Chevrolet

Equinox

2005

Table of Contents

Product Information

Equinox Brings Innovation, Efficiency And Comfort To Compact Suv Class

Equinox is Chevrolet's all-new entry in the growing compact SUV market – but one that is significantly larger, more versatile and efficient than almost all other competitors while bringing a new balance of style, comfort and capability to the segment.

As one of the few compact SUVs equipped with a standard V-6 engine, Equinox is powered by GM's 3400 3.4L V-6, rated at 185 horsepower (138 kw) and 210 lb.-ft. (285 Nm) of torque. This durable overhead valve engine is coupled to an electronically controlled five-speed automatic transmission, resulting in a powertrain that delivers smooth, strong acceleration along with reduced highway cruising engine speeds for excellent fuel economy.

Owners can equip the front-drive Equinox with an innovative on-demand all-wheel-drive system, which delivers power to the front wheels during normal driving conditions but seamlessly transfers power to the rear wheels if front wheel slippage is detected. While primarily intended for on-road use, this AWD system also provides excellent traction and mobility for off-road use.

Boasting the longest wheelbase and largest door openings among compact SUVs, as well as a wide stance, Equinox provides generous comfort for five adults and delivers a degree of versatility and innovation simply not found in its class.

Innovative sliding rear seat

One such innovative feature is a wide rear seat that can be moved nearly 8 inches (203 mm) fore or aft. In the aft position, the 60/40 split-folding multi-flex rear seat provides generous legroom for three full-size adults along with two recline positions. With the seat all the way forward, Equinox offers 68.6 cubic feet (1,943L) of cargo space. Because the rear seatback is split, Equinox can still carry up to two rear passengers and long cargo items. The front passenger seat folds flat, further extending cargo room length. When folded, the hard front seatback can be used as a table or desktop.

At the rear, a removable shelf can be positioned several ways to carry two levels of cargo. The panel has carpet on one side and a washable plastic surface on the other for messy loads, plus handy grocery bag hooks. A built-in leg turns the shelf into a convenient table for tailgate parties.

Stable yet smooth ride

Equinox's solid body architecture is complemented by an independent MacPherson strut suspension up front and a four-link coil spring layout in the rear for a smooth, comfortable ride normally associated with larger SUVs, even on unpaved surfaces. The rear suspension has a trailing arm plus three additional locating links to facilitate a low, wide load floor and maximum rear passenger space. Equinox also boasts the longest wheelbase in its class.

Equinox is equipped with vented front disc brakes with dual piston calipers and rear brake drums. Anti-lock brakes are standard on AWD models, and available on FWD versions. Traction control is standard on FWD versions equipped with ABS.

All Equinox models come standard with an innovative electric power steering system that provides precise control and performance, along with improved fuel economy. An electronic control unit, calibrated for a variety of desired performance characteristics, controls an electric motor mounted adjacent to the steering column to provide the precise amount of assist needed for any given driving situation. Its variable-ratio steering delivers a responsive feel during highway driving and low effort for easier parking.

Safety/convenience features

Dual-stage frontal air bags and safety belt pretensioners complement the strong safety cage construction of Equinox. 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.

Pretensioners in the outboard front safety belt system deploy at the same time as the frontal air bags to take up slack in the safety belt webbing. Pretensioners also help reduce the amount of occupant movement in the event of a crash to help reduce the risk of injury.

Optional head curtain side air bags act like a protective curtain when deployed, unfolding from the roof rail between the A-pillar and side window header. When the bag deploys in a moderate to severe side impact, it is angled somewhat toward the window to help provide protection for front- and rear-seat outboard passengers.

Rear seats are equipped with the LATCH (Lower Anchors and Tethers for CHildren) system anchors for child safety seats. This system provides two lower anchors and a top tether anchor in all three rear seat positions to be used to secure a child seat to the vehicle seat structure. These anchorages are designed to make it easier to properly install compatible child safety seats.

Starting with the Equinox, Chevrolet is making information about child safety seat installation more accessible to consumers shopping for a vehicle. Specific pages on the Chevy web site tell customers exactly how many car seats a vehicle can hold, where the seats can be placed, and where to find the LATCH hardware. The child seat web pages can be accessed from the main vehicle sections of the Chevy site (www.chevy.com) or directly at www.chevy.com/childseats.

Equinox has a comprehensive list of standard comfort and convenience features such as air conditioning; 16-inch wheels; multi-flex sliding and split-folding rear seat; flat folding front passenger seat; manual height adjuster on the driver seat; daytime running lamps; multi-tier cargo storage system; folding outside rearview mirrors; power door locks, mirror and windows; remote keyless entry; and AM/FM stereo with CD player.

Available features include leather-trimmed seats and steering wheel (LT only), heated front seats (LT with leather only), six-way power driver seat with manual lumbar adjustment, electrochromic inside rearview mirror with temperature and compass, redundant radio controls on the steering wheel, power sunroof with shade, 17-inch aluminum wheels, OnStar safety and security package (LT only), six-disc CD changer and MP3 player; and XM Satellite Radio (continental U.S. only).

Vehicle Highlights

- All-new model for 2005
- Standard V-6 power with five-speed automatic
- Longest wheelbase, largest door openings among compact SUVs
- Innovative sliding rear seat for maximum passenger comfort or cargo room
- Front drive or available on-demand all-wheel drive
- Multi-tier cargo configuration
- SUV ride and stability with nimble handling
- Standard electric power steering

Model Lineup

	Engine	Transmission
	3400 3.4L V-6	**5-spd auto (Aisin AF33-5)**
Equinox LS FWD	S	s
Equinox LT FWD	S	s
Equinox LS AWD	S	s
Equinox LT AWD	S	s

Standard s
Optional o
Not available –

Specifications

Overview	
Models:	Chevrolet Equinox LS FWD, AWD; LT FWD, AWD
Body style / driveline:	5-passenger, 4-door SUV, front-engine, front- or all-wheel drive
Construction:	welded galvanized steel monocoque
EPA vehicle class:	compact sport utility vehicle
Manufacturing location:	Ingersoll, Ontario, Canada
Key competitors:	Ford Escape, Jeep Liberty, Honda CR-V, Hyundai Santa Fe, Kia Sorento, Toyota RAV4, Mazda Tribute, Mitsubishi Outlander, Land Rover Freelander

Engine	
Type:	3.4L V-6
Displacement (cu in / cc):	204 / 3350
Bore & stroke (in / mm):	3.62 x 3.31 / 92 x 84
Block material:	cast iron
Cylinder head material:	aluminum alloy
Valvetrain:	overhead valves, 2 valves per cylinder, hydraulic roller valve lifters
Ignition system:	coil on plug
Fuel delivery:	sequential multi-port fuel injection
Compression ratio:	9.5:1
Horsepower (hp / kw @ rpm):	185 / 138 @ 5200
Torque (lb-ft / Nm @ rpm):	210 / 285 @ 3800
Recommended fuel:	87 octane
Emissions controls:	mass air flow measurement, heated oxygen sensor, split-brick close-coupled catalytic converter, exhaust gas recirculation, evaporative collection and purging system
Estimated fuel economy:	
MPG (city / hwy / combined)	FWD / AWD: 19 / 25 / 22
MPIG (city / hwy / combined)	FWD / AWD: 22 / 33 / 26
L/100km (city / hwy / combined)	FWD / AWD: 12.7 / 8.6 / 10.9

Transmission	
Type:	5-speed automatic
Gear ratios: (:1):	
First:	4.68
Second:	2.94
Third:	1.92
Fourth:	1.30
Fifth:	1.00
Reverse:	3.18
Final drive ratio:	2.65

Chassis/Suspension	
Front:	independent MacPherson struts
Rear:	independent 4-link w/coil springs and trailing arm
Steering type:	power rack and pinion
Steering ratio:	19.4:1
Steering wheel turns, lock-to-lock:	3.8
Turning circle, curb-to-curb (ft / m):	41.83 / 12.75

Brakes	
Type:	power front disc/rear drum, optional anti-lock brakes
Rotor diameter x thickness (in / mm):	front: 11.65 x 1.02 / 296 x 26
Drum diameter x width (in / mm):	rear: 9.84 x 1.7 / 250 x 45
Wheels/Tires	
Wheel size and type:	std: LS 16-inch x 6.5-inch steel; LT 16-inch x 6.5-inch aluminum opt: 17-inch x 7-inch aluminum.
Tires:	std: LS/LT: Bridgestone P235/65R16 all-season steel-belted radial blackwall tires
	opt on LT: Bridgestone P235/60R17 all-season steel-belted radial blackwall tires

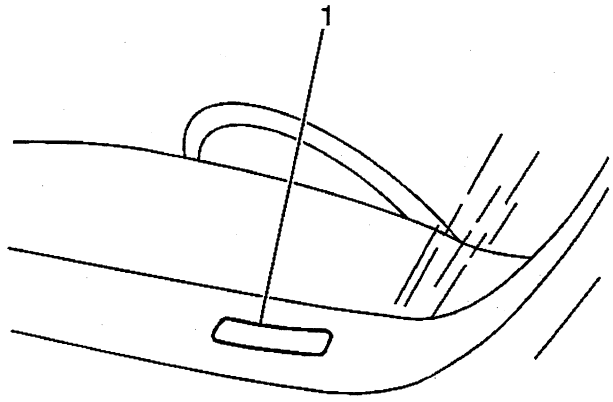
Dimensions

Exterior	
Wheelbase (in / mm):	112.5 / 2857
Overall length (in / mm):	188.8 / 4795
Overall width (in / mm):	71.4 / 1814
Overall height (in / mm):	67.0 / 1703
Track (in / mm):	front: 61.6 / 1565
	rear: 61.8 / 1570
Approach angle (deg):	23.1
Departure angle (deg):	33.4
Breakover ramp angle (deg):	14
Minimum ground clearance (in / mm):	7.9 / 201
Ground to rear load floor (in / mm):	2WD: 27.7 / 704 AWD: 26.9 / 684
Curb weight, base (lb / kg):	FWD: 3660 / 1660
	AWD: 3776 / 1713
Weight distribution (front / rear):	FWD: 57 / 43; AWD: 56 / 44
Interior	
Seating capacity:	5
Head room (in / mm):	front: 40.9 / 1038
	rear: 40.1 / 1018
Leg room (in / mm):	front: 41.2 / 1048
	fear: 40.2 / 1021
Shoulder room (in / mm):	front: 55.7 / 1414
	rear: 55.9 / 1420
Hip room (in / mm):	front: 51.1 / 1298
	rear: 51.4 / 1305

Capacities	
EPA interior volume (cu ft / L):	138.6 / 3919
Passenger Volume (cu ft / L)	106.4 / 3013
Cargo volume (cu ft / L): Maximum behind rear seat: Maximum behind front seat:	 32.2 / 912 68.6 / 1943
GVWR, standard (lb / kg):	FWD: 5070 / 2300
	AWD: 5070 / 2300
Payload, base (lb / kg):	FWD: 1290 / 585
	AWD: 1157 / 525
Trailer towing maximum (lb / kg):	3500 / 1588
Fuel tank (gal / L):	16.6 / 62.8
Engine oil (qt / L):	4.5 / 4.26
Cooling system (qt / L):	10.6 / 10

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 (I/P) and can be seen through the windshield from the outside of the vehicle.

The last five digits of the assembly plant sequential number are stamped onto the rear side of the front sill (tie bar). This number is the same as the last five digits on the VIN plate. The VIN plate also has bar code characteristics.

Position	Definition	Character	Description
1	Country of Origin	2	Canada
2	Manufacturer	C	CAMI
3	Make	1	Chevrolet
4	GVWR/Brake System	--	GVWR 2 300 kg (5070 lbs)/Hydraulic
5 6	Line/Carline/Series	1LF 1LG	FWD 6 CYL. Automatic AWD 6 CYL. Automatic
7	Body Type	3	Four Door, Utility
8	Engine Type	F	3.4L V6 SFI 60 Degree V (RPO LNJ)
9	Check Digit	--	Check Digit
10	Model Year	4	2005
11	Plant Location	6	Ingersoll, Ontario, Canada
12-17	Plant Sequence Number	--	Plant Sequence Number

VIN Derivative

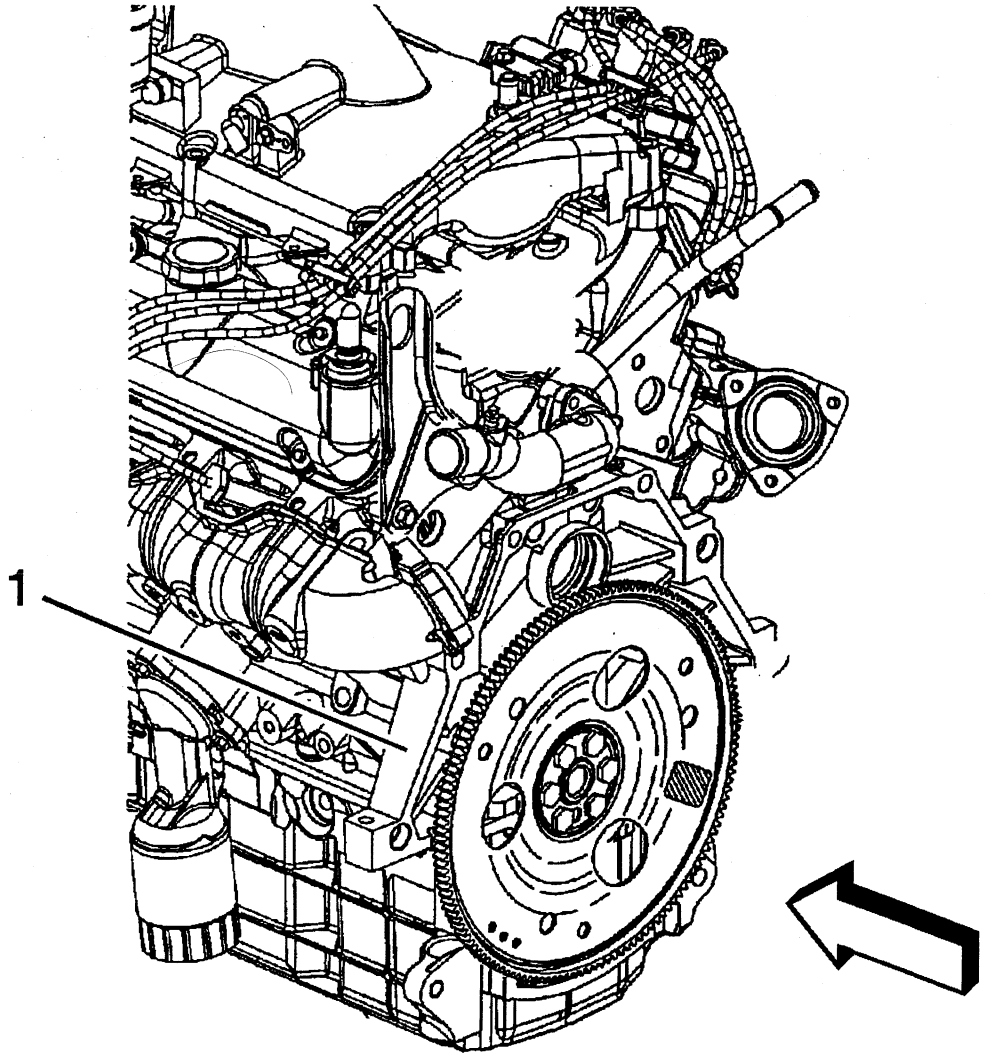
All engines and transmissions are stamped or laser etched with a partial vehicle identification number (VIN), which was derived from the complete VIN. A VIN derivative contains the following nine positions:

Position	Definition	Character	Description
1	GM Division Identifier	1	Chevrolet
2	Model Year	5	2005
3	Assembly Plant	6	Ingersoll, Ontario, Canada
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

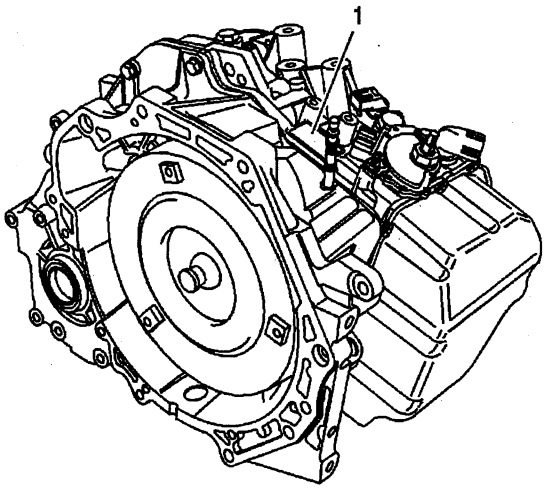
Engine ID and VIN Derivative Location 3.4L – RPO LNJ

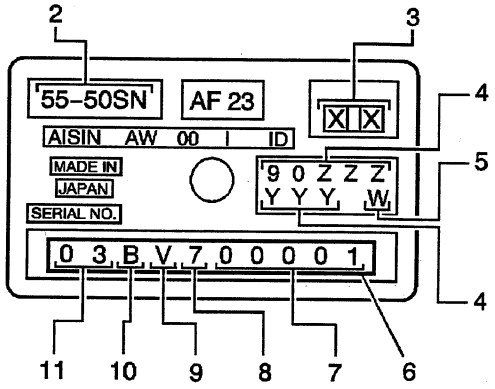


The Vehicle Identification Number - VIN derivative (1) for 3400 LNJ is stamped or laser etched on the left side rear of the engine block. The Vehicle Identification Number - VIN derivative is 9 digits long and can be used to determine if a vehicle contains the original engine.

