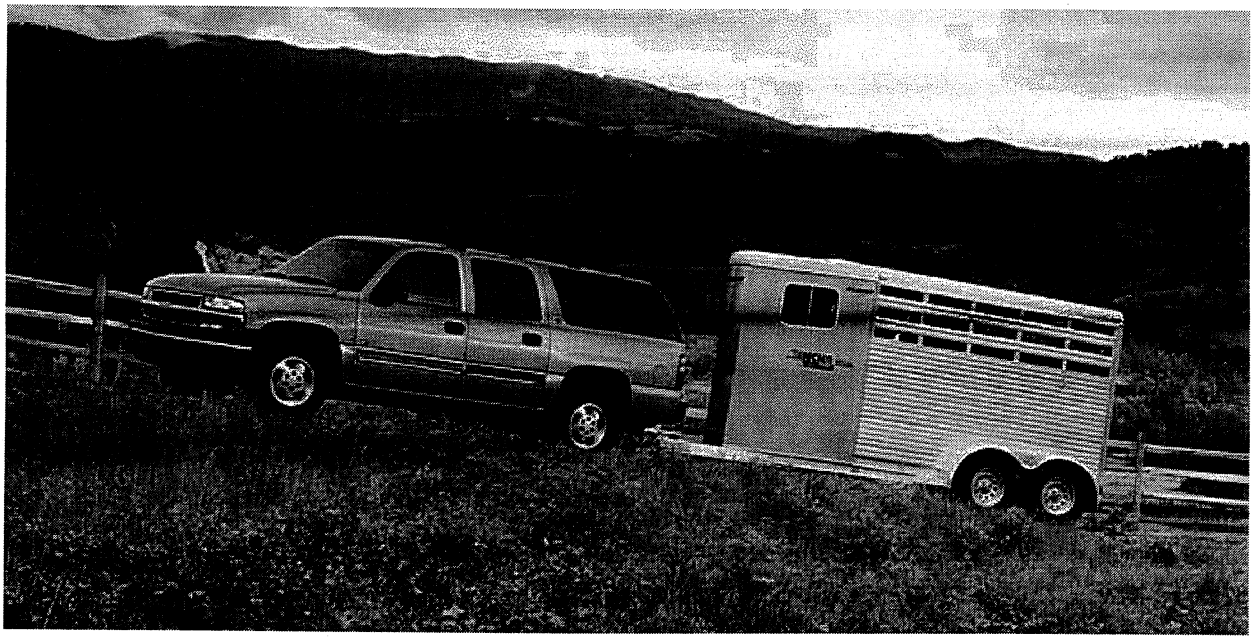
Chevrolet

Suburban



2000

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Product Information

Chevrolet Suburban - The Ultimate Blend Of Comfort, Capability And Confidence

DETROIT- As the most enduring nameplate in automotive history, the Chevrolet Suburban makes its grand entrance into the 21st century. Already known for its "do everything" versatility, the all-new 2000 Chevy Suburban continues to set the benchmark as an SUV that offers both awesome capability and everyday practicality.

"Even though the Suburban is all-new, it's really a product of 65 years of continual refinement," said Brand Manager Steve Ramsey. "You can sum up the new Suburban in three words - more comfortable, capable and confident. In short, it's the best Suburban ever."

The 2000 Suburban will be available in both two-and four-wheel-drive configurations, in a choice of 1500- or 2500-Series models.

More Comfortable

The all-new Suburban is the most comfortable Suburban in history, thanks to a combination of structural enhancements, ride and handling improvements and new luxury features.

Suburban's new frame design is stiffer and stronger than previous designs, creating a more stable foundation for the body, powertrain and suspension, which contributes to improved ride and handling. Hydroforming, used in strategic areas such as the front/rear rails and engine crossmember, adds strength and improves dimensional control by eliminating weld.

And, 1500-Series Suburbans utilize a new five-link rear suspension with coil springs. Frame and body improvements enabled engineers to more efficiently tune Suburban's suspension for an exceptionally smooth ride and optimum traction, even over bumpy roads.

Suburban's new interior maximizes space through efficient packaging of components, such as heating/air conditioning ducts, and by moving the spare tire from inside the cargo bay to underneath the vehicle. Driving comfort is maximized, thanks to easier maneuverability than the previous model and a tighter turning diameter.

In addition, a new driver seat provides increased seat travel and improved seatback angles. Standard on Suburban LT, a new premium driver bucket seat pampers with added comfort and convenience touches such as a heated seatback and cushion, power lumbar adjustment, an articulating headrest and two-position memory driver seat.

For the first time, Suburban offers optional second-row bucket seats complete with inboard armrests and reclining seatbacks. This can provide rear-seat passengers with even more comfort. A new heating, ventilation and air conditioning system provides quicker cool-downs, a quieter blower and other features, such as a five-speed fan control and rear-seat heat ducts.

Suburban is available with a new 126-watt uplevel audio system, which is matched to a new nine-speaker system. This package comes complete with a sealed, eight-inch subwoofer for fuller sound and richer bass.

Suburban owners can also opt for the available rear-seat audio controls which allow front and rear-seat passengers to listen to music independently. In all, comfort is the classic strength of the Chevrolet Suburban.

More Capable

Building on 45 years of successful small block production, 2000 Suburbans feature versions of Chevy's new lineup of small block engines - the Vortec 5300 and 6000 V8s.

The new Vortec 5300 V8, standard on 1500-Series models, offers 30 more horsepower than its predecessor. The 300 horsepower Vortec 6000 V8, standard on 2500-Series models, offers 45 more horsepower than the previous 5700 V8 and 10 more horsepower than the 7400 V8.

Torque has been improved for towing and hauling capability as Suburban delivers steady power when and where it's needed most. The new Vortec engines are teamed with a more durable and "smarter" four-speed electronically controlled automatic transmission. New features include a redesigned, larger sump, which reduces heat and improves durability. 2500-Series Suburbans with the Z82 Trailering Package now feature a transmission temperature gauge, which allows the driver to monitor the transmission fluid temperature.

Long known for its "big truck" trailering capacity, the new Suburban features technological advances which enhance performance, safety and durability applications.

"For customers with boats, campers or horse trailers, Suburban keeps it simple. You just 'plug in and play,' " said Chief Engineer Ken Sohocki. Suburban has the power to not only move heavy loads, but keep them moving, Suburban also incorporates features such as pre-wired trailer connections and electric brake controller. The Tow/Haul mode eliminates manual shifting on hilly terrain, and Dynamic Rear Proportioning helps maximize Suburban's rear brakes while trailering.

To improve ride and handling while trailering, Suburban offers the following:

- Smooth Ride Suspension-Ideal for everyday city and highway driving and light-duty trailering, this system provides a smooth, soft ride and excellent handling.
- Autoride Suspension-This new segment-exclusive utilizes information from wheel height, steering and other sensors to continuously vary shock damping while driving.
- Premium Ride Suspension-This system features self-leveling rear shocks that use energy from normal suspension motion to adjust and maintain level vehicle trim heights to help improve handling.
- Autotrac-Available on four-wheel-drive models, the transfer case delivers torque to the front wheels when itÕs needed, based on road conditions.
- Electronic Traction Control-Available on two-wheel-drive models, this system reacts to low-traction conditions and even disengages cruise control when wheel slippage is detected.

More Confident

With a long list of new safety, security, durability and low-maintenance features, the new Suburbans inspire more confidence when you get behind the wheel. For 2000, Suburban's four-wheel disc antilock brake system performs better and provides longer life than the previous-model design due to 40 percent larger brake pads.

Side-impact air bags are standard for the driver and front outboard passenger for enhanced protection in a side impact. Visibility has been improved through more effective headlamps, a larger windshield, longer wipers in the front and rear, and a relocated spare tire.

Also on Suburban, GM's available factory-installed OnStar(r) Communications System detects air bag deployment and sends help, in addition to providing a variety of convenience features. For added peace of mind, standard child-safety door locks prevent inadvertent rear-door opening while the vehicle is in motion.

Suburban's interior safeguards against injury, as all "contactable" interior objects, such as knobs, edges and air conditioning vents, have been rounded and their protrusion into the cabin area is limited to help avoid injury in the event of a collision.

Energy-absorbing foam attached to trim panels, moldings, the headliner and other areas helps protect occupants from a potential head injury. In fact, Suburban meets the new 2003 Federal Motor Vehicle Safety Standard 201 for head-impact protection today.

Driver lockout prevention helps reduce the chance of locking your keys in the vehicle. And, programmable automatic locking and unlocking doors allow Suburban drivers to tailor locking and unlocking operation to their individual preferences.

More Worldly

Suburban was designed to be more environmentally friendly, as fuel economy, component life and emissions have all been improved relative to previous designs.

In addition, Suburban makes greater use of recycled and recyclable materials. An average of 56,000 old tires are used annually for radiator-side air baffles; 5.5 million pounds of recycled fabric is used for floor insulation.

It's this kind of forward thinking that has made Suburban one of America's largest mass-produced all-purpose vehicles.

"Full-size sport utility buyers will find that the new Suburban offers more of what they want, in a way that fits their lifestyles," Ramsey said. "It's that kind of attention to detail that made Suburban an American icon in the first place."

Brand Identity

What's New And Highlights

Model

- All-new for 2000.

Exterior

- Chrome grille (LS and LT)
- Body-color mirror caps, body-side moldings, door handles and bumper top cap with LT trim
- Ground illumination feature on exterior mirrors (LS and LT)
- Two available rear-door configurations: panel doors or liftgate/liftglass design
- Foglamps included with LT trim and available with LS
- Spare tire relocated beneath the vehicleDual fuel tank design included on 2500 models
- Dual fuel tank design included on 2500 models
- Specific LS and LT aluminum wheels for 1500 models
- Standard 16-inch silver-painted wheels.

Interior

- Available power sunroof
- Front 40/20/40 split-bench seat
- Driver Message Center
- Engine hour meter
- Dual sunshades with extenders and lighted vanity mirrors (LS and LT)
- Rear cargo area shade (LS and LT) Self-dimming inside rearview mirror that includes simultaneous outside temperature display and compass (LS and LT)
- Uplevel stereos provide improved sound quality and feature nine speakers, including a rear-mounted subwoofer
- 12-volt power outlet in rear cargo area
- Two-Tone interior trim
- Electronic climate control (LT only)
- Available second-row audio controls with 12-volt outlet (Standard on LT)
- Available second-row bucket seats with LS and LT trim.

Safety and Security

- Side-impact air bags for driver and right-front passenger*
- Seat-mounted safety belts on front and third row for outboard passengers
- Second and third row seats feature a child safety seat top-tether anchor
- Automatic Exterior Lamp Control
- Interior trim meets enhanced FMVSS 201 head-impact standards for 2003.

Engineering

- Available Traction Package on 2WD models which includes Traction Assist, Locking Differential and front recovery hooks
- Class II electrical architecture and Bussed Electrical Centers (BEC)
- 4-wheel antilock disc brakes
- Tow/Haul mode
- Hydroformed front and rear frame and tubular cross-members.

Engines

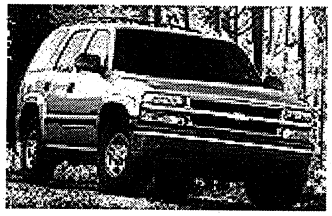
- Vortec 5300 V8 (1500 model)
- Vortec 6000 V8 (2500 model).

Suspension

- Five-link rear suspension with coil springs on 1500 models
- Independent SLA front suspension with torsion bars (for most models)
- Available Autoride suspension with load leveling (LT only)
- Available Premium Ride rear self-leveling suspension system for LS 1500 models.

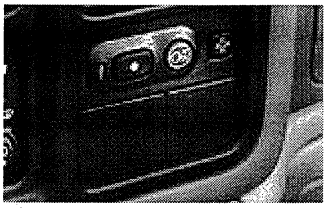
Highlights

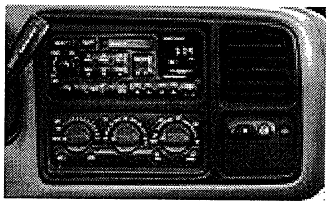
The Autotrac four-wheel-drive system helps keep Suburban moving over and through difficult road conditions.



The available new Autoride suspension helps provide a smooth, comfortable ride, even over difficult terrain.

An available OnStar Communications System helps provide Suburban owners with peace of mind.





Choose from a selection of standard and optional systems ranging from a basic AM/FM stereo to a premium system featuring both cassette and CD players with an enhanced-performance nine speaker system that includes a subwoofer and 126-watt/6-channel amplifier.

Model Summary

- Suburban 1500 2WD
- Suburban 1500 4x4
- Suburban 2500 2WD
- Suburban 2500 4x4.

Trim Levels

- Base
- LS
- LT

Marketplace

Chevy Suburban is all-new for 2000, offering even greater capability and comfort than ever before, all in a package that's the "right size" for today's active families. Having pioneered the full-size SUV segment 65 years ago, look for Suburban to maintain the benchmark of offering awesome capability and everyday practicality for the demanding full-size SUV buyer.

Competitors:

- Ford Excursion
- Toyota Land Cruiser

Buyer Demographics

Median Age:	44 years
Percentage Male:	60%
Median Household Income:	$100,000
College Graduates:	56%
Percentage with Children in Household:	74%

Vehicle Overview

Interior Overview

Key Standard Features*

Base Model:

- Front vinyl 40/20/40 split-bench seat
- Full, black vinyl floor covering
- Driver and right front-passenger air bags*
- Driver and right front-passenger side-impact air bags*
- ETR AM/FM stereo with seek-scan and digital clock
- Variable intermittent windshield wipers
- Power door locks with cargo-area lock/unlock switch
- PASSlock® II vehicle theft-deterrent system
- Solar-Ray light-tinted glass
- Passenger assist handles
- Two covered power outlets on the instrument panel (in addition to the cigarette lighter) and an additional outlet in the rear cargo area
- Tilt-Wheel™ steering column
- Two-Tone interior trim
- Engine hour meter shows engine usage by the hour
- Driver Message Center monitors and reports the status of up to 18 vehicle functions
- Full gauge package
- Turn signal-on reminder
- Retained accessory power feature allows operation of the sound system for up to 20 minutes with the ignition switch off
- Battery-rundown protection.

