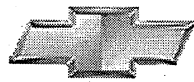


Chevrolet



Malibu/Malibu Maxx



2005

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Product Information

2005 Malibu: Refined Performance, Adaptable Versatility, And Tailored Comfort

Introduced as a 2004 model, the all-new Malibu and Malibu Maxx made an immediate impression. The clean lines of the Malibu sedan were recognized as crisply tailored and the unique extended sedan design of the Malibu Maxx attracted customers while defying classification.

Malibu delivers the performance and versatility of the best midsize sedans with the dependability and value that customers expect from Chevrolet. Plus, the Malibu adapts to different individuals and lifestyles with two body styles, flexible interiors and a full range of driver personalization features.

From the B-pillar forward, the Malibu sedan and Malibu Maxx are identical. Rearward of the B-pillar, the two differ substantially. The five-door Malibu Maxx rides on a wheelbase that is 6 inches (15.2 cm) longer than the Malibu sedan, while its overall length is a half-inch (1.3 cm) shorter. The result is a spacious interior for a car its size.

Performance

"Anyone who has driven the previous version of the Malibu will immediately notice a firmer, quieter, more linear feel in the ride and handling of the new generation," said Gene Stefanyshyn, vehicle line executive for the Malibu and Malibu Maxx. Malibu's dynamic performance and refined composure starts with its foundation - the General Motors Epsilon global architecture. The Malibu and its Malibu Maxx stablemate were the first North American applications of the Epsilon architecture, which also provides the foundation for the Saab 9-3, Opel Vectra and the forthcoming Pontiac G6.

The powertrain choices for the Malibus help bring out the best of the new architecture. The Malibu sedan gets power and fuel efficiency from its standard 144 horsepower (107 kw), 2.2L, dual-overhead-cam Ecotec four-cylinder engine. The LS and LT models of the Malibu and Malibu Maxx feature the new GM 3500 3.5L, overhead-valve V-6, with 200 horsepower (149 kw). All Malibus come with the smooth-shifting Hydra-Matic 4T45-E four-speed electronic automatic transmission. Combined with the broad torque curve of Malibu's four- and six-cylinder engines, the result is strong performance and best-in-class fuel economy.

An independent front suspension with MacPherson struts and a four-link independent rear suspension underpin Malibu. All Malibu models are equipped with power brakes and electric power steering (EPS) with variable assist for low- and high-speed steering maneuvers.

In addition to the vibration-reducing properties of the Epsilon architecture, Malibu has a host of noise-elimination features, including a cast foam-rubber barrier covering the dash panel; a modular noise-dampening plate in the dash panel; a fiberglass-composite hood insulator; and front and rear "glove-fit" carpet floor modules.

High standards

Every Malibu features a high level of standard equipment. A power driver's seat height adjuster, tilt/telescoping steering column, CD-equipped audio system, power windows, door locks and mirrors are standard on all Malibus. Power adjustable brake and accelerator pedals and manual lumbar support are standard on LS and LT models, and available on the base Malibu sedan. Many of these features are not standard, or even available, in other cars in the Malibu's class.

Malibu is also the first car in its class to offer an optional factory-installed remote vehicle starter system, allowing the driver to get a head start on the car's interior heating and cooling from a range of about 200 feet (61 m).

Genuine versatility

Malibu can be a cargo carrier by day and a refined, comfortable people-hauler by night, or the other way around. Use of space is the key. In the sedan body style, Malibu is roomy, measuring out at 101 cubic feet (2,871L) of space for passengers. With a 60/40-split/folding rear seat and a fold-flat front passenger seat, a variety of items will fit fully inside Malibu, including long items such as ladders and snow skis.

The rear seats in Malibu Maxx slide nearly 7 inches (17.8 cm) fore and aft and are split 60/40 not just in the seat back, but also the seat cushion, to further increase comfort. The rear seat backs recline, allowing different sized rear passengers to tailor their seating position in a similar way a front-seat passenger can. The Malibu Maxx has a generous 106 cubic feet (3,002L) of passenger space and a luxurious 41 inches (104 cm) of legroom with the seats pushed all the way back – legroom comparable to a full-size domestic luxury sedan.

The Malibu Maxx also features a standard fixed-rear glass skylight that provides a spacious, open atmosphere over the rear seats. Both driver- and passenger-side rear occupants have the option of opening or closing a standard split/retractable shade to control the amount of light coming through the skylight.

The Malibu Maxx's rear cargo area features a standard power outlet and a multi-functional cargo panel with four positions for two-tier loading. The cargo panel also can be positioned as a table for picnics or tailgate parties. Hooks on the cargo panel help secure smaller items, and cargo nets on each side of the cargo area, also unique to the Malibu Maxx, help keep items from sliding around.

Comfort for rear-seat passengers for all Malibu models is enhanced with a heating/air conditioning system designed for their needs. In addition to airflow to the feet, two vents on the center of the dash – dubbed “turbo blasters” by the car’s engineers – are designed to pour generous amounts of heated or cooled air directly into the back seat.

Three levels of audio system offerings are available on the Malibu, including an uplevel radio with an in-dash, six-CD changer, six speakers (including two tweeters on the A-pillar), automatic volume and tone controls, and XM Satellite Radio compatibility (continental U.S. only). Malibu Maxx adds the option of a rear-seat audio system or a DVD-based rear-seat entertainment system, both complete with wireless headphones.

Style

Malibu features crisp, clean lines that highlight a space-efficient and aerodynamic exterior. Crystalline-like headlamp lenses and a chrome front bar and gold Chevy bowtie highlight these contemporary lines. Compared with its predecessor, the new Malibu has a slightly wider stance and a much more substantial front end. The exterior is a fresh direction that honors Chevrolet’s heritage while allowing European influence in execution.

The interior features a Chevrolet-signature dual cockpit design with luxury features and an overall sense of quality and attention to detail. Seating in the Malibu has the look and feel of an upscale European sedan with comfortable, firm foam padding to give occupants a solid, secure ride that matches the car’s nimble performance.

Safety and strength

Engineers made extensive use of high-strength steel in strategic areas of the body and developed energy-absorbing front and rear crush zones to help obtain impressive structural performance for safety.

OnStar is the leading provider of in-vehicle safety, security and information services in the United States and Canada. Using the GPS satellite network and wireless technology, OnStar features core safety services and OnStar Personal Calling that allows drivers to make and receive hands-free, voice-activated phone calls using a powerful three-watt analog system and external antenna for greater reception.

The OnStar service available on the 2005 Malibu and Malibu Maxx also includes the Advanced Automatic Crash Notification (AACN) system, making crash data available to 911 centers to potentially dispatch the appropriate life-saving personnel and equipment to crash scenes faster. AACN does not require air bag deployment.

Other safety features in the Malibu include:

- Dual-stage frontal air bags for the driver and front passenger
- Three-point safety belts for all occupants
- Head curtain side-impact air bag with front seat-mounted thorax side-impact air bag standard on LT, and available on all other models

2005 Chevrolet Malibu Restoration Kit

- Standard four-wheel anti-lock brakes with traction control on LS and LT models, available on base sedan
- LATCH (Lower Anchors and Tethers for CHildren) child-seat attachment system in all rear seating positions

Model Lineup – Malibu

| | Engines | | Transmission |
|----------------|-----------------|---------------|--|
| | Ecotec 2.2L I-4 | 3500 3.5L V-6 | 4-spd electronic auto (Hydra-Matic 4T45-E) |
| Malibu | S | O | S |
| Malibu LS | - | S | S |
| Malibu LT | - | S | S |
| Malibu Maxx LS | - | S | S |
| Malibu Maxx LT | - | S | S |

Key:

Standard s

Optional o

Not available -

New for 2005

- Rear spoiler and rear window wiper/washer on Malibu Maxx – optional on LS, standard on LT
- Thorax side-impact air bags for front occupants are standard on Malibu LT and Malibu Maxx LT. Available on all other models
- Exterior Appearance Package for Malibu base sedan includes body-color side moldings, 15-inch alloy wheels and rear spoiler
- Heated cloth seats available on Malibu sedan and Malibu Maxx LS

Specifications

Overview

| | |
|-------------------------|--|
| Models: | Malibu, Malibu Maxx |
| Body style / driveline: | 5-passenger sedan & extended sedan, unitized body and chassis, front engine, front-wheel drive |
| Construction: | 2-sided galvanized steel on exterior panels (except roof) |
| EPA vehicle class: | midsize car |
| Manufacturing location: | Kansas City, Kan. |
| Key competitors: | Toyota Camry, Honda Accord, Dodge Stratus, Hyundai Sonata, Mazda 6 |

Engines

| | Ecotec 2.2L I-4 (L61) | 3500 3.5L V-6 (LX9) |
|---------------------------------|---|---|
| Application: | std on base sedan Malibu | std on LS, LT |
| Type: | 2.2L DOHC I-4 | 3.5L V-6 |
| Displacement (cu in / cc): | 134 / 2189 | 213 / 3500 |
| Bore & stroke (in / mm): | 3.39 x 3.72 / 86 x 94.6 | 3.70 x 3.31 / 94 x 84 |
| Block material: | cast aluminum | cast iron |
| Cylinder head material: | cast aluminum | cast aluminum |
| Valvetrain: | DOHC, 4 valves per cylinder | OHV, 2 valves per cylinder |
| Ignition system: | electronic direct | electronic direct |
| Fuel delivery: | sequential multi-port fuel injection | sequential multi-port fuel injection |
| Compression ratio: | 10:1 | 9.8:1 |
| Horsepower (hp / kw @ rpm): | 144 / 107 @ 5600 | 200 / 149 @ 5400 |
| Torque (lb-ft / Nm @ rpm): | 155 / 210 @ 4000 | 220 / 298 @ 3200 |
| Recommended fuel: | 87 octane | 87 octane |
| Maximum engine speed (rpm): | 6500 | 6200 |
| Exhaust system: | stainless steel with aluminized coating on the muffler and tailpipe | stainless steel with aluminized coating on the muffler and tailpipe |
| Emissions controls: | close-coupled catalytic converters; Quick-Sync 24x ignition system; returnless fuel rail; fast-response O ₂ sensor | close-coupled catalytic converters; Quick-Sync 24x ignition system; returnless fuel rail; fast-response O ₂ sensor |
| Estimated fuel economy: | | |
| MPG (city / hwy / combined) | 24 / 34 / 29 | sedan: 23 / 32 / 27 Maxx: 22 / 30 / 26 |
| MPiG (city / hwy / combined) | 29 / 43 / 34 | sedan: 27 / 42 / 32 Maxx: 27 / 42 / 32 |
| L/100km (city / hwy / combined) | 9.8 / 6.6 / 8.4 | sedan: 10.5 / 6.7 / 8.8 Maxx: 10.5 / 6.7 / 8.8 |

Transmission

| | |
|--------------------------|--|
| Type: | Hydra-Matic 4T45-E 4-speed automatic w/overdrive, front-wheel drive |
| Gear ratios (:1): | |
| First: | 2.96 |
| Second: | 1.62 |
| Third: | 1.00 |
| Fourth: | 0.68 |
| Reverse: | 2.14 |
| Final drive ratio: | 3.63:1 (2.2L) 3.05:1 (3.5L) |

Chassis/Suspension

| | |
|--|--|
| Front: | independent MacPherson coil-over-strut strut (gas pressurized), coil springs, tubular stabilizer bar, full frame isolated front chassis cradle |
| Rear: | independent 4-link design, twin-tube gas shock, dual rate (non-linear) mini block coil spring, solid stabilizer bar, adjustable toe and camber |
| Steering type: | electric, power-assisted variable-speed rack-and-pinion |
| Steering ratio: | 15.9:1 |
| Steering wheel turns, lock-to-lock: | 3.1 turns |
| Turning circle, curb-to-curb (ft / m): | 36 / 10.9 sedan 37.6 / 11.4 Maxx |

Brakes

| | |
|--|---|
| Type: | base: power-assisted front disc, rear drum LS/LT: power-assisted front disc, rear disc anti-lock braking system and traction control with Dynamic Rear Proportioning and active wheel-speed sensors std on LS/LT, opt on base) |
| Front rotor (diameter x thickness, in/mm): | 10.87 x 1.02 / 276 x 26 sedan 11.65 x 1.02 / 296 x 25.9; vented discs |
| Rear drum (diameter x thickness, in/mm): | 9.05 x 1.57 / 230 x 40 (drum) |
| Rear rotor (diameter x thickness, in/mm): | 10.63 x 0.55 / 270 x 14 (disc) |
| Total swept area (sq in / sq cm): | front: 224 / 1444 sedan, 208.3 / 1343 Maxx; rear: 88.6 / 572 (drum) 97.2 / 627 (disc) |

Wheels/Tires

| | Malibu | Malibu Maxx |
|----------------------|---|---|
| Wheel size and type: | base: 15-inch x 6.5-inch steel | LS: 16-inch x 6.5-inch aluminum machine faced |
| | LS: 15-inch x 6.5-inch aluminum, machine-faced or painted | |
| | LT: 16-inch x 6.5-inch aluminum, machine-faced | LT: 16-inch x 6.5-inch aluminum styled |
| Tires: | base: P205/65R15, compact spare tire | P215/60R16 all season blackwall, compact spare tire |
| | LS/LT: P205/60R15 or P215/60R16 blackwall touring tires, compact spare tire | |

Dimensions

Exterior

| | Malibu | Malibu Maxx |
|---------------------------------------|---|---------------------------------------|
| Wheelbase (in / mm): | 106.3 / 2700 | 112.3 / 2852 |
| Overall length (in / mm): | 188.3 / 4783 | 187.8 / 4770 |
| Overall width (in / mm): | 69.9 / 1776 | 69.8 / 1773 |
| Overall height (in / mm): | 57.5 / 1461 | 58.1 / 1476 |
| Track (in / mm): | front: 60 / 1524 rear: 59.3 / 1506 | front: 60 / 1524 rear: 60.2 / 1529 |
| Minimum ground clearance (in / mm): | 6.1 / 154 | 6.1 / 154 |
| Curb weight (lb / kg): | Base: 3174 / 1440 LS: 3297 / 1495 LT: 3315 / 1504 | LS: 3458 / 1569 LT: 3476 / 1577 |
| Weight distribution (% front / rear): | 62 / 38 | 60 / 40 |

Interior

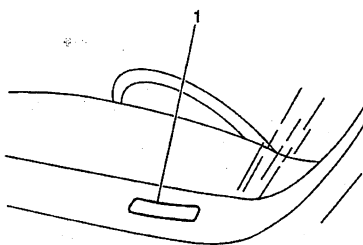
| | Malibu Front | Malibu Rear | Malibu Maxx Front | Malibu Maxx Rear |
|--------------------------|---------------------|--------------------|--------------------------|-------------------------|
| Seating capacity: | 2 | 3 | 2 | 3 |
| Head room (in / mm): | 39.6 / 1006 | 37.6 / 955 | 39.4 / 1001 | 39.4 / 1001 |
| Leg room (in / mm): | 41.9 / 1064 | 38.5 / 978 | 41.9 / 1064 | 41 / 1042 |
| Shoulder room (in / mm): | 56.7 / 1440 | 56.1 / 1425 | 56.7 / 1440 | 55.5 / 1410 |
| Hip room (in / mm): | 53.2 / 1351 | 52.4 / 1331 | 53.5 / 1359 | 52.4 / 1331 |

Capacities

| | Malibu | Malibu Maxx |
|--|-----------------------------------|--------------------|
| EPA passenger volume (cu ft / L): | 101.4 / 2871 | 106 / 3002 |
| EPA interior volume (cu ft / L): | 116.8 / 3307 | 128.8 / 3647 |
| Cargo volume (cu ft / L): | 15.4 / 436 | 22.8 / 646 |
| With second-row seat folded down (Maxx): | — | 41 / 1161 |
| Trailer towing maximum (lb / kg): | 1000 / 454 | 1000 / 454 |
| Fuel tank (gal / L): | 16.3 / 61 | 16.4 / 62 |
| Engine oil (qt / L): | 5.0 / 4.7 (I4) 4.5 / 4.3 (V-6) | 4.5 / 4.3 |
| Cooling system (qt / L): | 13.6 / 12.9 | 13.6 / 12.9 |

Vehicle Identification

Vehicle Identification Number (VIN)



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

| Position | Definition | Character | Description |
|----------|-----------------------|-------------------|--|
| 1 | Country of Origin | 1 | U.S.A. |
| 2 | Manufacturer | G | General Motors |
| 3 | Make | 1 | Chevrolet |
| 4-5 | Carline/Series | Z/S Z/T Z/U | Malibu Malibu LS Malibu LT |
| 6 | Body Style | 5 6 | Sedan-4 Door 4 Window Notchback, 69 Sedan- 4 Door 6 Window Plain Back-Hatchback, 68 |
| 7 | Restraint System | 2 | Active Manual Belts W/Driver and Passenger Inflatable Restraint System Frontal |
| 8 | Engine Type | 8 F | RPO LX9 Engine Gas, 6 CYL, 3.5L, SFI, V6 RPO L61 Engine Gas, 4 CYL, 2.2L, SFI, ALUM |
| 9 | Check Digit | -- | Check Digit |
| 10 | Model Year | 5 | 2005 |
| 11 | Plant Location | F | Fairfax II, KS |
| 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 | F | Fairfax II, KS |
| 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:

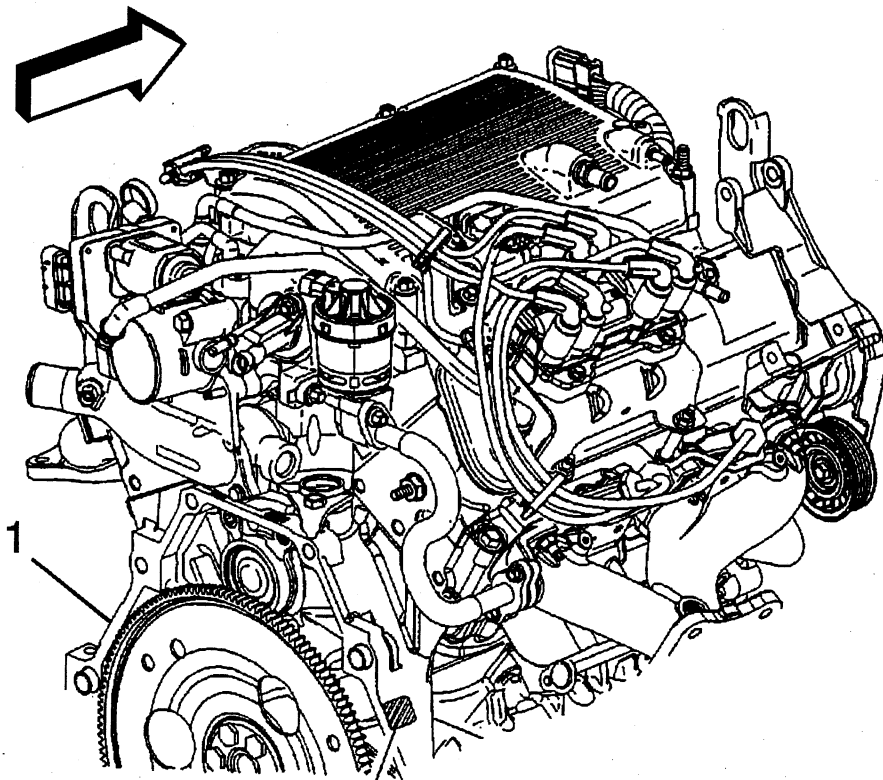
| VIN Derivative Position | Equivalent VIN Position |
|-------------------------|-------------------------|
| 1 | 3 |
| 2 | 10 |
| 3 | 11 |
| 4-9 | 12-17 |

Engine ID and VIN Derivative Location

The eighth character in the Vehicle Identification Number (VIN) identifies the engine. Adhesive-backed labels attached to the engine, laser etching or stampings on the engine block indicate the engine unit number/date code. All engines are stamped with a VIN derivative. For more information on the VIN derivative, refer to VIN Derivative above.

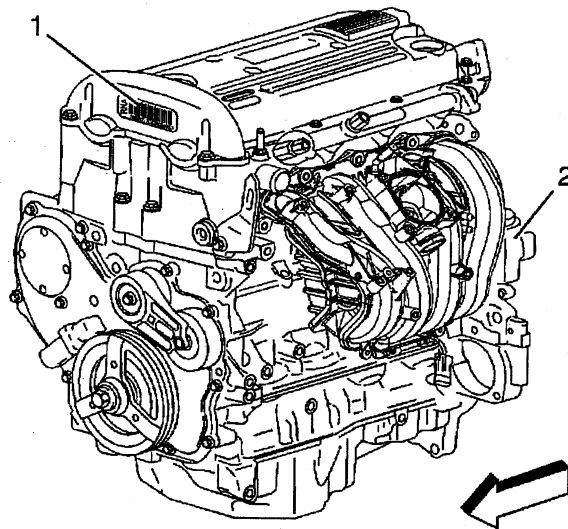
LX9, 3.5L Engine VIN Derivative Location

The Vehicle Identification Number - VIN derivative (1) for 3.5L LX9 is stamped or laser etched on the left side rear of the engine block. The Vehicle Identification Number - VIN derivative is nine digits long and can be used to determine if a vehicle contains the original engine.

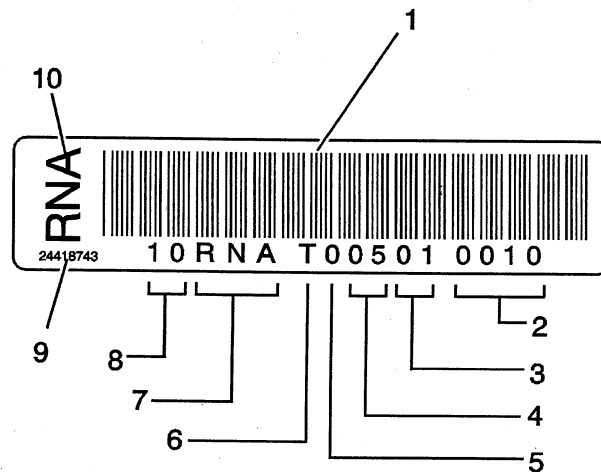


- The first digit identifies the division.
- The second digit identifies the model year.
- The third digit identifies the assembly plant.
- The fourth through ninth digits are the last six digits of the Vehicle Identification Number - VIN.