- 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 Vehicle Identification Number - VIN.

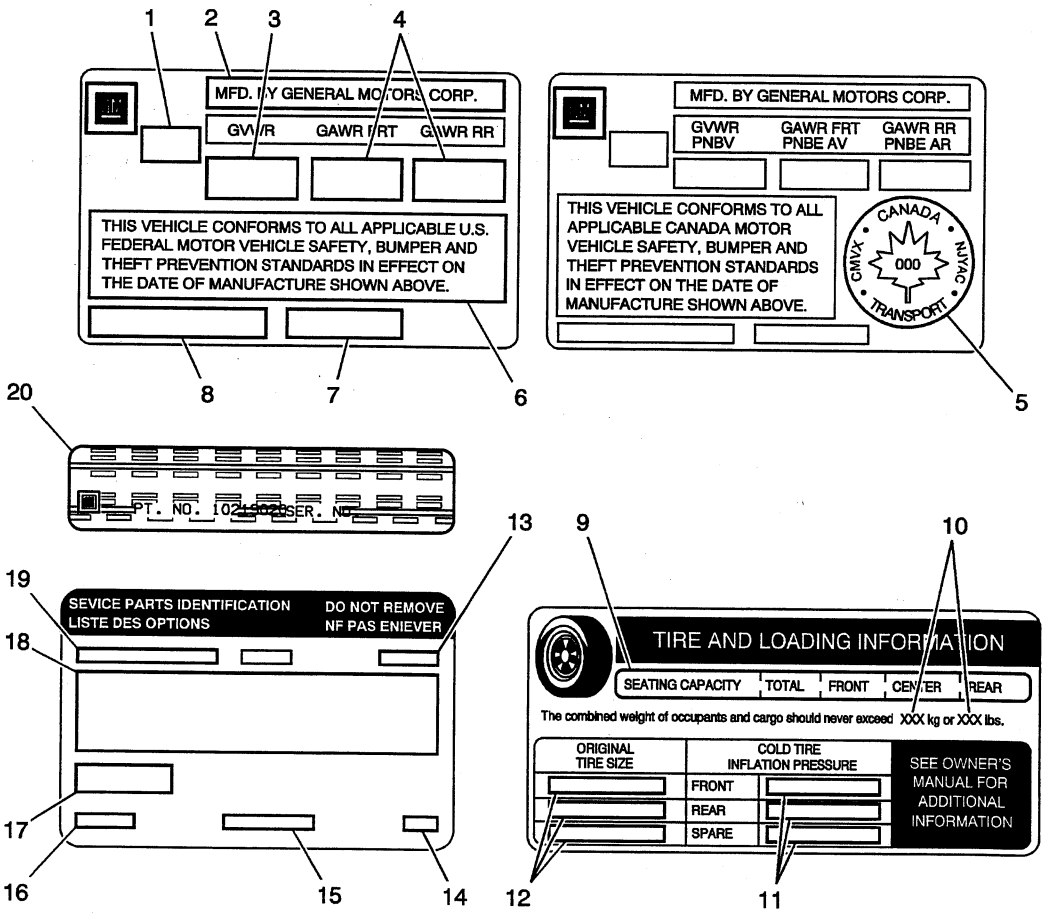
Transmission ID and VIN Derivative Location





(1) Transmission I.D. Location
(2) Model Number
(3) GM I.D. Code
(4) GM Part Number
(4) GM Part Number
(5) Calibration Code
(6) AW Production Unit Number
(7) Serial Number During the Month of Manufacture
(8) Assembly Line Code
(9) Model of Transaxle, V = 55-50SN
(10) Month of Manufacture, A = Jan, B = Feb, etc
(11) Year of Manufacture, 03 = 2003

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 instrument panel (I/P) compartment. The label is use 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	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. 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. 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.

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:

RPO	Description
AG1	Adjuster Front Steering Power, Multi-Directional, Driver
AJ1	Window Tinted Deep, All Except Windshield and Doors
AK5	Restraint System Seat, Inflatable, Driver and Passenger
AP9	Net Convenience
AR9	Seat Front Bucket, Deluxe
ASF	Restraint Roof Side, LH and RH, Inflatable
B58	Covering Floor Mat, Front and Rear, Carpeted Insert
CF5	Roof Sun, Glass, Sliding, Electrical
C60	HVAC System Air Conditioner Front, Manual Controls
DF5	Mirror Inside Rearview Light Sensitive, Compass, Outside Temperature Display
DH3	Mirror Inside Rearview Light Sensitive, Compass, Outside Temperature Display, Vehicle Communication System Control
DT4	Ashtray Cigarette Lighter
D22	Mirror Outside LH and RH, Remote Control, Electric
FE1	Suspension System Soft Ride
F67	Ratio Transaxle Final Drive 2.70
JM4	Brake System Power, Front Disc, Rear Drum, Cast Iron, Antilock, Front and Rear Wheel
J41	Brake System Power, Front Disc, Rear Drum, Cast Iron
KA1	Heater Seat, Front
KG3	Generator 145 Amp
K05	Heater Engine Block
K34	Cruise Control Automatic, Electronic
LNJ	Engine Gas, 6 Cyl, 3.4L, SFI, V6, SGM
MX0	Merchandised Trans Auto Provisions O/D
M09	Transmission Auto 5-Speed, AISIN, AF33 (Tiptronic)
M45	Transmission Auto 5-Speed, AOpel, AF33 (Tiptronic)
NK5	Steering Wheel Standard
NP5	Steering Wheel Leather Wrapped
N75	Wheel 17 x 7, Aluminum, Custom
PY0	Wheel 16 x 6.5, Aluminum
QB5	Wheel 16 x 6.5, Steel
QKG	Tire All P235/65R16-101S BW R/PE ST TL AL2
QKN	Tire All P215/70R16-99S BW PE/ST TL AL2
QLJ	Tire All P235/60R17-100S BW R/PE ST TL AL2
T96	Lamp Fog, Front
UC6	Radio AM/FM Stereo, Seek/Scan, RDS, Multiple Compact Disc, Auto Tone Control, Clock, ETR
UE1	Communication System Vehicle, GPS 1
UG3	Lamp Interior, Console, Dual Reading
UH8	Cluster Instrument, Cool Temp, Trip Odometer, Tachometer
UK3	Control Steering Wheel
US8	Radio AM/FM Stereo, Seek/Scan, CD, Auto Tone, Clock, ETR, MP3, RDS
UW4	Speaker System 4, Custom
UW6	Speaker System 6, Custom
U1C	Radio AM/FM Stereo, Seek/Scan, CD, Clock, ETR
U19	Speedometer Inst, Kilometers and Miles, Kilo Odometer
U2K	Digital Audio System S-Band
U65	Speaker System 7, Premium

RPO	Description
VK3	License Plate Front Mounting Package
VR6	Hook Tie-Down Shipping
VXE	Ornamentation Additional Homologation Badging Requirements
V1K	Bar Luggage Carrier, Center Cross
V92	Trailer Provisions
Z49	Export Canadian Modify Mandatory Base Equipment

Technical Information

Maintenance and Lubrication

Capacities - Approximate Fluid

Application	Capacities	
	English	Metric
Air Conditioning Refrigerant R134a	1.76 lbs	0.8 kg
Cooling System	10.6 qt	10.0 L
Engine Oil with Filter	4.5 qt	4.3 L
Fuel Tank	16.7 gal	63.5 L
Transaxle Fluid	7.5 qt	7.1 L
Wheel Nut Torque	92 lb ft	125 N·m

All capacities are approximate. When adding, be sure to fill to the approximate level, as recommended in this manual. Recheck fluid level after filling.

Maintenance Items

Part	GM Part Number	ACDelco Part Number
Engine Air Cleaner/Filter	22665802	--
Engine Oil Filter	25010792	PF47
Fuel Filter	22676397	--
Passenger Compartment Air Filter Element	22665802	CF135
Replacement Battery	15104967	75-6YR
Spark Plugs	12568387	41-101
Windshield Wiper Blades		
Driver's Side - 24 inches (60.0 cm)	22703508	--
Passenger's Side - 19 inches (47.5 cm)	22703507	--
Rear - 11 inches (28.0 cm)	5480788*	--

* Wiper blade and assembly

Fluid and Lubricant Recommendations

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.
Automatic Transaxle	Use only T-IV Automatic Transmission Fluid (GM Part No. U.S. 88900925, in Canada 22689186).
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474).
Carrier Assembly -- Differential (Rear Drive Module) and Transfer Case (Power Transfer Unit)	VERSATRAK Fluid (GM Part No. U.S. 12378514, in Canada 88901045).
Hood Latch Assembly, Secondary Latch, Pivots, Spring Anchor, and Release Pawl	Lubriplate Lubricant Aerosol (GM Part No. U.S. 12346293, in Canada 992723) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Hood and Door Hinges, Rear Folding Seat	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).

Tire Inflation Pressure Specifications

Application	Specification	
	Metric	English
The tire pressures in the table are the correct inflation pressures for the factory installed tires when the tires are cold. Cold means the vehicle has been sitting for at least 3 hours or driven no more than 1 mile (1.6 km). Inspect the inflation pressure when the tires are cold.		
Tire Inflation Compact Spare	420 kPa	60 psi
Tire Inflation Front Tires	210 kPa	30 psi
Tire Inflation Rear Tires	210 kPa	30 psi

Descriptions and Operations

Power Steering System

The electric power steering (EPS) system reduces the amount of effort needed to steer the vehicle. The system uses the body control module (BCM), power steering control module (PSCM), torque sensor, discrete battery voltage supply circuit, EPS motor, serial data bus, and the instrument panel cluster (IPC) message center to perform the system functions. The PSCM, torque sensor, nor the EPS motor are serviced separately from each other or from the steering column. Ant EPS components diagnosed to be malfunctioning requires replacement of the steering column assembly, also known as the EPS assembly.

Torque Sensor

The PSCM uses a torque sensor as it's main input for determining the amount of steering assists. The steering column has an input shaft, from the steering wheel to the torque sensor, and an output shaft, from the torque sensor to the steering shaft coupler. The input and output shafts are separated by a torsion bar, where the torque sensor is located. The sensor consists of a compensation coil, detecting coil, and 3 detecting rings. These detecting rings have toothed edges that face each other. Detecting ring 1 is fixed to the output shaft, detecting rings 2 and 3 are fixed to the input shaft. The detecting coil is positioned around the toothed edges of detecting rings 1 and 2. As torque is applied to the steering column shaft the alignment of the teeth between detecting rings 1 and 2 changes, which causes the detecting coil signal voltage to change. The PSCM recognizes this change in signal voltage as steering column shaft torque. The compensation coil is used to compensate for changes in electrical circuit impedance due to circuit temperature changes from electrical current and voltage levels as well as ambient temperatures for accurate torque detection.

EPS Motor

The EPS motor is a 12 volt brushed DC reversible motor with a 65 amp rating. The motor assists steering through a worm shaft and reduction gear located in the steering column housing.

Power Steering Control Module (PSCM)

The PSCM uses a combination of torque sensor inputs, vehicle speed, calculated system temperature and the steering calibration to determine the amount of steering assist. When the steering wheel is turned, the PSCM uses signal voltage from the torque sensor to detect the amount of torque being applied to the steering column shaft and the amount of current to command to the EPS motor. The PSCM receives serial data from the engine control module (ECM) to determine vehicle speed. At low speeds more assist is provided for easy turning during parking maneuvers. At high speeds, less assist is provided for improved road feel and directional stability. The PSCM nor the EPS motor are designed to handle 65 amps continuously. The PSCM will go into overload protection mode to avoid system thermal damage. In this mode the PSCM will limit the amount of current commanded to the EPS motor which reduces steering assist levels. The PSCM also chooses which steering calibration to use when the ignition is turned ON, based on the VIN. The PSCM contains all 8 of the steering calibrations which are different in relation to the vehicles RPO's. The PSCM has the ability to detect malfunctions within the EPS system. Any malfunction detected will cause the IPC message center to display the PWR STR (or Power Steering) warning message.

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 – Some Vehicles

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
- 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.

Ignition Lock Cylinder Control Actuator

If the vehicle is equipped with a floor mounted console gear shifter, it has a ignition lock cylinder control actuator system in the steering column. The ignition lock cylinder control actuator's purpose is to prevent the ignition key from being turned to the OFF position when the transmission is in gear and the vehicle may still be moving. The column ignition lock system consists of a ignition lock cylinder control actuator , and a Park position switch that is located in the automatic transmission (A/T) shift lock control switch. The ignition lock cylinder control actuator contains a pin that is spring loaded out to mechanically prevent the ignition key cylinder from being turned to the Lock position when vehicle transmission is not in the Park position. If vehicle power is lost, and/or the transmission is not in the Park position the operator will not be able to turn the ignition key to the Lock position and will not be able to remove the ignition key from the column.

Suspension Description and Operation

Front Suspension

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 vehicles 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 a lower control arm and a strut assembly. 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 portion of the steering knuckle is attached to a strut assembly. The strut assembly then connects to the vehicle body by way of an upper bearing. The steering knuckle is allowed to travel up and down independent of the vehicle body structure and frame.

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. This spring is retained under tension over the strut assembly. A strut is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A strut is a basic hydraulic cylinder. The strut is filled with oil and has a moveable shaft that connects to a piston inside the strut. 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. Each end of the strut is designed as the connection point of the suspension system to the vehicle and acts as the coil spring seat. This allows the strut to utilize the dampening action to reduce the recoil of a spring alone. The lower control arm is 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.

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 vehicles handling characteristics on turns.

Rear Suspension

The rear suspension system on this vehicle is of the independent link type. The rear suspension system performs the following functions:

- Maintains the relationship of the rear axle to the body
- Controls the torque reaction on acceleration and braking

The rear coil springs are retained between the spring seat in the lower control arm. Rubber insulators isolate the coil spring at both top and bottom.