LS Adds The Following, In Addition To Or Replacing Base Model Features:

- Self-dimming inside rearview mirror with outside temperature and compass dual display
- Dual sunshades with extenders, lighted vanity mirrors, auxiliary shades and storage pockets
- Rear compartment cargo shade
- Air conditioning (front and rear)
- ETR AM/FM stereo with compact disc player, automatic tone control and new nine speaker system with subwoofer
- Solar-Ray deep-tinted glass
- Custom Cloth seats
- Second-row 60/40 three-passenger split-bench seat and third row full bench seat
- Cruise control
- Leather-wrapped steering wheel
- Color-keyed carpeting with vinyl floor mats
- Power windows with driver's Express-Down
- Rear-window defogger
- Rear-window wiper/washer (included with optional liftglass/liftgate).

LT Adds The Following, In Addition To Or Replacing LS Model Features:

- Electronic climate control
- Six-way power front bucket seats, heated with driver-side two-position memory
- Custom Leather seating surfaces
- Carpeted floor mats

- ETR AM/FM stereo with automatic tone control, cassette and CD players and nine speakers with subwoofer
- Second-row audio controls with 12-volt outlet
- OnStar Driver Assistance Service provides security and convenience 24 hours a day, seven days per week. With the touch of a button, subscribers can communicate with trained OnStar Advisors to receive valuable assistance for many situations, including the dispatch of emergency roadside assistance or providing directions. For more information, call 1-800-OnStar7 (1-800-667-8277)
- HomeLink Universal Transmitter, contained inside the overhead console, is capable of controlling up to three remote control devices, such as garage door openers, estate gates and security lighting.

Available Interior Features

- Power-operated sunroof includes an "express open"feature for added convenience and can be opened to a variety of positions (includes HomeLink)
- Second-row, 60/40 vinyl folding split-bench seat (Base)
- Second-row bucket seats
- Custom Leather seating surfaces (LS)
- Second-row audio controls (with 12-volt outlet) allow rear passengers to listen to music independently from front passengers (standard on LT).

Exterior/Structural Overview

Key Standard Features*

Base Model:

- Daytime Running Lamps with Automatic Exterior Lamp Control
- Dual Black foldaway mirrors
- Front recovery hooks are standard on 4x4 Suburban (available on 2WD models) for off-road pulling, when necessary
- Molded Spectra Gray grille with Argent center bar
- Underbody-mounted, full-size spare tire with lock.

LS and Models Add The Following, In Addition To Or Replacing Base Model Features:

- Remote Keyless Entry and content theft-deterrent system
- Power, heated, below-eyeline, black foldaway mirrors with ground illumination feature
- Cast-aluminum wheels with machined surface (1500 models)
- Chrome grille
- Black body-side moldings with chrome insert
- Roof luggage carrier.

LT Adds The Following, In Addition To Or Replacing LS Model Features:

- Self-dimming driver-side rearview mirror
- Body-color mirror caps, body-side moldings, door handles and front-bumper top cap
- Cast-aluminum wheels with polished surface (1500)
- Premium suspension (1500)
- Foglamps
- Assist steps.

Available Exterior Features

- Wheel flares
- Appearance Package for Base models that includes chrome grille, body-side moldings, roof luggage carrier and stainless steel-clad wheels with silver center cap
- Foglamps (LS models)

- Rear liftgate with washer/wiper (LS and LT models).

Exterior Paint

Basecoat/clearcoat paint is standard on Suburban for all colors. Fade resistance and a high-gloss shine for long-lasting exterior beauty is a major feature of this paint process.

Paint Colors

Base And LS Paint Colors:

- Onyx Black
- Indigo Blue Metallic
- Medium Charcoal Gray Metallic
- Light Pewter Metallic
- Sunset Gold Metallic
- Dark Copper Metallic
- Dark Carmine Red Metallic
- Victory Red
- Summit White

Custom Two-Tone paint is also available on LS models in a variety of combinations.

LT Paint Colors:

- Onyx Black
- Medium Charcoal Gray Metallic
- Light Pewter Metallic
- Sunset Gold Metallic
- Dark Copper Metallic

* See Feature Availability Chart for additional features.

Functional Overview

Key Standard Features*

- Vortec 5300 V8 SFI engine (1500 Series)
- Vortec 6000 V8 SFI engine (2500 Series)
- 4-wheel antilock disc brakes (ABS) with Dynamic Rear Proportioning
- 4-speed automatic transmission with Tow/Haul mode
- Speed-sensitive power steering (4x4 1500 models only)
- Autotrac active 4x4 system (4x4 models only)
- Dual fuel tank system (2500 models)
- Independent SLAfront suspension with torsion bars (coil springs with 2WD 2500 models)
- All-new five-link rear suspension with coil springs (1500)
- Trailering provisions: trailer wiring harness.

Suburban LT Models Add:

- Premium Ride rear self-leveling suspension helps to keep Suburban at the normal ride height, even when carrying heavier loads (1500).

* See Feature Availability Chart for additional features.

Safety And Security

Crash Avoidance Features

- Automatic Exterior Lamp Control
- Four-wheel antilock disc brake system with Dynamic Rear Proportioning
- Daytime Running Lamps
- Steering wheel center-mounted horn pad
- Brake/transmission shift interlock.

Occupant Protection Features

- Driver and right front-passenger air bags*
- Driver and right front-passenger side-impact air bags*
- Child seat top-tether anchor on the second and third row seats for a more secure attachment of child seats equipped with top tethers
- Seat-mounted outboard safety belts on front and third row
- Energy-absorbing interior trim
- Safety belt warning lamp
- Reinforced steel safety cage
- Steel side-door beams
- Energy-absorbing steering column
- Child security rear-door locks
- Outboard head restraints for all rows.

Security Features

- PASSlock® II vehicle theft-deterrent system will not allow the vehicle to operate unless the proper key is used. Even if the proper key is subsequently inserted, the vehicle will not start for up to 10 minutes
- Remote Keyless Entry uses a key fob to activate power locking and unlocking features and illuminates the interior lamps and outside mirror lamps for convenient access into the vehicle (LS and LT models)
- Content theft deterrent alarm triggers horn and interior lighting in the event of an unauthorized entry (LS and LT models)
- Lockout provision prevents doors from locking if the key is inadvertently left in the ignition.

* 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.

Sound Systems

Base Model

Standard:

- Electronically Tuned Receiver (ETR) AM/FM stereo with seek-scan and digital clock.

Optional:

- ETR AM/FM stereo with with seek-scan, auto-reverse cassette player and digital clock.

LS Model

Standard:

- ETR AM/FM stereo with compact disc player, automatic tone control, TheftLock, CD random select and speed-compensated volume
- Enhanced-performance nine-speaker system with subwoofer and 126-watt/6-channel amplifier
- Automatic tone control (ATC) allows the sound system to be set to a predetermined equalizer level. One touch allows access to automatic settings for rock, country, pop, jazz, classical and news programs.

Optional:

- ETR AM/FM stereo with auto-reverse cassette player and nine enhanced-performance speakers with subwoofer, ATC, TheftLock and speed-compensated volume
- ETR AM/FM stereo with compact disc and cassette players featuring the nine enhanced-performance speaker system with subwoofer, ATC, speed-compensated volume, CD random select, TheftLock and bidirectional seek
- Second-row audio controls.

LT Model

Standard:

- ETR AM/FM stereo with compact disc and cassette players featuring the nine enhanced-performance speaker system with subwoofer, ATC, speed-compensated volume, CD random select, TheftLock and bidirectional seek
- Enhanced-performance nine-speaker system with subwoofer and 126-watt/6-channel amplifier
- Automatic tone control allows the sound system to be set to a predetermined equalizer level. One touch allows access to automatic settings for rock, country, pop, jazz, classical and news programs
- Second-row audio controls.

Seats

Standard Suburban Base Model

- Vinyl 40/20/40 split-bench seat with driver recliner.

Standard Suburban LS:

- Reclining 40/20/40 split-bench seat with manual lumbar support and center stowage armrest (Custom Cloth or optional Custom Leather seating surfaces).

Optional Suburban LS:

- Reclining bucket seats with manual lumbar support (Custom Cloth or Custom Leather seating surfaces). Six-way power driver and front-passenger seats are optional with bench or bucket seats; included with Custom Leather seating surfaces.

Standard Suburban LT:

- Power, heated bucket seats with power recliner, six-way adjustment, two-position driver seat memory, power lumbar adjustment, power back bolster, articulating head restraints and Custom Leather seating surfaces.

Interior Colors

Vinyl:

- Graphite
- Medium Oak.

Custom Cloth

- Graphite
- Medium Oak

Custom Leather Seating Surfaces:

- Graphite
- Medium Oak
- Medium Gray.

Powertrain and Performance

Engineering

Every Suburban is built to last. Its solid frame is key to providing a smooth ride and precise handling characteristics. Two powerful Vortec engines are engineered to provide Suburban with excellent performance and good fuel economy. A durable multi-link rear suspension with coil springs (multi-stage leaf springs on 2500 models) provides an excellent ride and added strength for heavy loads. The modular, three-section frame includes a front section that is fabricated by a hydroforming method which uses pressurized fluid to form the steel. Instead of rivets, the frame is welded in key areas for stronger joints. Hydrformed tubular cross members provide enhanced torsional performance over the more conventional stampings. A rear lower control arm cross brace adds additional support for the front suspension area.

Key Suburban Engineering Features Include

- Bussed Electrical Centers (BEC) reduce wire complexity by centrally locating critical electrical system functions. This also reduces the number of necessary plug-ins and wire splices, which results in a more overall efficient electrical system
- Class IIelectrical architecture allows on-board electrical components to broadcast and receive their digital messages on a shared network of wires. This reduces unnecessary wiring, connectors and splices which decreases potential wiring-related problems
- Traction Assist (available on 2WD models) prevents wheelspin by detecting when a driven wheel is about to lose traction. If traction is about to be lost, Traction Assist reduces engine power to help restore traction
- Extensive corrosion protection on Suburban begins with the use of two-sided galvanized steel for all exterior body panels (except the roof). The galvanized zinc coating helps prevent surface rust caused by minor chips and scratches and also helps to prevent holes which start from the inside. The inner and outer vehicle panels are coated by submersion in an electro-coat primer before the application of primer surfacer and top coat. The frame is totally submersed in high temperature wax for added protection
- Choice of rear doors — Panel doors or liftgate with liftglass allow for cargo loading preference
- Solar-Ray tinted glass reduces interior heat buildup and helps protect interior fabrics and materials from damaging UV rays
- Trailer-ready capability.* A pre-wired trailer harness and a Tow/Haul mode ensure that Suburban is ready to tow as soon as the vehicle leaves the showroom. For those looking to upgrade a Suburban for additional towing capability, there is an optional Trailering Package. Included in the package are a trailer hitch platform, 7-lead trailer harness connector, trailer brake controller jumper harness and transmission oil cooler.

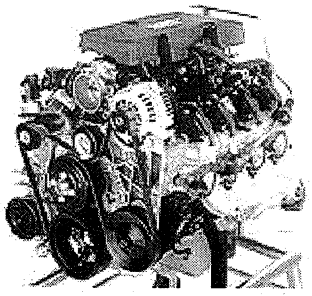
Suburban is manufactured at two General Motors assembly plants:

- Janesville, Wisconsin
- Silao, Mexico

* Additional equipment may be required depending on application.

Engines

Vortec 5300 SFI V8 (LM7)



The Vortec 5300 V8 engine offers some of the best power capabilities available in an SUV. It is standard on 1500 models.

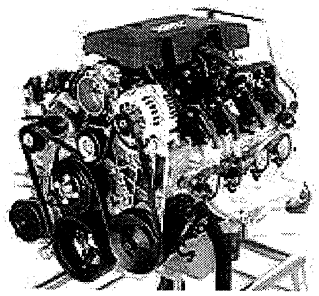
Power Ratings For The Vortec 5300 V8 Engine:

- 285 horsepower at 5200 rpm
- 325 lb.-ft. of torque at 4000 rpm.

Vortec 5300 V8 Engine Technical Features:

- Deep-skirt block design
- Cast-aluminum cylinder heads
- Six-bolt main crankshaft bearing caps
- Durable valvetrain design
- Fully-pressurized cooling system
- Low coolant level sensor
- Direct ignition system
- Long-life accessory drive belt life*
- Low maintenance.*

Vortec 6000 SFI V8 (LQ4)



The impressive balance of horsepower and torque of the Vortec 6000 V8 engine helps the Suburban make light work of hauling the boat trailer. The Vortec 6000 is standard on 2500 models.

Power Ratings For The Vortec 6000 V8 Engines:

- 300 horsepower at 4800 rpm
- 355 lb.-ft. of torque at 4000 rpm.

Vortec 6000 V8 Engine Technical Features:

- Deep-skirt block design
- Cast-iron cylinder heads
- Six-bolt main crankshaft bearing caps
- Durable valvetrain design
- Fully-pressurized cooling system
- Low coolant level sensor
- Direct ignition system
- Long-life accessory drive belt life*
- Low maintenance.*

* Maintenance needs vary with different uses and driving conditions. See owner's manual for more information.

Transmissions

4L80-E 4-Speed Electronically Controlled Automatic Transmission

4L60-E and 4L80-E Electronically Controlled 4-Speed Automatic Transmissions (4L80-E shown)

The GM 4L60-E 4-speed automatic transmission with overdrive is teamed with the Vortec 5300 engine and the 4L80-E with the Vortec 6000 engine. Both transmissions feature electronic controls allowing the transmission to match the engine's performance and helping the powertrain deliver excellent fuel efficiency.

Both transmissions feature:

- Seals that provide excellent protection against seepage and leakage. Internal components are designed to reduce friction, aiding long-term durability
- Two-piece case adds increased powertrain stiffness, resulting in reduced vibration and noise
- Deep transmission oil pan provides efficient cooling for long transmission life
- Wide range of gear ratios
- The Powertrain Control Module (PCM) measures key vehicle input, utilizing precise and flexible electronic controls to monitor throttle position, vehicle speed, gear range, temperature and engine load. Shift points and shift smoothness are controlled by four solenoids connected to the PCM
- Electronically controlled converter clutch, which allows gradual engagement for smooth drivability while aiding fuel economy
- Electronic line pressure scheduling software, which adjusts pressure to the clutches based on the torque output of the engine for a smooth, consistent shift feel
- Second-gear start feature, which provides an extra measure of control in most slippery driving conditions. By moving the gear selector to the Drive 2 position, the driver can reduce torque to the drive wheels, helping to maximize traction during initial acceleration on slippery surfaces
- Automatic transmission fluid can go up to 100,000 miles before the first scheduled change (4L60-E only)*
- Brake/transmission shift interlock requires the driver to apply the brake pedal to shift out of Park.

* Maintenance needs vary with different uses and driving conditions. See owner's manual for more information.