L61, 2.2 L Engine VIN Derivative Location



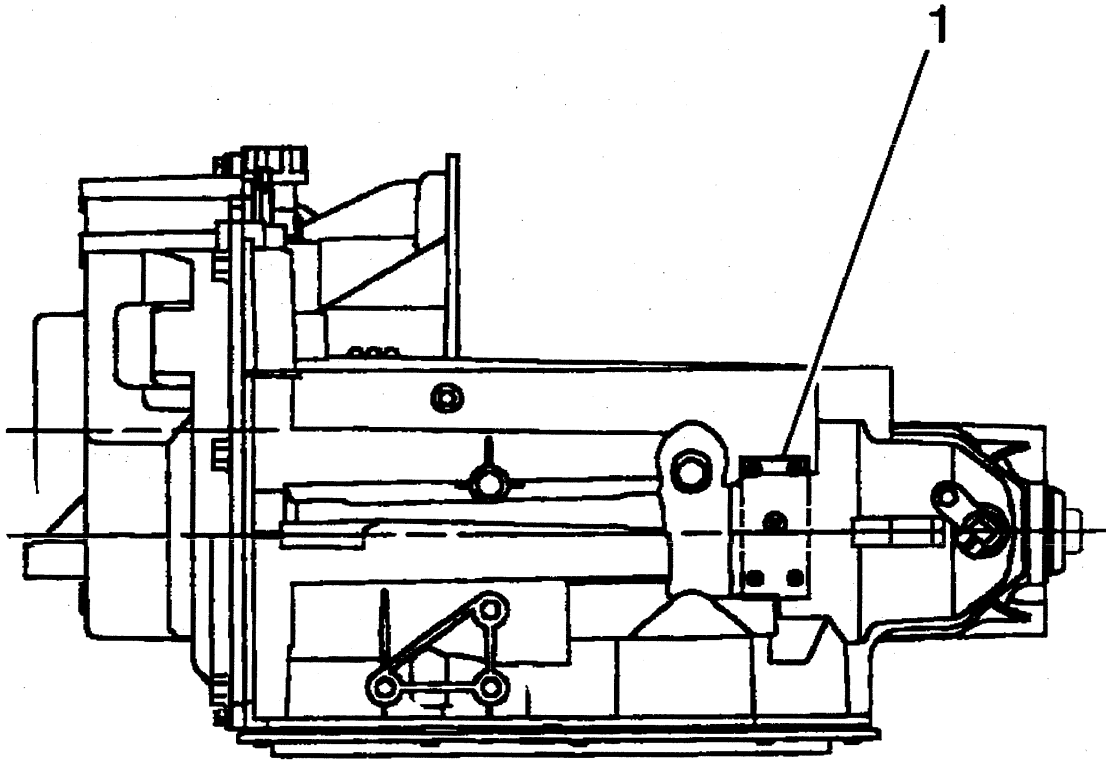
Identification can be made through the use of the Broadcast Code label on the engine front cover (1) and the use of the partial VIN etched on the oil filter bowl (2).



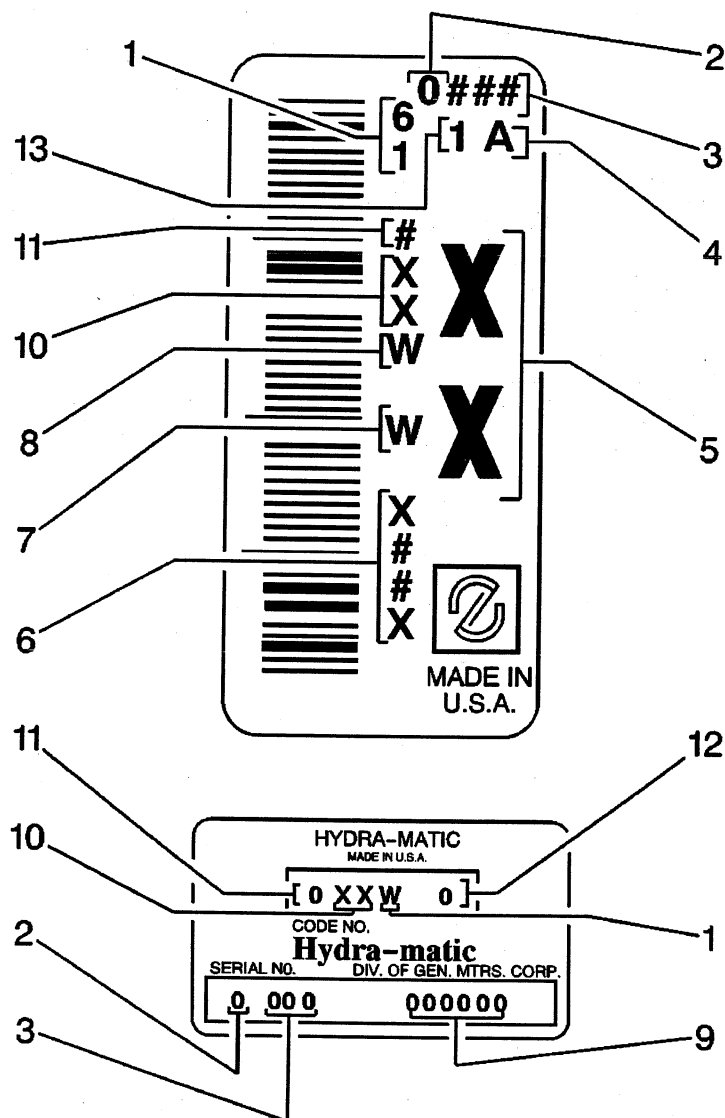
- Barcode (1)
- Sequence Number (2)
- Day (3)
- Month (4)
- Year (5)
- Engine Assembly Plant (6)
- Broadcast Code (7)
- Part Designation (8)
- Engine Assembly Number (9)
- Broadcast Code (10)

The partial VIN identifies the specific vehicle by sequence number.

Transmission ID and VIN Derivative Location 4T40-E (c)



All automatic transmissions have a metal identification (ID) nameplate (1) attached to the case exterior.

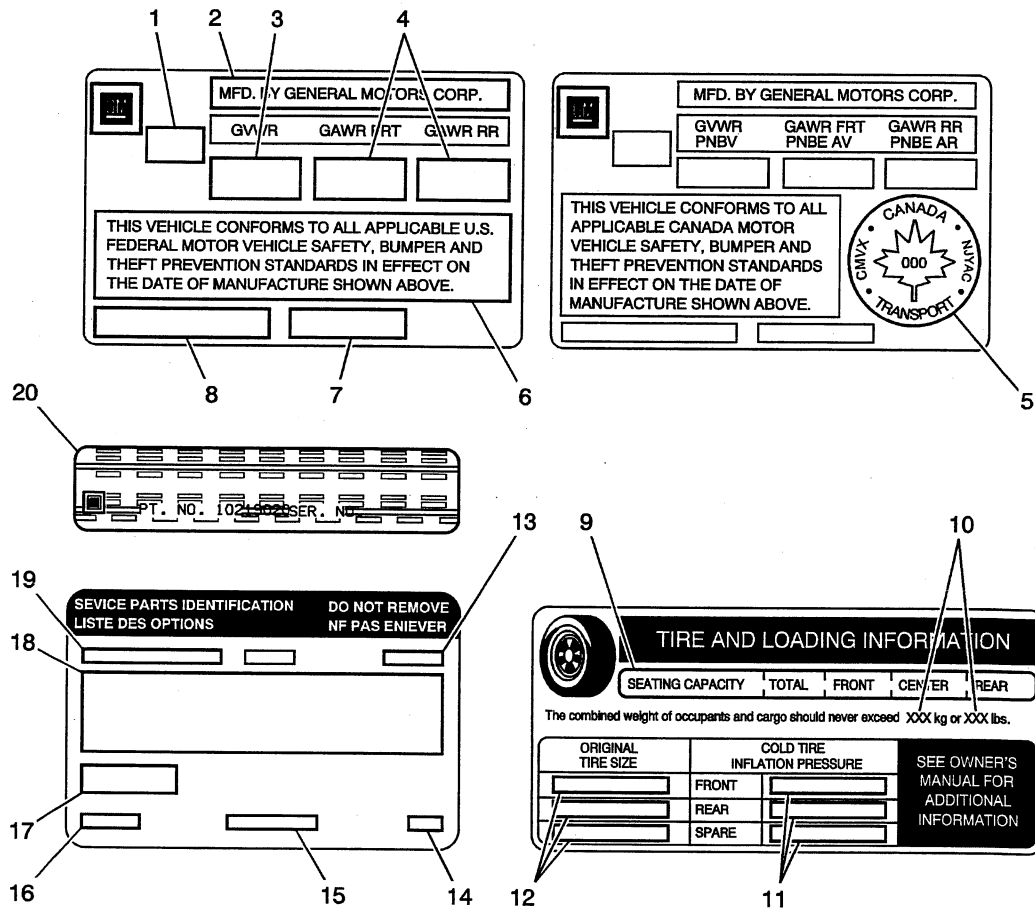


(1) Transaxle (1) Transaxle (2) Calendar Year (2) Calendar Year (3) Julian Date or Day of the Year (3) Julian Date or Day of the Year (4) Shift (A=First Shift, B=Second Shift, C=Third Shift) (5) Model (6) Serial Number in Base Code 31 (7) Plant (8) Hydramatic 4T40 E (9) Serial Number (10) Model (10) Model (11) Model Year (11) Model Year (12) Control Number (13) Line Built (1=Line 1, 2=Line 2, 3=Line 3, 4=Line 4)

Engine and Transmission Usage

| Body Type | Car Line (Division) | Engine Size | Fuel System | Engine RPO | Transmission Used | Transmission RPO |
|-----------|---------------------|-------------|-------------|------------|-------------------|------------------|
| Z/S | Chevrolet Malibu | 3.5L, V6 | SFI | LX9 | 4T45-E | MN5 |
| Z/T | Chevrolet Malibu LS | | | | | |
| Z/U | Chevrolet Malibu LT | | | | | |
| Z/S | Chevrolet Malibu | 2.2L, V6 | SFI | L61 | 4T45-E | MN5 |
| Z/T | Chevrolet Malibu LS | | | | | |

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 rear compartment under the spare tire cover. 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 | <p>The Federal law requires that General Motors label certain body parts on this vehicle with the VIN. The purpose of the law is to reduce the number of motor vehicle thefts by helping in the tracing and recovery of parts from stolen vehicles.</p> <p>Labels are permanently affixed to an interior surface of the part. The label on the replacement part contains the letter R, the manufacturer's logo, and the DOT symbol.</p> <p>The anti-theft label must be covered before any painting, and rustproofing procedures, and uncovered after the procedures. Failure to follow the precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard and possible suspicion to the owner that the part was stolen.</p> |

RPO Code List

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

| RPO | Description |
|-----|---|
| AG1 | Adjuster Front Seat Power, Multi-Directional, Driver |
| AK5 | Restraint System - Seat, Inflatable, Driver & Passenger |
| AP3 | Lock Control, Entry - Remote, Keyless Entry, Start |
| AP9 | Net - Convenience |
| ASN | Adjuster FRT ST- Manual, 2 Way, PWR VERT, Driver |
| AUO | Lock Control, Entry Remote Entry |
| AY0 | Restraint System - Seat, Inflatable, Driver & Passenger, FRT & Side, Roof Side |
| AY1 | Restraint System - Seat, Inflatable, Driver & Passenger, Roof Side |
| A51 | Seat-FRT BKT, Custom |
| A90 | Lock Control RR CMPT - Lid, REM CONT ELEC Release |
| B37 | Covering - Floor Mat, FRT & RR, AUX |
| CF5 | Roof Sun, Glass, Sliding Electric |
| CV3 | Country - Mexico |
| CV4 | Country - Israel |
| C25 | Wiper System - RR Window, Intermittent |
| C60 | HVAC System - Air Conditioner, FRT, MAN Controls |
| C68 | HVAC System - Air Conditioner, FRT, AUTO, Electronic Controls |
| DD8 | Mirror I/S R/V - LT Sensitive |
| DL5 | Decal - Roadside Service Information |
| DL8 | Mirror O/S - LH & RH, Remote Control, Electric, Heated |
| D49 | Mirror O/S - LH & RH, Remote Control, Electric, Manual Fold |
| E90 | Pocket - Front Seat Back, Driver |
| E91 | Pocket - Front Seat Back, Passenger |
| FAI | Plant Code - Fairfax, KS, USA |
| FE0 | Suspension System - FRT & RR, Active |
| FE9 | Certification - Emission, Federal |
| FR9 | Ratio - Transaxle Final Drive 3.29 |
| FY1 | Ratio - Transaxle Final Drive 3.63 |
| F83 | Ratio - Transaxle Final Drive 3.05 |
| JF4 | Pedals, Adjustable, Power |
| JL9 | Brake System - PWR, FRT & RR DISC, Antilock, FRT & RR Wheel |
| JM4 | Brake System - PWR, FRT DISC, RR Drum, Cast Iron, Antilock, FRT & RR Wheel |
| J41 | Brake System - Power, FRT DISC, RR Drum, Cast Iron |
| J67 | Brake System - Power, FRT & RR DISC, ABS, 15 |
| KA1 | Heater Seat, FRT |
| KC8 | Receptacle - Electrical, Load Compartment |
| K05 | Heater Engine - Block |
| K34 | Cruise Control - Automatic, Electronic |
| LX9 | Engine, 6 cyl, 3.5L, SFI, V6, GM |
| L61 | Engine Gas, 4 CYL, 2.2L, MFI, ALUM, DOHC |
| MN5 | Transmission - Auto 4 SPD, HMD, 4T45-E |
| NE1 | Certification - Emission, Geographically Restricted Registration For Vehicles Up to 14,000 LBS GVW (Use 2003 MDL YR) |
| NR0 | Steering Wheel - Leather, 4 Spokes |
| NT7 | Emission System - Federal, Tier 2 |
| NT9 | Emission System - Federal, Tier 2 Phase Out |
| NU1 | Emission System - California, LEV2 |

| RPO | Description |
|-----|--|
| NU4 | Emission System - California, LEV2 Plus |
| NW7 | Traction Control - Powertrain Management ONLY |
| N46 | Steering Wheel - 4 Spokes |
| N65 | Tire & Wheel - Spare, Space Saver, Steel |
| PA7 | Wheel - 15 x 6.5, Steel |
| PF3 | Wheel - 15 x 6.5, Aluminum |
| QB5 | Wheel - 16 x 6.5, Steel |
| QD1 | Wheel - 16 x 6.5, Aluminum, Styled |
| QLM | Tire All - P215/60R15-93H BW R/PE ST TL AL3 |
| QMR | Tire All - P205/65R15-92S BW TL AL2 |
| QPE | Tire All - P215/60R16/N BL R/PE ST TL AL2 |
| SSG | Graphic - Switch Function Symbol |
| T43 | Spoiler - RR |
| T62 | Lamp System - Daytime Running-Delete |
| UA6 | Theft Deterrent SYS |
| UC1 | Speedometer - INST, Miles |
| UC6 | Radio - AM/FM Stereo, Seek/Scan, RDS, Multiple Compact DISC, Auto Tone Control, Clock, ETR |
| UE1 | Communication System Vehicle, G. P. S. 1 |
| UG1 | Opener- Garage Door, Universal |
| UK3 | Control - Steering Wheel, Accessory |
| UK6 | Radio Control - RR Seat & Earphone Jacks |
| UL2 | Frequencies - European |
| UQ4 | Speaker System 4, Base |
| UN0 | Radio AM/FM Stereo, Seek/Scan, CD, Auto Tone, Clock ETR |
| UP0 | Radio AM/FM Stereo, Seek/Scan, Auto Rev Music Search Cass, CD, Auto Tone, Clock ETR |
| UW4 | Speaker System 4, Custom |
| UZ6 | Speaker System 6, Premium |
| U1C | Radio AM/FM Stereo, Seek/Scan, CD, Clock, ETR |
| U19 | Speedometer-INST, KILO & Miles, KILO Odometer |
| U2K | Digital Audio System S-Band |
| U32 | Entertainment PKG Rear Seat, Player, DVD |
| U73 | Antenna - Fixed, Radio |
| U77 | Antenna - RR Window , Radio |
| VC5 | Label - Shipping, Except US, US Possessions, or Japan |
| VF5 | Certification - Emission, California |
| VJ8 | Holder - Coin |
| VK3 | License Plate Front FRT Mounting PKG |
| VPM | Modification - Noise Control, Mexico |
| VY7 | Knob - Trans Cont Lever, Leather |
| VZ3 | Label - Mercury Disposal Notification |
| V73 | Vehicle Statement-USA/Canada |
| V78 | Vehicle Statement - Delete |
| Z49 | Export Canadian Modify Mandatory Base Equipment |

Technical Information

Maintenance and Lubrication

Capacities - Approximate Fluid

| Application | Specification | |
|---|---------------|-----------|
| | Metric | English |
| Important: All capacities are approximate. When adding, be sure to fill to the appropriate level, as recommended in this manual. | | |
| Air Conditioning Refrigerant R134a | 0.6 kg | 1.1 lb |
| Automatic Transaxle Complete Overhaul | 9.0 L | 9.5 qt |
| Engine Cooling | | |
| 2.2L L61 Engine | 6.5 L | 6.9 qt |
| 3.5L LX9 Engine | 9.6 L | 10.1 qt |
| Engine Oil with Filter | | |
| 2.2L L61 Engine | 4.7 L | 5 qt |
| 3.5L LX9 Engine | 3.8 L | 4 qt |
| Fuel Tank | 61.1 L | 16.1 gal |
| Power Steering System | 0.7 L | 1.5 pt |
| Wheel Nut Torque | 140 N·m | 100 lb ft |

Maintenance Items

| Part | GM Part Numbers | ACDelco Part Numbers |
|--|-----------------|----------------------|
| Engine Air Cleaner/Filter | 24577608 | A1615C |
| Engine Oil Filter | | |
| 2.2L L4 Engine | 24460713 | PF2244G |
| 3.5L V6 Engine | 25010792 | PF47 |
| Spark Plugs | | |
| 2.2L L4 Engine | 25337472 | 41-981 |
| 3.5L V6 Engine | 12568387 | 41-101 |
| Windshield Wiper Blades | | |
| Driver's Side - 22.0 inches (55.0 cm) | 22688087 | -- |
| Passenger's Side - 19.6 inches (50.0 cm) | 22688086 | -- |
| Rear - 18 inches (46.7 cm) | 22730014* | -- |
| * Wiper blade and assembly | | |

Tire Inflation Pressure Specifications

| Application | Metric | English |
|--|---------|---------|
| The tire pressures in the table are the correct inflation pressures for the factory installed tires when they are cold. "Cold" means the vehicle has been sitting for at least 3 hours or driven no more than 1.6 km (1 mi). Inspect the tires inflation pressure when the tires are cold. | | |
| Front Tires | 200 kPa | 29 psi |
| Rear Tires | 180 kPa | 26 psi |
| Compact Spare | 420 kPa | 60 psi |

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 | DEXRON®-III Automatic Transmission Fluid. Look for "Approved for the H-Specification" on the label. |
| Key Lock Cylinders | Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 10953474). |
| 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 | Multi-Purpose Lubricant, Superlube (GM Part No. U.S. 12346241, in Canada 109435474). |
| Weatherstrip Conditioning | Dielectric Silicone Grease (GM Part No. U.S. 12345579, in Canada 992887). |

Descriptions and Operations

Power Steering System Description

The power steering system reduces the amount of effort needed to steer the vehicle. The system uses the powertrain control module (PCM), body control module (BCM), power steering control module (PSCM), discrete battery voltage supply circuit, steering shaft torque sensor, steering wheel position sensor, power steering motor, driver information center (DIC), and the serial data circuit to perform the system functions. The PSCM and the power steering motor are serviced as an assembly and are serviced separately from the steering column assembly. The steering shaft torque sensor and the steering wheel position sensor are not serviced separately from each other or from the steering column assembly. The steering column assembly does not include the power steering motor and module assembly.

Steering Shaft Torque Sensor

The PSCM uses the steering shaft torque sensor as its main input for determining steering direction and the amount of assists needed. 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 section of torsion bar, where the torque sensor is located. The sensor is a 5 volt dual analog inverse signal device with a valid signal voltage range of 0.25-4.75 volts. When applying torque to the steering column shaft during a right turn, the sensor's signal 1 voltage increases, while the signal 2 voltage decreases within the valid signal voltage range. When applying torque to the steering column shaft during a left turn, the signal 1 voltage decreases, while the signal 2 voltage increases within the valid signal voltage range. The PSCM recognizes this change in signal voltage as steering direction and steering column shaft torque.

Steering Wheel Position Sensor

The PSCM uses the steering position sensor to determine the steering system on center position. Since the power steering motor provides a slight amount of return to center assist, the PSCM will command the power steering motor to the steering system center position and not beyond. The sensor is a 5 volt dual analog triangle signal device with a valid signal voltage range of 0-5 volts. The sensor's signal 1 and signal 2 voltage values will increase and decrease within the valid voltage range, and stay within 2.5-2.8 volts of each other as the steering wheel is turned.

Power Steering Motor

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

Power Steering Control Module (PSCM)

The PSCM uses a combination of steering shaft torque sensor input, vehicle speed, calculated system temperature and steering tuning to determine the amount of steering assist. When the steering wheel is turned, the PSCM uses signal voltage from the steering shaft torque sensor to detect the amount of torque and steering direction being applied to the steering column shaft and then command the proper amount of current to the power steering motor. The PSCM receives a vehicle speed message from the PCM via the serial data circuit. 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 power steering motor are designed to handle 65 amps continuously. If the power steering system is exposed to excessive amounts of static steering conditions, the PSCM will go into a protection mode to avoid thermal damage to the power steering components. In this mode the PSCM will limit the amount of current commanded to the power steering motor which reduces system temperature and steering assist levels. The PSCM must also be setup with the correct steering tuning which are different in relation to the vehicle's powertrain configuration, sedan, coupe, tire and wheel size etc.. The PSCM has the ability to detect malfunctions within the power steering system. Any malfunction detected will cause the DIC to display the POWER STEERING warning message and/or the service vehicle soon indicator.

Steering Wheel and Column

The electric power steering (EPS) system reduces the amount of effort needed to steer the vehicle. The steering column is integrated with an assist mechanism which contains a hub gear fitted onto the lower steering shaft. The hub gear mates with a worm gear that is driven by the EPS motor, which is serviced separately from the steering column. The steering column is serviced as a complete assembly only. Disassembly of the column beyond the procedures included may lead to malfunction of the steering system.

Assist Mechanism

The assist mechanism is located at the bottom of the steering column. It contains the assist mechanism input shaft (driven by the EPS motor), the lower steering shaft, the hub gear and both the torque sensor and the steering position sensor. These sensors provide information to the power steering control module (PSCM), which is serviced as a unit with the EPS motor.

Steering Shaft Torque Sensor

The PSCM uses the steering shaft torque sensor as its main input for determining steering direction and the amount of assist needed. 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 section of torsion bar, where the torque sensor is located. The sensor is a 5-volt dual analog inverse signal device with a valid signal voltage range of 0.25-4.75 volts. When applying torque to the steering column shaft during a right turn, the sensor signal 1 voltage increases, while the signal 2 voltage decreases within the valid signal voltage range. When applying torque to the steering column shaft during a left turn, the signal 1 voltage decreases, while the signal 2 voltage increases within the valid signal voltage range. The PSCM recognizes this change in signal voltage as steering direction and steering column shaft torque.

Steering Wheel Position Sensor

The PSCM uses the steering position sensor to determine the steering system on center position. Since the motor/module provides a slight amount of return to center assist, the PSCM will command the motor/module to the steering system center position and not beyond. The sensor is a 5-volt dual analog triangle signal device with a valid signal voltage range of 0-5 volts. The sensors signal 1 and signal 2 voltage values will increase and decrease within the valid voltage range, and stay within 2.5-2.8 volts of each other as the steering wheel is turned.

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. Rear suspension adjustment is achieved through adjustable toe links and lower control arms. The rear coil springs are retained between the Body and the lower control arm. Rubber insulators isolate the coil spring at both top and bottom. The rear suspension consists of two shock absorbers attached to the Knuckle and the reinforced body areas.

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 suspension system consists of the following components:

- Support Assembly
- Coil Springs and Insulators
- Stabilizer Shaft, Insulators and Stabilizer Links
- Toe Links
- Upper Control Arms
- Lower Control Arms
- Trailing Arms
- 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.

