
Engine Oil Cooler	66
Transmission Oil Cooler	66

Engine Electrical	67
Fastener Tightening Specifications	67
Battery Usage – Non HP2	68
Battery Usage (HP2)	68
Battery Temperature vs Minimum Voltage	68
Generator Usage	68
Battery Description and Operation	68
Reserve Capacity	70
Cold Cranking Amperage	70
Circuit Description	70
Starting System Description and Operation	70
Charging System Description and Operation (W/O Generator/Battery Control Module)	70
Generator	70
Regulator	71
Auxiliary Battery Charging	71
Engine Controls	72
Fuel System Specifications	72
Engine Controls – 6.0L	72
Ignition System Specifications	72
Fastener Tightening Specifications	72
Exhaust System	73
Fastener Tightening Specifications	73
Exhaust System Description	74
Resonator	74
Catalytic Converter	74
Muffler	74
Transmission/Transaxle Description and Operation	75
Automatic Transmission – 4L60E	75
Transmission General Specifications	75
Fastener Tightening Specifications (M30/M32)	75
Fluid Capacity Specifications	76
Transmission Component and System Description	76
Adapt Function	77
Transmission Adapt Function	77
Automatic Transmission Shift Lock Control Description	77
Abbreviations and Meanings	i
Conversion - English/Metric	i
Equivalents - Decimal and Metric	ii
Fasteners	i
Metric Fasteners	i
Fastener Strength Identification	i
Prevailing Torque Fasteners	ii
All Metal Prevailing Torque Fasteners	ii
Nylon Interface Prevailing Torque Fasteners	ii
Adhesive Coated Fasteners	ii
Metric Prevailing Torque Fastener Minimum Torque Development	iii
All Metal Prevailing Torque Fasteners	iii
Nylon Interface Prevailing Torque Fasteners	iii
English Prevailing Torque Fastener Minimum Torque Development	iv
All Metal Prevailing Torque Fasteners	iv
Nylon Interface Prevailing Torque Fasteners	iv

Product Information

Chevy Silverado: For Every Personal and Professional Truck Need

As General Motors' best selling vehicle, the Chevrolet Silverado has an unequalled reputation for outstanding performance, dependability and capability. Silverado also is known for having one of the broadest model ranges in the entire industry, to meet every personal and professional need in the full-size pickup truck market.

Silverado's extensive range of 1500 and 2500 light duty models is expanded even further for 2005, with the introduction of a gas-electric hybrid version of the 1500 Series Extended Cab for the retail market. Hybrid models are powered by a standard Vortec 5300 V-8 and Hydra-Matic 4L60-E four-speed automatic transmission coupled with the segment's first hybrid propulsion technology, to provide up to 10 percent better fuel economy; 120-volt electrical power with ground fault detection; and unique accessory powering capability.

In addition to the hybrid-powered Silverado, an even more potent 310 horsepower (231 kw) version of GM's Vortec 5300 5.3L V-8 is available for 2005 on 4WD Silverado 1500 Extended Cabs with a standard cargo box.

Other functional changes for 2005 include the availability of a power sunroof on all Extended Cab and Crew Cab models. Front-disc, rear-drum anti-lock brakes are now standard on all light duty models except those equipped with GM's innovative QuadraSteer four-wheel steering system.

A new 3.23 rear axle ratio is standard on 2WD models, while a more powerful 145-amp alternator is standard on all models for 2005. (A 160-amp alternator comes with the optional Snow Plow prep package.)

New tire choices for 2005 include P245/70R17-108S all-season blackwall tires as standard on 2WD models, with P245/70R17-108S all-season white-outlined letter tires as an option. P265/70R17 all-season blackwall tires are now standard on 4WD Regular and Extended Cab models, while P265/70R17 all-season white outlined-letter tires are available.

Revised wheel combinations include six-lug painted 17 x 7-inch steel wheels standard on Work Truck Models, and six-lug chrome-styled steel 17 x 7.5-inch wheels on all models except 2WD Extended Cab and 2WD/4WD Crew Cab models.

Dark Blue Metallic is a new color for 2005 across all light and heavy duty models except Silverado SS.

Unmatched power and selection

Within the light duty lineup, Silverado can be ordered in an almost unlimited number of configurations to suit any requirement: Regular, Extended or Crew Cab body styles; standard 6.5-foot (2-m) or extended 8-foot (2.4-m) cargo boxes in either Fleetside or Sportside style; 1500 half-ton or 2500 three-quarter-ton models; and either 2WD or 4WD systems.

An impressive array of Vortec engines is offered: a 4300 4.3 L V-6; 4800 4.8L V-8; two models of the Vortec 5300 5.3L V-8; and the powerful Vortec 6000 6.0L V-8. Engine output ranges from 195 hp (145 kw) all the way up to 330 hp (246 kw).

In addition to the new hybrid version, Silverado can be ordered in several reduced-emissions or alternative-fuel variations. All Silverados with the Vortec 4300 4.3L V-6, and those sold in California with the Vortec 4800 4.8L or Vortec 5300 5.3L V-8, have a robust catalytic converter system that meets Ultra Low Emission Vehicle (ULEV) standards. Models equipped with the Vortec 6000 6.0L V-8 come with a dedicated compressed natural gas (CNG) or bi-fuel system that can run on CNG or gasoline.

Light-duty Silverado models with the Vortec 5300 5.3L V-8 offer an option that enables owners to operate them on varying blends of ethanol and gasoline, up to a maximum of 85 percent ethanol.

Silverado can be equipped to meet any personal requirement or professional demand when it comes to hauling or towing. Payload capacities range from 1,295 pounds (587 kg) all the way to 4,047 pounds

(1,836 kg) for 2500 heavy duty models. Gross Vehicle Weight Ratings range from 6,100 pounds (2,767 kg) to 9,200 pounds (4,173 kg) on properly equipped heavy duty versions.

Improved fuel economy

Already best in class in terms of fuel economy, the 2005 Silverados receive four major enhancements that lead to a nearly one-mile-per-gallon fuel economy improvement.

The 2005 model Silverados feature an all-electric cooling system (compared to fan and fan clutch on 2004 models). The all-electric cooling system consists of two 200-watt electric fan packages and an improved dissipation radiator. The new cooling system provides a number of advantages:

A reduction in parasitic losses due to disengaged fan speed with a corresponding increase in combined city/highway fuel economy

A significant improvement in idle A/C performance (driver/passenger comfort) as well as an ability to idle with A/C on for extended periods in very high ambient temperatures

A reduction in customer complaints normally attributed to unusual engine noise or transmission noise/delayed shift, which are actually fan noise issues.

A new voltage control system monitors the battery's charge status and controls the vehicle's generator to minimize parasitic voltage loss.

Other changes designed to improve fuel economy include improved sealing of the vehicles' front end. For example, tow hook and fog light openings are now sealed when those items are not ordered on the vehicle. In addition, the center hole in the front air deflector has been sealed; an extension has been added to the front air deflector; the aerodynamics for the running boards have been improved and the center high mounted stop lamp (CHMSL) – which was previously roof-mounted – is now recessed into the liftgate glass for improved vehicle aerodynamics.

Hybrid highlights

Introduced during the 2004 model year, Silverado 1500 Hybrid promises up to 10 percent improvement in fuel economy and returns all the performance and capability expected in a full-size pickup. The Vortec 5300 V-8 engine delivers 295 horsepower (220 kw) and 335 lb.-ft. (463 Nm) of torque – the same as its non-hybrid counterpart. Yet there's something the Sierra Hybrid provides that standard models do not: it is essentially a mobile power-generating station, with four 120-volt/20-amp electrical auxiliary power outlets (APO). The power outlets are located under the rear seat of the cab and in the pickup bed. Customers can conveniently operate power equipment without taking up the bed space typical portable generators would use.

A key contributor to the Hybrid's fuel efficiency is its ability to automatically stop and restart the engine under different operating circumstances. Instead of a conventional starter motor and alternator, Hybrid pickups use a compact 14-kw electric induction motor or starter generator integrated in a patented, space-efficient manner between the engine and transmission. The starter generator provides fast, quiet starting power and allows automatic engine stops/starts to conserve fuel. It also smoothes out any driveline surges; generates electrical current to charge the batteries and run auxiliary power outlets; and provides coast-down regenerative braking, as an aid to fuel economy.

Safety and security across the range

Silverados are equipped with GM's Passenger Sensing System (PSS). PSS uses the latest sensing technology to turn the front passenger air bag on or off. If the sensor system detects an unoccupied front passenger seat or the presence of a smaller occupant, the front passenger air bag is designed to automatically turn off so it would not deploy in the event of a frontal collision. A status indicator on the instrument panel alerts occupants that the passenger air bag is on or off. Even with this system, GM strongly recommends to restrain child passengers in an appropriate child seat placed in the second or third row of the vehicle. Never install a rear-facing infant seat in front of an active air bag. GM also recommends that all children 12 and under ride in the rear seat when possible.

The Silverado also has dual-stage frontal air bags (not available on 1500 HD Crew Cab and 2500 HD and 3500 Series models) for supplemental protection for front seat passengers. Dual-stage frontal air bags are designed to help reduce the risk of air bag-induced injury. When the air bag system's control unit detects an impact, it determines whether the crash is severe enough to trigger a deployment, and whether the primary amount of inflation is sufficient. The primary stage alone will deploy in most frontal impacts requiring the supplemental protection of an air bag, while a secondary stage is designed to deploy in more severe frontal collisions.

GM's OnStar safety and security system is standard on LT and available on LS light duty models. In the heavy duty range, OnStar is standard on Silverado LT Extended Cab and Crew Cab models, and available on 2500 HD and 3500 models.

Silverados feature OnStar's new sixth-generation hardware with digital and analog coverage. The Gen 6 hardware also includes upgraded hands-free voice recognition capabilities including more intuitive continuous digit dialing and improved voice recognition accuracy. OnStar is the leading provider of in-vehicle safety, security and information services in the United States and Canada. Using the GPS satellite network and wireless technology, OnStar features core safety services and OnStar Personal Calling that allows drivers to make and receive hands-free, voice-activated phone calls using a powerful three-watt digital/analog system and external antenna for greater reception.

Additional safety and security systems include electronic traction control on 2WD Silverados to enhance handling and response on models equipped with a V-8 engine, automatic transmission and locking rear differential. All models come standard with PASSLock II theft deterrent system, and a driver information center that monitors and reports on up to 34 vehicle system functions.

Air conditioning, chrome front bumpers, tinted glass, power steering with tilt-adjustable column, a full-size spare tire and heavy-duty battery also are standard on all Silverado models.

Quadrasteer for added maneuverability

GM's exclusive Quadrasteer four-wheel steering system – which offers low-speed maneuverability and high-speed stability, handling and control ideal for pulling a trailer – is available on 1500 Extended Cab short-box and 2500 Crew Cab pickups. At low speeds, Quadrasteer enables the rear wheels to turn in the opposite direction of the front wheels. That helps the vehicle make tighter turns such as when cornering or getting into a tight parking space. At higher speeds, the system reduces vehicle yaw, or rotational motion, for more control during lane changes and demanding conditions.

Quality entertainment systems

Impressive entertainment systems – from available Bose sound systems to a Panasonic DVD passenger entertainment system – add to Silverado's creature comforts. These systems (except the base fleet radio) feature the next-generation Radio Data System, and can interface with services such as the optional XM Satellite Radio. On Crew Cab models, available rear-seat audio controls allow second-row passengers to enjoy a separate audio source from front-seat occupants.

XM (continental U.S. only) provides more than 120 coast-to-coast, digital-quality channels of original commercial-free music and premier news, sports and talk as well as advanced traffic and weather information for select major metropolitan areas nationwide. Consumers can subscribe to the basic service for \$9.99 a month. In addition, GM customers with GMAC financing can choose to include the XM subscription in their car payments.

Silverado SS, Z71 Off-Road Package

Among the wide selection of Silverado models are two versions that offer the ultimate for either highway cruising or off-road fun.

Silverado SS, based on a 1500 Series Extended Cab with a short bed, is a contemporary expression of Chevy power for those muscle car enthusiasts who want the added versatility of a muscle truck. A high-output version of GM's Vortec 6000 V-8 pumps out 345 horsepower (257 kw) and 380 lb.-ft. (515 Nm) of torque. Bolted to a Hydra-Matic 4L85-E four-speed automatic overdrive transmission equipped with a

3.06 first gear and 0.70 final gear, this potent powertrain delivers both rapid acceleration and relaxed highway cruising.

Keeping all this power connected to the pavement is a standard full-time, electronic all-wheel-drive (AWD) viscous-coupled transfer case for enhanced wet or dry pavement handling, along with an innovative Z60 high-performance chassis and tire package that includes Silverado's largest ever 20-inch wheel and tire combination for exceptional road holding and cornering capabilities.

For 2005, Silverado SS is available with a power sunroof option. Silver Birch Metallic is offered in addition to Victory Red.

For those interested more in four-wheeling fun and capability, the Silverado Z71 Off-Road Package is available on half-ton 4WD models. The Z71 package includes 46-mm gas-charged shock absorbers, off-road jounce bumpers, specific stabilizer bars, a skid-plate package, a high-capacity air cleaner and distinctive Z71 decals for the pickup box.

Silverado Z71 can be equipped with features such as cruise control, rear defogger, power door locks, remote keyless entry, rearview mirror, AM/FM stereo with CD and cassette player, leather-wrapped steering wheel, power windows, fog lamps, color-keyed grille and deep-tinted glass.

Silverado Heavy Duty – For any power and performance need

Featuring a redesigned hood and grille for 2005, Chevy Silverado Heavy Duty pickups comprise the segment's most diverse lineup, with a wide selection of weight ratings, body styles and powertrain combinations including diesel and compressed natural gas (CNG) models.

GM's Duramax 6600 6.6L (V-8) turbo-diesel was already legendary for its awesome performance, but engineers decided to make it even better. Both hardware and software were upgraded in '04, resulting in a 10 horsepower (7.5 kw) increase. Not satisfied with "good enough," the engineers went back to work and the result is a 70 lb.-ft. (97 Nm) torque increase for 2005. The revised powerplant delivers 310 horsepower (231 kw) at 3000 rpm and 605 lb.-ft. (836 Nm) of torque at 1600 rpm when equipped with the Allison automatic transmission.

At the top of the gasoline engine range is an optional Vortec 8100 8.1L V-8, rated at 330 hp (246 kw) and 450 lb.-ft. (610 Nm) of torque. The Vortec 6000 6.0L V-8 produces 300 hp (224 kw) and 360 lb.-ft. (488 Nm) of torque.

No fewer than 14 different Silverado HD models can run on dedicated (CNG) or bi-fuel systems, the latter which operates on either CNG or gasoline when equipped with a Vortec 6000 6.0L V-8 with hardened valves and seats to withstand CNG's lack of lubricity and cooling. Special versions with reduced gross vehicle weight ratings (8,500 pounds or 3,825 kg) enable customers to meet fleet requirements in "non-attainment" areas, while GVWR ratings of up to 9,200 pounds (4,173 kg) are available.

Impressive and tough

With impressive power, tough frames, advanced suspensions and high-capacity brakes, the 2500HD/3500 Series provides outstanding payload capacities as well as outstanding hauling and towing capabilities. The three-quarter-ton models have a GVWR as much as 9,200 pounds (4,173 kg), and payloads up to 3,964 pounds (1,798 kg). The one-ton pickup models have a GVWR up to 11,400 pounds (5,171 kg) and payloads up to 5,753 pounds (2,610 kg).

For chassis cab models, Silverado HD has an 11,400-pound (5,171-kg) GVWR for 2WD versions and a 12,000-pound (5,443 kg) GVWR when equipped with 4WD. Chassis cabs provide payloads up to 6,089 pounds (2,762 kg).

Capable smooth-shifting transmissions

Duramax 6600 and Vortec 8100 are mated to smooth-shifting, high-capacity transmissions with close-ratio gearing to provide optimum launch, hill climbing and towing capabilities.

The ZF S6-650 six-speed is fully synchronized in all gears. Dual cone synchronizers in second and third gear provide extra capacity. The shift lever moves forward for first and straight back for reverse, providing easy low-speed maneuvering since drivers don't have to go across the shift pattern to select reverse.

Second gear can be used for launching unloaded or lightly loaded trucks. First gear can be used as a "creeper gear" for extra low-end performance.

The Allison 1000 was built to move big-time tonnage. It has full electronic control of shift-timing points, five forward speeds and helical-type planetary gearsets for quiet operation. It also provides two operating modes, normal and Tow/Haul. When hauling heavy loads down long, steep grades, a grade-braking mechanism automatically downshifts to help slow the vehicle when the driver applies the brakes.

A heavy-duty, five-speed manual transmission and GM's optional Hydra-Matic 4L80-E four-speed electronically controlled automatic transmission are available with the Vortec 6000. The 4L80-E also provides Passive Shift Stabilization with Tow/Haul mode and a standard temperature gauge and temperature monitoring system.

New For 2005

- Hybrid version of half-ton 1500 Extended Cab model
- Higher output (310 hp/231 kw) Vortec 5300 5.3L V-8 (available on 4WD Extended Cab w/standard box)
- Power sunroof package (available late 2004 on Extended and Crew Cab models with Universal Transmitter and overhead console)
- Front disc/rear drum anti-lock brakes standard on all models except with QuadraSteer
- (QPR) P245/70R17-108S all-season blackwall tires standard on 2WD models
- (QPO) P245/70R17-108S all-season, white-outlined letter tires available on 2WD models
- (QVL) P265/70R17, all-season, blackwall tires standard on 4WD Regular/Extended Cab models
- (QVM) P265/70R17, all-season, white outlined-letter tires available on 4WD Regular/Extended Cab models
- Six -lug painted 17-inch x 7-inch steel wheels standard on Work Truck Models
- Six-lug chrome-styled steel 17-inch x 7.5-inch (except 2WD Extended Cab and 2WD/4WD Crew Cab models)
- 3.23 rear axle ratio standard on 2WD models
- 145-amp alternator standard
- Snow Plow prep package includes 160-amp alternator
- New hood and grille design for Heavy Duty models
- New exterior colors: Dark Blue Metallic (all except Silverado SS), Silver Birch Metallic (Silverado SS)

OnStar driver safety and security system, featuring Gen 6 hardware with analog/digital coverage and upgraded hands-free capabilities. Standard on light-duty LT, available on LS; standard on heavy-duty Silverado LT Extended Cab and Crew Cab, available on 2500HD and 3500 models.

Model Lineup – Silverado

	Engines				Transmissions				
	Vortec 4300 4.3L V-6	Vortec 4800 4.8L V-8	Vortec 5300 5.3L V-8 ***	Vortec 6000 6.0L V-8	4-spd auto (Hydra- Matic 4L60-E)	4-spd auto (Hydra- Matic 4L80-E)	4-spd auto (Hydra- Matic 4L85-E)	5-spd man (MG5)	5-spd HD man (MW3)
1500 Regular Cab, Sportside Short Box	s	o	o*	–	o	–	–	s	–
1500 Regular Cab, Fleetside Short Box	s	o	o*	–	o	–	–	s	–
1500 Regular Cab, Fleetside Long Box	s	o	o*	–	o	–	–	s	–
2500 Regular Cab, Fleetside Long Box	–	–	–	s	–	o	–	–	s
1500 Extended Cab, Sportside Short Box	s	o	o	–	s	–	–	–	–
1500 Extended Cab, Fleetside Short Box	s	o	o*	–	o	–	–	s	–
2500 Extended Cab, Fleetside Short Box	–	–	–	s	–	o	–	–	s
1500 Extended Cab, Fleetside Long Box	–	s**	o*	–	s	–	–	–	–
1500 Crew Cab Fleetside Short Box	–	–	s	–	s	–	–	–	–
2500 Crew Cab Fleetside Short Box	–	–	–	s	–	s	–	–	–
SS	–	–	–	s	–	–	s	–	–

* Available only with four-speed automatic overdrive transmission

** Vortec 5300 V-8 is included with LT trim

*** Higher-output 310 hp /231 kw version available on 4WD Extended Cab w/standard box

Key:

Standard s

Optional o

Not available --

Model Lineup – Silverado HD

	Engines			Transmissions			
	Vortec 6000 6.0L V-8	Vortec 8100 8.1L V-8	Duramax 6600 6.6L V-8	5-spd man (MW3)	6-spd man (ML6)	4-spd auto (Hydra- Matic 4L80-E)	5-spd auto (M74)
Pickups							
C/K25903 HD, C/K35903 2WD/4WD Regular Cab, Wideside Long Box	s	o	o	s	o	o	o
C/K25753 HD 2WD/4WD Extended Cab, Wideside Short Box	s	o	o	s	o	o	o
C/K25953 HD, C/K35953 2WD/4WD Extended Cab, Wideside Long Box	s	o	o	s	o	o	o
C/K25743 HD 2WD/4WD Crew Cab, Wideside Short Box	s	o	o	s	o	o	o
C/K25943, C/K35943 2WD/4WD Crew Cab, Wideside Long Box	s	o	o	s	o	o	o
Chassis Cabs							
C/K36003, C/K36403 2WD/4WD Regular Cab	s	o	o	s	o	o	o
C/K36053, C/K36453 2WD/4WD Extended Cab	s	o	o	s	o	o	o

Key:

Standard s
Optional o
Not available --

Specifications – Silverado

Models:	Chevrolet Silverado 1500, including 1500 Hybrid, 1500HD and 2500
	Regular Cab Fleetside / Sportside Short Box, 2WD and 4WD: Base & LS
	Regular Cab Fleetside Longbox, 2WD and 4WD: Base & LS
	Extended Cab Fleetside/Sportside Short Box, 2WD and 4WD: Base, LS & LT
	Extended Cab Fleetside Long Box, 2WD & 4WD: Base LS & LT
	Crew Cab Fleetside Short Box, 2WD & 4WD, LS & LT
Body style / driveline:	2/3 passenger Regular Cab, 5/6 passenger Crew Cab or 5/6 passenger Extended Cab, 2- and 4-wheel-drive pickup
Construction:	body on frame
EPA vehicle class:	full-size truck
Manufacturing location:	Oshawa, Ontario, Canada; Fort Wayne, Indiana; Pontiac, Michigan
Key competitors:	Ford F-Series Pickup, Dodge Ram Pickup, Toyota Tundra Pickup, Nissan Titan Pickup

Engines

	Vortec 4300 4.3L V-6 (LU3)	Vortec 4800 4.8L V-8 (LR4)	Vortec 5300 5.3L V-8 (LM7) <i>including Hybrid model</i>	Vortec 5300 5.3L V-8 (L33)
Type:	4.3L V-6	4.8L V-8	5.3L V-8	5.3L V-8
Displacement (cu in / cc):	262 / 4300	293 / 4807	325 / 5328	325 / 5328
Bore & stroke (in / mm):	4 x 3.48 / 101.6 x 88	3.78 x 3.27 / 96.01 x 83	3.78 x 3.62 / 96.01 x 92	3.78 x 3.62 / 96.01 x 92
Block material:	cast iron	cast iron	cast iron	aluminum with iron cylinder sleeves
Cylinder head material:	cast iron	cast aluminum	cast aluminum	cast aluminum
Valvetrain:	OHV, 2 valves per cylinder	OHV, 2 valves per cylinder	OHV, 2 valves per cylinder	OHV, 2 valves per cylinder
Ignition system:	direct composite distributor, platinum-tipped spark plugs, low-resistance spark plug wires	coil near plug, composite distributor, platinum-tipped spark plugs, low-resistance spark plug wires	coil near plug, composite distributor, platinum-tipped spark plugs, low-resistance spark plug wires	coil near plug, composite distributor, platinum-tipped spark plugs, low-resistance spark plug wires
Fuel delivery:	sequential fuel injection	sequential fuel injection	sequential fuel injection	sequential fuel injection
Compression ratio:	9.2:1	9.5:1	9.5:1	9.5:1
Horsepower (hp / kw @ rpm):	195 / 145 @ 4600	285 / 201 @ 5200	295 / 220 @ 5200	310 / 231 @ 5200
Torque (lb-ft / Nm @ rpm):	260 / 353 @ 2800	295 / 398 @ 4000	335 / 463 @ 4000	335 / 463 @ 4000
Recommended fuel:	87 octane	87 octane	87 octane	87 octane
Maximum engine speed (rpm):				
Manual:	5600	5600	5600	5600
Automatic:	5600	6000	6000	6000
Emissions controls:	3-way catalytic converter, exhaust gas recirculation, positive crankcase ventilation, evaporative collection system			

Engines (Continued)

	Vortec 5300 5.3L V-8 (L59) Flexible Fuel	Vortec 6000 6.0L V-8 (LQ4)	Vortec 6000 6.0L V-8 (LQ9) (Silverado SS)
Type:	5.3L V-8	6.0L V-8	6.0L V-8
Displacement (cu in / cc):	325 / 5328	364 / 5967	364 / 5967
Bore & stroke (in / mm):	3.78 x 3.62 / 96 x 92	4 x 3.62 / 101.6 x 92	4 x 3.62 / 101.6 x 92
Block material:	cast iron	cast iron	cast iron
Cylinder head material:	cast aluminum	cast aluminum	cast aluminum
Valvetrain:	OHV, 2 valves per cylinder	OHV, 2 valves per cylinder	OHV, 2 valves per cylinder
Ignition system:	coil near plug, composite distributor, platinum- tipped spark plugs, low- resistance spark plug wires	coil near plug, platinum- tipped spark plugs, low- resistance spark plug wires	coil near plug, platinum- tipped spark plugs, low- resistance spark plug wires
Fuel delivery:	sequential fuel injection	sequential fuel injection	sequential fuel injection
Compression ratio:	9.5:1	9.4:1	10:1
Horsepower (hp / kw @ rpm):	295 / 220 @ 5200	300 / 224 @ 4400	345 / 257 @ 5200
Torque (lb-ft / Nm @ rpm):	335 / 463 @ 4000	360 / 488 @ 4000	375 / 508 @ 4000
Recommended fuel:	87 octane or E85 (Ethanol)	87 octane	87 octane (premium recommended but not required)
Maximum engine speed (rpm):			
Manual:	5600	5600	5600
Automatic:	6000	5600	5600
Emissions controls:	3-way catalytic converter, exhaust gas recirculation, positive crankcase ventilation, evaporative collection system		

Estimated Fuel Economy

	C1500 Series (2WD)		K1500 Series (4WD)	
	C1500 Series - 4.3L (2WD)		K1500 Series - 4.3L (4WD)	
MPG (city / hwy / comb.)	automatic: manual:	16 / 20 / 18 17 / 23 / 20	automatic: manual:	16 / 20 / 18 15 / 18 / 16
MPIG (city / hwy / comb.)	automatic: manual:	19 / 27 / 22 18 / 27 / 21	automatic: manual:	16 / 22 / 19 18 / 25 / 21
L/100km (city / hwy / comb.)	automatic: manual:	14.7 / 10.3 / 12.8 15.7 / 10.3 / 13.3	automatic: manual:	17.3 / 12.6 / 15.2 15.9 / 11.1 / 13.7
	C1500 Series - 4.8L (2WD)		K1500 Series - 4.8L (4WD)	
MPG (city / hwy / comb.)	automatic: manual:	16 / 21 / 18 16 / 20 / 18	automatic: manual:	15 / 18 / 16 15 / 19 / 17
MPIG (city / hwy / comb.)	automatic: manual:	20 / 27 / 23 19 / 27 / 22	automatic: manual:	19 / 25 / 21 17 / 25 / 20
L/100km (city / hwy / comb.)	automatic: manual:	14.3 / 10.4 / 12.5 15.0 / 10.3 / 12.9	automatic: manual:	15.1 / 11.1 / 13.3 16.7 / 11.3 / 14.2
	C1500 Series - 5.3L (2WD)		K1500 Series - 5.3L (4WD)	
MPG (city / hwy / comb.)	automatic:	16 / 21 / 18	automatic:	15 / 18 / 16
MPIG (city / hwy / comb.)	automatic: flexible fuel: flex. fuel E85:	19 / 27 / 22 19 / 27 / 22 14 / 21 / 17	automatic: flexible fuel: flex. fuel E85:	18 / 24 / 20 17 / 23 / 19 13 / 18 / 15
L/100km (city / hwy / comb.)	automatic: flexible fuel: flex. fuel E85:	15.0 / 10.6 / 13.0 14.8 / 10.3 / 12.8 19.6 / 13.6 / 16.9	automatic: flexible fuel: flex. fuel E85:	15.8 / 11.6 / 13.9 16.5 / 12.1 / 14.5 21.1 / 15.4 / 18.5
	C1500 Series - 6.0L (2WD)		Silverado SS - 6.0L (4WD)	
MPG (city / hwy / comb.)			automatic:	12 / 16 / 14
MPIG (city / hwy / comb.)	automatic:	17 / 23 / 19	automatic:	14 / 19 / 16
L/100km (city / hwy / comb.)	automatic:	16.5 / 12.1 / 14.5	automatic:	19.9 / 14.8 / 17.6

Transmissions

	NV3500 (MG5)	NV4500 (MW3)	Hydra-Matic 4L60-E	Hydra-Matic 4L80-E
Type:	5-speed manual	5-speed manual	4-speed automatic	4-speed automatic
Gear ratios (:1):				
First:	4.02	5.61	3.06	2.48
Second:	2.32	3.04	1.63	1.48
Third:	1.40	1.67	1.00	1.00
Fourth:	1.00	1.00	0.70	0.75
Fifth:	0.73	0.75	—	—
Reverse:	3.55	5.04	2.29	2.08
Final drive ratio:	3.08	3.42	3.08	3.42
	3.42	3.73	3.42	3.73
	3.73	4.10	3.73	4.10
	4.10	—	4.10	—

Chassis/Suspension

Front:	1500 4WD, 2500: independent with computer-selected torsion bars, 28.6-mm stabilizer bar
	1500 2WD: computer-selected coil springs; gas-pressurized shocks; 31.8-mm stabilizer bar
Rear:	solid axle with semi-elliptic, variable-rate, two-stage multileaf springs; gas-pressurized shocks
Traction control:	2WD only
Steering type	
1500 4WD & 2500:	power recirculating ball
1500 2WD:	power rack-and-pinion
With QuadraSteer four-wheel steering:	front: hydraulic power, recirculating ball; rear: electrically powered (system also uses front steering-wheel position sensor, steerable solid hypoid rear axle, electric motor-drive actuator and control unit)
Steering ratio:	14.2:1
Steering wheel turns, lock-to-lock:	3
Turning circle, curb-to-curb (ft / m):	
Ext. Cab Short Box with QuadraSteer:	37.4 / 11.4
2WD Reg. Cab Short Box:	40.1 / 12.2
2WD Ext. Cab Short Box:	46.6 / 14.2
4WD Ext. Cab Short Box:	47.3 / 14.4
2WD 1500 Crew Cab Short Box	46.6 / 14.2
4WD 1500 Crew Cab Short Box	47.3 / 14.4
2WD 2500 Crew Cab Short Box	49.6 / 15.1
4WD 2500 Crew Cab Short Box	49.6 / 15.1

Brakes

Type:	(all) vacuum booster, power, 4-wheel disc, 4-wheel ABS, DRP
Rotor diameter x thickness (in / mm)	
1500 up to 6400 GVWR:	front: 12.01 x 1.14 / 305 x 29 rear: 12.8 x 0.78 / 325 x 20
1500 with QuadraSteer:	front: 12.01 x 1.14 / 305 x 29 rear: 13 x 1.18 / 330 x 30
1500 HD, 1500 HD with QuadraSteer, 2500:	front: 12.8 x 1.5 / 325 x 38 rear: 13.00 x 1.14 / 330 x 29
Total swept area (sq in / sq cm)	
1500 up to 6400 GVWR:	front: 213.6 / 1378 rear: 211.1 / 1362
1500 with QuadraSteer:	front: 213.6 / 1378 rear: 223.7 / 1443
1500HD, 1500HD with QuadraSteer, 2500:	front: 245.5 / 1584 rear: 236.5 / 1526

Wheels/Tires

Wheel size & type:	
Work Truck	6-lug 17-inch x 7.5-inch painted steel (std)
2WD Reg and Ext cab, 2WD/4WD Crew Cab:	6-lug 17-inch x 7.5-inch chrome-style steel (std w/YE9, opt w/o YE9, opt with Quadrasteer)
	6-lug 16-inch x 6.5-inch chrome-style steel (std w/ Quadrasteer)
	6-lug 16-inch x 7-inch cast alum (opt with Quadrasteer)
	6-lug 17-inch x 7-inch cast alum (opt on all)
	6-lug 20-inch x 8.5-inch chrome alum (std w/B4V)
1500HD:	6-lug 20-inch x 8.5-inch chrome alum (std w/Silverado SS)
	8-lug 16-inch x 6.5-inch chrome-style steel (std)
	8-lug 16-inch x 6.5-inch cast alum (opt)
Tires:	
2WD:	P245/70R17-108S all-season blackwall (std)
	P245/70R17-108S all-season white-outlined letter (opt)
	P275/55R20-111S touring blackwall (std w/B4V)
	P235/75R16-106S all-season blackwall (std w/PHT)
	P235/75R16-106S all-season white-outlined letter (opt w/PHT)
4WD (Reg/Ext. Cab):	P265/70R17-113S, all-season blackwall (std)
	P265/70R17-113S, all-season, white outlined-letter (opt)
	P265/70R17-113S, on-off road blackwall (opt)
	P265/70R17-113S, on-off road white outlined letter (opt)
	P245/55R20-111S, touring blackwall (std w/Silverado SS)
	P245/75R20-109S, all season blackwall (std w/PHT)
	P245/75R20-109S, all season white outlined letter (opt w/PHT)
4WD Crew Cab:	P265/70R17-113S all-season blackwall (std)
	P265/70R17-113S all-season white-outlined letter (opt)
1500HD 2WD/4WD:	LT245/75R16E-120S all season blackwall (opt)
	LT245/75R16E-120S on-off road blackwall (opt)
4WD Ext. Cab w/Quadrasteer:	P245/75R16-109S all-season blackwall (std)
	P245/75R16-109S all-season white outlined letter (opt)
	P265/75R16-109S all-terrain, blackwall (opt)
	P265/75R16-109S all-terrain, white outlined letter (opt)
	LT245/75R16C-108R on-off road blackwall (opt)
	LT245/75R16C-108R on-off road white outlined letter (opt)

Dimensions

See attached documentation for specific dimensions, specifications, capacities and trailering information for your model vehicle.