Axles

- Synthetic gear lubricant helps reduce rear axle temperatures when towing and hauling, and aids fuel economy by allowing a lower viscosity to be used
- Front and rear differential drain plugs result in easy serviceability. Previously, draining the lubricant meant suctioning out the fluid or removing the sealed differential cover to allow the fluid to drain
- Carbon fiber clutch pack on limited slip differential provides 13 plates instead of the usual seven for smoother engagement.

Four-Wheel-Drive Systems

Autotrac

Autotrac system is capable of engaging four-wheel drive for maximum traction, without any input from the driver. This system is not all-wheel drive, but more accurately termed a standby four-wheel-drive system. With AUTO 4WDselected Autotrac provides 100 percent rear-wheel drive until road conditions warrant a change. When extra traction is needed, the Electronic Control Module activates an electronic motor to transfer the torque between the front and rear wheels — all within a fraction of a second. Once the front and rear prop shafts speeds are equalized (traction is regained at the rear wheels), the transfer case returns to its standby mode until a speed difference occurs.

Suspension

Front

- The independent Short/Long Arm (SLA) suspension with stabilizer bar is standard on every Suburban. This design provides good on-center feel and a smooth ride
- 1500 two- and four-wheel-drive models and 2500 four-wheel-drive models are equipped with torsion bars, which provide generous room for front-end driveline components. The torsion bars are computer selected to optimize ride and handling. 2500 two-wheel-drive models utilize coil springs in place of the torsion bars
- The front differential is mounted to the front frame with rubber bushings to isolate driveline noise and vibration. The vehicle's overall design provides good ground clearance when traveling over uneven terrain
- Maintenance-free front-wheel bearings are sealed for life, eliminating the need for periodic grease repacking.

Rear

- The rear suspension on 1500 models feature a five-link design with coil springs and rear stabilizer bar. The 2500 model rear suspension design features a live axle with variable-rate, two-stage, multi-leaf springs. The longer set of leaves provides a smooth ride when the vehicle is unloaded. As additional passengers and cargo (payload) are added, the longer leaves flatten out and the shorter, stiffer leaves create additional support to help maintain a comfortable ride. The shock absorbers and jounce bumpers are positioned to help isolate road bumps, contributing to a smooth, controlled ride.
- Autoride suspension system is available on LT models and is a computer-controlled suspension feature that automatically adjusts shock absorber damping when travelling over uneven terrain. For 1500 models, the system also includes a load-leveling feature to help keep the vehicle at normal ride heights when carrying heavy loads
- The Premium Ride rear self-leveling suspension is an available hydraulically operated system that returns the vehicle to normal ride height when carrying heavier loads. This feature is available on Suburban LS 1500 models and standard on LT 1500 models.

Steering

- Speed-sensitive power steering is standard on all Suburban 1500 4x4 models. This electronically controlled system improves steering ease at lower vehicle speeds (e.g., parking). At higher vehicle speeds, steering effort reverts to normal. This system is also designed to operate at a lower power steering fluid temperature, which may help extend fluid life
- Suburban 1500 2WDand all 2500 models feature a power-assisted recirculating ball system.

BRAKES

Brakes

- 4-wheel antilock brake system (ABS) is standard on Suburban. ABS helps the driver maintain steering control during hard braking situations by reducing wheel lockup on most slippery surfaces. The driver simply maintains pressure on the brake pedal and steers the vehicle. ABS adjusts brake pressure by modulating the brakes several times per second, a rate even most skilled professional drivers cannot attain
- Power 4-wheel disc brakes are standard on all Suburban models. The 4-wheel-disc system is designed to feature reduced pedal effort, shorter stopping distances, more linear braking feel, better brake balance with varying cargo loads and longer brake pad life than a disc/drum setup. In fact, the non-asbestos organic brake pads are designed to last up to four times as long as traditional brake linings
- Dynamic Rear Proportioning optimizes front-to-rear braking balance by recognizing minute changes in wheel speed, and then reducing enough rear brake pressure to prevent an impending wheel lockup — all without activating the ABS. This system replaces the conventional mechanical proportioning valve and actually increases overall brake life by keeping the front-to-rear brake balance more evenly matched. The system also aids brake balance when towing a trailer or hauling cargo
- Self-adjusting drum-in-hat parking brake is used on the rear wheels. This system is separate from the primary brake system and therefore is subjected to reduced wear. Even though the system's brake lining could potentially last the life of the vehicle, it was nevertheless designed to meet stringent wear limit standards set by the European Economic Community (EEC).

Wheels And Tires

Wheels

All 1500 Series models feature six-bolt fastening for excellent durability. All 2500 Series models feature eight-bolt fastening.

- Standard 16" steel, painted silver with silver center cap — Base
- 6" chrome-cladded, stainless-steel wheel with silver center cap — available on Base
- 16" cast-aluminum machined wheel — standard on 1500 LS
- 16" cast-aluminum polished wheel — standard on 1500 LT
- 16" forged-aluminum wheel — standard on 2500 LS and LT.

Tires

Suburban offers the following tires, availability depending on model and suspension selected:

- P245/75R-16 all-season steel-belted radial blackwall tires (2WD and 4x4–1500 models)
- P245/75R-16 all-season steel-belted radial outline white-lettered tires (2WD and 4x4–1500 models)
- P265/70R-16 all-season steel-belted radial blackwall tires (2WD and 4x4–1500 models)
- P265/70R-16 all-season steel-belted radial outline white-lettered tires (2WD and 4x4–1500 models)
- LT245/75R-16 all-season steel-belted radial blackwall tires (2WD and 4x4–2500 models)
- LT265/75R-16 On-/Off-Road steel-belted radial blackwall tires (2WD and 4x4–2500 models).

Feature Availability

	Base	LS	LT
Interior			
Air bags – driver and right front-passenger*	S	S	S
– side-impact, driver and right front-passenger*	S	S	S
Air conditioning – with CFC-free refrigerant	O	S (front and rear)	S (front and rear)
Audio controls,second-row	NA	O	S
Cargo shade, rear	NA	S	S
Climate control, electronic	NA	NA	S
Cruise control	O	S	S
Defogger – rear window (with panel doors)	O	S	S
– rear window/wiper/washer (with liftglass/liftgate)	NA	S	S
Door beams – steel side-impact	S	S	S
Door locks – power with cargo area switch	S	S	S
Door, rear – liftgate with liftglass	NA	O	O
– panel doors	S	S	S
Floor covering – full black rubber	S	NA	NA
– color-keyed carpet with vinyl mats (carpeted mats on LT)	NA	S	S
Gauges – trip odometer, oil pressure, volts, tachometer, temperature and engine hour meter	S	S	S
Lights, interior – dome with delayed entry Message Center with system messages, transmission overheat, low fuel,low coolant, security, oil level, oil temp., oil pressure and oil change and more	S	S	S
Mirror – inside self-dimming with dual compass and outside temp. display	NA	S	S
Seats– 40/20/40 vinyl split-bench	S	NA	NA
– 40/20/40 Custom Cloth split-bench	NA	S	NA
– 40/20/40 Custom Leather seating surfaces, split-bench	NA	O	NA
– Custom Leather seating surfaces, front buckets	NA	O	S
– 60/40 split-bench second row, 3-passenger folding	O	S	S
– second row, bucket (leather seating surfaces only)	NA	O	O
– third row full bench	O	S	S
Sunroof, power	NA	O	O
Stereo – AM/FM with seek-scan and digital clock	S	NA	NA
– AM/FM with seek-scan, digital clock and cassette player	O	NA	NA
– AM/FM with ATC, CD player and 9 speaker system w/ subwoofer	NA	S	NA
– AM/FM w/ ATC, cassette player and 9 speaker system w/ subwoofer	NA	O	NA
– AM/FM w/ATC, CD and cassette and 9 speaker system w/ subwoofer	NA	O	S
Steering wheel – leather-wrapped	NA	NA	NA
– Tilt-Wheel column	S	S	S
Sunshades – cloth with LH storage clip and RH mirror	S	NA	NA
– cloth with storage pocket, illuminated vanity mirrors, extenders and auxiliary shade	NA	S	S
Wipers – intermittent variable	S	S	S
Windows, power with driver's Express-Down	NA	S	S

Exterior			
Foglamps	NA	O	S
Luggage carrier – roof-mounted	O	S	S
Mirrors – dual black breakaway	S	NA	NA
– dual power, black, heated with ground illumination	NA	S	NA
– dual power, color-keyed, heated, w/ground illum. and LH self-dim.	NA	O (black)	S
Wire harness – trailering	S	S	S
Wheels – 16" x 6.5" silver-painted with silver center cap	S	NA	NA
– chrome-cladded steel with silver center cap	O	NA	NA
– machined cast-aluminum (1500 only)	NA	S	NA
– polished cast-aluminum (1500 only)	NA	NA	S
– polished forged-aluminum (2500 only)	NA	S	S
Functional			
Brakes– 4-wheel antilock	S	S	S
– power, 4-wheel disc	S	S	S
Engine – Vortec 5300 V8 SFI (1500 only)	S	S	S
– Vortec 6000 V8 SFI (2500 only)	S	S	S
Autotrac (4x4 models only)	S	S	S
Suspension – Smooth	S	S	NA
– Premium Ride	NA	O (1500)	S
– Autoride	NA	NA	O
Traction Assist (2WD only)	O	O	O
Remote Keyless Entry	NA	S	S
Transmission – 4-speed electronically controlled automatic	S	S	S

S — Standard
O — Optional (some options may be available only as part of a Preferred Equipment Group.)
NA — Not available
*Always use safety belts and 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.

Specifications

Model Availability	
Models	1500 4-Door and 2500 4-Door
Passengers	3/6/7/8/9
Class	Full-Size Utility
Assembly plants	Janesville, Wisconsin and Silao, Mexico
Primary structure	Three-piece modular steel frame
Body material	Two-sided galvanized steel (except roof)

Dimensions & Capacities				
	1500 models		2500 models	
Exterior Dimensions	**U. S. Standard**	**Metric**	**U. S. Standard**	**Metric**
Wheelbase	130.0 in.	3302.0mm	130.0 in.	3302.0mm
Overall length	219.3 in.	5570.0mm	219.3 in.	5570.0mm
Overall height (2WD/4x4)	73.6/73.3 in.	1870.6/1862.0mm	74.3/74.4 in.	1887.0/1890.1mm
Overall maximum width	78.8 in.	2001.5mm	79.8 in.	2026.9mm
Ground to rear load floor (2WD/4x4)	29.3/30.6 in.	744.2/777.2mm	30.9/33.0 in.	784.9/838.2mm
Ground clearance (front–2WD/4x4)	9.9/10.7 in.	252.0/271.0mm	9.0/10.2 in.	229.0/259.0mm
Ground clearance (rear–2WD/4x4)	10.2/9.8 in.	258.0/249.0mm	10.2/9.8 in.	259.0/253.0mm
Interior Dimensions				
Headroom (front/mid./rear)	40.7/39.0/38.6 in.	1033.8/990.6/980.5mm	40.7/39.0/38.6 in.	1033.8/990.6/980.5mm
Legroom (front/mid./rear)	41.3/39.1/36.1 in.	1049.0/994.1/917.2mm	41.3/39.1/36.1 in.	1049.0/994.1/917.2mm
Shoulder room (front/mid./rear)	65.2/65.1/64.8 in.	1657.0/1653.0/1647.7mm	65.2/65.1/64.8 in.	657.0/1653.0/1647.7mm
Hip room (front/mid./rear)	61.4/61.6/49.2 in.	1560.0/1564.6/1248.5mm	61.4/61.6/49.2 in.	1560.0/1564.6/1248.5mm
Cargo volume (max.)	138.4 cu. ft.	3918.4 liters	138.4 cu. ft.	3918.4 liters
Capacities				
Curb weight (2WD/4x4)	4914/5123 lbs.	1902/2323 kg	5447/5760 lbs.	2470/2612 kg
Maximum GVWR (2WD/4x4)	7000/7200 lbs.	3175/3266 kg	8600/8600 lbs.	3901/3901 kg
Base payload (2WD/4x4)	1886/2077 lbs	855/942 kg	3153/2839 lbs.	1430/1287 kg
Maximum trailer capacity	(2WD/4x4)* 9000/8800 lbs.	4082/3991 kg	10,500/10,100 lbs.	4763/4588 kg
Fuel tank capacity (approx.)	33 gallons	124 liters	39 gallons	147 liters

* When properly equipped.

Steering		
	1500 models	2500 models
Type	Power recirculating ball (2WD) With EVO variable-assist (4x4)	Power recirculating ball
Steering ratio,overall (2WD/4x4)	16.5:1/16.4:1	16.4:1
Turning diameter, curb-to-curb (2WD)	42.3 ft./12.9 m	44.5 ft./13.5 m
Turning diameter, curb-to-curb (4x4)	42.3 ft./12.9 m	44.3 ft./13.5 m

Brakes

	1500 models		2500 models	
Type	Power assist 4-wheel disc with 4-wheel ABS		Power-assist 4-wheel disc with 4-wheel ABS	
	U. S. Standard	**Metric**	**U. S. Standard**	**Metric**
Front disc size	12.01 x 1.14 in.	305.0 x 29.0mm	12.80 x 1.50 in.	325.0 x 38.0mm
Rear disc size	13.00 x 1.18 in.	330.0 x 30.0mm	13.00 x 1.14 in.	330.0 x 29.0mm
Booster diameter	10.24 in. (tandem)	260.0mm (tandem)	hydraulic booster	
Parking brake	Drum-in-hat, cable activated		Drum-in-hat, cable activated	

Engines

	1500 models	2500 models
RPO Code	LM7	LQ4
Type	Vortec 5300 V8 SFI	Vortec 6000 V8 SFI
Block	Cast iron	Cast iron
Cylinder head	Aluminum	Cast iron
Bore & stroke (mm)	96.0 x 92.0	101.6 x 92.0
Displacement (cc)	5328	5990
Compression ratio	9.5:1	9.4:1
Induction system	SFI	SFI
Valves/cylinder	2	2
Lifters	Hydraulic roller	Hydraulic roller
Cam drive	Chain	Chain
Horsepower/kW @ RPM (SAE net)	285 @ 5200/ 207 kW@ 5200	300 @ 4800/ 224 kW @ 4800
Torque/N-m @ RPM (SAE net)	325 @ 4000/ 440 N-m @ 4000	355 @ 4000/ 481 N-m @ 4000
Recommended fuel (min.)	87 octane	87 octane

Transmission Gear Ratios

	1500 models	2500 models
Engine	Std. – LM7	Std. – LQ4
Transmission	Elec. Auto. 4-speed with overdrive (4L60-E)	HD elec. Auto. 4-speed with overdrive (4L80-E)
1st	3.06	2.48
2nd	1.63	1.48
3rd	1.00	1.00
4th	0.70	0.75
Reverse	2.29	2.08

Suspension

	1500 models	2500 models
Frame	All-welded, ladder-type, fully-boxed design w/hydroformed front section	All-welded, ladder-type, lipped-C midsection and hydroformed front section
Front	Independent with torsion bars	Independent with torsion bars (2500 4x4) Independent with coil springs (2500 2WD)
Rear	Five-link w/coil springs	Semi-elliptic, 2-stage multileaf springs
Shock absorbers (front/rear)(mm)	32/32	32/32

Stabilizer bar, front (mm)	32	32
Stabilizer bar, rear (mm)	30	–
Rear axle type	Semi-floating	Semi-floating

Mileage/Performance

	1500 models
Engine and transmission type	4-speed automatic with Vortec 5300 V8 SFI
Mileage:	mpg liters/100 km
City (2WD/4x4)	not available at the time of printing
Highway (2WD/4x4)	not available at the time of printing
Est. cruising range:	mi. km
City (2WD/4x4)	not available at the time of printing
Highway (2WD/4x4)	not available at the time of printing

NOTE: Suburban 2500 models are not rated by the EPA for fuel economy performance.