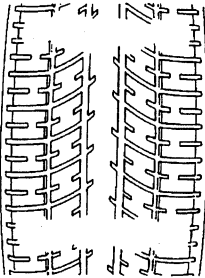
The following factors have an important influence on tire life:

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

The following factors increase tire wear:

- Heavy cornering
- Excessively rapid acceleration
- Heavy braking

Tread Wear Indicators Description



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

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

Metric Wheel Nuts and Bolts Description

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

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

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

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

Tire Inflation Description

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

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

Inspect the tire pressure when the following conditions apply:

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

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

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

Inflation Pressure Conversion (Kilopascals to PSI)

| kPa | psi | kPa | psi |
|-----|-----|-----|-----|
| 140 | 20 | 215 | 31 |
| 145 | 21 | 220 | 32 |
| 155 | 22 | 230 | 33 |
| 160 | 23 | 235 | 34 |
| 165 | 24 | 240 | 35 |
| 170 | 25 | 250 | 36 |
| 180 | 26 | 275 | 40 |

| kPa | psi | kPa | psi |
|-----------------------------|-----|-----|-----|
| 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

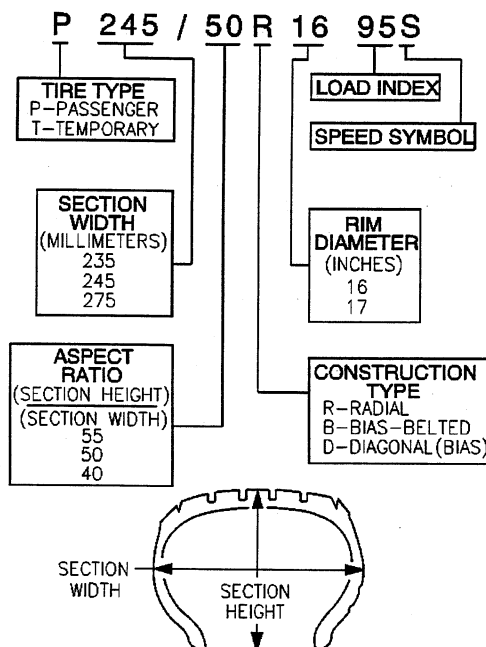
Tires with a lower than recommended pressure can cause the following conditions:

- 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

Wheel Drive Shafts

Front wheel drive axles are flexible assemblies.

Front wheel drive axles consist of the following components:

- A front wheel drive shaft tri-pot joint (inner joint)
- A front wheel drive shaft constant velocity joint (outer joint)
- A front wheel drive shaft The front wheel drive shaft connects the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint.

The front wheel drive shaft tri-pot joint is completely flexible. The front wheel drive shaft tri-pot joint can move in and out.

The front wheel drive shaft constant velocity joint is flexible, but the front wheel drive shaft constant velocity joint cannot move in and out.

Boots (Seals) And Clamps

The front wheel drive shaft constant velocity joint and the front wheel drive shaft tri-pot joint boots (seals) in the front wheel drive axle are made of a thermoplastic material.

The clamps in front wheel drive axle are made of stainless steel.

The boot (seal) provides the following functions:

- Protection of the internal parts of the front wheel drive shaft constant velocity joint and the front wheel drive shaft tri-pot joint. The boot (seal) protects the grease from the following sources of damage:
 - Harmful atmospheric conditions (such as extreme temperatures or ozone gas)
 - Foreign material (such as dirt or water)
- Allows angular movement and the axial movement of the front wheel drive shaft tri-pot joint.
- Allows angular movement of the front wheel drive shaft constant velocity joint.

Important

Protect the boots (seals) from sharp tools and from the sharp edges of the surrounding components.

Any damage to the boots (seals) or the clamps will result in leakage. Leakage will allow water to leak into the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joints. Leakage will also allow grease to leak out of the front wheel drive shaft tri-pot joints and the front wheel drive shaft constant velocity joints.

Leakage may cause noisy front wheel drive axle operation and eventual failure of the internal components.

The clamps provide a leak proof connection for the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint at the following locations:

- The housing
- The front wheel drive shaft

The thermoplastic material performs well under normal conditions and normal operation. However, the material is not strong enough to withstand the following conditions:

- Abusive handling

- Damage from sharp objects (such as sharp tools or any sharp edges of the surrounding components in the vehicle).

Front Wheel Drive Shaft Tri-pot Joint (Inner Joint)

The front wheel drive shaft tri-pot joint is made with the tri-pot design without an over-extension limitation retainer.

The joint is constructed as follows for vehicles that are equipped with an automatic transmission:

- The left front wheel drive axle has a female spline. The female spline installs over a stub shaft that protrudes from the transaxle.
- The right front wheel drive axle has a male spline. The right front wheel drive axle uses barrel type snap rings in order to interlock with the transaxle gears.

Front Wheel Drive Shaft Constant Velocity Joint (Outer Joint)

The front wheel drive shaft constant velocity joint is made with the Rzeppa joint design.

The shaft end (which mates with the knuckle/hub) has a helical spline. The helical spline ensures a tight, press-type fit.

This design prevents end play between the hub bearing and the front wheel drive axle.

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.

Drum Brake System Description and Operation

System Component Description

The drum brake system consists of the following:

Drum Brake Shoes

Applies mechanical output force, from hydraulic brake wheel cylinders, to friction surface of brake drums.

Brake Drums

Uses mechanical output force applied to friction surface from drum brake shoes to slow speed of tire and wheel assembly rotation.

Drum Brake Hardware

Secures drum brake shoes firmly in proper relationship to hydraulic brake wheel cylinders. Enables sliding motion of brake shoes needed to expand toward friction surface of drums when mechanical output force is applied. Provides return of brake shoes when mechanical output force is relieved.

Drum Brake Adjusting Hardware

Provides automatic adjustment of brake shoes to brake drum friction surface whenever brake apply occurs.

System Operation

Mechanical output force is applied from the hydraulic brake wheel cylinder pistons to the top of the drum brake shoes. The output force is then distributed between the primary and secondary brake shoes as the shoes expand toward the friction surface of the brake drums. The brake shoes apply the output force to the friction surface of the brake drums, which slows the rotation of the tire and wheel assemblies. The proper function of both the drum brake hardware and adjusting hardware is essential to the proper 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 pedal to apply the disc brake pads towards the friction surface of the brake rotor.

Threaded park brake actuators are also used to control clearance between the disc brake pads and the friction surface of the brake rotor.

System Operation

Park brake apply input force is received by the park brake pedal assembly being applied. The input force is multiplied by the pedal 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 which apply the disc brake pads towards the friction surface of the brake rotor in order to prevent the rotation of the rear tire and wheel assemblies. The park brake pedal assembly releases an applied park brake system when it is released and returned to the at rest position.

ABS Description and Operation

Antilock Brake System

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

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

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

Engine Description and Operation

Engine Mechanical – 2.2L (L61)

Mechanical Specifications

| Application | Specification | |
|--|-------------------|-------------------|
| | Metric | English |
| General Data | | |
| Engine Type | Inline 4 Cylinder | |
| Displacement | 2.2 L | 134 CID |
| RPO | L61 | |
| Liter (VIN) | F | |
| Bore | 85.992-86.008 mm | 3.3855-3.3861 in |
| Stroke | 94.6 mm | 3.727 in |
| Compression Ratio | 10:01 | |
| Balance Shaft | | |
| Bearing Clearance | 0.030-0.063 mm | 0.0012-0.0025 in |
| Bearing Diameter - Inside - Carrier | 20.050-20.063 mm | 0.7894-0.7899 in |
| Bearing Diameter - Outside - Carrier | 41.975-41.995 mm | 1.6526-1.6534 in |
| Bearing Journal Diameter | 20.000-20.020 mm | 0.7874-0.7882 in |
| Bushing Clearance | 0.033-0.102 mm | 0.0013-0.0040 in |
| Bushing Diameter - Inside | 36.776-36.825 mm | 1.4479-1.4498 in |
| Bushing Journal Diameter | 36.723-36.743 mm | 1.4458-1.4466 in |
| End Play | 0.100-0.300 mm | 0.0020-0.0118 in |
| Block | | |
| Balance Shaft Bearing Bore Diameter - Carrier | 42.000-42.016 mm | 1.6535-1.6542 in |
| Balance Shaft Bushing Bore Diameter | 40.763-40.776 mm | 1.6048-1.6054 in |
| Crankshaft Main Bearing Bore Diameter | 64.068-64.082 mm | 2.5224-2.5229 in |
| Cylinder Bore Diameter | 85.992-86.008 mm | 3.3855-3.3861 in |
| Cylinder Bore Out-of-Round - Maximum | 0.010 mm | 0.0004 in |
| Cylinder Bore Taper - Maximum | 0.010 mm | 0.0004 in |
| Cylinder Head Deck Surface Flatness - Transverse | 0.030 mm | 0.0012 in |
| Cylinder Head Deck Surface Flatness - Longitude | 0.050 mm | 0.002 in |
| Cylinder Head Deck Surface Flatness - Overall | 0.08 mm | 0.0031 in |
| Camshaft | | |
| Camshaft End Play | 0.040-0.144 mm | 0.0016-0.0057 in |
| Camshaft Journal Diameter | 26.935-26.960 mm | 1.0604-1.0614 in |
| Camshaft Thrust Surface | 21.000-21.052 mm | 0.8268-0.8252 in |
| Connecting Rod | | |
| Connecting Rod Bearing Clearance | 0.029-0.069 mm | 0.0011-0.0027 in |
| Connecting Rod Bore Diameter - Bearing End | 52.118-52.134 mm | 2.0519-2.05252 in |
| Connecting Rod Bore Diameter - Pin End | 20.007-20.021 mm | 0.7877-0.7882 in |
| Connecting Rod Side Clearance | 0.070-0.370 mm | 0.0028-0.0146 in |
| Connecting Rod Straightness - Bend - Maximum | 0.021 mm | 0.0083 in |
| Connecting Rod Straightness - Twist - Maximum | 0.04 mm | 0.0157 in |
| Crankshaft | | |
| Connecting Rod Journal Diameter | 49.000-49.014 mm | 1.9291-1.9297 in |
| Crankshaft End Play | 0.050-0.380 mm | 0.0012-0.0150 in |
| Crankshaft Main Bearing Clearance | 0.031-0.067 mm | 0.0012-0.0026 in |
| Crankshaft Main Journal Diameter | 55.994-56.008 mm | 2.2045-2.2050 in |

| Application | Specification | |
|---|----------------------------|------------------|
| | Metric | English |
| Cylinder Head | | |
| Surface Flatness - Block Deck - Transverse | 0.030 mm | 0.0012 in |
| Surface Flatness - Block Deck - Longitude | 0.050 mm | 0.002 in |
| Surface Flatness - Block Deck - Overall | 0.1 mm | 0.004 in |
| Valve Guide Bore - Exhaust | 6.000-6.012 mm | 0.2362-0.2367 in |
| Valve Guide Bore - Intake | 6.000-6.012 mm | 0.2362-0.2367 in |
| Valve Lifter Bore Diameter - Stationary Lash Adjusters | 12.013-12.037 mm | 0.4730-0.4739 in |
| Lubrication System | | |
| Oil Pressure - Minimum - [commat]1000 RPM | 344.75-551.60 kPa | 50-80 psi |
| Oil Capacity | 4.8L | 5.0 quarts |
| Piston Rings | | |
| Piston Ring End Gap - First Compression Ring | 0.20-0.40 mm | 0.008-0.016 in |
| Piston Ring End Gap - Second Compression Ring | 0.35-0.55 mm | 0.014-0.022 in |
| Piston Ring End Gap - Oil Control Ring - Rails | 0.25-0.76 mm | 0.010-0.030 in |
| Piston Ring to Groove Clearance - First Compression Ring | 0.04-0.08 mm | 0.0015-0.0031 in |
| Piston Ring to Groove Clearance - Second Compression Ring | 0.030-0.069 mm | 0.0012-0.0027 in |
| Piston Ring to Groove Clearance - Oil Control Ring | 0.090-0.106 mm | 0.0035-0.0042 in |
| Piston Ring Thickness - First Compression Ring | 1.170-1.190 mm | 0.0461-0.0469 in |
| Piston Ring Thickness - Second Compression Ring | 1.471-1.490 mm | 0.0579-0.0587 in |
| Piston Ring Thickness - Oil Control Ring - Rail - Maximum | 0.43 mm | 0.0169 in |
| Piston Ring Thickness - Oil Control Ring - Spacer | 1.574-1.651 mm | 0.0620-0.0650 in |
| Pistons and Pins | | |
| Piston - Piston Diameter - [commat]14.5 mm up | 85.967-85.982 mm | 3.3845-3.3851 in |
| Piston - Piston Pin Bore Diameter | 20.002-20.007 mm | 0.7875-0.7877 in |
| Piston - Piston Ring Groove Width - Top | 1.23-1.25 mm | 0.0484-0.0492 in |
| Piston - Piston Ring Groove Width - Second | 1.52-1.54 mm | 0.0598-0.0606 in |
| Piston - Piston Ring Groove Width - Oil Control | 2.52-2.54 mm | 0.0992-0.1000 in |
| Piston - Piston To Bore Clearance | 0.010-0.041 mm | 0.0004-0.0016 in |
| Pin - Piston Pin Clearance to Connecting Rod Bore | 0.007-0.026 mm | 0.0003-0.0010 in |
| Pin - Piston Pin Clearance to Piston Pin Bore | 0.002-0.012 mm | 0.0001-0.0005 in |
| Pin - Piston Pin Diameter | 19.995-20.000 mm | 0.7872-0.7874 in |
| Pin - Piston Pin End Play | 0.19-1.16 mm | 0.0075-0.0461 in |
| Valve System | | |
| Valves - Valve Face Runout - Maximum | 0.04 mm | 0.0016 in |
| Valves - Valve Seat Runout - Maximum | 0.05 mm | 0.0020 in |
| Valves - Valve Stem Diameter - Intake | 5.955-5.970 mm | 0.2344-0.2355 in |
| Valves - Valve Stem Diameter - Exhaust | 5.935-5.950 mm | 0.2337-0.2343 in |
| Valves - Valve Stem to Guide Clearance - Intake | 0.030-0.057 mm | 0.0012-0.0022 in |
| Valves - Valve Stem to Guide Clearance - Exhaust | 0.050-0.077 mm | 0.0020-0.0026 in |
| Valve Lifters - Valve Lifter Diameter - Stationary Lash Adjuster | 11.986-12.000 mm | 0.0005-0.0020 in |
| Valve Lifters - Valve Lifter-to-Bore Clearance - Stationary Lash Adjuster | 0.013-0.051 mm | 3.2210-3.2299 in |
| Valve Springs - Valve Spring Load - Closed - [commat]22.5 mm | 245.0-271.0 N. - Eng Spec. | |
| Valve Springs - Valve Spring Load - Open - [commat]32.5 mm | 525.0-575.0 N. - Eng Spec. | |

Fastener Tightening Specifications

| Application | Specification | |
|---|---------------|-----------|
| | Metric | English |
| A/C Compressor to Block Bolt | 20 N·m | 15 lb ft |
| Balance Shaft Adjustable Chain Guide Bolt | 10 N·m | 89 lb in |
| Balance Shaft Bearing Carrier to Block Bolt | 10 N·m | 89 lb in |
| Balance Shaft Fixed Chain Guide Bolt | 10 N·m | 89 lb in |
| Balance Shaft Sprocket Bolt | 50 N·m | 37 lb ft |
| Cam Cover to Cylinder Head Bolt | 10 N·m | 89 lb in |
| Cam Cover to Ground Cable Bolt | 10 N·m | 89 lb in |
| Cam Cover to Ground Cable Stud | 10 N·m | 89 lb in |
| Camshaft Bearing Cap Bolt | 10 N·m | 89 lb in |
| Camshaft Sprocket Bolt | | |
| First Pass | 85 N·m | 63 lb ft |
| Final Pass | 30 degrees | |
| Camshaft Timing Chain Tensioner | 75 N·m | 55 lb ft |
| Chain Guide Plug | 90 N·m | 59 lb ft |
| Connecting Rod Bolt Torque | | |
| First Pass | 25 N·m | 18 lb ft |
| Final Pass | 100 degrees | |
| Crankshaft Position Sensor Bolt | 10 N·m | 89 lb in |
| Crankshaft Pulley Bolt | | |
| First Pass | 100 N·m | 74 lb ft |
| Final Pass | 125 degrees | |
| Cylinder Head Air Bleed Tube | 15 N·m | 11 lb ft |
| Cylinder Head Bolt | | |
| First Pass | 30 N·m | 22 lb ft |
| Final Pass | 155 degrees | |
| Cylinder Head Front Chaincase Bolt | 35 N·m | 26 lb ft |
| Cylinder Head Oil Gallery Plug | 35 N·m | 26 lb ft |
| Dipstick Guide to Intake Manifold Bolt | 10 N·m | 89 lb in |
| Drive Belt Tensioner Bolt | 45 N·m | 33 lb ft |
| EGR Cover Bolt | 25 N·m | 18 lb ft |
| Elek. ICM Cover Bolt | 10 N·m | 89 lb in |
| Engine Coolant Temperature Sensor | 22 N·m | 16 lb ft |
| Engine Lift Bracket Front Bolt | 25 N·m | 18 lb ft |
| Engine Lift Bracket Rear Bolt | 25 N·m | 18 lb ft |
| Exhaust Manifold to Cylinder Head Nut | 14 N·m | 124 lb in |
| Exhaust Manifold to Cylinder Head Stud | 10 N·m | 89 lb in |
| Exhaust Manifold Pipe Flange Stud | 16 N·m | 12 lb ft |
| Flexplate (AMT) Bolt | | |
| First Pass | 53 N·m | 39 lb ft |
| Final Pass | 25 degrees | |
| Flywheel (SMT) Bolt | | |
| First Pass | 53 N·m | 39 lb ft |
| Final Pass | 25 degrees | |
| Front Cover to Block Bolt | 25 N·m | 18 lb ft |
| Front Lift Bracket Bolt | 25 N·m | 18 lb ft |
| Fuel Pipe Bracket Bolt | 10 N·m | 89 lb in |
| Fuel Rail Bracket Stud | 10 N·m | 89 lb in |
| Generator to Block Bolt | 23 N·m | 17 lb ft |
| Heat Shield to Exhaust Manifold Bolt | 23 N·m | 17 lb ft |
| Ignition Coil Bolt | 10 N·m | 89 lb in |

| Application | Specification | |
|---|---------------|----------|
| | Metric | English |
| Intake Camshaft Rear Cap Bolt | 25 N·m | 18 lb ft |
| Intake Manifold to Cylinder Head Bolt | 10 N·m | 89 lb in |
| Intake Manifold to Cylinder Head Nut | 10 N·m | 89 lb in |
| Intake Manifold to Cylinder Head Stud | 6 N·m | 53 lb in |
| Knock Sensor Bolt | 25 N·m | 18 lb ft |
| Oil Filter Housing Cover | 25 N·m | 18 lb ft |
| Oil Pan Drain Plug | 25 N·m | 18 lb ft |
| Oil Pan to Block Bolts | 25 N·m | 18 lb ft |
| Oil Pressure Switch | 22 N·m | 16 lb ft |
| Oil Pump Cover Bolt | 6 N·m | 53 lb in |
| Oil Pump Pressure Relief Valve Plug | 40 N·m | 30 lb ft |
| Oxygen Sensor | 42 N·m | 31 lb ft |
| Power Steering Pump Blockout Plate | 25 N·m | 18 lb ft |
| Rear Lift Bracket Bolt | 25 N·m | 18 lb ft |
| Spark plug | 20 N·m | 15 lb ft |
| Starter Motor to Block Bolt | 53 N·m | 39 lb ft |
| Thermostat Housing to Block Bolts | 10 N·m | 89 lb in |
| Throttle Body Bolt | 10 N·m | 89 lb in |
| Throttle Body Nut | 10 N·m | 89 lb in |
| Throttle Body Stud | 6 N·m | 53 lb in |
| Timing Adjustable Chain Guide Bolt | 10 N·m | 89 lb in |
| Timing Chain Oil Nozzle Bolt | 10 N·m | 89 lb in |
| Timing Fixed Chain Guide Bolt | 10 N·m | 89 lb in |
| Timing Upper Chain Guide Bolt | 10 N·m | 89 lb in |
| Vent Tube to Cylinder Head | 15 N·m | 11 lb ft |
| Water Jacket Drain Plug | 20 N·m | 15 lb ft |
| Water Pipe Support Bracket Bolt | 10 N·m | 89 lb in |
| Water Pump Access Cover Bolt | 7 N·m | 62 lb in |
| Water Pump/Balance Shaft Chain Tensioner Bolt | 10 N·m | 89 lb in |
| Water Pump Bolts | 25 N·m | 18 lb ft |
| Water Pump Sprocket Bolt | 10 N·m | 89 lb in |

Engine Component Description

Cylinder Block

The cylinder block is lost foam cast aluminum with four cylinders arranged in-line. The cylinders have pressed in place iron liners. The block has five crankshaft bearings with the thrust bearing located on the second bearing from the front of the engine. The cylinder block incorporates a bedplate design that forms an upper and lower crankcase. This design promotes cylinder block rigidity and reduced noise and vibration.

Crankshaft

The crankshaft is cast nodular iron with eight counterweights. The number eight counterweight is also the ignition system reluctor wheel. The main bearing journals are cross-drilled, and the upper bearings are grooved. The crankshaft has a slip fit balance shaft drive sprocket. Number two main bearing is the thrust bearing. A harmonic damper is used to control torsional vibration.

Connecting Rod and Piston

The connecting rods are powdered metal. The connecting rod incorporates the floating piston pin. The pistons are cast aluminum. The piston rings are of a low tension type to reduce friction. The top compression ring is ductile iron with a molybdenum facing and phosphate coated sides. The second compression ring is gray iron. The oil ring is a 3-piece spring construction with chromium plating.

Oil Pan

The oil pan is die cast aluminum. The oil pan includes an attachment to the transmission to provide additional structural support.

Balance Shaft Assembly

There are two block mounted balance shafts located on each side of the crankcase at the bottom of the cylinder bores. The balance shafts are driven by a single roller chain that also drives the water pump. The chain is tensioned by a hydraulic tensioner that is supplied pressure by the engine oil pump. This design promotes the maximum effectiveness of the balance shaft system and reduces noise and vibration.

Cylinder Head

The cylinder head is a lost foam aluminum casting. Pressed-in powdered metal valve guides and valve seat insets are used. The fuel injection nozzle is located in the intake port. The cylinder head incorporates camshaft bearing journals and camshaft bearing caps.

Valves

There are two intake and two exhaust valves per cylinder. Rotators are used on all of the intake valves. The rotators are located at the bottom of the valve spring to reduce valve train reciprocating mass. Positive valve stem seals are used on all valves.

Camshaft

Two camshafts are used, one for all intake valves, the other for all exhaust valves. The camshafts are cast iron. The intake camshaft had a pressed-in hex insert. The hex inset is used to drive the direct drive power steering pump.

Valve Lifters

The valve train uses a roller finger follower acted on by a hydraulic element adjuster. The roller finger follower reduces friction and noise.

Camshaft Cover

The camshaft cover is cast aluminum with steel crankcase ventilation baffling incorporated. The camshaft cover has mounting locations for the ignition system.

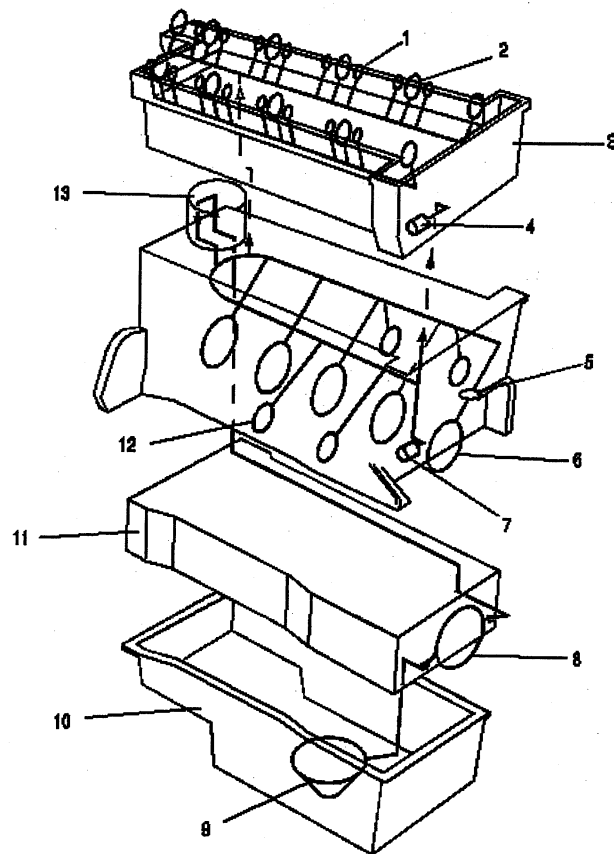
Camshaft Drive

A single row roller chain is used for camshaft drive. There is a tensioner and active guide used on the slack side of the chain to control chain motion and noise. The chain drive promotes long valve train life and low maintenance.