Specifications – Silverado HD

Overview

Models:	Chevy Silverado
	2500HD, 3500 Reg. Cab, Fleetside, Long Box-Standard and LS
	2500HD Ext. Cab, Fleetside, Short Box-Standard LS and LT
	2500HD, 3500 Ext. Cab, Fleetside, Long Box-Standard, LS and LT
	Crew Cab, Fleetside, Short Box-Standard, LS and LT
	Crew Cab, Fleetside, Long Box-Standard, LS and LT
	Chassis Cab
Body style / driveline:	2/3 passenger Regular Cab or 5/6 passenger Extended Cab,
	5-6-passenger Crew Cab
	3/4- and 1-ton, 2- and 4-wheel-drive heavy-duty pickup
Construction:	body on frame
EPA vehicle class:	full-size truck
Manufacturing location:	Fort Wayne, Indiana; Pontiac, Michigan; Flint, Michigan
Key competitors:	Ford Superduty Series Pickup, Dodge Ram Heavy Duty Pickup

Engines

	Vortec 6000 6.0L V-8 (LQ4)	Vortec 8100 8.1L V-8 (L18)	Duramax 6600 6.6L V-8 (LB7)
Type:	6.0L V-8	8.1L V-8	6.6L V-8
Displacement (cu in / cc):	364 / 5967	496 / 8128	403 / 6599
Bore & stroke (in / mm):	4 x 3.62 / 101.6 x 92	4.25 x 4.37 / 107.9 x 111	4.06 x 3.9 / 103 x 99
Block material:	cast iron	cast iron	cast iron
Cylinder head material:	cast aluminum	cast iron	cast aluminum
Valvetrain:	OHV	OHV	OHV
Ignition system:	coil-near-plug, platinum- tipped spark plugs, low-resistance spark plug wires	coil-near-plug, platinum-tipped spark plugs, low-resistance spark plug wires	compression, glow plug start aid; low- resistance spark plug wires
Fuel delivery:	sequential fuel injection	sequential fuel injection	direct injection diesel with high pressure common rail
Compression ratio:	9.4:1	9.1:1	17.5:1
Horsepower (hp / kw @ rpm):	300 / 224 @ 4400	330 / 246 @ 4200 (L18)	310 / 231 @ 3000 (auto trans)
		325 / 242 @ 4000 (MD L18 with LRW option)	
		295 / 220 @ 3600 (MD L18 with LRZ option)	300 / 224 @ 3000 (man trans)
		225 / 168 @ 3600 (MD L18 with LQR option)	
Torque (lb-ft / Nm @ rpm):	360 / 488 @ 4000	450 / 610 @ 3200 (L18)	605 / 820 @ 1600 (auto trans)
		450 / 610 @ 2800 (MD L18 with LRW option)	
		440 / 597 @ 3200 (MD L18 with LRZ option)	520 / 705 @ 1800 (man trans)
		350 / 475 @ 1200 (MD L18 with LQR option)	
Recommended fuel:	87 octane	87 octane	diesel
Maximum engine speed (rpm):	manual: 5600	manual: 5000	3250
	auto: 5600	auto: 4000	

	Vortec 6000 6.0L V-8 (LQ4)	Vortec 8100 8.1L V-8 (L18)	Duramax 6600 6.6L V-8 (LB7)
Emissions controls:	3-way catalytic converter, exhaust gas recirculation, positive crankcase ventilation, evaporative collection system	3-way catalytic converter, exhaust gas recirculation, positive crankcase ventilation, evaporative collection system	turbocharged, intercooled, catalytic converter system

Transmissions

	Hydra-Matic 4L80-E	NVG 3500 (MW3)	ZF S6-650 (ML6)	Allison 1000 (M74)
Type:	4-speed automatic	5-speed manual	6-speed manual	5-speed automatic
Gear ratios (:1):				
First:	2.48	5.61	5.79	3.10
Second:	1.48	3.04	3.31	1.81
Third:	1.00	1.67	2.10	1.41
Fourth:	0.75	1.00	1.31	1.00
Fifth:	—	0.75	1.00	0.71
Sixth:	—	—	0.76	—
Reverse:	2.08	5.61	5.23	4.49
Final drive ratio (with all transmissions):	Vortec 6000: 4.10 standard on all models			
	Vortec 8100: (opt) 3.73 or 4.10 on 2500HD; 4.10 std on 3500 Series			
	Duramax 6600: 3.73 ratio standard on all models			

Chassis/Suspension

Front :	(all models) std long- and short-arm independent front torsion bar suspension		
Rear	semi-elliptic 2-stage multileaf spring 3-stage multileaf spring		
2500HD Pickups:			
3500 Chassis Cabs:			
Steering type:	integral power recirculating ball		
Steering ratio:	24:1		
Steering wheel turns, lock-to-lock	3.14		
	Regular Cab	Extended Cab	Crew Cab
Turning circle, curb-to-curb (ft / m):			
2500HD Series single-wheel pickups:	2WD: 43.8 / 13.4	2WD: 46.8 / 14.3	2WD: 49.6 / 15.1
	4WD: 43.8 / 13.4	4WD: 50.8 / 15.5	4WD: 49.6 / 15.1
3500 Series dual-wheel pickups:	2WD: 43.7 / 13.3	2WD: 50.7 / 15.5	2WD: 53.5 / 16.3
	4WD: 43.7 / 13.3	4WD: 50.7 / 15.5	4WD: 53.5 / 16.3
3500 Series single-wheel pickups:	4WD: 43.8 / 13.4	4WD: 50.8 / 15.5	4WD: 49.6 / 15.1

Brakes

Type:	power, Hydroboost brake-apply system, 4-wheel disc, 4-wheel ABS
Rotor diameter x thickness (in / mm):	front: 12.8 x 1.5 / 325 x 38 rear: 12.8 x 1.2 / 325 x 30
Total swept area (sq in / sq cm):	front: 245.5 / 1584 rear: 235.1 / 1517

Wheels/Tires

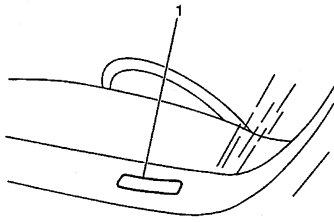
Wheel size and type:	8-bolt 16 x 6.5-inch steel wheels std; opt on 2500HD models: chrome center cap, chrome steel wheels with chrome center cap and polished forged aluminum wheels
	Chassis Cab wheels redesigned to display more surface area and provide increased corrosion resistance (compared to previous designs)
Tires:	2500HD models: LT245/75R16E radials, with either all-season or on-/off-road design, depending on model
	3500-Series: LT215/85R16-E highway or on-/off-road tires; tire size and inflation pressure geared to specific load ratings

Dimensions

See attached documentation for specific dimensions, specifications, capacities and trailering information for your model vehicle.

Vehicle Identification

Vehicle Identification Number (VIN)



The vehicle identification number (VIN) plate is the legal identifier of the vehicle. The VIN plate is located on the upper LH corner of the Instrument Panel and can be seen through the windshield from the outside of the vehicle:

Position	Definition	Character	Description
1	Country of Origin	1	United States
		2	Canada
2	Manufacturer	G	General Motors
3	Make	B	Chevrolet Incomplete
		C	Chevrolet Truck
4	GVWR/Brake System	E	6001-7000/Hydraulic
		F	7001-8000/Hydraulic
		G	8001-9000/Hydraulic
		H	9001-10000/Hydraulic
		J	10001-14000/Hydraulic
5	Truck Line/Chassis Type	C	4x2
		K	4x4
6	Series	1	Half Ton Nominal
		2	¾ Ton Nominal
		6	1/2 Ton Luxury
7	Body Type	3	Four-Door Crew Cab or Utility
		4	Two-Door Cab
		9	Extended Cab
8	Engine Type	X	6.0L V8 MFI (LQ9)
9	Check Digit	--	Check Digit
10	Model Year	5	2005
11	Plant Location	1	Oshawa, Ontario
		E	Pontiac, Michigan
		F	Flint, Michigan
		Z	Fort Wayne, Indiana
12-17	Plant Seq. Number	G	Silao, Mexico
		--	Plant Sequence Number

VIN Derivative

All engines and transmissions are stamped or laser etched with a partial vehicle identification number (VIN), which was derived from the complete VIN. A VIN derivative contains the following nine positions:

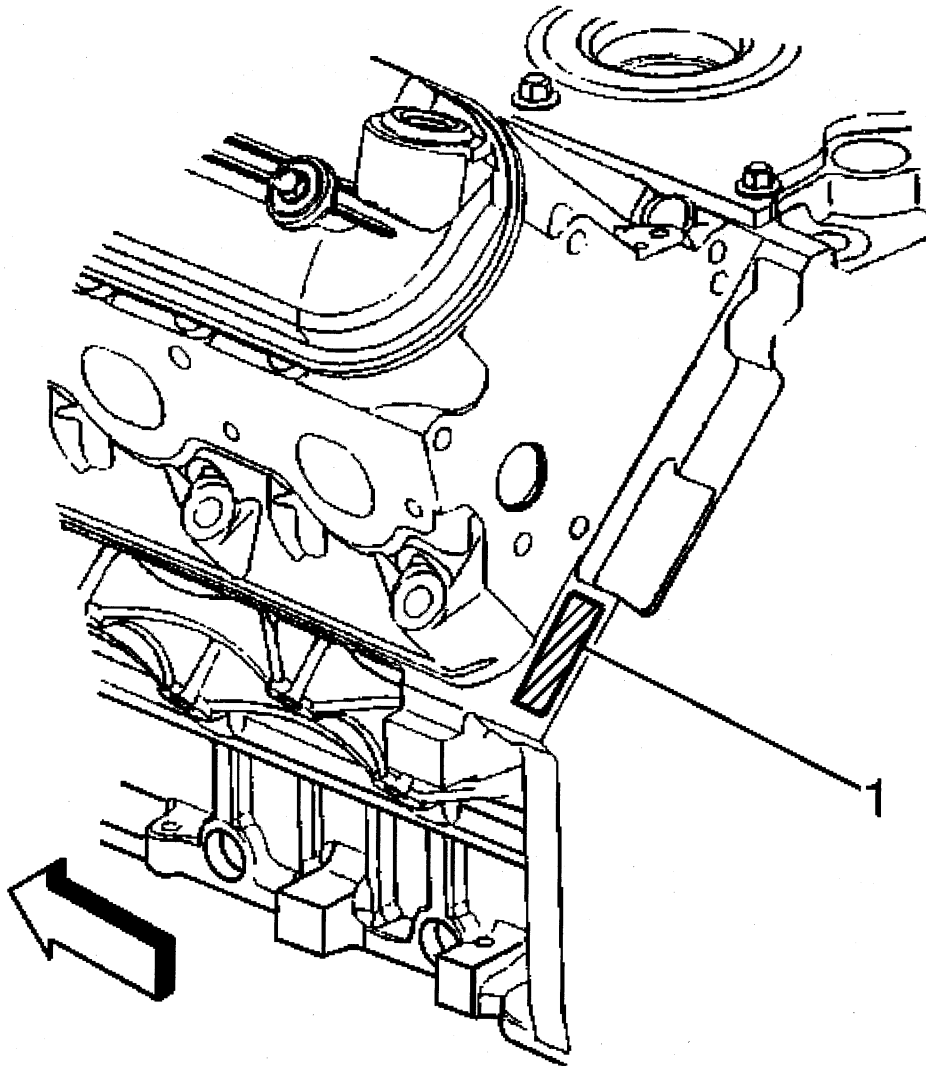
Position	Definition	Character	Description
1	Division	B C	Chevrolet Incomplete Chevrolet Truck
2	Model Year	5	2005
3	Plant Location	1 E Z J G F	Oshawa, Ontario Pontiac, Michigan Fort Wayne, Indiana Janesville Silao Flint
4-9	Plant Sequence Number	--	--

A VIN derivative can be used to determine if a vehicle contains the original engine or transmission, by matching the VIN derivative positions to their accompanying positions in the complete VIN:

VIN Derivative Position	Equivalent VIN Position
1	3
2	10
3	11
4-9	12-17

Engine ID and VIN Derivative Location

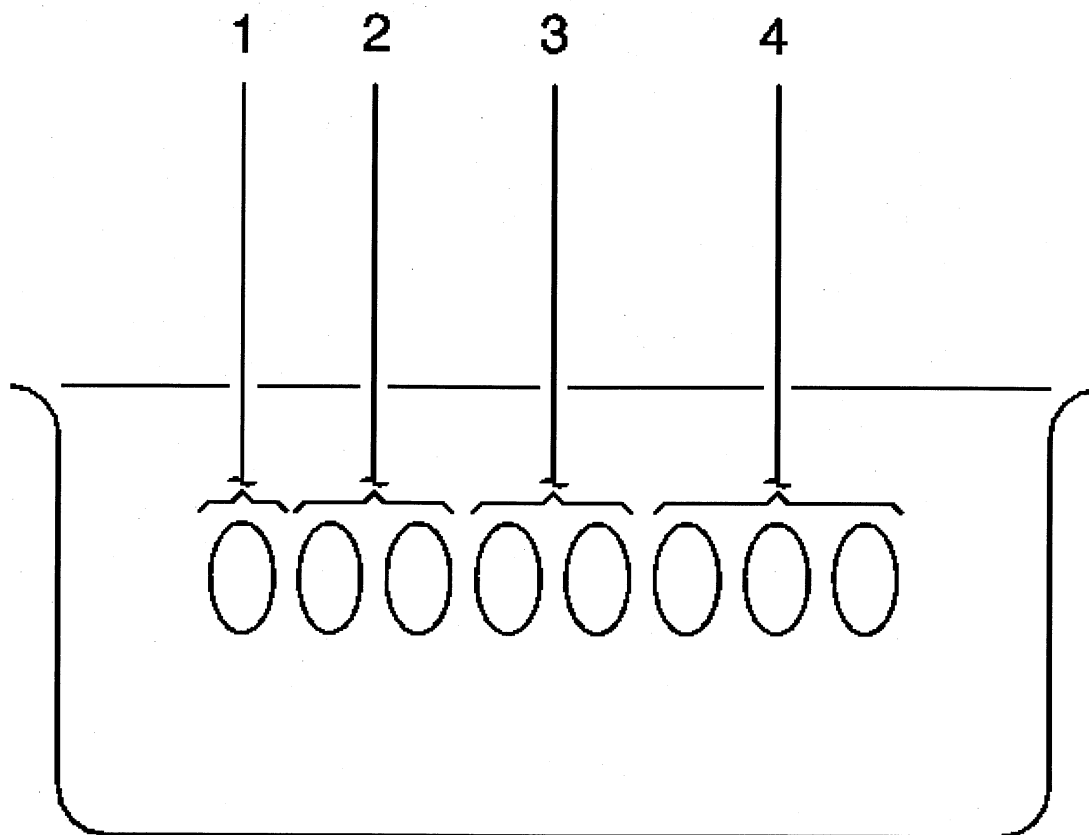
6.0L V-8 Engines



The vehicle identification number (VIN) is located on the left side rear of the engine block (1) and is typically a nine digit number stamped or laser-etched onto the engine at the vehicle assembly plant.

- The first digit identifies the division.
- The second digit identifies the model year.
- The third digit identifies the assembly plant.
- The fourth through ninth digits are the last six digits of the VIN.

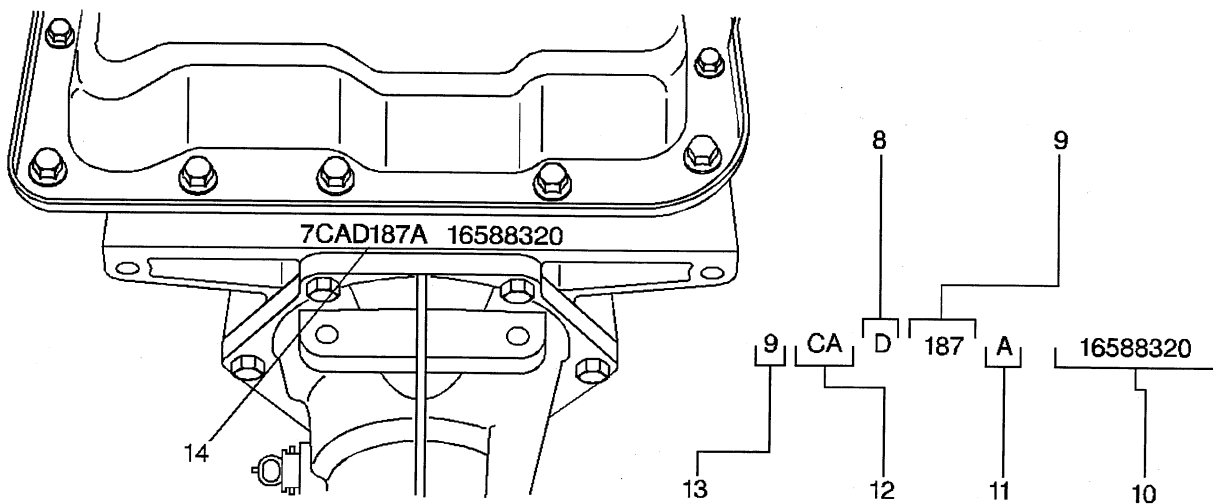
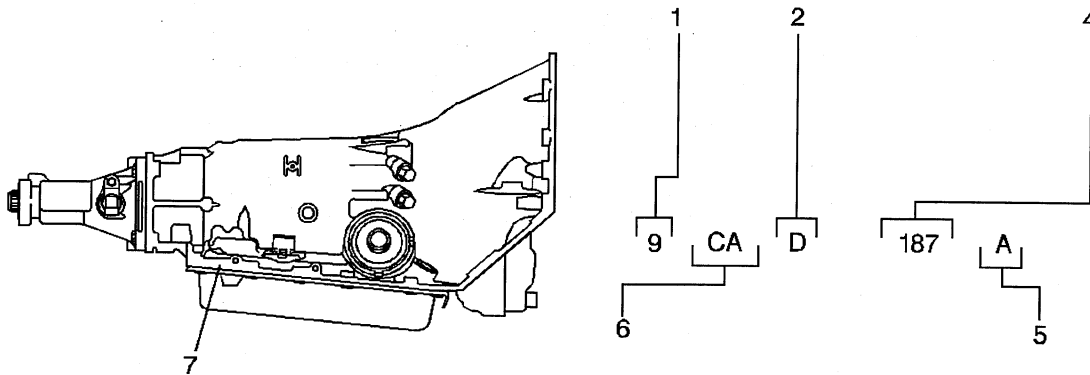
Engine ID Legend



1. Source Code
2. Month of Build
3. Date of Build
4. Broadcast Code

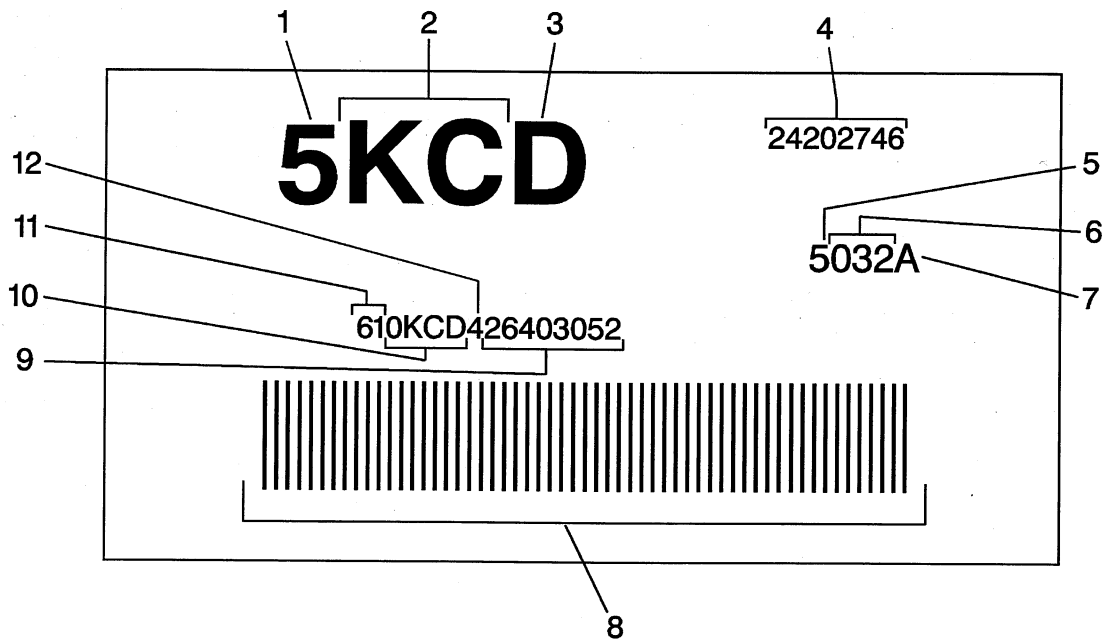
Transmission ID and VIN Derivative Location

4L60-E Transmission ID Location



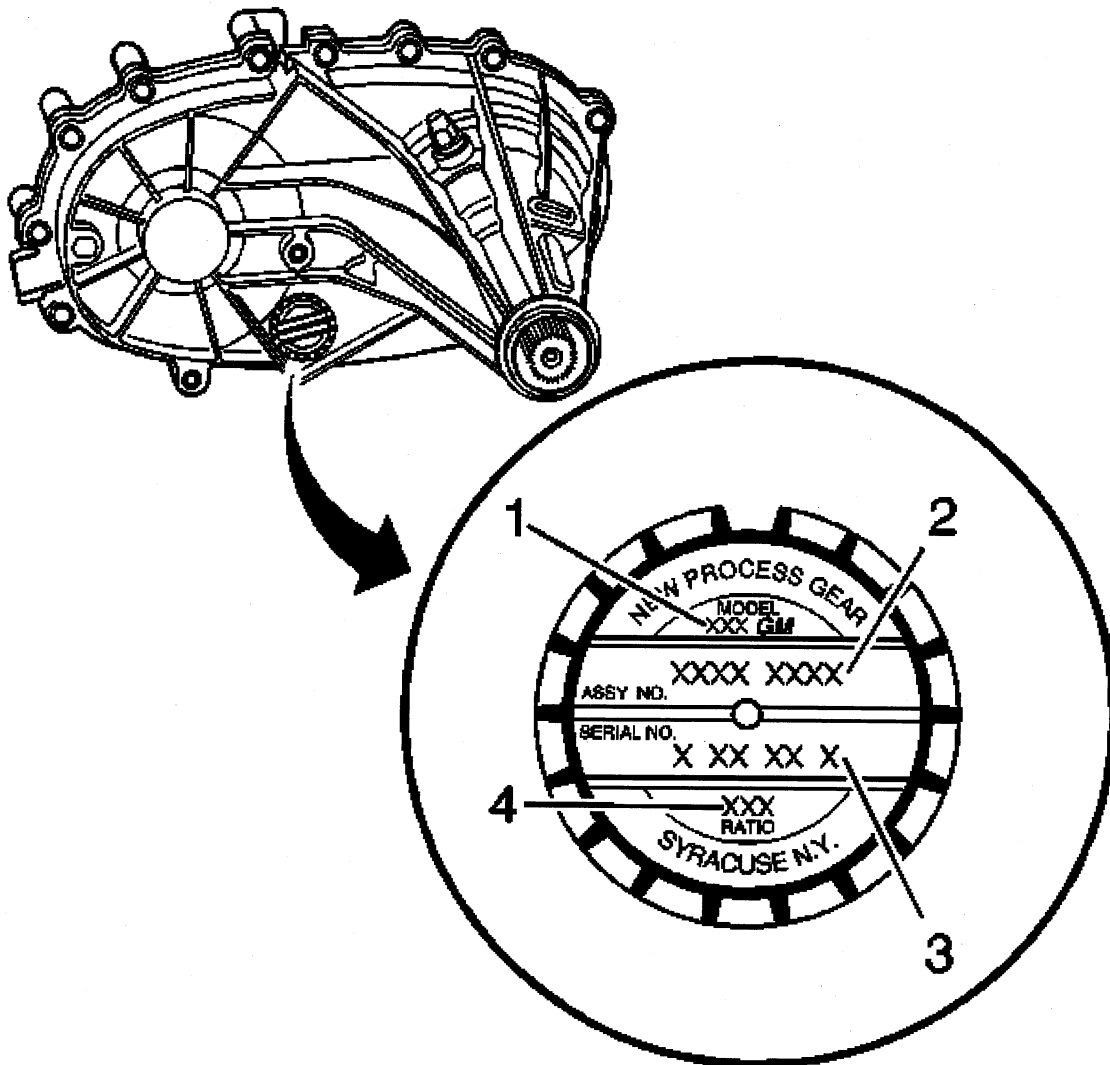
- (1) Model Year
- (2) Hydra-Matic 4L60-E
- (4) Julian Date (or Day of the Year)
- (5) Shift Built (A, B, J = First Shift; C, H, W = Second Shift)
- (6) Model
- (7) Transmission ID Location
- (8) Hydra-Matic 4L60-E
- (9) Julian Date (or Day of the Year)
- (10) Serial No.
- (11) Shift Built (A, B, J = First Shift; C, H, W = Second Shift)
- (12) Model
- (13) Model Year
- (14) Transmission ID Location

Bar Code Label Contents(c)



- (1) 5 = 2005
- (2) Model
- (3) Hydra-Matic 4L60-E
- (4) Transmission Asm. as Shipped Number
- (5) 5 = Model Year
- (6) Julian Date or Day of the Year
- (7) Letter After Julian Date Identifies the Plant Shift Build, See Shift Build
- (8) Bar Code
- (9) Serial Number
- (10) Broadcast Code
- (11) Transmission ID
- (12) Build Location Y = Toledo, OH, R = Romulus, MI, 4 = Ramos Arizpe, Mexico

Transfer Case Identification

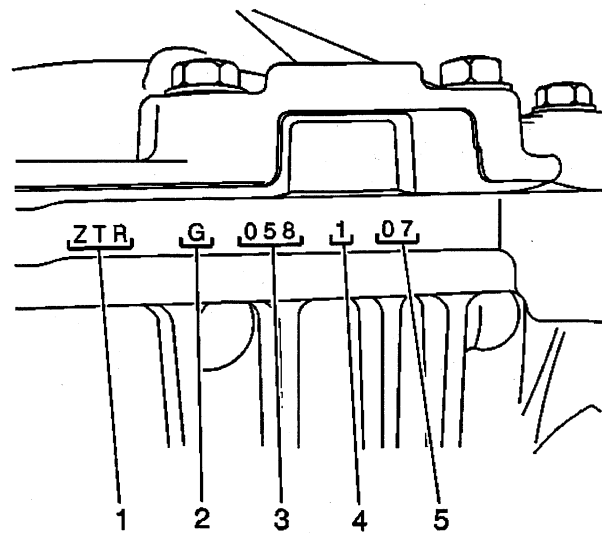


An identification tag is attached to the rear half of the transfer case. The tag provides the following information:

- 1 Model number (1)
 - A First Digit-1 =Single Speed, 2=Two-Speed
 - B Second Digit-2 = T Utility, 3 =T-Truck, L-Van, 4 or 6 = K Truck and Utility
 - C Third Digit-1 = Manual, 3 = Electric Shift, 6 = Automatic, 9 = All Wheel Drive
- 2 Assembly number (2)
- 3 Serial number (Date and Shift Code) (3)
- 4 Low range reduction ratio (4)

The information on this tag is necessary for servicing the transfer case. If the tag is removed or becomes dislodged during service operations, keep the identification tag with the unit.

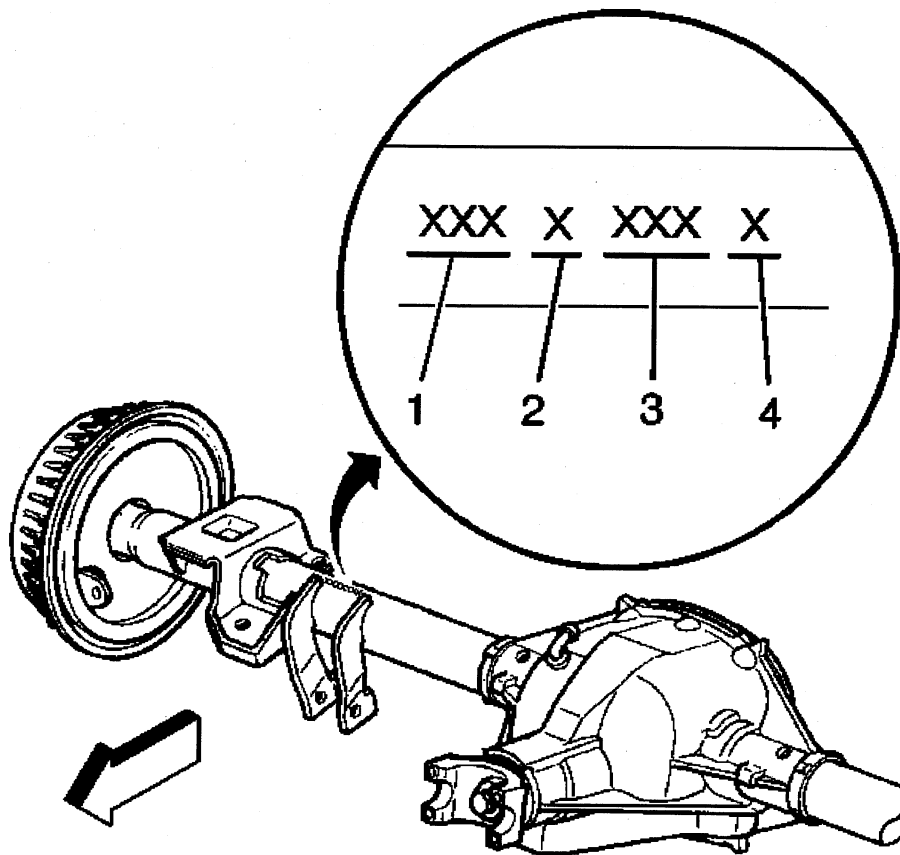
Axle Identification – Front



- (1) Broadcast Code
- (2) Supplier Code (G = American Axle)
- (3) Julian Date (Day of Year)
- (4) Shift Built (1 = First Shift; 2 = Second Shift) (Optional for 8.25" and 9.25" axles)
- (5) Hour Built

Front axle identification information is stamped on the top of the differential carrier assembly.

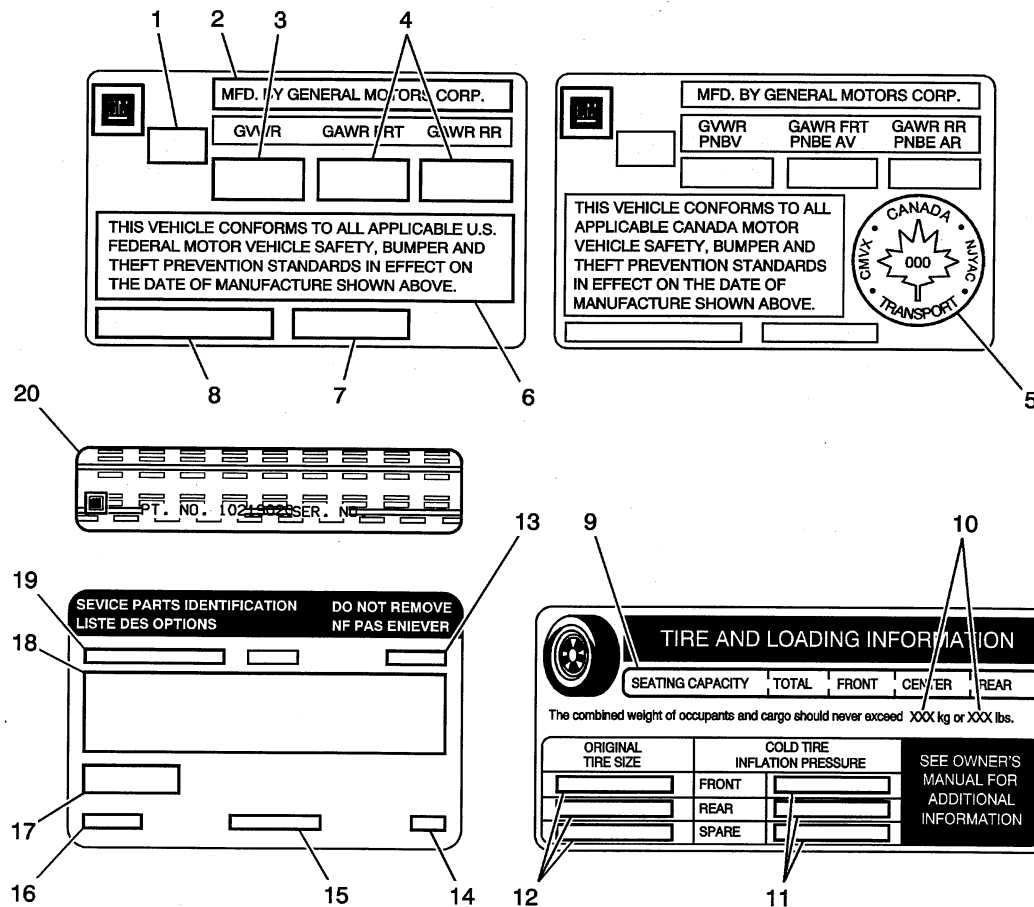
Axle Identification – Rear



- (1) Rear Axle Ratio
- (2) Build Source (C = Buffalo; K = Canada)
- (3) Julian Date
- (4) Shift Built (1 = First; 2 = Second)

All rear axles are identified by a broadcast code on the right axle tube near the carrier. The rear axle identification and manufacturer's codes must be known before attempting to adjust or to repair axle shafts or the rear axle case assembly. Rear axle ratio, differential type, manufacturer, and build date information is stamped on the right axle tube on the forward side.