The suspension system consists of the following components:

- Support assembly
- Coil springs
- Stabilizer shaft, insulators, and stabilizer links
- Toe link
- Upper control arm
- Lower control arm
- Trailing arm
- Knuckles
- Wheel bearing/hub
- Shock absorbers

Wheels and Tires

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

Passenger Tire Service Description

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

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

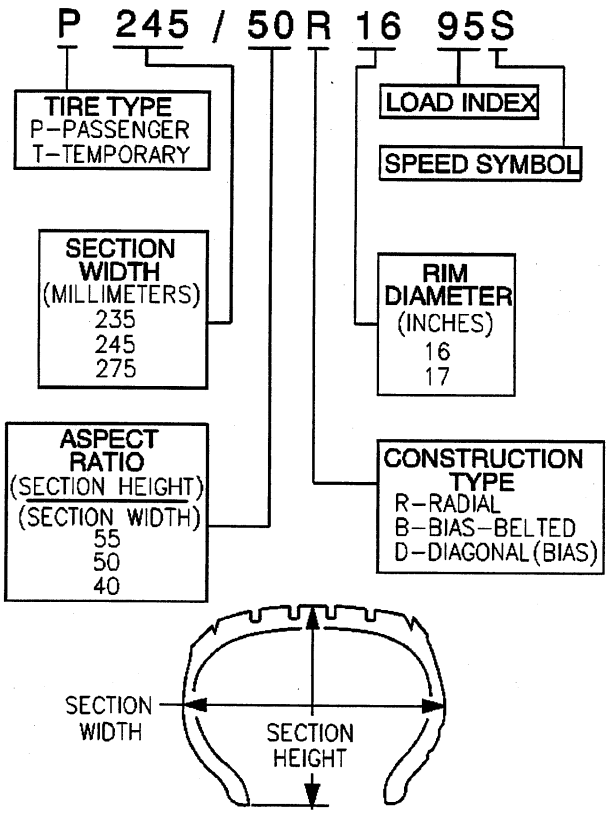
Tires with a lower than recommended pressure can cause the following conditions:

- 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

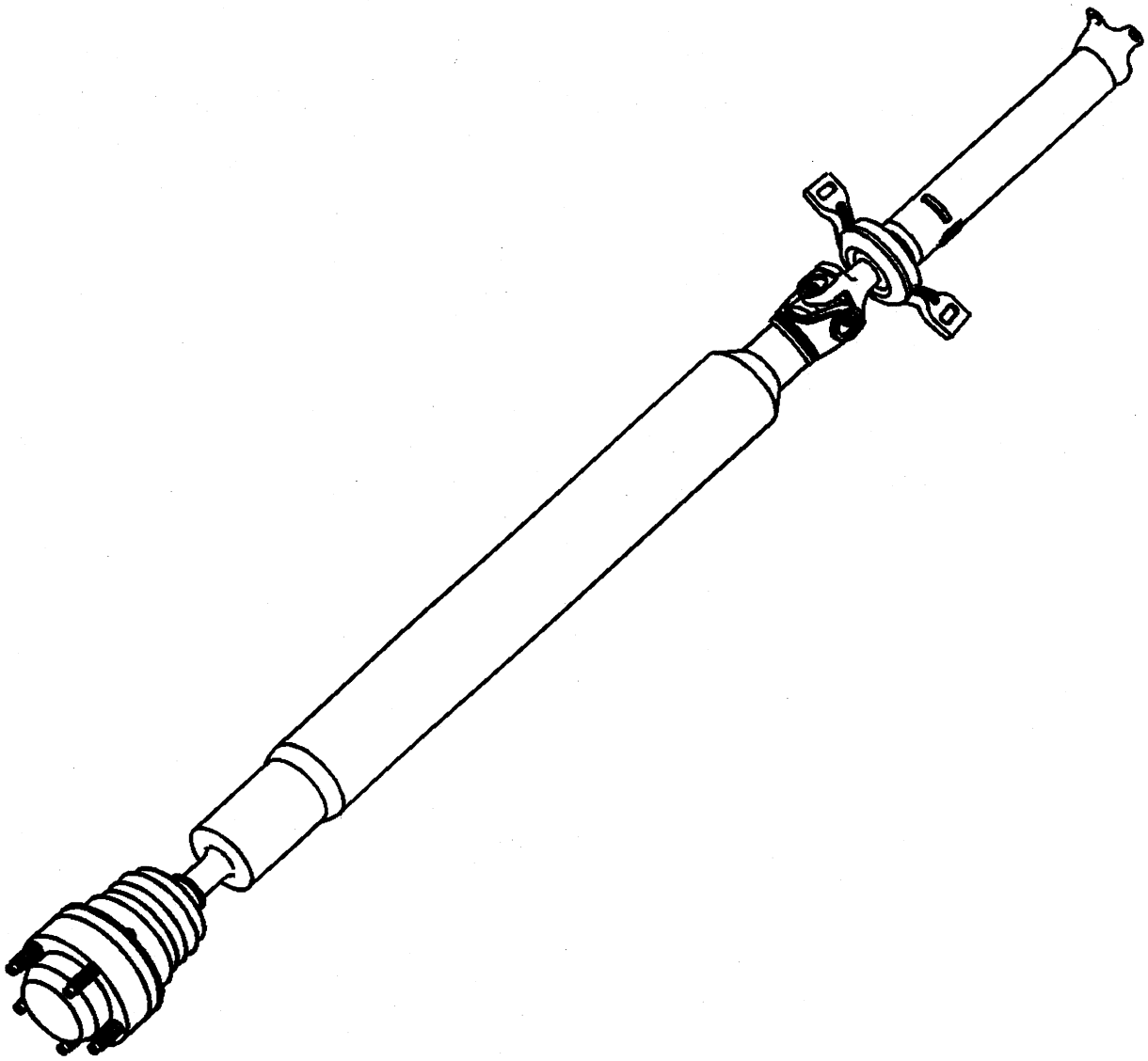
P-Metric Sized Tires Description



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 assembly is a 2-piece design. The front shaft consists of a plunging A-type constant velocity joint at the front and a universal joint and yoke at the rear.

The rear shaft consists of a center bearing and a center yoke, which are pressed onto the rear half of the propshaft and retained by a snap ring. The front and rear shafts are joined together at the yokes with a universal joint. The rear shaft attaches to the axle with a flange which is attached to the rear shaft with a universal joint.

The center bearing provides support where the front and rear shafts mate and is bolted to the underbody. The front constant velocity joint is bolted to the power take-off unit (PTU), and the rear universal joint flange is bolted to the rear differential.

Wheel Drive Shafts Description and Operation

Drive axles are flexible assemblies consisting of an inner and outer constant velocity (CV) joint connected by an axle shaft. The inner joint is completely flexible, and can move in and out. The outer joint is also flexible, but cannot move in and out. These drive axles are used to transmit rotational force from the rear axle differential to the rear tire and wheel assemblies.

Seal and Clamp

The drive axle assemblies use inboard and outboard joint seals made of thermoplastic material, and clamps made of stainless steel. The functions of the seals are as follows:

- The seals protect the internal parts of the inboard and outboard joints.
  - They protect the joint lubricating grease from surrounding detrimental atmospheric conditions (such as extreme temperatures, ozone gas, etc.).
  - They protect the joint lubricating grease from foreign materials (such as stones, dirt, water, salt, etc.).
- The seals facilitate angular and axial movement of the inboard joint.
- The seals facilitate angular movement of the outboard joint.

The function of the clamps is as follows:

Provide a leak proof connection at both the housing and the axle shaft for the inboard and outboard joints.

The thermoplastic material performs well against normal handing, operational wear and conditions. This material however, is not strong enough to withstand abusive handling or damage due to objects such as sharp tools or the sharp edge of any other surrounding component on the vehicle.

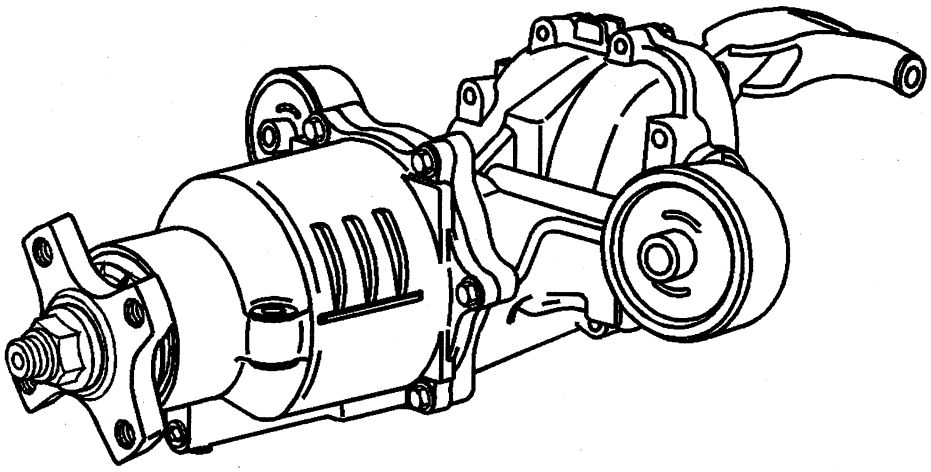
Inner Joint

The inner joints are of the tripot design without an over-extension limitation retainer. The inner joints incorporate a male spline which interlocks with the transaxle using snap rings.

Outer Joint

The outer joints are of the Rzeppa constant velocity joint design. The shaft end which mates with the wheel bearing and hub assembly, incorporates a helical spline to assure a tight, press-type fit. This design assures that no end play will exist between the hub bearing and the drive shaft assembly for added durability and reduced bearing noise.

Rear Drive Axle Description and Operation



The rear drive module (RDM) in this vehicle consists of an aluminum housing which contains a gerotor fluid pump, clutch pack and a differential. It has a common fluid reservoir.

The on-demand rear differential distributes variable torque/power to the rear wheels via individual axle shafts.

The on-demand system operates as follows: only when front wheel slippage is encountered torque/power is proportioned to the rear wheels. As long as there is no front-to-rear speed difference; there is no torque/power to the rear wheels.

When front-to-rear wheel slippage does occur, the rear differential (gerotor) pumps fluid stored in the sump to a piston which actuates a clutch pack, which then distributes torque/power to the rear wheels.

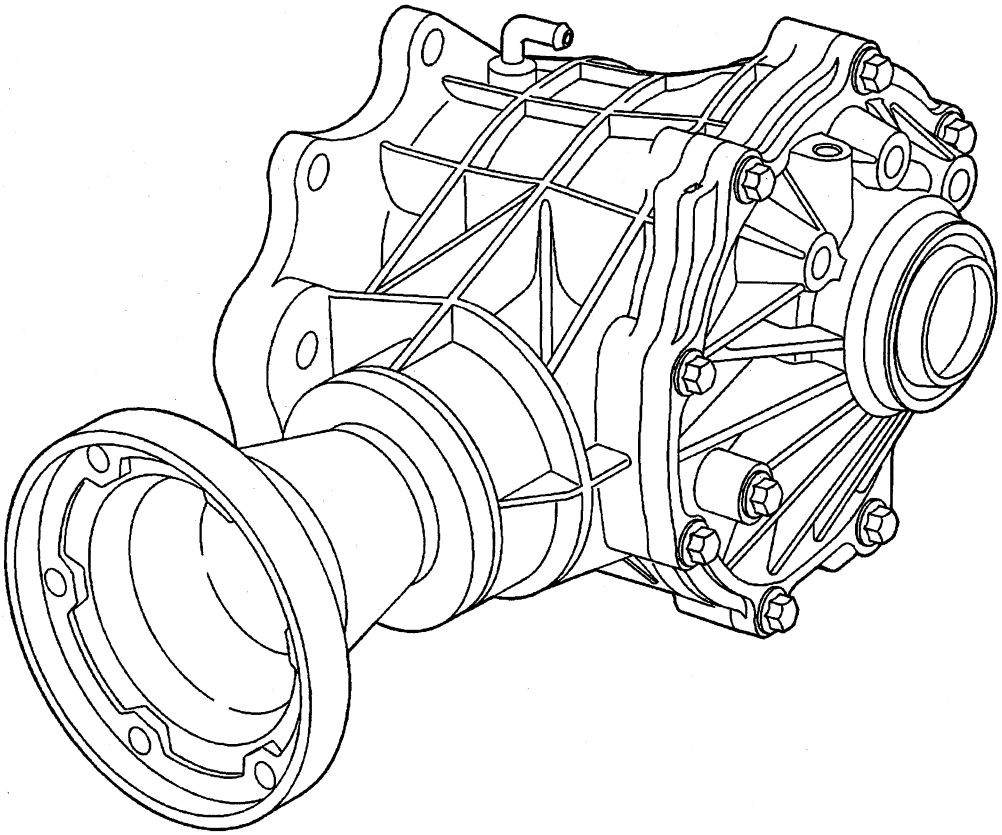
The system has an integral protection device that reduces rear wheel torque when excessive heat is generated, thus protecting the rear wheel drive module (RDM).

Rear Differential Assembly Fluid

The rear differential assembly uses a specifically developed synthetic hypoid fluid which is intended for a lifetime service interval. However, proper fluid level must be maintained to ensure proper rear differential assembly operation.

The fluid level range for proper rear differential assembly operation is 700-800 ml. New service replacement units will be shipped dry (without fluid). Fill new units with 750 ml of GM VERSATRAK fluid.

Transfer Case - NVG 900



The transfer case (PTU) in this vehicle consists of an aluminum housing and a ring and pinion power transfer system.

The PTU transfers torque/power to the rear differential, gerotor pump design, via a two-piece propshaft assembly.

The on-demand rear differential distributes variable torque/power to the rear wheels via individual axle shafts.

The on-demand system operates as follows: only when front wheel slippage is encountered torque/power is proportioned to the rear wheels, as long as there is not front-to-rear speed difference; there is no torque/power to the rear wheels.

When front-to-rear wheel slippage does not occur, the rear differential, gerotor, pumps fluid stored in the sump to a piston that actuates a clutch pack, which then distributes torque/power to the rear wheels.

Power Take-Off Unit (PTU) Fluid

Important

Use only GM Versatrak fluid.

The PTU uses a specifically developed synthetic hypoid gear lubricant, which is intended for lifetime service. Full fluid level is at the bottom of the fill plug hole.

Power Take-Off Unit (PTU) Operation

Motion is transferred from the engine crankshaft/flywheel through the transaxle. A ring and pinion design transfer case is mated to the right side of the transaxle.

The transfer case transfers torque/power to the rear differential via a two-piece propeller shaft assembly. The transfer case consists of an aluminum housing, a clutch pack/hydraulic pump assembly and a ring and pinion assembly.

The on-demand rear differential distributes variable torque/power to the rear wheels via individual axle shaft assemblies. The rear differential consists of an aluminum housing, a clutch pack/hydraulic pump assembly and a ring and pinion assembly.

The system operates as follows:

On-demand drive is provided to the rear wheels only when slippage is detected at the front wheels, there is no front-to-rear speed difference and no rear wheel drive torque. In the event there is front-to-rear wheel speed difference/slippage, a rotation speed difference between the gerotor pump components, rotor and housing, occurs. In those instances, the rotor draws fluid from the sump and through the internal passages of the differential carrier, sending pressurized fluid to a piston, actuating the rear clutch pack.

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

System Component Description

The park brake system consists of the following:

Park Brake Lever Assembly

Receives, multiplies, and transfers park brake system apply input force from operator to park brake cable system.

Releases applied park brake system when lever is returned to at-rest, lowered, position.

Park Brake Cables

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

Park Brake Cable Equalizer

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

Park Brake Apply Lever

Multiplies and transfers input force to park brake actuator/adjuster.

Park Brake Actuator/Adjuster

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

Threaded park brake actuators/adjusters 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 (Rear Disc, Drum-In-Hat System)

Applies mechanical output force from park brake actuator/adjuster 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 lever assembly being applied. The input force is multiplied by the lever assembly, 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. The park brake lever assembly releases an applied park brake system when it is returned to the at-rest, lowered, position.

ABS Description and Operation

The purpose of the Antilock Brake System (ABS) is to minimize wheel slip during heavy braking. The ABS performs this function by monitoring the speed of each wheel and controlling the brake fluid pressure to each wheel independently during an braking event. This allows the driver to maintain directional stability while minimizing stopping distance.