Intake and Exhaust Manifold

The intake manifold is made of composite plastic. The exhaust manifold is cast iron. The intake manifold incorporates a distribution and control system for PCV gases. The exhaust manifold is a dual plane design that promotes good low end torque and performance.

Lubrication



- (1) Hydraulic Lifter
- (2) Cam Bearing
- (3) Cylinder Head
- (4) Timing Chain Tensioner
- (5) Cam Drive Chain Oil Nozzle
- (6) Crankshaft Bearing
- (7) Balance Shaft Chain Tensioner
- (8) Oil Pump
- (9) Oil Pick Up
- (10) Oil Pan
- (11) Bedplate
- (12) Balance Shaft Bearings
- (13) Oil Filter

Oil is applied under pressure to the crankshaft, connecting rods, balance shaft assembly, camshaft bearing surfaces, valve lifters and timing chain hydraulic tensioner. All other moving parts are lubricated by gravity flow or splash. Oil enters the gerotor type oil pump through a fixed inlet screen. The oil pump is driven by the crankshaft. The oil pump body is within the engine front cover. The pressurized oil from the pump passes through the oil filter. The oil filter is located on the right (front) side of the engine block. The oil filter is housed in a casting that is integrated with the engine block. The oil filter is a disposable cartridge type. A by-pass valve in the filter cap allows continuous oil flow in case the oil filter should become restricted. Oil then enters the gallery where it is distributed to the balance shafts, crankshaft, camshafts and camshaft timing chain oiler nozzle. The connecting rod bearings are oiled by constant oil flow passages through the crankshaft connecting the main journals to the rod journals. A groove around each upper main bearing furnishes oil to the drilled crankshaft passages. The pressurized oil passes through the cylinder head restrictor orifice into the cylinder head and then into each camshaft feed gallery.

Cast passages feed each hydraulic element adjuster and drilled passages feed each camshaft bearing surface. An engine oil pressure switch or sensor is installed at the end. Oil returns to the oil pan through passages cast into the cylinder head. The timing chain lubrication drains directly into the oil pan.

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.

Engine Mechanical – 3.5L (LX9)**Mechanical Specifications**

| Application | Specification | |
|--|--------------------|--------------------|
| | Metric | English |
| General Data | | |
| Engine Type | 60 degree V-6 | |
| Displacement | 3.5L | 214 cu in |
| RPO | LX9 | |
| VIN | 8 | |
| Bore | 94 mm | 3.70 in |
| Stroke | 84 mm | 3.31 in |
| Compression Ratio | 9.8:1 | |
| Firing Order | 123456 | |
| Spark Plug Gap | 1.52 mm | 0.060 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 | 72.1535-72.1695 mm | 2.840-2.841 in |
| Crankshaft Main Bearing Bore Out-of-Round | 0.008 mm | 0.00031 in |
| Cylinder Bore Diameter | 93.991-94.009 mm | 3.700-3.701 in |
| Cylinder Bore Out-of-Round - Diameter - Production | 0.020 mm | 0.0008 in |
| Cylinder Bore Out-of-Round - Diameter - 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 | 47.516-47.541 mm | 1.871-1.872 in |
| Camshaft Journal Diameter | 47.443-47.468 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 | 195 degrees | |
| Connecting Rod | | |
| Connecting Rod Bearing Clearance | 0.18-0.062 mm | 0.0007-0.017 in |
| Connecting Rod Bore Diameter | 60.322-60.338 mm | 2.375-2.376 in |
| Connecting Rod Bore Out-of-Round | 0.006 mm | 0.00023 in |
| Connecting Rod Length - Center to Center | 150 mm | 5.9 in |
| Connecting Rod Side Clearance | 0.200-0.241 mm | 0.008-0.009 in |
| Connecting Rod Journal Diameter | 57.122-57.138 mm | 2.249-2.250 in |
| Crankshaft | | |
| Connecting Rod Journal Diameter | 57.122-57.138 mm | 2.248-2.249 in |
| Connecting Rod Journal Out-of-Round | 0.005 mm | 0.0002 in |
| Connecting Rod Journal Taper | 0.008 mm | 0.0003 in |
| 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 |

| Application | Specification | |
|--|---------------------|----------------------|
| | Metric | English |
| Crankshaft Main Bearing Journal Width | 23.9-24.1 mm | 0.941-0.949 in |
| Crankshaft Main Bearing Clearance | 0.019-0.064 mm | 0.0008-0.0025 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 | 0.008 mm | 0.0003 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 | 3.8 liter | 4.0 quarts |
| Oil Capacity - without Filter | 3.3 liter | 3.5 quarts |
| Oil Pressure - @ 1850 RPM | 207-310 kPa | 30-45 PSI |
| Oil Pump | | |
| Gear Diameter | 38.05-38.10 mm | 1.498-1.500 in |
| Gear Pocket - Depth | 30.53-30.59 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 in |
| Relief Valve-to-Bore Clearance | 0.038-0.089 mm | 0.0015-0.0035 in |
| Piston Ring End Gap | | |
| First Compression Ring | 0.18-0.39 mm | 0.007-0.015 in |
| Second Compression Ring | 0.48-0.74 mm | 0.019-0.029 in |
| Oil Control Ring | 0.25-0.74 mm | 0.010-0.029 in |
| Piston Ring to Groove Clearance | | |
| First Compression Ring | 0.03-0.076 mm | 0.001-0.003 in |
| Second Compression Ring | 0.04-0.078 mm | 0.002-0.003 in |
| Oil Control Ring | 0.09 mm | 0.004 in |
| Piston Ring Thickness | | |
| First Compression Ring | 1.164-1.190 mm | 0.046-0.047 in |
| Second Compression Ring | 1.472-1.490 mm | 0.058 in |
| Oil Control Ring - Maximum | 2.440 mm | 0.096 in |
| Piston | | |
| Piston Diameter - production | 93.980-94.020 mm | 3.7-3.701 in |
| Piston Diameter - service limit | 93.960 mm | 3.699 in |
| Piston Pin Bore Diameter | 24.008-24.013 mm | 0.9452-0.9454 in |
| Piston Ring Groove Width | 1.23-1.255 mm | 0.048-0.049 in |
| Piston to Bore Clearance - production | -0.029 to +0.029 mm | -0.0011 to +0.011 in |
| Piston to Bore Clearance - service limit - Maximum | 0.080 mm | 0.003 in |

| Application | Specification | |
|---|-----------------------|-----------------------|
| | Metric | English |
| Pin | | |
| Piston Pin Clearance to Connecting Rod Bore - Press Fit | -0.022 to +0.044 mm | -0.0008 to +0.0017 in |
| Piston Pin Clearance to Piston Pin Bore | 0.008-0.016 mm | 0.0003-0.0006 in |
| Piston Pin Diameter | 23.997-24.000 mm | 0.9447-0.9448 in |
| Piston Pin Length | 59.87-60.13 mm | 2.35-2.36 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 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 | 144.2 mm | 5.67 in |
| Push Rod Length - Exhaust | 152.5 mm | 6.0 in |
| Valve Springs | | |
| Valve Spring Free Length | 50.0 mm | 1.91 in |
| Valve Spring Installed Height | 44.2 mm | 1.74 in |
| Valve Spring Load - Closed | 343 N [commat]44.2 mm | 77 lb 1.74 in |
| Valve Spring Load - Open | 1041 N [commat]33 mm | 234 lb 1.299 in |
| Valve Spring Total Number of Coils | 7.10 | |

Fastener Tightening Specifications

| Application | Specification | |
|--|---------------|-----------|
| | Metric | English |
| 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 | 25 N·m | 18 lb ft |
| Final Pass | 110 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 | 70 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 | 10 N·m | 89 lb in |
| 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 Assembly Bolt | 30 N·m | 22 lb ft |

| Application | Specification | |
|---|---------------|-----------|
| | Metric | English |
| EGR Valve Pipe Bolt - Exhaust Manifold | 30 N·m | 22 lb ft |
| EGR Valve Pipe Bolt - EGR | 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 Mount Strut and A/C Compressor Bracket Bolt | 50 N·m | 37 lb ft |
| Engine Mount Strut and Lift Bracket Bolt - Engine Lift Rear | 50 N·m | 37 lb ft |
| Engine Mount Strut and Generator Bracket Bolt | 50 N·m | 37 lb ft |
| Engine Mount Strut and Support Bracket Bolt | 25 N·m | 18 lb ft |
| Engine Oil Pressure Indicator Switch | 16 N·m | 12 lb ft |
| Engine Wiring Harness Bracket Bolt | 13 N·m | 115 lb in |
| EVAP Purge Valve Bolt | 10 N·m | 89 lb in |
| 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 | 70 N·m | 52 lb ft |
| Front Oil Gallery Plug - Small | 19 N·m | 14 lb ft |
| Front Oil Gallery Plug - Large | 33 N·m | 24 lb ft |
| Fuel Feed Pipe to Fuel Injector Rail Bolt | 10 N·m | 89 lb in |
| Fuel Injector Rail Bolt | 10 N·m | 89 lb in |
| Heated Oxygen Sensor | 42 N·m | 31 lb ft |
| Heater Inlet Pipe Nut | 25 N·m | 18 lb ft |
| Heater Inlet Pipe Stud | 35 N·m | 26 lb ft |
| Ignition Coil Bracket Bolt/Nut/Stud | 25 N·m | 18 lb ft |
| Intake Manifold Coolant Pipe Bolt | 10 N·m | 89 lb in |
| Knock Sensor | 25 N·m | 18 lb ft |
| Lower Intake Manifold Bolt - Center | 20 N·m | 15 lb ft |
| Lower Intake Manifold Bolt - Corner | 25 N·m | 18 lb ft |
| MAP Sensor Bolt | 10 N·m | 89 lb in |
| Oil Filter Adapter Bolt | 25 N·m | 18 lb ft |
| Oil Filter | 30 N·m | 22 lb ft |
| Oil Filter Bypass Hole Plug | 19 N·m | 14 lb ft |
| Oil Filter Fitting | 39 N·m | 29 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 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 |
| PCV Tube Clip bolt - Foul Air | 10 N·m | 89 lb in |
| Piston Oil Nozzle Bolt | 10 N·m | 89 lb in |
| Rear Oil Gallery Plug - 1/4 inch | 19 N·m | 14 lb ft |
| Rear Oil Gallery Plug - 3/8 inch | 33 N·m | 24 lb ft |
| Spark Plug - Initial Installation | 20 N·m | 15 lb ft |
| Spark Plug - After Initial Installation | 15 N·m | 11 lb ft |
| Thermostat Bypass Pipe to Engine Front Cover Bolt | 10 N·m | 89 lb in |
| Thermostat Bypass Pipe to Throttle Body Nut/Bolt | 10 N·m | 89 lb in |
| Throttle Body Bolt | 10 N·m | 89 lb in |
| Throttle Body Stud | 6 N·m | 53 lb in |

| Application | Specification | |
|---------------------------------|---------------|----------|
| | Metric | English |
| Timing Chain Dampener Bolt | 21 N·m | 15 lb ft |
| 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 | 32 N·m | 24 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 | 10 N·m | 89 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 - accessory belt end, the right bank cylinders are 2, 4, 6. The left 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 forged steel - some applications use cast 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 pistons also have 2 polymer coated patches on the skirt for noise reduction. 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 made of chromium steel and 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.

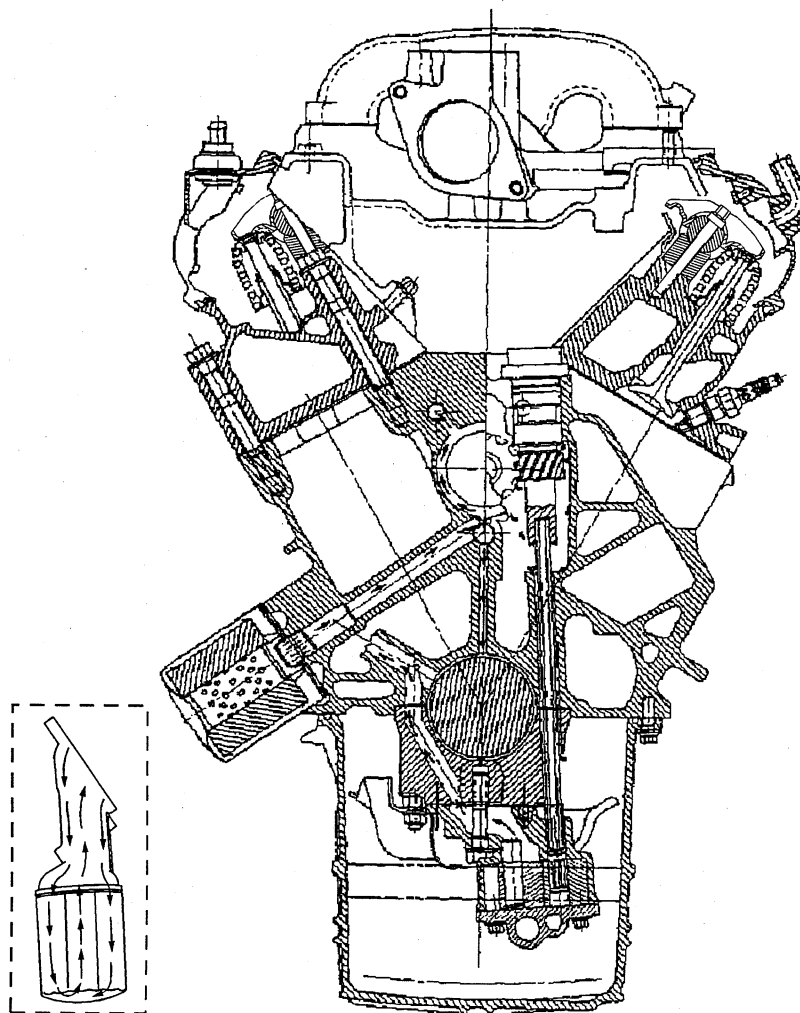
A roller rocker type valve train is used. Motion is transmitted from the camshaft through the hydraulic roller lifter and from the pushrod to the roller rocker arm. The rocker arm pivots on the needle roller bearings. The rocker arm transmits the camshaft motion to the valve. The rocker arm pedestal 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.

Lubrication System Description

Front View



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

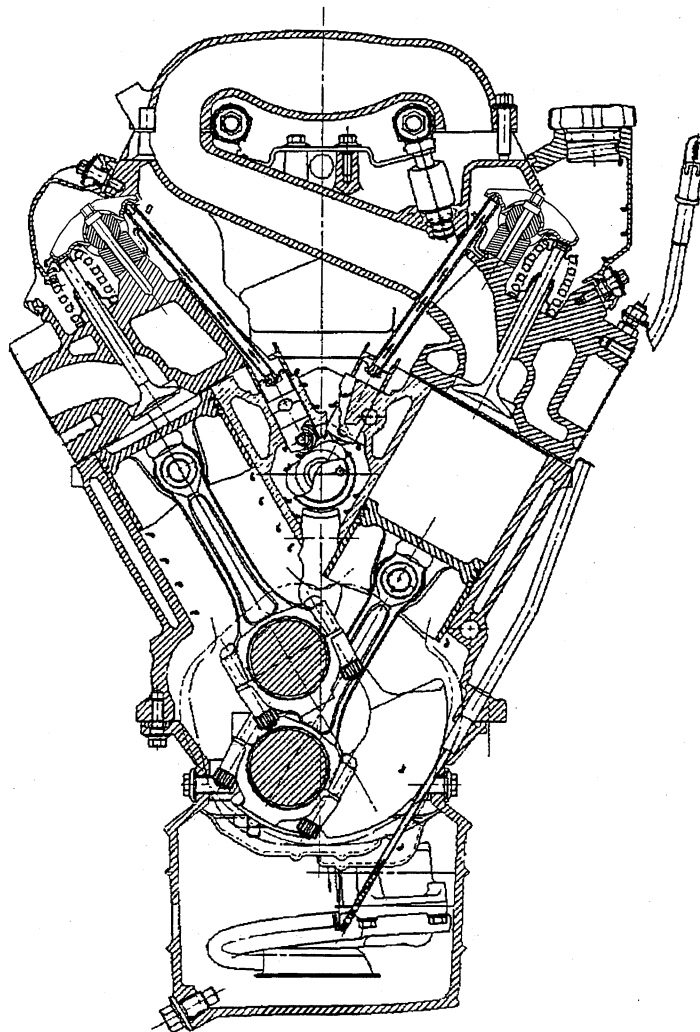
The bypass is designed to open at 69-83 kPa (10-12 psi).

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.

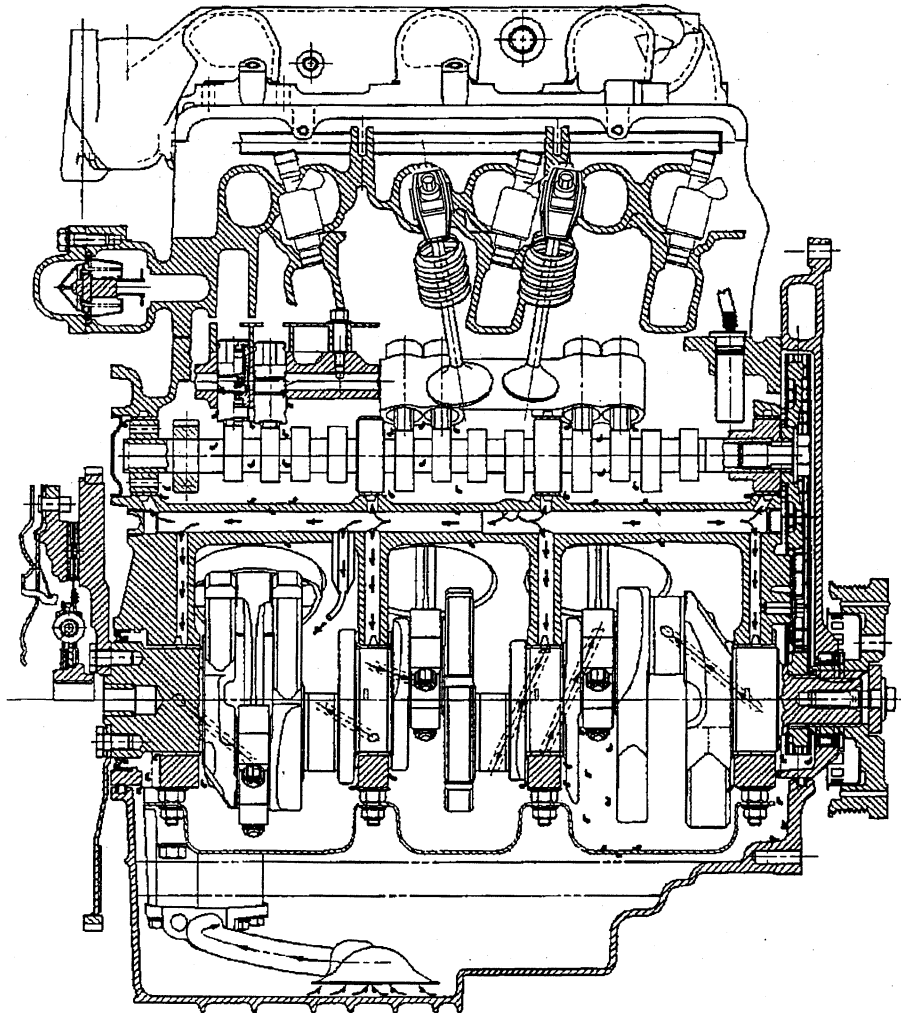
The piston oil nozzle lubricates the pistons and cylinder walls in cylinders 5 and 6. A nonserviceable check valve integrated into the nozzle prevents oil bleed down from the nozzle when the engine is not running.

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.

Rear View



Right View



Drive Belt System Description

See drive belt system description above.

Engine Cooling

Fastener Tightening Specifications

| Application | Specification | |
|--|---------------|----------|
| | Metric | English |
| Lower Radiator Support Bracket Bolt | 60 N·m | 44 lb ft |
| Transmission Oil Cooler Line Nut at Transmission | 7 N·m | 62 lb in |
| Transmission Oil Cooler Line Quick Connect Fitting | 20 N·m | 15 lb ft |
| Transmission Oil Cooler Line Stud at Transmission | 7 N·m | 62 lb in |
| Upper Radiator Support Bracket Bolt | 10 N·m | 89 lb in |

Cooling System Description and Operation

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 left hand tank. The drain cock unit includes the drain cock and drain cock seal.

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

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.

Coolant Recovery System

The coolant recovery system consists of a plastic coolant recovery reservoir and overflow tube. The recovery reservoir is also called a recovery tank or expansion tank. It is partially filled with coolant and is connected to the radiator fill neck with the overflow tube. Coolant can flow back and forth between the radiator and the reservoir.

In effect, a cooling system with a coolant recovery reservoir is a closed system. When the pressure in the cooling system gets too high, it will open the pressure valve in the pressure cap. This allows the coolant, which has expanded due to being heated, is allowed to flow through the overflow tube and into the recovery reservoir. As the engine cools down, the temperature of the coolant drops and a vacuum is created in the cooling system. This vacuum opens the vacuum valve in the pressure cap, allowing some of the coolant in the reservoir to be siphoned back into the radiator. Under normal operating conditions, no coolant is lost. Although the coolant level in the recovery reservoir goes up and down, the radiator and cooling system are kept full. An advantage to using a coolant recovery reservoir is that it eliminates almost all air bubbles from 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 drive belt.

Thermostat

The thermostat is a coolant flow control component. Its 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 right side end tank of the radiator. The transmission fluid temperature is regulated by the temperature of the engine coolant in the radiator.