Label - Vehicle Certification, Tire Place Card, Anti-Theft and Service Parts ID



Callout	Description
Vehicle Certification Label	
The vehicle certification label is located on the driver door and displays the following assessments:	
Gross Vehicle Weight Rating (GVWR)	
Gross Axle Weight Rating (GAWR), front and rear	
The gross vehicle weight (GVW) is the weight of the vehicle and everything it carries. The GVW must not exceed the GVWR. Include the following items when figuring the GVW:	
The base vehicle weight (factory weight)	
The weight of all vehicle accessories	
The weight of the driver and the passengers	
The weight of the cargo	
1	Name of Manufacturer
2	Gross Vehicle Weight Rating
3	Gross Axle Weight Rating (Front, Rear)
4	Canadian Safety Mark (w/RPO Z49)
5	Certification Statement
6	Vehicle Class Type (Pass Car, etc.)
7	Vehicle Identification Number
8	Date of Manufacture (Mo/Yr)

Callout	Description
Tire Placard	
The tire placard label is located on the driver door and displays the following assessments:	
9	Specified Occupant Seating Positions
10	Maximum Vehicle Capacity Weight
11	Original Equipment Tires Size
12	Tire Pressure, Front, Rear, and Spare (Cold)
Service Parts ID Label	
The vehicle service parts identification label is located in the glove compartment. The label is used to help identify the vehicle original parts and options.	
13	Vehicle Identification Number
14	Engineering Model Number (Vehicle Division, Line and Body Style)
15	Interior Trim Level and Decor
16	Exterior (Paint Color) WA Number
17	Paint Technology
18	Special Order Paint Colors and Numbers
19	Vehicle Option Content
Anti-Theft Label	
20	<p>The Federal law requires that General Motors label certain body parts on this vehicle with the VIN. The purpose of the law is to reduce the number of motor vehicle thefts by helping in the tracing and recovery of parts from stolen vehicles.</p> <p>Labels are permanently affixed to an interior surface of the part. The label on the replacement part contains the letter R, the manufacturer's logo, and the DOT symbol.</p> <p>The anti-theft label must be covered before any painting, and rustproofing procedures, and uncovered after the procedures. Failure to follow the precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard and possible suspicion to the owner that the part was stolen.</p>

RPO Code List

The production/process codes provide the description of the Regular Production Options (RPOs) used on the vehicle. The RPO list is printed on the Service Parts Identification Label. The following is a list of the RPO abbreviations and the description of each:

See the attached documentation for the appropriate RPO code list for your model vehicle.

Technical Information

Maintenance and Lubrication

Capacities - Approximate Fluid

Application	Capacities	
	English	Metric
Axle Capacities		
• Front Drive Axle (8.25")	1.51 quarts	1.43 liters
• Front Drive Axle (9.25")	1.83 quarts	1.73 liters
• Rear Drive Axle (8.6")	2.15 quarts	2.03 liters
• Rear Drive Axle (9.5")	2.75 quarts	2.6 liters
• Rear Drive Axle (9.75")	3.00 quarts	2.84 liters
• Rear Drive Axle (10.5")	2.75 quarts	2.6 liters
• Rear Drive Axle (11.5")	3.17 quarts	3.0 liters
Cooling System		
• VORTEC 5300 V8 Automatic with Front A/C**	16.8 quarts	15.9 liters
• VORTEC 6000 V8 Automatic*	16.2 quarts	15.3 liters
• VORTEC 6000 V8 Automatic**	16.7 quarts	15.8 liters
* Engine Fan Driven cooling system		
** Electric Cooling Fan system		
Engine Oil with Filter		
• 6000 V8	6.0 quarts	5.7 liters
Fuel Tank		
• Short Bed and 2500 LD	26.0 gallons	98.0 liters
Transfer Case		
• New Venture Gear 149 (NP3)	2.22 quarts	2.1 liters
Transmission		
• 4L60-E 4 Spd. HMD Auto Pan Removal	5.0 quarts	4.7 liters
• 4L60-E 4 Spd. HMD Auto (M30) After Complete Overhaul	11.2 quarts	10.6 liters

Maintenance Items – Gasoline Engine

Part	GM Part Number	ACDelco Part Number
Engine Air Cleaner/Filter		
High Capacity	25313349	A1518C
Standard	25313348*	A1519C*
Oil Filter		
6000 V8	88984215	PF46
Spark Plugs		
6000 V8	12571164	41-985
Wiper Blades (ITTA Type) 22 inches (56.0 cm)	15153642	--
* A1518C high-capacity air cleaner filter may be substituted.		

Fluid and Lubricant Recommendations – Gasoline Engine

Usage	Fluid/Lubricant
Engine Oil	Engine oil which meets GM Standard GM6094M and displays the American Petroleum Institute Certified for Gasoline Engines starburst symbol. GM Goodwrench® oil meets all the requirements for your vehicle.
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL® coolant.
Hydraulic Brake System	Delco® Supreme 11 Brake Fluid or equivalent DOT-3 brake fluid.
Windshield Washer	GM Optikleen Washer Solvent.
Hydraulic Clutch System (5-Speed Trans.)	Hydraulic Clutch Fluid (GM Part No. U.S. 12345347, in Canada 10953517) or equivalent DOT-3 brake fluid.
Hydraulic Clutch System (6-Speed Trans.)	Hydraulic Clutch Fluid. Use only GM Part No. U.S. 88958860, in Canada 88901244, Super DOT-4 brake fluid.
Power Steering System	GM Power Steering Fluid (GM Part No. U.S. 89021184, in Canada 89021186).
Manual Transmission (5-Speed with Low Gear, RPO MW3)	GM Goodwrench® Synthetic Manual Transmission Fluid (GM Part No. U.S. 12346190, in Canada 10953477) or equivalent SAE 75W-85 GL-4 gear oil.
Manual Transmission (5-Speed without Low Gear, RPO MG5)	Synchromesh Transmission Fluid (GM Part No. U.S. 12345349, in Canada 10953465).
Manual Transmission (6-Speed)	Synthetic Transmission Fluid approved to Allison Transmission® specification TES-295 (GM Part No. U.S. 12378515, in Canada 88900701).
Automatic Transmission	DEXRON®-III Automatic Transmission Fluid. Look for "Approved for the H-Specification" on the label.
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Floor Shift Linkage	Lubriplate Lubricant Aerosol (GM Part No. U.S. 12346293, in Canada 992723) or lubricant meeting requirements of NLGI #2 Category LB or GC-LB.
Chassis Lubrication	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Front Axle (Four-Wheel Drive)	SAE 80W-90 Axle Lubricant (GM Part No. U.S. 1052271, in Canada 10950849).
Front Axle (All-Wheel Drive)	SAE 75W-90 Synthetic Axle Lubricant (GM Part No. U.S. 12378261, in Canada 10953455) meeting GM Specification 9986115.
Front Axle	SAE 80W-90 Axle Lubricant (GM Part No. U.S. 1052271, in Canada 10950849).
Rear Axle	SAE 75W-90 Synthetic Axle Lubricant (GM Part No. U.S. 12378261, in Canada 10953455) meeting GM Specification 9986115.
Rear Axle (Steerable)	Synthetic Axle Lubricant; use only GM Part No. U.S. 12378557, in Canada 88901362. <i>Do not add friction modifier.</i>
Manual Transfer Case	DEXRON®-III Automatic Transmission Fluid. Look for "Approved for the H-Specification" on the label.
Automatic Transfer Case (Four-Wheel Drive)	AUTO-TRAK II Fluid (GM Part No. U.S. 12378508, in Canada 10953626).
Transfer Case (All-Wheel Drive)	DEXRON®-III Automatic Transmission Fluid. Look for "Approved for the H-Specification" on the label.
Front Axle Propshaft Spline or One-Piece Propshaft Spline (Two-Wheel Drive with Auto. Trans.)	Spline Lubricant, Special Lubricant (GM Part No. U.S. 12345879, in Canada 10953511) or lubricant meeting requirements of GM 9985830.

Usage	Fluid/Lubricant
Rear Driveline Center Spline	Chassis Lubricant (GM Part No. U.S. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Hood Hinges	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Body Door Hinge Pins, Tailgate Hinge and Linkage, Folding Seats, and Fuel Door Hinge	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Tailgate Handle Pivot Points, Hinges, Latch Bolt, and Linkage	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Weatherstrip Conditioning	Dielectric Silicone Grease (GM Part No. U.S. 12345579, in Canada 992887).
Weatherstrip Squeaks	Synthetic Grease with Teflon, Superlube (GM Part No. U.S. 12371287, in Canada 10953437).

GM Oil Life System - Resetting

The engine oil life monitor will indicate when to change the engine oil - usually between 5 000 km (3,000 miles) and 16 000 km (10,000 miles) since the last oil change. Under severe conditions, the CHANGE OIL SOON light may be displayed before 5 000 km (3,000 miles). The vehicle must not be driven more than 16 000 km (10,000 miles) or 12 months without an oil change.

Reset the oil life monitor when the oil has been changed, use the following procedure.

1. Turn the ignition key to the RUN position.
2. Fully push and release the accelerator pedal 3 times within 5 seconds.
3. If the Change Oil Soon light flashes, the system is resetting.
4. Start the vehicle.
5. The oil life will change to 100%.
6. If the Change Oil Soon light comes back on, the system has not reset. Repeat the procedure.

Descriptions and Operations

Power Steering System

Without Electro-Hydraulic Steering

The hydraulic power steering pump is a constant displacement vane-type pump that provides hydraulic pressure and flow for the power steering gear. The hydraulic power steering pumps are either belt-driven or direct-drive, cam-driven.

The power steering fluid reservoir holds the power steering fluid and may be integral with the power steering pump or remotely located. The following locations are typical locations for the remote reservoir:

- Mounted to the front of the dash panel
- Mounted to the inner fender
- Mounted to a bracket on the engine

The 2 basic types of power steering gears are listed below:

- A recirculating ball system
- A rack and pinion system

In the recirculating ball system, a worm gear converts steering wheel movement to movement of a sector shaft. A pitman arm attached to the bottom of the sector shaft actually moves one tie rod and an intermediate rod move the other tie rod.

In the rack and pinion system, the rack and the pinion are the 2 components that convert steering wheel rotation to lateral movement. The steering shaft is attached to the pinion in the steering gear. The pinion rotates with the steering wheel. Gear teeth on the pinion mesh with the gear teeth on the rack. The rotating pinion moves the rack from side to side. The lateral action of the rack pushes and pulls the tie rods in order to change the direction of the vehicle's front wheels.

The power steering pressure hose connects the power steering pump union fitting to the power steering gear and allows pressurized power steering fluid to flow from the pump to the gear.

The power steering return hose returns fluid from the power steering gear back to the power steering fluid reservoir. The power steering return line may contain an integral fin-type or line-type power steering fluid cooler.

In a typical power steering system, a pump generates hydraulic pressure, causing fluid to flow, via the pressure hose, to the steering gear valve assembly. The steering gear valve assembly regulates the incoming fluid to the right and left chambers in order to assist in right and left turns.

Turning the steering wheel activates the valve assembly, which applies greater fluid pressure and flow to 1 side of the steering gear piston, and lower pressure and flow to the other side of the piston. The pressure assists the movement of the gear piston. Tie rods transfer this force to the front wheels, which turn the vehicle right or left.

With Electro-Hydraulic Steering

The electro-hydraulic power steering (EHPS) module controls the power steering motor which has the function of providing hydraulic power to the brake booster and the steering gear. A secondary function includes the ability to improve fuel economy by operating on a demand basis and the ability to provide speed-dependent variable-effort steering.

The EHPS module controls the EHPS powerpack, an integrated assembly consisting of the following components:

- The electric motor
- The hydraulic pump
- The fluid reservoir
- The reservoir cap
- The reservoir baffles, if required
- The fluid level sensor, if required
- The electronic controller
- The electrical connectors

EHPS Module

The electro-hydraulic power steering (EHPS) module shall interface with the vehicle electrical subsystem to provide connections for the +36-volt (nominal) power supply, for signal inputs necessary to control the EHPS module output and for serial communications. If the 125 A EHPS fuse or the +36-volt circuit supplying the EHPS module is open, the EHPS system will not operate and only communication codes will be set by modules which communicate with the EHPS module. The powertrain control module (PCM) shall act as the gateway to translate controller area network (CAN) messages into class 2 messages when required for diagnostic purposes.

The EHPS module shall receive the following messages from the CAN bus:

- Vehicle speed (direct signal in km/h)
- Service disconnect status
- PRNDL (shift lever) position
- Torque converter clutch (TCC)/Cruise Dump signal (gives zero-adjust brake switch position)

The EHPS module shall output the following messages to the CAN bus:

- Brake pedal rate, position, in-range rationality, and out-of-range diagnosis
- EHPS system status
- Diagnostic messages to driver information center (DIC) via hybrid control module (HCM)
- Diagnostic information requested by service technicians via Tech 2 link (class 2 via PCM)
- Steering wheel sensor diagnostic message (in-range, out-of-range failure)

The EHPS module receives several hardwire signals. Digital steering wheel speed signals from the steering wheel sensor mounted on the steering column and an analog brake pedal position signal from the brake-pedal mounted brake pedal position (BPP) sensor.

The steering wheel speed sensor outputs 3 digital signals characterizing the steering wheel position. The digital output consists of 3 open collector output data lines referred to as phase A, phase B, and Index. The normal operating range of the digital signals is plus or minus 720 degrees of steering wheel rotation. Phase A and phase B are 90 degrees out of phase to provide quadrature pulsed data corresponding to steering shaft rotational displacement and direction. The signal is resolved to within 1 mechanical degree of resolution. The index output references a steering wheel mechanical position of 0° plus or minus 10 degrees (steering wheel centered) and is repeated every 360 degrees of steering wheel rotation.

The BPP sensor outputs an analog signal, referenced to 5 volts, which may increase or decrease monotonically with brake pedal depression. The sensor analog output shall have a specified electrical output over a mechanical range of 32 degrees (rotation of the brake pedal pivot). Out-of-range values will

be provided outside of the 32 degrees range. The electrical range of the BPP sensor motion is -55 degrees to +25 degrees. The mechanical range of the BPP sensor is -70 degrees to +40 degrees.

The EHPS module also receives ignition key position signals. These signals are the ignition signal and the accessory signal. The EHPS module receives an ignition input (ignition 1) on the 24-way signal connector. Ignition signal logic is defined as follows:

- When the ignition switch is in the RUN or CRANK positions, then Ignition 1 = high, greater than 6 volts for more than 50 milliseconds.
- When the ignition switch is in the LOCK/OFF or ACCY positions, then Ignition 1 = low, less than 3 volts for more than 0.5 milliseconds.

The EHPS module receives an input from the ignition 0 circuit indicating when the key is in the ACCY position. This input has 2 functions, to provide an independent wake-up signal in the event of loss of the ignition input, and to activate the EHPS module when the key remains in the ACCY position. The ACCY signal logic is defined as follows:

- When the ignition switch is in the ACC or RUN positions, then Ignition 0 = high, greater than 6 volts for more than 50 milliseconds.
- When the ignition switch is in the LOCK/OFF or CRANK positions, the Ignition 0 = low, less than 3 volts for more than 5 milliseconds.

The EHPS module will function normally when the voltage at the EHPS connector is in the range of 34-50 volts. If the supply voltage at the EHPS connector drops below 18 volts for more than 10 ms, the EHPS module shall go into the Standby mode (power stage turned OFF). Once the supply voltage rises above 22 volts again, the power stage shall be turned back ON without a key cycle being required. If the supply voltage drops below 12 volts, the EHPS module drivers shall shut down and a key cycle will be required to reset. The EHPS module shall withstand voltage up to a transient voltage of 58 volts for 400 milliseconds. If the supply voltage exceeds 55 volts, the EHPS module drivers shall shut down and a key cycle will be required to reset.

EHPS system performance may be reduced with power steering fluid temperature change. The temperature range at which full performance is achieved is approximately -20 to +105°C (-4 to +220°F). The EHPS system performance will be affected as follows:

- At approximately less than -40°C (-40°F), the system will be disabled.
- At approximately -40 to -29°C (-40 to -20°F), the hydraulic output power reduction less than 50 percent.
- At approximately -29 to -20°C (-20 to -4°F), the hydraulic output power reduction less than 20 percent.
- At approximately -20 to +105°C (-4 to +221°F), the hydraulic output power is at full performance.
- At approximately 105-135°C (220-275°F), the hydraulic output power reduction less than 20 percent.
- At approximately greater than 135°C (275°F), the system will be disabled.

EHPS system performance may also be reduced with voltage change. The voltage range at which full performance is achieved is approximately 34-50 volts. The EHPS system performance will be affected as follows:

- At approximately less than 18 volts, the EHPS system will be disabled.
- At approximately 18-33 volts, the EHPS system performance is reduced.
- At approximately 34-50 volts, the EHPS module will be at full performance.
- At approximately greater than 55 volts, the EHPS module will be disabled.

Whenever a replacement EHPS powerpack is installed, reprogramming is necessary. If the EHPS powerpack is not programmed, DTC C0564 will be set.

Steering Linkage (Non-Rack and Pinion)

The steering linkage consists of the following components:

- A pitman arm
- An idler arm
- A relay rod
- 2 adjustable tie rods

When you turn the steering wheel, the steering gear rotates the pitman arm which forces the relay rod to one side. The tie rods connect to the relay rod with the ball studs. The tie rods transfer the steering force to the wheels. Use the tie rods in toe adjustments. The tie rods are adjustable. The pitman arm support the relay rod. The idler arm pivots on a support attached to the frame rail and the ball stud attaches to the relay rod.

The 2 tie rod are threaded into the tube and secured with jam nuts. Right and left hand threads are used in order to permit the adjustment of toe.

Steering Wheel and Column

The steering wheel and column has 4 primary functions:

- Vehicle steering
- Vehicle security
- Driver convenience
- Driver safety

Vehicle Steering

The steering wheel is the first link between the driver and the vehicle. The steering wheel is fastened to a steering shaft within the column. At the lower end of the column, the intermediate shaft connects the column to the steering gear.

Vehicle Security

Theft deterrent components are mounted and designed into the steering column. The following components allow the column to be locked in order to minimize theft:

- The ignition switch
- The steering column lock
- The ignition cylinder

Driver Convenience

The steering wheel and column may also have driver controls attached for convenience and comfort. The following controls may be mounted on or near the steering wheel or column.

- The turn signal switch
- The hazard switch
- The headlamp dimmer switch
- The wiper/washer switch
- The horn pad/cruise control switch
- The redundant radio/entertainment system controls
- The tilt or tilt/telescoping functions
- Navigation/OnStar Features
- The HVAC controls

Driver Safety

The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance of injury to the driver. The mounting capsules break away from the mounting bracket in the event of an accident.

Rear Wheel Steering Description and Operation

Quadrasteer™ is a 4-wheel steering system that dramatically enhances low speed maneuverability, high speed stability, and towing capability. The system is an electrically powered rear wheel steering system comprised of the following components:

- A steerable, solid hypoid rear axle.
- A steering wheel position sensor located at the base of the steering column.
- A rear wheel position sensor located below the rear wheel steering motor on the rear steering gear.
- An electric motor driven actuator.
- A rear wheel steering control module.
- A combined yaw rate sensor/ lateral accelerometer sensor.
- Three hall effect switches in the motor assembly.
- A mode select switch on the dash.
- A heavy duty wiring harness and fuse .
- A Service 4 Wheel Steer indicator in the IPC.
- A shorting relay in the rear wheel steering gear motor .
- A power relay in the rear wheel steering control module.

Rear Wheel Steering Control Module

The rear wheel steering control module controls all functions of the rear wheel steering system . The module has a dedicated power feed line from the under hood fuse holder. The fuse is a 125 amp mega fuse . The wiring is routed to the rear of the vehicle. The rear wheel steering control module is located above the rear mounted spare tire. The rear wheel steering control module uses the inputs listed above to determine when and how far to turn the rear wheels. The rear wheel steering control module also uses the hall switches in the steering gear motor , shorting relay , and motor control relay to monitor and control the direction and speed the motor operates. The rear wheel control module also controls the duty cycle of the phase leads to the motor . The motor control relay is part of the rear wheel steering control module and is not serviceable . The rear wheel steering control module uses both a class 2 and a discrete vehicle speed sensor signal . The system will not function without a discrete vehicle speed sensor signal . The rear wheel steering control module uses the 2 vehicle speed sensor signals for comparison purposes. The rear wheel steering control module uses inputs from the steering wheel position sensor to determine steering wheel position and rate of change. The rear wheel position sensor signals provide the rear wheel steering control module with rear wheel position data. The rear wheel steering control module will send out a class 2 message to the IPC to turn on and off the amber Service 4-Wheel Steering System Indicator. The rear wheel steering control module controls the indicators in the mode switch on the dash.

The control module allows the vehicle's rear wheels to turn a maximum of 12 degrees left or right. When the vehicle is operated in reverse, the maximum rear wheel steering angle is 5 degrees left or right. When the vehicle is sitting still in the test mode the system will move a maximum of 5 degrees left or right.

Important

The rear wheel steering control module may shut down if the system is operated under very extreme conditions and becomes overheated. The Service 4-Wheel Steer indicator will not be illuminated. Once the temperature decreases back to operating range, the rear wheel steering system will resume normal operation upon the next ignition cycle.

Rear Wheel Steering Mode Switch

The mode switch located on the instrument panel allows the driver the option of selecting 2-wheel steering, 4-wheel steering, or 4-wheel steering tow operation. The mode switch also has indicators that show which mode the rear wheel steering system is in. When all indicators are lit the rear wheel steering control module has lost its memory settings and the scan tool must be used to re-calibrate the rear wheel steering control module. When the indicators are flashing the rear wheel steering control module is waiting for the steering wheel to pass the center position before changing to the selected mode. The indicators on the mode switch are led's, the switch is also back lit.

The system operates in 3 principal modes, as follows:

2-Wheel Steer Mode

Normal steering operation; rear wheel steering is disabled while in this mode.

4-Wheel Steer Mode

The 4-wheel steering mode provides the 3 principal phases of steering: negative phase, neutral phase, and positive phase. In the negative phase the rear wheels turn opposite of the front wheels. In the neutral phase the rear wheels are centered and do not turn in or out. In the positive phase the rear wheels turn the same direction as the front wheels.

4-Wheel Steer Tow Mode

The 4-wheel steer tow mode provides more positive phase steering than the normal 4-wheel steering at high speed. At low speed driving, the 4-wheel steer tow mode provides similar negative phase steering as it does in the normal 4-wheel steering mode.

NOTE: There is also a cross-over speed. This is the speed that the control module transitions from a negative phase to a positive phase status. In 4-Wheel Steer mode, this transition occurs when the vehicle obtains a speed of 65 km/h (40 mph).

The cross over speed in the 4-Wheel Steer tow mode occurs at 40 km/h (25 mph).

Rear Wheel Steering Gear Motor

The rear steering gear motor is a 3 phase, 6 pole brushless, DC motor. The rear wheel steering gear motor is located on the top of the rear steering gear. The motor transmits its power through a planetary gear set inside the rear steering gear. There are 3 hall switches inside the motor, hall A, hall B, and hall C. They are not serviceable. There is a motor phase shorting relay located inside the motor assembly, it is not serviceable. The motor leads are not to be spliced or damaged in any way. If there is damage to the wiring the motor must be replaced. If there is any damage to the wiring it is possible for water to get inside the rear steering gear. The rear wheel steering control module uses the hall switch inputs to monitor motor position, speed, and direction.

Steering Wheel Position Sensor

The steering wheel position sensor inputs to the rear wheel steering control module consists of 3 digital input circuits. The steering wheel position sensor supply voltage is between 4.9-5.1 volts. Phase A and phase B circuits are digital pulse signals whose output represents one degree of steering wheel rotation. When observing the phase A and phase B data parameters on the scan tool, the parameters will not have the same value at the same time. When the steering wheel is rotated, the phase A and phase B data parameters will be shown as high or low on the scan tool. The marker pulse is a digital pulse that is displayed as high on the scan tool for 20 ° only when the steering wheel angle is between -10 and +10 °. The steering wheel position sensor analog signal voltage is at or near 2.5 volts with the wheels at center. Voltage increases/decreases for less than 1 full turn (+/- 225°) then plateaus for remainder of wheel travel.

Rear Wheel Steering Position Sensor

The rear wheel position sensor has 2 signal circuits: position 1 and position 2. Position 1 is a linear measurement of voltage per degree. The voltage range for position 1 is from 0.25 to 4.75 volts, and the

angular measurement range is from - 620° to + 620°. At 0.25 volts the steering wheel has been rotated - 600° past center. At 4.75 volts the steering wheel has been rotated + 600° past center. Position 2 circuit is a linear measurement of voltage per degree. The voltage for position 2 increases or decreases from 0.25 to 4.75 volts every 180°. When the steering wheel is 0° or at center, position 1 and position 2 output signals measure 2.5 volts respectively.

Combined Yaw Rate Sensor / Lateral Accelerometer Sensor

The combined yaw rate sensor / lateral accelerometer sensor is located under the passenger front seat . Yaw rate is a rotational force on a horizontal plane. Lateral acceleration is a measure of forward motion on a horizontal plane . The inputs to the rear wheel steering controller are bias compensated. This compensates for variations in manufacturing, temperature, and mounting. With the vehicle at rest the sensor should have a voltage output on both circuits of approximately 2.5 volts .

Steerable Rear Axle

The steerable rear axle has a rack and pinion mounted to the differential cover, and half shafts with upper and lower ball joints on movable hub and bearings assemblies . The rack is part of the differential cover. If a system malfunction occurs the rear wheels are moved back to center via an internal spring. The rack has redundant inner and outer tie rods ends . There are inner tie rod boots on the rack to prevent water and dirt from getting inside. Long term exposure to moisture due to a damaged boot or components can result in an internal malfunction. The rear wheel steering gear has the rear wheel steering gear motor attached to the upper rack . There are shields and a skid plate type shield on the rear axle assembly to protect the steering gear. There are no internal adjustments to the rack . It is mandatory to preform a 4 wheel alignment if any hard parts , such as tie rods or ball joints or wheel bearings are serviced . The axle assembly is a heavier duty version of the standard rear axle on a non rear wheel steer truck . You must consult the owners manual and the trailer towing guide for specific towing capacities . The carrier contains 9.74 inch ring and pinon gear set. The quarter shafts are a special heavy duty design with up to 15° of movement and a special designed CV joint and boot at the wheel end of the axle.

Suspension Description and Operation

Front Suspension

Coil Spring

The front suspension has 2 primary purposes:

- Isolate the driver from irregularities in the road surface.
- Define the ride and handling characteristics of the vehicle.

The front suspension absorbs the impact of the tires travelling over irregular road surfaces and dissipates this energy throughout the suspension system. This process isolates the vehicle occupants from the road surface. The rate at which the suspension dissipates the energy and the amount of energy that is absorbed is how the suspension defines the vehicle's ride characteristics. Ride characteristics are designed into the suspension system and are not adjustable. The ride characteristics are mentioned in this description in order to aid in the understanding of the functions of the suspension system. The suspension system must allow for the vertical movement of the tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road.

This requires that the steering knuckle be suspended between an upper and a lower control arm. The lower control arm attaches from the steering Knuckle at the outermost point of the control arm. The attachment is through a ball and socket type joint. The innermost end of the control arm attached at 2 points to the vehicle frame, through semi-rigid bushings. The upper control arm attaches to the frame in the same fashion. Between the lower control arm and a spring seat on the vehicle's frame, under tension, is a coil spring.

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. The vertical movement of the steering knuckle as the vehicle travels over irregular road surfaces will tend to compress the spring and spring tension will lead the spring to return to the original, at-rest state. This action isolates the vehicle from the road surface. The upper and

lower control arms are allowed to pivot at the vehicle frame in a vertical fashion. The ball joint allows the steering knuckle to maintain the perpendicular relationship to the road surface.

A shock absorber is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A shock absorber is a basic hydraulic cylinder. The shock is filled with oil and has a moveable shaft that connects to a piston inside the shock absorber. Valves inside the shock absorber offer resistance to oil flow and consequently inhibit rapid movement of the piston and shaft. Each end of the shock absorber is connected in such a fashion to utilize this recoil action of a spring alone.

Front suspensions systems utilize a stabilizer shaft. The stabilizer bar connects between the left and right lower control arm assemblies through the stabilizer link and stabilizer shaft insulators. This bar controls the amount of independent movement of the suspension when the vehicle turns. Limiting the independent movement defines the vehicle's handling characteristics on turns.

Torsion Bar

The front suspension has 2 primary purposes:

- Isolate the driver from irregularities in the road surface.
- Define the ride and handling characteristics of the vehicle.

The front suspension absorbs the impact of the tires travelling over irregular road surfaces and dissipates this energy throughout the suspension system. This process isolates the vehicle occupants from the road surface. The rate at which the suspension dissipates the energy and the amount of energy that is absorbed is how the suspension defines the vehicle's ride characteristics. Ride characteristics are designed into the suspension system and are not adjustable. The ride characteristics are mentioned in this description in order to aid in the understanding of the functions of the suspension system. The suspension system must allow for the vertical movement of the tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road.

This requires that the steering knuckle be suspended between an upper and a lower control arm. The lower control arm attaches from the steering knuckle at the outermost point of the control arm. The attachment is through a ball and socket type joint. The innermost end of the control arm is attached at 2 points to the vehicle frame through semi-rigid bushings. The upper control arm attaches to the frame in the same fashion. Attached to the lower control arm is a torsion bar. Torsion bars are steel or steel composite shaft that connects from the lower control arm an adjustable mount at the torsion bar crossmember. The torsion bar functions as a spring in this suspension system. The torsion bar absorbs energy from irregular road surfaces by twisting force along the center axis. The torsion bar has a resistance to this twisting motion and will return to the original, at-rest position similar to that of a spring.

A shock absorber is used in conjunction with this system in order to dampen out the oscillations of the torsion bar. A shock absorber is a basic hydraulic cylinder. The shock is filled with oil and has a moveable shaft that connects to a piston inside the shock absorber. Valves inside the shock absorber offer resistance to oil flow and consequently offer resistance to rapid movement of the piston and shaft. Each end of the shock absorber is connected in such a fashion in order to utilize this recoil action of a torsion bar alone.

Front suspension systems utilize a stabilizer shaft. The stabilizer bar connects between the left and right lower control arm assemblies through the stabilizer link and stabilizer shaft insulators. This bar controls the amount of independent movement of the suspension when the vehicle turns. Limiting the independent movement defines the vehicle's handling characteristics on turns.

Rear Suspension

These vehicles use a leaf spring and a solid rear axle suspension system.

The rear axle assembly is attached to multi-leaf springs with U-bolts. The front ends of the springs are attached to the frame at the front hangers with rubber bushings. The rear ends of the springs are attached to the frame with shackles that use rubber bushings. Shackles allow the springs to change position while the vehicle is in motion.

Two direct double-acting shock absorbers provide ride control. The shock absorbers are angle-mounted between the frame. The shock absorbers are attached with brackets. The brackets are attached to the anchor plate.

The rear spring steel stabilizing shaft helps minimize body roll and sway during cornering. The rear stabilizer shaft is connected to the rear axle and the frame with the following components:

- The rubber insulators
- The clamps
- The link assemblies

Selectable Ride Description and Operation

The selectable ride (SR) suspension system allows the driver to choose between 2 distinct damping levels, firm and normal.

The SR dampers are gas charged units which provide damping by forcing hydraulic fluid through internal orifices within each shock in order to resist suspension movement. Each shock contains an internal solenoid actuator that the SR switch controls. This solenoid actuator controls the size of the orifice that the hydraulic fluid is forced through, thus altering the ride characteristics of the vehicle.

Wheels and Tires

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Spare Tire Hoist Retaining Bolt	40 N·m	30 lb ft
Wheel Nuts	190 N·m	140 lb ft

General Description

The factory installed tires are designed to operate satisfactorily with loads up to and including the full rated load capacity when these tires are inflated to the recommended pressures.

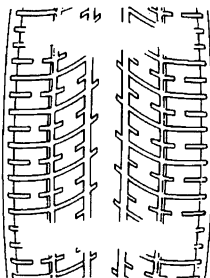
The following factors have an important influence on tire life:

- Correct tire pressures
- Correct wheel alignment
- Proper driving techniques
- Tire rotation

The following factors increase tire wear:

- Heavy cornering
- Excessively rapid acceleration
- Heavy braking

Tread Wear Indicators Description



The original equipment tires have tread wear indicators that show when you should replace the tires.

The location of these indicators are at 72 degree intervals around the outer diameter of the tire. The indicators appear as a 6 mm (0.25 in) wide band when the tire tread depth becomes 1.6 mm (2/32 in).