Valve Assembly (BPMV)

The valve assembly provides brake fluid pressure modulation for each of the individual wheel circuits, as required, during an ABS/traction control system (TCS) event. During an ABS event, the valve assembly can maintain or reduce brake fluid pressure that is applied by the master cylinder. The valve assembly cannot increase pressure beyond what is applied by the master cylinder (driver). The valve assembly contains a motor-driven pump, ABS inlet and outlet valves, as well as TCS prime and isolation valves. With exception of the ABS control module (EBTCM), the valve assembly is not serviceable and should never be disassembled.

The valve assembly is an addition to the four-circuit diagonally-split hydraulic system found on vehicles without ABS.

ABS Control Module (EBTCM)

The ABS control module monitors the speed of each wheel to detect wheel slip. If wheel slip is detected, the module commands the appropriate valve positions in the valve assembly to modulate brake pressure in some or all of the hydraulic circuits. This action prevents wheel slip and provides optimum braking. In addition, the ABS control module performs a continuous diagnostic routine to detect malfunctions. If the module detects an electrical malfunction, it can disable ABS/traction control module (TCS)/dynamic rear proportioning (DRP), illuminate the appropriate telltale, and store a Diagnostic Trouble Code (DTC).

The ABS control module contains a solenoid for each ABS/TCS valve it operates and a relay for the solenoid circuit and pump motor circuit respectively. The relays and solenoids are not serviceable.

ABS Operation

During an ABS event, the ABS control module will control the hydraulic pressure in the individual wheel circuits to prevent any wheel from slipping. The control module can decrease or hold hydraulic pressure by energizing the appropriate valve solenoid. A rapid pulsation is felt in the brake pedal and a ticking or popping noise can be heard as control module commands valve solenoids in response to wheel speed changes.

When the ABS control module detects wheel slip, it holds pressure by closing both the inlet valve from the master cylinder and the outlet valve. If pressure hold is not enough to control wheel slip, the ABS control module releases pressure by opening the outlet valve and allowing some pressure bleed-off into the accumulator. The accumulator stores this fluid until the motor-driven pump returns fluid to the master cylinder.

The control module opens the inlet valve to allow master cylinder pressure to the wheel circuits again when no wheel slip is detected.

Traction Control System (TCS)

The Traction Control System (TCS) compares front wheel speeds to rear wheel speeds to determine if drive wheels lose traction. The TCS activates when drive wheel speed exceeds speed of non-drive wheels by a calibrated value. This allows the driver to maintain acceleration and directional stability while accelerating on low traction surfaces.

The TCS limits wheel slip during acceleration when one or more of the drive wheels lose traction. The brake switch must be off for TCS to operate.

The ABS control module monitors wheel speed output and compares drive wheel to non-drive wheel values to detect wheel slip. During a TCS event, the ABS control module sends a requested torque value to the powertrain control module (PCM). The PCM initiates an engine torque reduction routine to slow down the drive wheels. This routine consists of ignition timing reduction, fuel injector cut-off and transmission shift control. The PCM also sends a torque delivered value to the ABS control module. If the engine management routine is insufficient to achieve the desired wheel speed, the ABS control module will then use the TCS isolation valves and prime valves to slow down the drive wheels. The isolation valves close to isolate the wheel circuit from the master cylinder and the prime valves open to allow the motor-driven pump to access master cylinder fluid so it can build pressure to apply the desired brake.

If the ABS control module detects a malfunction, it will disable TCS and will command the body control module (BCM) to turn the TRAC LED Off. The driver can also disable TCS, if desired, by depressing the TRAC switch. When the driver depresses the TRAC switch, the ABS control module will disable TCS and will command the BCM to turn the TRAC LED Off.

Dynamic Rear Proportioning (DRP)

Dynamic rear proportioning (DRP) is an electronic brake proportioning feature that replaces the mechanical proportioning valve in the base brake system. DRP uses existing ABS components to regulate the vehicle's rear brake pressure and provide optimum front-rear brake balance in all braking situations.

Engine Description and Operation

Engine Mechanical – 3.4L

General Specifications

Application	Specification	
	Metric	English
General Data		
Engine Type	60 degree V-6	
Displacement	3.4L	204 cu in
RPO	LNJ	
VIN	F	
Bore	92 mm	3.62 in
Stroke	84 mm	3.31 in
Compression Ratio	9.6:1	
Firing Order	1-2-3-4-5-6	
Spark Plug Gap	1.52 mm	0.60 in
Block		
Camshaft Bearing Bore Diameter - Front and Rear	51.03-51.08 mm	2.009-2.011 in
Camshaft Bearing Bore Diameter - Middle #2, #3	50.77-50.82 mm	1.999-2.001 in
Crankshaft Main Bearing Bore Diameter	72.1535-72.0695 mm	2.840-2.841 in
Crankshaft Main Bearing Bore Out-of-Round	0.008 mm	0.00031 in
Cylinder Bore Diameter - Production	92.020-92.038 mm	3.622-3.623 in
Cylinder Bore Diameter - Service	92.020-92.038 mm	3.622-3.623 in
Cylinder Bore Out-of-Round - Diametral - Production	0.020 mm	0.0008 in
Cylinder Bore Out-of-Round - Diametral - Service	0.025 mm	0.001 in
Cylinder Bore Taper - Production	0.020 mm	0.0008 in
Cylinder Bore Taper - Service	0.025 mm	0.001 in
Cylinder Head Deck Height	224 mm	8.818 in
Cylinder Head Deck Surface Flatness	0.05 mm per 152 mm	0.0019 in per 6 in
Valve Lifter Bore Diameter	21.417-21.455 mm	0.843-0.844 in
Camshaft		
Camshaft Bearing Inside Diameter	47.523-47.549 mm	1.871-1.872 in
Camshaft Journal Diameter	47.45-47.48 mm	1.868-1.869 in
Camshaft Journal Out-of-Round	0.025 mm	0.001 in
Camshaft Lobe Lift - Exhaust	6.9263 mm	0.2727 in
Camshaft Lobe Lift - Intake	6.9263 mm	0.2727 in
Cooling System		
Capacity	12.4 liters	13.1 quarts
Thermostat Full Open Temperature	91 C	195 F
Connecting Rod		
Connecting Rod Bearing Clearance	0.18-0.062 mm	0.0007-0.017 in
Connecting Rod Bore Diameter	53.962-53.978 mm	2.124-2.125 in
Connecting Rod Bore Out-of-Round	0.008 mm	0.0002 in
Connecting Rod Length - Center to Center	144.75-144.81 mm	5.69-5.70 in
Connecting Rod Side Clearance	0.25-0.37 mm	0.010-0.015 in
Crankshaft		
Connecting Rod Journal Diameter	50.768-50.784 mm	1.9987-1.9994 in
Connecting Rod Journal Out-of-Round	0.005 mm	0.0002 in
Connecting Rod Journal Taper	0.005 mm	0.0002 in

Application	Specification	
	Metric	English
Connecting Rod Journal Width	21.92-22.08 mm	0.863-0.869 in
Crankshaft End Play	0.060-0.210 mm	0.0024-0.0083 in
Crankshaft Main Bearing Journal Width	23.9-24.1 mm	0.941-0.949 in
Crankshaft Main Bearing Clearance - Except #3	0.019-0.064 mm	0.0008-0.0025 in
Crankshaft Main Bearing Clearance - #3 Thrust Bearing	0.032-0.077 mm	0.0012-0.0030 in
Crankshaft Main Journal Diameter	67.239-67.257 mm	2.6473-2.6483 in
Crankshaft Main Journal Out-of-Round	0.005 mm	0.0002 in
Crankshaft Main Journal Taper	0.005 mm	0.0002 in
Crankshaft Rear Flange Runout	0.04 mm	0.0016 in
Cylinder Head		
Combustion Chamber Depth - at Measurement Point	2.2 mm	0.087 in
Surface Finish - Maximum	2.8 Ra	
Surface Flatness - Block Deck	0.08 mm per 152 mm	0.003 in per 6 in
Surface Flatness - Exhaust Manifold Deck	0.1 mm	0.004 in
Surface Flatness - Intake Manifold Deck	0.1 mm	0.004 in
Valve Guide Bore - Exhaust	8.01 mm	0.315 in
Valve Guide Bore - Intake	8.01 mm	0.315 in
Valve Guide Installed Height	16.6 mm	0.654 in
Lubrication System		
Oil Capacity - with Filter	4.3 liters	4.5 quarts
Oil Capacity - without Filter	3.8 liters	4.0 quarts
Oil Pressure - @ 1850 RPM	207-241 kPa	30-35 psi
Oil Pump		
Gear Diameter	38.05-38.10 mm	1.498-1.500 in
Gear Pocket - Depth	30.52-30.58 mm	1.202-1.204 in
Gear Pocket - Diameter	38.176-38.226 mm	1.503-1.505 in
Gears Lash	0.094-0.195 mm	0.0037-0.0077 mm
Relief Valve-to-Bore Clearance	0.038-0.089 mm	0.0015-0.0035 in
Piston Ring End Gap		
First Compression Ring	0.15-0.36 mm	0.006-0.014 in
Second Compression Ring	0.48-0.74 mm	0.0188-0.0291 in
Oil Control Ring	0.25-0.77 mm	0.0098-0.0303 in
Piston Ring to Groove Clearance		
First Compression Ring	0.04-0.086 mm	0.002-0.0033 in
Second Compression Ring	0.04-0.08 mm	0.002-0.0031 in
Oil Control Ring	0.07-0.095 mm	0.0028-0.0037 in
Piston Ring Thickness		
First Compression Ring	1.164-1.190 mm	0.046-0.047 in
Second Compression Ring	1.460-1.490 mm	0.0574-0.0586 in
Oil Control Ring - Maximum	2.960 mm	0.116 in
Piston		
Piston Diameter - production - cylinder 1-4	91.985-92.003 mm	3.621-3.622 in
Piston Diameter - service limit - cylinder 1-4	91.945 mm	3.619 in
Piston Diameter - production - cylinder 5-6	91.99-92.028 mm	3.621-3.623 in
Piston Diameter - service limit - cylinder 5-6	91.945 mm	3.619 in
Piston Pin Bore Diameter	23.005-23.010 mm	0.9057-0.9059 in
Piston Ring Groove Width - First	1.23-1.25 mm	0.048-0.049 in
Piston Ring Groove Width - Second	1.53-1.55 mm	0.060-0.061 in

Application	Specification	
	Metric	English
Piston Ring Groove Width - Oil Control	3.03-3.055 mm	0.119-0.120 in
Piston to Bore Clearance - production - 1-4	0.17-0.053 mm	0.0006-0.0020 in
Piston to Bore Clearance - service limit- 1-4	0.093 mm	0.0036 in
Piston to Bore Clearance - production - 5-6	-0.008-0.048 mm	-0.0003-0.0018 in
Piston to Bore Clearance - service limit- 5-6	0.093 mm	0.0036 in
Pin		
Piston Pin Clearance to Connecting Rod Bore - Press Fit	-0.047 to -0.019 mm	-0.0019 to -0.0007 in
Piston Pin Clearance to Piston Pin Bore	0.008-0.016 mm	0.00031-0.00063 in
Piston Pin Diameter	22.994-22.997 mm	0.9053-0.9054 in
Valves		
Valve Face Angle	45 degrees	
Valve Seat Angle	46 degrees	
Valve Seat Depth - Intake - from deck face	7.9-8.1 mm	0.311-0.318 in
Valve Seat Depth - Exhaust - from deck face	8.9-9.1 mm	0.350-0.358 in
Valve Seat Runout	0.037 mm	0.0015 in
Valve Seat Width - Intake	1.55-1.80 mm	0.061-0.071 in
Valve Seat Width - Exhaust	1.70-2.0 mm	0.067-0.079 in
Valve Stem-to-Guide Clearance	0.026-0.068 mm	0.0010-0.0027 in
Valve Lifters/Push Rods		
Push Rod Length - Intake	146.0 mm	5.75 in
Push Rod Length - Exhaust	152.5 mm	6.0 in
Valve Springs		
Valve Spring Free Length	48.5 mm	1.89 in
Valve Spring Installed Height	43.2 mm	1.701 in
Valve Spring Load - Closed	320 N @ 43.2 mm	75 lb @ 1.701 in
Valve Spring Load - Open	1036 N @ 32 mm	230 lb @ 1.260 in
Valve Spring Total Number of Coils	6.55	

Fastener Tightening Specifications

Application	Specification	
	Metric	English
A/C Compressor Bracket Bolt	50 N·m	37 lb ft
Automatic Transaxle to Engine Bolt	75 N·m	55 lb ft
Camshaft Position Sensor Bolt	10 N·m	89 lb in
Camshaft Sprocket Bolt	140 N·m	103 lb ft
Camshaft Thrust Plate Screw	10 N·m	89 lb in
Connecting Rod Bearing Cap Bolt		
First Pass	20 N·m	15 lb ft
Final Pass	75 degrees	
Coolant Drain Plug	19 N·m	14 lb ft
Coolant Temperature Sensor	23 N·m	17 lb ft
Crankshaft Balancer Bolt		
First Pass	70 N·m	52 lb ft
Final Pass	72 degrees	
Crankshaft Main Bearing Cap Bolt/Stud		
First Pass	50 N·m	37 lb ft
Final Pass	77 degrees	
Crankshaft Oil Deflector Nut	25 N·m	18 lb ft
Crankshaft Position Sensor Stud-Side of Engine Block	11 N·m	98 lb in
Crankshaft Position Sensor Shield Nut	11 N·m	98 lb in

Application	Specification	
	Metric	English
Cylinder Head Bolt		
First Pass	60 N·m	44 lb ft
Final Pass	95 degrees	
Drive Belt Tensioner Bolt	50 N·m	37 lb ft
EGR Valve Pipe to Exhaust Manifold Bolt	30 N·m	22 lb ft
EGR Valve Pipe to EGR Valve Bolt	30 N·m	22 lb ft
EGR Valve to Upper Intake Manifold Bolt	30 N·m	22 lb ft
Engine Electrical Harness Ground Bolt	25 N·m	18 lb ft
Engine Front Cover Bolt		
Large Bolt	55 N·m	41 lb ft
Medium Bolt	55 N·m	41 lb ft
Small Bolt	27 N·m	20 lb ft
Engine Lift Bracket - Rear	50 N·m	37 lb ft
Engine Lift and Generator Bracket Bolt	50 N·m	37 lb ft
Engine Mount Bracket Bolt		
Small Bolt	25 N·m	18 lb ft
Large Bolt	55 N·m	41 lb ft
Engine Mount Bracket to Engine Block Bolt	85 N·m	63 lb ft
Engine Mount Bracket to Oil Pan	58 N·m	43 lb ft
Engine Mount to Engine Mount Bracket Nut	53 N·m	39 lb ft
Engine Mount to Engine Oil Pan Bolts	58 N·m	43 lb ft
Engine Mount to Frame Bolts	47 N·m	35 lb ft
Engine Mount to Lower Nut	47 N·m	35 lb ft
Engine Mount Strut Bolt	48 N·m	35 lb ft
Engine Mount Strut Bracket Bolt, Left	70 N·m	52 lb ft
Engine Mount Strut Bracket Bolt, Right	50 N·m	37 lb ft
Engine Mount Strut and Lift Bracket Bolt - Engine Lift Rear	50 N·m	37 lb ft
Engine Oil Pressure Indicator Switch	16 N·m	12 lb ft
Engine to Transaxle Brace Bolt	50 N·m	37 lb ft
Engine Wiring Harness Bracket Bolt	13 N·m	110 lb in
Exhaust Crossover Pipe Stud/Nut	25 N·m	18 lb ft
Exhaust Manifold Heat Shield Bolt	10 N·m	89 lb in
Exhaust Manifold Nut	16 N·m	12 lb ft
Exhaust Manifold Stud	18 N·m	13 lb ft
Flywheel Bolt	71 N·m	52 lb ft
Frame to Body Bolt	155 N·m	114 lb ft
Fuel Hose/Pipe Retainer Nut	28 lb ft	21 lb ft
Fuel Injector Rail Bolt	10 N·m	89 lb in
Fuel Injector Sight Shield Stud	10 N·m	89 lb in
Generator B+ Lead Nut	20 N·m	15 lb ft
Generator Bolt	50 N·m	37 lb ft
Generator Brace Nut	25 N·m	18 lb ft
Heated Oxygen Sensor	42 N·m	31 lb ft
Heater Inlet Pipe Nut	25 N·m	18 lb ft
Heater Inlet Pipe Stud	50 N·m	37 lb ft
Heater Outlet Pipe Adapter to Engine Front Cover Bolt	12 N·m	106 lb in
Heater Outlet Pipe to Throttle Body Bolt	10 N·m	89 lb in
Heater Outlet Pipe to Throttle Body Nut	10 N·m	89 lb in
Heater Outlet Pipe to Upper Intake Manifold Nut	25 N·m	18 lb ft
Ignition Coil Bracket Bolt/Nut/Stud	25 N·m	18 lb ft
Ignition Control Module Bracket Stud	25 N·m	18 lb ft