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

Engine Electrical

Fastener Tightening Specifications

| Application | Specification | |
|---------------------------------------|---------------|-----------|
| | Metric | English |
| Battery Hold-Down Retainer Bolt | 25 N·m | 18 lb ft |
| Battery Tray Bracket Bolts | 16 N·m | 12 lb ft |
| Cable to Solenoid Nut | 12 N·m | 106 lb in |
| Drive Belt Idler Pulley Bolt | 50 N·m | 37 lb ft |
| Drive Belt Tensioner Bolt | 50 N·m | 37 lb ft |
| Flywheel Inspection Cover Bolt | 10 N·m | 89 lb in |
| Generator Bolt - 2.2L | 22 N·m | 16 lb ft |
| Generator Bolt/Stud | 50 N·m | 37 lb ft |
| Generator Bracket Bolt | 50 N·m | 37 lb ft |
| Generator Nut - 3.5L | 30 N·m | 22 lb ft |
| Generator Terminal Bolt - 2.2L | 20 N·m | 15 lb ft |
| Generator Terminal Nut - 3.5L | 17 N·m | 13 lb ft |
| Negative Battery Cable Bolt | 17 N·m | 13 lb ft |
| Positive Battery Cable Bolt | 17 N·m | 13 lb ft |
| Starter Bolt | 40 N·m | 30 lb ft |
| Starter Solenoid Battery Terminal Nut | 10 N·m | 89 lb in |
| Starter Solenoid S Terminal Nut | 5 N·m | 4 lb ft |

Battery Usage

| Application | Specification |
|----------------------------|---------------|
| L61, LX9 | |
| Cold Cranking Amperage | 525 A |
| Amp Hour Rating | 54 AH |
| Reserve Capacity Rating | 90 Minutes |
| Replacement Battery Number | 75-5YR |

Battery Temperature vs Minimum Voltage

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

Starter Motor Usage

| Application | Specification |
|-------------|---------------|
| L61 | PG260-D |
| LX9 | PG260-D |

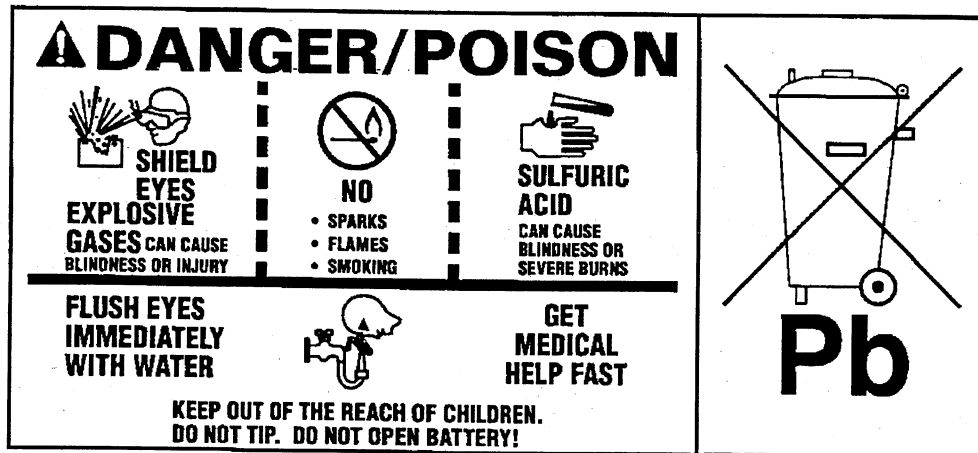
Generator Usage

| Application | Specification |
|--------------|---------------|
| Model | Valeo TG11 |
| Rated Output | 115 A |
| Load Test | 80 A |

Battery Description and Operation**Caution**

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

- Always shield your eyes and avoid leaning over the battery whenever possible.
- Do not expose the battery to open flames or sparks.
- Do not allow the battery electrolyte to contact the eyes or the skin. Flush immediately and thoroughly any contacted areas with water and get medical help.
- Follow each step of the jump starting procedure in order.
- Treat both the booster and the discharged batteries carefully when using the jumper cables.



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

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

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

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

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

CATALOG NO.

1819

| | |
|------------------------------|------------------|
| CCA 770 | LOAD TEST 380 |
| REPLACEMENT MODEL 100-6YR | |

A battery has 2 ratings:

- Reserve capacity
- Cold cranking amperage

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

Reserve Capacity

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

Cold Cranking Amperage

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

Circuit Description

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

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

Starting System Description and Operation

The PG-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 through 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 (Key Start)

For ignition switch power modes refer to Body Control System Description and Operation in Computer/Integrating Systems. Once the ignition is placed in the Run/Crank position, the control circuit of the Run/Crank relay is grounded by the body control module (BCM). With the Run/Crank relay switch closed, battery positive voltage flows through it and on to the park/neutral position (PNP) switch. With the PNP switch in either the Park or Neutral position, battery positive voltage will flow to the starter relay coil supply voltage input terminal of the powertrain control module and the coil side of the starter relay. Placing the ignition in the START position sends a message to the powertrain control module (PCM) requesting engine start. If the PCM has determined that the transmission is in Park or Neutral and theft is not active, it will ground 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.

Remote Vehicle Start (RVS)

To operate the function, first press and release the lock button on the key fob, then press the remote vehicle start (RVS) button for 2 seconds. The vehicle park lamps will be illuminated to indicate that the engine is running. The vehicle doors will be able to be unlocked. The RVS function is allowed to start the vehicle 2 times for 10-minute intervals. If the body control module (BCM) receives a second request for an RVS event while already operating in RVS then the first timer times out and then the second timer starts. If the RVS button was pressed for the first time and then 7 minutes later the RVS button was pressed a second time, the total time for the RVS event would be 17 minutes. When the RVS button is pressed for the second time, the first 10-minute interval automatically stops and the BCM starts counting the second 10-minute interval. After the first event times out, 10 minutes, the second event must be requested within 20 minutes or the function is disabled.

RVS can be deactivated by pressing the RVS button on the key fob, pressing the hazard switch, or inserting the ignition key and cycling it to the ON position and then OFF again. There are also other safety and security measures that will deactivate RVS, these include depressing the accelerator pedal or opening the hood. RVS will not function with any current or history codes set. The park lights will flash once when the RVS signal is received by the BCM, but the vehicle will not start.

RVS is designed to transition for RVS to normal key ON, engine run operation without any apparent change to the customer except inserting the ignition key and turning it to the RUN position.

While in RVS mode all modules that are powered by the Run/Crank shall be active and understand that RVS is active. All on-board diagnostics (OBD) II functions shall also be active.

The current state of RVS can be viewed through the driver information center (DIC) display under the Remote Start the display will read either On or Off.

The HVAC preset RVS settings are as follows:

- Inside air temperature input below 22°C (72°F) the HVAC system will set the blower motor speed to high speed, set the mode door to the defrost position, set the temperature door to the full hot position and set the recirculation door to the outside air position.
- Inside air temperature input above 26°C (79°F) the HVAC system will set the blower motor speed to high speed, set the mode door to the panel position, set the temperature door to the full cold position, request air conditioning (A/C) compressor operation and set the recirculation door to the recirculate position.
- Inside air temperature input between 22°C (72°F) and 26°C (79°F) the HVAC system will set the blower motor speed to a medium speed, set the mode door to the panel position, set the temperature door to the full cold position, request A/C compressor operation and set the recirculation door to the outside air position.

Once the ignition switch is placed to the RUN position the HVAC system reverts back to its last known setting.

Disable RVS

To disable the remote vehicle start (RVS) function perform the following steps:

1. All doors must be closed.
2. Turn ON the ignition, with the engine OFF.
3. Press the Menu button on the driver information center (DIC) until REMOTE START is displayed.
4. Press the Enter button on the DIC until ON is displayed.

The current state of RVS can be viewed through the DIC display under the Remote Start the display will read either On or Off.

Enable RVS

To enable the remote vehicle start (RVS) function perform the following steps:

1. Turn ON the ignition, with the engine OFF.
2. Press the Menu button on the driver information center (DIC) until REMOTE START appears on the display.
3. Press the Enter button on the DIC and then ON is displayed.

The current state of RVS can be viewed through the DIC display under the Remote Start the display will read either On or Off.

Hood Ajar Switch

The hood switch provides status of the hood to the body control module (BCM) for remote vehicle start (RVS) functions. It is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. When the hood is closed, the hood ajar open signal circuit is approximately battery voltage. The hood ajar closed signal circuit is pulled low to ground. The opposite occurs when the hood is opened.

Circuit Description (RVS)

The body control module (BCM) is the main controller for remote vehicle start (RVS). It handles the majority of the RVS functions from how long RVS lasts to protecting the vehicle from theft while RVS is active.

Once the BCM receives a signal from the key fob it reviews the following information to determine if a Crank Request message will be sent to the powertrain control module (PCM) to activate RVS:

- Valid hood ajar switch closed signal
- The key is not in the ignition.
- The doors are locked.
- The hazard switch is OFF

The PCM relies on the RVS message from the BCM to enable RVS when the Crank Request signal is received. If the PCM does not receive a valid RVS message from the BCM it will not ground the control circuit of the Crank relay and start the engine. While the PCM is in RVS mode it will cut fuel to the engine if any of the following additional conditions occur:

- Vehicle speed is greater than 0 km/h
- Engine overheating
- Low oil pressure
- The malfunction indicator lamp (MIL) is commanded ON.
- Engine crank time is greater than 30 seconds.
- Engine speed greater than 2,000 RPM for more than 10 seconds.
- Engine speed greater than 4,000 RPM for more than 2 seconds.
- Throttle position (TP) greater than 10 percent for 2 seconds.
- Remote start timer equals 0.

Charging System Description and Operation

Generator

The generator is non-repairable. The generator(s) feature the following major components:

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

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

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

Regulator

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

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

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

Engine Controls

Engine Controls – 2.2L (L61)

Ignition System Specifications

| Application | Specification | |
|-----------------------------|---|----------|
| | Metric | English |
| Firing Order | 1-3-4-2 | |
| Primary Coil Current Output | 8.5-9.5 Amps | |
| Spark Plug Torque | 20 N·m | 15 lb ft |
| Spark Plug Gap | 1.06 mm | 0.042 in |
| Spark Plug Type | GM P/N 12569190 or 41-981--AC plug type | |

Fastener Tightening Specifications

| Application | Specification | |
|---|---------------|----------|
| | Metric | English |
| Accelerator Cable Bracket Nuts | 10 N·m | 89 lb in |
| Accelerator Pedal Retaining Nuts | 30 N·m | 22 lb ft |
| Air Cleaner Duct Clamp | 5 N·m | 44 lb in |
| Air Cleaner Element Cover Screws | 3 N·m | 26 lb in |
| Air Cleaner Outlet Resonator Clamp | 5 N·m | 44 lb in |
| Air Cleaner Outlet Resonator Mounting Bolt | 10 N·m | 89 lb in |
| Crankshaft Position (CKP) Sensor Bolts | 8 N·m | 71 lb in |
| Engine Coolant Temperature (ECT) Sensor | 10 N·m | 89 lb in |
| Evaporative Emission (EVAP) Canister Purge Valve Mounting Bracket Nut | 8 N·m | 71 lb in |
| EVAP Canister Retainer Bolt | 10 N·m | 89 lb in |
| Exhaust Heat Shield Bolt | 2.0 N·m | 18 lb in |
| Exhaust Heat Shield Nut | 1.0 N·m | 9 lb in |
| Fuel Filler Hose Clamp | 3 N·m | 27 lb in |
| Fuel Filler Pipe Attaching Screw | 10 N·m | 89 lb ft |
| Fuel Filter Fitting | 27 N·m | 20 lb ft |
| Fuel Pipe Mounting Bolts | 6 N·m | 53 lb in |
| Fuel Pipe Retainer Bolts | 10 N·m | 89 lb in |
| Fuel Pressure Regulator Retaining Bolts | 5 N·m | 44 lb in |
| Fuel Rail Attaching Studs | 10 N·m | 89 lb in |
| Fuel Rail Pipe Fittings | 10 N·m | 89 lb in |
| Fuel Tank Retaining Strap Bolt | 35 N·m | 26 lb ft |
| Heated Oxygen Sensor (HO2S) 1 | 30 N·m | 22 lb ft |
| HO2S 2 | 41 N·m | 30 lb ft |
| Idle Air Control (IAC) Valve | 3 N·m | 27 lb in |
| Ignition Coil Housing Screws | 4 N·m | 35 lb in |
| Ignition Control Module (ICM) Cover Bolts | 10 N·m | 89 lb in |
| Knock Sensor (KS) | 25 N·m | 18 lb ft |
| Spark Plugs | 20 N·m | 15 lb in |
| Throttle Body Attaching Bolts and Studs | 10 N·m | 89 lb in |
| Throttle Position (TP) Sensor Mounting Screw | 2 N·m | 18 lb in |
| Upper Air Cleaner Cover Screws | 3 N·m | 27 lb in |

Engine Controls – 3.5L (LX9)**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 | 4,018 ohms per meter (1,225 ohms per ft) | |

Fastener Tightening Specifications

| Application | Specification | |
|--|---------------|-----------|
| | Metric | English |
| Accelerator Cable Bracket Retaining Bolts | 13 N·m | 115 lb in |
| Accelerator Cable Bracket Retaining Nut | 10 N·m | 89 lb in |
| Accelerator Pedal Retaining Bolt | 3 N·m | 27 lb in |
| Air Cleaner Duct Clamps | 2 N·m | 18 lb in |
| Air Cleaner Housing Nuts | 10 N·m | 89 lb in |
| Air Cleaner Retainer Screws | 6 N·m | 40 lb in |
| Air Cleaner Upper Cover Bolt | 2.3 N·m | 20 lb in |
| Camshaft Position (CMP) Sensor Retaining Bolt | 8 N·m | 71 lb in |
| Crankshaft Position 7X (CKP) Sensor Bolts | 11 N·m | 97 lb in |
| Crankshaft Position 24X (CKP) Sensor Bolts | 10 N·m | 89 lb in |
| Engine Coolant Temperature (ECT) Sensor | 20 N·m | 15 lb ft |
| EVAP Canister Purge Valve Retaining Bolt | 10 N·m | 89 lb in |
| EVAP Canister Retainer Bolt | 10 N·m | 89 lb in |
| Exhaust Gas Recirculation (EGR) Pipe Bolt | 25 N·m | 18 lb ft |
| Exhaust Gas Recirculation Pipe Nut | 25 N·m | 18 lb ft |
| Exhaust Gas Recirculation Valve Bolts | 30 N·m | 22 lb ft |
| Exhaust Shield Bolt | 2 N·m | 18 lb in |
| Exhaust Shield Nut | 1 N·m | 9 lb in |
| Fuel Feed and Return Pipes to Fuel Rail | 17 N·m | 13 lb ft |
| Fuel Filler Hose Clamp | 3 N·m | 27 lb in |
| Fuel Filler Pipe Attaching Screw | 10 N·m | 89 lb in |
| Fuel Filter Fitting | 27 N·m | 20 lb ft |
| Fuel Pipe Mounting Bolts | 6 N·m | 53 lb in |
| Fuel Pipe Retainer Bolt | 25 N·m | 18 lb ft |
| Fuel Pressure Regulator Attaching Screw | 8.5 N·m | 75 lb in |
| Fuel Rail Attaching Bolts | 10 N·m | 89 lb in |
| Fuel Tank Retaining Strap Bolts | 35 N·m | 26 lb ft |
| Heated Oxygen Sensors (HO2S) | 41 N·m | 30 lb ft |
| Idle Air Control (IAC) Valve Attaching Screws | 3 N·m | 27 lb in |
| Ignition Coil to Ignition Control Module Screws | 4.5 N·m | 40 lb in |
| Knock Sensor (KS) | 19 N·m | 14 lb in |
| Manifold Absolute Pressure (MAP) Sensor Retaining Screws | 3 N·m | 27 lb in |
| PCM Connector Screws | 8 N·m | 71 lb in |
| Spark Plugs | 15 N·m | 11 lb ft |
| Throttle Body Retaining Nuts or Bolts | 10 N·m | 89 lb in |
| Throttle Position (TP) Sensor Screws | 2 N·m | 18 lb in |

Fuel System Specifications

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

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

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

Notice

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

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

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

Exhaust System

Fastener Tightening Specifications

| Application | Specification | |
|---|---------------|----------|
| | Metric | English |
| Catalytic Converter-to-Exhaust Manifold Bolt/Nut (LX9) | 31 N·m | 23 lb ft |
| Exhaust Gas Recirculation (EGR) Pipe Bolt (LX9) | 10 N·m | 89 lb in |
| Exhaust Manifold/Catalytic Converter-to-Intermediate Pipe Nut (L61) | 35 N·m | 26 lb ft |
| Exhaust Manifold Heat Shield Bolt (L61) | 23 N·m | 17 lb ft |
| Exhaust Manifold Heat Shield Bolt (LX9) | 10 N·m | 89 lb in |
| Exhaust Manifold Nut (L61) | 14 N·m | 10 lb ft |
| Exhaust Manifold Nut (LX9) | 16 N·m | 12 lb ft |
| Exhaust Pipe Clamp Nut | 50 N·m | 37 lb ft |
| Front Catalytic Converter-to-Rear Catalytic Converter Nut (LX9) | 31 N·m | 23 lb ft |
| Intermediate Pipe-to-Muffler Nut (L61) | 30 N·m | 22 lb ft |
| Oxygen Sensor | 42 N·m | 31 lb ft |
| Rear Catalytic Converter-to-Muffler Nut (LX9) | 30 N·m | 22 lb ft |

Exhaust System Description

Important

Use of non-OEM parts may cause driveability concerns.

General Description

The exhaust system is used to carry and treat the gases that are created by the engine. When the engine exhaust valve opens hot gases created by the engine combustion cycle are allowed to travel out through the cylinder head into the exhaust manifold. In the exhaust manifold the exhaust gases combine with exhaust gases from the other cylinders and pass through a flanged port into the three-way catalytic converter pipe. The exhaust gases pass through the catalytic converter to reduce pollutants from the exhaust stream gases. The three-way catalytic converter pipe carries the exhaust gases on to the exhaust system where the resonator and muffler are used to reduce the noise levels of the exhaust. The exhaust system exits at the rear of the vehicle to reduce exhaust noise and prevent fumes from entering the vehicle. Exhaust system hangers and insulators support the weight of the exhaust system, isolate engine noise, isolate engine vibration, space the system away from the underbody of the vehicle and allow for exhaust system expansion that occurs as the exhaust system warms up.

Exhaust Manifold

The exhaust manifold is a component of the exhaust system used to collect and carry hot exhaust gases away from the engine. Made from cast iron, the exhaust manifold combines the exhaust gases from several cylinders. The exhaust manifold is bolted to the cylinder head with a exhaust manifold gasket between them. The left (front) exhaust manifold connects to a crossover pipe that is part of the right (rear) exhaust manifold and carries the exhaust gases from the front of the vehicle over the transmission to the right (rear) exhaust manifold. The gases are combined in the right (rear) manifold and directed on to the three-way catalytic converter. The three-way catalytic converter pipe and gasket are bolted to the right (rear) exhaust manifold. The right (rear) exhaust manifold has two tapped holes. The heated oxygen sensor (HO2S) threads into the hole by the flange and the EGR valve pipe threads into the hole where the crossover meets the right (rear) exhaust manifold.

Resonator

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

Catalytic Converter

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

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

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

The catalyst in the converter is not serviceable.

Exhaust Pipe Description

The exhaust pipe carries exhaust gases treated by the three-way catalytic converter through a resonator and into the exhaust muffler. As exhaust gases travel through the resonator and muffler baffles, exhaust noise is lessened. The exhaust system exits at the rear of the vehicle to reduce exhaust noise and eliminate fumes from entry into the vehicle. Exhaust system hangers and insulators support the weight of the exhaust pipe, the resonator, and the muffler. The exhaust system hangers also space the exhaust system away from the underbody of the vehicle and allow the exhaust system to expand as the exhaust system warms up.

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 – 4T40E/4T45E

Transmission General Specifications

| Name | | Hydra-Matic® 4T40-E/4T45-E | |
|--|-------------|---|--|
| RPO Codes | | MN4 - 4T40-E MN5 - 4T45-E | |
| Production Location | | Windsor, Ontario, Canada | |
| Vehicle Platform | | J, N, Z | |
| Engine/Transmission Usage | | | |
| Transmission Drive | | Transverse Mounted Front Wheel Drive | |
| Maximum Engine Torque | | 4T40-E 270 N·m (200 lb ft) 4T45-E 290 N·m (215 lb ft) | |
| Maximum Shift Speed | | 1-2 6,500 RPM 2-3 6,500 RPM 3-4 6,500 RPM | |
| 1st Gear Ratio | | 2.960:1 | |
| 2nd Gear Ratio | | 1.626:1 | |
| 3rd Gear Ratio | | 1.000:1 | |
| 4th Gear Ratio | | 0.681:1 | |
| Reverse | | 2.143:1 | |
| Torque Converter Size - Diameter of Torque Converter Turbine | | 245 mm | |
| Pressure Taps | | Line Pressure | |
| Transmission Fluid Type | | DEXRON® III | |
| Transmission Fluid Capacity - Approximate | | Bottom Pan Removal: 6.5 L (6.9 qts) Complete Overhaul: 9.0 L (9.5 qts) Dry: 12.2 L (12.9 qts) | |
| Transmission Type: 4 | | Four Forward Gears | |
| Transmission Type: T | | Transverse Mount | |
| Transmission Type: 40 | | Product Series | |
| Transmission Type: E | | Electronic Controls | |
| Position Quadrant | | P, R, N, Overdrive, 3, 2, 1 | |
| Case Material | | Die Cast Aluminum | |
| Transmission Weight Dry | | 4T40-E 74.7 kg (164 lbs) 4T45-E 75.1 kg (165.6 lbs) | |
| Transmission Weight Wet | | 4T40-E 85.0 kg (187 lbs) 4T45-E 85.5 kg (188.5 lbs) | |
| Maximum Trailer Towing Capacity | | 487 kg (1,000 lbs) | |
| Maximum Gross Vehicle Weight (GVW) | | 1,826 kg (4,100 lbs) | |
| Ratios | | | |
| Chain | Final Drive | Effective - Overall | |
| 32/38 | 3.29 | 3.91 | |
| 32/38 | 3.05 | 3.63 | |
| 35/35 | 3.29 | 3.29 | |
| 35/35 | 3.05 | 3.42 | |
| 33/37 | 3.29 | 3.69 | |
| 33/37 | 3.05 | 3.42 | |