Metric Wheel Nuts and Bolts Description

Metric wheel/nuts and bolts are identified in the following way:

- The wheel/nut has the word Metric stamped on the face.
- The letter M is stamped on the end of the wheel bolt.

The thread sizes of metric wheel/nuts and the bolts are indicated by the following example: M12 x 1.5.

- M = Metric
- 12 = Diameter in millimeters
- 1.5 = Millimeters gap per thread

Tire Inflation Description

When you inflate the tires to the recommended inflation pressures, the factory-installed wheels and tires are designed in order to handle loads to the tire's rated load capacity. Incorrect tire pressures, or under-inflated tires, can cause the following conditions:

- Vehicle handling concerns
- Poor fuel economy
- Shortened tire life
- Tire overloading

Inspect the tire pressure when the following conditions apply:

- The vehicle has been sitting at least 3 hours.
- The vehicle has not been driven for more than 1.6 km (1 mi).
- The tires are cool.

Inspect the tires monthly or before any extended trip. Adjust the tire pressure to the specifications on the tire label. Install the valve caps or the extensions on the valves. The caps or the extensions keep out dust and water.

The kilopascal (kPa) is the metric term for pressure. The tire pressure may be printed in both kilopascal (kPa) and psi. One psi equals 6.9 kPa.

Inflation Pressure Conversion (Kilopascals to PSI)

kPa	psi	kPa	psi
140	20	215	31
145	21	220	32
155	22	230	33
160	23	235	34
165	24	240	35
170	25	250	36
180	26	275	40
185	27	310	45
190	28	345	50
200	29	380	55
205	30	415	60
Conversion: 6.9 kPa = 1 psi			

Tires with a higher than recommended pressure can cause the following conditions:

- A hard ride
- Tire bruising
- Rapid tread wear at the center of the tire

Tires with a lower than recommended pressure can cause the following conditions:

- A tire squeal on turns
- Hard steering

- Rapid wear and uneven wear on the edge of the tread
- Tire rim bruises and tire rim rupture
- Tire cord breakage
- High tire temperatures
- Reduced vehicle handling
- High fuel consumption
- Soft riding

Unequal pressure on the same axle can cause the following conditions:

- Uneven braking
- Steering lead
- Reduced vehicle handling

Tire Description

Caution

Do not mix different types of tires on the same vehicle such as radial, bias, and bias-belted tires except in emergencies because vehicle handling may be seriously affected and may result in loss of control and possible serious injury.

This vehicle is equipped with speed rated tires. Listed below are the common speed rating symbols and the corresponding maximum speeds:

Speed Symbol	Maximum Speed (km/h)	Maximum Speed (mp/h)
S	180	112
T	190	118
U	200	124
H	210	130
V	240	149
Z	Over 240	Over 149

A Tire Performance Criteria (TPC) specification number is molded in the sidewall near the tire size of all original equipment tires. Usually, a specific TPC number is assigned to each tire size. The TPC specification number assures that the tire meets the following GM's performance standards.

- Meets the standards for traction.
- Meets the standards for endurance.
- Meets the standards for dimension.
- Meets the standards for noise.
- Meets the standards for handling.
- Meets the standards for rolling resistance, and others.

The following is required of replacement tires:

- Replacement tires must be of the same size as the original tires.
- Replacement tires must be of the same speed rating as the original tires.
- Replacement tires must be of the same load index as the original tires.
- Replacement tires must be of the same construction as the original tires.
- Replacement tires must have the same TPC specification number as the original tires.

The following may seriously be affected by the use of any other tire size, tire speed rating or tire type:

- May seriously affect the ride.
- May seriously affect the handling.
- May seriously affect the speedometer/odometer calibration.
- May seriously affect the antilock brake system.
- May seriously affect the vehicle ground clearance.

- May seriously affect the trailering capacity.
- May seriously affect the tire clearance to the body.
- May seriously affect the tire clearance to the chassis.

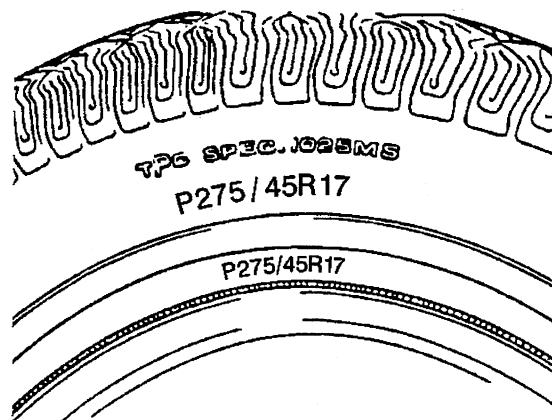
Conditions for Tire Replacement

Replace the tires when one and/or all of the following conditions are evident:

- When the tire(s) is worn to a point where 1.6 mm (2/32 in) or less of tread remains. The tires have built in tread wear indicators that appear between the tread grooves when the tread is worn to 1.6 mm (2/32 in) or less to help in the detection of this condition. Replace the tire when the indicators appear in two or more adjacent grooves at three spots around the tire.
- When the following conditions are evident on the tread:
 - When the tread is cracked.
 - When the tread is cut.
 - When the tread is snagged deeply enough to expose the cord.
 - When the tread is snagged deeply enough to expose the fabric.
 - When the sidewall is snagged deeply enough to expose the cord.
 - When the sidewall is snagged deeply enough to expose the fabric.
- When the following conditions are evident on the tire:
 - When the tire has a bump.
 - When the tire has a bulge (protrusion).
 - When the tire is split.
 - Please note that slight sidewall indentations are normal in radial tires.
- When the following damage is evident on the tire and the damage cannot be correctly repaired because of the size or the location of the damage:
 - When the tire has a puncture.
 - When the tire is cut, or other damage.

Always install new tires in pairs on the same axle. In the event that only one tire is replaced, then pair with the tire having the most tread.

All Seasons Tires Description

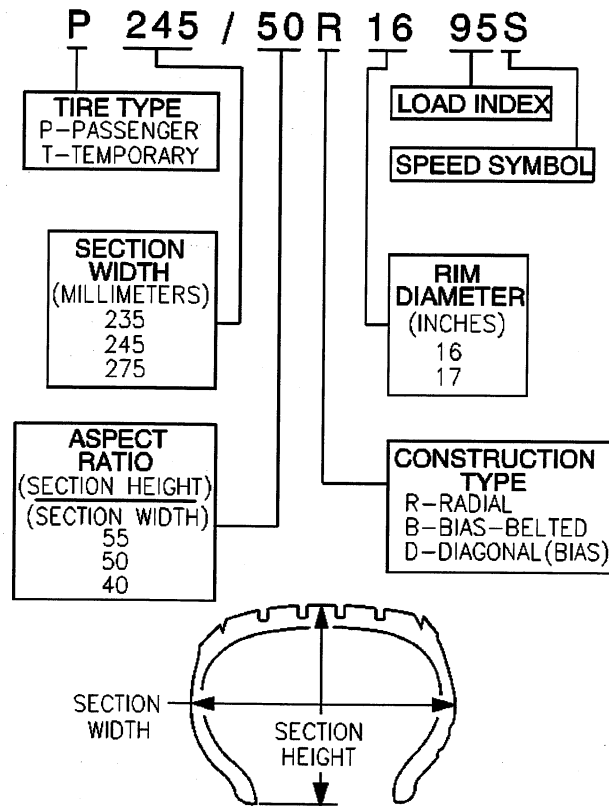


Most GM vehicles are equipped with steel belted all-season radial tires as standard equipment. These tires qualify as snow tires, with a higher than average rating for snow traction than the non-all season radial tires previously used. Other performance areas, such as wet traction, rolling resistance, tread life, and air retention, are also improved. This is done by improvements in both tread design and tread

compounds. These tires are identified by an M + S molded in the tire side wall after the tire size. The suffix MS is also molded in the tire side wall after the TPC specification number.

The optional handling tires used on some vehicles now also have the MS marking after the tire size and the TPC specification number.

P-Metric Sized Tires Description



Most P-metric tire sizes do not have exact corresponding alphanumeric tire sizes. Replacement tires should be of the same tire performance criteria (TPC) specification number including the same size, the same load range, and the same construction as those originally installed on the vehicle. Consult a tire dealer if you must replace the P-metric tire with other sizes. Tire companies can best recommend the closest match of alphanumeric to P-metric sizes within their own tire lines.

Driveline System Description and Operation

Driveline/Axle – Propeller Shaft

The Propeller Shaft is a tube with universal joints at both ends which do not require periodic maintenance, that transmit power from the transmission output shaft to the differential.

Front Propeller Shaft Description

The front propeller shaft transmits rotating force from the transfer case to the front differential when the transfer case is engaged. The front propeller shaft connects to the transfer case using a splined slip joint.

One Piece Propeller Shaft Description

A 1 piece propeller shaft uses a splined slip joint to connect the driveline to the transmission or transfer case.

Two Piece Propeller Shaft Description

There are three universal joints used on the two piece propeller shaft. A center bearing assembly is used to support the propeller shaft connection point, and help isolate the vehicle from vibration.

Propeller Shaft Phasing Description

The driveline components in this vehicle have been system balanced at the factory. System balance provides for a smoother running driveline. These components include the propeller shafts, drive axles, pinion shafts and output shafts. Affixed to the rear axle is a system balanced driveline notice indicating that the driveline components have been factory tested. The propeller shaft is designed and built with the yoke lugs/ears in line with each other. This produces the smoothest running shaft possible. A propeller shaft designed with built in yoke lugs in line is known as in -- phase. An out of phase propeller shaft often causes vibration. The propeller shaft generates vibration from speeding up and slowing down each time the universal joint goes around. The vibration is the same as a person snapping a rope and watching the wave reaction flow to the end. An in phase propeller shaft is similar to 2 persons snapping a rope at the same time and watching the waves meet and cancel each other out. A total cancellation of vibration produces a smooth flow of power in the drive line. All splined shaft slip yokes are keyed in order to ensure proper phasing.

Universal Joint Description

The universal joint is connected to the propeller shaft. The universal consist of 4 caps with needle bearings and grease seals mounted on the trunnions of a cross or spider. These bearings and caps are greased at the factory and no periodic maintenance is required. There are 2 universal joints used in a one piece propeller shaft and 3 used in two piece propeller shaft. The bearings and caps are pressed into the yokes and held in place with snap rings, except for 2 bearings on some models witch are strapped onto the pinion flange of the differential. Universal joints are designed to handle the effects of various loads and rear axle windup conditions during acceleration and braking. The universal joint operates efficiently and safely within the designed angle variations. when the design angles are exceeded, the operational life of the joint decreases.

Center Bearing Description

Center bearings support the driveline when using 2 or more propeller shafts. The center bearing is a ball bearing mounted in a rubber cushion that attaches to a frame crossmember. The manufacturer prelubricates and seals the bearing. The cushion allows vertical motion at the driveline and helps isolate the vehicle from vibration.

Wheel Drive Shafts Description and Operation

Front Wheel Drive Shafts are flexible assemblies which consist of the following components:

- Front wheel drive shaft constant velocity joint outer joint.
- Front wheel drive shaft tri-pot joint inner joint.
- The front wheel drive shaft connects the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint.
- Wheel Drive Shaft Seal Cover 15 Series
- The front wheel drive shaft tri-pot joint is completely flexible, and moves with an in and out motion.
- The front wheel drive shaft constant velocity joint is flexible but can not move in and out.

The Wheel Drive Shaft is a balanced shaft that transmits rotational force from the front differential to the front wheels when the transfer case is engaged. The wheel drive shaft is mounted to the front differential by bolting the flange of the wheel drive shaft to the flange on the inner output shaft of the front differential. The other end of the wheel drive shaft is splined to fit into and drive the hub assembly when the transfer case is engaged. The tri-pot joint and constant velocity joint on the wheel drive shaft allows the shaft to be flexible to move with the suspension travel of the vehicle.

Front Drive Axle Description and Operation

Selectable Four Wheel Drive (S4WD) Front Axle Description and Operation

The Selectable Four Wheel Drive (S4WD) Front Axle consist of the following components:

- Differential Carrier Housing
- Differential Assembly
- Output Shafts (Left and Right Side)
- Inner Axle Shaft Housing
- Inner Axle Shaft (Right Side)
- Clutch Fork
- Clutch Fork Sleeve
- Electric Motor Actuator

The front axle on Selectable Four Wheel Drive model vehicles uses a central disconnect feature in order to engage and disengage the front axle. When the driver engages the 4WD system, the Transfer Case Control Module sends a signal to the electric motor actuator to energize and extend the plunger inside. The extended plunger moves the clutch fork and clutch fork sleeve across the inner axle shaft and the clutch fork shaft and locks the two shafts together. The locking of the two shafts allows the axle to operate in the same manner as a semi-floating rear axle. A propeller shaft connects the transfer case to the front axle. The differential carrier assembly uses a conventional ring and pinion gear set to transmit the driving force of the engine to the wheels. The open differential allows the wheels to turn at different rates of speed while the axle continues to transmit the driving force. This prevents tire scuffing when going around corners and premature wear on internal axle parts. The ring and pinion set and the differential are contained within the carrier. The axle identification number is located on top of the differential carrier assembly or on a label on the bottom of the right half of differential carrier assembly. The drive axles are completely flexible assemblies consisting of inner and outer constant velocity CV joints protected by thermoplastic boots and connected by a wheel drive shaft.

Full-Time Four Wheel Drive (F4WD) Front Axle Description and Operation

The Full-Time Four Wheel Drive (F4WD) Front Axle consist of the following components:

- Differential Carrier Housing
- Differential Assembly
- Output Shaft (Left Side)
- Inner Axle Shaft Housing
- Inner Axle Shaft (Right Side)

The front axle on Full-Time Four Wheel Drive model vehicles does not have a central disconnect feature in order to engage and disengage the front axle. The left and right axle shafts are connected directly to the differential case assembly. This allows the axle shafts and the propeller shaft to spin continuously. The transfer case controls the amount of torque applied to the front axle. The remaining components are the same as the selectable four wheel drive axle.

Rear Drive Axle Description and Operation

Rear Axles for this vehicle consist of the following components:

- Differential Axle Housing
- Differential Carrier
- Right and left Axle tubes
- Right and left axle shafts

These axles are either Full-Floating or Semi-Floating. These axles can be identified as follows: The Semi-Floating Axle has axle shafts with C-Clips inside the differential carrier on the inner ends of the axle shafts. The Full-Floating Axle has bolts at the hub retaining the axle shafts to the hub assembly. The axles can be identified by the stamping on the right side axle tube. They may also be identified by the ring gear size. The ring gear sizes include 8.60, 9.50, 9.75, 10.50 and 11.50 inch axles. The limited slip/locking differential information for these rear axles can be located in the limited slip/locking differential section.

A open differential has a set of four gears. Two are side gears and two are pinion gears. Some differentials have more than two pinion gears. Each side gear is splined to an axle shaft so each axle shaft ; so each axle shaft turns when it's side gear rotates. The pinion gears are mounted on a differential pinion shaft, and the gears are free to rotate on this shaft. The pinion shaft is fitted into a bore in the differential case and is at right angles to the axle shafts. Power is transmitted through the differential as follows: the drive pinion rotates the ring gear. The ring gear being bolted to the differential case, rotates the case, The differential pinion, as it rotates the case, forces the pinion gears against the side gears. When both wheels have equal traction, the pinion gears do not rotate on the pinion shaft because of input force on the pinion gear is equally divided between the two side gears. Therefore, the pinion gears revolve with the pinion shaft, but do not rotate around the shaft itself. The side gears, being splined to the axle shafts and in mesh with the pinion gears rotate the axle shafts. If a vehicle were always driven in a straight line, the ring and pinion gears would be sufficient. The axle shaft could be solidly attached to the ring gear and both driving wheels would turn at equal speed. However, if it became necessary to turn a corner, the tires would scuff and slide because the differential allows the axle shafts to rotate at different speeds. When the vehicle turns a corner, the inner wheel turns slower than the out wheel and slows it's rear axle side gear (as the shaft is splined to the side gear). the rear axle pinion gears will roll around the slowed rear axle side gear, driving the rear axle side gear wheel faster.

Locking/Limited Slip Rear Axle Description and Operation

The locking differential consists of the following components:

- Differential case - 1 or 2 piece
- Locking differential spider - 2 piece case only
- Pinion gear shaft - 1 piece case only
- Differential pinion gear shaft lock bolt - 1 piece case only
- 2 clutch discs sets
- Locking differential side gear
- Thrust block
- Locking differential clutch disc guides
- Differential side gear shim
- Locking differential clutch disc thrust washer
- Locking differential governor
- Latching bracket
- Cam plate assembly

- Differential pinion gears
- Differential pinion gear thrust washers

The optional locking differential (RPO G80) enhances the traction capability of the rear axle by combining the characteristics of a limited-slip differential and the ability of the axle shafts to "lock" together when uneven traction surfaces exist. The differential accomplishes this in 2 ways. First by having a series of clutch plates at each side of the differential case to limit the amount of slippage between each wheel. Second, by using a mechanical locking mechanism to stop the rotation of the right differential side gear, or the left differential side gear on the 10.5 inch axle, in order to transfer the rotating torque of the wheel without traction to the wheel with traction. Each of these functions occur under different conditions.

Limited-Slip Function

Under normal conditions, when the differential is not locked, a small amount of limited-slip action occurs. The gear separating force developed in the right-hand (left-hand side on 10.5 inch axle) clutch pack is primarily responsible for this.

The operation of how the limited-slip function of the unit works can be explained when the vehicle makes a right-hand turn. Since the left wheel travels farther than the right wheel, it must rotate faster than the ring gear and differential case assembly. This results in the left axle and left side gear rotating faster than the differential case. The faster rotation of the left-side gear causes the pinion gears to rotate on the pinion shaft. This causes the right-side gear to rotate slower than the differential case.

Although the side gear spreading force produced by the pinion gears compresses the clutch packs, primarily the right side, the friction between the tires and the road surface is sufficient to overcome the friction of the clutch packs. This prevents the side gears from being held to the differential case.

Locking Function

Locking action occurs through the use of some special parts:

- A governor mechanism with 2 flyweights
- A latching bracket
- The left side cam plate and cam side gear

When the wheel-to-wheel speed difference is 100 RPM or more, the flyweights of the governor will fling out and one of them will contact an edge of the latching bracket. This happens because the left cam side gear and cam plate are rotating at a speed different, either slower or faster, than that of the ring gear and differential case assembly. The cam plate has teeth on its outer diameter surface in mesh with teeth on the shaft of the governor.

As the side gear rotates at a speed different than that of the differential case, the shaft of the governor rotates with enough speed to force the flyweights outward against spring tension. One of the flyweights catches its edge on the closest edge of the latching bracket, which is stationary in the differential case. This latching process triggers a chain of events.

When the governor latches, it stops rotating. A small friction clutch inside the governor allows rotation, with resistance, of the governor shaft while one flyweight is held to the differential case through the latching bracket. The purpose of the governor's latching action is to slow the rotation of the cam plate as compared to the cam side gear. This will cause the cam plate to move out of its detent position.

The cam plate normally is held in its detent position by a small wave spring and detent humps resting in matching notches of the cam side gear. At this point, the ramps of the cam plate ride up on the ramps of the cam side gear, and the cam plate compresses the left clutch pack with a self-energizing action.

As the left clutch pack is compressed, it pushes the cam plate and cam side gear slightly toward the right side of the differential case. This movement of the cam side gear pushes the thrust block which compresses the right-hand side gear clutch pack.

At this point, the force of the self-energizing clutches and the side gear separating force combine to hold the side gears to the differential case in the locking stage.

The entire locking process occurs in less than 1 second. The process works with either the left or right wheel spinning, due to the design of the governor and cam mechanism. A torque reversal of any kind will unlatch the governor, causing the cam plate to ride back down to its detent position. Cornering or deceleration during a transmission shift will cause a torque reversal of this type. The differential unit returns to its limited-slip function.

The self-energizing process would not occur if it were not for the action of one of the left clutch discs. This energizing disc provides the holding force of the ramping action to occur. It is the only disc which is splined to the cam plate itself. The other splined discs fit on the cam side gear.

If the rotating speed of the ring gear and differential case assembly is high enough, the latching bracket will pivot due to centrifugal force. This will move the flyweights so that no locking is permitted. During vehicle driving, this happens at approximately 32 km/h (20 mph) and continues at faster speeds.

When comparing the effectiveness of the locking differential, in terms of percent-of-grade capability to open and limited-slip units, the locking differential has nearly 3 times the potential of the limited-slip unit under the same conditions.

Locking Differential Torque-Limiting Disc

The locking differential design was modified in mid-1986 to include a load-limiting feature to reduce the chance of breaking an axle shaft under abusive driving conditions. The number of tangs on the energizing disc in the left-hand clutch pack was reduced allowing these tangs to shear in the event of a high-torque engagement of the differential locking mechanism.

At the time of failure of the load-limiting disc, there will be a loud bang in the rear axle and the differential will operate as a standard differential with some limited-slip action of the clutch packs at low torques.

The service procedure, when the disc tangs shear, involves replacing the left-hand clutch plates and the wave spring. It is also necessary to examine the axle shafts for twisting because at high torques it is possible to not only shear the load-limiting disc, but to also twist the axle shafts.

Transfer Case - NVG 149-NP3 (One Speed Automatic)

The NVG 149 RPO NP3 is a single speed, single mode transfer case. The mode is full-time all wheel drive. It has a planetary differential gear set that splits the torque, normally 38 percent to the front wheels and 62 percent to the rear wheels.

The NVG 149 utilizes magnesium housings. Proper fasteners, brackets, and fill/drain plugs must be used to prevent galvanic corrosion. The planetary differential uses the carrier as the input. The annulus gear connects to the rear output shaft and rear wheels. The sun gear connects to the front output shaft and front wheels through the chain and sprockets. The viscous coupling consists of a sealed housing filled with a high viscosity silicone fluid and thin steel plates alternately splined to the inner and outer drum. The inner drum is connected to the input shaft, and the outer drum to the sun gear. Whenever there is a speed difference between the front and rear wheels, the inner and outer plates of the viscous coupling spin relative to each other and the silicone fluid provides resistance. The resistance was tuned to be high enough to bias power quickly to the wheels with traction, and low enough to prevent binding in a tight turn on dry surfaces. This is the most common way the viscous coupling is activated, the shear mode. If the speed difference is high, the coupling can lock or hump. This "hump" occurs when the heat generated, expands the fluid inside the housing, changing the fluid dynamics between the plates. This results in pressure between the plates, forcing them into contact with each other, similar to a clutch pack. In the hump mode, the coupling can bias torque 100 percent to one axle, if required. Situations requiring this are extreme such as backing up a steep gravel grade or climbing over off-road obstacles. The viscous coupling is not serviceable; it must be replaced if defective. This is because each viscous coupling is calibrated for optimum vehicle performance for both the shear and hump modes. If the viscous coupling is in the "hump" mode too long, severe damage will occur. To prevent damage to the viscous coupling, DO NOT:

- Tow with only two wheels down
- Drive without one propshaft
- Drive with a "donut" spare tire for an extended period of time

Braking System Description and Operation

Hydraulic Brake System Description and Operation

System Component Description

The hydraulic brake system consists of the following:

Hydraulic Brake Master Cylinder Fluid Reservoir

Contains supply of brake fluid for the hydraulic brake system.

Hydraulic Brake Master Cylinder

Converts mechanical input force into hydraulic output pressure.

Hydraulic output pressure is distributed from the master cylinder through two hydraulic circuits, supplying diagonally-opposed wheel apply circuits.

Hydraulic Brake Pressure Balance Control System

Regulates brake fluid pressure delivered to hydraulic brake wheel circuits, in order to control the distribution of braking force.

Pressure balance control is achieved through dynamic rear proportioning (DRP), which is a function of the ABS modulator.

Hydraulic Brake Pipes and Flexible Brake Hoses

Carries brake fluid to and from hydraulic brake system components.

Hydraulic Brake Wheel Apply Components

Converts hydraulic input pressure into mechanical output force.

System Operation

Mechanical force is converted into hydraulic pressure by the master cylinder, regulated to meet braking system demands by the pressure balance control system, and delivered to the hydraulic brake wheel circuits by the pipes and flexible hoses. The wheel apply components then convert the hydraulic pressure back into mechanical force which presses linings against rotating brake system components.

Brake Assist System Description and Operation

System Component Description

The brake assist system consists of the following:

Brake Pedal

Receives, multiplies and transfers brake system input force from driver.

Brake Pedal Pushrod

Transfers multiplied input force received from brake pedal to brake booster.

Vacuum Brake Booster

Uses source vacuum to decrease effort required by driver when applying brake system input force.

When brake system input force is applied, air at atmospheric pressure is admitted to the rear of both vacuum diaphragms, providing a decrease in brake pedal effort required. When input force is removed, vacuum replaces atmospheric pressure within the booster.

Vacuum Source

Supplies force used by vacuum brake booster to decrease brake pedal effort.

Vacuum Source Delivery System

Enables delivery and retention of source vacuum for vacuum brake booster.

System Operation

Brake system input force is multiplied by the brake pedal and transferred by the pedal pushrod to the hydraulic brake master cylinder. Effort required to apply the brake system is reduced by the vacuum brake booster.

Disc Brake System Description and Operation

System Component Description

The disc brake system consists of the following components:

Disc Brake Pads

Applies mechanical output force from the hydraulic brake calipers to friction surfaces of brake rotors.

Disc Brake Rotors

Uses mechanical output force applied to friction surfaces from the disc brake pads to slow speed of tire and wheel assembly rotation.

Disc Brake Pad Hardware

Secures disc brake pads firmly in proper relationship to the hydraulic brake calipers. Enables a sliding motion of brake pads when mechanical output force is applied.

Disc Brake Caliper Hardware

Provides mounting for hydraulic brake caliper and secures the caliper firmly in proper relationship to caliper bracket. Enables a sliding motion of the brake caliper to the brake pads when mechanical output force is applied.

System Operation

Mechanical output force is applied from the hydraulic brake caliper pistons to the inner brake pads. As the pistons press the inner brake pads outward, the caliper housings draw the outer brake pads inward. This allows the output force to be equally distributed. The brake pads apply the output force to the friction surfaces on both sides of the brake rotors, which slows the rotation of the tire and wheel assemblies. The correct function of both the brake pad and brake caliper hardware is essential for even distribution of braking force.

Park Brake System Description and Operation w/Rear Disc

General Description

The park brake system consists of the following:

Park Brake Pedal Assembly

Receives and transfers park brake system apply input force from driver to park brake cable system.

Park Brake Release Handle Assembly

Releases applied park brake system when pulled.

Park Brake Cables

Transfers input force received from park brake pedal, through park brake cable equalizer, to park brake apply lever.

Park Brake Cable Equalizer

Evenly distributes input force to both the left and right park brake units.

Threaded park brake cable equalizers are also used to remove slack in park brake cables.

Park Brake Apply Lever

Multiplies and transfers input force to park brake actuator.

Park Brake Actuator/Adjuster

Uses multiplied input force from apply lever to expand park brake shoe toward the friction surface of the drum-in-hat portion of the rear brake rotor.

Threaded park brake actuators are also used to control clearance between the park brake shoe and the friction surface of the drum-in-hat portion of the rear brake rotor.

Park Brake Shoe

Applies mechanical output force from park brake actuator to friction surface of the drum-in-hat portion of the rear brake rotor.

System Operation

Park brake apply input force is received by the park brake pedal assembly being depressed, transferred and evenly distributed, through the park brake cables and the park brake cable equalizer, to the left and right park brake apply levers. The park brake apply levers multiply and transfer the apply input force to the park brake actuators which expand the park brake shoe toward the friction surface of the drum-in-hat portion of the rear brake rotor in order to prevent the rotation of the rear tire and wheel assemblies. The park brake release handle assembly releases an applied park brake system when it is pulled rearward.

ABS Description and Operation

Antilock Brake System

When wheel slip is detected during a brake application, the ABS enters antilock mode. During antilock braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel brake. The ABS cannot, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During antilock braking, a series of rapid pulsations is felt in the brake pedal. These pulsations are caused by the rapid changes in position of the individual solenoid valves as the EBCM responds to wheel speed sensor inputs and attempts to prevent wheel slip. These pedal pulsations are present only during antilock braking and stop when normal braking is resumed or when the vehicle comes to a stop. A ticking or popping noise may also be heard as the solenoid valves cycle rapidly. During antilock braking on dry pavement, intermittent chirping noises may be heard as the tires approach slipping. These noises and pedal pulsations are considered normal during antilock operation.

Vehicles equipped with ABS may be stopped by applying normal force to the brake pedal. Brake pedal operation during normal braking is no different than that of previous non-ABS systems. Maintaining a constant force on the brake pedal provides the shortest stopping distance while maintaining vehicle stability.