Application	Specification	
	Metric	English
Intake Manifold Coolant Pipe Bolt	10 N·m	89 lb in
Knock Sensor	25 N·m	18 lb ft
Left Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Left Engine Mount Strut Bracket to Engine Bolts	50 N·m	37 lb ft
Left Transaxle Mount to Transaxle Bolt	50 N·m	37 lb ft
Lower Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Lower Intake Manifold Bolt - Center		
First Pass	7 N·m	62 lb in
Final Pass	13 N·m	115 lb in
Lower Intake Manifold Bolt - Corner		
First Pass	13 N·m	115 lb in
Final Pass	25 N·m	18 lb ft
MAP Sensor Bolt	10 N·m	89 lb in
Negative Battery Cable to Inner Fender Body Ground Nut	12 N·m	106 lb in
Negative Battery Cable to Transaxle Nut	45 N·m	33 lb ft
Oil Filter	30 N·m	22 lb ft
Oil Filter Adapter Bolt	25 N·m	18 lb ft
Oil Filter Bypass Hole Plug	19 N·m	14 lb ft
Oil Filter Fitting	39 N·m	29 lb ft
Oil Gallery Plug - 1/4 inch	19 N·m	14 lb ft
Oil Gallery Plug - 3/8 inch	33 N·m	24 lb ft
Oil Level Indicator Tube Bolt	25 N·m	18 lb ft
Oil Pan Bolt	25 N·m	18 lb ft
Oil Pan Drain Plug	25 N·m	18 lb ft
Oil Pan Side Bolt	50 N·m	37 lb ft
Oil Pressure Indicator Switch	16 N·m	12 lb ft
Oil Pump Cover Bolt	10 N·m	89 lb in
Oil Pump Drive Clamp Bolt	36 N·m	27 lb ft
Oil Pump Mounting Bolt	41 N·m	30 lb ft
Positive Crankcase Ventilation (PCV) Foul Air Pipe Retaining Clip Bolt	10 N·m	89 lb in
Right Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Right Engine Mount to Engine Mount Bracket Bolt	50 N·m	37 lb ft
Spark Plug - Initial Installation	20 N·m	15 lb ft
Spark Plug - After Initial Installation	15 N·m	13 lb ft
Spark Plug Wire Retainer Support Bolt	25 N·m	18 lb ft
Steering Intermediate Shaft Pinch Bolt	34 N·m	25 lb ft
Throttle Body Bolt/Stud	10 N·m	89 lb in
Timing Chain Dampener Bolt	21 N·m	15 lb ft
Torque Converter Bolt	60 N·m	44 lb ft
Transfer Case Mounting Bracket Bolt	50 N·m	37 lb ft
Upper Engine Mount Strut Bracket to Upper Radiator Support Bolts	28 N·m	21 lb in
Upper Intake Manifold Bolt/Stud	25 N·m	18 lb ft
Valve Lifter Guide Bolt	10 N·m	89 lb in
Valve Rocker Arm Bolt	42 N·m	31 lb ft
Valve Rocker Arm Cover Bolt	10 N·m	89 lb in
Water Outlet Bolt	25 N·m	18 lb ft
Water Pump Bolt	11 N·m	98 lb in
Water Pump Pulley Bolt	25 N·m	18 lb ft

Engine Component Description

The cylinder block is made of cast alloy iron. The cylinder block has 6 cylinders that are arranged in a V shape. There are 3 cylinders in each bank. The cylinder banks are set at a 60 degree angle from each other.

Starting from the front of the engine, the left bank cylinders are 2, 4, 6. The right bank cylinders are 1, 3, 5.

Four main bearings support the crankshaft. The crankshaft is retained by the bearing caps. The bearing caps are machined with the block for proper alignment and clearances. The main bearing caps are drilled and tapped for the structural oil pan side bolts.

The aluminum cylinder heads have individual intake and exhaust ports for each cylinder. The valve guides are pressed in. The roller rocker arms are located on a pedestal in a slot in the cylinder head. The roller rocker arms are retained on individual threaded bolts.

The crankshaft is cast nodular iron with deep rolled fillets on all 6 crankpins and all 4 main journals. Four steel-backed aluminum bearings are used. The #3 bearing is the end-thrust bearing.

The camshaft is made from a new metal composite design. The camshaft profile is a hydraulic roller design. The camshaft is supported by 4 journals. The camshaft includes an oil pump drive gear.

The pistons are cast aluminum using 2 compression rings and 1 oil control ring. The piston pin is offset 0.8 mm (0.031 in) towards the major thrust side. This placement allows for a gradual change in thrust pressure against the cylinder wall as the piston travels its path. The pins are chromium steel. The pins have a floating fit in the pistons. The pins are retained in the connecting rods by a press fit.

The connecting rods are made of forged steel. Full pressure lubrication is directed to the connecting rods by drilled oil passages from the adjacent main bearing journal.

A roller rocker type valve train is used. Motion is transmitted from the camshaft through the hydraulic roller lifter and from the pushrod to the roller rocker arm. The rocker arm pivots on the needle roller bearings. The rocker arm transmits the camshaft motion to the valve. The rocker arm pedestal is located in a slot in the cylinder head. The rocker arm is retained in the cylinder head by a bolt. The pushrod is located by the rocker arm.

The intake manifold is a 2-piece cast aluminum unit. The intake manifold centrally supports a fuel rail with 6 fuel injectors.

The exhaust manifolds are cast nodular iron.

Drive Belt System Description

The drive belt system consists of the following components:

- The drive belt
- The drive belt tensioner
- The drive belt idler pulley
- The crankshaft balancer pulley
- The accessory drive component mounting brackets
- The accessory drive components
  - The power steering pump, if belt driven
  - The generator
  - The A/C compressor, if equipped
  - The engine cooling fan, if belt driven
  - The water pump, if belt driven
  - The vacuum pump, if equipped
  - The air compressor, if equipped

The drive belt system may use one belt or two belts. The drive belt is thin so that it can bend backwards and has several ribs to match the grooves in the pulleys. There also may be a V-belt style belt used to

drive certain accessory drive components. The drive belts are made of different types of rubbers (chloroprene or EPDM) and have different layers or plys containing either fiber cloth or cords for reinforcement.

Both sides of the drive belt may be used to drive the different accessory drive components. When the back side of the drive belt is used to drive a pulley, the pulley is smooth.

The drive belt is pulled by the crankshaft balancer pulley across the accessory drive component pulleys. The spring loaded drive belt tensioner keeps constant tension on the drive belt to prevent the drive belt from slipping. The drive belt tensioner arm will move when loads are applied to the drive belt by the accessory drive components and the crankshaft.

The drive belt system may have an idler pulley, which is used to add wrap to the adjacent pulleys. Some systems use an idler pulley in place of an accessory drive component when the vehicle is not equipped with the accessory.

Lubrication

Full pressure lubrication, through a full flow oil filter, is furnished by a gear type oil pump. The oil is drawn up through the pickup screen and the tube. The oil passes through the pump to the oil filter.

The oil filter is a full flow paper element unit. An oil filter bypass is used in order to ensure oil supply during the following conditions:

- On a cold start
- If the filter is plugged
- If the filter develops excessive pressure drop

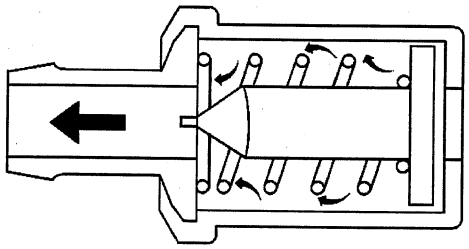
The bypass is designed to open at 69-83 kPa (10-12 psi).

A priority oil delivery system supplies oil first to the crankshaft journals. The oil from the crankshaft main bearings is supplied to the connecting rod bearings by intersecting the passages drilled in the crankshaft. The passages supply the oil to the crankshaft main bearings and the camshaft bearings through the intersecting vertical drilled holes. The oil passages from the camshaft journals supply oil to the hydraulic lifters.

The hydraulic lifters pump oil up through the pushrods to the rocker arms. The cast dams in the crankcase casting direct the oil that drains back from the rocker arms in order to supply the camshaft lobes. The camshaft chain drive is lubricated by indirect oil splash.

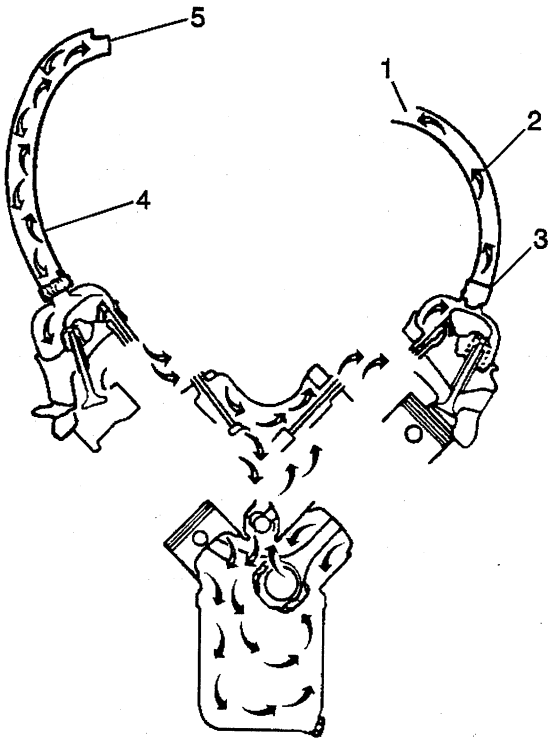
Crankcase Ventilation System Description

General Description



A crankcase ventilation system is used to consume crankcase vapors in the combustion process instead of venting them to atmosphere. Fresh air from the throttle body is supplied to the crankcase, mixed with blow by gases and then passed through a PCV valve into the intake manifold.

Operation



The primary control is through the positive crankcase ventilation (PCV) valve which meters the flow at a rate depending on inlet vacuum. To maintain idle quality, the PCV valve restricts the flow when inlet 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 into the throttle body to be consumed by normal combustion.

Results of Incorrect Operation

A plugged valve may cause the following conditions:

- Rough idle
- Stalling or slow idle speed
- Oil leaks
- Sludge in engine

A leaking valve would cause:

- Rough idle
- Stalling
- High idle speed

Functional Check of PCV valve

If an engine is idling rough, check for a clogged PCV valve. Replace if required. Use the following procedure:

- Remove PCV valve from intake manifold.
- Shake valve and listen for the rattle of needle inside the valve.
- If valve does not rattle, replace valve.

With this system, any blow-by in excess of the system capacity (from a badly worn engine, sustained heavy load, etc.) is exhausted into the intake manifold and is drawn into the engine.

Proper operation of the crankcase ventilation system is dependent upon a sealed engine. If oil sludging or dilution is noted, and the crankcase ventilation system is functioning properly, check engine for possible cause and correct to ensure that system will function as intended.

Engine Cooling

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Coolant Heater	50 N·m	37 lb ft
Heater Inlet Pipe Nut	25 N·m	18 lb ft
Heater Outlet Pipe to Throttle Body Bolt	10 N·m	89 lb in
Heater Outlet Pipe to Throttle Body Nut	10 N·m	89 lb in
Heater Outlet Pipe to Upper Intake Manifold Nut	25 N·m	18 lb ft
Manifold Absolute Pressure (MAP) Sensor Bracket Bolt	10 N·m	89 lb in
Thermal Bypass Fitting Bolt	12 N·m	106 lb in
Thermal Bypass Pipe Bolt	10 N·m	89 lb in
Thermostat Housing Bolt	25 N·m	18 lb ft
Water Pump Bolt	10 N·m	89 lb in
Water Pump Pulley Bolt	25 N·m	18 lb ft

Cooling System Description and Operation

General Description

Cooling Fan Control

The engine cooling fan system consists of 2 cooling fans and 3 relays. The relays are powered by the battery positive voltage circuit and controlled by a switched ground from the powertrain control module (PCM).

During low speed operation, the PCM supplies the ground path for the low speed cooling fan relay through the low speed cooling fan relay control circuit. This energizes the cooling fan low relay coil, closes the relay contacts, and supplies battery positive voltage from the COOL FAN LO fuse through the cooling fan motor supply voltage circuit to the cooling fan. During high speed operation the PCM supplies the ground path for the cooling fan low relay through the low speed cooling fan relay control circuit. After a 3-second delay, the PCM supplies a ground path for the cooling fan high relay and the s/p cooling fan relay through the high speed fan relay control circuit.

The PCM commands the fan on under the following conditions:

- Engine coolant temperature exceeds approximately 98°C (208°F) Low Fan Speed
- Engine coolant temperature exceeds approximately 102°C (216°F) High Fan Speed
- A/C refrigerant pressure exceeds 361 kPa (52 psi) Low Fan Speed
- A/C refrigerant pressure exceeds 2100 kPa (300 psi) High Fan Speed
- When the engine coolant temperature exceeds 112°C (234°F) at key off, the fan high speed will run for up to 300 seconds. If within that time frame 102°C (216°F) is reached then fan speed will change from high to low speed. If within that time frame 99°C (210°F) is reached then fan speed will change from low to off.

The PCM commands the fan off under the following conditions:

- A/C is requested and engine speed exceeds 6,240 RPM
- Engine coolant temperature exceeds approximately 99°C (210°F) turns the cooling fans from low to off.

Engine Coolant Indicator(s)

LOW COOLANT LEVEL

The IPC illuminates the low coolant warning indicator when any of the following occur:

- The BCM detects a low coolant level condition for at least 30 seconds.
- The IPC performs the displays test at the start of each ignition cycle. The indicator illuminates for approximately 3 seconds.

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 flows from the radiator outlet and into the water pump inlet. Some coolant flows from the water pump, to the heater core, then back to the water pump. This provides the passenger compartment with heat and defrost capability as the coolant warms up.

Coolant also flows from 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.

The coolant then flows 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.

From the cylinder heads, the coolant flows to the thermostat. The flow of coolant will either be stopped at the thermostat until the engine reaches normal operating temperature, or it will flow through the thermostat and into the radiator where it is cooled. At this point, the coolant flow cycle is completed.

Efficient 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 right 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.

Pressure Cap

The pressure cap seals the cooling system. It contains a blow off or pressure 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.

Surge Tank

The surge tank is a plastic tank that the pressure cap mounts onto. The tank is mounted at a point higher than all other coolant passages. The surge tank provides an air space in the cooling system. The air space allows the coolant to expand and contract. The surge tank also provides a coolant fill point and a central air bleed location. During vehicle use, the coolant heats and expands. The coolant that is displaced by this expansion flows into the surge tank. As the coolant circulates, air is allowed to exit. This is an advantage to the cooling system. Coolant without bubbles absorbs heat much better than coolant with bubbles.

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 timing chain.

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.