Trailering Information

Model	1500 models		2500 models	
Engine	Vortec 5300 SFIV8		Vortec 6000 SFI V8	
Trailer classification	Medium		Medium	
	U. S. Standard	Metric	U. S. Standard	Metric
Maximum gross trailer wt. (2WD/4x4)	9000/ 8800 lbs.	4096/ 3995 kg	10,500/ 10,100 lbs.	4763/ 4581 kg

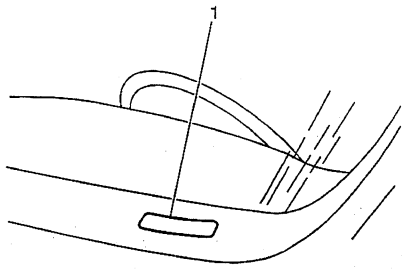
NOTE: Trailer tongue weight should be 10 to 15 percent of total loaded trailer weight (up to 1,000 lbs.).

Wheels& Tires

	1500 models	2500 models
Wheel size (in.)	16 x 6.5	16 x 6.5
Tire type	All-season steel-belted radials	
Tire size	P245/75R16	LT245/75R16E

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 2 3	United States Canada Mexico
2	Manufacturer	G	General Motors
3	Make	B C D T	Chevrolet Incomplete Chevrolet Truck GMC Incomplete GMC Truck
4	GVWR/Brake System	E F G H	6001-7000/Hydraulic 7001-8000/Hydraulic 8001-9000/Hydraulic 9001-10000/Hydraulic
5	Truck Line/Chassis Type	C K	Conventional Cab/4x2 Conventional Cab/4x4
6	Series	1 2	Half Ton ¾ Ton
7	Body Type	4 9	Regular Cab Extended Cab
8	Engine Type	V U T W	(LR4) 4.8L Gas (LQ4) 6.0L Gas (LM7) 5.3L Gas (L35) 4.3L Gas
9	Check Digit	--	--
10	Model Year	Y	2000
11	Plant Location	1 E Z G	Oshawa, Ontario Pontiac, Michigan Fort Wayne, Indiana Silao, Mexico
12-17	Plant Sequence Number	--	Plant Sequence Number

Engine and Transmission Usage

Model	Engine		Transmission	
	Base	Option	Base	Option
C157 (03)	4.3L V6(L35)	4.8L(LR4) 5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
C157 (53)	4.3L V6(L35)	5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
C159 (03)	4.3L V6(L35)	4.8L(LR4) 5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
C159 (53)	4.8L V8(LR4)	5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
C257 (53)	5.3L V8(LM7)	6.0L V8(LQ4)	4 Spd. Auto. (M30)	4 Spd. Auto. (MT1)
C259 (03)	5.3L V8(LM7)	6.0L V8(LQ4)	4 Spd. Auto. (M30)	4 Spd. Auto. (MT1) 5 Spd. Manual (MW3)
C259 (53)	6.0L V8(LQ4)	--	5 Spd. Manual (MW3)	4 Spd. Auto. (MT1)
K157 (03)	4.3L V6(L35)	4.8L(LR4) 5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
K157 (53)	4.8L V8(LR4)	5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
K159 (03)	4.3L V6(L35)	4.8L(LR4) 5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
K159 (53)	4.8L V8(LR4)	5.3L V8(LM7)	5 Spd. Manual (MG5)	4 Spd. Auto. (M30)
K257 (53)	6.0L V8(LQ4)	--	4 Spd. Auto. (MT1)	5 Spd. Manual (MW3)
K259 (03)	6.0L V8(LQ4)	--	5 Spd. Manual (MW3)	4 Spd. Auto. (MT1)
K259 (53)	6.0L V8(LQ4)	--	5 Spd. Manual (MW3)	4 Spd. Auto. (MT1)

Model Codes

- C--Rear wheel drive
- K--Selectable four wheel drive
- 03--Regular cab
- 53--Extended cab
- 15--1/2 ton
- 25--3/4 ton
- 57--Short bed
- 59--Long bed

VIN Derivative

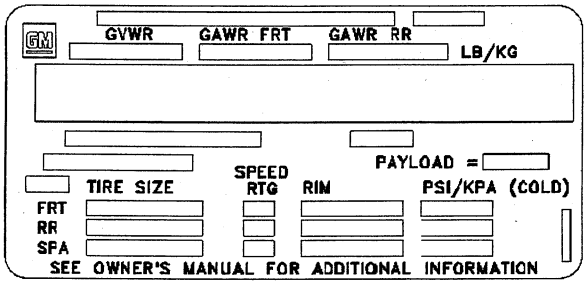
All engines and transmissions are stamped or laser etched with a partial vehicle identification number (VIN), which was derived from the complete VIN. A VIN derivative contains the following nine positions:

Position	Definition	Character	Description
1	GM Division Identifier	G	General Motors
2	Model Year	Y	2000
3	Assembly Plant	1 E Z G	Oshawa, Ontario Pontiac, Michigan Fort Wayne, Indiana Silao, Mexico
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	2
2	10
3	11
4-5	12-17

Vehicle Certification Label



The vehicle certification label displays the following assessments:

- The gross vehicle weight rating (GVWR)
- The gross axle weight rating (GAWR)
- The vehicle payload rating
- The original equipment tire sizes and the recommended tire pressures

Gross vehicle weight (GVW) is the weight of the vehicle and everything the GVW carries. Include the following items when figuring the GVW:

- The base vehicle weight (factory weight)
- The weight of all vehicle accessories, such as the winches or the plows
- The weight of the driver and the passengers
- The weight of the cargo

The gross vehicle weight must not exceed the GVWR.

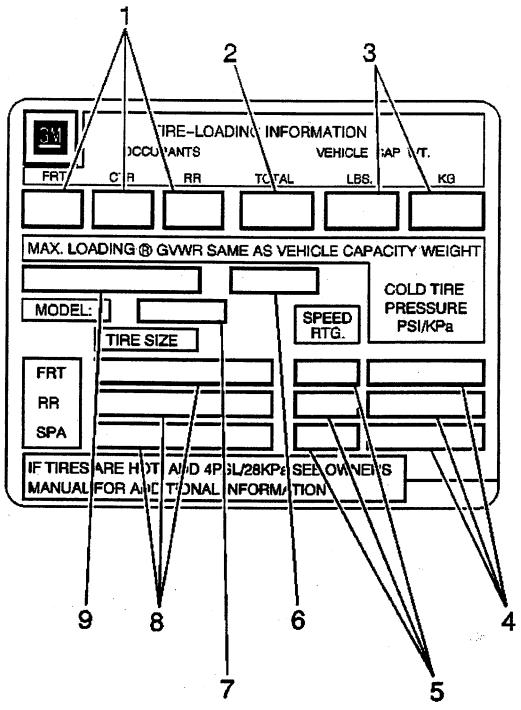
The front GAW is the weight exerted on the front axle. The rear GAW is the weight exerted on the rear axle. The front and the rear gross axle weights must not exceed the front and the rear gross axle weight ratings.

The payload rating defines the vehicle's maximum allowable cargo load. The cargo load includes the driver and the passengers. The payload rating is based on the vehicle's factory installed equipment. Deduct from the payload rating the weight of accessories added to the vehicle after the final date of manufacture .

The vehicle may have a gross combination weight rating (GCWR). The GCWR refers to the total maximum weight of the loaded tow vehicle (including driver and passengers) and a loaded trailer.

The vehicle's tires must be the proper size and properly inflated for the load the vehicle is carrying. For more information on tires, refer to Tire Inflation Pressure Specifications in Maintenace and Lubrication.

Tire Placard

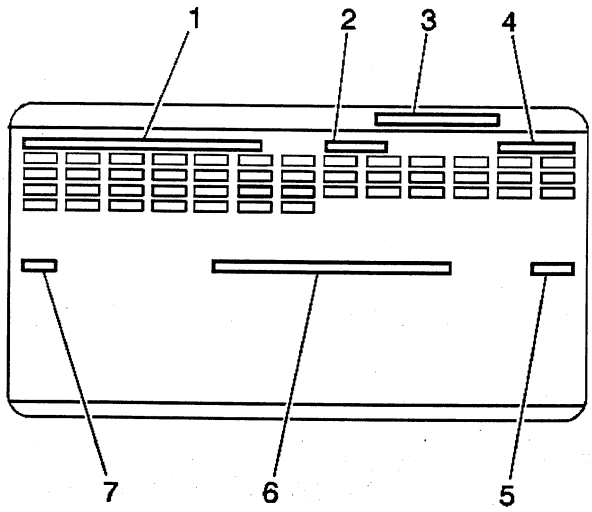


(1) Specified Occupant Seating Positions
(2) Total Occupant Seating
(3) Maximum Vehicle Capacity Weight
(4) Tire Pressures, Front, Rear, and Spare
(5) Tire Speed Rating, Front, Rear, and Spare
(6) Tire Label Code
(7) Engineering Model Minus First Character
(8) Tire Sizes, Front, Rear, and Spare
(9) Vehicle Identification Number

The Tire Placard is permanently located on the edge of the driver's door. Refer to the placard to obtain:

- The maximum vehicle capacity weight
- The cold tire inflation pressures
- The tire sizes (original equipment tires)
- The tire speed ratings (original equipment tires)

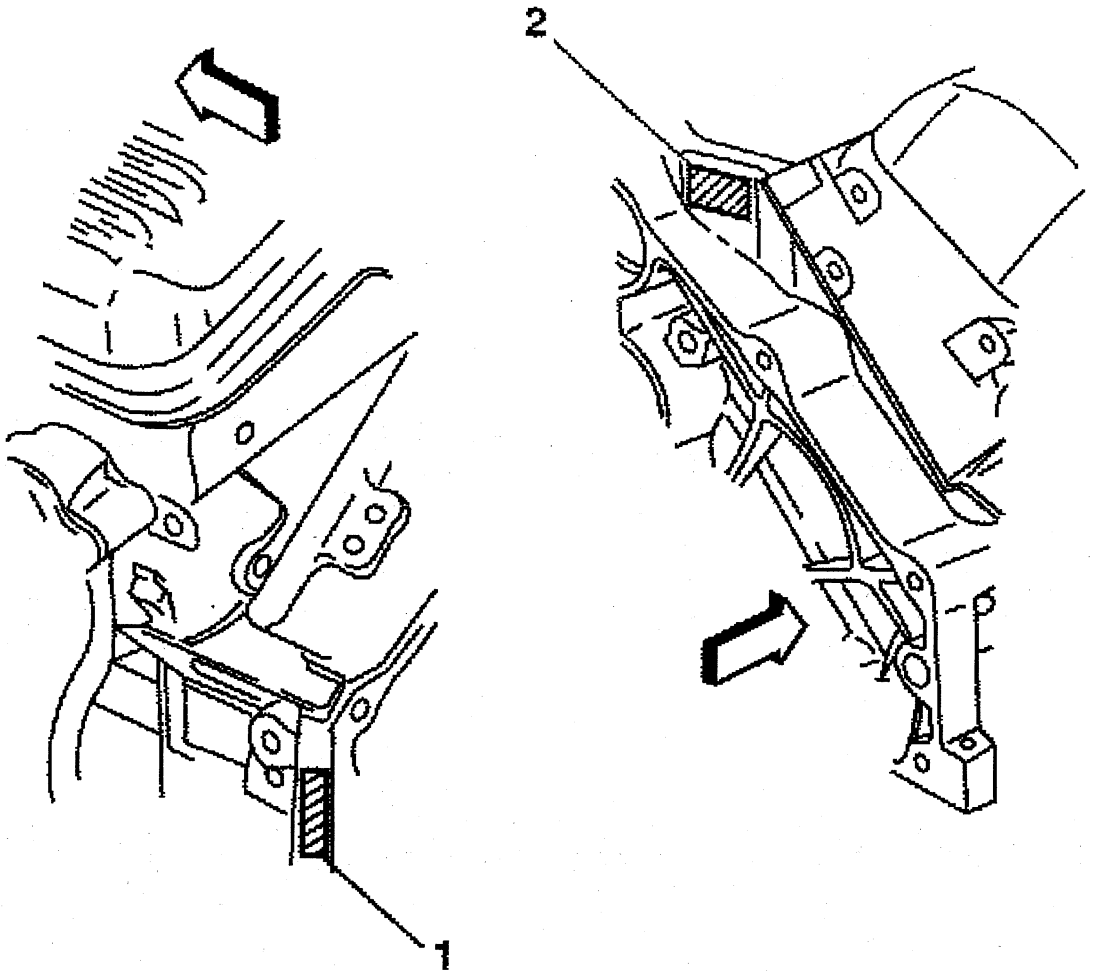
Service Parts Identification Label (SPID)



(1) Vehicle Identification Number
(2) Wheel Base
(3) Part Number Location
(4) Model Designation
(5) Order Number
(6) Exterior Color
(7) Paint Technology