Fastener Tightening Specifications

| Application | Specification | |
|---|---------------|-------------|
| | Metric | English |
| Bottom Pan to Case - M6 x 1.0 x 19.0 - Qty 12 | 12 N·m | 106 lb in |
| Case Cover | 24 N·m | 18 lb ft |
| Case Side Cover | 20 N·m | 15 lb ft |
| Channel Plate to Case - M6 x 1.0 x 28.0 - Qty 6 | 12 N·m | 106 lb in |
| Channel Plate to Case - M6 x 1.0 x 63.0 - Qty 2 | 12 N·m | 106 lb in |
| Channel Plate to Driven Sprocket Support - M6 x 1.0 x 28.0 - Qty 2 | 14 N·m | 124 lb in |
| Clip, Wiring Harness - M6 x 1.0 x 15.0 - Qty 1 | 12 N·m | 106 lb in |
| Converter Shield | 10 N·m | 89 lb in |
| Cooler Pipes at Case | 8 N·m | 71 lb in |
| Cooler Pipes at Radiator | 20-40 N·m | 15-30 lb ft |
| Cover Assembly, Intermediate 4th Servo to Case - M6 x 1.0 x 28.0 - Qty 3 | 12 N·m | 106 lb in |
| Cover, Lo/Reverse Servo to Case - M6 x 1.0 x 28.0 - Qty 3 | 12 N·m | 106 lb in |
| Cover, Side to Case - M8 x 1.25 x 28.0 - Qty 10 | 20 N·m | 15 lb ft |
| Cover, Side to Case (Stud) - M8 x 1.25 x 28.0 - Qty 1 | 20 N·m | 15 lb ft |
| Flywheel to Torque Converter | 62 N·m | 46 lb ft |
| Oil Check Plug | 14 N·m | 124 lb in |
| Oil Feed Tube Bolts | 14 N·m | 124 lb in |
| Oil Pan to Case | 10 N·m | 89 lb in |
| Park/Neutral Position Switch to Case | 24 N·m | 18 lb ft |
| Plug, Pipe - 1/8-27 NPTF - Qty 2 | 12 N·m | 106 lb in |
| Pressure Switch Assembly Bolts | 12 N·m | 106 lb in |
| Pump, Valve Body to Channel Plate - M6 x 1.0 x 63.0 - Qty 1 | 12 N·m | 106 lb in |
| Pump, Valve Body to Channel Plate - M6 x 1.0 x 90.0 - Qty 6 | 12 N·m | 106 lb in |
| Pump, Valve Body, Channel Plate to Case - M6 x 1.0 x 103.0 - Qty 1 | 12 N·m | 106 lb in |
| Sensor, Input Speed - M6 x 1.0 x 15.0 (Qty 1) | 12 N·m | 106 lb in |
| Sensor, Output Speed Stud - M6 x 1.0 x 15.0 - Qty 1 | 12 N·m | 106 lb in |
| Shift Lever to Transmission Nut | 20 N·m | 15 lb ft |
| Spacer, Channel Plate to Driven Sprocket Support - M6 x 1.0 x 70.0 - Qty 2 | 14 N·m | 124 lb in |
| Speed Sensor Housing to Case | 11 N·m | 97 lb in |
| Spring and Roller Assembly, Detent to Channel Plate - M6 x 1.0 x 19.0 - Qty 1 | 12 N·m | 106 lb in |
| Support Assembly, Drive Sprocket to Case - M6 x 1.0 x 17.2 - Qty 6 | 12 N·m | 106 lb in |
| TFP Switch, Valve Body, Channel Plate - M6 x 1.0 x 51.0 - Qty 3 | 12 N·m | 106 lb in |
| TFP Switch, Valve Body, Channel Plate - M6 x 1.0 x 63.0 - Qty 1 | 12 N·m | 106 lb in |
| TFP Switch, Valve Body, Channel Plate to Case - M6 x 1.0 x 90.0 - Qty 2 | 12 N·m | 106 lb in |
| Transmission Mount Bracket Bolts | 120 N·m | 89 lb ft |
| Transmission Mount - Front | 130 N·m | 96 lb ft |
| Transmission Mount - Rear | 122 N·m | 90 lb ft |
| Transmission Mount - Side | 66 N·m | 49 lb ft |
| Transmission Mount Thru-bolt - Front | 75 N·m | 55 lb ft |
| Transmission Mount Thru-bolt - Rear | 120 N·m | 89 lb ft |
| Transmission Mount Thru-bolt - Side | 55 N·m | 41 lb ft |
| Transmission to Engine Mount Bolts | 90 N·m | 66 lb ft |
| Tube Assembly, Transmission Oil to Case - M6 x 1.0 x 19.0 - Qty 2 | 12 N·m | 106 lb in |
| Tube Assembly, Transmission Oil to Forward Clutch Support - M6 x 1.0 x 19.0 | 12 N·m | 106 lb in |
| Tube Assembly, Transmission Oil to Lo/Reverse Servo Cover - M6 x 1.0 x 19.0 | 12 N·m | 106 lb in |
| TV Cable to Case | 9 N·m | 80 lb in |
| Valve Body, Channel Plate to Case - M6 x 1.0 x 90.0 - Qty 5 | 12 N·m | 106 lb in |
| Valve Body, Channel Plate to Case - M6 x 1.0 x 103.0 - Qty 2 | 12 N·m | 106 lb in |
| Valve Body to Channel Plate - M6 x 1.0 x 51.0 - Qty 5 | 12 N·m | 106 lb in |

Fluid Capacity Specifications

| Application | Specification | |
|--------------------|---------------|-------------|
| | Metric | English |
| Bottom Pan Removal | 6.5 liters | 6.9 quarts |
| Complete Overhaul | 9.0 liters | 9.5 quarts |
| Dry | 12.2 liters | 12.9 quarts |

Transmission Component and System Description**Transmission General Description**

The 4T40-E is a fully automatic front wheel drive electronically controlled transmission. The 4T40-E provides four forward ranges including overdrive and one reverse gear range. The PCM controls shift points by means of two shift solenoids. A vane type pump supplies the oil pressure. The PCM regulates oil pressure by means of the Pressure Control Solenoid (PCS).

You can operate the transmission in any one of the following seven modes:

- P – Park position prevents the vehicle from rolling either forward or backward. For safety reasons, use the parking brake in addition to the park position.
- R – Reverse allows the vehicle to be operated in a rearward direction.
- N – Neutral allows the engine to be started and operated while driving the vehicle. If necessary, you may select this position in order to restart the engine with the vehicle moving.
- D – Overdrive is used for all normal driving conditions. Overdrive provides four gear ratios plus a converter clutch operation. Depress the accelerator in order to downshift for safe passing.
- 3 – Drive position is used for city traffic, hilly terrain, and trailer towing. Drive provides three gear ranges and prevents the transmission from operating in fourth gear. Depress the accelerator in order to downshift.
- 2 – Manual Second provides two gear ratios under most operating conditions. Manual Second provides acceleration and engine braking. You may select this range at any vehicle speed, but you cannot downshift the transmission into Second gear until the vehicle speed drops below approximately 100 km/h (62 mph).
- 1 – Manual Lo provides maximum engine braking. You may select this range at any vehicle speed, but you cannot downshift the transmission into First gear until the vehicle speed drops below approximately 60 km/h (37 mph).

Components

The mechanical components of this unit are as follows:

- A torque converter with a torque converter clutch (TCC)
- A drive link assembly
- Intermediate/4th and Lo/Reverse friction band assemblies
- Forward, Coast, 2nd, Reverse, and Direct multiple disc clutch assemblies
- Two planetary gear sets: Input and Reaction
- Two roller clutches - Lo and 2nd
- One sprag clutch
- One vane type oil pump
- One control valve assembly
- A final drive and differential assembly

The electrical components of this unit are as follows:

- Two shift solenoid valves, 1-2 and 2-3
- A torque converter clutch pulse width modulated (TCC PWM) solenoid valve
- A transmission pressure control (PC) solenoid valve
- An automatic transmission fluid temperature (TFT) sensor
- Two speed sensors: input and output speed sensor
- An automatic transmission fluid pressure (TFP) manual valve position switch assembly
- An automatic transmission wiring harness assembly

- A park/neutral position switch

Automatic Transmission Shift Lock Control Description

The automatic transmission shift lock control system is a safety device that prevents an inadvertent shift out of PARK when the engine is running. 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.

With the ignition in the ON position, battery positive voltage is supplied to the park/neutral position switch. With the transmission in the PARK position the contacts in the park/neutral position switch are closed and voltage flows through the normally closed contacts of the automatic transmission shift lock control switch to the automatic transmission shift lock control solenoid. The automatic transmission shift lock control solenoid is permanently ground. This energizes the automatic transmission shift lock control solenoid and locks the shift lever in the PARK position. When the driver presses the brake pedal the contacts in the automatic transmission shift lock control switch open, de-energizing the automatic transmission shift lock control solenoid. This allows the shift lever to move out of the PARK position.

Abbreviations and Meanings

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

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

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

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

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

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

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

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

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

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

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

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intentionally left
blank.**

Conversion - English/Metric

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

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

Equivalents - Decimal and Metric

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

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

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Fasteners

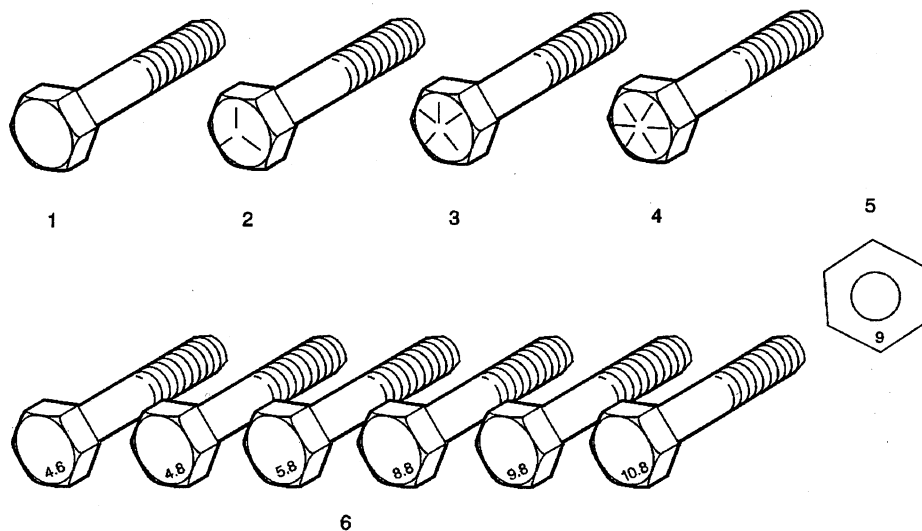
Metric Fasteners

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

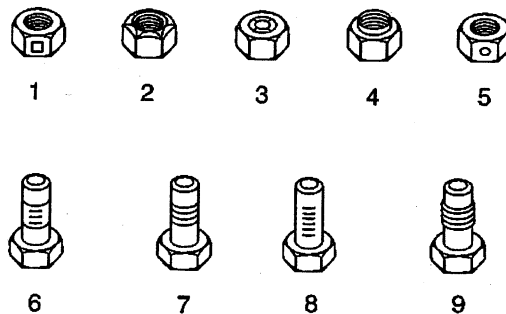
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

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 | | | | | | | | | |
|--|-----------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | AK5 | Air bags , dual-stage, frontal, 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 | S ¹ | S ¹ |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | C60 | Air conditioning , front manual | S | S | S | S | S | -- | -- |
| | C68 | Air conditioning , front automatic climate control | -- | -- | -- | -- | -- | S | S |
| | | Assist handles , rear outboard passenger | S | S | S | S | S | S | S |
| | AP9 | Cargo convenience nets , trunk | -- | ■ | ■ | S | S | S | S |
| | | Console , floor, includes floor shifter, integral armrest and storage compartment | S | S | S | S | S | S | S |
| K34 | | Cruise control , electronic with set and resume speed 1 - Includes (AU0) Keyless entry, remote. | A ¹ | ■ | ■ | S | S | S | S |
| | | Cupholders , dual front and rear | S | S | S | S | S | S | S |
| | | Defogger , rear-window, electric | S | S | S | S | S | S | S |
| | | Door locks , power programmable, includes lockout protection and delayed locking | S | S | S | S | S | S | S |
| | | Driver Information Center , driver customization, warning messages and vehicle information | S | S | S | S | S | S | S |
| B37 | | Floormats , carpeted, front and rear | A | ■ | ■ | A | ■ | S | S |
| | | Instrumentation , analog, includes speedometer, temperature, fuel, tachometer and PRNDL | S | S | S | S | S | S | S |
| | AU0 | Keyless entry , remote 1 - Included and only available with (K34) Cruise control. | A ¹ | ■ | ■ | S | S | S | S |
| | | LATCH system , (Lower Anchors and Top tethers for CHildren), for child safety seats | S | S | S | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | | Lighting , reading lights, front | -- | -- | -- | S | S | -- | -- |
| | | Lighting , reading lights, front and rear | -- | -- | -- | -- | -- | S | S |
| | E91 | Map pocket , seatback, driver and front passenger | -- | ■ | ■ | S | S | S | S |
| | | Mirror , inside rearview, manual day/night | S | S | S | S | S | S | -- |
| | JF4 | Pedals , power, adjustable, gas and brake | -- | ■ | ■ | S | S | S | S |
| | | Power outlet , auxiliary, 2 1 - 2 outlets in front without (NW7) Traction Control. 2 - 1 outlet in front and 1 in center console. | S ¹ | S ¹ | S ¹ | S ² | S ² | S ² | S ² |
| AP3 | | Remote vehicle starter system 1 - Requires (K34) Cruise control and includes the functionality of (AU0) Keyless entry, remote. | A ¹ | A | A | A | ■ | S | S |
| | | Safety belts , 3-point, all seating positions, includes front seat pretensioners | S | S | S | S | S | S | S |
| | | Seats , front Cloth bucket, includes reclining seatback and adjustable head restraints | S | S | S | -- | -- | -- | -- |
| | | Seats , front Custom Cloth bucket, includes reclining seatback and adjustable head restraints | -- | -- | -- | S | S | -- | -- |
| | | Seats , front UltraLux and Leather-appointed bucket, includes reclining seatback and adjustable head restraints | -- | -- | -- | -- | -- | S | S |
| | AM9 | Seat , rear 60/40 split-folding seatback | S | S | S | S | S | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | A | -- | A | S | S |
| | | Seat , front passenger, flat-folding | S | S | S | S | S | S | S |
| | | Seat adjuster , power, vertical height, driver only | S | S | S | S | S | -- | -- |
| | AG1 | Seat adjuster , power, driver 6-way | -- | -- | -- | -- | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | -- | ■ | ■ | S | S | S | S |
| | | Seat cushion storage pocket , driver | -- | -- | -- | S | S | -- | -- |
| | | Seat cushion storage pockets , driver, front passenger and rear outboard seating positions | -- | -- | -- | -- | -- | S | S |
| | U1C | Sound system , ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 4-speakers | S | -- | -- | -- | -- | -- | -- |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|--|---------------|-----|-----|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| UN0 | | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | ■ | ■ | S | S | S | S |
| | | Steering column , tilt/telescoping | S | S | S | S | S | S | S |
| | N46 | Steering wheel , 4-spoke | S | S | S | S | S | — | — |
| | NR0 | Steering wheel , 4-spoke, leather-wrapped with mounted audio and cruise controls, includes leather-wrapped shift knob | — | — | — | — | — | S | S |
| | | Theft-deterrent system , PASS-Key III Plus | S | S | S | S | S | S | S |
| | | Trunk release , power, interior | S | S | S | S | S | S | S |
| | | Visors , vanity mirrors, driver and front passenger, covered | S | S | S | — | — | — | — |
| | | Visors , illuminated vanity mirror, driver only, non-illuminated passenger, covered | — | — | — | S | S | — | — |
| | | Visors , illuminated vanity mirrors, driver and front passenger, covered | — | — | — | — | — | S | S |
| | | Windows , power, includes driver express-down and passenger lockout | S | S | S | S | S | S | S |
| | | Daytime running lamps | S | S | S | S | S | S | S |
| | | Door handles , body-color | S | S | S | S | S | S | S |
| | | Fascias , front and rear, body-color | S | S | S | S | S | S | S |
| | | Fog lamps , front, integral in front fascia | — | — | — | — | — | S | S |
| | | Glass , Solar-Ray light tinted | S | S | S | S | S | S | S |
| | | Headlamps , halogen, composite, includes crystalline-like lenses and automatic exterior lamp control | S | S | S | S | S | S | S |
| | D49 | Mirrors , outside rearview, power, Black | S | S | S | S | S | — | — |
| | DL8 | Mirrors , outside rearview, folding, power, heated, Black | — | — | — | — | — | S | S |
| | | Moldings , bodyside, Black | S | S | — | — | — | — | — |
| | B86 | Moldings , bodyside, body-color | — | — | ■ | S | S | S | S |
| | | Moldings , rocker, Black | S | S | S | S | S | — | — |
| | | Moldings , rocker, body-color | — | — | — | — | — | S | S |
| T43 | | Spoiler , rear | — | — | A | A | A | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------|-----|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | QMR | Tires, P205/65R15, touring, blackwall | S | S | S | S | S | -- | -- |
| | QPE | Tires, P215/60R16, touring, blackwall 1 - Included and only available with (B2N) LS Sport Appearance Package. 2 - Included and only available with (PY1) Wheels, 16" aluminum, chrome or (B2N) LS Sport Appearance Package. | -- | -- | -- | A ¹ | A ² | S | S |
| | PA7 | Wheels, 15" (38.1 cm) steel, includes bolt-on wheel cover | S | S | -- | -- | -- | -- | -- |
| | PF3 | Wheels, 15" (38.1 cm) aluminum | -- | -- | ■ | S | S | -- | -- |
| | QD1 | Wheels, 16" (40.6 cm) aluminum, machined-face | -- | -- | -- | -- | -- | S | S |
| | | Wipers, variable intermittent, speed-sensitive, front | S | S | S | S | S | S | S |
| | | Battery, maintenance free, includes rundown protection | S | S | S | S | S | S | S |
| | J41 | Brakes, front disc/rear drum | S | S | S | -- | -- | -- | -- |
| | J67 | Brakes, 4-wheel antilock, 4-wheel disc, includes Traction Control | -- | -- | -- | S | S | S | S |
| | L61 | Engine, ECOTEC 2.2L DOHC, 16-valve, 4-cylinder, MFI (145 HP [108.1 kW] @ 5600 rpm, 155 lb.-ft. [209.2 N-m] @ 4000 rpm) | S | S | S | -- | -- | -- | -- |
| | LX9 | Engine, 3500 V6 SFI (200 HP [149.1 kW] @ 5400 rpm, 220 lb.-ft. [297 N-m] @ 3200 rpm) | -- | -- | -- | S | S | S | S |
| | | Steering, electric power (EPS) | S | S | S | S | S | S | S |
| | | Suspension, 4-wheel independent | S | S | S | S | S | S | S |
| | NW7 | Traction Control, all-speed 1 - Included and only available with (JM4) Brakes, 4-wheel antilock. | A ¹ | A ¹ | A ¹ | S | S | S | S |
| | MX0 | Transmission, 4-speed automatic, electronically controlled with overdrive, includes electronic range selector. | S | S | S | S | S | S | S |

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

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

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 | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| | AK5 | Air bags , dual-stage, frontal, 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 |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | C60 | Air conditioning , front manual | S | S | — | — |
| | C68 | Air conditioning , front automatic climate control | — | — | S | S |
| | | Armrest , rear, includes dual cupholders and storage | S | S | S | S |
| | | Assist handles , rear outboard passenger | S | S | S | S |
| | | Cargo panel , rear, multi-functional with 4 positions, including one that forms a table | S | S | S | S |
| | | Console , floor, includes floor shifter, integral armrest and storage compartment | S | S | S | S |
| | | Cruise control , electronic with set and resume speed | S | S | S | S |
| | | Cupholders , dual front and rear | S | S | S | S |
| | | Defogger , rear-window, electric | S | S | S | S |
| | | Door locks , power programmable, includes lockout protection and delayed locking | S | S | S | S |
| | | Driver Information Center , driver customization, warning messages and vehicle information | S | S | S | S |
| B37 | | Floormats , carpeted, front and rear | A | ■ | S | S |
| | | Instrumentation , analog, includes speedometer, temperature, fuel, tachometer and PRNDL | S | S | S | S |
| | | Keyless entry , remote | S | S | S | S |
| | | LATCH system , (Lower Anchors and Top tethers for CHildren), for child safety seats | S | S | S | S |
| | | Lift-Gate release , power, interior | S | S | S | S |
| | | Lighting , reading lights, front and rear | S | S | S | S |
| | | Map pockets , seatback, driver and front passenger | S | S | S | S |
| | | Mirror , inside rearview, manual day/night | S | S | S | — |

| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
|--------------------|--------------------|--|----------|-----|----------|-----|
| | | | 1SA | 1SB | 1SA | 1SB |
| | | Pedals , power adjustable, gas and brake | S | S | S | S |
| | | Power outlet , auxiliary, 1 front, 1 inside center console and 1 rear cargo area | S | S | S | S |
| AP3 | | Remote vehicle starter system | A | ■ | S | S |
| | | Safety belts , 3-point, all seating positions, includes front seat pretensioners | S | S | S | S |
| | | Seats , front Custom Cloth bucket, includes reclining seatback and adjustable head restraints | S | S | -- | -- |
| | | Seats , front UltraLux and Leather-appointed bucket, includes reclining seatback and adjustable head restraints | -- | -- | S | S |
| | | Seats , rear Multi-Flex 60/40 forward and rearward sliding, independently reclines and folds down | S | S | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | S | S |
| | | Seat , front passenger, flat-folding | S | S | S | S |
| | | Seat adjuster , power, vertical height, driver only | S | -- | -- | -- |
| | AG1 | Seat adjuster , power, driver 6-way | -- | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | S | S | S | S |
| | | Seat cushion storage pocket , driver | S | S | -- | -- |
| | | Seat cushion storage pockets , driver, front passenger and rear outboard seating positions | -- | -- | S | S |
| | UN0 | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | S | S | S | S |
| | UK6 | Sound system feature , rear audio controls, includes 2 headphone jacks and 2-sets of wireless headphones | -- | ■ | S | S |
| | | Skylight , fixed rear, above rear seat passengers, includes retractable shade | S | S | S | S |
| | | Steering column , tilt/telescoping | S | S | S | S |
| | N46 | Steering wheel , 4-spoke | S | S | -- | -- |
| | NR0 | Steering wheel , 4-spoke, leather-wrapped with mounted audio and cruise controls, includes leather-wrapped shift knob | -- | -- | S | S |
| | | Theft-deterrent system , PASS-Key III Plus | S | S | S | S |
| | | Visors , illuminated vanity mirror, driver only, non-illuminated passenger, covered | S | S | -- | -- |
| | | Visors , illuminated vanity mirrors, driver and front passenger, covered | -- | -- | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SA | 1SB |
| | | Windows , power, includes driver express-down and passenger lockout | S | S | S | S |
| | | Daytime running lamps | S | S | S | S |
| | | Door handles , body-color | S | S | S | S |
| | | Fascias , front and rear, body-color | S | S | S | S |
| | | Fog lamps , front, integral in front fascia | -- | -- | S | S |
| | | Glass , Solar-Ray light tinted | S | S | S | S |
| | | Headlamps , halogen, composite, includes crystalline-like lenses and automatic exterior lamp control | S | S | S | S |
| | D49 | Mirrors , outside rearview, power, Black | S | S | -- | -- |
| | DL8 | Mirrors , outside rearview, folding, power, heated, Black | -- | -- | S | S |
| | B86 | Moldings , bodyside, body-color | S | S | S | S |
| | | Moldings , rocker, Black | S | S | -- | -- |
| | | Moldings , rocker, body-color | -- | -- | S | S |
| T43 | | Spoiler , rear, includes rear wiper | A | A | S | S |
| | QPE | Tires , P215/60R16, touring, blackwall | S | S | S | S |
| | PY0 | Wheels , 16" (40.6 cm) aluminum | S | S | -- | -- |
| | QD1 | Wheels , 16" (40.6 cm) aluminum, machined-face | -- | -- | S | S |
| | | Wipers , variable intermittent, speed-sensitive, front | S | S | S | S |
| | | Battery , maintenance free, includes rundown protection | S | S | S | S |
| | JL9 | Brakes , 4-wheel antilock, 4-wheel disc, includes Traction Control | S | S | S | S |
| | LX9 | Engine , 3500 V6 SFI (200 HP [149.1 kW] @ 5400 rpm, 220 lb.-ft. [297 N-m] @ 3200 rpm) | S | S | S | S |
| | | Steering , electric power (EPS) | S | S | S | S |
| | | Suspension , 4-wheel independent | S | S | S | S |
| | NW7 | Traction Control , all-speed | S | S | S | S |
| | MX0 | Transmission , 4-speed automatic, electronically controlled with overdrive, includes electronic range selector | 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.

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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | AP9 | Cargo convenience nets , trunk | – | ■ | ■ | S | S | S | S |
| K34 | | Cruise control , electronic with set and resume speed 1 - Includes (AU0) Keyless entry, remote. | A ¹ | ■ | ■ | S | S | S | S |
| B37 | | Floormats , carpeted, front and rear | A | ■ | ■ | A | ■ | S | S |
| | UG1 | Homelink transmitter , includes garage door opener, 3-channel programmable | – | – | – | – | – | – | ■ |
| | AU0 | Keyless entry , remote 1 - Included and only available with (K34) Cruise control. | A ¹ | ■ | ■ | S | S | S | S |
| | E91 | Map pocket , seatback, driver and front passenger | – | ■ | ■ | S | S | S | S |
| | DD8 | Mirror , inside rearview, auto dimming | – | – | – | – | – | – | ■ |
| | JF4 | Pedals , power, adjustable, gas and brake | – | ■ | ■ | S | S | S | S |
| AP3 | | Remote vehicle starter system 1 - Requires (K34) Cruise control and includes the functionality of (AU0) Keyless entry, remote. | A ¹ | A | A | A | ■ | S | S |
| | AG1 | Seat adjuster , power, driver 6-way | – | – | – | – | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | – | ■ | ■ | S | S | S | S |
| UN0 | | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | ■ | ■ | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| 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 - Not available with (U1C) Sound system, ETR AM/FM stereo with CD player. Subscription fees apply. Available only in the 48 contiguous U.S. states. 2 - Subscription fees apply. Available only in the 48 contiguous U.S. states. | A ¹ | A ² | A ² | A ² | A ² | A ² | ■ ² |
| CF5 | | Sunroof, power, tilt-sliding | — | — | — | — | A | A | ■ |
| | B86 | Moldings, bodyside, body-color | — | — | ■ | S | S | S | S |
| | PF3 | Wheels, 15" (38.1 cm) aluminum | — | — | ■ | 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.