Engine Description and Operation

Engine Mechanical

General Specifications 6.0L (LQ9 VIN N)

Application	Specification	
	Metric	English
General		
• Engine Type	V8	
• Displacement	6.0L	364 CID
• RPO	LQ9	
• VIN	N	
• Bore	101.618-101.636 mm	4.0007-4.0014 in
• Stroke	92.0 mm	3.622 in
• Compression Ratio	10.08:1	
• Firing Order	1-8-7-2-6-5-4-3	
• Spark Plug Gap	1.524 mm	0.06 in
Block		
• Camshaft Bearing Bore 1 and 5 Diameter	59.12-59.17 mm	2.327-2.329 in
• Camshaft Bearing Bore 2 and 4 Diameter	58.87-58.92 mm	2.317-2.319 in
• Camshaft Bearing Bore 3 Diameter	58.62-58.67 mm	2.307-2.309 in
• Crankshaft Main Bearing Bore Diameter	69.871-69.889 mm	2.75-2.751 in
• Crankshaft Main Bearing Bore Out-of-Round	0.006 mm	0.0002 in
• Cylinder Bore Diameter	101.618-101.636 mm	4.0007-4.0017 in
• Cylinder Bore Taper - Thrust Side	0.018 mm	0.0007 in
• Cylinder Head Deck Height - Measuring from the Centerline of Crankshaft to the Deck Face	234.57-234.82 mm	9.235-9.245 in
• Cylinder Head Deck Surface Flatness - Measured within a 152.4 mm (6.0 in) Area	0.11 mm	0.004 in
• Cylinder Head Deck Surface Flatness - Measuring the Overall Length of the Block Deck	0.22 mm	0.008 in
• Valve Lifter Bore Diameter	21.417-21.443 mm	0.843-0.844 in
Camshaft		
• Camshaft End Play	0.025-0.305 mm	0.001-0.012 in
• Camshaft Journal Diameter	54.99-55.04 mm	2.164-2.166 in
• Camshaft Journal Out-of-Round	0.025 mm	0.001 in
• Camshaft Lobe Lift - Exhaust	7.13 mm	0.281 in
• Camshaft Lobe Lift - Intake	6.96 mm	0.274 in
• Camshaft Runout - Measured at the Intermediate Journals	0.05 mm	0.002 in
Connecting Rod		
• Connecting Rod Bearing Clearance - Production	0.023-0.065 mm	0.0009-0.0025 in
• Connecting Rod Bearing Clearance - Service	0.023-0.076 mm	0.0009-0.003 in
• Connecting Rod Bore Diameter - Bearing End	56.505-56.525 mm	2.224-2.225 in
• Connecting Rod Bore Out-of-Round - Bearing End - Production	0.006 mm	0.00023 in
• Connecting Rod Bore Out-of-Round - Bearing End - Service	0.004-0.008 mm	0.00015-0.0003 in

Application	Specification	
	Metric	English
• Connecting Rod Side Clearance	0.11-0.51 mm	0.00433-0.02 in
Crankshaft		
• Connecting Rod Journal Diameter - Production	53.318-53.338 mm	2.0991-2.0999 in
• Connecting Rod Journal Diameter - Service	53.308 mm	2.0987 in
• Connecting Rod Journal Out-of-Round - Production	0.005 mm	0.0002 in
• Connecting Rod Journal Out-of-Round - Service	0.01 mm	0.0004 in
• Connecting Rod Journal Taper - Maximum for 1/2 of Journal Length - Production	0.005 mm	0.0002 in
• Connecting Rod Journal Taper - Maximum for 1/2 of Journal Length - Service	0.02 mm	0.00078 in
• Crankshaft End Play	0.04-0.2 mm	0.0015-0.0078 in
• Crankshaft Main Bearing Clearance - Production	0.02-0.052 mm	0.0008-0.0021 in
• Crankshaft Main Bearing Clearance - Service	0.02-0.065 mm	0.0008-0.0025 in
• Crankshaft Main Journal Diameter - Production	64.993-65.007 mm	2.558-2.559 in
• Crankshaft Main Journal Diameter - Service	64.993 mm	2.558 in
• Crankshaft Main Journal Out-of-Round - Production	0.003 mm	0.000118 in
• Crankshaft Main Journal Out-of-Round - Service	0.008 mm	0.0003 in
• Crankshaft Main Journal Taper - Production	0.01 mm	0.0004 in
• Crankshaft Main Journal Taper - Service	0.02 mm	0.00078 in
• Crankshaft Rear Flange Runout	0.05 mm	0.002 in
• Crankshaft Reluctor Ring Runout - Measured 1.0 mm (0.04 in) Below Tooth Diameter	0.7 mm	0.028 in
• Crankshaft Thrust Surface - Production	26.14-26.22 mm	1.029-1.0315 in
• Crankshaft Thrust Surface - Service	26.22 mm	1.0315 in
• Crankshaft Thrust Surface Runout	0.025 mm	0.001 in
Cylinder Head		
• Cylinder Head Height/Thickness - Measured from the Cylinder Head Deck to the Valve Rocker Arm Cover Seal Surface	120.2 mm	4.732 in
• Surface Flatness - Block Deck - Measured Within a 152.4 mm (6.0 in) Area	0.08 mm	0.003 in
• Surface Flatness - Block Deck - Measuring the Overall Length of the Cylinder Head	0.1 mm	0.004 in
• Surface Flatness - Exhaust Manifold Deck	0.13 mm	0.005 in
• Surface Flatness - Intake Manifold Deck	0.08 mm	0.0031 in
• Valve Guide Installed Height - Measured from the Spring Seat Surface to the Top of the Guide	17.32 mm	0.682 in
Intake Manifold		
• Surface Flatness - Measured at Gasket Sealing Surfaces and Measured Within a 200 mm (7.87 in) Area that Includes Two Runner Port Openings	0.3 mm	0.118 in

Application	Specification	
	Metric	English
Lubrication System		
• Oil Capacity - with Filter	5.68 Liters	6.0 Quarts
• Oil Capacity - without Filter	4.73 Liters	5.0 Quarts
• Oil Pressure - Minimum - Hot	41 kPa at 1,000 engine RPM 124 kPa at 2,000 engine RPM 165 kPa at 4,000 engine RPM	6 psig at 1,000 engine RPM 18 psig at 2,000 engine RPM 24 psig at 4,000 engine RPM
Oil Pan		
• Front Cover Alignment - at Oil Pan Surface	0.0-0.5 mm	0.0-0.02 in
• Rear Cover Alignment - at Oil Pan Surface	0.0-0.5 mm	0.0-0.02 in
• Oil Pan Alignment - to Rear of Engine Block at Transmission Bell Housing Mounting Surface	0.0-0.25 mm	0.0-0.01 in
Piston Rings		
• Piston Ring End Gap - First Compression Ring - Measured in Cylinder Bore - Production	0.31-0.52 mm	0.012-0.02 in
• Piston Ring End Gap - First Compression Ring - Measured in Cylinder Bore - Service	0.31-0.59 mm	0.0122-0.023 in
• Piston Ring End Gap - Second Compression Ring - Measured in Cylinder Bore - Production	0.51-0.77 mm	0.02-0.03 in
• Piston Ring End Gap - Second Compression Ring - Measured in Cylinder Bore - Service	0.51-0.84 mm	0.02-0.033 in
• Piston Ring End Gap - Oil Control Ring - Measured in Cylinder Bore - Production	0.31-0.87 mm	0.0122-0.034 in
• Piston Ring End Gap - Oil Control Ring - Measured in Cylinder Bore - Service	0.31-0.94 mm	0.0122-0.037 in
• Piston Ring to Groove Clearance - First Compression Ring - Production	0.035-0.08 mm	0.0014-0.0031 in
• Piston Ring to Groove Clearance - First Compression Ring - Service	0.035-0.08 mm	0.0014-0.0031 in
• Piston Ring to Groove Clearance - Second Compression Ring - Production	0.034-0.079 mm	0.0013-0.003 in
• Piston Ring to Groove Clearance - Second Compression Ring - Service	0.034-0.079 mm	0.0013-0.003 in
• Piston Ring to Groove Clearance - Oil Control Ring - Production	0.012-0.2 mm	0.00047-0.00078 in
• Piston Ring to Groove Clearance - Oil Control Ring - Service	0.012-0.2 mm	0.00047-0.00078 in
Pistons and Pins		
• Piston - Piston Diameter - Measured Over Skirt Coating	101.611-101.642 mm	4.0-4.001 in
• Piston - Piston to Bore Clearance - Production	-0.022 to +0.030 mm	-0.009 to +0.0012 in
• Piston - Piston to Bore Clearance - Service Limit with Skirt Coating Worn Off -	0.08 mm	0.0031 in
• Pin - Piston Pin Fit in Connecting Rod Bore - Production	0.007-0.02 mm	0.00027-0.00078 in
• Pin - Piston Pin Fit in Connecting Rod Bore - Service	0.007-0.022 mm	0.00027-0.00086 in

Application	Specification	
	Metric	English
• Pin - Piston Pin Clearance to Piston Pin Bore - Production	0.002-0.01 mm	0.00008-0.0004 in
• Pin - Piston Pin Clearance to Piston Pin Bore - Service	0.002-0.015 mm	0.0008-0.0006 in
• Pin - Piston Pin Diameter	23.952-23.955 mm	0.943-0.943 in
Valve System		
• Valves - Valve Face Angle	45 degrees	
• Valves - Valve Face Width	1.25 mm	0.05 in
• Valves - Valve Lash	Net Lash - No Adjustment	
• Valves - Valve Lift - Intake	11.79 mm	0.464 in
• Valves - Valve Lift - Exhaust	12.16 mm	0.479 in
• Valves - Valve Seat Angle	46 degrees	
• Valves - Valve Seat Runout	0.05 mm	0.002 in
• Valves - Valve Seat Width - Exhaust	1.78 mm	0.07 in
• Valves - Valve Seat Width - Intake	1.02 mm	0.04 in
• Valves - Valve Stem Diameter - Production	7.955-7.976 mm	0.313-0.314 in
• Valves - Valve Stem Diameter - Service	7.95 mm	0.313 in
• Valves - Valve Stem-to-Guide Clearance - Production - Intake	0.025-0.066 mm	0.001-0.0026 in
• Valves - Valve Stem-to-Guide Clearance - Service - Intake	0.093 mm	0.0037 in
• Valves - Valve Stem-to-Guide Clearance - Production - Exhaust	0.025-0.066 mm	0.001-0.0026 in
• Valves - Valve Stem-to-Guide Clearance - Service - Exhaust	0.093 mm	0.0037 in
• Rocker Arms - Valve Rocker Arm Ratio	1.70:1	
• Valve Springs - Valve Spring Free Length	52.9 mm	2.08 in
• Valve Springs - Valve Spring Installed Height	45.75 mm	1.8 in
• Valve Springs - Valve Spring Load - Closed	340 N at 45.75 mm	76 lb at 1.8 in
• Valve Springs - Valve Spring Load - Open	980 N at 33.55 mm	220 lb at 1.32 in

Fastener Tightening Specifications

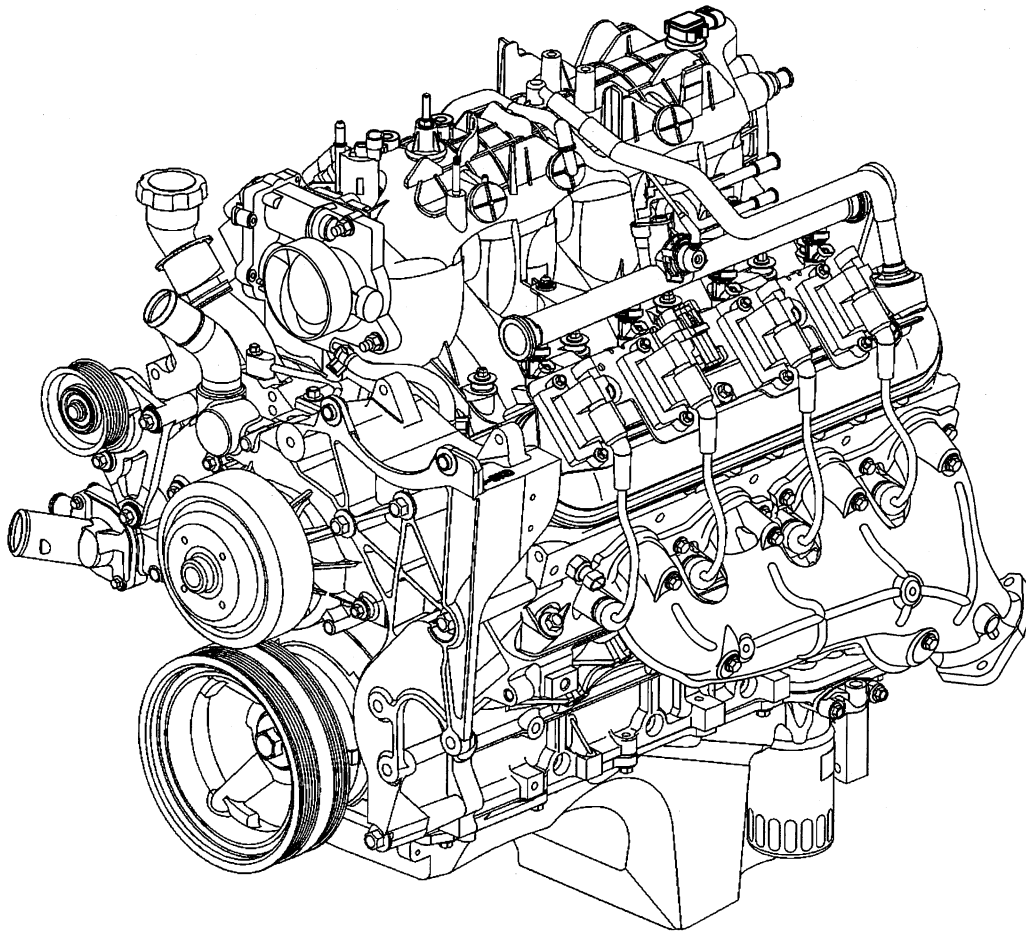
Application	Specification	
	Metric	English
3-Phase Cable Bracket Cover Bolt - RPO HP2	9 N·m	80 lb in
3-Phase Cable Bracket Nut - RPO HP2	15 N·m	11 lb ft
3-Phase Cable Nut-to-Starter/Generator - RPO HP2	14 N·m	10 lb ft
3-Phase Cable Nut-to-Starter/Generator Control Module (SGCM) - RPO HP2	12 N·m	106 lb in
Air Cleaner Outlet Duct Clamp Screw	7 N·m	62 lb in
Air Conditioning (A/C) Belt Tensioner Bolt	50 N·m	37 lb ft
Air Conditioning (A/C) Compressor Bolt	50 N·m	37 lb ft
Air Conditioning (A/C) Discharge Hose Bolt	16 N·m	12 lb ft
Air Conditioning (A/C) Suction Hose Bolt	16 N·m	12 lb ft
Auxiliary Heater Water Pump Bracket Bolt - RPO HP2	15 N·m	11 lb ft
Battery Cable Channel Bolt	12 N·m	106 lb in
Battery Cable Junction Block Bracket Bolt - RPO HP2	9 N·m	80 lb in
Camshaft Retainer Bolts	25 N·m	18 lb ft
Camshaft Sensor Bolt	25 N·m	18 lb ft
Camshaft Sprocket Bolts	35 N·m	26 lb ft
Clutch Pressure Plate Bolt	70 N·m	53 lb ft
Connecting Rod Bolts - First Pass	20 N·m	15 lb ft
Connecting Rod Bolts - Final Pass	75 degrees	
Coolant Temperature Sensor	20 N·m	15 lb ft
Crankshaft Balancer Bolt - Installation Pass - to Ensure the Balancer is Completely Installed	330 N·m	240 lb ft
Crankshaft Balancer Bolt - First Pass - Install a NEW Bolt After the Installation Pass and Tighten as Described in the First and Final Passes	50 N·m	37 lb ft
Crankshaft Balancer Bolt - Final Pass	140 degrees	
Crankshaft Bearing Cap Bolts - Inner Bolts - First Pass in Sequence	20 N·m	15 lb ft
Crankshaft Bearing Cap Bolts - Inner Bolts - Final Pass in Sequence	80 degrees	
Crankshaft Bearing Cap Bolts - Outer Bolts - First Pass in Sequence	20 N·m	15 lb ft
Crankshaft Bearing Cap Bolts - Outer Bolts - Final Pass in Sequence	51 degrees	
Crankshaft Bearing Cap Side Bolts	25 N·m	18 lb ft
Crankshaft Oil Deflector Nuts	25 N·m	18 lb ft
Crankshaft Position Sensor Bolt	25 N·m	18 lb ft
Crossbar Bolt	100 N·m	74 lb ft
Cylinder Head Bolts - First Design - First Pass all M11 Bolts in Sequence	30 N·m	22 lb ft
Cylinder Head Bolts - First Design - Second Pass all M11 Bolts in Sequence	90 degrees	
Cylinder Head Bolts - First Design - Final Pass all M11 Bolts in Sequence - Excluding the Medium Length Bolts at the Front and Rear of each Cylinder Head	90 degrees	
Cylinder Head Bolts - First Design - Final Pass M11 Medium Length Bolts at the Front and Rear of each Cylinder Head	50 degrees	
Cylinder Head Bolts - Second Design - First Pass all M11 Bolts in Sequence	30 N·m	22 lb ft
Cylinder Head Bolts - Second Design - Second Pass all M11 Bolts in Sequence	90 degrees	
Cylinder Head Bolts - Second Design - Final Pass all M11 Bolts in Sequence	70 degrees	
Cylinder Head Bolts - M8 Inner Bolts in Sequence	30 N·m	22 lb ft
Cylinder Head Coolant Plug	20 N·m	15 lb ft
Differential Carrier Lower Mounting Bolt/Nut	100 N·m	74 lb ft

Application	Specification	
	Metric	English
Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Drive Belt Tensioner Bolt	50 N·m	37 lb ft
Engine Block Coolant Drain Plugs	60 N·m	44 lb ft
Engine Block Heater	40 N·m	30 lb ft
Engine Block Oil Gallery Plugs	60 N·m	44 lb ft
Engine Coolant Air Bleed Pipe and Cover Bolts	12 N·m	106 lb in
Engine Coolant Fitting - RPO HP2	35 N·m	26 lb ft
Engine Flywheel Bolts - First Pass	20 N·m	15 lb ft
Engine Flywheel Bolts - Second Pass	50 N·m	37 lb ft
Engine Flywheel Bolts - Final Pass	100 N·m	74 lb ft
Engine Front Cover Bolts	25 N·m	18 lb ft
Engine Harness Ground Bolt - Right Rear	16 N·m	12 lb ft
Engine Harness Ground Bolt-to-Block	25 N·m	18 lb ft
Engine Mount Bracket Through Bolt	75 N·m	55 lb ft
Engine Mount-to-Engine Mount Bracket Bolt	65 N·m	50 lb ft
Engine Mount Bolt	50 N·m	37 lb ft
Engine Rear Cover Bolts	25 N·m	18 lb ft
Engine Service Lift Bracket M10 Bolts	50 N·m	37 lb ft
Engine Service Lift Bracket M8 Bolt	25 N·m	18 lb ft
Engine Shield Bolt	20 N·m	15 lb ft
Engine Valley Cover Bolts	25 N·m	18 lb ft
Engine Wiring Harness Bracket Nut	5 N·m	44 lb in
Evaporative Emission (EVAP) Purge Solenoid Bolt	10 N·m	89 lb in
Exhaust Manifold Bolts - First Pass	15 N·m	11 lb ft
Exhaust Manifold Bolts - Final Pass	25 N·m	18 lb ft
Exhaust Manifold Heat Shield Bolts	9 N·m	80 lb in
Flexplate/Rotor Bolts - RPO HP2	100 N·m	74 lb ft
Fuel Rail Bolts	10 N·m	89 lb in
Fuel Rail Cover Bolt	9 N·m	80 lb in
Fuel Rail Crossover Tube Bolts	3.8 N·m	34 lb in
Fuel Rail Stop Bracket Bolt	50 N·m	37 lb ft
Generator Bracket Bolt	50 N·m	37 lb ft
Generator Cable Nut	9 N·m	80 lb in
Generator Coolant Inlet Hose Bolt - RPO HP2	10 N·m	89 lb in
Generator Coolant Outlet Pipe Stud - RPO HP2	6 N·m	53 lb in
Heater Hose Bracket Nut	9 N·m	80 lb in
Hood Hinge Bolt	25 N·m	18 lb ft
Ignition Coil-to-Bracket Bolts	10 N·m	89 lb in
Ignition Coil Bracket-to-Valve Rocker Arm Cover Stud	12 N·m	106 lb in
Inner Axle Housing Nut	100 N·m	74 lb ft
Intake Manifold Bolts - First Pass in Sequence	5 N·m	44 lb in
Intake Manifold Bolts - Final Pass in Sequence	10 N·m	89 lb in
Intake Manifold Sight Shield Bolt	10 N·m	89 lb in
Intake Manifold Sight Shield Retainer Bolt	5 N·m	44 lb in
Intake Manifold Wiring Harness Stud	10 N·m	89 lb in
J 42286-A Bolt	50 N·m	37 lb ft
J 46093 Bolt	50 N·m	37 lb ft
Knock Sensors	20 N·m	15 lb ft
Oil Filter	30 N·m	22 lb ft
Oil Filter Fitting	55 N·m	40 lb ft
Oil Level Indicator Tube Bolt	25 N·m	18 lb ft

Application	Specification	
	Metric	English
Oil Level Sensor	13 N·m	115 lb in
Oil Pan Baffle Bolts	12 N·m	106 lb in
Oil Pan Closeout Cover Bolt - Left Side	12 N·m	106 lb in
Oil Pan Closeout Cover Bolt - Right Side	12 N·m	106 lb in
Oil Pan Cover Bolts	12 N·m	106 lb in
Oil Pan Drain Plug	25 N·m	18 lb ft
Oil Pan M8 Bolts - Oil Pan-to-Engine Block and Oil Pan-to-Front Cover	25 N·m	18 lb ft
Oil Pan M6 Bolts - Oil Pan-to-Rear Cover	12 N·m	106 lb in
Oil Pan Skid Plate Bolt	20 N·m	15 lb ft
Oil Pressure Sensor	20 N·m	15 lb ft
Oil Pump-to-Engine Block Bolts	25 N·m	18 lb ft
Oil Pump Cover Bolts	12 N·m	106 lb in
Oil Pump Relief Valve Plug	12 N·m	106 lb in
Oil Pump Screen Nuts	25 N·m	18 lb ft
Oil Pump Screen-to-Oil Pump Bolt	12 N·m	106 lb in
Positive Battery Cable Clip Bolt	9 N·m	80 lb in
Power Steering Pump Bolt - RPO HP2	25 N·m	18 lb ft
Power Steering Pump Bracket Bolt - RPO HP2	25 N·m	18 lb ft
Power Steering Pump Harness Bolt - RPO HP2	25 N·m	18 lb ft
Power Steering Pump Harness Ground Bolt - RPO HP2	25 N·m	18 lb ft
Power Steering Pump Rear Bolt	50 N·m	37 lb ft
Spark Plugs - New Cylinder Heads	20 N·m	15 lb ft
Spark Plugs - All Subsequent Installations	15 N·m	11 lb ft
Starter/Generator Control Module (SGCM) Cover Bolts - RPO HP2	9 N·m	80 lb in
Stator Stud - RPO HP2	16 N·m	12 lb ft
Throttle Body Nuts	10 N·m	89 lb in
Throttle Body Studs	6 N·m	53 lb in
Torque Converter Bolt - 4L60-E/4L65-E Transmissions	63 N·m	47 lb ft
Torque Converter Bolt - 4L80-E/4L85-E Transmissions	60 N·m	44 lb ft
Transmission Bolt/Stud	50 N·m	37 lb ft
Transmission Cover Bolt	12 N·m	106 lb in
Transmission Nut - RPO HP2	12 N·m	106 lb in
Transmission Oil Level Indicator Tube Nut	18 N·m	13 lb ft
Valve Lifter Guide Bolts	12 N·m	106 lb in
Valve Rocker Arm Bolts	30 N·m	22 lb ft
Valve Rocker Arm Cover Bolts	12 N·m	106 lb in
Water Inlet Housing Bolts	15 N·m	11 lb ft
Water Pump Bolts - First Pass	15 N·m	11 lb ft
Water Pump Bolts - Final Pass	30 N·m	22 lb ft
Water Pump Cover Bolts	15 N·m	11 lb ft

Engine Component Description

6.0 Liter V8 Engines



Camshaft and Drive System

A billet steel one piece camshaft is supported by five bearings pressed into the engine block. The camshaft has a machined camshaft sensor reluctor ring incorporated between the fourth and fifth bearing journals. The camshaft timing sprocket is mounted to the front of the camshaft and is driven by the crankshaft sprocket through the camshaft timing chain. The splined crankshaft sprocket is positioned to the crankshaft by a key and keyway. The crankshaft sprocket splines drive the oil pump driven gear. A retaining plate mounted to the front of the engine block maintains camshaft location.

Crankshaft

The crankshaft is cast nodular iron. The crankshaft is supported by five crankshaft bearings. The bearings are retained by crankshaft bearing caps which are machined with the engine block for proper alignment and clearance. The crankshaft journals are undercut and rolled. The center main journal is the thrust journal. A crankshaft position reluctor ring is press fit mounted at the rear of the crankshaft. The reluctor ring is not serviceable separately. All crankshafts will have a short rear flange, at the crankshaft rear oil seal area. Certain 4.8L manual transmissions and 6.0L applications require a spacer between the rear of the crankshaft and the flywheel for proper flywheel positioning. Longer bolts are required in applications using the spacer.

Cylinder Heads

The cylinder heads are cast aluminum and have pressed in place powdered metal valve guides and valve seats. Passages for the engine coolant air bleed system are at the front of each cylinder head. The valve rocker arm covers are retained to the cylinder head by four center mounted rocker arm cover bolts.

Engine Block

The engine block is a cam-in-block deep skirt 90 degree V configuration with five crankshaft bearing caps. The engine block is cast iron. The five crankshaft bearing caps each have four vertical M10 and two horizontal M8 mounting bolts. The camshaft is supported by five camshaft bearings pressed into the block.

Exhaust Manifolds

The exhaust manifolds are a one piece cast iron design. The exhaust manifolds direct exhaust gasses from the combustion chambers to the exhaust system. Each manifold also has an externally mounted heat shield that is retained by bolts.

Intake Manifold

The intake manifold is a one piece composite design that incorporates brass threaded inserts for mounting the fuel rail, throttle cable bracket, throttle body, evaporative emission (EVAP) solenoid, wire harness stud, engine sight shield and sight shield bracket. Each side of the intake manifold is sealed to the cylinder head by a nonreusable silicone sealing gasket and nylon carrier assembly. The electronically actuated throttle body bolts to the front of the intake manifold. The throttle body is sealed by a one piece push in place silicone gasket. The fuel rail assembly with eight separate fuel injectors is retained to the intake by four bolts. The injectors are seated into their individual manifold bores with O-ring seals to provide sealing. A fuel rail stop bracket is retained to the rear of the left cylinder head by a mounting bolt. The manifold absolute pressure (MAP) sensor is installed and retained to the top rear of the intake manifold and sealed by an O-ring seal. The EVAP solenoid is mounted to the top front of the intake manifold and retained by one bolt. There are no coolant passages within the intake manifold.

Oil Pan

The structural oil pan is cast aluminum. Incorporated into the design are the oil filter mounting boss, drain plug opening, oil level sensor mounting bore, and oil pan baffle. The oil pan transfer cover and oil level sensor mount to the sides of the oil pan. The alignment of the structural oil pan to the rear of the engine block and transmission bell housing is critical.

Piston and Connecting Rod Assembly

The pistons are cast aluminum. The pistons use two compression rings and one oil control ring assembly. The piston is a low friction, lightweight design with a flat or recessed top and barrel shaped skirt. The piston pins are chromium steel, have floating fit in the piston, and are retained by a press fit in the connecting rod. 6.0L LQ9 applications will have full-floating pistons/pins retained by internal clips. The connecting rods are powdered metal. The connecting rods are fractured at the connecting rod journal and then machined for the proper clearance. 2003 applications use a piston with a graphite coated skirt. The piston, pin, and connecting rod are to be serviced as an assembly.

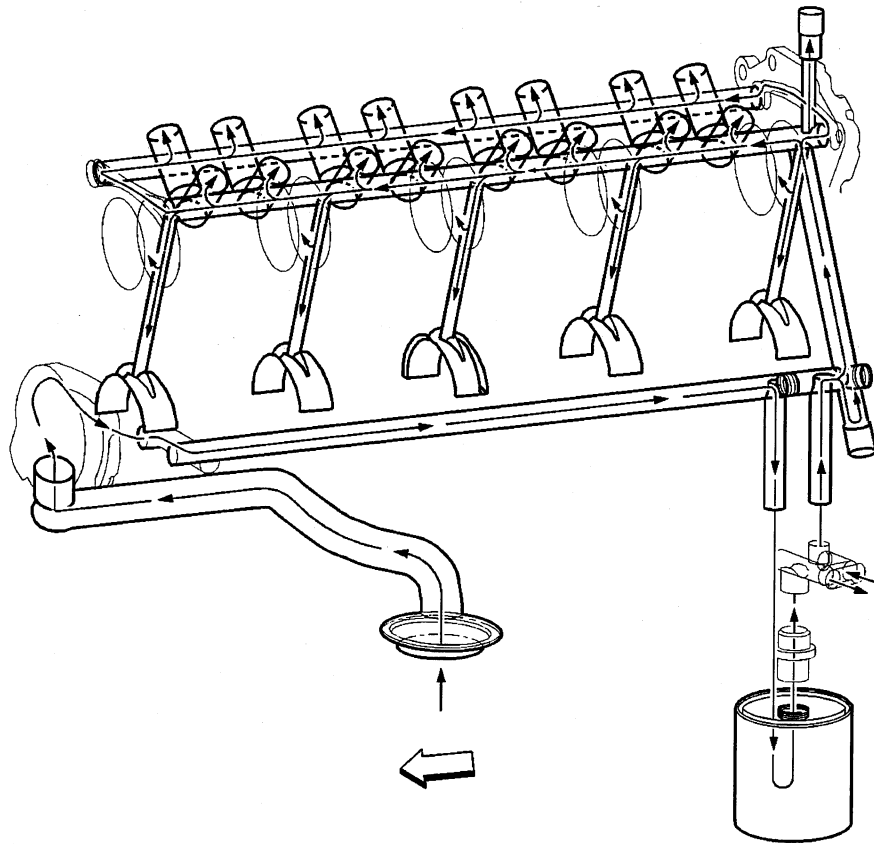
Valve Rocker Arm Cover Assemblies

The valve rocker arm covers are cast aluminum and use a pre-molded silicon gasket for sealing. Mounted to each rocker cover are the coil and bracket assemblies. Incorporated into the covers are the oil fill tube, the positive crankcase ventilation (PCV) system passages, and the engine fresh air passages.

Valve Train

Motion is transmitted from the camshaft through the hydraulic roller valve lifters and tubular pushrods to the roller type rocker arms. The nylon valve lifter guides position and retain the valve lifters. The valve rocker arms for each bank of cylinders are mounted on pedestals, pivot supports. Each rocker arm is retained on the pivot support and cylinder head by a bolt. Valve lash is set build.

Lubrication Description



Engine lubrication is supplied by a gerotor type oil pump assembly. The pump is mounted on the front of the engine block and driven directly by the crankshaft sprocket. The pump gears rotate and draw oil from the oil pan sump through a pick-up screen and pipe. The oil is pressurized as it passes through the pump and is sent through the engine block oil galleries. Contained within the oil pump assembly is a pressure relief valve that maintains oil pressure within a specified range. Pressurized oil is directed through the lower gallery to the full flow oil filter where harmful contaminants are removed. A bypass valve is incorporated into the oil pan, at the oil filter boss, which will permit oil flow in the event the filter becomes restricted. At the rear of the block, oil is then directed to the upper main oil galleries which are drilled just above the camshaft assembly. From there oil is then directed to the crankshaft and camshaft bearings. Oil that has entered the upper main oil galleries also pressurizes the valve lifter assemblies and is then pumped through the pushrods to lubricate the valve rocker arms and valve stems. Oil returning to the pan is directed by the crankshaft oil deflector. Oil pressure and crankcase level are each monitored by individual sensors.

An external oil cooler is available on certain applications, all 6.0L. Oil is directed from the oil pump, through the lower main oil gallery to the full flow oil filter. Oil is then directed through the oil pan outlet oil gallery, located in the left rear of the oil pan, and to the external oil cooler via a hose assembly. Oil flows through the oil cooler and returns to the engine at the oil pan inlet oil gallery, located in the left rear of the oil pan. Oil is then directed to the upper main oil galleries and the remainder of the engine assembly.

Crankcase Ventilation System Description

A closed crankcase ventilation system is used in order to provide a more complete scavenging of the crankcase vapors. Fresh air from the throttle body is supplied to the crankcase, mixed with blow-by gases, and then passed through a crankcase ventilation valve into the intake manifold.

The primary control is through the crankcase ventilation valve which meters the flow at a rate depending on manifold vacuum. To maintain idle quality, the crankcase ventilation valve restricts the flow when intake manifold vacuum is high. If abnormal operating conditions arise, the system is designed to allow excessive amounts of blow-by gases to back flow through the crankcase vent tube into the engine air inlet to be consumed by normal combustion.

Filtered fresh air is routed from up-stream of the throttle blade to the front of the right rocker arm cover via a formed rubber hose. To reduce the potential of oil pullover into the throttle bore area due to back flow of the ventilation system, the fitting in the right rocker arm cover is shielded from the rocker arms. From there fresh air and gases are routed through the crankcase and up to the opposite rocker arm cover where the positive crankcase ventilation (PCV) valve is located. Gases are then routed through a hose to the intake manifold.

Engine Cooling

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Cleaner Outlet Duct Clamp	4 N·m	35 lb in
Auxiliary Water Pump Bracket Nut	9 N·m	80 lb in
Coolant Air Bleed Pipe Cover Bolt	12 N·m	106 lb in
Coolant Air Bleed Pipe Stud/Bolt	12 N·m	106 lb in
Coolant Heater	50 N·m	37 lb ft
Coolant Heater Cord Bolt	8 N·m	71 lb in
Cooling Fan Motor Bolt	10 N·m	89 lb in
Engine Block Coolant Drain Plug	60 N·m	44 lb ft
Engine Shield Bolt	20 N·m	15 lb ft
Exhaust Manifold Pipe Nut	50 N·m	37 lb ft
Fan Clutch Bolt	23 N·m	17 lb ft
Fan Clutch Nut	56 N·m	41 lb ft
Fan Shroud Bolt	9 N·m	80 lb in
Hood Hinge Bolts	25 N·m	18 lb ft
Oil Cooler Hose Adapter Bolt (6.0L)	12 N·m	106 lb in
Oil Cooler Hose Bracket Bolt (6.0L)	25 N·m	18 lb ft
Radiator Bolt	25 N·m	18 lb ft
Starter/Generator Control Module (SGCM) Brace Bolts	25 N·m	18 lb ft
Starter/Generator Control Module (SGCM) Coolant Pump Bolts	9 N·m	80 lb in
Starter/Generator Control Module (SGCM) Coolant Tank Bolts	20 N·m	15 lb ft
Starter/Generator Control Module (SGCM) Coolant Tank Nuts	9 N·m	80 lb in
Starter/Generator Control Module (SGCM) Cooling Fan Bolt	9 N·m	80 lb in
Starter/Generator Control Module (SGCM) Radiator Bolt	9 N·m	80 lb in
Starter/Generator Stator Coolant Inlet Pipe Bolt	9 N·m	80 lb in
Surge Tank Bolt/Nut	9 N·m	80 lb in
Thermal Bypass Fitting	35 N·m	26 lb ft
Thermal Bypass Hose Bolt	10 N·m	89 lb in
Thermostat Housing Bolt	15 N·m	11 lb ft
Transmission Control Module (TCM) Cover Bolt	9 N·m	80 lb in
Transmission Control Module (TCM) Electrical Connector Bolt	8 N·m	71 lb in
Water Pump Bolt		
First Pass	15 N·m	11 lb ft
Final Pass	30 N·m	22 lb ft

Cooling System Description and Operation

Engine Coolant Indicators

ENGINE COOLANT HOT

The instrument panel cluster (IPC) displays ENGINE COOLANT HOT message when the IPC receives a class 2 message from the powertrain control module (PCM) requesting illumination of this driver warning.

ENGINE OVERHEATED

The IPC displays ENGINE OVERHEATED message when the IPC receives a class 2 message from the PCM requesting illumination of this driver warning.

LOW COOLANT LEVEL B

The IPC displays LOW COOLANT LEVEL message when the IPC receives a class 2 message from the PCM requesting illumination of this driver warning.

REDUCED ENGINE POWER

The IPC displays REDUCED ENGINE POWER message when the IPC detects a reduced engine power condition from the PCM. The IPC receives a class 2 message from the PCM requesting illumination when the engine temperature reaches 132°C (270°F).

Cooling Fan Control - Two Fan System

The engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. The relays are arranged in a series/parallel configuration that allows the powertrain control module (PCM) to operate both fans together at low or high speeds. The cooling fans and fan relays receive battery positive voltage from the underhood fuse block.

During low speed operation, the PCM supplies the ground path for the low speed fan relay through the low speed cooling fan relay control circuit. This energizes the low speed fan relay coil, closes the relay contacts, and supplies battery positive voltage from the low fan fuse through the cooling fan motor supply voltage circuit to the left cooling fan. The ground path for the left cooling fan is through the cooling fan s/p relay and the right cooling fan. The result is a series circuit with both fans running at low speed.

During high speed operation the PCM supplies the ground path for the low speed fan relay through the low speed cooling fan relay control circuit. After a 3 second delay, the PCM supplies a ground path for the high speed fan relay and the cooling fan s/p relay through the high speed cooling fan relay control circuit. This energizes the cooling fan s/p relay coil, closes the relay contacts, and provides a ground path for the left cooling fan. At the same time the high speed fan relay coil is energized closing the relay contacts and provides battery positive voltage from the high fan fuse on the cooling fan motor supply voltage circuit to the right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. The result is a parallel circuit with both fans running at high speed.