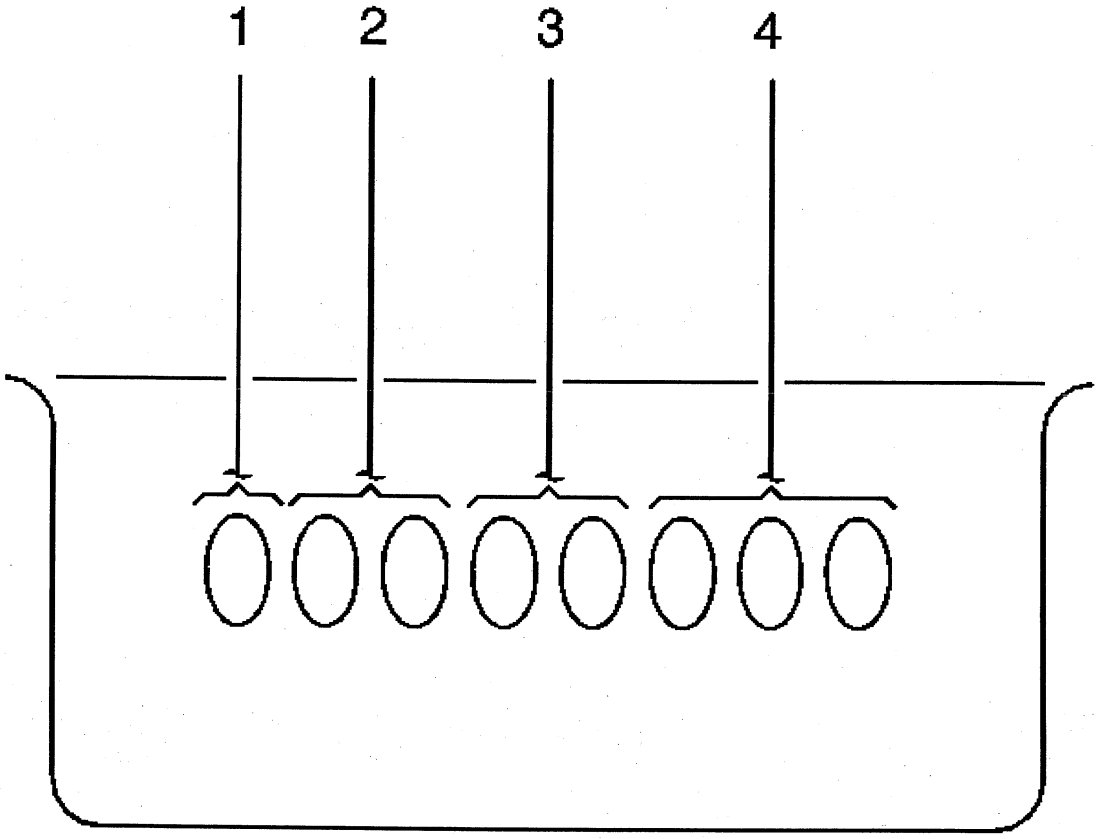
The service parts identification label is placed on the vehicle in order to help service and parts personnel identify the vehicle's original parts and the vehicle's original options.

Engine ID and VIN Derivative Location 5.3L & 6.0L



(1) Primary Engine Identification Location
(2) Secondary Engine Identification Location

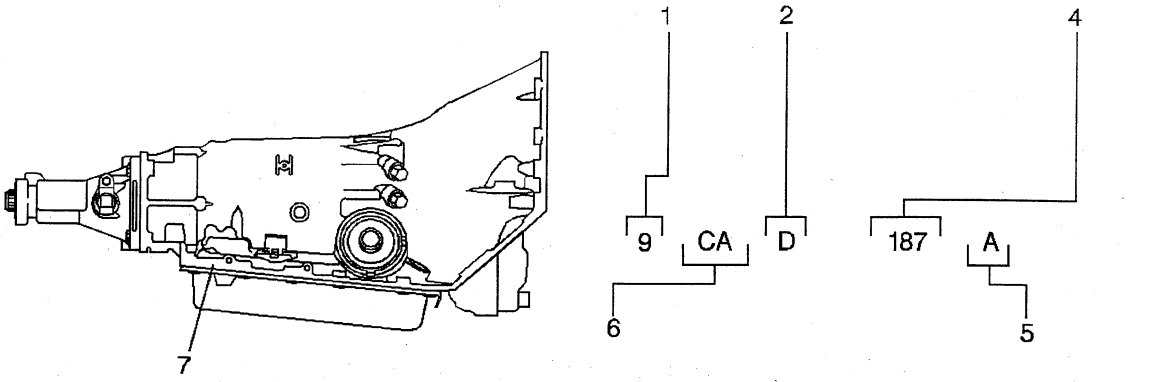
Engine ID Legend

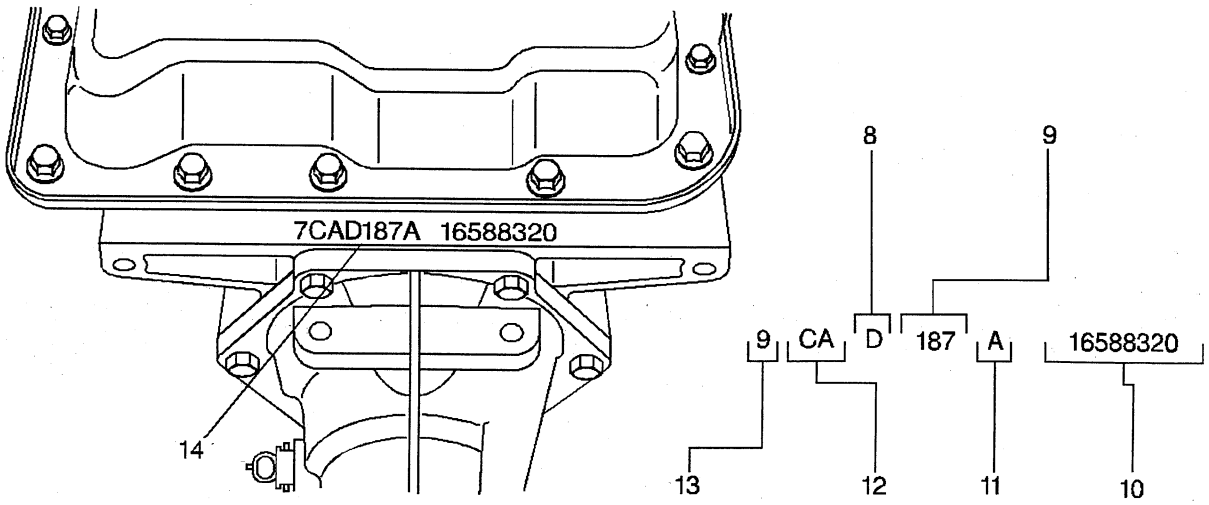


1. Source Code
2. Month of Build
3. Date of Build
4. Broadcast Code

Transmission ID and VIN Derivative Location

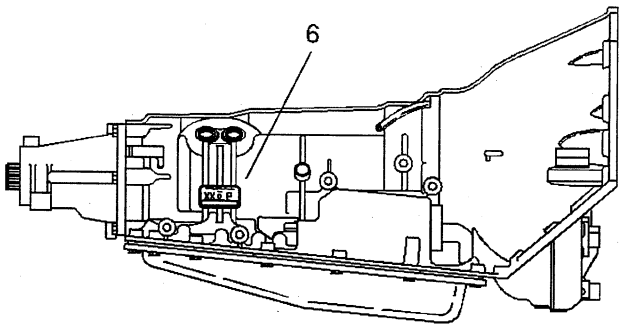
4L60-E Transmission ID Location

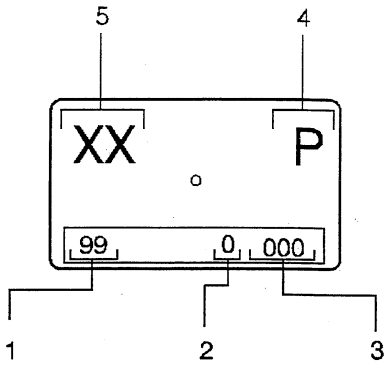




(1) Model Year
(2) Hydra-Matic 4L60-E
(4) Julian Date (or Day of the Year)
(5) Shift Built (A, B, J = First Shift; C, H, W = Second Shift)
(6) Model
(7) Transmission ID Location
(8) Hydra-Matic 4L60-E
(9) Julian Date (or Day of the Year)
(10) Serial No.
(11) Shift Built (A, B, J = First Shift; C, H,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

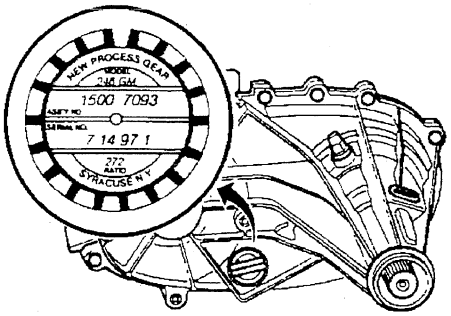
4L80-E Transmission ID Location





1. Calendar Year
2. Julian Date of the Year
3. Shift and Line Number
4. Plant
5. Model
6. Location on Transmission

Transfer Case Identification



NV MODEL IDENTIFICATION KEY

246

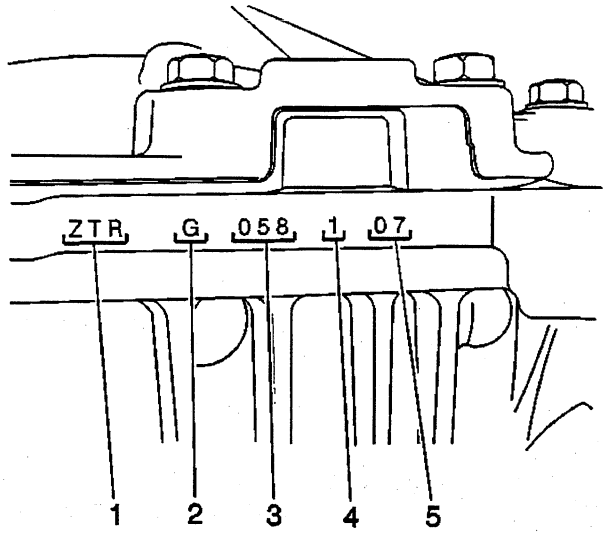
1	Single Speed	3	T – Truck/L – Van	1	Manual
2	2 Speed	4	K – Truck	3	Selectable
				6	Automatic

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

- The transfer case model number
- An assembly number
- A serial number
- The low range reduction ratio

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

Axle Identification – Front



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

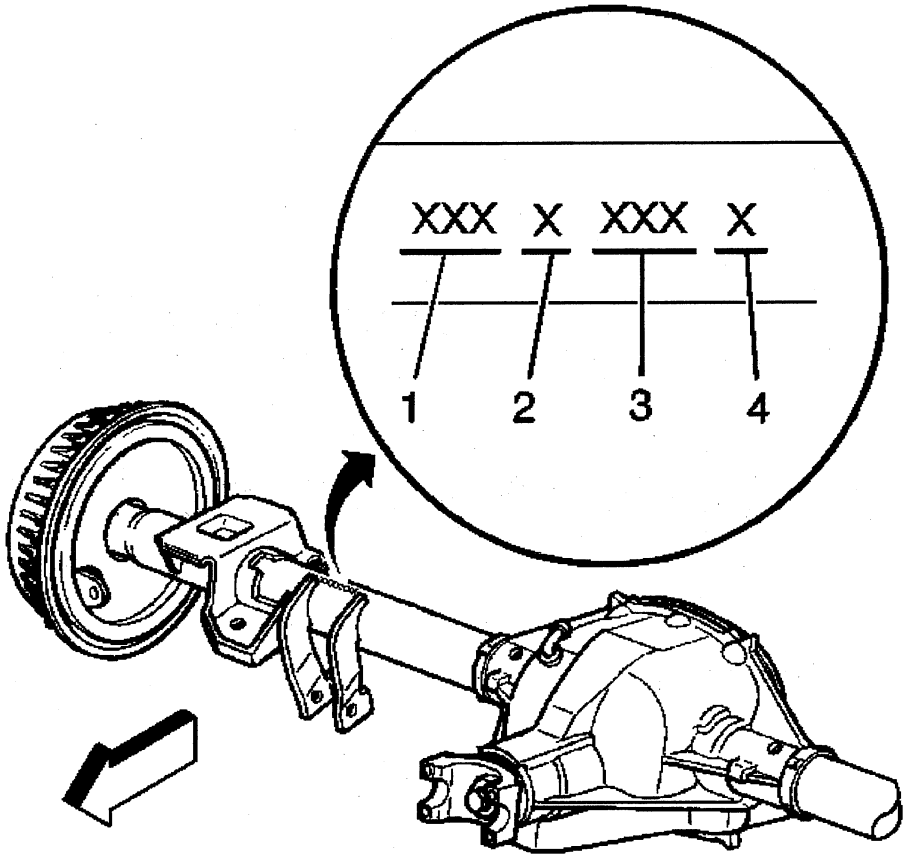
Front axle identification information is stamped on the top of the differential carrier assembly.

The following broadcast codes identifies the axle ratio:

Broadcast Code	Ratio
ZTM	3.08
ZTN, ZTU, ZTW, ZSY, ZA2, ZC2	3.42
ZTP, ZTR, ZTS, ZTX, ZSZ, ZB2,ZD2	3.73
ZTT,ZF2	4.10
ZH2	4.56

The information on the differential carrier assembly is necessary for servicing.

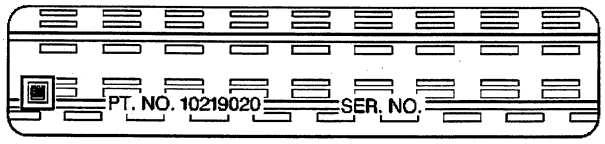
Axle Identification – Rear



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

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

Labeling - Anti-Theft



Notice

The anti-theft label found on some major body panels MUST be covered before performing any painting, rustproofing or undercoating procedures. The mask must also be removed following those procedures. Failure to follow these precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard, and subject the vehicle owner to possible suspicion that the part was stolen.

Federal law requires General Motors (GM) to affix a label to certain parts on selected vehicles with the Vehicle Identification Number (VIN). The purpose of this law is to reduce the number of motor vehicle thefts by helping in the tracing and recovery of parts from stolen vehicles. The certification label on the driver's door qualifies as a theft deterrent label.

The theft deterrent label will be permanently affixed to an interior surface of the part and will contain the complete VIN. The label on replacement parts will contain the letter R, the manufacturer's logo, and the acronym for the Department of Transportation (DOT). DO NOT deface, or remove these labels.