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 | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| B37 | | Floormats , carpeted, front and rear | A | ■ | S | S |
| | UG1 | Homelink transmitter , includes garage door opener, 3-channel programmable | -- | -- | -- | ■ |
| | DD8 | Mirror , inside rearview, auto dimming | -- | -- | -- | ■ |
| AP3 | | Remote vehicle starter system | A | ■ | S | S |
| | AG1 | Seat adjuster , power, driver 6-way | -- | ■ | S | S |
| | UK6 | Sound system feature , rear audio controls, includes 2 headphone jacks and 2-sets of wireless headphones | -- | ■ | S | S |
| 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. states. | A ¹ | A ¹ | A ¹ | ■ ¹ |
| CF5 | | Sunroof , power, tilt-sliding | -- | 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.

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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | AP9 | Cargo convenience nets , trunk | -- | ■ | ■ | S | S | S | S |
| K34 | | Cruise control , electronic with set and resume speed 1 - Includes (AU0) Keyless entry, remote. | A ¹ | ■ | ■ | S | S | S | S |
| B37 | | Floormats , carpeted, front and rear | A | ■ | ■ | A | ■ | S | S |
| | UG1 | Homelink transmitter , includes garage door opener, 3-channel programmable | -- | -- | -- | -- | -- | -- | ■ |
| | AU0 | Keyless entry , remote 1 - Included and only available with (K34) Cruise control. | A ¹ | ■ | ■ | S | S | S | S |
| | E91 | Map pocket , seatback, driver and front passenger | -- | ■ | ■ | S | S | S | S |
| | DD8 | Mirror , inside rearview, auto dimming | -- | -- | -- | -- | -- | -- | ■ |
| | JF4 | Pedals , power, adjustable, gas and brake | -- | ■ | ■ | S | S | S | S |
| AP3 | | Remote vehicle starter system 1 - Requires (K34) Cruise control and includes the functionality of (AU0) Keyless entry, remote. | A ¹ | A | A | A | ■ | S | S |
| | AG1 | Seat adjuster , power, driver 6-way | -- | -- | -- | -- | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | -- | ■ | ■ | S | S | S | S |
| UN0 | | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | ■ | ■ | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| 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 - Not available with (U1C) Sound system, ETR AM/FM stereo with CD player. Subscription fees apply. Available only in the 48 contiguous U.S. states. 2 - Subscription fees apply. Available only in the 48 contiguous U.S. states. | A ¹ | A ² | A ² | A ² | A ² | A ² | ■ ² |
| CF5 | | Sunroof, power, tilt-sliding | — | — | — | — | A | A | ■ |
| | B86 | Moldings, bodyside, body-color | — | — | ■ | S | S | S | S |
| | PF3 | Wheels, 15" (38.1 cm) aluminum | — | — | ■ | S | S | — | — |
| ADDITIONAL OPTIONS | | | | | | | | | |
| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags, side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| K34 | | Cruise control, electronic with set and resume speed 1 - Includes (AU0) Keyless entry, remote. | A ¹ | ■ | ■ | S | S | S | S |
| B37 | | Floormats, carpeted, front and rear | A | ■ | ■ | A | ■ | S | S |

| ADDITIONAL OPTIONS | | | | | | | | | |
|--------------------|--------------------|---|----------------|-----|-----|----------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| UE1 | | OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, and/or advanced automatic crash notification, emergency services, roadside assistance, stolen vehicle tracking, AccidentAssist, remote door unlock, GM Goodwrench 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 1 - Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands. | -- | -- | -- | -- | A ¹ | A ¹ | A ¹ |
| AP3 | | Remote vehicle starter system 1 - Requires (K34) Cruise control and includes the functionality of (AU0) Keyless entry, remote. | A ¹ | A | A | A | ■ | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | A | -- | A | S | S |
| UN0 | | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | ■ | ■ | S | S | S | S |
| UC6 | | Sound system , ETR AM/FM stereo with 6-disc CD changer, in-dash, includes Radio Data System, seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | -- | A | A | A | A | A | A |

| ADDITIONAL OPTIONS | | | | | | | | | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| 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 - Not available with (U1C) Sound system, ETR AM/FM stereo with CD player. Subscription fees apply. Available only in the 48 contiguous U.S. states. 2 - Subscription fees apply. Available only in the 48 contiguous U.S. states. | A ¹ | A ² | A ² | A ² | A ² | A ² | ■ ² |
| CF5 | | Sunroof, power, tilt-sliding | — | — | — | — | A | A | ■ |
| VK3 | | License plate bracket, front 1 - Will be forced on orders with ship-to states that require a front license plate. | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ |
| B2N | | NEW! LS Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R16, touring, blackwall, (T43) Spoiler, rear and (VH4) Mud guards, front | — | — | — | A | A | — | — |
| B2N | | NEW! LT Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R15, touring, blackwall and (VH4) Mud guards, front | — | — | — | — | — | A | A |
| T43 | | Spoiler, rear | — | — | A | A | A | S | S |
| PY1 | | Wheels, 16" (40.6 cm) aluminum, chrome 1 - Included and only available with (B2N) LS or LT Sport Appearance Package. 2 - Available separately or included with (B2N) LS or LT Sport Appearance Package. | — | — | — | A ¹ | A ² | A ¹ | A ² |
| JM4 | | Brakes, 4-wheel antilock, front disc/rear drum, includes Traction Control | A | A | A | — | — | — | — |
| FE9 | | Emissions, Federal requirements | A | A | A | A | A | A | A |
| NE1 | | Emissions, Maine, Massachusetts, New York or Vermont state requirements | A | A | A | A | A | A | A |
| YF5 | | Emissions, California state requirements | A | A | A | A | A | A | A |

| ADDITIONAL OPTIONS | | | | | | | | | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| VCL | | Emissions Certification, CFF (Clean Fuel Fleet) LEV (Low Emission Vehicle). Option (VCL) should ONLY be ordered to receive the CFF LEV certification. If (VCL) is not ordered, the vehicle will be produced with your normally selected emission system and may not be CFF LEV certified. Products ordered with the (VCL) option may not be certified to California emission requirements. Therefore, they may not be legal for registration in California, New York, Maine, Massachusetts and Vermont. Option (YF5) should be ordered for all vehicles ordered in California. Option (NE1) should be ordered for all vehicles ordered in Maine or Vermont. 1 - Requires (NB8) Emissions override, California, Massachusetts, New York or Vermont, for vehicles ordered in California, Massachusetts, New York or Vermont. Not available in Maine. Available with (LX9) Engine, 3500 V6 SFI. | — | — | — | A ¹ | A ¹ | A ¹ | A ¹ |
| 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 | 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) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements. | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ |
| K05 | | Engine block heater | A | A | A | A | A | A | A |

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

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

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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 | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags, side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| B37 | | Floormats, carpeted, front and rear | A | ■ | S | S |
| | UG1 | Homelink transmitter, includes garage door opener, 3-channel programmable | -- | -- | -- | ■ |
| | DD8 | Mirror, inside rearview, auto dimming | -- | -- | -- | ■ |
| AP3 | | Remote vehicle starter system | A | ■ | S | S |
| | AG1 | Seat adjuster, power, driver 6-way | -- | ■ | S | S |
| | UK6 | Sound system feature, rear audio controls, includes 2 headphone jacks and 2-sets of wireless headphones | -- | ■ | S | S |
| 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. states. | A ¹ | A ¹ | A ¹ | ■ ¹ |
| CF5 | | Sunroof, power, tilt-sliding | -- | A | A | ■ |
| ADDITIONAL OPTIONS | | | | | | |
| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
| | | | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags, side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |

| ADDITIONAL OPTIONS | | | | | | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
| | | | 1SA | 1SB | 1SA | 1SB |
| U32 | | Entertainment system , includes rear seat DVD/CD player and monitor, remote control and 2-sets of wireless headphones 1 - Includes the functionality of (UK6) Rear audio controls when (U32) Entertainment system is ordered. | -- | A ¹ | A ¹ | A ¹ |
| B37 | | Floormats , carpeted, front and rear | A | ■ | S | S |
| UE1 | | OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, and/or advanced automatic crash notification, emergency services, roadside assistance, stolen vehicle tracking, AccidentAssist, remote door unlock, GM Goodwrench 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 1 - Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands. | -- | A ¹ | A ¹ | A ¹ |
| AP3 | | Remote vehicle starter system | A | ■ | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | S | S |
| UC6 | | Sound system , ETR AM/FM stereo with 6-disc CD changer, in-dash, includes Radio Data System, seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | A | A | A |
| U2K | | Sound system feature , XM Satellite Radio. 100% commercial-free music. Over 120 channels. In-depth local traffic and weather in major metro markets. Digital quality sound with coast-to-coast signal coverage. 3-month trial - no charge and no obligation. 1 - Subscription fees apply. Available only in the 48 contiguous U.S. states. | A ¹ | A ¹ | A ¹ | ■ ¹ |
| CF5 | | Sunroof , power, tilt-sliding | -- | A | A | ■ |
| VK3 | | License plate bracket , front 1 - Will be forced on orders with ship-to states that require a front license plate. | A ¹ | A ¹ | A ¹ | A ¹ |
| B2N | | NEW! LS Sport Appearance Package , includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R16, touring, blackwall, (T43) Spoiler, rear and (VH4) Mud guards, front | A | A | -- | -- |

| ADDITIONAL OPTIONS | | | | | | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
| | | | 1SA | 1SB | 1SA | 1SB |
| B2N | | NEW! LT Sport Appearance Package , includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R15, touring, blackwall and (VH4) Mud guards, front | -- | -- | A | A |
| T43 | | Spoiler , rear, includes rear wiper | A | A | S | S |
| PY1 | | Wheels , 16" (40.6 cm) aluminum, chrome 1 - Included and only available with (B2N) LS or LT Sport Appearance Package. 2 - Available separately or included with (B2N) LS or LT Sport Appearance Package. | A ¹ | A ² | A ¹ | A ² |
| FE9 | | Emissions , Federal requirements | A | A | A | A |
| NE1 | | Emissions , Maine, Massachusetts, New York or Vermont state requirements | A | A | A | A |
| YF5 | | Emissions , California state requirements | A | A | A | A |
| VCL | | Emissions Certification , CFF (Clean Fuel Fleet) LEV (Low Emission Vehicle). Option (VCL) should ONLY be ordered to receive the CFF LEV certification. If (VCL) is not ordered, the vehicle will be produced with your normally selected emission system and may not be CFF LEV certified. Products ordered with the (VCL) option may not be certified to California emission requirements. Therefore, they may not be legal for registration in California, New York, Maine, Massachusetts and Vermont. Option (YF5) should be ordered for all vehicles ordered in California. Option (NE1) should be ordered for all vehicles ordered in Maine or Vermont. 1 - Requires (NB8) Emissions override, California, Massachusetts, New York or Vermont, for vehicles ordered in California, Massachusetts, New York or Vermont. Not available in Maine. Available with (LX9) Engine, 3500 V6 SFI. | A ¹ | A ¹ | A ¹ | A ¹ |
| 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 |
| NC7 | | Emissions override , Federal (for vehicles ordered by dealers in Federal emission states with California, New York, Vermont, Massachusetts or Maine emissions; may also be used by dealers in states of California, New York, Vermont, Massachusetts or Maine to order different state-specific emissions) 1 - Requires (YF5) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements. | A ¹ | A ¹ | A ¹ | A ¹ |
| K05 | | Engine block heater | A | A | 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.

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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|---|---------------|-----|-----|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| B37 | | Floor mats, carpeted, front and rear | | ■ | ■ | | ■ | | |
| | AP9 | Cargo convenience nets | | ■ | ■ | | | | |
| K34 | | Cruise control | | ■ | ■ | | | | |
| | AU0 | Keyless entry, remote | | ■ | ■ | | | | |
| | E91 | Map pocket, seatback, | | ■ | ■ | | | | |
| | JF4 | Pedals, power, adjustable | | ■ | ■ | | | | |
| | | Seat adjuster, manual lumbar, driver | | ■ | ■ | | | | |
| UN0 | | Sound system, ETR AM/FM stereo with CD player | | ■ | ■ | | | | |
| | B86 | Moldings, bodyside, body-color | | | ■ | | | | |
| | PF3 | Wheels, 15" (38.1 cm) aluminum | | | ■ | | | | |
| AY0 | | NEW! Air bags, side impact | | | | | ■ | | |
| AP3 | | Remote vehicle starter system | | | | | ■ | | |
| | AG1 | Seat adjuster, power, driver 6-way | | | | | ■ | | |
| | UG1 | Homelink transmitter, | | | | | | | ■ |
| | DD8 | Mirror, inside rearview | | | | | | | ■ |
| U2K | | Sound system feature, XM Satellite Radio | | | | | | | ■ |
| CF5 | | Sunroof, power | | | | | | | ■ |

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.

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 | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SA | 1SB |
| AY0 | | NEW! Air bags, side impact | | ■ | | |
| B37 | | Floormats, carpeted, front and rear | | ■ | | |
| AP3 | | Remote vehicle starter system | | ■ | | |
| | AG1 | Seat adjuster, power, driver 6-way | | ■ | | |
| | UK6 | Sound system feature, rear audio controls | | ■ | | |
| | UG1 | Homelink transmitter, | | | | ■ |
| | DD8 | Mirror, inside rearview | | | | ■ |
| U2K | | Sound system feature, XM Satellite Radio | | | | ■ |
| CF5 | | Sunroof, power | | | | ■ |

| S = Standard Equipment A = Available – (dashes) = Not Available ■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable | | | | | | | | | |
|---|-----------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | AK5 | Air bags , dual-stage, frontal, 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 | S ¹ | S ¹ |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | C60 | Air conditioning , front manual | S | S | S | S | S | – | – |
| | C68 | Air conditioning , front automatic climate control | – | – | – | – | – | S | S |
| | | Assist handles , rear outboard passenger | S | S | S | S | S | S | S |
| | AP9 | Cargo convenience nets , trunk | – | ■ | ■ | S | S | S | S |
| | | Console , floor, includes floor shifter, integral armrest and storage compartment | S | S | S | S | S | S | S |
| K34 | | Cruise control , electronic with set and resume speed 1 - Includes (AU0) Keyless entry, remote. | A ¹ | ■ | ■ | S | S | S | S |
| | | Cupholders , dual front and rear | S | S | S | S | S | S | S |
| | | Defogger , rear-window, electric | S | S | S | S | S | S | S |
| | | Door locks , power programmable, includes lockout protection and delayed locking | S | S | S | S | S | S | S |
| | | Driver Information Center , driver customization, warning messages and vehicle information | S | S | S | S | S | S | S |
| B37 | | Floormats , carpeted, front and rear | A | ■ | ■ | A | ■ | S | S |
| | UG1 | Homelink transmitter , includes garage door opener, 3-channel programmable | – | – | – | – | – | – | ■ |
| | | Instrumentation , analog, includes speedometer, temperature, fuel, tachometer and PRNDL | S | S | S | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | AU0 | Keyless entry, remote 1 - Included and only available with (K34) Cruise control. | A ¹ | ■ | ■ | S | S | S | S |
| | | LATCH system , (Lower Anchors and Top tethers for CHildren), for child safety seats | S | S | S | S | S | S | S |
| | | Lighting , reading lights, front | -- | -- | -- | S | S | -- | -- |
| | | Lighting , reading lights, front and rear | -- | -- | -- | -- | -- | S | S |
| | E91 | Map pocket , seatback, driver and front passenger | -- | ■ | ■ | S | S | S | S |
| | | Mirror , inside rearview, manual day/night | S | S | S | S | S | S | -- |
| | DD8 | Mirror , inside rearview, auto dimming | -- | -- | -- | -- | -- | -- | ■ |
| UE1 | | OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, and/or advanced automatic crash notification, emergency services, roadside assistance, stolen vehicle tracking, AccidentAssist, remote door unlock, GM Goodwrench 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 1 - Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands. | -- | -- | -- | -- | A ¹ | A ¹ | A ¹ |
| | JF4 | Pedals , power, adjustable, gas and brake | -- | ■ | ■ | S | S | S | S |
| | | Power outlet , auxiliary, 2 1 - 2 outlets in front without (NW7) Traction Control. 2 - 1 outlet in front and 1 in center console. | S ¹ | S ¹ | S ¹ | S ² | S ² | S ² | S ² |
| AP3 | | Remote vehicle starter system 1 - Requires (K34) Cruise control and includes the functionality of (AU0) Keyless entry, remote. | A ¹ | A | A | A | ■ | S | S |
| | | Safety belts , 3-point, all seating positions, includes front seat pretensioners | S | S | S | S | S | S | S |
| | | Seats , front Cloth bucket, includes reclining seatback and adjustable head restraints | S | S | S | -- | -- | -- | -- |
| | | Seats , front Custom Cloth bucket, includes reclining seatback and adjustable head restraints | -- | -- | -- | S | S | -- | -- |
| | | Seats , front UltraLux and Leather-appointed bucket, includes reclining seatback and adjustable head restraints | -- | -- | -- | -- | -- | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | AM9 | Seat , rear 60/40 split-folding seatback | S | S | S | S | S | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | A | -- | A | S | S |
| | | Seat , front passenger, flat-folding | S | S | S | S | S | S | S |
| | | Seat adjuster , power, vertical height, driver only | S | S | S | S | S | -- | -- |
| | AG1 | Seat adjuster , power, driver 6-way | -- | -- | -- | -- | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | -- | ■ | ■ | S | S | S | S |
| | | Seat cushion storage pocket , driver | -- | -- | -- | S | S | -- | -- |
| | | Seat cushion storage pockets , driver, front passenger and rear outboard seating positions | -- | -- | -- | -- | -- | S | S |
| | U1C | Sound system , ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 4-speakers | S | -- | -- | -- | -- | -- | -- |
| UN0 | | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | ■ | ■ | S | S | S | S |
| UC6 | | Sound system , ETR AM/FM stereo with 6-disc CD changer, in-dash, includes Radio Data System, seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | -- | A | A | A | A | A | A |
| U2K | | Sound system feature , XM Satellite Radio. 100% commercial-free music. Over 120 channels. In-depth local traffic and weather in major metro markets. Digital quality sound with coast-to-coast signal coverage. 3-month trial - no charge and no obligation. 1 - Not available with (U1C) Sound system, ETR AM/FM stereo with CD player. Subscription fees apply. Available only in the 48 contiguous U.S. states. 2 - Subscription fees apply. Available only in the 48 contiguous U.S. states. | A ¹ | A ² | A ² | A ² | A ² | A ² | ■ ² |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|--|---------------|-----|-----|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | | Steering column , tilt/telescoping | S | S | S | S | S | S | S |
| | N46 | Steering wheel , 4-spoke | S | S | S | S | S | -- | -- |
| | NR0 | Steering wheel , 4-spoke, leather-wrapped with mounted audio and cruise controls, includes leather-wrapped shift knob | -- | -- | -- | -- | -- | S | S |
| CF5 | | Sunroof , power, tilt-sliding | -- | -- | -- | -- | A | A | ■ |
| | | Theft-deterrent system , PASS-Key III Plus | S | S | S | S | S | S | S |
| | | Trunk release , power, interior | S | S | S | S | S | S | S |
| | | Visors , vanity mirrors, driver and front passenger, covered | S | S | S | -- | -- | -- | -- |
| | | Visors , illuminated vanity mirror, driver only, non-illuminated passenger, covered | -- | -- | -- | S | S | -- | -- |
| | | Visors , illuminated vanity mirrors, driver and front passenger, covered | -- | -- | -- | -- | -- | S | S |
| | | Windows , power, includes driver express-down and passenger lockout | S | S | S | S | S | S | S |

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

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

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 | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| | AK5 | Air bags , dual-stage, frontal, 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 |
| AY0 | | NEW! Air bags , side impact, seat-mounted, driver and right front passenger. Air bags, head curtain side, front and rear outboard seating positions 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 | ■ ¹ | S ¹ | S ¹ |
| | C60 | Air conditioning , front manual | S | S | -- | -- |
| | C68 | Air conditioning , front automatic climate control | -- | -- | S | S |
| | | Armrest , rear, includes dual cupholders and storage | S | S | S | S |
| | | Assist handles , rear outboard passenger | S | S | S | S |
| | | Cargo panel , rear, multi-functional with 4 positions, including one that forms a table | S | S | S | S |
| | | Console , floor, includes floor shifter, integral armrest and storage compartment | S | S | S | S |
| | | Cruise control , electronic with set and resume speed | S | S | S | S |
| | | Cupholders , dual front and rear | S | S | S | S |
| | | Defogger , rear-window, electric | S | S | S | S |
| | | Door locks , power programmable, includes lockout protection and delayed locking | S | S | S | S |
| | | Driver Information Center , driver customization, warning messages and vehicle information | S | S | S | S |
| U32 | | Entertainment system , includes rear seat DVD/CD player and monitor, remote control and 2-sets of wireless headphones 1 - Includes the functionality of (UK6) Rear audio controls when (U32) Entertainment system is ordered. | -- | A ¹ | A ¹ | A ¹ |
| B37 | | Floormats , carpeted, front and rear | A | ■ | S | S |
| | UG1 | Homelink transmitter , includes garage door opener, 3-channel programmable | -- | -- | -- | ■ |
| | | Instrumentation , analog, includes speedometer, temperature, fuel, tachometer and PRNDL | S | S | S | S |
| | | Keyless entry , remote | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
|--------------------|--------------------|---|-------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| | | LATCH system , (Lower Anchors and Top tethers for CHildren), for child safety seats | S | S | S | S |
| | | Lift-Gate release , power, interior | S | S | S | S |
| | | Lighting , reading lights, front and rear | S | S | S | S |
| | | Map pockets , seatback, driver and front passenger | S | S | S | S |
| | | Mirror , inside rearview, manual day/night | S | S | S | -- |
| | DD8 | Mirror , inside rearview, auto dimming | -- | -- | -- | ■ |
| UE1 | | OnStar , 1-year Safe and Sound Service, includes automatic notification of air bag deployment, and/or advanced automatic crash notification, emergency services, roadside assistance, stolen vehicle tracking, AccidentAssist, remote door unlock, GM Goodwrench 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 1 - Visit www.onstar.com for system information and details. Not available with a ship-to of Puerto Rico or the Virgin Islands. | -- | A ¹ | A ¹ | A ¹ |
| | | Pedals , power adjustable, gas and brake | S | S | S | S |
| | | Power outlet , auxiliary, 1 front, 1 inside center console and 1 rear cargo area | S | S | S | S |
| AP3 | | Remote vehicle starter system | A | ■ | S | S |
| | | Safety belts , 3-point, all seating positions, includes front seat pretensioners | S | S | S | S |
| | | Seats , front Custom Cloth bucket, includes reclining seatback and adjustable head restraints | S | S | -- | -- |
| | | Seats , front UltraLux and Leather-appointed bucket, includes reclining seatback and adjustable head restraints | -- | -- | S | S |
| | | Seats , rear Multi-Flex 60/40 forward and rearward sliding, independently reclines and folds down | S | S | S | S |
| KA1 | | Seats , heated, driver and front passenger | -- | A | S | S |
| | | Seat , front passenger, flat-folding | S | S | S | S |
| | | Seat adjuster , power, vertical height, driver only | S | -- | -- | -- |
| | AG1 | Seat adjuster , power, driver 6-way | -- | ■ | S | S |
| | | Seat adjuster , manual lumbar, driver | S | S | S | S |
| | | Seat cushion storage pocket , driver | S | S | -- | -- |
| | | Seat cushion storage pockets , driver, front passenger and rear outboard seating positions | -- | -- | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|--|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| | UN0 | Sound system , ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | S | S | S | S |
| UC6 | | Sound system , ETR AM/FM stereo with 6-disc CD changer, in-dash, includes Radio Data System, seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers | A | A | A | A |
| | UK6 | Sound system feature , rear audio controls, includes 2 headphone jacks and 2-sets of wireless headphones | -- | ■ | S | S |
| 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. states. | A ¹ | A ¹ | A ¹ | ■ ¹ |
| | | Skylight , fixed rear, above rear seat passengers, includes retractable shade | S | S | S | S |
| | | Steering column , tilt/telescoping | S | S | S | S |
| | N46 | Steering wheel , 4-spoke | S | S | -- | -- |
| | NR0 | Steering wheel , 4-spoke, leather-wrapped with mounted audio and cruise controls, includes leather-wrapped shift knob | -- | -- | S | S |
| CF5 | | Sunroof , power, tilt-sliding | -- | A | A | ■ |
| | | Theft-deterrent system , PASS-Key III Plus | S | S | S | S |
| | | Visors , illuminated vanity mirror, driver only, non-illuminated passenger, covered | S | S | -- | -- |
| | | Visors , illuminated vanity mirrors, driver and front passenger, covered | -- | -- | S | S |
| | | Windows , power, includes driver express-down and passenger lockout | S | S | S | S |