Transmission Oil Cooler

The transmission oil cooler is a heat exchanger. It is located inside the left 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
Air Conditioning (A/C) Evaporator Outlet Hose to Battery Box Bolt	15 N·m	11 lb ft
Battery Box Cover Screw	2 N·m	18 lb in
Battery Box Inner Bolt	15 N·m	11 lb ft
Battery Box Outer Bolt	10 N·m	89 lb in
Battery Hold Down Bolt	15 N·m	11 lb ft
Battery Negative Cable Terminal Bolt	17 N·m	13 lb ft
Battery Positive Cable Terminal Bolt	17 N·m	13 lb ft
Battery Tray Bolt	25 N·m	18 lb ft
Coolant Surge Tank Bolt	6 N·m	53 lb in
Generator Battery Positive Terminal Nut	20 N·m	15 lb ft
Generator Bolt	50 N·m	37 lb ft
Generator Bracket Bolt	50 N·m	37 lb ft
Negative Battery Cable to Inner Fender Bolt	12 N·m	106 lb in
Negative Battery Cable to Transaxle Nut	45 N·m	33 lb ft
Remote Battery Terminal Nut	17 N·m	13 lb ft
Starter Solenoid Positive Battery Terminal Nut	10 N·m	89 lb in
Starter Solenoid S Terminal Nut	3 N·m	27 lb in
Starter-to-Engine Bolt	43 N·m	32 lb ft
Torque Converter Shield Bolt	8 N·m	71 lb in
UHFB Connector Bolt	4 N·m	35 lb in
Under Hood Fuse Block (UHFB) Battery Positive Terminal Nut	15 N·m	11 lb ft

Battery Usage

Description	Specification
LNJ	
Cold Cranking Amperage	600 A
Reserve Capacity Rating	90 Minutes
Amp Hour Rating	54 AH
Replacement Battery Number	75-6YR

Generator Usage

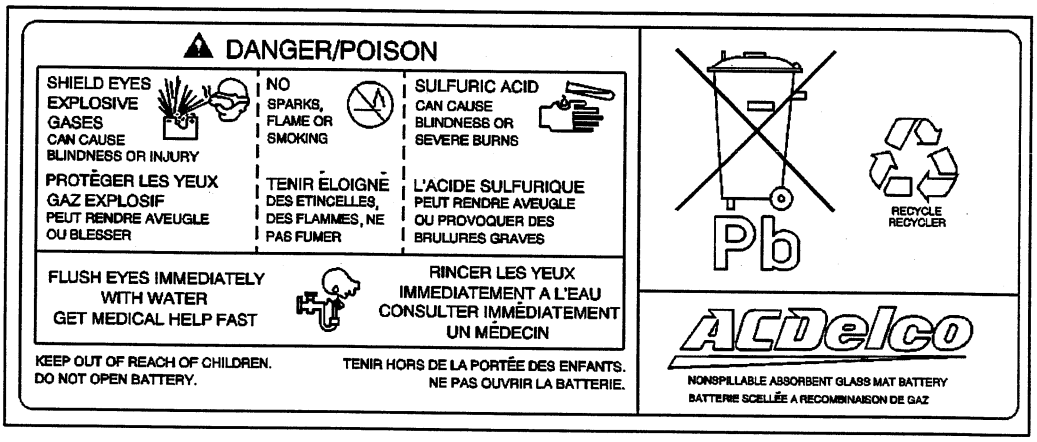
Application	Specification
3.4 (LNJ)	
Generator Model	Valeo SG10
Rated Output	145 A
Load Test Output	87 A

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.**



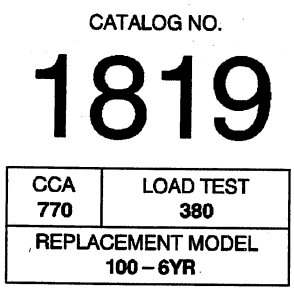
The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for two small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

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



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.

Starting System Description and Operation

The PG-260D is a non-repairable starter motor. It has pole pieces that are arranged around the armature. Both solenoid windings are energized. The pull-in winding circuit is completed to the ground through the starter motor. The windings work together magnetically to pull 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. Moving at the same time, the plunger also closes the solenoid switch contacts in the starter solenoid. Full battery voltage is applied directly to the starter motor and it cranks the engine.

As soon as the solenoid switch contacts close, current stops flowing thorough the pull-in winding because battery voltage is 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, pinion overrun protects the armature from excessive speed until the switch is opened.

When the ignition switch is released from the START position, the START relay opens and battery voltage is removed from the starter solenoid S terminal. Current flows from the motor contacts through both windings to the ground at the end of the hold-in winding. However, the direction of the current flow through the pull-in winding is now opposite the 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, causes the starter drive assembly to disengage and the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

Circuit Description

Moving the ignition switch to the START position signals the powertrain control module (PCM) through the STARTER relay in the underhood BEC that engine crank has been requested. The PCM verifies that theft is not active and grounds the control circuit of the STARTER relay. Battery positive voltage will then flow through the switch side of the STARTER relay to the S terminal of the starter solenoid, cranking the engine. Ground is supplied through the engine block.

Charging System Description and Operation

Generator

The generator features the following major components:

- The delta stator
- The rectifier bridge
- The rotor with slip rings and brushes
- A conventional pulley
- The regulator

The slip ring and the frame are liquid cooled.

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

Regulator

The voltage regulator controls the rotor field current in order to limit the system voltage. When the field current is on, 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.

Circuit Description

The generator provides voltage to operate the vehicle's electrical system and to charge its battery. A magnetic field is created when current flows through the rotor. This field rotates as the rotor is driven by the engine, creating an AC voltage in the stator windings. The AC voltage is converted to DC by the rectifier bridge and is supplied to the electrical system at the battery terminal.

When the engine is running, the generator turn-on signal is sent to the generator from the PCM, turning on the regulator. The generator's voltage regulator controls current to the rotor, thereby controlling the output voltage. The rotor current is proportional to the electrical pulse width supplied by the regulator. When the engine is started, the regulator senses generator rotation by detecting AC voltage at the stator through an internal wire. Once the engine is running, the regulator varies the field current by controlling the pulse width. This regulates the generator output voltage for proper battery charging and electrical

system operation. The generator F terminal is connected internally to the voltage regulator and externally to the PCM. When the voltage regulator detects a charging system problem, it grounds this circuit to signal the PCM that a problem exists. The PCM monitors the generator field duty cycle signal circuit. The system voltage sense circuit receives B+ voltage that is Hot At All Times through the GEN BAT fuse in the underhood junction block. This voltage is used by the regulator as the reference for system voltage control.

Engine Controls

Ignition System Specifications

Application	Specification	
	Metric	English
Firing Order	1-2-3-4-5-6	
Spark Plug Gap	1.52 mm	0.060 in
Spark Plug Torque	15 N·m	11 lb ft
Spark Plug Type	GM P/N 12568387 AC Delco #41-101	
Spark Plug Wire Resistance	5,600 ohms per meter (1,707 ohms per ft)	

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accelerator Pedal Position Sensor Bolt	25 N·m	25 lb ft
Air Cleaner Assembly Bolt	10 N·m	89 lb in
Air Cleaner Intake Duct Clamp	4 N·m	35 lb in
Camshaft Position Sensor Bolt	10 N·m	89 lb in
Camshaft Position Sensor Nut	11 N·m	97 lb in
Engine Coolant Temperature Sensor	23 N·m	17 lb ft
Evaporative Emissions (EVAP) Canister Purge Valve Bolt	10 N·m	89 lb in
EVAP Canister to Underbody Nut	9 N·m	80 lb ft
EVAP Hose/Pipe to Strut Tower Nut	10 N·m	89 lb in
Exhaust Gas Recirculation (EGR) Pipe to EGR Valve Bolt	30 N·m	22 lb ft
EGR Pipe to Exhaust Manifold Bolt	10 N·m	89 lb in
EGR Valve Bolt	30 N·m	22 lb ft
Fuel Filler Tube Bolt	12 N·m	106 lb in
Fuel Filler Tube Clamp	5 N·m	44 lb in
Fuel Hose/Pipe Retainer Nut	28 N·m	21 lb ft
Fuel Rail Bolt	10 N·m	89 lb in
Fuel Tank Strap Bolt	25 N·m	18 lb ft
Heated Oxygen Sensor (HO2S) 1	42 N·m	31 lb ft
Heated Oxygen Sensor (HO2S) 2	42 N·m	31 lb ft
Heater Outlet Pipe to Upper Intake Manifold Nut	25 N·m	18 lb ft
Ignition Coil/Control Module to Bracket	4.5 N·m	40 lb ft
Ignition Control Module Bracket Bolt	25 N·m	18 lb ft
Ignition Control Module Bracket Nut	25 N·m	18 lb ft
Knock Sensor Bolt	25 N·m	18 lb ft
Manifold Absolute Pressure Sensor Bolt	10 N·m	89 lb in
Mass Air Flow Sensor Screw	4 N·m	35 lb in
Positive Crankcase Ventilation Fresh Air Tube Retainer Bolt	5 N·m	44 lb in
Propeller Shaft Guard Bolt	25 N·m	18 lb ft
Spark Plug - Initial Installation	20 N·m	15 lb ft
Spark Plug - After Initial Installation	15 N·m	11 lb ft
Throttle Body Bolt	10 N·m	89 lb in
Throttle Body Stud	6 N·m	53 lb in

Exhaust System

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Catalytic Converter to Exhaust Manifold Nut	37 N·m	27 lb ft
Catalytic Converter to Exhaust Manifold Stud	6 N·m	53 lb in
Exhaust Crossover Pipe Nut	25 N·m	18 lb ft
Exhaust Manifold Crossover Pipe Stud	25 N·m	18 lb ft
Exhaust Manifold Heat Shield Bolt	10 N·m	89 lb in
Exhaust Manifold Nut	16 N·m	12 lb ft
Exhaust Manifold Stud	18 N·m	13 lb ft
Exhaust System to Catalytic Converter Nut	37 N·m	27 lb ft
Front Exhaust Heat Shield Nut	10 N·m	89 lb in
Fuel Tank Strap Bolt	25 N·m	18 lb ft
Propeller Shaft Underbody Guard Loop Bolt	25 N·m	18 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:

- Platium (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 – AF33-5

Transmission General Specifications

Name	AF33-5
RPO Codes	M09 or M45
Vehicle Platform Engine/Transmission Usage	L - SUV LNJ 3.4L
Transmission Drive	FWD or AWD
1st Gear Ratio	4.685
2nd Gear Ratio	2.942
3rd Gear Ratio	1.923
4th Gear Ratio	1.301
5th Gear Ratio	1.000
Reverse Ratio	3.177
Pressure Taps	Line Pressure
Transmission Fluid Type	T - IV
Transmission Fluid Capacity - Approximate	Complete Overhaul: Dry 7.8L (8.2 qt)
Transmission Type: 5	Five Forward Gears, Clutch to Clutch Shifting
Case Material	Die Cast Aluminum
Transmission Weight	90 kg (198 lb)

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Automatic Transaxle to Engine Bolt	75 N·m	55 lb ft
Control Valve Body Bolt	10 N·m	89 lb in
Control Valve Body Cover Bolt	13 N·m	115 lb in
Drain Plug	40 N·m	30 lb ft
Engine to Transaxle Brace Bolt	50 N·m	37 lb ft
Fluid Level Indicator Bolt	10 N·m	89 lb in
Frame to Body Bolt	155 N·m	114 lb ft
Fuel Hose/Pipe Retainer Nut	28 N·m	21 lb ft
Input Speed Sensor Bolt	6 N·m	53 lb in
Left Transaxle Mount to Side Rail Bolt	37 N·m	27 lb ft
Left Transaxle Mount to Transaxle Bolt	50 N·m	37 lb ft
Negative Battery Cable to Transaxle Nut	45 N·m	33 lb ft
Output Speed Sensor Bolt	6 N·m	53 lb in
Rear Transaxle Mount Bracket Bolt	55 N·m	41 lb ft
Rear Transaxle Mount to Rear Transaxle Mount Bracket Bolt	110 N·m	80 lb ft
Shift Control Assembly Nut	25 N·m	18 lb ft
Shift Control Cable Bracket Bolt	25 N·m	18 lb ft
Steering Intermediate Shaft Pinch Bolt	34 N·m	25 lb ft
Torque Converter Bolt	60 N·m	44 lb ft
Transaxle Manual Shaft Nut	7 N·m	62 lb in
Transaxle Range Switch Bolt	25 N·m	18 lb ft
Transaxle Range Switch Lever Nut	16 N·m	12 lb ft
Transaxle Range Switch Stud	25 N·m	18 lb ft
Transaxle Case to Transaxle Bolt	60 N·m	44 lb ft
Transaxle Oil Cooler Line Fitting	16 N·m	12 lb ft
Transaxle Oil Cooler Line Retaining Nut	7 N·m	62 lb in
Transmission Test Hole Plug	7 N·m	62 lb in

Fluid Capacity Specifications

Application	Specification	
	Metric	English
Complete Overhaul	7.8 liters	8.2 quarts

Transmission General Description

The AF33-5 is a fully automatic, five speed, electronically controlled, transaxle. It consists primarily of a four-element torque converter, three planetary gear sets, friction and mechanical clutches and a hydraulic pressurization and control system.

The TCM commands shift solenoids, within the transmission, ON and OFF to control shift timing. The TCM controls shift feel through the line pressure control solenoid valve. The TCM also controls the apply and release of the torque converter clutch which allows the engine to deliver the maximum fuel efficiency without sacrificing vehicle performance. The hydraulic system primarily consists of a gear type pump, four control valve bodies, case cover, converter housing and case. The pump maintains the working pressures needed to stroke the servo and clutch pistons that apply or release the friction components. These friction components, when applied or released, support the automatic shifting qualities of the transmission. The friction components used in this transmission consist of seven multiple disc clutches and one band. The multiple disc clutches combine with two mechanical sprag clutches, to deliver six different gear ratios through the gear sets. The gear sets then transfers torque through the front differential assembly and out to the drive axles.

The transmission can be operated in any one of the 6 different ranges.

- P - Park position enables the engine to be started while preventing the vehicle from rolling either forward or backward. For safety reasons, the vehicle parking brake should be used in addition to the transmission Park position. Since the front differential assembly and drive axles are mechanically locked to the case through the park pawl and front differential transfer drive gear assembly, Park position should not be selected until the vehicle has come to a complete stop.
- R - Reverse enables the vehicle to be operated in a rearward direction.
- N - Neutral position enables the engine to start and operate without driving the vehicle. If necessary, this position should be selected to restart the engine while the vehicle is moving.
- D - Drive range should be used for all normal driving conditions for maximum efficiency and fuel economy. Drive range allows the transmission to operate in each of the five forward gear ratios. Downshifts to a lower gear, or higher gear ratio are available for safe passing by depressing the accelerator or by manually selecting a lower gear with the shift selector.
- L4 - Low Four range can be used for conditions where it may be desirable to use only three gear ratios. These conditions include towing a trailer and driving on hilly terrain as described above. This range is also helpful for engine braking when descending slight grades. Upshifts and downshifts are the same as in Drive range for first, second and third gears except that the transmission is prevented from shifting above third gear. Low Four can be selected at any vehicle speed but will downshift into third gear only if vehicle speed is low enough not to overrev the engine, calibratable in TCM.
- L2 - Low Two range adds more performance for congested traffic and hilly terrain. It has the same starting ratio, first gear, as Drive and Low Two ranges but prevents the transmission from shifting above second gear. Thus, Low Two can be used to retain second gear for acceleration and engine braking as desired. Low Two can be selected at any vehicle speed but the transmission will downshift into second gear only if vehicle speed is low enough not to overrev the engine, calibratable in TCM. This range is particularly beneficial for maintaining maximum engine braking when descending steep grades.

Transmission Adaptive Functions

The AF33-5 uses a line pressure control system which has the ability to adapt the system line pressure in order to compensate for normal wear of clutch fiber plates, seals, springs, etc. The adapt feature is similar in function to fuel control (integrator/block learn).