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
AE7	40/20/40 Seat Front Split Driver Includes Easy Entry Feature
AG1	Power Seat - Adjuster- 6Way - Driver
AG2	Power Seat - Adjuster- 6Way - Passenger
AJ1	Windows Deep Tint, All Except W/S & Front Door
AL4	Rear Second Seat (Two Buckets)
AM7	Rear Seat Folding (Not Merchandised)
AN3	Full Feature Front Bucket Seat
ANJ	No Deep Tint - E Marked
AT5	Seat Rear Second, Folding
AU0	Remote Function Actuation - Keyless Entry (Domestic)
AU3	Lock, Power Door, Electric
AU8	Remote Function Actuation, Specific Frequency
AX4	European Seats And Restraints
B30	Floor Covering - Color Keyed, Carpet
B32	Floor Covering - Color Keyed, Rubber/Vinyl,Floor Mats, Throw In, Front Seat
B33	Floor Covering - Color Keyed, Rubber/Vinyl,Floor Mats, Throw In, Rear Seat
B34	Floor Covering - Color Keyed, Rubber/Vinyl, Floor Mats, Throw In, Front Seat
B35	Floor Covering - Color Keyed, Rubber/Vinyl, Floor Mats, Throw In, Rear Seat
B37	Floor Covering - Color Keyed, Rubber/Vinyl, Floor Mats, Throw In, Front & Intermediate Seat
B39	Floor Covering - Reversible Carpeted/Vinyl Cargo Area Mat
B71	Wheel Opening Flares
B74	Wheel Opening Flares, Extra Wide
B85	Molding - Body Side
B96	Wheel Opening Flares
BAG	Parts Package For Overseas Shipping.
BG9	Full Rubber Floor Mat - Color Keyed Embossed
C49	Rear Window Defogger
C5M	6100 # GVWR
C5P	6250 # GVWR
C5Q	6300 # GVWR
C5S	6600 # GVWR
C5U	6800 # GVWR
C52	7200 # GVWR
C60	Front Air Conditioning
C68	Electronic Climate Control
C69	Rear Air Conditioning
C6P	8600 # GVWR
C6U	9000 # GVWR
C6W	9200 # GVWR
C7A	10000 # GVWR
C7E	11000 # GVWR
C7L	12000 # GVWR
C85	Fog Lamp Suppression With Headlamps On
CF5	Sun Roof - Electric, Sliding
CKD	Complete Knock Down - International (Chevrolet Only)

CT1	Country, Belgium
CT2	Country, Austria
CT3	Country, Germany
CT4	Country, Luxembourg
CT5	Country, Netherlands
CT6	Country, Italy
CT7	Country, Denmark
CT8	Country, Portugal
CT9	Country, Spain
CU1	Country, Norway
CU2	Country, Finland
CU3	Country, France
CU4	Country, Sweden
CU7	Country, Kuwait
CU8	Country, Saudi Arabia
CV1	Country, Iceland
CV6	Country, Chile
CW2	Country, Gulf States (Bahraim, Oman, Qman, Uae)
CW4	Country, Caribbean
CW5	Country, Venezuela
CW6	Country, Guam
CW7	Country, Puerto Rico/U.S. Virgin Islands
CZ1	Country, Central America
CZ2	Country, China
CZ3	Country, Russia
D07	Console, Floor Seat Seperator (Extended)
D44	Mirror, OSRV, Class2, Molded-In Black Plastic, Gooseneck Style
D45	Mirror, OSRV, Class2, Chrome, Gooseneck Style (GMM)
D48	Mirror, OSRV, Power Control
D55	Console, Floor, Seat Seperator
DD7	Mirror, ISRV, Electrochromic, Autodimming, Autocal Compass
DE2	Mirror, OSRV, Manual Control
DF2	Mirror, OSRV, Camper Style
DF5	Mirror, ISRV, Electric W/Simulations Compass/Temp/O/S EC CNTL
DG5	Mirror, OSRV, SR West Coast
DH6	Sunshade, Driver And Passenger, Flap Covered Lighted Vanity Mirror, With Extenders (Not Merchandised)
DK6	Console, Overhead - Bucket Seat (Long)
DK7	Console, Overhead - Bench Seat W/O Sunroof (Short)
DL8	Mirror, OSRV, Power Control, Defog
E35	Optional Pickup Box - Steel (6 1/2 Foot) Or (8 Foot)
E62	Sportside Pickup Box (6 1/2 Foot) Steel Inner/Plastic Outer
E63	Fleetside / Wideside Pickup Box (6 1/2 Foot And 8 Foot)
EQ9	Underride Protection Equipment
EXP	Export Processing Option
F60	Provisions-Increased Torsion Bar Rate
FE9	Emissons Requirements - Federal Customer
FRL	Provisions-Increased Spring Rate
FW1	Manual Electric Control, Ride And Handling
FWI	Fort Wayne Assembly
G80	Locking, Rear Axle
GH0	3.54:1 Rear Axle Ratio
GMC	Pontiac East Assembly
GT4	3.73:1 Rear Axle Ratio

GT5	4.10:1 Rear Axle Ratio
GTY	Wide Track Rear Axle
GU4	3.08:1 Rear Axle Ratio
GU6	3.42:1 Rear Axle Ratio
HC4	4.65:1 Rear Axle Ratio
J81	Export Fog Lamp Switch
JAN	Janesville Assembly
JB8	Hydroboost Brakes - Export
JC5	Brake System (6100-7200 # GVWR) 4 Wheel Disc Brakes (Gasoline - Vacuu, Type Booster)
JH6	Brake System (7300-9900 # GVWR) 4 Wheel Disc Brakes
JH7	Brake System (10000-12000 # GVWR)(R05) 4 Wheel Disc
K05	Engine Block Heater
K18	A.I.R. Pump (Air Injection Reactor), (Electric)
K34	Cruise Control, Electronic
K47	Air Cleaner, High Capacity System
K53	Enhanced Fuel Sender - International
K68	Alternator, 105 AMP.
KA6	Rear Seat Cushion And Back Heater For Luxury Utility
KC4	Heavy Duty Engine Oil Cooling
KC6	Provisions - Accommodated Accessory Device
KNP	Cooler - Transmission Oil Cooler- Air-To-Oil
L35	4.3L V6 Gasoline Engine SCPI
LM7	5.3L V8 Gasoline Engine SFI GEN III
LQ4	6.0L V8 Gasoline Engine SFI GEN III
LR4	4.8L V8 Gasoline Engine SFI GEN III
M1F	Power-Take-Off (P.T.O.) Provisions
M30	Transmission - 4 Speed Auto W/ Electric Controls L.D. (Hydra-Matic 4L60-E)
M74	Transmission - Automatic, 5 Speed (H.D.) Allison 1000 Series
MAE	Marketing Area Code Europe
MAU	Marketing Area Code Unregulated
MG5	Transmission - 5 Speed Manual (4.02:1) New Venture Gear
MT1	Transmission - 4 Speed Auto W/Elect Controls H.D. (Hydra - Matic 4L80 - E
MW3	Transmission - 5 Speed Manual (5.61:1) New Venture Gear
N05	Locking Fuel Filler Cap
N12	Rear Exit Tail Pipe
N93	Wheel - New - Aluminum - 17" x 7.5"
NA1	Emissions Systems (At Or Below 8500 # GVWR)
NA4	Emission Systems (Greater Than 8500 # GVWR)
NA7	European Emissions
NB6	Emissions Requirements - California Tier 1
NC1	Emissions Requirements - California Lev
NF2	Emissions Requirements- Federal Tier 1
NG1	Emissions Requirements- Geographically Restricted Regions (California REQTS Outside Of California)
NN8	Emissions Override, Unleaded Fuel, Export
NP1	Transfer Case - (Electric) - Full Range
NP2	Transfer Case- (Manual) - Full Range
NP3	Transfer Case - (AWD)
NP5	Leather Wrapped Steering Wheel
NP8	Transfer Case - (Active) - Push Button Control, 2 Speed
NW7	Traction Control - Electronic
NZZ	Skid Plate Off-Road
OSG	Oshawa Assembly

P03	Bright Hub Caps
P06	Bright Rally Trim Rings W/ Bright Hub Caps
PF4	Wheel - Cast - Aluminum- 16 X 7.0
PF9	Wheel - Cast - Aluminum- 16 X 7.0
PTO	Engine Controls For PTO Application
PY0	Wheel- New - Aluminum - 16 X 6.5
PY2	Wheel- Bright Chrome Appearance- 16 X 6.5
Q4B	6200 # GVWR
QAN	P265/7OR 17 Tire
QBN	LT245/75R16C R/PE ST TBL OOR BW
QBX	LT245/75R16C R/PE ST TBL OOR WOL
QC3	Wheel- New -Theme - Aluminum- 16 X 7
QCC	P255/70R16-109S ALS BW
QE4	Wheel- Aluminum-Spare - 16 X 6.5
QGA	P245/75R16 R/PE ST TL AT 109S BW
QGB	P245/75R16 R/PE ST TL AT 109S WOL
QGC	P265/75R16 R/PEST TL AT 114S BW
QGD	P265/75R16 R/PE ST TL AT 114S WOL
QHP	LT225/75R16D R/PE ST TL ALS BW
QHS	P265/75R16-114S AT Temp (A) BW (Middle East Export Only)
QIW	LT245/75R16E R/PE ST TL OOR BL
QIZ	LT245/75R16E R/PE ST TL ALS BL
QMG	P245/75R16-112S ALS (EL) BW
QMH	P245/75R16 - 1125 ALS (EL) WOL
QMK	P265/70R16-111S AL2 WOL
QNF	P235/75R16-106S ALS BW
QNG	P235/75R16-106S ALS WOL
QNK	P245/75R16-109S ALS BW
QNL	P245/75R16-109S ALS WOL
RO4	Axle - Single, Rear
Ro5	Axle - Dual Rear
T62	Daytime Running Lamp - Delete
T65	Daytime Running Lamps - European
T84	Headlamps - Right Hand Rule Of Road, E Marked (China, Former Soviet Union)
T89	Lamp - Tail and Stop, Export
T90	Lamp - Signal and Marker
T96	Fog Lamps - Front
TP2	Provisions For Dual Batteries, (Not Availabe On V6 Engine)
TR2	Side Repeater Lamp
TR6	Headlamp Leveling Device
TRW	Provisions-Emergency Roof Mounted Lights
TS9	CHMSL Delete
UO1	Roof Marker Lamps
U19	Metric Dominant Cluster, Nornal Bias (Canadian
U68	Trip Computer - Secondary Information Center
UC2	Metric Dominant Cluster, Positive Bias (European)
UD4	Uverspeed Warning Device (Required For Saudi Arabia, Gulf States, And Kuwait)
UG1	Homelink System
UL0	Radio- AM/FM Stereo, Cass. (Euro Compliant)
UL1	Radio- AM/FM Stereo, Seek/Scan, Clock, And ETR. (European Frequency Radio, Base On All Models For European Export, Requires UL2)
UL2	European Frequency, (Required For Europe, And Middle East On All Models With ULO Radio, UM7, UL1 OR UW3. Also Includes Former Soviet Union, RPO CZ)
UL5	Radio - Delete

UM6	Radio- AM/FM Stereo, Seek/Scan, Auto Reverse Cassette, Clock And ETR
UM7	Radio - AM/FM Stereo, Seek/Scan Clock, And ETR (Base On All Models)
UN0	Radio - AM/FM Stereo, Seek/Scan, Compact Disc, Auto Tone Control, Clock, And ETR (Radio Will Not Snap Fit Into I/P - No Attaching Fasteners)
UP0	Radio - AM/FM Stereo, Seek/Scan, Auto Reverse Music Search Cassette, Compact Disc, Auto Tone control, Clock, And ETR (Radio Will Not Snap Fit Into IP- No Attaching Fasteners, CD Will Be Remote Mounted Other Than The IP)
UQ3	Speaker System - Performance, Enhanced Audio
UQ5	Speaker System - Base (Speakers Will Snap-Fit, No Attaching Fasteners)
UQ7	Bose Radio Speaker System (Consists of An 11 Speaker System)
UV8	Provisions For Cellular Phone Ready Wiring Option
UW3	RDS Feature With European Frequency
UY2	Wiring Provisions for Camper / 5th Wheel Trailer
UY7	Trailer Wiring Harness
V10	Cold Climate Package
V43	Bumper - Painted, Rear Step - With Step Pad
V53	Luggage Carrier Roof
V54	Roof Mounted Luggage Carrier
V60	Gulf States Organizations - Vehicle Statement - Incomplete Vehicle
V76	Front Towing Hook
VB3	Bumper- Chrome. Rear Step - Rub Strip & Step Pad
VC0	Noise Label
VC4	Lable Price And Fuel, Puerto Rico/USVI
VC5	Export Shipping Label
VC7	Lable Price And Fuel Economy For Guam
VD1	European Provisions
VF7	Rear Bumper Delete
VG3	Bumper - Chrome Front W/ Upper Fascia
VGC	Paint Etch Preventive Protector Film (Required For All Vehicles Shipped To Hawaii)
VJ3	Lable, Plate - ECE Approval And VIN
VJ4	Lable, Export Child Seat Location
VPH	Vehicle Prep Overseas
VR4	Trailer Hitch Patform
VR6	Rear Shipping Hooks
VR7	Rear Recovering Towing Hook
VYU	Snow Plow Prep Package
VZ2	Calibration, Speedometer A
W86	Equipement, Disc Equipment For Venezuela (GMV Controlled)
W87	Parts, North American, Venezula Sourced
X88	Cheverolet Conversion
XBN	LT245/75R16C R/PE ST TBL OOR BW - Front
XBX	LT245/75R16C R/PE ST TBL OOR WOL - Front
XCC	P255/70R16-109S ALS BW - Front
XGA	P245/75R16 R/PE ST TL AT 109S BW - Front
XGB	P245/75R16 R/PE ST TL AT 109S WOL - Front
XGL	LT265/75R16 OOR BW - Front
XGC	P265/75R16 R/PE ST TL AT 114S BW - Front
XGD	P265/75R16 R/PE ST TL AT 114S WOL - Front
XHP	LT225/75R16D R/PE ST TL ALS BW - Front
XHS	P265/75R16-114S AT Temp (A) BW - Front
XIW	LT245/75R16E R/PE ST TL OOR BL - Front
XIZ	LT245/75R16E R/PE ST TL ALS BL - Front
XMG	P245/75R16-112S ALS (EL) BW - Front
XMH	P245/75R16-112S ALS (EL) WOL - Front