Important

The right and left cooling fan connectors are interchangeable. When servicing the fans be sure that the connectors are plugged into the correct fan.

The PCM commands the low speed cooling fans ON under the following conditions:

- Engine coolant temperature exceeds approximately 94.5°C (202°F).
- A/C refrigerant pressure exceeds 1447 kPa (210 psi).
- After the vehicle is shut OFF if the engine coolant temperature at key-off is greater than 101°C (214°F) the low speed fans will run for a minimum of 60 seconds After 60 seconds, if the coolant temperature drops below 101°C (214°F) the fans will shut OFF. The fans will automatically shut OFF after 3 min. regardless of coolant temperature.

The PCM commands the high speed fans ON under the following conditions:

- Engine coolant temperature exceeds approximately 104.25°C (220°F).
- A/C refrigerant pressure exceeds approximately 1824 kPa (265 psi).
- When certain DTCs set.

At idle and very low vehicle speeds the cooling fans are only allowed to increase in speed if required. This insures idle stability by preventing the fans from cycling between high and low speed.

Coolant Level Control (If Equipped)

The engine cooling system contains an engine coolant level switch to alert the driver in the event of a coolant loss. The powertrain control module (PCM) sends out a coolant loss signal over the coolant level switch signal circuit. When the engine coolant level switch reads a low coolant level in the fill tank, the switch opens. The message center receives its power from engine wiring harness junction block on the battery positive voltage circuit. Ground is provided by the ground circuits via the body wiring harness junction block and the engine wiring harness junction block. The cluster receives the class 2 message from the PCM indicating Low Coolant and displays the LOW COOLANT LEVEL message on the driver information center (DIC).

Coolant Heater

The optional engine coolant heater (RPO K05) operates using 110-volt AC external power and is designed to warm the coolant in the engine block area for improved starting in very cold weather 29°C (20°F). The coolant heater helps reduce fuel consumption when a cold engine is warming up. The unit is equipped with a detachable AC power cord. A weather shield on the cord is provided to protect the plug when not in use.

Cooling System

The cooling system's function is to maintain an efficient engine operating temperature during all engine speeds and operating conditions. The cooling system is designed to remove approximately one-third of the heat produced by the burning of the air-fuel mixture. When the engine is cold, the coolant does not flow to the radiator until the thermostat opens. This allows the engine to warm quickly.

Cooling Cycle

Coolant is drawn from the radiator outlet and into the water pump inlet by the water pump. Coolant will then be pumped through the water pump outlet and into the engine block. In the engine block, the coolant circulates through the water pump outlet and into the engine block. In the engine block, the coolant circulates through the water jackets surrounding the cylinders, where it absorbs heat.

Some coolant is also pumped from the water pump to the heater core, then back to the water pump. This provides the passenger compartment with heat and defrost.

The coolant is then forced through the cylinder head gasket openings and into the cylinder heads. In the cylinder heads, the coolant flows through the water jackets surrounding the combustion chambers and valve seats, where it absorbs additional heat.

Coolant is also directed to the throttle body. There it circulates through passages in the casting. During initial start up, the coolant assists in warming the throttle body. During normal operating temperatures, the coolant assists in regulating the throttle body temperature.

Operation of the cooling system requires proper functioning of all cooling system components. The cooling system consists of the following components:

Coolant

The engine coolant is a solution made up of a 50-50 mixture of DEX-COOL and suitable drinking water. The coolant solution carries excess heat away from the engine to the radiator, where the heat is dissipated to the atmosphere.

Radiator

The radiator is a heat exchanger. It consists of a core and two tanks. The aluminum core is a tube and fin crossflow design that extends from the inlet tank to the outlet tank. Fins are placed around the outside of the tubes to improve heat transfer to the atmosphere.

The inlet and outlet tanks are a molded, high temperature, nylon reinforced plastic material. A high temperature rubber gasket seals the tank flange edge to the aluminum core. The tanks are clamped to the core with clinch tabs. The tabs are part of the aluminum header at each end of the core.

The radiator also has a drain cock located in the bottom of the left hand tank. The drain cock unit includes the drain cock and drain cock seal.

The radiator removes heat from the coolant passing through it. The fins on the core transfer heat from the coolant passing through the tubes. As air passes between the fins, it absorbs heat and cools the coolant.

Surge Tank

The surge tank is a plastic tank with a threaded pressure cap. The tank is mounted at a point higher than all other coolant passages. The surge tank provides an air space in the cooling system that allows the coolant to expand and contract. The surge tank provides a coolant fill point and a central air bleed location.

During vehicle use, the coolant heats and expands. The increased coolant volume flows into the surge tank. As the coolant circulates, any air is allowed to bubble out. Coolant without air bubbles absorbs heat much better than coolant with bubbles.

Pressure Cap

The pressure cap seals the cooling system. It contains a blow off or pressure relief valve and a vacuum or atmospheric valve. The pressure valve is held against its seat by a spring, which protects the radiator from excessive cooling system pressure. The vacuum valve is held against its seat by a spring, which permits opening of the valve to relieve vacuum created in the cooling system as it cools off. The vacuum, if not relieved, might cause the radiator and/or coolant hoses to collapse.

The pressure cap allows cooling system pressure to build up as the temperature increases. As the pressure builds, the boiling point of the coolant increases. Engine coolant can be safely run at a temperature much higher than the boiling point of the coolant at atmospheric pressure. The hotter the coolant is, the faster the heat transfers from the radiator to the cooler, passing air.

The pressure in the cooling system can get too high. When the cooling system pressure exceeds the rating of the pressure cap, it raises the pressure valve, venting the excess pressure.

As the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum causes the vacuum valve to open, allowing outside air into the surge tank. This equalizes the pressure in the cooling system with atmospheric pressure, preventing the radiator and coolant hoses from collapsing.

Cooling Fan and Clutch

The engine cooling fan and clutch are driven by the crankshaft via the drive belt. The cooling fan draws air through the radiator to improve the transfer of heat from the coolant to the atmosphere. As the fan blades spin, they pull cool, outside air past the radiator core. The fan clutch drives the cooling fan. The fan clutch controls the amount of torque that is transmitted from the crankshaft to the fan blades. The clutch allows more torque to engage on the fan when the engine operating temperature increases and/or the vehicle speed is low. As the torque increases, the fan turns more quickly. The fan clutch decreases the torque applied to the cooling fan when the engine temperature decreases and/or the vehicle speed is high. As the torque decreases, the fan speed decreases.

Air Baffles and Seals

The cooling system uses deflectors, air baffles and air seals to increase cooling system capability. Deflectors are installed under the vehicle to redirect airflow beneath the vehicle and through the radiator to increase engine cooling. Air baffles are also used to direct airflow through the radiator and increase cooling capability. Air seals prevent air from bypassing the radiator and A/C condenser, and prevent recirculation of hot air for better hot weather cooling and A/C condenser performance.

Water Pump

The water pump is a centrifugal vane impeller type pump. The pump consists of a housing with coolant inlet and outlet passages and an impeller. The impeller is mounted on the pump shaft and consists of a series of flat or curved blades or vanes on a flat plate. When the impeller rotates, the coolant between the vanes is thrown outward by centrifugal force.

The impeller shaft is supported by one or more sealed bearings. The sealed bearings never need to be lubricated. Grease cannot leak out, dirt and water cannot get in as long as the seal is not damaged or worn.

The purpose of the water pump is to circulate coolant throughout the cooling system. The water pump is driven by the crankshaft via the drive belt.

Thermostat

The thermostat is a coolant flow control component. It's purpose is to help regulate the operating temperature of the engine. It utilizes a temperature sensitive wax-pellet element. The element connects to a valve through a small piston. When the element is heated, it expands and exerts pressure against the

small piston. This pressure forces the valve to open. As the element is cooled, it contracts. This contraction allows a spring to push the valve closed.

When the coolant temperature is below the rated thermostat opening temperature, the thermostat valve remains closed. This prevents circulation of the coolant to the radiator and allows the engine to warm up. After the coolant temperature reaches the rated thermostat opening temperature, the thermostat valve will open. The coolant is then allowed to circulate through the thermostat to the radiator where the engine heat is dissipated to the atmosphere. The thermostat also provides a restriction in the cooling system, after it has opened. This restriction creates a pressure difference which prevents cavitation at the water pump and forces coolant to circulate through the engine block.

Engine Oil Cooler

The engine oil cooler is a heat exchanger. It is located inside the left side end tank of the radiator. The engine oil temperature is controlled by the temperature of the engine coolant that surrounds the oil cooler in the radiator.

The engine oil pump, pumps the oil through the engine oil cooler line to the oil cooler. The oil then flows through the cooler where the engine coolant absorbs heat from the oil. The oil is then pumped through the oil cooler return line, to the oil filter, to the engine block oil system.

Transmission Oil Cooler

The transmission oil cooler is a heat exchanger. It is located inside the right side end tank of the radiator. The transmission fluid temperature is regulated by the temperature of the engine coolant in the radiator.

The transmission oil pump, pumps the fluid through the transmission oil cooler line to the transmission oil cooler. The fluid then flows through the cooler where the engine coolant absorbs heat from the fluid. The fluid is then pumped through the transmission oil cooler return line, to the transmission.

Engine Electrical

Fastener Tightening Specifications

Application	Specification	
	Metric	English
3-Phase Cable Bracket Cover Bolt	9 N·m	80 lb in
3-Phase Cable Bracket Nut	9 N·m	80 lb in
3-Phase Cable Cover Nut	9 N·m	80 lb in
3-Phase Cable Nut to Starter Generator Control Module (SGCM)	12 N·m	106 lb in
3-Phase Cable Nut to Stator	14 N·m	10 lb ft
Air Cleaner Outlet Duct Clamp	4 N·m	35 lb in
Accessory Power Receptacle Harness Ground Wire Bolt	9 N·m	80 lb in
Auxiliary Battery Cable Clip Bolt	10 N·m	89 lb in
Auxiliary Battery Negative Cable Bolt (6.6L)	34 N·m	25 lb ft
Auxiliary Battery Positive Cable Nut	9 N·m	80 lb in
Auxiliary Battery Relay Nut	9 N·m	80 lb in
Auxiliary Battery Tray Bolt	9 N·m	80 lb in
Auxiliary Battery Tray Nut	25 N·m	18 lb ft
Auxiliary Negative Battery Cable Bolt	17 N·m	13 lb ft
Auxiliary Positive Battery Cable Bolt	17 N·m	13 lb ft
Auxiliary Positive Battery Cable Nut	8 N·m	71 lb in
Auxiliary Positive Cable to Relay Nut	9 N·m	80 lb in
Battery Cable Bracket Bolt	25 N·m	18 lb ft
Battery Cable Channel Bolt	12 N·m	106 lb in
Battery Cable Junction Block Bracket Bolt (4.8L, 5.3L, 6.0L, and 8.1L)	9 N·m	80 lb in
Battery Hold Down Retainer Bolt	25 N·m	18 lb ft
Battery Tray Bolt	9 N·m	80 lb in
Crossbar Bolt	100 N·m	74 lb ft
Engine Wiring Harness/Auxiliary Negative Battery Cable Bolt	16 N·m	12 lb ft
Engine Wiring Harness Ground Bolt	16 N·m	12 lb ft
Engine Wiring Harness Ground/Negative Cable Bolt	25 N·m	18 lb ft
Fender to Cowl Support Brace Bolt	9 N·m	80 lb in
Flexplate Bolt	100 N·m	74 lb ft
Forward Lamp Wiring Harness Ground/Negative Cable Bolt	9 N·m	80 lb in
Front End Diagonal Brace Bolt	9 N·m	80 lb in
Generator Bolt (4.8L, 5.3L, 6.0L, 6.6L, and 8.1L)	50 N·m	37 lb ft
Generator Bracket Bolt (4.8L, 5.3L, 6.0L, 6.6L, and 8.1L)	50 N·m	37 lb ft
Generator Cable Nut	9 N·m	80 lb in
Ground Strap Nut	9 N·m	80 lb in
Ground Strap Nut (Energy Storage Box)	10 N·m	89 lb in
Harness Clip to Junction Block Bracket Bolt	9 N·m	80 lb in
Hybrid Control Module (HCM) Bracket Bolt	9 N·m	80 lb in
J-46093 Bolt	50 N·m	37 lb ft
Negative Battery Cable Bolt	17 N·m	13 lb ft
Positive Battery Cable Bolt	17 N·m	13 lb ft
Positive Cable at Underhood Bussed Electrical Center (UBEC) Bolt	9 N·m	80 lb in
Starter Bolt (4.8L, 5.3L, 6.0L, and 8.1L)	50 N·m	37 lb ft
Starter/Generator Stator Stud	16 N·m	12 lb ft
Starter Lead Nut	9 N·m	80 lb in
Starter Solenoid Nut	3.4 N·m	30 lb in
Transmission Cover Bolt (4.8L, 5.3L, and 6.0L)	9 N·m	80 lb in
Transmission Fill Tube Nut	18 N·m	13 lb ft
Transmission Heat Shield	17 N·m	13 lb ft

Application	Specification	
	Metric	English
Transmission Mount Nut	40 N·m	29 lb ft
Transmission Support Bolts/Nuts	70 N·m	50 lb ft

Battery Usage – Non HP2

Base	
Cold Cranking Amperage (CCA)	600 A
Reserve Capacity Rating	115 Minutes
Replacement Battery Number	78-6YR
Optional (Dual)	
Cold Cranking Amperage (CCA)	770 A
Reserve Capacity Rating	115 Minutes
Replacement Battery Number	78-7YR

Battery Usage (HP2)

Parallel Hybrid Truck (PHT) (HP2)	
GM Part Number	88986971
Replacement Battery Number	Panasonic HV1255

Battery Temperature vs Minimum Voltage

Estimated Temperature °F	Estimated Temperature °C	Minimum Voltage
70 or above	21 or above	9.6
50	10	9.4
32	0	9.1
15	-10	8.8
0	-18	8.5
Below 0	Below -18	8.0

Generator Usage

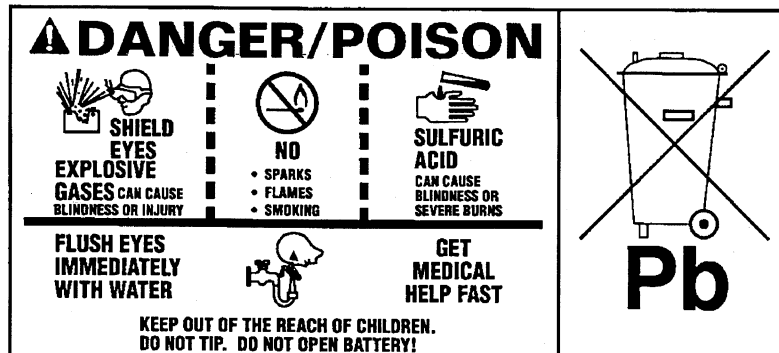
Base	
Generator Model	Delphi AD230
Rated Output	102 A
Load Test Output	71 A
Optional (Dual)	
Generator Model	Delphi AD244
Rated Output	130 A
Load Test Output	91 A
Bosch® Generator	
Generator Model	Bosch® 15755900
Rated Output	130 A
Load Test Output	91 A

Battery Description and Operation**Caution**

Batteries produce explosive gases, contain corrosive acid, and supply levels of electrical current high enough to cause burns. Therefore, to reduce the risk of personal injury when working near a battery:

- Always shield your eyes and avoid leaning over the battery whenever possible.
- Do not expose the battery to open flames or sparks.

- Do not allow the battery electrolyte to contact the eyes or the skin. Flush immediately and thoroughly any contacted areas with water and get medical help.
- Follow each step of the jump starting procedure in order.
- Treat both the booster and the discharged batteries carefully when using the jumper cables.



The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for two small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

The battery has three functions as a major source of energy:

- Engine cranking
- Voltage stabilizer
- Alternate source of energy with generator overload.

The battery specification label (example below) contains information about the following:

- The test ratings
- The original equipment catalog number
- The recommended replacement model number

CATALOG NO.

1819

CCA 770	LOAD TEST 380
REPLACEMENT MODEL 100-6YR	

A battery has 2 ratings:

- Reserve capacity
- Cold cranking amperage

When a battery is replaced use a battery with similar ratings. Refer to the battery specification label on the original battery or refer to Battery Usage .

Reserve Capacity

Reserve capacity is the amount of time in minutes it takes a fully charged battery, being discharged at a constant rate of 25 amperes and a constant temperature of 27°C (80°F) to reach a terminal voltage of 10.5 V. Refer to Battery Usage for the reserve capacity rating of the original equipment battery.

Cold Cranking Amperage

The cold cranking amperage is an indication of the ability of the battery to crank the engine at cold temperatures. The cold cranking amperage rating is the minimum amperage the battery must maintain for 30 seconds at -18°C (0°F) while maintaining at least 7.2 volts. Refer to Battery Usage for the cold cranking amperage rating for this vehicle.

Circuit Description

The battery positive terminal supplies Battery Positive voltage to the under hood fuse block and the rear fuse block. The under hood fuse block provides a cable connection for the generator and a cable connection for the starter.

The battery negative terminal is connected to chassis ground G305 and supplies ground for the AD converter in the DIM.

Starting System Description and Operation

The PG-260M and Hitachi-S14-100B are non-repairable starter motors. It has pole pieces that are arranged around the armature within the starter housing. When the solenoid windings are energized, the pull-in winding circuit is completed to ground through the starter motor. The hold-in winding circuit is completed to ground through the solenoid. The windings work together magnetically to pull in and hold in the plunger. The plunger moves the shift lever. This action causes the starter drive assembly to rotate on the armature shaft spline as it engages with the flywheel ring gear on the engine. At the same time, the plunger closes the solenoid switch contacts in the starter solenoid. Full battery voltage is then applied directly to the starter motor and it cranks the engine.

As soon as the solenoid switch contacts close, current stops flowing through the pull-in winding as battery voltage is now applied to both ends of the windings. The hold-in winding remains energized; its magnetic field is strong enough to hold the plunger, shift lever, starter drive assembly, and solenoid switch contacts in place to continue cranking the engine. When the engine starts, the pinion gear overrun sprag protects the armature from excessive speed until the switch is opened.

When the ignition switch is released from the CRANK position, voltage is removed from the starter solenoid S terminal. Current flows from the motor contacts through both windings to ground at the end of the hold-in winding. However, the direction of the current flow through the pull-in winding is now in the opposite direction of the current flow when the winding was first energized.

The magnetic fields of the pull-in and hold-in windings now oppose one another. This action of the windings, along with the help of the return spring, cause the starter drive assembly to disengage and the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter motor is turned off.

Charging System Description and Operation (W/O Generator/Battery Control Module)

Generator

The AD-230 and AD-244 generators are non-repairable. They are electrically similar to earlier models. The generators feature the following major components:

- The delta stator
- The rectifier bridge
- The rotor with slip rings and brushes
- A conventional pulley
- Dual internal fans

- A voltage regulator

The pulley and the fan cool the slip ring and the frame.

The AD stands for Air-cooled Dual internal fan; the 2 is an electrical design designator; the 30/44 denotes the outside diameter of the stator laminations in millimeters, over 100 millimeters. The generator is rated at 102 and 130 amperes respectively.

The generator features permanently lubricated bearings. Service should only include the tightening of mounting components. Otherwise, the generator is replaced as a complete unit.

Regulator

The voltage regulator controls the field current of the rotor in order to limit system voltage. The regulator switches the current on and off at a rate of 400 cycles per second in order to perform the following functions:

- Radio noise control
- Obtain the correct average current needed for proper system voltage control

At high speeds, the on-time may be 10 percent with the off-time at 90 percent. At low speeds, the on-time may be 90 percent and the off-time 10 percent.

Auxiliary Battery Charging

The auxiliary battery is charged in the same manner as the primary battery with the ignition switch in the run position and the engine running. The system contains the following components:

- Auxiliary battery.
- Auxiliary battery relay.
- Mega fuse.
- Junction block battery cable.
- Associated wiring.

The auxiliary battery relay coil is energized with the engine running through the fuse block and wiring, thus closing the relay contacts which allow the battery to be charged from the vehicle's generator via the battery junction block. The auxiliary battery relay is permanently grounded so any time the ignition switch is in the run position the relay will be energized.

The auxiliary battery is only used for accessories and is not part of the vehicle starting system. However if the primary battery fails and in need of a jump start, follow the service information for Jump Starting In Case Of Emergency using appropriate battery jumper cables.

Engine Controls

Fuel System Specifications

Use regular unleaded gasoline rated at 87 octane or higher. It is recommended that the gasoline meet specifications which have been developed by the American Automobile Manufacturers Association (AAMA) and endorsed by the Canadian Motor Vehicle Manufacturers Association for better vehicle performance and engine protection. Gasoline meeting the AAMA specification could provide improved driveability and emission control system performance compared to other gasoline. For more information, write to: American Automobile Manufacturer's Association, 7430 Second Ave, Suite 300, Detroit MI 48202.

Be sure the posted octane is at least 87. If the octane is less than 87, you may get a heavy knocking noise when you drive. If it is bad enough, it can damage your engine.

If you're using fuel rated at 87 octane or higher and you hear heavy knocking, your engine needs service. Don't worry if you hear a little pinging noise when you're accelerating or driving up a hill. That is normal and you don't have to buy a higher octane fuel to get rid of pinging. It is the heavy, constant knock that means you have a problem.

Notice

Your vehicle was not designed for fuel that contains methanol. Do not use methanol fuel which can corrode metal parts in your fuel system and also damage plastic and rubber parts. This kind of damage would not be covered under your warranty.

If your vehicle is certified to meet California Emission Standards, indicated on the under hood emission control label, your vehicle is designed to operate on fuels that meet California specifications. If such fuels are not available in states adopting California emissions standards, your vehicle will operate satisfactorily on fuels meeting federal specifications, but emission control system performance may be affected. The malfunction indicator lamp on your instrument panel may turn ON and/or your vehicle may fail a smog-check test. If this occurs, return to your authorized dealer for diagnosis to determine the cause of failure. In the event there is a determination that the cause of the condition is the type of fuels used, repairs may not be covered by your warranty.

Some gasolines that are not reformulated for low emissions may contain an octane-enhancing additive called methylcyclopentadienyl manganese tricarbonyl (MMT). Ask your service station operator whether or not the fuel contains MMT.

Engine Controls – 6.0L

Ignition System Specifications

Application	Specification	
	Metric	English
Firing Order	1-8-7-2-6-5-4-3	
Spark Plug Wire Resistance	1000 ohms per ft	
Spark Plug Torque	15 N·m	11 lb ft
Spark Plug Gap	1.52 mm	0.060 in
Spark Plug Type	25171803 [AC plug type]	
	12567759 [NGK plug type]	

Fastener Tightening Specifications

Application	Specifications	
	Metric	English
3-Phase Cable Bracket Nut	15 N·m	11 lb ft
3-Phase Cable to Starter/Generator Control Module (SGCM) Nut	9 N·m	80 lb in
Accelerator Pedal Nut	20 N·m	15 lb ft
Air Cleaner Outlet Duct Clamp	7 N·m	62 lb in
Auxiliary Heater Water Pump Bracket Bolt	15 N·m	11 lb ft

Application	Specifications	
	Metric	English
Brake Pipe Fittings to Electronic Brake Control Module (EBCM)	25 N·m	18 lb ft
Camshaft Position (CMP) Sensor Bolt	29 N·m	21 lb ft
Canister Vent Solenoid (CVS) Bracket Bolt	12 N·m	106 lb in
Crankshaft Position (CKP) Sensor Bolt	25 N·m	18 lb ft
Crossover Fuel Pipe Retainer Clip Attaching Screw	3.8 N·m	34 lb in
Electro-Hydraulic Control Unit (EHCUC) Bolts	25 N·m	18 lb ft
Engine Coolant Temperature (ECT) Sensor	20 N·m	15 lb ft
Engine Wiring Harness Bracket Nut	5 N·m	44 lb in
EVAP Canister Bolt/Nut	25 N·m	18 lb ft
EVAP Canister Bracket Bolt	25 N·m	18 lb ft
EVAP Canister Purge Solenoid Bolt	10.5 N·m	93 lb in
EVAP Vent Valve Bracket Bolt	12 N·m	106 lb in
Fuel Composition Sensor Nut	17 N·m	13 lb ft
Fuel Composition Sensor to Bracket Bolt	10 N·m	89 lb in
Fuel Feed and EVAP Pipe Assembly Nut	12 N·m	106 lb in
Fuel Feed, EVAP, and Return Pipe Assembly Nut	12 N·m	106 lb in
Fuel Line Fitting	25 N·m	18 lb ft
Fuel Pipe Bracket Nut	10 N·m	89 lb in
Fuel Rail Bolts	10 N·m	89 lb in
Fuel Return Pipe Attaching Screw	5 N·m	44 lb in
Fuel Tank Ground Strap Bolt	9 N·m	80 lb in
Fuel Tank Fill Pipe Clamp	2.5 N·m	22 lb in
Fuel Tank Filler Housing to Body Screw	2.3 N·m	20 lb in
Fuel Tank Filler Pipe Housing to Fuel Tank Fill Pipe Screw	2.3 N·m	20 lb in
Fuel Tank Shield Bolt	18 N·m	13 lb ft
Fuel Tank Strap Bolt	40 N·m	30 lb ft
Heated Oxygen Sensor (HO2S)	42 N·m	31 lb ft
Ignition Coil Bolt	8 N·m	71 lb in
Knock Sensor	20 N·m	15 lb ft
Mass Air Flow/Intake Air Temperature (MAF/IAT) Sensor Clamp	7 N·m	62 lb in
Powertrain Control Module (PCM) Electrical Connector Bolt	8 N·m	71 lb in
Rear Fuel Line Bundle Nut	12 N·m	106 lb in
Spark Plug		
New Head	20 N·m	15 lb ft
Used Head	15 N·m	11 lb ft
Starter/Generator Control Module (SGCM) Cover Bolt	9 N·m	80 lb in
Throttle Actuator Control (TAC) Module Nut	9 N·m	80 lb in
Throttle Body Nut	10 N·m	89 lb in

Exhaust System

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Exhaust Hanger Bracket Bolt	12 N·m	106 lb in
Exhaust Heat Shield Bolt (Body Panel)	9 N·m	80 lb in
Exhaust Heat Shield Nut (Body Panel)	9 N·m	80 lb in
Exhaust Manifold Bolts (4.8L, 5.3L, and 6.0L)		
First Pass	15 N·m	11 lb ft
Final Pass	25 N·m	18 lb ft
Exhaust Manifold Heat Shield Bolt (4.3L, 4.8L, 5.3L, and 6.0L)	9 N·m	80 lb in
Exhaust Manifold Pipe Nut	50 N·m	37 lb ft

Application	Specification	
	Metric	English
Exhaust Muffler Hanger Nut	50 N·m	39 lb ft
Exhaust Muffler Nut	40 N·m	30 lb ft
Exhaust Pipe Clamp	44 N·m	33 lb ft
Exhaust Pipe Hanger Bracket Bolt	12 N·m	106 lb in
Exhaust Pipe Hanger Bracket Bolt (4L60-E)	17 N·m	13 lb if
Hood Hinge Bolt	25 N·m	18 lb ft
Outlet Duct Clamp	6 N·m	53 lb in
Oxygen Sensor	42 N·m	31 lb ft
Rear Shock Absorber Lower Bolt	95 N·m	70 lb ft
Transmission Bolt	100 N·m	74 lb ft
Transmission Mount to Support Nut	40 N·m	30 lb ft
Transmission Support Crossmember Bolt	95 N·m	70 lb ft

Exhaust System Description

Important

Use of non-OEM parts may cause driveability concerns.

The exhaust system design varies according to the model designation and the intended use of the vehicle.

In order to secure the exhaust pipe to the exhaust manifold, the exhaust system utilizes a flange and seal joint coupling. A flange and gasket coupling secures the catalytic converter assembly to the muffler assembly.

Hangers suspend the exhaust system from the underbody, allowing some movement of the exhaust system and disallowing the transfer of noise and vibration into the vehicle.

Heat shields protect the vehicle from the high temperatures generated by the exhaust system.

Resonator

Some exhaust systems are equipped with a resonator. The resonator, located either before or after the muffler, allows the use of mufflers with less back pressure. Resonators are used when vehicle characteristics require specific exhaust tuning.

Catalytic Converter

The catalytic converter is an emission control device added to the engine exhaust system in order to reduce hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) pollutants from the exhaust gas.

The catalytic converter is comprised of a ceramic monolith substrate, supported in insulation and housed within a sheet metal shell. The substrate may be washcoated with 3 noble metals:

- Platinum (Pt)
- Palladium (Pd)
- Rhodium (Rh)

The catalyst in the converter is not serviceable.

Muffler

The exhaust muffler reduces the noise levels of the engine exhaust by the use of tuning tubes. The tuning tubes create channels inside the exhaust muffler that lower the sound levels created by the combustion of the engine.

Transmission/Transaxle Description and Operation

Automatic Transmission – 4L60E

Transmission General Specifications

Name	Hydra-Matic 4L60-E
RPO Codes	M30/M32/M33
Production Location	Toledo, Ohio Romulus, MI
Vehicle Platform (Engine/Transmission) Usage	C/K 800
Transmission Drive	Longitudinally-Mounted Rear Wheel Drive
1st Gear Ratio	3.059:1
2nd Gear Ratio	1.625:1
3rd Gear Ratio	1.000:1
4th Gear Ratio	0.696:1
Reverse	2.294:1
Torque Converter Size (Diameter of Torque Converter Turbine)	300 mm 258 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	DEXRON® III
Transmission Fluid Capacity (Approximate)	300 mm Converter Dry: 11.50 l (12.1 qt) 258 mm Converter Dry: 9.17 l (9.7 qt)
Transmission Type: 4	Four Forward Gears
Transmission Type: L	Longitudinal Mount
Transmission Type: 60	Product Series
Transmission Type: E	Electronic Controls
Position Quadrant	P, R, N, , D, 2, 1 P, R, N, , 3, 2, 1
Case Material	Die Cast Aluminum
Transmission Weight Dry (Approximate)	300 mm Converter 86.17 kg (190.5 lb) 258 mm Converter 68.71 kg (151.5 lb)
Transmission Weight Wet (Approximate)	300 mm Converter 98.4 kg (218.0 lb) 258 mm Converter 81.2 kg (179 lb)
Maximum Trailer Towing Capacity	6 130 kg (13,500 lb)
Maximum Gross Vehicle Weight (GVW)	3 900 kg (8,600 lb)

Fastener Tightening Specifications (M30/M32)

Application	Specification	
	Metric	English
Accumulator Cover to Case Bolt	8.0-14.0 N·m	6-10 lb ft
Case Extension to Case Bolt	42.0-48.0 N·m	31-35 lb ft
Case Extension to Case Bolt (4WD Shipping)	11.2-22.6 N·m	8.3-16.7 lb ft
Converter Cover Bolt	10 N·m	89 lb in
Converter Housing to Case Screw	65.0-75.0 N·m	48-55 lb ft
Cooler Pipe Connector	35.0-41.0 N·m	26-30 lb ft
Detent Spring to Valve Body Bolt	20.0-27.0 N·m	15-20 lb ft
Floorshift Control Bolt	10 N·m	89 lb in
Flywheel to Torque Converter Bolt	63 N·m	46 lb ft

Application	Specification	
	Metric	English
Forward Accumulator Cover to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Heat Shield to Transmission Bolt	17 N·m	13 lb ft
Line Pressure Plug	8.0-14.0 N·m	6-10 lb ft
Manual Shaft to Inside Detent Lever Nut	27.0-34.0 N·m	20-25 lb ft
Negative Battery Cable Bolt	15 N·m	11 lb ft
Oil Level Indicator Bolt	47 N·m	35 lb ft
Oil Pan to Transmission Case Bolt	11 N·m	97 lb in
Oil Passage Cover to Case Bolt	8-14.0 N·m	6-10 lb ft
Park Brake Bracket to Case Bolt	27.0-34.0 N·m	20-25 lb ft
Park/Neutral Position Switch Screw	3 N·m	27 lb in
Plate to Case Bolt (Shipping)	27.0-34.0 N·m	20-25 lb ft
Plate to Converter Bolt (Shipping)	27.0-34.0 N·m	20-25 lb ft
Plug Assembly, Automatic Transmission Oil Pan (C/K)	30-40 N·m	22.1-29.5 lb ft
Plug Assembly, Automatic Transmission Oil Pan (Y)	28-32 N·m	20.7-23.6 lb ft
Pressure Control Solenoid Bracket to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Pump Assembly to Case Bolt	26.0-32.0 N·m	19-24 lb ft
Pump Cover to Pump Body Bolt	20.0-27.0 N·m	15-20 lb ft
Shift Cable Grommet Screw	1.7 N·m	15 lb in
Shift Control Cable Attachment	20 N·m	15 lb ft
Speed Sensor Retainer Bolt	10.5-13.5 N·m	7.7-10 lb ft
Stud, Automatic Transmission Case Extension (Y-car)	18.0-22.0 N·m	13-16 lb ft
TCC Solenoid Assembly to Case Bolt	8.0-14.0 N·m	6-10 lb ft
Transmission Fluid Pressure Manual Valve Position Switch to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Transmission Mount to Transmission Bolt	50 N·m	37 lb ft
Transmission Mount Retaining Nut	40 N·m	30 lb ft
Transmission Oil Cooler Pipe Fitting	35.0-41.0 N·m	26-30 lb ft
Transmission Oil Pan to Case Bolt	9.5-13.8 N·m	7-10 lb ft
Transmission to Engine Bolt	47 N·m	35 lb ft
Valve Body to Case Bolt	8.0-14.0 N·m	6-10 lb ft

Fluid Capacity Specifications

Application	Specification	
	Metric	English
Bottom Pan Removal	4.7 liters	5 quarts
Complete Overhaul	10.6 liters	11 quarts
(measurements are approximate)		

Transmission Component and System Description

The 4L60E transmission consists primarily of the following components:

- A torque converter with an electronically controlled capacity clutch (ECCC) This transmission is equipped with an ECCC. The pressure plate does not fully lock to the torque converter cover. Instead, the pressure plate maintains a small amount of slippage, about 20 RPM, in SECOND, THIRD, and FOURTH gears, depending on the vehicle application. ECCC was developed to reduce the possibility of noise, vibration, or chuggle caused by TCC apply. Typical apply speeds are 49-52 km/h (30-32 mph) in THIRD gear and 65-73 km/h (40-45 mph) in FOURTH gear. Full lockup is available at highway speeds on some applications.
- Servo assembly and 2-4 band assembly
- Reverse input clutch and housing
- Overrun clutch
- Forward clutch

- 3-4 clutch
- Forward sprag clutch assembly
- Lo and reverse roller clutch assembly
- Lo and reverse clutch assembly
- Two planetary gear sets: Input and Reaction
- Oil pump assembly
- Control valve body assembly

The electrical components of the 4L60-E are as follows:

- 1-2 and 2-3 shift solenoid valves
- 3-2 shift solenoid valve assembly
- Transmission pressure control (PC) solenoid
- Torque converter clutch (TCC) solenoid valve
- TCC pulse width modulation (PWM) solenoid valve
- Automatic transmission fluid pressure (TFP) manual valve position switch
- Automatic transmission fluid temperature (TFT) sensor
- Vehicle speed sensor assembly

Adapt Function

Transmission Adapt Function

The 4L60-E transmission uses a line pressure control system, which has the ability to continuously adapt the system's line pressure. This compensates for normal wear of the following parts:

- The clutch fiber plates
- The seals
- The springs

The PCM maintains the Upshift Adapt parameters for the transmission. The PCM monitors the AT ISS sensor and the AT OSS during commanded shifts in order to determine if a shift is occurring too fast or too slow. The PCM adjusts the signal from the transmission pressure control solenoid in order to maintain a set shift feel.