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|--|-----------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | | Daytime running lamps | S | S | S | S | S | S | S |
| | | Door handles, body-color | S | S | S | S | S | S | S |
| | | Fascias, front and rear, body-color | S | S | S | S | S | S | S |
| | | Fog lamps, front, integral in front fascia | -- | -- | -- | -- | -- | S | S |
| | | Glass, Solar-Ray light tinted | S | S | S | S | S | S | S |
| | | Headlamps, halogen, composite, includes crystalline-like lenses and automatic exterior lamp control | S | S | S | S | S | S | S |
| VK3 | | License plate bracket, front 1 - Will be forced on orders with ship-to states that require a front license plate. | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ |
| B2N | | NEW! LS Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R16, touring, blackwall, (T43) Spoiler, rear and (VH4) Mud guards, front | -- | -- | -- | A | A | -- | -- |
| B2N | | NEW! LT Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R15, touring, blackwall and (VH4) Mud guards, front | -- | -- | -- | -- | -- | A | A |
| | D49 | Mirrors, outside rearview, power, Black | S | S | S | S | S | -- | -- |
| | DL8 | Mirrors, outside rearview, folding, power, heated, Black | -- | -- | -- | -- | -- | S | S |
| | | Moldings, bodyside, Black | S | S | -- | -- | -- | -- | -- |
| | B86 | Moldings, bodyside, body-color | -- | -- | ■ | S | S | S | S |
| | | Moldings, rocker, Black | S | S | S | S | S | -- | -- |
| | | Moldings, rocker, body-color | -- | -- | -- | -- | -- | S | S |
| T43 | | Spoiler, rear | -- | -- | A | A | A | S | S |
| | QMR | Tires, P205/65R15, touring, blackwall | S | S | S | S | S | -- | -- |
| | QPE | Tires, P215/60R16, touring, blackwall 1 - Included and only available with (B2N) LS Sport Appearance Package. 2 - Included and only available with (PY1) Wheels, 16" aluminum, chrome or (B2N) LS Sport Appearance Package. | -- | -- | -- | A ¹ | A ² | S | S |
| | PA7 | Wheels, 15" (38.1 cm) steel, includes bolt-on wheel cover | S | S | -- | -- | -- | -- | -- |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|--|---------------|-----|-----|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | PF3 | Wheels, 15" (38.1 cm) aluminum | — | — | ■ | S | S | — | — |
| | QD1 | Wheels, 16" (40.6 cm) aluminum, machined-face | — | — | — | — | — | S | S |
| PY1 | | Wheels, 16" (40.6 cm) aluminum, chrome 1 - Included and only available with (B2N) LS or LT Sport Appearance Package. 2 - Available separately or included with (B2N) LS or LT Sport Appearance Package. | — | — | — | A ¹ | A ² | A ¹ | A ² |
| | | Wipers, variable intermittent, speed-sensitive, front | S | S | S | S | S | S | S |

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|---|-----------------------------|---|----------------|----------------|----------------|----------------|
| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
| | | | 1SA | 1SB | 1SA | 1SB |
| | | Daytime running lamps | S | S | S | S |
| | | Door handles, body-color | S | S | S | S |
| | | Fascias, front and rear, body-color | S | S | S | S |
| | | Fog lamps, front, integral in front fascia | -- | -- | S | S |
| | | Glass, Solar-Ray light tinted | S | S | S | S |
| | | Headlamps, halogen, composite, includes crystalline-like lenses and automatic exterior lamp control | S | S | S | S |
| VK3 | | License plate bracket, front 1 - Will be forced on orders with ship-to states that require a front license plate. | A ¹ | A ¹ | A ¹ | A ¹ |
| B2N | | NEW! LS Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R16, touring, blackwall, (T43) Spoiler, rear and (VH4) Mud guards, front | A | A | -- | -- |
| B2N | | NEW! LT Sport Appearance Package, includes (PY1) Wheels, 16" (40.6 cm) aluminum, chrome, (QPE) Tires, P215/60R15, touring, blackwall and (VH4) Mud guards, front | -- | -- | A | A |
| | D49 | Mirrors, outside rearview, power, Black | S | S | -- | -- |
| | DL8 | Mirrors, outside rearview, folding, power, heated, Black | -- | -- | S | S |
| | B86 | Moldings, bodyside, body-color | S | S | S | S |
| | | Moldings, rocker, Black | S | S | -- | -- |
| | | Moldings, rocker, body-color | -- | -- | S | S |
| T43 | | Spoiler, rear, includes rear wiper | A | A | S | S |
| | QPE | Tires, P215/60R16, touring, blackwall | S | S | S | S |
| | PY0 | Wheels, 16" (40.6 cm) aluminum | S | S | -- | -- |
| | QD1 | Wheels, 16" (40.6 cm) aluminum, machined-face | -- | -- | S | S |
| PY1 | | Wheels, 16" (40.6 cm) aluminum, chrome 1 - Included and only available with (B2N) LS or LT Sport Appearance Package. 2 - Available separately or included with (B2N) LS or LT Sport Appearance Package. | A ¹ | A ² | A ¹ | A ² |
| | | Wipers, variable intermittent, speed-sensitive, front | S | S | S | S |

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

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

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 | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|-----------------------------|-----------------------------|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| | | Battery , maintenance free, includes rundown protection | S | S | S | S | S | S | S |
| | J41 | Brakes , front disc/rear drum | S | S | S | -- | -- | -- | -- |
| JM4 | | Brakes , 4-wheel antilock, front disc/rear drum, includes Traction Control | A | A | A | -- | -- | -- | -- |
| | J67 | Brakes , 4-wheel antilock, 4-wheel disc, includes Traction Control | -- | -- | -- | S | S | S | S |
| FE9 | | Emissions , Federal requirements | A | A | A | A | A | A | A |
| NE1 | | Emissions , Maine, Massachusetts, New York or Vermont state requirements | A | A | A | A | A | A | A |
| YF5 | | Emissions , California state requirements | A | A | A | A | A | A | A |
| VCL | | Emissions Certification , CFF (Clean Fuel Fleet) LEV (Low Emission Vehicle). Option (VCL) should ONLY be ordered to receive the CFF LEV certification. If (VCL) is not ordered, the vehicle will be produced with your normally selected emission system and may not be CFF LEV certified. Products ordered with the (VCL) option may not be certified to California emission requirements. Therefore, they may not be legal for registration in California, New York, Maine, Massachusetts and Vermont. Option (YF5) should be ordered for all vehicles ordered in California. Option (NE1) should be ordered for all vehicles ordered in Maine or Vermont. 1 - Requires (NB8) Emissions override, California, Massachusetts, New York or Vermont, for vehicles ordered in California, Massachusetts, New York or Vermont. Not available in Maine. Available with (LX9) Engine, 3500 V6 SFI. | -- | -- | -- | A ¹ | A ¹ | A ¹ | A ¹ |
| 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 | A ¹ | A ¹ |

| Free Flow RPO Code | Ref. Only RPO Code | Description | Base 1ZS69 | | | LS 1ZT69 | | LT 1ZU69 | |
|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SC | 1SA | 1SB | 1SA | 1SB |
| NC7 | | Emissions override , Federal (for vehicles ordered by dealers in Federal emission states with California, New York, Vermont, Massachusetts or Maine emissions; may also be used by dealers in states of California, New York, Vermont, Massachusetts or Maine to order different state-specific emissions) 1 - Requires (YF5) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements. | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ | A ¹ |
| | L61 | Engine , ECOTEC 2.2L DOHC, 16-valve, 4-cylinder, MFI (145 HP [108.1 kW] @ 5600 rpm, 155 lb.-ft. [209.2 N-m] @ 4000 rpm) | S | S | S | — | — | — | — |
| | LX9 | Engine , 3500 V6 SFI (200 HP [149.1 kW] @ 5400 rpm, 220 lb.-ft. [297 N-m] @ 3200 rpm) | — | — | — | S | S | S | S |
| K05 | | Engine block heater | A | A | A | A | A | A | A |
| | | Steering , electric power (EPS) | S | S | S | S | S | S | S |
| | | Suspension , 4-wheel independent | S | S | S | S | S | S | S |
| | NW7 | Traction Control , all-speed 1 - Included and only available with (JM4) Brakes, 4-wheel antilock. | A ¹ | A ¹ | A ¹ | S | S | S | S |
| | MX0 | Transmission , 4-speed automatic, electronically controlled with overdrive, includes electronic range selector | S | S | S | S | S | S | S |

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

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

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 | LS 12T68 | | LT 12U68 | |
|--------------------|--------------------|--|----------------|----------------|----------------|----------------|
| | | | 1SA | 1SB | 1SA | 1SB |
| | | Battery , maintenance free, includes rundown protection | S | S | S | S |
| | JL9 | Brakes , 4-wheel antilock, 4-wheel disc, includes Traction Control | S | S | S | S |
| FE9 | | Emissions , Federal requirements | A | A | A | A |
| NE1 | | Emissions , Maine, Massachusetts, New York or Vermont state requirements | A | A | A | A |
| YF5 | | Emissions , California state requirements | A | A | A | A |
| VCL | | Emissions Certification , CFF (Clean Fuel Fleet) LEV (Low Emission Vehicle). Option (VCL) should ONLY be ordered to receive the CFF LEV certification. If (VCL) is not ordered, the vehicle will be produced with your normally selected emission system and may not be CFF LEV certified. Products ordered with the (VCL) option may not be certified to California emission requirements. Therefore, they may not be legal for registration in California, New York, Maine, Massachusetts and Vermont. Option (YF5) should be ordered for all vehicles ordered in California. Option (NE1) should be ordered for all vehicles ordered in Maine or Vermont. 1 - Requires (NB8) Emissions override, California, Massachusetts, New York or Vermont, for vehicles ordered in California, Massachusetts, New York or Vermont. Not available in Maine. Available with (LX9) Engine, 3500 V6 SFI. | A ¹ | A ¹ | A ¹ | A ¹ |
| 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 |
| NC7 | | Emissions override , Federal (for vehicles ordered by dealers in Federal emission states with California, New York, Vermont, Massachusetts or Maine emissions; may also be used by dealers in states of California, New York, Vermont, Massachusetts or Maine to order different state-specific emissions) 1 - Requires (YF5) Emissions, California state requirements or (NE1) Emissions, New York, Vermont, Massachusetts or Maine state requirements. | A ¹ | A ¹ | A ¹ | A ¹ |
| | LX9 | Engine , 3500 V6 SFI (200 HP [149.1 kW] @ 5400 rpm, 220 lb.-ft. [297 N-m] @ 3200 rpm) | S | S | S | S |
| K05 | | Engine block heater | A | A | A | A |
| | | Steering , electric power (EPS) | S | S | S | S |
| | | Suspension , 4-wheel independent | S | S | S | S |

| Free Flow RPO Code | Ref. Only RPO Code | Description | LS 1ZT68 | | LT 1ZU68 | |
|-----------------------------|-----------------------------|---|-------------|-----|-------------|-----|
| | | | 1SA | 1SB | 1SA | 1SB |
| | NW7 | Traction Control, all-speed | S | S | S | S |
| | MX0 | Transmission, 4-speed automatic, electronically controlled with overdrive, includes electronic range selector | S | S | S | S |

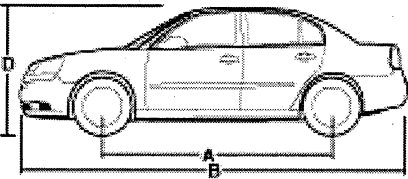
| S = Standard Equipment A = Available – (dashes) = Not Available ■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable | | | | | |
|---|---------------|-----------|--------------------------------|----------|---------|
| Model | Seat Type | Seat Code | Seat Trim | Interior | |
| | | | | Gray | Neutral |
| Base | Bucket, front | A51 | Cloth | 14D | 52D |
| LS | Bucket, front | A51 | Custom Cloth | 14E | 52E |
| LT | Bucket, front | A51 | UltraLux and Leather-appointed | 142 | 522 |

| Exterior Solid Paint | Color Code | Touch Up Paint Number | Interior | |
|---|---------------|-----------------------------|----------|----------------|
| | | | Gray | Neutral |
| Galaxy Silver Metallic | 12U | WA-519F | A | – |
| NEW! Laser Blue Metallic ² | 21U | WA-218M | A | A |
| NEW! Dark Blue Metallic | 25U | WA-722J | A | A |
| Light Driftwood Metallic | 33U | WA-5322 | – | A |
| White | 40U | WA-8554 | A | A ¹ |
| Black | 41U | WA-8555 | A | A |
| Sport Red Metallic ¹ | 63U | WA-817K | – | A |
| Medium Gray Metallic ¹ | 88U | WA-812K | A | – |
| Silver Green Metallic | 92U | WA-816K | – | A |
| 1 - Not available on Base. | | | | |
| 2 - Requires (B2N) LS or LT Sport Appearance Package. | | | | |

| S = Standard Equipment A = Available – (dashes) = Not Available ■ = Included in Equipment Group □ = Included in Equipment Group but upgradeable | | | | | |
|---|---------------|-----------|--------------------------------|----------|---------|
| Model | Seat Type | Seat Code | Seat Trim | Interior | |
| | | | | Gray | Neutral |
| LS | Bucket, front | A51 | Custom Cloth | 14E | 52E |
| LT | Bucket, front | A51 | UltraLux and Leather-appointed | 142 | 522 |


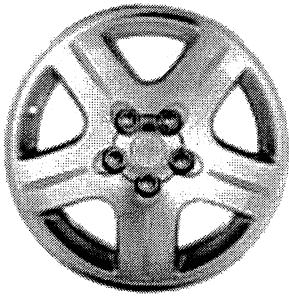
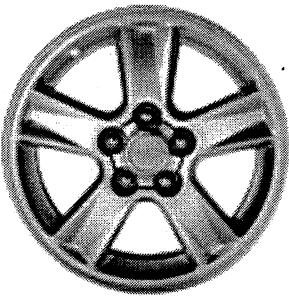
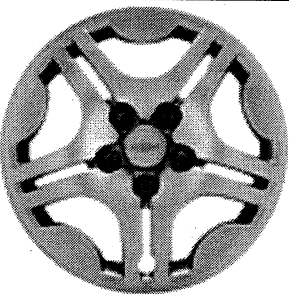
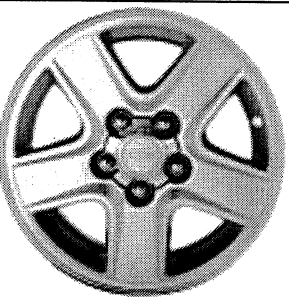
| Exterior Solid Paint | Color Code | Touch Up Paint Number | Interior | |
|---|------------|-----------------------|----------|---------|
| | | | Gray | Neutral |
| Galaxy Silver Metallic | 12U | WA-519F | A | – |
| NEW! Laser Blue Metallic ¹ | 21U | WA-218M | A | A |
| NEW! Dark Blue Metallic | 25U | WA-722J | A | A |
| Light Driftwood Metallic | 33U | WA-5322 | – | A |
| White | 40U | WA-8554 | A | A |
| Black | 41U | WA-8555 | A | A |
| Sport Red Metallic | 63U | WA-817K | – | A |
| Medium Gray Metallic | 88U | WA-812K | A | – |
| Silver Green Metallic | 92U | WA-816K | – | A |
| 1 - Requires (B2N) LS or LT Sport Appearance Package. | | | | |

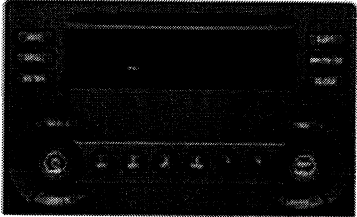
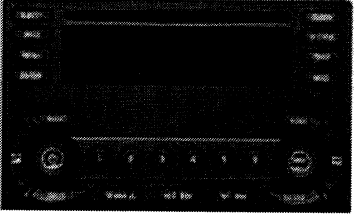
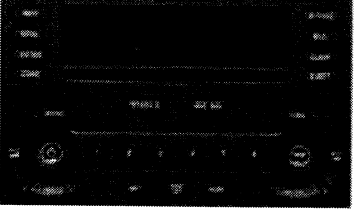
All dimensions in inches (mm) unless otherwise stated.

| | Specifications | Sedan | MAXX |
|---|----------------------|------------------|------------------|
|  | A Wheelbase | 106.30 (2700) | 112.30 (2852) |
| | B Overall length | 188.30 (4783) | 187.80 (4770) |
| | Body width | 69.90 (1775) | 69.80 (1773) |
| | D Overall height | 57.50 (1460) | 58.10 (1476) |
| | Front track width | 60.00 (1524) | 60.00 (1524) |
| | Rear track width | 59.30 (1506) | 60.20 (1529) |
| | Head room, front | 39.90 (1013) | 39.40 (1001) |
| | Head room, rear | 37.60 (955) | 39.40 (1001) |
| | Shoulder room, front | 56.70 (1440) | 56.70 (1440) |
| | Shoulder room, rear | 56.10 (1425) | 55.50 (1410) |
| | Hip room, front | 52.40 (1331) | -- |
| | Hip room, rear | 52.00 (1321) | -- |
| | Leg room, front | 41.90 (1064) | 41.90 (1064) |
| | Leg room, rear | 38.50 (978) | 41.00 (1041) |

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.

| | Sedan | MAXX |
|---|--------------|---------------|
| Capacities | | |
| Cargo volume, cu. ft. (liters) | 15.4 (436.1) | 22.8 (645.7) |
| Cargo volume, with rear seat folded, cu. ft. (liters) | -- | 41.0 (1161.1) |
| Fuel capacity, approximate, gallon (liters) | 16 (62) | 16 (61) |
| Seating capacity (front/rear) | 2/3 | 2/3 |

| | |
|--|--|
|  <p>Image to come</p> | <p>PY1 Wheels, 16" (40.6 cm) aluminum, chrome</p> |
|  | <p>QD1 Wheels, 16" (40.6 cm) aluminum, machined-face</p> |
|  | <p>PY0 Wheels, 16" (40.6 cm) aluminum</p> |
|  | <p>PA7 Wheels, 15" (38.1 cm) steel, includes bolt-on wheel cover</p> |
|  | <p>PF3 Wheels, 15" (38.1 cm) aluminum</p> |

| | |
|---|---|
|  | <p>U1C Sound system, ETR AM/FM stereo with CD player, includes seek-and-scan, digital clock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 4-speakers</p> |
|  | <p>UN0 Sound system, ETR AM/FM stereo with CD player, includes Radio Data System (RDS), seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers</p> |
|  | <p>UC6 Sound system, ETR AM/FM stereo with 6-disc CD changer, in-dash, includes Radio Data System, seek-and-scan, digital clock, auto-tone control, automatic volume, TheftLock, outside temperature display, trip odometer, Driver Information Center, warning messages, programmable menu functions and 6 speakers</p> |

| Option Code | Description |
|-------------|---|
| AG1 | Seat adjuster, power, driver 6-way |
| AK5 | Air bags, dual-stage, frontal |
| AM9 | Seat, rear 60/40 split-folding seatback |
| AP3 | Remote vehicle starter system |
| AP9 | Cargo convenience nets |
| AU0 | Keyless entry, remote |
| AY0 | Air bags, side impact |
| B2N | LS Sport Appearance Package |
| B2N | LT Sport Appearance Package |
| B37 | Floormats, carpeted, front and rear |
| B86 | Moldings, bodyside, body-color |
| C60 | Air conditioning, front manual |
| C68 | Air conditioning, front automatic |
| CF5 | Sunroof, power |
| D49 | Mirrors, outside rearview, power, Black |
| DD8 | Mirror, inside rearview |
| DL8 | Mirrors, outside rearview |
| E91 | Map pocket, seatback, |
| FE9 | Emissions, Federal requirements |
| J41 | Brakes, front disc/rear drum |
| J67 | Brakes, 4-wheel antilock |
| JF4 | Pedals, power, adjustable |
| JL9 | Brakes, 4-wheel antilock |
| JM4 | Brakes, 4-wheel antilock, front disc/rear drum |
| K05 | Engine block heater |
| K34 | Cruise control |
| KA1 | Seats, heated, driver and front passenger |
| L61 | Engine, ECOTEC 2.2L DOHC, |
| LX9 | Engine, 3500 V6 SFI |
| MX0 | Transmission, 4-speed automatic |
| N46 | Steering wheel, 4-spoke |
| NB8 | Emissions override |
| NC7 | Emissions override, Federal |
| NE1 | Emissions, Maine, Massachusetts, New York or Vermont state requirements |
| NR0 | Steering wheel, 4-spoke |
| NW7 | Traction Control, all-speed |
| PA7 | Wheels, 15" (38.1 cm) steel, |
| PF3 | Wheels, 15" (38.1 cm) aluminum |
| PY0 | Wheels, 16" (40.6 cm) aluminum |
| PY1 | Wheels, 16" (40.6 cm) aluminum, chrome |
| QD1 | Wheels, 16" (40.6 cm) aluminum |
| QMR | Tires, P205/65R15, touring |
| QPE | Tires, P215/60R16, touring |
| T43 | Spoiler, rear |
| T43 | Spoiler, rear, includes rear wiper |
| U1C | Sound system, ETR AM/FM stereo with CD player |
| U2K | Sound system feature, XM Satellite Radio |
| U32 | Entertainment system, includes rear seat DVD/CD player and monitor, |
| UC6 | Sound system, ETR AM/FM stereo with 6-disc CD changer |

| Option Code | Description |
|-------------|---|
| UE1 | OnStar |
| UG1 | Homelink transmitter, |
| UK6 | Sound system feature, rear audio controls |
| UN0 | Sound system, ETR AM/FM stereo with CD player |
| VCL | Emissions Certification, CFF (Clean Fuel Fleet) LEV (Low Emission Vehicle). |
| VK3 | License plate bracket, front |
| YF5 | Emissions, California state requirements |