XMJ	P265/70R16-111S AL2 BW - Front
XMK	P265/70R16-111S AL2 WOL - Front
XNF	P235/75R16-106S ALS BW - Front
XNG	P235/75R16-106S ALS WOL - Front
XNK	P245/75R16-109S ALS BW - Front
XNL	P245/75R16-109S ALS WOL - Front
XYK	LT215/85R16D R/PE ST TL ALS BL - Front
XYL	LT215/85R16D R/PE ST TL OOR BL - Front
XYN	LT235/85R16E R/PE ST TL ALS BL - Front
YB3	Clutch Plate - Delete
YBN	LT245/75R16C R/PE ST TBL OOR BW - Rear
YBX	LT245/75R16C R/PE ST TBL OOR WOL - Rear
YCC	P255/70R16-109S ALS BW - Rear
YE9	Uplevel Decor
YF2	Ambulance Package
YF5	Emissions Requirements- California Customer
YF7	Upfitter Package
YGA	P245/75R16 R/PE ST TL AT 109S BW - Rear
YGB	P245/75R16 R/PE ST TL AT 109S WOL - Rear
YGC	P265/75R16 R/PE ST TL AT 114S BW - Rear
YGD	P265/75R16 R/PE ST TL AT 114S WOL - Rear
YGL	LT265/75R16 OOR BW - Rear
YHP	LT225/75R16D R/PE ST TL ALS BW - Rear
YHS	P265/75R-114S AT Temp (A) BW - Rear
YIW	LT245/75R16E R/PE ST TL OOR BL - Rear
YIZ	LT245/75R16E R/PE ST TL ALS BL - Rear
YMG	P245/75R16-112S ALS (EL) BW - Rear
YMH	P245/75R16-112S ALS (EL) WOL - Rear
YMJ	P265/70R16-111S AL2 BW - Rear
YMK	P265/70R16-111S AL2 WOL - Rear
YNF	P235/75R16-106S ALS BW - Rear
YNG	P235/75R16-106S ALS WOL - Rear
YNK	P245/75R16-109S ALS BW - Rear
YNL	P245/75R16-109S ALS WOL - Rear
YYK	LT215/85R16D R/PE ST TL ALS BL - Rear
YYL	LT215/85R16D R/PE ST TL OOR BL - Rear
YYN	LT235/85R16E R/PE ST TL ALS BL - Rear
Z49	canadian Equipment
Z55	Continously Variable Real Time Damping (CVRTD)
Z5X	Mirror Provisions Arabic Language
Z71	Off Road Suspension
Z82	Trailering Provisions HD (Not Available For Export To Europe, China, And FSU)
Z83	Solid Smooth Ride Suspension
Z85	Handling / Trailering Suspension
Z88	GMC Conversion (Available On All Domestic Models, Required For The Middle East)
ZBN	LT245/75R16C R/PE ST TBL OOR BW - Spare
ZBX	LT245/75R16C R/PE ST TBL OOR WOL - Spare
ZCC	P255/70R16-109S ALS BW - Spare
ZE5	ID Trim Level Base (Available For Export)
ZGA	P245/75R16 R/PE ST TL AT 109S BW - Spare
ZGB	P245/75R16 R/PE ST TL AT 109S WOL - Spare
ZGC	P265/75R16 R/PE ST TL AT 114S BW - Spare
ZGD	P265/75R16 R/PE ST TL AT 114S WOL - Spare

ZGL	LT 265/75R16 OOR BW - Spare
ZHP	LT225/75R16D R/PE ST TL ALS BW - Spare
ZHS	P265/75R16-114S AT Temp (A) BW - Spare
ZIW	LT245/75R16E R/PE ST TL OOR BL - Spare
ZIZ	LT245/75R16E R/PE ST TL ALS BL - Spare
ZM9	Features Enhancement Package
ZMG	P245/75R16-112S ALS (EL) BW - Spare
ZMH	P245/75R16-112S ALS (EL) WOL - Spare
ZMJ	P265/70R16-111S AL2 BW - Spare
ZMK	P265/70R16-11S AL2 WOL - Spare
ZNF	P235/75R16-106S ALS BW - Spare
ZNG	P235/75R16-106S ALS WOL - Spare
ZNK	P245/75R16-109S ALS BW - Spare
ZNL	P245/75R16-109S ALS WOL - Spare
ZW9	Base Body or Chassie
ZX3	Adjustable Electronic (Selectable) Suspension
ZY1	Solid Paint Scheme
ZY2	Two-Tone Paint Scheme (RequiresYE9)
ZYK	LT215/85R16D R/PE ST TL ALS BL - Spare
ZYL	LT215/85R16D R/PE ST TL OOR BL - Spare
ZYN	LT235/85R16E R/PE ST TL ALS BL - Spare

Technical Information

Maintenance and Lubrication

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
Engine Cooling System		
• 4.3L (VIN W) Automatic Transmission	12.0 liters	13.0 quarts
• 4.3L (VIN W) Manual Transmission	12.3 liters	13.0 quarts
• 4.8L (VIN V) Automatic Transmission	12.7 liters	13.4 quarts
• 4.8L (VIN V) Manual Transmission	13.0 liters	13.7 quarts
• 5.3L (VIN T) Automatic Transmission	12.7 liters	13.4 quarts
• 5.3L (VIN T) Automatic Transmission with optional Air Conditioning	14.1 liters	14.9 quarts
• 6.0L (VIN V) Automatic Transmission	14.0 liters	14.8 quarts
• 6.0L (VIN V) Automatic Transmission with optional Engine Oil Cooler	13.6 liters	14.4 quarts
• 6.0L (VIN V) Manual Transmission	14.4 liters	15.2 quarts
• 6.0L (VIN V) Manual Transmission with optional Engine Oil Cooler	14.0 liters	14.8 quarts
Engine Crankcase		
• 4.3L (VIN W) With Filter	4.3 liters	4.5 quarts
• 4.8L (VIN V) With Filter	5.7 liters	6.0 quarts
• 5.3L (VIN T) With Filter	5.7 liters	6.0 quarts
• 6.0L (VIN U) With Filter	5.7 liters	6.0 quarts
Transmission		
• 4L60-E	4.7 liters	5.0 quarts
• After Complete Overhaul	10.6 liters	11.2 quarts
• 4L80-E	7.3 liters	7.7 quarts
• After Complete Overhaul	12.8 liters	13.5 quarts
• New Venture Gear 3500 Manual Transmission	2.0 liters	2.1 quarts
• New Venture Gear 4500 Manual Transmission	3.8 liters	4.0 quarts
Transfer Case		
• New Venture 246 Auto 2 Speed	1.9 liters	2.0 quarts
• New Venture 261 Manual 2 Speed	1.9 liters	2.0 quarts
Axle		
• Rear 8.6 Inch Ring Gear	2.0 liters	0.52 gallons 2.1 quarts
• Rear 9.5 Inch Ring Gear	2.6 liters	0.67 gallons 2.7 quarts
• Rear 10.5 Inch Ring Gear	3.8 liters	0.81 gallons 3.25 quarts
• Front Axle	1.66 liters	3.5 pints
• Fuel Tank		
• Short Bed Models	98.0 liters	26.0 gallons
• Long Bed Models	128.0 liters	34.0 gallons

Maintenance Items

Usage	Type
Air Cleaner	
• 4.3L (VIN W)	A1300C
• 4.8L (VIN V)	A1519C
• 5.3L (VIN T)	A1519C
• 6.0L (VIN U)	A1519C
Engine Oil Filter	
• 4.3L (VIN W) RWD AND S4WD	AC Type PF-47
• 4.8L (VIN V) RWD and S4WD	AC Type PF-59
• 5.3L (VIN T) RWD and S4WD	AC Type PF-59
• 6.0L (VIN U) RWD and S4WD	RWD-AC Type PF-1218 S4WD-A/C Type PF-59
PCV Valve	
• 4.3L (VIN W)	CV769C
• 4.8L (VIN V)	CV948C
• 5.3L (VIN T)	CV948C
• 6.0L (VIN U)	CV948C
Spark Plugs and Gaps	
• 4.3L (VIN W)	AC Type 41-932 (GAP 1.52 mm, 0.060 in)
• 4.8L (VIN V)	AC Type 41-932 (GAP 1.52 mm, 0.060 in)
• 5.3L (VIN T)	AC Type 41-932 (GAP 1.52 mm, 0.060 in)
• 6.0L (VIN U)	AC Type 41-932 (GAP 1.52 mm, 0.060 in)
Fuel Filter	
• 4.3L (VIN W)	GF-626
• 4.8L (VIN V)	GF-626
• 5.3L (VIN T)	GF-626
• 6.0L (VIN U)	GF-626

Fluid and Lubricant Recommendations

Usage	Fluid/Lubricant
Engine Oil	Engine oil with the American Petroleum Institute Certified For Gasoline Engines STARBURST symbol of the proper viscosity. To determine the preferred viscosity for this vehicle's engine, refer to Explanation of Scheduled Maintenance.
Engine Coolant	50/50 mixture of clean drinkable water and use only GM Goodwrench® DEX-COOL® or Havoline® DEX-COOL® coolant.
Hydraulic Brake System	Delco Supreme 11® Brake Fluid (GM P/N 12377967 or equivalent DOT-3 brake fluid).
Parking Brake Cable Guides	Chassis lubricant (GM P/N 12377985 or equivalent) meeting requirements of NLGI Grade 2, Category GC or GC-LB
Power Steering System	GM Hydraulic Power Steering Fluid (GM P/N 1052884 - 1 pint, 1050017 - 1 quart, or equivalent).
Automatic Transmission	DEXRON®-III Automatic Transmission Fluid
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube® (GM P/N 12346241 or equivalent).
Chassis Lubrication	Chassis lubricant (GM P/N 12377985 or equivalent) or lubricant meeting requirements of NLGI Grade 2, Category GC or GC-LB.
Rear Wheel Bearings	Wheel bearing lubricant (GM P/N 1051344) or equivalent) or lubricant meeting requirements of NLGI Grade 2, Category GC or GC-LB
Front Axle	Axle Lubricant (GM P/N 1052271) or SAE 80W-90 GL-5 Gear Lubricant.
Rear Axle	Axle Lubricant (GM P/N 12378261) SAE 75W-90 Synthetic or equivalent meeting GM Specification 9986115.
Transfer Case	DEXRON®-III Automatic Transmission Fluid
Automatic Transfer Case	Automatic transfer case fluid (GM P/N 12378396)
Windshield Washer Solvent	GM Optikleen® Washer Solvent (GM P/N 1051515) or equivalent
Hood Latch Assembly • Pivots and Spring Anchor • Release Pawl	Lubriplate lubricant aerosol (GM Part No. 12346293 or equivalent) or lubricant meeting requirements of NLGI Grade 2, Category LB or GC-LB.
Hood and Door Hinges	Multi-Purpose lubricant, Superlube® (GM P/N 12346241 or equivalent).
Weatherstrip Conditioning	Dielectric Silicone Grease (GM P/N 12345579 or equivalent).

Descriptions and Operations

Power Steering System Description and Operation

The hydraulic power steering system consists of the following components:

- The pump
- The fluid reservoir
- The steering gear
- The pressure hose
- The return hose

The power steering pump is a vane-type pump. The pump houses the internal components inside the reservoir. The pump operates submerged in oil.

Two bore openings are located at the rear of the pump housing. The larger opening contains the following components:

- The cam ring
- The pressure plate
- The thrust plate
- The rotor and vane assembly
- The end plate

The smaller opening contains the following components:

- The pressure hose union
- The flow control valve
- The spring

The flow control orifice is part of the pressure control union. The pressure relief valve inside the flow control valve limits the pump pressure.

The power steering gear has a recirculating ball system. The system acts as a rolling thread between the worm shaft and the rack position. The lower end of the worm shaft is supported by a preloaded thrust bearing and two conical thrust races. The upper end of the worm shaft is supported by an adjusted plug. When you turn the worm shaft right, the rack piston moves up in the gear. When you turn the worm shaft left, the rack piston moves down in gear. The rack piston teeth mesh with the sector. The sector is part of the pitman shaft. The pitman shaft turns the wheels through the steering linkage.

The control valve in the steering gear directs the power steering fluid to either side of the rack piston. The rack piston converts the hydraulic pressure into a mechanical force. You can control the vehicle manually if the steering system becomes damaged and loses hydraulic pressure.

Steering Linkage Description and Operation

The steering linkage consists of a Pitman arm, idler arm, relay rod and two adjustable tie rods. On some 4WD vehicles, the steering shock absorber attaches to the relay rod.

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

The C3500HD steering linkage consists of the Pitman arm, the tie rod assembly, and the adjustable drag link.

In the heavy duty series, when you turn the wheel, the gear rotates the Pitman arm. The Pitman arm forces the adjustable drag link to one side. The tie rod moves sideways, activating the steering knuckles and turning the wheels.

The condition of the steering linkage affects the steering performance. If parts are bent, damaged, worn, or poorly lubricated, potentially dangerous steering action will result.

Steering Wheel and Column - Standard Description and Operation

The steering wheel and column has 4 primary functions:

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

Vehicle Steering

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

Vehicle Security

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

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

Driver Convenience

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

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

Driver Safety

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

Variable Effort Steering Description

The electronic variable orifice (EVO) system increases or decreases the amount of fluid leaving the power steering pump. This provides the driver with a comfortable balance of steering wheel feel and power assist.

At vehicle standstill or at very low speeds, the system allows full hydraulic fluid flow for maximum power assist and reduced steering effort. As the vehicle gains speed, a variable orifice closes at the steering pump which reduces the pump fluid flow. This action provides a stiffer steering wheel response for an improved road feel and a greater directional stability at highway speeds.

A sensor mounted on the steering column detects the steering wheel movements associated with defensive driving maneuvers. A control module uses this sensor input and the vehicle speed in order to adjust the amount of current to the solenoid.

The EVO system consists of the following components:

- The power steering (PS) solenoid actuator is located on the power steering pump discharged fitting.
- The EVO/Passlock™ module is mounted on the instrument panel carrier, beneath the radio.
- The steering handwheel speed sensor (HWSS) is located in the lower bearing of the steering column.
- The vehicle speed sensor is located on the transmission output shaft or on selectable four wheel drive the transfer case output shaft.
- The powertrain control module (PCM) is located in the engine compartment on the left inner wheel well panel (diesel engines only).
- The vehicle control module (VCM) is located in the engine compartment on the left inner wheel well panel (gasoline engines only).

Suspension Description and Operation

Front Suspension

The front suspension allows each wheel to compensate for changes in the road surface without affecting the opposite wheel. Each wheel independently connects to the frame with a steering knuckle, ball joint assemblies, and upper and lower control arms.