Transmission adapts must be reset whenever the transmission is overhauled or replaced.

Automatic Transmission Shift Lock Control Description

The automatic transmission shift lock control is a safety device that prevents an inadvertent shift out of PARK when the ignition is ON. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components:

- The automatic transmission shift lock control solenoid.
- The automatic transmission shift lock control switch.
- The park/neutral position switch.

With the ignition in the ON position, battery positive voltage is supplied to the park/neutral position switch. With the transmission in the PARK position, the contacts in the park/neutral position switch are closed. This allows current to flow through the switch to the automatic transmission shift lock control switch. The circuit continues through the normally-closed switch to the automatic transmission shift lock control solenoid. The automatic transmission shift lock control solenoid is permanently grounded. This energizes the automatic transmission shift lock control solenoid, locking the shift linkage in the PARK position. When the driver presses the brake pedal, the contacts in the automatic transmission shift lock control switch open, causing the automatic transmission shift lock control solenoid to release. This allows the shift lever to move from the PARK position.

Abbreviations and Meanings

Abbreviation	Meaning
A	
A	Ampere(s)
ABS	Antilock Brake System
A/C	Air Conditioning
AC	Alternating Current
ACC	Accessory, Automatic Climate Control
ACL	Air Cleaner
ACR4	Air Conditioning Refrigerant, Recovery, Recycling, Recharging
AD	Automatic Disconnect
A/D	Analog to Digital
ADL	Automatic Door Lock
A/F	Air/Fuel Ratio
AH	Active Handling
AIR	Secondary Air Injection
ALC	Automatic Level Control, Automatic Lamp Control
AM/FM	Amplitude Modulation/Frequency Modulation
Ant	Antenna
AP	Accelerator Pedal
APCM	Accessory Power Control Module
API	American Petroleum Institute
APP	Accelerator Pedal Position
APT	Adjustable Part Throttle
ASM	Assembly, Accelerator and Servo Control Module
ASR	Acceleration Slip Regulation
A/T	Automatic Transmission/Transaxle
ATC	Automatic Transfer Case, Automatic Temperature Control
ATDC	After Top Dead Center
ATSLC	Automatic Transmission Shift Lock Control
Auto	Automatic
avg	Average
A4WD	Automatic Four-Wheel Drive
AWG	American Wire Gage
B	
B+	Battery Positive Voltage
BARO	Barometric Pressure
BATT	Battery
BBV	Brake Booster Vacuum
BCA	Bias Control Assembly
BCM	Body Control Module
BHP	Brake Horsepower
BLK	Black
BLU	Blue
BP	Back Pressure
BPCM	Battery Pack Control Module
BPMV	Brake Pressure Modulator Valve
BPP	Brake Pedal Position
BRN	Brown

BTDC	Before Top Dead Center
BTM	Battery Thermal Module
BTSI	Brake Transmission Shift Interlock
Btu	British Thermal Units
C	
°C	Degrees Celsius
CAC	Charge Air Cooler
CAFE	Corporate Average Fuel Economy
Cal	Calibration
Cam	Camshaft
CARB	California Air Resources Board
CC	Coast Clutch
cm ³	Cubic Centimeters
CCM	Convenience Charge Module, Chassis Control Module
CCOT	Cycling Clutch Orifice Tube
CCP	Climate Control Panel
CD	Compact Disc
CE	Commutator End
CEAB	Cold Engine Air Bleed
CEMF	Counter Electromotive Force
CEX	Cabin Exchanger
cfm	Cubic Feet per Minute
cg	Center of Gravity
CID	Cubic Inch Displacement
CKP	Crankshaft Position
CKT	Circuit
C/Ltr	Cigar Lighter
CL	Closed Loop
CLS	Coolant Level Switch
CMC	Compressor Motor Controller
CMP	Camshaft Position
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Coax	Coaxial
COMM	Communication
Conn	Connector
CPA	Connector Position Assurance
CPP	Clutch Pedal Position
CPS	Central Power Supply
CPU	Central Processing Unit
CRT	Cathode Ray Tube
CRTC	Cathode Ray Tube Controller
CS	Charging System
CSFI	Central Sequential Fuel Injection
CTP	Closed Throttle Position
cu ft	Cubic Foot/Feet
cu in	Cubic Inch/Inches
CV	Constant Velocity Joint
CVRSS	Continuously Variable Road Sensing Suspension

Cyl	Cylinder(s)
D	
DAB	Delayed Accessory Bus
dB	Decibels
dBA	Decibels on A-weighted Scale
DC	Direct Current, Duty Cycle
DCM	Door Control Module
DE	Drive End
DEC	Digital Electronic Controller
DERM	Diagnostic Energy Reserve Module
DI	Distributor Ignition
dia	Diameter
DIC	Driver Information Center
Diff	Differential
DIM	Dash Integration Module
DK	Dark
DLC	Data Link Connector
DMCM	Drive Motor Control Module
DMM	Digital Multimeter
DMSDS	Drive Motor Speed and Direction Sensor
DMU	Drive Motor Unit
DOHC	Dual Overhead Camshafts
DR, Drvr	Driver
DRL	Daytime Running Lamps
DTC	Diagnostic Trouble Code
E	
EBCM	Electronic Brake Control Module
EBTCM	Electronic Brake and Traction Control Module
EC	Electrical Center, Engine Control
ECC	Electronic Climate Control
ECI	Extended Compressor at Idle
ECL	Engine Coolant Level
ECM	Engine Control Module, Electronic Control Module
ECS	Emission Control System
ECT	Engine Coolant Temperature
EEPROM	Electrically Erasable Programmable Read Only Memory
EEVIR	Evaporator Equalized Values in Receiver
EFE	Early Fuel Evaporation
EGR	Exhaust Gas Recirculation
EGR TVV	Exhaust Gas Recirculation Thermal Vacuum Valve
EHPS	Electro-Hydraulic Power Steering
EI	Electronic Ignition
ELAP	Elapsed
ELC	Electronic Level Control
E/M	English/Metric
EMF	Electromotive Force
EMI	Electromagnetic Interference
Eng	Engine
EOP	Engine Oil Pressure
EOT	Engine Oil Temperature

EPA	Environmental Protection Agency
EPR	Exhaust Pressure Regulator
EPROM	Erasable Programmable Read Only Memory
ESB	Expansion Spring Brake
ESC	Electronic Suspension Control
ESD	Electrostatic Discharge
ESN	Electronic Serial Number
ETC	Electronic Throttle Control, Electronic Temperature Control, Electronic Timing Control
ETCC	Electronic Touch Climate Control
ETR	Electronically Tuned Receiver
ETS	Enhanced Traction System
EVAP	Evaporative Emission
EVO	Electronic Variable Orifice
Exh	Exhaust
F	
°F	Degrees Fahrenheit
FC	Fan Control
FDC	Fuel Data Center
FED	Federal All United States except California
FEDS	Fuel Enable Data Stream
FEX	Front Exchanger
FF	Flexible Fuel
FFH	Fuel-Fired Heater
FI	Fuel Injection
FMVSS	Federal U.S. Motor Vehicle Safety Standards
FP	Fuel Pump
ft	Foot/Feet
FT	Fuel Trim
F4WD	Full Time Four-Wheel Drive
4WAL	Four-Wheel Antilock
4WD	Four-Wheel Drive
FW	Flat Wire
FWD	Front Wheel Drive, Forward
G	
g	Grams, Gravitational Acceleration
GA	Gage, Gauge
gal	Gallon
gas	Gasoline
GCW	Gross Combination Weight
Gen	Generator
GL	Gear Lubricant
GM	General Motors
GM SPO	General Motors Service Parts Operations
gnd	Ground
gpm	Gallons per Minute
GRN	Green
GRY	Gray
GVWR	Gross Vehicle Weight Rating

H	
H	Hydrogen
H ₂ O	Water
Harn	Harness
HC	Hydrocarbons
H/CMPR	High Compression
HD	Heavy Duty
HDC	Heavy Duty Cooling
hex	Hexagon, Hexadecimal
Hg	Mercury
Hi Alt	High Altitude
HO ₂ S	Heated Oxygen Sensor
hp	Horsepower
HPL	High Pressure Liquid
HPS	High Performance System
HPV	High Pressure Vapor
HPVS	Heat Pump Ventilation System
Htd	Heated
HTR	Heater
HUD	Head-up Display
HVAC	Heater-Ventilation-Air Conditioning
HVACM	Heater-Vent-Air Conditioning Module
HVIL	High Voltage Interlock Loop
HVM	Heater Vent Module
Hz	Hertz
I	
IAC	Idle Air Control
IAT	Intake Air Temperature
IC	Integrated Circuit, Ignition Control
ICCS	Integrated Chassis Control System
ICM	Ignition Control Module
ID	Identification, Inside Diameter
IDI	Integrated Direct Ignition
IGBT	Insulated Gate Bi-Polar Transistor
ign	Ignition
ILC	Idle Load Compensator
in	Inch/Inches
INJ	Injection
inst	Instantaneous, Instant
IP	Instrument Panel
IPC	Instrument Panel Cluster
IPM	Instrument Panel Module
I/PEC	Instrument Panel Electrical Center
ISC	Idle Speed Control
ISO	International Standards Organization
ISS	Input Speed Shaft, Input Shaft Speed
K	
KAM	Keep Alive Memory
KDD	Keyboard Display Driver
kg	Kilogram

kHz	Kilohertz
km	Kilometer
km/h	Kilometers per Hour
km/l	Kilometers per Liter
kPa	Kilopascals
KS	Knock Sensor
kV	Kilovolts
L	
L	Liter
L4	Four Cylinder Engine, In-Line
L6	Six-Cylinder Engine, In-Line
lb	Pound
lb ft	Pound Feet Torque
lb in	Pound Inch Torque
LCD	Liquid Crystal Display
LDCL	Left Door Closed Locking
LDCM	Left Door Control Module
LDM	Lamp Driver Module
LED	Light Emitting Diode
LEV	Low Emissions Vehicle
LF	Left Front
lm	Lumens
LR	Left Rear
LT	Left
LT	Light
LT	Long Term
LTPI	Low Tire Pressure Indicator
LTPWS	Low Tire Pressure Warning System
M	
MAF	Mass Air Flow
Man	Manual
MAP	Manifold Absolute Pressure
MAT	Manifold Absolute Temperature
max	Maximum
M/C	Mixture Control
MDP	Manifold Differential Pressure
MFI	Multiport Fuel Injection
mi	Miles
MIL	Malfunction Indicator Lamp
min	Minimum
MIN	Mobile Identification Number
mL	Milliliter
mm	Millimeter
mpg	Miles per Gallon
mph	Miles per Hour
ms	Millisecond
MST	Manifold Surface Temperature
MSVA	Magnetic Steering Variable Assist, Magnasteer®
M/T	Manual Transmission/Transaxle
MV	Megavolt

mV	Millivolt
N	
NAES	North American Export Sales
NC	Normally Closed
NEG	Negative
Neu	Neutral
NI	Neutral Idle
NiMH	Nickel Metal Hydride
NLGI	National Lubricating Grease Institute
N·m	Newton-meter Torque
NO	Normally Open
NOx	Oxides of Nitrogen
NPTC	National Pipe Thread Coarse
NPTF	National Pipe Thread Fine
NOVRAM	Non-Volatile Random Access Memory
O	
O ₂	Oxygen
O ₂ S	Oxygen Sensor
OBD	On-Board Diagnostics
OBD II	On-Board Diagnostics Second Generation
OC	Oxidation Converter Catalytic
OCS	Opportunity Charge Station
OD	Outside Diameter
ODM	Output Drive Module
ODO	Odometer
OE	Original Equipment
OEM	Original Equipment Manufacturer
OHC	Overhead Camshaft
ohms	Ohm
OL	Open Loop, Out of Limits
ORC	Oxidation Reduction Converter Catalytic
ORN	Orange
ORVR	On-Board Refueling Vapor Recovery
OSS	Output Shaft Speed
oz	Ounce(s)
P	
PAG	Polyalkylene Glycol
PAIR	Pulsed Secondary Air Injection
PASS, PSGR	Passenger
PASS-Key®	Personalized Automotive Security System
P/B	Power Brakes
PC	Pressure Control
PCB	Printed Circuit Board
PCM	Powertrain Control Module
PCS	Pressure Control Solenoid
PCV	Positive Crankcase Ventilation
PEB	Power Electronics Bay
PID	Parameter Identification
PIM	Power Inverter Module
PM	Permanent Magnet Generator

P/N	Part Number
PNK	Pink
PNP	Park/Neutral Position
PRNDL	Park, Reverse, Neutral, Drive, Low
POA	Pilot Operated Absolute Valve
POS	Positive, Position
POT	Potentiometer Variable Resistor
PPL	Purple
ppm	Parts per Million
PROM	Programmable Read Only Memory
P/S, PS	Power Steering
PSCM	Power Steering Control Module, Passenger Seat Control Module
PSD	Power Sliding Door
PSP	Power Steering Pressure
psi	Pounds per Square Inch
psia	Pounds per Square Inch Absolute
psig	Pounds per Square Inch Gauge
pt	Pint
PTC	Positive Temperature Coefficient
PWM	Pulse Width Modulated
Q	
QDM	Quad Driver Module
qt	Quart(s)
R	
R-12	Refrigerant-12
R-134a	Refrigerant-134a
RAM	Random Access Memory, Non-permanent memory device, memory contents are lost when power is removed.
RAP	Retained Accessory Power
RAV	Remote Activation Verification
RCDLR	Remote Control Door Lock Receiver
RDCM	Right Door Control Module
Ref	Reference
Rev	Reverse
REX	Rear Exchanger
RIM	Rear Integration Module
RF	Right Front, Radio Frequency
RFA	Remote Function Actuation
RFI	Radio Frequency Interference
RH	Right Hand
RKE	Remote Keyless Entry
Rly	Relay
ROM	Read Only Memory, Permanent memory device, memory contents are retained when power is removed.
RPM	Revolutions per Minute Engine Speed
RPO	Regular Production Option
RR	Right Rear
RSS	Road Sensing Suspension
RTD	Real Time Damping
RT	Right

RTV	Room Temperature Vulcanizing Sealer
RWAL	Rear Wheel Antilock
RWD	Rear Wheel Drive
S	
s	Second(s)
SAE	Society of Automotive Engineers
SC	Supercharger
SCB	Supercharger Bypass
SCM	Seat Control Module
SDM	Sensing and Diagnostic Module
SEO	Special Equipment Option
SFI	Sequential Multiport Fuel Injection
SI	System International Modern Version of Metric System
SIAB	Side Impact Air Bag
SIR	Supplemental Inflatable Restraint
SLA	Short/Long Arm Suspension
sol	Solenoid
SO ₂	Sulfur Dioxide
SP	Splice Pack
S/P	Series/Parallel
SPO	Service Parts Operations
SPS	Service Programming System, Speed Signal
sq ft, ft ²	Square Foot/Feet
sq in, in ²	Square Inch/Inches
SRC	Service Ride Control
SRI	Service Reminder Indicator
SRS	Supplemental Restraint System
SS	Shift Solenoid
ST	Scan Tool
STID	Station Identification Station ID
S4WD	Selectable Four-Wheel Drive
Sw	Switch
SWPS	Steering Wheel Position Sensor
syn	Synchronizer
T	
TAC	Throttle Actuator Control
Tach	Tachometer
TAP	Transmission Adaptive Pressure, Throttle Adaptive Pressure
TBI	Throttle Body Fuel Injection
TC	Turbocharger, Transmission Control
TCC	Torque Converter Clutch
TCS	Traction Control System
TDC	Top Dead Center
TEMP	Temperature
Term	Terminal
TFP	Transmission Fluid Pressure
TFT	Transmission Fluid Temperature
THM	Turbo Hydro-Matic
TIM	Tire Inflation Monitoring, Tire Inflation Module
TOC	Transmission Oil Cooler

TP	Throttle Position
TPA	Terminal Positive Assurance
TPM	Tire Pressure Monitoring, Tire Pressure Monitor
TR	Transmission Range
TRANS	Transmission/Transaxle
TT	Tell Tail Warning Lamp
TV	Throttle Valve
TVRS	Television and Radio Suppression
TVV	Thermal Vacuum Valve
TWC	Three Way Converter Catalytic
TWC+OC	Three Way + Oxidation Converter Catalytic
TXV	Thermal Expansion Valve
U	
UART	Universal Asynchronous Receiver Transmitter
U/H	Underhood
U/HEC	Underhood Electrical Center
U-joint	Universal Joint
UTD	Universal Theft Deterrent
UV	Ultraviolet
V	
V	Volt(s), Voltage
V6	Six-Cylinder Engine, V-Type
V8	Eight-Cylinder Engine, V-Type
Vac	Vacuum
VAC	Vehicle Access Code
VATS	Vehicle Anti-Theft System
VCIM	Vehicle Communication Interface Mode
VCM	Vehicle Control Module
V dif	Voltage Difference
VDOT	Variable Displacement Orifice Tube
VDV	Vacuum Delay Valve
vel	Velocity
VES	Variable Effort Steering
VF	Vacuum Fluorescent
VIO	Violet
VIN	Vehicle Identification Number
VLR	Voltage Loop Reserve
VMV	Vacuum Modulator Valve
VR	Voltage Regulator
V ref	Voltage Reference
VSES	Vehicle Stability Enhancement System
VSS	Vehicle Speed Sensor
W	
w/	With
W/B	Wheel Base
WHL	Wheel
WHT	White
w/o	Without
WOT	Wide Open Throttle
W/P	Water Pump

W/S	Windshield
WSS	Wheel Speed Sensor
WU-OC	Warm Up Oxidation Converter Catalytic
WU-TWC	Warm Up Three-Way Converter Catalytic
X	
X-valve	Expansion Valve
Y	
yd	Yard(s)
YEL	Yellow

**This page
intentionally left
blank.**

Conversion - English/Metric

English	Multiply/ Divide by	Metric
In order to calculate English measurement, divide by the number in the center column.		
In order to calculate metric measurement, multiply by the number in the center column.		
Length		
in	25.4	mm
ft	0.3048	m
yd	0.9144	
mi	1.609	km
Area		
sq in	645.2	sq mm
	6.45	sq cm
sq ft	0.0929	sq m
sq yd	0.8361	
Volume		
cu in	16,387.00	cu mm
	16.387	cu cm
	0.0164	L
qt	0.9464	
gal	3.7854	
cu yd	0.764	cu m
Mass		
lb	0.4536	kg
ton	907.18	
	0.907	tonne (t)
Force		
Kg F	9.807	newtons (N)
oz F	0.278	
lb F	4.448	
Acceleration		
ft/s ²	0.3048	m/s ²
ln/s ²	0.0254	
Torque		
Lb in	0.11298	N·m
lb ft	1.3558	
Power		
hp	0.745	kW
Pressure (Stress)		
inches of H2O	0.2488	kPa
lb/sq in	6.895	
Energy (Work)		
Btu	1055	J (J= one Ws)
lb ft	1.3558	
kW hour	3,600,000.00	
Light		
Foot Candle	10.764	lm/m ²

Velocity		
mph	1.6093	km/h
Temperature		
(°F - 32) 5/9	=	°C
°F	=	(9/5 °C + 32)
Fuel Performance		
235.215/mpg	=	100 km/L

Equivalents - Decimal and Metric

Fraction (in)	Decimal (in)	Metric (mm)
1/64	0.015625	0.39688
1/32	0.03125	0.79375
3/64	0.046875	1.19062
1/16	0.0625	1.5875
5/64	0.078125	1.98437
3/32	0.09375	2.38125
7/64	0.109375	2.77812
1/8	0.125	3.175
9/64	0.140625	3.57187
5/32	0.15625	3.96875
11/64	0.171875	4.36562
3/16	0.1875	4.7625
13/64	0.203125	5.15937
7/32	0.21875	5.55625
15/64	0.234375	5.95312
1/4	0.25	6.35
17/64	0.265625	6.74687
9/32	0.28125	7.14375
19/64	0.296875	7.54062
5/16	0.3125	7.9375
21/64	0.328125	8.33437
11/32	0.34375	8.73125
23/64	0.359375	9.12812
3/8	0.375	9.525
25/64	0.390625	9.92187
13/32	0.40625	10.31875
27/64	0.421875	10.71562
7/16	0.4375	11.1125
29/64	0.453125	11.50937
15/32	0.46875	11.90625
31/64	0.484375	12.30312
1/2	0.5	12.7
33/64	0.515625	13.09687
17/32	0.53125	13.49375
35/64	0.546875	13.89062
9/16	0.5625	14.2875
37/64	0.578125	14.68437
19/32	0.59375	15.08125
39/64	0.609375	15.47812
5/8	0.625	15.875
41/64	0.640625	16.27187

Fraction (in)	Decimal (in)	Metric (mm)
21/32	0.65625	16.66875
43/64	0.671875	17.06562
11/16	0.6875	17.4625
45/64	0.703125	17.85937
23/32	0.71875	18.25625
47/64	0.734375	18.65312
3/4	0.75	19.05
49/64	0.765625	19.44687
25/32	0.78125	19.84375
51/64	0.796875	20.24062
13/16	0.8125	20.6375
53/64	0.828125	21.03437
27/32	0.84375	21.43125
55/64	0.859375	21.82812
7/8	0.875	22.225
57/64	0.890625	22.62187
29/32	0.90625	23.01875
59/64	0.921875	23.41562
15/16	0.9375	23.8125
61/64	0.953125	24.20937
31/32	0.96875	24.60625
63/64	0.984375	25.00312
1	1.0	25.4

**This page
intentionally left
blank.**

Fasteners

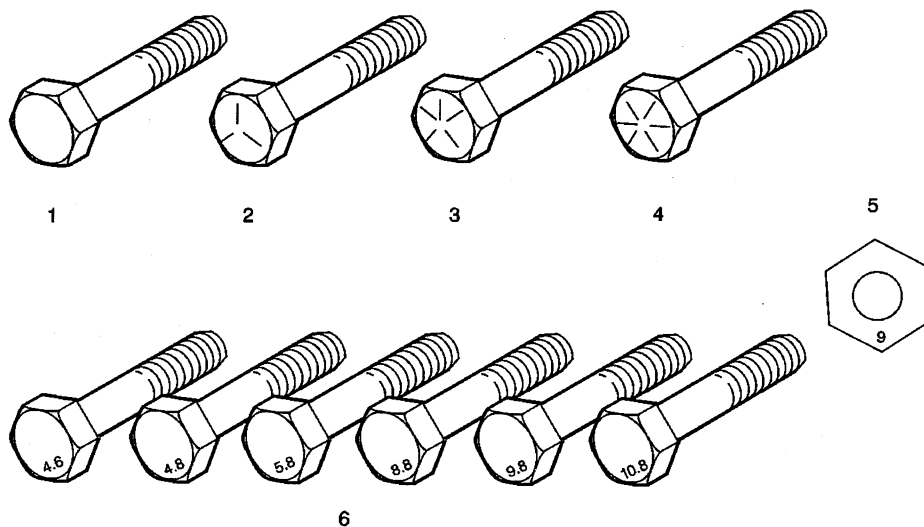
Metric Fasteners

This vehicle provides fastener dimensions using the metric system. Most metric fasteners are approximate in diameter to equivalent English fasteners. Make replacements using fasteners of the same nominal diameter, thread pitch, and strength.

A number marking identifies the OE metric fasteners except cross-recess head screws. The number also indicates the strength of the fastener material. A Posidrive® or Type 1A cross-recess identifies a metric cross-recess screw. For best results, use a Type 1A cross-recess screwdriver, or equivalent, in Posidrive® recess head screws.

GM Engineering Standards and North American Industries have adopted a portion of the ISO-defined standard metric fastener sizes. The purpose was to reduce the number of fastener sizes used while retaining the best thread qualities in each thread size. For example, the metric M6.0 X 1 screw, with nearly the same diameter and 25.4 threads per inch replaced the English 1/4-20 and 1/4-28 screws. The thread pitch is midway between the English coarse and fine thread pitches.

Fastener Strength Identification



1. English Bolt, Grade 2 (Strength Class)
2. English Bolt, Grade 5 (Strength Class)
3. English Bolt, Grade 7 (Strength Class)
4. English Bolt, Grade 8 (Strength Class)
5. Metric Nut, Strength Class 9
6. Metric Bolts, Strength Class Increases as Numbers Increase

The most commonly used metric fastener strength property classes are 9.8 and 10.9. The class identification is embossed on the head of each bolt. The English, inch strength classes range from grade 2 to grade 8. Radial lines are embossed on the head of each bolt in order to identify the strength class. The number of lines on the head of the bolt is 2 lines less than the actual grade. For example, a grade 8 bolt will have 6 radial lines on the bolt head. Some metric nuts are marked with a single digit strength identification number on the nut face.

The correct fasteners are available through GM SPO. Many metric fasteners available in the aftermarket parts channels are designed to metric standards of countries other than the United States, and may exhibit the following:

- Lower strength
- No numbered head marking system
- Wrong thread pitch

The metric fasteners on GM products are designed to new, international standards. The following are the common sizes and pitches, except for special applications:

- M6.0 X 1
- M8 X 1.25
- M10 X 1.5
- M12 X 1.75
- M14 X 2.00
- M16 X 2.00

Prevailing Torque Fasteners

Prevailing torque fasteners create a thread interface between the fastener and the fastener counterpart in order to prevent the fastener from loosening.

All Metal Prevailing Torque Fasteners

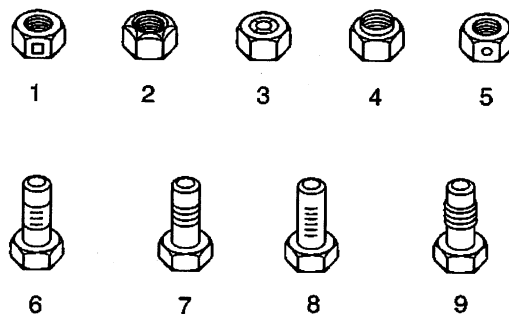
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

Nylon Interface Prevailing Torque Fasteners

These fasteners accomplish the thread interface by the presence of a nylon material on the fastener threads.

Adhesive Coated Fasteners

These fasteners accomplish the thread interface by the presence of a thread-locking compound on the fastener threads. Refer to the appropriate repair procedure in order to determine if the fastener may be reused and the applicable thread-locking compound to apply to the fastener.



1. Prevailing Torque Nut, Center Lock Type
2. Prevailing Torque Nut, Top Lock Type
3. Prevailing Torque Nut, Nylon Patch Type
4. Prevailing Torque Nut, Nylon Washer Insert Type
5. Prevailing Torque Nut, Nylon Insert Type

6. Prevailing Torque Bolt, Dry Adhesive Coating Type
7. Prevailing Torque Bolt, Thread Profile Deformed Type
8. Prevailing Torque Bolt, Nylon Strip Type
9. Prevailing Torque Bolt, Out-of-Round Thread Area Type

A prevailing torque fastener may be reused ONLY if:

- The fastener and the fastener counterpart are clean and not damaged
- There is no rust on the fastener
- The fastener develops the specified minimum torque against its counterpart prior to the fastener seating

Metric Prevailing Torque Fastener Minimum Torque Development

Application	Specification	
	Metric	English
All Metal Prevailing Torque Fasteners		
6 mm	0.4 N·m	4 lb in
8 mm	0.8 N·m	7 lb in
10 mm	1.4 N·m	12 lb in
12 mm	2.1 N·m	19 lb in
14 mm	3 N·m	27 lb in
16 mm	4.2 N·m	37 lb in
20 mm	7 N·m	62 lb in
24 mm	10.5 N·m	93 lb in
Nylon Interface Prevailing Torque Fasteners		
6 mm	0.3 N·m	3 lb in
8 mm	0.6 N·m	5 lb in
10 mm	1.1 N·m	10 lb in
12 mm	1.5 N·m	13 lb in
14 mm	2.3 N·m	20 lb in
16 mm	3.4 N·m	30 lb in
20 mm	5.5 N·m	49 lb in
24 mm	8.5 N·m	75 lb in

English Prevailing Torque Fastener Minimum Torque Development

Application	Specification	
	Metric	English
All Metal Prevailing Torque Fasteners		
1/4 in	0.5 N·m	4.5 lb in
5/16 in	0.8 N·m	7.5 lb in
3/8 in	1.3 N·m	11.5 lb in
7/16 in	1.8 N·m	16 lb in
1/2 in	2.3 N·m	20 lb in
9/16 in	3.2 N·m	28 lb in
5/8 in	4 N·m	36 lb in
3/4 in	7 N·m	54 lb in
Nylon Interface Prevailing Torque Fasteners		
1/4 in	0.3 N·m	3 lb in
5/16 in	0.6 N·m	5 lb in
3/8 in	1 N·m	9 lb in
7/16 in	1.3 N·m	12 lb in
1/2 in	1.8 N·m	16 lb in
9/16 in	2.5 N·m	22 lb in
5/8 in	3.4 N·m	30 lb in
3/4 in	5 N·m	45 lb in

2005 Chevrolet Truck Silverado SS STANDARD EQUIPMENT

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
		Air bags , frontal, driver and right front passenger, includes Passenger Sensing System	S
	CJ3	Air conditioning , dual-zone, manual, individual climate settings for driver and right front passenger	S
		Assist handles , front passenger and outboard rear seats	S
		Cigarette lighter , on instrument panel	S
		Coat hooks , driver and passenger side	S
	DK7	Console , overhead mini, includes map lights 1 - Not available with (CF5) Sunroof, power.	S ¹
	K34	Cruise control , electronic with set and resume speed, includes telltale in instrument panel cluster	S
		Cupholders , in console	S
	C49	Defogger , rear-window, electric 1 - Not available with (A28) Glass, rear sliding.	S ¹
	AU3	Door locks , power	S
		Driver Information Center , includes trip odometer and message center (monitors numerous systems depending on vehicle equipment level including low fuel, turn signal "on", transmission temperature and oil change notification) 1 - With (UK3) Sound system feature, steering wheel mounted radio controls, includes trip and fuel information selections and programmable personalization features.	S ¹
	B30	Floor covering , color-keyed carpeting and carpeted floor mats	S
		Instrumentation , analog, includes speedometer, odometer with trip odometer, fuel level, voltmeter, engine hour meter, temperature, oil pressure, transmission temperature gauge, tachometer and white instrument cluster	S
	AU0	Keyless entry , remote, includes 2 transmitters, panic button and content theft alarm	S
		Lighting , dome lamp, reading, backlit instrument panel switches, rear map lights and door handle-activated illuminated entry	S
	DF5	Mirror , inside rearview, 8-point compass, passenger sensing system indicator light, and outside temperature indicator	S
		Power outlets , auxiliary, covered, 2 dash-mounted, 12-volt	S
	AE7	Seats , front 40/20/40 split-bench, 3-passenger, driver and passenger manual reclining, includes center fold-down armrest with storage, adjustable outboard head restraints and storage pockets 1 - Not available with (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer.	S ¹
		Seats , rear bench, full width, folding, 3-passenger (includes child seat top tether anchor)	S

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
	**D	Seat trim , Custom Cloth, Dark Charcoal 1 - Not available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	S ¹
	UB0	Sound system , ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume and Radio Data System (RDS) 1 - Upgradeable to (UB1) Sound system, ETR AM/FM stereo with CD and cassette player or (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer. Requires (AE7) Seats, front 40/20/40 split bench.	S ¹
		Steering column , Tilt-Wheel, adjustable, includes brake/transmission shift interlock	S
	NP5	Steering wheel , leather-wrapped rim, Black, includes theft-deterrent locking feature	S
		Theft-deterrent system , PASSlock II	S
		Tools , mechanical jack and wheel wrench, spare tire assist hook, floor-mounted in back of cab	S
		Visors , padded, Shale-colored, driver and passenger side with cloth trim, extenders, pocket on driver side and vanity mirror on passenger side	S
		Warning tones , headlamp on, key-in-ignition, driver and passenger buckle up reminder, turn signal on	S
	A31	Windows , power, includes driver and passenger express-down	S
		Windows , rear quarter swing-out	S
	VF1	Bumper , front, integrated, with color-keyed front fascia	S
	VF3	Bumper , rear, integrated, with color-keyed rear fascia	S
		Daytime running lamps , includes automatic exterior lamp control	S
		Glass , Solar-Ray light tinted, all windows	S
	AJ1	Glass , Solar-Ray deep tinted (all windows except light tinted glass on windshield, driver and front passenger)	S
	TRB	Grille , color-keyed	S
		Headlamps , dual halogen composite, includes flash-to-pass feature and automatic lamp control	S
		Lamps , dual cargo area lamps	S
	DL3	Mirrors , outside rearview, power folding, power, heated, color-keyed, driver side electrochromic (light-sensitive auto dimming), turn signal in glass and curb-tilt	S
	ZY1	Paint , solid	S
	E63	Pickup bed , Fleetside box	S
	SAF	Spare tire lock , keyed cylinder lock that utilizes same key as ignition and door	S
		Tire carrier , outside spare, winch-type mounted under frame at rear, steel wheel located at rear underbody of vehicle	S
	QSS	Tires , P275/55R20, touring, blackwall	S
		Tire , spare, P265/75R16, blackwall, steel wheel located at rear underbody of vehicle 1 - Requires CK15753 Models.	S ¹

2005 Chevrolet Truck Silverado SS STANDARD EQUIPMENT

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High- Performance Package 1SS ¹
	ZAN	Tire , spare, P265/70R17, blackwall, steel wheel located at rear underbody of vehicle 1 - Requires CC15753 Models.	S ¹
	P35	Wheels , 4 - 20" x 8.5" (50.8 cm x 21.6 cm) chrome	S
		Wheel , spare, 16" x 6.5" (40.6 cm x 16.5 cm) steel	S
		Wipers , intermittent, front, wet-arm with pulse washers	S
	KG3	Alternator , 145 amps	S
		Battery , heavy-duty, 600 cold-cranking amps, includes rundown protection and retained accessory power	S
	JC4	Brakes , 4-wheel antilock, 4-wheel disc, heavy-duty	S
	KC4	Cooling , external engine oil cooler, heavy-duty air-to-oil, integral to driver side of radiator tank	S
	KNP	Cooling , external transmission oil cooler, auxiliary, heavy-duty air-to-oil	S
	G80	Differential , locking, heavy-duty, rear	S
	LQ9	Engine , Vortec high-output 6000 V8 SFI (345 HP [257.0 kW] @ 5200 rpm, 380 lb. -ft. [513.0 N-m] @ 4000 rpm)	S
		Exhaust , high-performance "throaty" exhaust with NASCAR inspired polished exhaust tip	S
		Frame , ladder-type, hydroformed	S
	C7H	GVWR , 6400 lbs. (2903 kg)	S
	GT4	Rear axle , 3.73 ratio 1 - Requires CC15753 Models.	S ¹
		Steering , power	S
		Suspension , front, independent torsion bar, and stabilizer bar	S
		Suspension , rear, semi-elliptic 4-stage multi-leaf springs	S
	Z60	Suspension Package , High-performance	S
	NW7	Traction assist system , electronic 1 - Requires CC15753 Models.	S ¹
	NP3	Transfer case , AWD electronic automatic system	S
	M32	Transmission , 4-speed automatic, heavy-duty, electronically controlled with overdrive, tow/haul mode and external transmission oil cooler (Must specify)	S

2005 Chevrolet Truck Silverado SS EQUIPMENT GROUPS

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

No deletions allowed to Equipment Groups. Additional options may be added; check ordering information section for compatibility.