The AF33-5 transmission uses the adapt function for garage shifts, upshifts, and TCC application. The TCM monitors the input shaft speed in order to determine if the shift is occurring too fast or too slow and adjusts the pressure control solenoid in order to maintain the correct shift feel.

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 consist of the following components:

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

This page intentionally left blank.

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
CO2	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
H2O	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
HO2S	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	
O2	Oxygen
O2S	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
SO2	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/s²	0.3048	m/s²
In/s²	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/m²

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

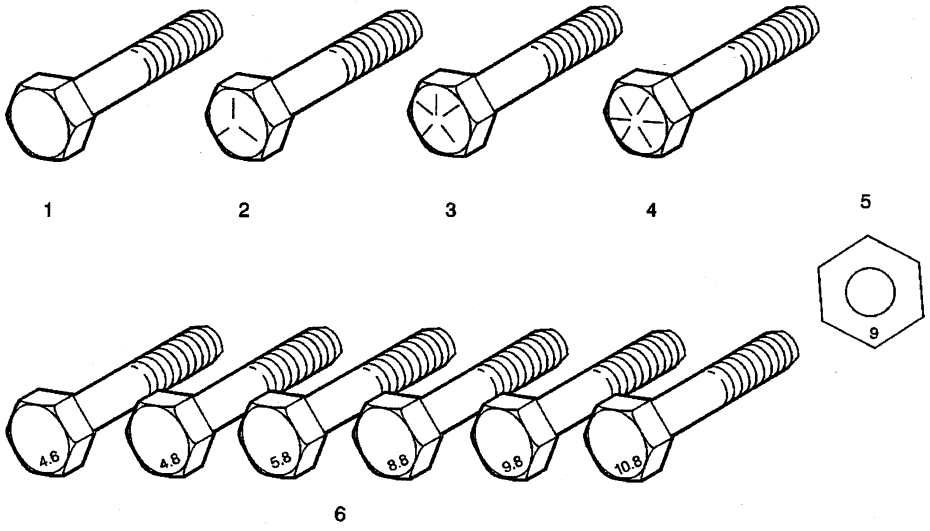
Metric Fasteners

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

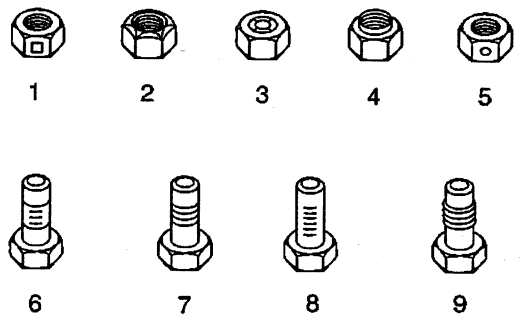
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

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

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 groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
		Air bags, frontal, dual-stage, driver and right front passenger **1 - Always use safety belts and proper child restraints, even with air bags. Children are safer when properly secured in a rear seat. See the Owner's Manual for more safety information.**	S[1]	S[1]	S[1]	S[1]	S[1]
	C60	**Air conditioning,** front	S	S	S	S	S
		Armrest, concealed storage and coin holder	S	S	S	S	S
	AP9	**Cargo convenience net,** rear, full across	–	–	S	S	S
		Cargo panel, rear, height-adjustable, includes use as security cover and service table	S	S	S	S	S
		Console, center, with armrest and concealed storage	S	S	S	S	S
		Console, floor, with storage bin	S	S	S	S	S
	K34	**Cruise control,** electronic with set and resume speed	–	■	S	S	S
		Cupholders, 3 front, 2 rear	S	S	S	S	S
		Defogger, rear-window, electric	S	S	S	S	S
		Door locks, power programmable	S	S	S	S	S
		Door locks, child security, rear	S	S	S	S	S
B58		**Floormats,** carpeted, front and rear, removable	A	■	S	S	S
		Instrumentation, electronic, includes speedometer, single trip odometer, fuel level, engine temperature, and tachometer	S	S	S	S	S
	AU0	**Keyless entry,** remote, includes 2 transmitters, panic button, content theft alarm, activation verification and illuminated entry	S	S	S	S	S
		LATCH system, (Lower Anchors and Top tethers for CHildren), for child safety seats	S	S	S	S	S
		Lighting, interior, theatre dimming, center dome, rear cargo area	S	S	S	S	S
		LS Interior Trim Package, with Custom Cloth	S	S	–	–	–
		LT Trim Package, with Manhattan Cloth plus dual map lights, cargo net, driver's seatback map pocket **1 - Includes (**2) Seat trim, leather seating surfaces.**	–	–	S	S	S[1]
		Mirror, inside rearview, manual day/night	S	S	S	–	–
	DF5	**Mirror,** inside rearview, auto-dimming, with temperature and compass	–	–	–	S	–
		Power outlets, auxiliary, covered, 1 front, 1 rear and 1 cargo area, 12-volt	S	S	S	S	S

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
		Safety belts, 3-point, driver and front passenger, height-adjustable includes pretensioners	S	S	S	S	S
		Safety belts, 3-point, rear, all positions	S	S	S	S	S
		Seats, front reclining buckets, driver's side manual height adjuster	S	S	S	--	--
		Seat, front passenger, flat-folding	S	S	S	S	S
		Seats, Multiflex sliding rear seat with 60/40 split seatback with two-position recline	S	S	S	S	S
	U1C	**Sound system,** ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock, Radio Data System (RDS) and 6-speakers	S	S	S	S	--
		Steering column, tilt	S	S	S	S	S
		Theft-deterrent system, content theft alarm	S	S	S	S	S
		Visors, vanity mirrors, driver and front passenger	S	S	S	S	S
		Warning tones, headlamp on and key-in-ignition	S	S	S	S	S
		Windows, power, includes driver express-down and passenger lockout	S	S	S	S	S
		Antenna, fixed-mast	S	S	S	S	S
		Body, liftgate with fixed glass	S	S	S	S	S
VD9		**Bumpers,** front and rear, body-color, includes Charcoal pads and (T96) Fog lamps **1 - Included with LT Exterior Appearance.**	A	A	S[1]	S[1]	S[1]
AJ1		**Glass,** deep tinted	A	■	S	S	S
		Daytime running lamps	S	S	S	S	S
	T96	**Fog lamps,** front, halogen **1 - Included and only available with (VD9) Bumpers, front and rear, body-color.**	A[1]	A[1]	S	S	S
		Headlamps, halogen composite, includes automatic exterior lamp control	S	S	S	S	S
		LS Exterior Appearance, includes Charcoal bumpers, Charcoal luggage rails, Black door handles and 16" steel wheels with cover	S	S	--	--	--
		LT Exterior Appearance, includes (VD9) Bumpers, front and rear, body-color, body-color luggage rails with Black cross bars, body-color door handles, (T96) Fog lamps and cast aluminum wheels	--	--	S	S	S
		Luggage rack, rooftop **1 - Body-color.**	S	S	S[1]	S[1]	S[1]
V1K		**Luggage crossbars,** rooftop, Black	A	■	S	S	S

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	D22	**Mirrors,** outside rearview, power, Black, manual folding	S	S	S	S	S
		Moldings, bodyside, body-color	S	S	S	S	S
		Spoiler, rear, integrated	S	S	S	S	S
	QKG	**Tires,** P235/65R16, all-season, blackwall	S	S	S	S	–
	QB5	**Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) steel with bolt-on covers, includes steel spare	S	S	–	–	–
PY0		**Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) cast aluminum, includes steel spare	A	A	S	S	–
		Wipers, intermittent, front	S	S	S	S	S
		Wiper, intermittent, rear, includes washer	S	S	S	S	S
	F67	**Axle,** rear, 2.70 ratio	S	S	S	S	S
		Battery, maintenance free, includes rundown protection	S	S	S	S	S
		Brakes, front disc/rear drum	S	S	S	S	S
JM4		**Brakes,** 4-wheel antilock **1 - Standard on 1LG26 (AWD) - Available on 1LF26 (FWD) and includes Traction control**	A[1]	A[1]	S	S	S
		Traction control **1 - 1LF26 (FWD) included and only available with (JM4) Brakes, 4-wheel antilock** **2 - 1LN26 (FWD) Models only**	A[1]	A[1]	S[2]	S[2]	S[2]
	LNJ	**Engine,** 3.4L 3400 V6 (185 HP [138.0 kW] @ 5200 rpm, 210 lb.-ft [283.8 N-m] @ 3800 rpm)	S	S	S	S	S
	C4Q	**GVWR,** 5070 lbs (2300 kg)	S	S	S	S	S
		Steering, power-assist, electric-variable	S	S	S	S	S
		Suspension, front, independent, strut type, coil springs	S	S	S	S	S
		Suspension, rear, independent, trailing arm with three lateral locating links, coil springs	S	S	S	S	S
	MX0	**Transmission,** 5-speed automatic, electronically controlled	S	S	S	S	S

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 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	K34	**Cruise control**, electronic with set and resume speed	–	■	S	S	S
B58		**Floormats,** carpeted, front and rear, removable	A	■	S	S	S
	DH3	**Mirror,** inside, rearview, auto-dimming, with temperature and compass **1 - Included and only available with (UE1) OnStar**	–	–	A[1]	A[1]	■
UE1		**OnStar**, 1-year Safe and Sound Service, includes automatic notification of air bag deployment, emergency services, roadside assistance, stolen-vehicle tracking, AccidentAssist, remote door unlock, remote diagnostics, online concierge and remote horn and lights. Drivers can also opt for other available OnStar services, including making and receiving voice-activated, hands-free phone calls with Personal Calling and getting location-based traffic and weather reports with Virtual Advisor. Visit onstar.com for system information and details **1 - Includes (NP5) Steering wheel, leather-wrapped and (UK3) Steering wheel, mounted audio controls. Not available with a ship-to of Puerto Rico or the Virgin Islands. Visit www.onstar.com for system information and details.** **2 - Includes (UK3) Steering wheel, mounted audio controls. Not available with a ship-to of Puerto Rico or the Virgin Islands. Visit www.onstar.com for system information and details.** **3 - Visit www.onstar.com for system information and details.**	–	–	A[1]	A[2]	■[3]
	AG1	**Seat adjuster,** power, driver 6-way, includes manual lumbar adjuster and map pocket	–	–	–	■	■
**2		**Seat trim,** leather seating surfaces	–	–	–	A	■
KA1		**Seats,** heated, driver and front passenger **1 - Requires (**2) Seat trim, leather seating surfaces**	–	–	–	A[1]	■
UC6		**Sound system,** ETR AM/FM stereo with in-dash 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock and Radio Data System (RDS) and 6-speakers **1 - May be substituted with (US8) Sound system, ETR AM/FM stereo with CD/MP3 player.**	A	A	A	A	□[1]
U65		**Sound system feature,** 7-speaker premium sound, including sub-woofer and amplifier **1 - Requires (US8) Sound system, ETR AM/FM stereo with CD player and MP3 playback or (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer, in-dash**	–	–	A[1]	A[1]	■

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	NP5	**Steering wheel,** leather-wrapped, includes shifter knob **1 - Included and only available with (UE1) OnStar**	--	--	A[1]	■	■
	UK3	**Steering wheel,** mounted radio controls **1 - Included and only available with (UE1) OnStar**	--	--	A[1]	A[1]	■
CF5		**Sunroof,** tilt-sliding with express-open and wind deflector	--	--	A	A	■
AJ1		**Glass,** deep tinted	A	■	S	S	S
V1K		**Luggage crossbars,** rooftop, Black	A	■	S	S	S
	QLJ	**Tires,** P235/60R17, all-season, blackwall **1 - Included with (N75) Wheels, 4 - 17" x 7" (43.2 cm x 17.8 cm) cast aluminum.**	--	--	A[1]	A[1]	■
N75		**Wheels,** 4 -17" x 7" (43.2 cm x 17.8 cm) cast aluminum, includes steel spare	--	--	A	A	■

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 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	K34	**Cruise control**		■			
B58		**Floormats,** carpeted, front and rear		■			
AJ1		**Glass,** deep tinted		■			
V1K		**Luggage crossbars,** rooftop		■			
	AG1	**Seat adjuster,** power, driver 6-way				■	■
	NP5	**Steering wheel,** leather-wrapped				■	■
	DH3	**Mirror,** inside, rearview, auto-dimming					■
UE1		**OnStar**					■
KA1		**Seats,** heated, driver and front passenger					■
**2		**Seat trim,** leather seating surfaces					■
UC6		**Sound system,** ETR AM/FM stereo with in-dash 6-disc CD changer **1 - May be substituted with (US8) Sound system, ETR AM/FM stereo with CD/MP3 player.**					□[1]
U65		**Sound system feature,** 7-speaker premium sound					■
	UK3	**Steering wheel,** mounted radio controls					■
CF5		**Sunroof,** tilt-sliding					■
	QLJ	**Tires,** P235/60R17					■
N75		**Wheels,** 4 -17" x 7" (43.2 cm x 17.8 cm) cast aluminum					■

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 groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
		Air bags, frontal, dual-stage, driver and right front passenger **1 - Always use safety belts and proper child restraints, even with air bags. Children are safer when properly secured in a rear seat. See the Owner's Manual for more safety information.**	S[1]	S[1]	S[1]	S[1]	S[1]
ASF		**Air bags,** side-impact, head curtain **1 - Always use safety belts and proper child restraints, even with air bags. Children are safer when properly secured in a rear seat. See the Owner's Manual for more safety information.**	A[1]	A[1]	A[1]	A[1]	A[1]
	C60	**Air conditioning,** front	S	S	S	S	S
		Armrest, concealed storage and coin holder	S	S	S	S	S
	AP9	**Cargo convenience net**, rear, full across	--	--	S	S	S
		Cargo panel, rear, height-adjustable, includes use as security cover and service table	S	S	S	S	S
		Console, center, with armrest and concealed storage	S	S	S	S	S
		Console, floor, with storage bin	S	S	S	S	S
	K34	**Cruise control**, electronic with set and resume speed	--	■	S	S	S
		Cupholders, 3 front, 2 rear	S	S	S	S	S
		Defogger, rear-window, electric	S	S	S	S	S
		Door locks, power programmable	S	S	S	S	S
		Door locks, child security, rear	S	S	S	S	S
B58		**Floormats,** carpeted, front and rear, removable	A	■	S	S	S
		Instrumentation, electronic, includes speedometer, single trip odometer, fuel level, engine temperature, and tachometer	S	S	S	S	S
	AU0	**Keyless entry,** remote, includes 2 transmitters, panic button, content theft alarm, activation verification and illuminated entry	S	S	S	S	S
		LATCH system, (Lower Anchors and Top tethers for CHildren), for child safety seats	S	S	S	S	S
		Lighting, interior, theatre dimming, center dome, rear cargo area	S	S	S	S	S
		LS Interior Trim Package, with Custom Cloth	S	S	--	--	--
		LT Trim Package, with Manhattan Cloth plus dual map lights, cargo net, driver's seatback map pocket **1 - Includes (**2) Seat trim, leather seating surfaces.**	--	--	S	S	S[1]
		Mirror, inside rearview, manual day/night	S	S	S	--	--