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description	Ext. Cab
			High- Performance Package 1SS ¹
	B4U	Silverado SS	■

2005 Chevrolet Truck Silverado SS EQUIPMENT GROUPS

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

No deletions allowed to Equipment Groups. Additional options may be added; check ordering information section for compatibility.

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description	Ext. Cab
			High-Performance Package 1SS ¹
	B4U	Silverado SS	■
ADDITIONAL OPTIONS			
Free Flow RPO Code	Ref. Only RPO Code	Description	Ext. Cab
			High-Performance Package 1SS ¹
CJ2		Air conditioning , dual-zone, automatic, individual climate settings for driver and right front passenger	A
UE1		OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, stolen vehicle tracking, emergency services, roadside assistance, remote door unlock, remote horn and lights, GM Goodwrench remote diagnostics, AccidentAssist and online concierge. Drivers can also obtain the available voice-activated, hands-free Personal Calling service and Virtual Advisor that provides location-based traffic and weather reports and other personalized information 1 - Requires (UK3) Sound system feature, steering wheel mounted radio controls. Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands.	A ¹
PDB		Safe and Sound Package , includes (U2K) Sound system feature, XM satellite radio, (UE1) OnStar, (UB1) Sound system, AM/FM stereo with CD and cassette player or (UC6) Sound system, AM/FM stereo with 6-disc CD changer and (AN3) Seats, front power reclining full-feature buckets 1 - Requires (UK3) Sound system feature, steering wheel mounted controls. - Package does not include (U2K) Sound system feature, XM Satellite Radio when ordered outside the 48 contiguous United States. Not available with a ship-to of Puerto Rico or the Virgin Islands.	A ¹
R6Q		Safe and Sound Package discount not desired	A
AN3		Seats , front leather seating surfaces power reclining full-feature buckets, includes adjustable head restraints, floor console, driver and passenger power lumbar, driver and front passenger 10-way power adjustable, dual inboard armrests, heated driver and passenger cushion and back, 2-position driver-side memory and storage pockets	A
AG1		Seat adjuster , power, driver 6-way 1 - With (AN3) Seats, front power reclining full-feature buckets, includes 10-way adjuster.	A ¹
DNH		Regular production accessory , underseat storage, rear, lockable. This is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A

ADDITIONAL OPTIONS			
Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab High-Performance Package 1SS ¹
UB1		Sound system , ETR AM/FM stereo with CD and cassette player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS) (with bucket seats includes Bose speaker system, Bose amplifier and Bose subwoofer) 1 - When (AN3) Seats, front leather seating surfaces power reclining full-feature buckets are ordered, an additional charge will be incurred for the above mentioned Bose system enhancements.	A ¹
UC6		Sound system , ETR AM/FM stereo with 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS), and Bose speaker system (includes 6-speakers, Bose amplifier and Bose Subwoofer) 1 - Requires and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	A ¹
UK3		Sound system feature , steering wheel mounted radio controls, Radio and Driver Information Center (DIC). Provides access to enhanced Driver Information Center (DIC) features and information	A
U2K		Sound system feature , XM Satellite Radio. 100% commercial-free music. Over 120 channels. In-depth local traffic and weather in major metro markets. Digital quality sound with coast-to-coast signal coverage. 3-month trial - no charge and no obligation. 1 - Subscription fees apply. - Available only in the 48 contiguous U.S.	A ¹
CF5		NEW! Sunroof , power, tilt-sliding, electric with express-open and wind deflector, includes (UG1) HomeLink, Universal Transmitter 1 - Requires (CJ2) Air conditioning, dual-zone, automatic. Not available with (AE7) Seats, front 40/20/40 split-bench.	A ¹
A28		Window , rear sliding 1 - Deletes (C49) Defogger, rear-window, electric when ordered.	A ¹
E95		Regular production accessory , Tonneau cover, Black, soft. The cover is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A
EN6		Regular production accessory , Tonneau cover, Black, hard, folding, lockable. The cover is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A
P30		Wheels , 4-20" x 8.5" (50.8 cm x 21.6 cm) aluminum, sport	A
YF5		Emissions , California state requirements	A
FE9		Emissions , Federal requirements	A
NE1		Emissions , Maine, Massachusetts, New York or Vermont state requirements	A
NB8		Emissions override , California, Massachusetts or New York (for vehicles ordered by dealers in states of California, Massachusetts or New York with Federal emissions) 1 - Requires (FE9) Emissions, Federal requirements.	A ¹

ADDITIONAL OPTIONS			
Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High- Performance Package 1SS ¹
NC7		Emissions override , Federal (for vehicles ordered by dealers in Federal emission states with California, New York, Vermont, Massachusetts or Maine emissions; may also be used by dealers in states of California, New York, Vermont, Massachusetts or Maine to order different state-specific emissions) 1 - Requires (YF5) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements.	A ¹
K05		Engine block heater	A
GT5		Rear axle, 4.10 ratio 1 - Standard on CK15753 Models only.	A ¹
Z82		Trailer equipment , heavy-duty, includes trailering hitch platform, 7-wire harness (harness includes wires for: park lamps, backup lamps, right turn, left turn, electric brake lead, battery and ground) with independent fused trailering circuits mated to a 7-way sealed connector, 7-way to 4-way trailer adapter, instrument panel jumper wiring harness for electric trailer brake controller, and 1-way sealed connector for center high-mounted stop/brake lamp. Also includes (K47) Air cleaner, high capacity	A

2005 Chevrolet Truck Silverado SS PEG STAIRSTEP

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

No deletions allowed to Equipment Groups. Additional options may be added; check ordering information section for compatibility.

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description	Ext. Cab
			High- Performance Package 1SS ¹
	B4U	Silverado SS	■

2005 Chevrolet Truck Silverado SS INTERIOR

S = Standard Equipment A = Available - (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
		Air bags , frontal, driver and right front passenger, includes Passenger Sensing System	S
	CJ3	Air conditioning , dual-zone, manual, individual climate settings for driver and right front passenger	S
	CJ2	Air conditioning , dual-zone, automatic, individual climate settings for driver and right front passenger	A
		Assist handles , front passenger and outboard rear seats	S
		Cigarette lighter , on instrument panel	S
		Coat hooks , driver and passenger side	S
	D07	Console , floor, includes CD carrier, storage bin, rear cupholders, rear seat HVAC air duct and outlets 1 - Included and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	A ¹
	DK7	Console , overhead mini, includes map lights 1 - Not available with (CF5) Sunroof, power.	S ¹
	DK8	Console , overhead deluxe 1 - Included and only available with (CF5) Sunroof, power.	A ¹
	K34	Cruise control , electronic with set and resume speed, includes telltale in instrument panel cluster	S
		Cupholders , in console	S
	C49	Defogger , rear-window, electric 1 - Not available with (A28) Glass, rear sliding.	S ¹
	AU3	Door locks , power	S
		Driver Information Center , includes trip odometer and message center (monitors numerous systems depending on vehicle equipment level including low fuel, turn signal "on", transmission temperature and oil change notification) 1 - With (UK3) Sound system feature, steering wheel mounted radio controls, includes trip and fuel information selections and programmable personalization features.	S ¹
	B30	Floor covering , color-keyed carpeting and carpeted floormats	S
		Instrumentation , analog, includes speedometer, odometer with trip odometer, fuel level, voltmeter, engine hour meter, temperature, oil pressure, transmission temperature gauge, tachometer and white instrument cluster	S
	AU0	Keyless entry , remote, includes 2 transmitters, panic button and content theft alarm	S
		Lighting , dome lamp, reading, backlit instrument panel switches, rear map lights and door handle-activated illuminated entry	S
	DF5	Mirror , inside rearview, 8-point compass, passenger sensing system indicator light, and outside temperature indicator	S

2005 Chevrolet Truck Silverado SS INTERIOR

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
UE1		OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, stolen vehicle tracking, emergency services, roadside assistance, remote door unlock, remote horn and lights, GM Goodwrench remote diagnostics, AccidentAssist and online concierge. Drivers can also obtain the available voice-activated, hands-free Personal Calling service and Virtual Advisor that provides location-based traffic and weather reports and other personalized information 1 - Requires (UK3) Sound system feature, steering wheel mounted radio controls. Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands.	A ¹
		Power outlets , auxiliary, covered, 2 dash-mounted, 12-volt	S
PDB		Safe and Sound Package , includes (U2K) Sound system feature, XM satellite radio, (UE1) OnStar, (UB1) Sound system, AM/FM stereo with CD and cassette player or (UC6) Sound system, AM/FM stereo with 6-disc CD changer and (AN3) Seats, front power reclining full-feature buckets 1 - Requires (UK3) Sound system feature, steering wheel mounted controls. - Package does not include (U2K) Sound system feature, XM Satellite Radio when ordered outside the 48 contiguous United States. Not available with a ship-to of Puerto Rico or the Virgin Islands.	A ¹
R6Q		Safe and Sound Package discount not desired	A
	AE7	Seats , front 40/20/40 split-bench, 3-passenger, driver and passenger manual reclining, includes center fold-down armrest with storage, adjustable outboard head restraints and storage pockets 1 - Not available with (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer.	S ¹
AN3		Seats , front leather seating surfaces power reclining full-feature buckets, includes adjustable head restraints, floor console, driver and passenger power lumbar, driver and front passenger 10-way power adjustable, dual inboard armrests, heated driver and passenger cushion and back, 2-position driver-side memory and storage pockets	A
		Seats , rear bench, full width, folding, 3-passenger (includes child seat top tether anchor)	S
AG1		Seat adjuster , power, driver 6-way 1 - With (AN3) Seats, front power reclining full-feature buckets, includes 10-way adjuster.	A ¹
	AG2	Seat adjuster , power, front passenger 10-way 1 - Included and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	A ¹
	**D	Seat trim , Custom Cloth, Dark Charcoal 1 - Not available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	S ¹
	**2	Seat trim , leather, Dark Charcoal 1 - Included and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets. Includes front leather seating surfaces with rear vinyl bench.	A ¹
DNH		Regular production accessory , underseat storage, rear, lockable. This is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A
	UB0	Sound system , ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume and Radio Data System (RDS) 1 - Upgradeable to (UB1) Sound system, ETR AM/FM stereo with CD and cassette player or (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer. Requires (AE7) Seats, front 40/20/40 split bench.	S ¹

2005 Chevrolet Truck Silverado SS INTERIOR

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
UB1		Sound system , ETR AM/FM stereo with CD and cassette player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS) (with bucket seats includes Bose speaker system, Bose amplifier and Bose subwoofer) 1 - When (AN3) Seats, front leather seating surfaces power reclining full-feature buckets are ordered, an additional charge will be incurred for the above mentioned Bose system enhancements.	A ¹
UC6		Sound system , ETR AM/FM stereo with 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS), and Bose speaker system (includes 6-speakers, Bose amplifier and Bose Subwoofer) 1 - Requires and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets.	A ¹
UK3		Sound system feature , steering wheel mounted radio controls, Radio and Driver Information Center (DIC). Provides access to enhanced Driver Information Center (DIC) features and information	A
U2K		Sound system feature , XM Satellite Radio. 100% commercial-free music. Over 120 channels. In-depth local traffic and weather in major metro markets. Digital quality sound with coast-to-coast signal coverage. 3-month trial - no charge and no obligation. 1 - Subscription fees apply. - Available only in the 48 contiguous U.S.	A ¹
		Steering column , Tilt-Wheel, adjustable, includes brake/transmission shift interlock	S
	NP5	Steering wheel , leather-wrapped rim, Black, includes theft-deterrent locking feature	S
CF5		NEW! Sunroof , power, tilt-sliding, electric with express-open and wind deflector, includes (UG1) HomeLink, Universal Transmitter 1 - Requires (CJ2) Air conditioning, dual-zone, automatic. Not available with (AE7) Seats, front 40/20/40 split-bench.	A ¹
		Theft-deterrent system , PASSlock II	S
		Tools , mechanical jack and wheel wrench, spare tire assist hook, floor-mounted in back of cab	S
	UG1	Universal transmitter , HomeLink 1 - Included and only available with (CF5) Sunroof, power.	A ¹
		Visors , padded, Shale-colored, driver and passenger side with cloth trim, extenders, pocket on driver side and vanity mirror on passenger side	S
		Warning tones , headlamp on, key-in-ignition, driver and passenger buckle up reminder, turn signal on	S
	A31	Windows , power, includes driver and passenger express-down	S
		Windows , rear quarter swing-out	S
A28		Window , rear sliding 1 - Deletes (C49) Defogger, rear-window, electric when ordered.	A ¹

2005 Chevrolet Truck Silverado SS EXTERIOR

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
	VF1	Bumper, front, integrated, with color-keyed front fascia	S
	VF3	Bumper, rear, integrated, with color-keyed rear fascia	S
		Daytime running lamps, includes automatic exterior lamp control	S
		Glass, Solar-Ray light tinted, all windows	S
	AJ1	Glass, Solar-Ray deep tinted (all windows except light tinted glass on windshield, driver and front passenger)	S
	TRB	Grille, color-keyed	S
		Headlamps, dual halogen composite, includes flash-to-pass feature and automatic lamp control	S
		Lamps, dual cargo area lamps	S
	DL3	Mirrors, outside rearview, power folding, power, heated, color-keyed, driver side electrochromic (light-sensitive auto dimming), turn signal in glass and curb-tilt	S
	ZY1	Paint, solid	S
	E63	Pickup bed, Fleetside box	S
E95		Regular production accessory, Tonneau cover, Black, soft. The cover is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A
EN6		Regular production accessory, Tonneau cover, Black, hard, folding, lockable. The cover is dealer installed and shipped separately from vehicle to parts department with VIN identification on packaging. (SPO-supplied, dealer installed)	A
	B4U	Silverado SS	■
	SAF	Spare tire lock, keyed cylinder lock that utilizes same key as ignition and door	S
		Tire carrier, outside spare, winch-type mounted under frame at rear, steel wheel located at rear underbody of vehicle	S
	QSS	Tires, P275/55R20, touring, blackwall	S
		Tire, spare, P265/75R16, blackwall, steel wheel located at rear underbody of vehicle 1 - Requires CK15753 Models.	S ¹
	ZAN	Tire, spare, P265/70R17, blackwall, steel wheel located at rear underbody of vehicle 1 - Requires CC15753 Models.	S ¹
P30		Wheels, 4-20" x 8.5" (50.8 cm x 21.6 cm) aluminum, sport	A
	P35	Wheels, 4 - 20" x 8.5" (50.8 cm x 21.6 cm) chrome	S
		Wheel, spare, 16" x 6.5" (40.6 cm x 16.5 cm) steel	S

2005 Chevrolet Truck Silverado SS EXTERIOR

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High- Performance Package 1SS ¹
		Wipers, intermittent, front, wet-arm with pulse washers	S

2005 Chevrolet Truck Silverado SS MECHANICAL

S = Standard Equipment A = Available -- (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Codes listed in the shaded column titled Ref. Only RPO Code are for internal use only and should not be ordered.

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High-Performance Package 1SS ¹
	K47	Air cleaner , high-capacity 1 - Included and only available with (Z82) Trailing equipment, heavy-duty.	A ¹
	KG3	Alternator , 145 amps	S
		Battery , heavy-duty, 600 cold-cranking amps, includes rundown protection and retained accessory power	S
	JC4	Brakes , 4-wheel antilock, 4-wheel disc, heavy-duty	S
	KC4	Cooling , external engine oil cooler, heavy-duty air-to-oil, integral to driver side of radiator tank	S
	KNP	Cooling , external transmission oil cooler, auxiliary, heavy-duty air-to-oil	S
	G80	Differential , locking, heavy-duty, rear	S
YF5		Emissions , California state requirements	A
FE9		Emissions , Federal requirements	A
NE1		Emissions , Maine, Massachusetts, New York or Vermont state requirements	A
NB8		Emissions override , California, Massachusetts or New York (for vehicles ordered by dealers in states of California, Massachusetts or New York with Federal emissions) 1 - Requires (FE9) Emissions, Federal requirements.	A ¹
NC7		Emissions override , Federal (for vehicles ordered by dealers in Federal emission states with California, New York, Vermont, Massachusetts or Maine emissions; may also be used by dealers in states of California, New York, Vermont, Massachusetts or Maine to order different state-specific emissions) 1 - Requires (YF5) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements.	A ¹
K05		Engine block heater	A
	LQ9	Engine , Vortec high-output 6000 V8 SFI (345 HP [257.0 kW] @ 5200 rpm, 380 lb. -ft. [513.0 N-m] @ 4000 rpm)	S
		Exhaust , high-performance "throaty" exhaust with NASCAR inspired polished exhaust tip	S
		Frame , ladder-type, hydroformed	S
	C7H	GVWR , 6400 lbs. (2903 kg)	S
	GT4	Rear axle , 3.73 ratio 1 - Requires CC15753 Models.	S ¹
GT5		Rear axle , 4.10 ratio 1 - Standard on CK15753 Models only.	A ¹
		Steering , power	S
		Suspension , front, independent torsion bar, and stabilizer bar	S

2005 Chevrolet Truck Silverado SS MECHANICAL

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment group 1SS available on C*15753 Models.	Ext. Cab
			High- Performance Package 1SS ¹
		Suspension , rear, semi-elliptic 4-stage multi-leaf springs	S
	Z60	Suspension Package , High-performance	S
Z82		Trailer equipment , heavy-duty, includes trailering hitch platform, 7-wire harness (harness includes wires for: park lamps, backup lamps, right turn, left turn, electric brake lead, battery and ground) with independent fused trailering circuits mated to a 7-way sealed connector, 7-way to 4-way trailer adapter, instrument panel jumper wiring harness for electric trailer brake controller, and 1-way sealed connector for center high-mounted stop/brake lamp. Also includes (K47) Air cleaner, high capacity	A
	NW7	Traction assist system , electronic 1 - Requires CC15753 Models.	S ¹
	NP3	Transfer case , AWD electronic automatic system	S
	M32	Transmission , 4-speed automatic, heavy-duty, electronically controlled with overdrive, tow/haul mode and external transmission oil cooler (Must specify)	S

S = Standard Equipment A = Available – (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Model	Engine	Transmissions	Axles		GVWR lbs. (kg)
		M32 4-Speed Automatic	GT4 3.73	GT5 4.10	C7H 6400 (2903)
CK15753	LQ9 High output Vortec 6000 SFI V8	S	--	S	S
CC15753	LQ9 High output Vortec 6000 SFI V8	S	S	A	S

S = Standard Equipment A = Available – (dashes) = Not Available

■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

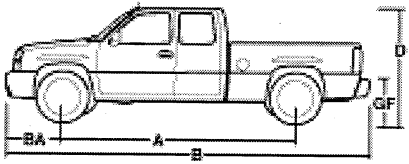
Decor Level	Seat Type	Seat Code	Seat Trim	Interior
				Dark Charcoal
SS	Front 40/20/40 split-bench	AE7	Custom Cloth	69D ¹
SS	Front full-feature reclining buckets	AN3	Leather seating surfaces ²	692

Exterior Solid Paint	Color Code	Touch Up Paint Number	Interior
			Dark Charcoal
Black	41U	WA-8555	A
NEW! Silver Birch Metallic	59U	WA-926L	A
Victory Red	74U	WA-9260	A

1 - Not available with (AN3) Seats, front leather seating surfaces, power reclining full-feature buckets.

2 - Included and only available with (AN3) Seats, front leather seating surfaces power reclining full-feature buckets. Includes front leather seating surfaces with rear vinyl bench.

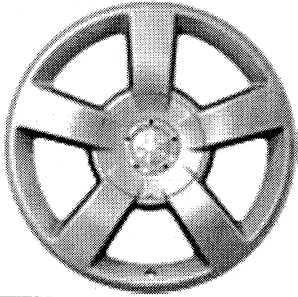
All dimensions in inches (mm) unless otherwise stated.

		Specifications	Ext. Cab Standard Box AWD CK15753	Ext. Cab Standard Box 2WD CC15753
	B	Overall length	227.70 (5784)	227.70 (5784)
	A	Wheelbase	143.50 (3645)	143.50 (3645)
	C	Body width	78.50 (1994)	78.50 (1994)
	D	Overall height	73.90 (1877)	TBD
		Head room, front	41.00 (1041)	41.00 (1041)
		Head room, rear	38.40 (975)	38.40 (975)
		Shoulder room, front	65.20 (1656)	65.20 (1656)
		Hip room, front	61.40 (1560)	61.40 (1560)
		Hip room, rear	61.50 (1562)	61.50 (1562)
		Leg room, front	41.30 (1049)	41.30 (1049)
		Leg room, rear	33.70 (856)	33.70 (856)
	CA	Cab to axle	41.90 (1064)	41.90 (1064)
	BA	Front bumper to axle	36.90 (937)	36.90 (937)
	BBC	Front bumper to rear of cab	138.50 (3518)	138.50 (3518)
		Rear bumper to axle	47.00 (1194)	47.00 (1194)
	GF	Ground to top of rear load floor	32.90 (836)	32.90 (836)
	IWR	Opening width, tailgate, top	63.80 (1621)	63.80 (1621)
	ILF	Inside length, at floor	78.60 (1996)	78.60 (1996)
		Inside height	19.50 (495)	19.50 (495)
		Shoulder room, rear	66.30 (1684)	66.30 (1684)
		Inside width, at floor	64.80 (1646)	64.80 (1646)

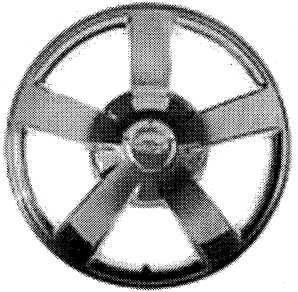
All dimensions in inches (mm) unless otherwise stated.				
		Specifications	Ext. Cab Standard Box AWD CK15753	Ext. Cab Standard Box 2WD CC15753
		Ground clearance, front	8.00 (203)	8.00 (203)
		Ground clearance, rear	8.30 (211)	8.30 (211)
	IWW	Inside width, between wheelhousing	50.00 (1270)	50.00 (1270)
Published dimensions indicated are without optional equipment or accessories. Additional accessories or equipment ordered at the customer's request can result in a minor change in these dimensions.				

2005 Chevrolet Truck Silverado SS SPECS

	Ext. Cab Standard Box AWD CK15753	Ext. Cab Standard Box 2WD CC15753
Specifications		
Front Shock Absorbers Diameter, in. (mm)	1.26 (32)	1.26 (32)
Front Stabilizer Bar Diameter, in. (mm)	28.60 (726)	28.60 (726)
Rear Shock Absorber Diameter, in. (mm)	1.26 (32)	1.26 (32)
Rear Stabilizer Bar Diameter, in. (mm)	TBD	TBD
Turning diameter, curb-to-curb, ft. (m)	47.3 (14.4)	TBD
Capacities		
Front Axle, lbs. (kg)	3925 (1780)	3925 (1780)
Front Springs, lbs. (kg)	3925 (1780)	3925 (1780)
Rear Axle, lbs. (kg)	4000 (1814)	4000 (1814)
Rear Springs, lbs. (kg)	4000 (1814)	4000 (1814)
Curb Weight, lbs. (kg)	5013 (2274)	TBD
Cargo Volume, cargo box, cu. ft. (liters)	56.9 (1611.4)	56.9 (1611.4)
Payload ¹ , lbs. (kg)	1787 (811)	TBD
Gross Vehicle Weight Rating, lbs. (kg)	6400 (2903)	6400 (2903)
Front Gross Axle Weight Rating, lbs. (kg)	3925 (1780)	3925 (1780)
Rear Gross Axle Weight Rating, lbs. (kg)	4000 (1814)	4000 (1814)
Fuel capacity, gallon (liters)	26 (98)	26 (98)
Seating capacity, max. (front/rear)	3/3	3/3
1. Maximum payload capacity includes weight of driver, passengers, optional equipment and cargo		

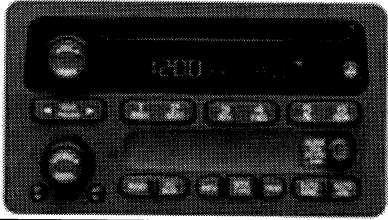
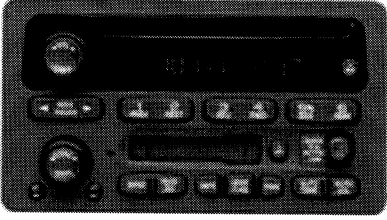
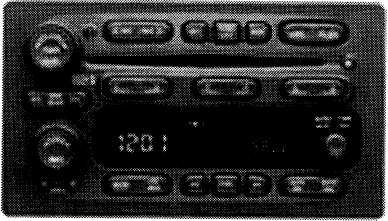


P30

Wheels, 4-20" x 8.5" (50.8 cm x 21.6 cm) aluminum, sport

P35

Wheels, 4 - 20" x 8.5" (50.8 cm x 21.6 cm) chrome

	<p>UB0</p> <p>Sound system, ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume and Radio Data System (RDS)</p>
	<p>UB1</p> <p>Sound system, ETR AM/FM stereo with CD and cassette player, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS) (with bucket seats includes Bose speaker system, Bose amplifier and Bose subwoofer)</p>
	<p>UC6</p> <p>Sound system, ETR AM/FM stereo with 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, speed-compensated volume, TheftLock, Radio Data System (RDS), and Bose speaker system (includes 6-speakers, Bose amplifier and Bose Subwoofer)</p>

Option Code	Description
**2	Seat trim, leather
**D	Seat trim, Custom Cloth
A28	Window, rear sliding
A31	Windows, power
AE7	Seats, front 40/20/40 split-bench, 3-passenger
AG1	Seat adjuster, power, driver 6-way
AG2	Seat adjuster, power
AJ1	Glass, Solar-Ray deep tinted
AN3	Seats, front leather seating surfaces power reclining full-feature buckets
AU0	Keyless entry, remote
AU3	Door locks, power
B30	Floor covering, color-keyed carpeting
B4U	Silverado SS
C49	Defogger, rear-window, electric
C7H	GVWR, 6400 lbs. (2903 kg)
CF5	Sunroof, power
CJ2	Air conditioning, dual-zone, automatic
CJ3	Air conditioning, dual-zone, manual
D07	Console, floor
DF5	Mirror, inside rearview
DK7	Console, overhead mini
DK8	Console, overhead deluxe
DL3	Mirrors, outside rearview
DNH	Regular production accessory, underseat storage
E63	Pickup bed, Fleetside
E95	Regular production accessory, Tonneau cover, Black, soft.
EN6	Regular production accessory, Tonneau cover, Black, hard, folding, lockable.
FE9	Emissions, Federal requirements
G80	Differential, locking, heavy-duty, rear
GT4	Rear axle, 3.73 ratio
GT5	Rear axle, 4.10 ratio
JC4	Brakes, 4-wheel antilock, 4-wheel disc
K05	Engine block heater
K34	Cruise control
K47	Air cleaner, high-capacity
KC4	Cooling, external engine oil cooler, heavy-duty air-to-oil, integral to driver side of radiator tank
KG3	Alternator, 145 amps
KNP	Cooling, external transmission oil cooler
LQ9	Engine, Vortec high-output 6000 V8 SFI
M32	Transmission, 4-speed automatic, heavy-duty
NB8	Emissions override
NC7	Emissions override, Federal
NE1	Emissions, Maine, Massachusetts, New York or Vermont state requirements
NP3	Transfer case, AWD electronic automatic system
NP5	Steering wheel, leather-wrapped rim
NW7	Traction assist system, electronic
P30	Wheels, 4-20" x 8.5" (50.8 cm x 21.6 cm) aluminum, sport
P35	Wheels, 4 - 20" x 8.5" (50.8 cm x 21.6 cm) chrome

Option Code	Description
PDB	Safe and Sound Package, includes (U2K) Sound system feature
QSS	Tires, P275/55R20, touring, blackwall
R6Q	Safe and Sound Package discount not desired
SAF	Spare tire lock
TRB	Grille, color-keyed
U2K	Sound system feature, XM Satellite Radio
UB0	Sound system, ETR AM/FM stereo with CD player
UB1	Sound system, ETR AM/FM stereo with CD and cassette player
UC6	Sound system, ETR AM/FM stereo with 6-disc CD changer
UE1	OnStar
UG1	Universal transmitter, HomeLink
UK3	Sound system feature, steering wheel mounted radio controls
VF1	Bumper, front, integrated, with color-keyed front fascia
VF3	Bumper, rear, integrated, with color-keyed rear fascia
YF5	Emissions, California state requirements
Z60	Suspension Package, High-performance
Z82	Trailer equipment, heavy-duty
ZAN	Tire, spare, P265/70R17, blackwall
ZY1	Paint, solid

Maximum trailer ratings are calculated assuming standard equipped vehicle, driver and required trailering equipment. The weight of optional equipment, passengers and cargo will reduce the maximum trailer weight your vehicle can tow. 10 to 15% of the trailer weight is the recommended trailer tongue load.

Automatic Transmission Ratings with Ball Hitch		
Model	(LQ9) Vortec high-output 6000 V8 SFI	
	Axle Ratio	Maximum Trailer Weight lbs. (kg)
CK15753	4.10	7500 (3402)

Addition of trailer tongue weight cannot cause vehicle weights to exceed Rear Gross Axle Weight Rating (RGAWR) of Gross Vehicle Weight Rating (GVWR).

5th wheel hitch is not recommended on a Silverado SS.

GCWR For Engine/Rear Axle Ratio Combination with Automatic Transmission	
Engine	(GCWR) Gross Combination Weight Ratings lbs. (kg)
	13000 (5897)
(LQ9) Vortec high-output 6000 V8 SFI	4.10