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	DF5	**Mirror,** inside rearview, auto-dimming, with temperature and compass	--	--	--	S	--
	DH3	**Mirror,** inside, rearview, auto-dimming, with temperature and compass **1 - Included and only available with (UE1) OnStar**	--	--	A[1]	A[1]	■
UE1		**OnStar,** 1-year Safe and Sound Service, includes automatic notification of air bag deployment, emergency services, roadside assistance, stolen-vehicle tracking, AccidentAssist, remote door unlock, remote diagnostics, online concierge and remote horn and lights. Drivers can also opt for other available OnStar services, including making and receiving voice-activated, hands-free phone calls with Personal Calling and getting location-based traffic and weather reports with Virtual Advisor. Visit onstar.com for system information and details **1 - Includes (NP5) Steering wheel, leather-wrapped and (UK3) Steering wheel, mounted audio controls. Not available with a ship-to of Puerto Rico or the Virgin Islands. Visit www.onstar.com for system information and details.** **2 - Includes (UK3) Steering wheel, mounted audio controls. Not available with a ship-to of Puerto Rico or the Virgin Islands. Visit www.onstar.com for system information and details.** **3 - Visit www.onstar.com for system information and details.**	--	--	A[1]	A[2]	■[3]
		Power outlets, auxiliary, covered, 1 front, 1 rear and 1 cargo area, 12-volt	S	S	S	S	S
		Safety belts, 3-point, driver and front passenger, height-adjustable includes pretensioners	S	S	S	S	S
		Safety belts, 3-point, rear, all positions	S	S	S	S	S
		Seats, front reclining buckets, driver's side manual height adjuster	S	S	S	--	--
	AG1	**Seat adjuster,** power, driver 6-way, includes manual lumbar adjuster and map pocket	--	--	--	■	■
		Seat, front passenger, flat-folding	S	S	S	S	S
		Seats, Multiflex sliding rear seat with 60/40 split seatback with two-position recline	S	S	S	S	S
**2		**Seat trim,** leather seating surfaces	--	--	--	A	■
KA1		**Seats,** heated, driver and front passenger **1 - Requires (**2) Seat trim, leather seating surfaces**	--	--	--	A[1]	■
	U1C	**Sound system,** ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock, Radio Data System (RDS) and 6-speakers	S	S	S	S	--
US8		**Sound system,** ETR AM/FM stereo with CD/MP3 player, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock, Radio Data System (RDS) and 6-speakers	A	A	A	A	A

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
UC6		**Sound system,** ETR AM/FM stereo with in-dash 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock and Radio Data System (RDS) and 6-speakers **1 - May be substituted with (US8) Sound system, ETR AM/FM stereo with CD/MP3 player.**	A	A	A	A	□[1]
U65		**Sound system feature,** 7-speaker premium sound, including sub-woofer and amplifier **1 - Requires (US8) Sound system, ETR AM/FM stereo with CD player and MP3 playback or (UC6) Sound system, ETR AM/FM stereo with 6-disc CD changer, in-dash**	–	–	A[1]	A[1]	■
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]	A[1]	A[1]
		Steering column, tilt	S	S	S	S	S
	NP5	**Steering wheel,** leather-wrapped, includes shifter knob **1 - Included and only available with (UE1) OnStar**	–	–	A[1]	■	■
	UK3	**Steering wheel,** mounted radio controls **1 - Included and only available with (UE1) OnStar**	–	–	A[1]	A[1]	■
CF5		**Sunroof,** tilt-sliding with express-open and wind deflector	–	–	A	A	■
		Theft-deterrent system, content theft alarm	S	S	S	S	S
		Visors, vanity mirrors, driver and front passenger	S	S	S	S	S
		Warning tones, headlamp on and key-in-ignition	S	S	S	S	S
		Windows, power, includes driver express-down and passenger lockout	S	S	S	S	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.

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 groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
		Antenna, fixed-mast	S	S	S	S	S
		Body, liftgate with fixed glass	S	S	S	S	S
VD9		**Bumpers,** front and rear, body-color, includes Charcoal pads and (T96) Fog lamps **1 - Included with LT Exterior Appearance.**	A	A	S[1]	S[1]	S[1]
AJ1		**Glass,** deep tinted	A	■	S	S	S
		Daytime running lamps	S	S	S	S	S
	T96	**Fog lamps,** front, halogen **1 - Included and only available with (VD9) Bumpers, front and rear, body-color.**	A[1]	A[1]	S	S	S
		Headlamps, halogen composite, includes automatic exterior lamp control	S	S	S	S	S
		LS Exterior Appearance, includes Charcoal bumpers, Charcoal luggage rails, Black door handles and 16" steel wheels with cover	S	S	–	–	–
		LT Exterior Appearance, includes (VD9) Bumpers, front and rear, body-color, body-color luggage rails with Black cross bars, body-color door handles, (T96) Fog lamps and cast aluminum wheels	–	–	S	S	S
		Luggage rack, rooftop **1 - Body-color.**	S	S	S[1]	S[1]	S[1]
V1K		**Luggage crossbars,** rooftop, Black	A	■	S	S	S
	D22	**Mirrors,** outside rearview, power, Black, manual folding	S	S	S	S	S
		Moldings, bodyside, body-color	S	S	S	S	S
		Spoiler, rear, integrated	S	S	S	S	S
	QKG	**Tires,** P235/65R16, all-season, blackwall	S	S	S	S	–
	QLJ	**Tires,** P235/60R17, all-season, blackwall **1 - Included with (N75) Wheels, 4 - 17" x 7" (43.2 cm x 17.8 cm) cast aluminum.**	–	–	A[1]	A[1]	■
	QB5	**Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) steel with bolt-on covers, includes steel spare	S	S	–	–	–
PY0		**Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) cast aluminum, includes steel spare	A	A	S	S	–

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
N75		**Wheels,** 4 -17" x 7" (43.2 cm x 17.8 cm) cast aluminum, includes steel spare	--	--	A	A	■
		Wipers, intermittent, front	S	S	S	S	S
		Wiper, intermittent, rear, includes washer	S	S	S	S	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.

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 groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models.** **2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.**	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	F67	**Axle,** rear, 2.70 ratio	S	S	S	S	S
		Battery, maintenance free, includes rundown protection	S	S	S	S	S
		Brakes, front disc/rear drum	S	S	S	S	S
JM4		**Brakes,** 4-wheel antilock **1 - Standard on 1LG26 (AWD) - Available on 1LF26 (FWD) and includes Traction control**	A[1]	A[1]	S	S	S
		Traction control **1 - 1LF26 (FWD) included and only available with (JM4) Brakes, 4-wheel antilock** **2 - 1LN26 (FWD) Models only**	A[1]	A[1]	S[2]	S[2]	S[2]
FE9		**Emissions,** Federal requirements	A	A	A	A	A
NE1		**Emissions,** Maine, Massachusetts, New York or Vermont state requirements	A	A	A	A	A
YF5		**Emissions,** California state requirements	A	A	A	A	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]	A[1]	A[1]	A[1]	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) California state requirements or (NE1) emissions, Massachusetts, Maine, New York and Vermont state requirements**	A[1]	A[1]	A[1]	A[1]	A[1]
	LNJ	**Engine,** 3.4L 3400 V6 (185 HP [138.0 kW] @ 5200 rpm, 210 lb.-ft [283.8 N-m] @ 3800 rpm)	S	S	S	S	S
K05		**Engine block heater**	A	A	A	A	A
	C4Q	**GVWR,** 5070 lbs (2300 kg)	S	S	S	S	S
		Steering, power-assist, electric-variable	S	S	S	S	S
		Suspension, front, independent, strut type, coil springs	S	S	S	S	S
		Suspension, rear, independent, trailing arm with three lateral locating links, coil springs	S	S	S	S	S
V92		**Trailering equipment**, includes receiver hitch, rear, 4-wire connection	A	A	A	A	A

Free Flow RPO Code	Ref. Only RPO Code	Description 1 - Equipment groups 1SA and 1SB available on 1LF26 (FWD) and 1LG26 (AWD) Models. 2 - Equipment groups 1SC, 1SD and 1SE available on 1LN26 (FWD) and 1LP26 (AWD) Models.	LS		LT		
			1SA[1]	1SB[1]	1SC[2]	1SD[2]	1SE[2]
	MX0	**Transmission,** 5-speed automatic, electronically controlled	S	S	S	S	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.

		Transmissions	Axles	GVWR lbs. (kg)
Model	**Engine**	**MX0 5-Speed Automatic**	**F67 2.70**	**C4Q 5070 (2300)**
1LF26	LNJ 3.4L, SFI V6	S	S	S
1LN26	LNJ 3.4L, SFI V6	S	S	S
1LG26	LNJ 3.4L, SFI V6	S	S	S
1LP26	LNJ 3.4L, SFI V6	S	S	S

S = Standard Equipment A = Available – (dashes) = Not Available
■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable

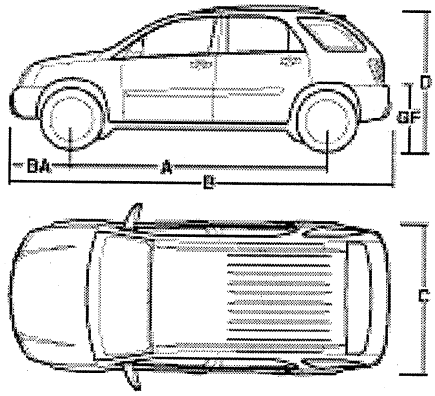
*Indicates availability of feature on multiple models. For example, it indicates feature availability on 2WD and 4WD Models or Rear wheel drive and All-wheel drive Models.

Decor Level	Seat Type	Seat Code	Seat Trim	Interior	
				Light Gray	Light Cashmere
LS	Seats, front reclining buckets	AR9	Custom Cloth	14B	31B
LT	Seats, front reclining buckets	AR9	Manhattan Cloth	14C[1]	31C[1]
LT	Seats, front reclining buckets	AR9	Leather seating surfaces	142[2]	312[2]

Exterior Solid Paint	Color Code	Touch Up Paint Number	Interior	
			Light Gray	Light Cashmere
Sandstone Metallic	15U	WA-231M	–	A
Galaxy Silver Metallic	18U	WA-687H	A	–
Black	19U	WA-990A	A	A
Laser Blue Metallic[3]	21U	WA-227M	A	A
Dark Silver Metallic	42U	WA-232M	A	–
Salsa Red Metallic	64U	WA-228M	A	A
Meander Green Metallic	83U	WA-230M	A	A
Summit White	96U	WA-686H	A	A

1 - Not available on 1SE.
2 - Not available on 1SC.
3 - Extra cost. Not available on LS.

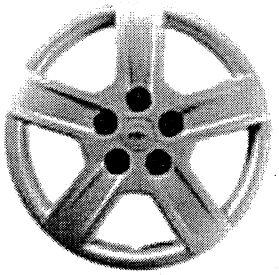
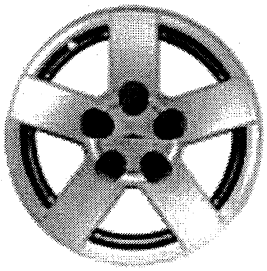
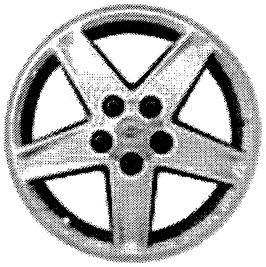
All dimensions in inches (mm) unless otherwise stated.

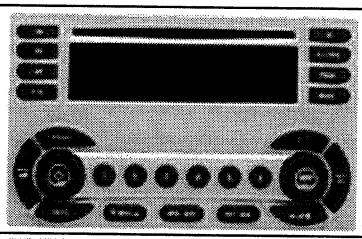
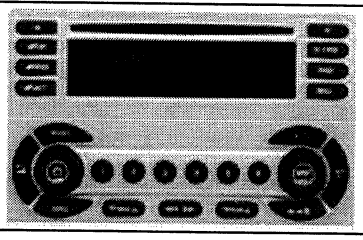


	Specifications	FWD	AWD
A	**Wheelbase**	112.50 (2858)	112.50 (2858)
B	**Overall length**	188.80 (4796)	188.80 (4796)
C	**Body width**	71.40 (1814)	71.40 (1814)
D	**Overall height**	69.30 (1760)	69.30 (1760)
BA	**Front bumper,** to axle	37.50 (952)	37.50 (952)
GF	**Ground to top of rear load floor**	28.60 (726)	28.60 (726)
	Front track width	61.60 (1565)	61.60 (1565)
	Rear track width	61.80 (1570)	61.80 (1570)
	Head room, front	40.90 (1039)	40.90 (1039)
	Head room, front w/optional sunroof	39.80 (1011)	39.80 (1011)
	Head room, rear	40.10 (1019)	40.10 (1019)
	Shoulder room, front	55.70 (1415)	55.70 (1415)
	Shoulder room, rear	55.90 (1420)	55.90 (1420)
	Hip room, front	51.10 (1298)	51.10 (1298)
	Hip room, rear	51.30 (1303)	51.30 (1303)
	Leg room, front	41.20 (1046)	41.20 (1046)
	Leg room, rear	40.20 (1021)	40.20 (1021)

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.

	LS	LT
Capacities		
Cargo volume, maximum behind 2nd row seats, cu. ft. (liters)	35.2 (996.9)	35.2 (996.9)
Cargo volume, behind 1st row seat, cu. ft. (liters)	68.6 (1942.8)	68.6 (1942.8)
Fuel capacity, approximate, gallon (liters)	17 (63)	17 (63)
Seating capacity (front/rear)	2/3	2/3

	QB5 **Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) steel with bolt-on covers, includes steel spare
	PY0 **Wheels,** 4 - 16" x 6.5" (40.6 cm x 16.5 cm) cast aluminum, includes steel spare
	N75 **Wheels,** 4 -17" x 7" (43.2 cm x 17.8 cm) cast aluminum, includes steel spare

	U1C **Sound system,** ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock, Radio Data System (RDS) and 6-speakers
	UC6 **Sound system,** ETR AM/FM stereo with in-dash 6-disc CD changer, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock and Radio Data System (RDS) and 6-speakers
	US8 **Sound system,** ETR AM/FM stereo with CD/MP3 player, includes seek-and-scan, digital clock, auto-tone control, automatic volume, Theftlock, Radio Data System (RDS) and 6-speakers

Option Code	Description
**2	Seat trim, leather seating surfaces
AG1	Seat adjuster, power, driver 6-way
AJ1	Glass, deep tinted
AP9	Cargo convenience net
ASF	Air bags, side-impact,
AU0	Keyless entry, remote
B58	Floormats, carpeted, front and rear
C4Q	GVWR, 5070 lbs (2300 kg)
C60	Air conditioning, front
CF5	Sunroof, tilt-sliding
D22	Mirrors, outside rearview, power, Black
DF5	Mirror, inside rearview
DH3	Mirror, inside, rearview, auto-dimming
F67	Axle, rear, 2.70 ratio
FE9	Emissions, Federal requirements
JM4	Brakes, 4-wheel antilock
K05	Engine block heater
K34	Cruise control
KA1	Seats, heated, driver and front passenger
LNJ	Engine, 3.4L 3400 V6 (185 HP [138.0 kW] @ 5200 rpm, 210 lb.-ft [283.8 N-m] @ 3800 rpm)
MX0	Transmission, 5-speed automatic
N75	Wheels, 4 -17" x 7" (43.2 cm x 17.8 cm) cast aluminum
NB8	Emissions override
NC7	Emissions override, Federal
NE1	Emissions, Maine, Massachusetts, New York or Vermont state requirements
NP5	Steering wheel, leather-wrapped
PY0	Wheels, 4 - 16" x 6.5" (40.6 cm x 16.5 cm) cast aluminum
QB5	Wheels, 4 - 16" x 6.5" (40.6 cm x 16.5 cm) steel with bolt-on covers
QKG	Tires, P235/65R16
QLJ	Tires, P235/60R17
T96	Fog lamps, front
U1C	Sound system, ETR AM/FM stereo with CD player
U2K	Sound system feature, XM Satellite Radio
U65	Sound system feature, 7-speaker premium sound
UC6	Sound system, ETR AM/FM stereo with in-dash 6-disc CD changer
UE1	OnStar
UK3	Steering wheel, mounted radio controls
US8	Sound system, ETR AM/FM stereo with CD/MP3 player,
V1K	Luggage crossbars, rooftop
V92	Trailering equipment
VD9	Bumpers, front and rear, body-color
YF5	Emissions, California state requirements

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 Receiver Hitch		
Model	(LNJ) 3.4L, SFI V6	
	Axle Ratio	Maximum Trailer Weight lbs. (kg)
Equinox	2.60	3500 (1588)

Trailering capacity may be limited by tow vehicle ability to carry trailer tongue weight.