Two tie rods connect to the steering arms on the knuckles and to a relay rod. These rods steer the front wheels.

Rear wheel drive 15/25 series pickup and 25 series Suburban/Yukon XL models have a front suspension that consists of the following components:

- Control arms
- Stabilizer shaft
- Shock absorbers
- Coil springs (right and left side)

The upper part of each shock absorber extends through the spring pocket. Two insulators and a nut secure the upper part of the shock to the frame. Two bolts secure the lower part of the shock to the lower control arm.

A spring steel stabilizer shaft controls the side roll of the front suspension. This shaft is mounted in rubber insulators that are held by clamps to the frame side rails. The ends of the stabilizer shaft connect to the lower control arms with link bolts.

The upper ball joint assembly is press fit into the upper control arm. The assembly attaches to the steering knuckle with a prevailing torque nut.

The lower ball joint assembly is riveted into the outer end of the lower control arm. A prevailing torque nut joins the steering knuckle to the lower ball joint.

The inner ends of the upper and the lower control arms have pressed-in bushings. The bolts pass through the bushings and join the arms to the frame.

Ball joint assemblies have rubber grease seals. These seals prevent the entry of moisture and dirt. This prevents damage to the bearing surfaces. All ball joints have grease fittings for routine maintenance.

Four-wheel drive 15/25 series pickup and all 15 series Tahoe/Yukon/Suburban/Yukon XL models have a front suspension that consists of the following components:

- Control arms
- Stabilizer shaft
- Shock absorbers
- Torsion bars (right and left side)

The upper part of each shock absorber extends through a frame bracket. Two insulators and a nut secure the upper part of the shock to the frame. A through bolt secures the lower part of the shock to the lower control arm.

A spring steel stabilizer shaft controls the side roll of the front suspension. This shaft is mounted in rubber insulators that are held by clamps to the frame side rails. The ends of the stabilizer shaft connect to the lower control arms with link bolts.

The upper and the lower ball joint assemblies are press fit into the upper and lower control arms. The assembly attaches to the steering knuckle with a prevailing torque nut

Torsion bars replace the conventional coil springs. The front end of the torsion bar attaches to the lower control arm. The rear of the torsion bar mounts into an adjustable arm at the torsion bar crossmember. This arm adjustment controls the vehicle trim height.

Both RWD and 4WD models have sealed front wheel bearings. These bearings are pre-adjusted and need no lubrication.

Rear Suspension

All pickup models and 25 series Suburban/Yukon XL models use a rear spring suspension system and a solid rear axle suspension system. The rear axle is attached to the multi-rear springs by U-bolts. The front of the spring ends are attached to the frame at the front hangers through rubber bushings. The rear of the spring ends are attached to the frame with shackles that allow the springs to change their length, due to the spring compressing, while the vehicle is in motion. The ride control is provided by 2 identical direct dual-action shock absorbers that are angle-mounted between the frame and the brackets which are attached to the axle tubes.

All 15 series utility vehicles use a 5-link rear suspension system. The rear axle is attached to the frame with the upper control arms, lower control arms, and a track bar. Two coil springs and a link mounted rear stabilizer shaft complete the system.

The ride control is provided by 2 identical direct dual-action shock absorbers that are angle-mounted between the frame and the brackets which are attached to the axle tubes. Also available are the Autoride™ and self adjusting level control shocks as well as the gas charged monotube shocks. For information about the Autoride™ components refer to Real Time Damping below. The self adjusting level control shock utilizes a hydraulic pump inside each shock and raises the rear of the vehicle to the proper height based on inputs from the road surface while the vehicle is being driven.

Real Time Damping Description

The Real Time Damping/AutoRide™ system consists of the following components: A control module, four dampers, and four position sensors. In addition, 15 series vehicles equipped with Real Time Damping/AutoRide™ have an integrated Automatic Level Control (ALC) system. The ALC consists of the rear automatic level control dampers and the automatic level control air compressor

The Real Time Damping/AutoRide™ system is fully automatic and uses a computer controller to continuously monitor vehicle speed, wheel to body position, lift/dive and steering position of the vehicle. The controller then sends signals to each damper to independently adjust the damping level.

The Real Time Damping/AutoRide™ system also interacts with the Tow/Haul switch. When engaged the Tow/Haul mode will provide additional control of the dampers.

The ALC is fully automatic and will provide a level ride under a variety of passenger and loading conditions. The ALC system utilizes inputs from the Real Time Damping/AutoRide™ position sensors to the ALC air compressor to raise or lower the rear dampers and maintain the proper vehicle height.

Selectable Ride System Description

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

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

Wheels and Tires

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Hoist to Crossmember Nut	40 N·m	30 lb ft
Wheel Nut Stud (6 Studs)	190 N·m	140 lb ft
Wheel Nut Sutd (8 Studs)	190 N·m	140 lb ft

Tire and Wheel Specifications

Rim Type	Steel	Styled Steel	Aluminum	Spare
15 Series				
Bolt Circle Diameter (in)	5.50	5.50	5.50	5.50
Bolt Holes	6	6	6	6
Offset (mm)	31	31	31	31
Rim Width (in)	6.5	6.5	6.5	6.5
Wheel Nuts	M14 x 1.5	M14 x 1.5	M14 x 1.5	M14 x 1.5
Wheel Rating (kg/lbs)	905/2000	905/2000	905/2000	905/2000
Wheel Rating (kPa/psi)	379/55	379/55	379/55	379/55
Wheel Size	16 x 6.5	16 x 6.5	16 x 6.5	16 x 6.5
25 Series				
Bolt Circle Diameter (in)	6.50	6.50	6.50	6.50
Bolt Holes	8	8	8	8
Offset (mm)	28	28	28	28
Rim Width (in)	6.5	6.5	6.5	6.5
Wheel Nuts	M14 x 1.5	M14 x 1.5	M14 x 1.5	M14 x 1.5
Wheel Rating (kPa/psi)	551/80	551/80	551/80	551/80
Wheel Rating (kg/lbs)	1367/3042	1367/3042	1367/3042	1367/3042
Wheel Size	16 x 6.5	16 x 6.5	16 x 6.5	16 x 6.5

General Description

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

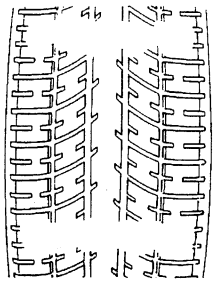
The following factors have an important influence on tire life:

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

The following factors increase tire wear:

- Heavy cornering
- Excessively rapid acceleration
- Heavy braking

Tread Wear Indicators Description



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

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

Metric Wheel Nuts and Bolts Description

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

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

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

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

Tire Inflation Description

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

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

Inspect the tire pressure when the following conditions apply:

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

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

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

Inflation Pressure Conversion (Kilopascals to PSI)

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

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

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

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

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

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

- Uneven braking
- Steering lead
- Reduced vehicle handling

Tire Description

Caution

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

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

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

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

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

The following is required of replacement tires:

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

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

- May seriously affect the ride.
- May seriously affect the handling.
- May seriously affect the speedometer/odometer calibration.
- May seriously affect the antilock brake system.
- May seriously affect the vehicle ground clearance.
- May seriously affect the trailering capacity.
- May seriously affect the tire clearance to the body.
- May seriously affect the tire clearance to the chassis.

Conditions for Tire Replacement

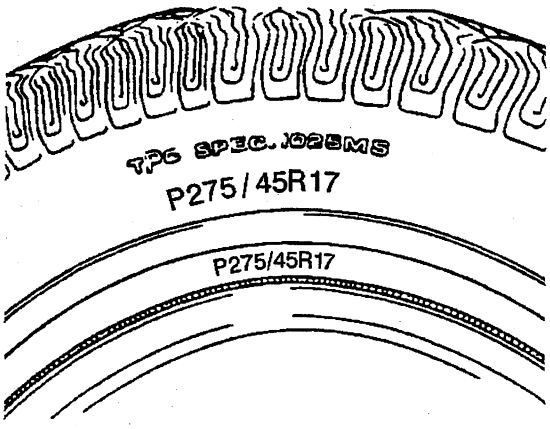
Replace the tires when one and/or all of the following conditions are evident:

- When the tire(s) is worn to a point where 1.6 mm (2/32 in) or less of tread remains. The tires have built in tread wear indicators that appear between the tread grooves when the tread is worn to 1.6 mm (2/32 in) or less to help in the detection of this condition. Replace the tire when the indicators appear in two or more adjacent grooves at three spots around the tire.
- When the following conditions are evident on the tread:
  - When the tread is cracked.
  - When the tread is cut.
  - When the tread is snagged deeply enough to expose the cord.
  - When the tread is snagged deeply enough to expose the fabric.
  - When the sidewall is snagged deeply enough to expose the cord.
  - When the sidewall is snagged deeply enough to expose the fabric.

- When the following conditions are evident on the tire:
  - When the tire has a bump.
  - When the tire has a bulge (protrusion).
  - When the tire is split.
  - Please note that slight sidewall indentations are normal in radial tires.
- When the following damage is evident on the tire and the damage cannot be correctly repaired because of the size or the location of the damage:
  - When the tire has a puncture.
  - When the tire is cut, or other damage.

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

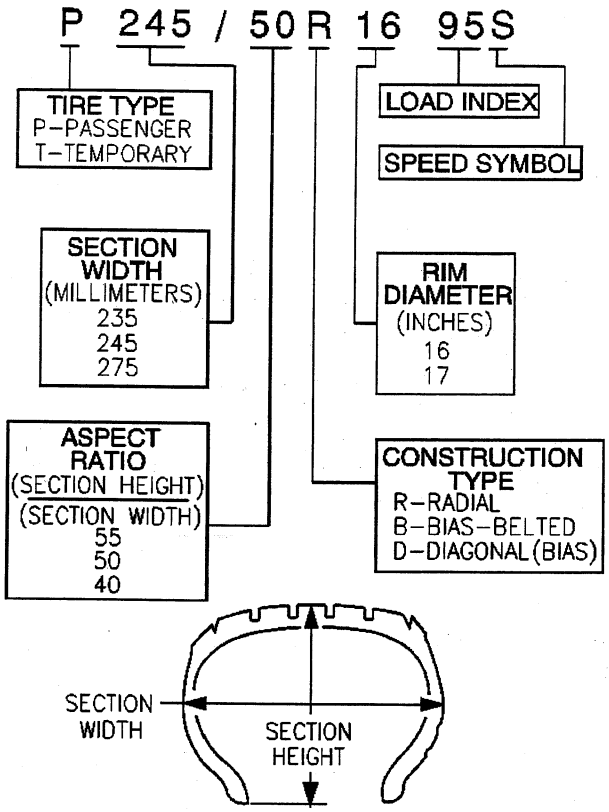
All Seasons Tires Description



Most GM vehicles are equipped with steel belted all-season radial tires as standard equipment. These tires qualify as snow tires, with a higher than average rating for snow traction than the non-all season radial tires previously used. Other performance areas, such as wet traction, rolling resistance, tread life, and air retention, are also improved. This is done by improvements in both tread design and tread compounds. These tires are identified by an M + S molded in the tire side wall after the tire size. The suffix MS is also molded in the tire side wall after the TPC specification number.

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

P-Metric Sized Tires Description



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

Driveline System Description and Operation

Driveline/Axle – Propeller Shaft

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

Front Propeller Shaft Description

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

One Piece Propeller Shaft Description

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

Two Piece Propeller Shaft Description

There are 3 universal joints used on the two piece propeller shaft, A center bearing assembly is used to support the propeller shaft connection point, and help isolate the vehicle from vibration.

Propeller Shaft Phasing Description

The propeller shaft is designed and built with the yoke lugs (ears) in line with each other. This produces the smoothest running shaft possible. A propeller shaft designed with built in yoke lugs in line is known as in - phase. An out of phase propeller shaft often causes vibration. The propeller shaft generates vibration from speeding up and slowing down each time the universal joint goes around. The vibration is the same as a person snapping a rope and watching the wave reaction flow to the end. An in phase propeller shaft is similar to 2 persons snapping a rope at the same time and watching the waves meet and cancel each other out. A total cancellation of vibration produces a smooth flow of power in the drive line. All splined shaft slip yokes are keyed in order to ensure proper phasing.

Universal Joint Description

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

Center Bearing Description

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

Front Drive Axle Description and Operation

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

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

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

The front axle on Selectable Four Wheel Drive model vehicles uses a central disconnect feature in order to engage and disengage the front axle. When the driver engages the 4WD system, the Transfer Case Control Module sends a signal to the electric motor actuator to energize and extend the plunger inside. The extended plunger moves the clutch fork and clutch fork sleeve across the inner axle shaft and the clutch fork shaft and locks the two shafts together. The locking of the two shafts allows the axle to operate in the same manner as a semi-floating rear axle. A propeller shaft connects the transfer case to the front axle. The differential carrier assembly uses a conventional ring and pinion gear set to transmit the driving

force of the engine to the wheels. The open differential allows the wheels to turn at different rates of speed while the axle continues to transmit the driving force. This prevents tire scuffing when going around corners and premature wear on internal axle parts. The ring and pinion set and the differential are contained within the carrier. The axle identification number is located on top of the differential carrier assembly or on a label on the bottom of the right half of differential carrier assembly. The drive axles are completely flexible assemblies consisting of inner and outer constant velocity CV joints protected by thermoplastic boots and connected by a wheel drive shaft.

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

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

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

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

Rear Drive Axle Description and Operation

Rear axles for this vehicle consist of the following components:

- Differential axle housing
- Differential carrier
- Right and left axle tubes
- Right and left axle shafts

These axles are either full-floating or semi-floating. These axles can be identified as follows: the semi-floating axle has axle shafts with C-clips inside the differential carrier on the inner ends of the axle shafts. The full-floating axle has bolts at the hub retaining the axle shafts to the hub assembly. The axles can be identified by the stamping on the right side axle tube and may also be identified by the ring gear size. The ring gear sizes include 8.60, 9.50, and 10.50 inch axles. The locking differential information for these rear axles can be located in the locking differential section.

The driveline components in this vehicle have been system balanced at the factory. System balance provides for a smoother running driveline. These components include the propeller shafts, drive axles, pinion shafts and output shafts. Affixed to the rear axle is a system balanced driveline notice indicating that the driveline components have been factory tested. All components must be referenced marked before disassembly and reassembly in the exact relationship to each other the components had before removal.

An open differential has a set of four gears. Two are side gears and two are pinion gears. Some differentials have more than two pinion gears. Each side gear is splined to an axle shaft which turns when it's side gear rotates. The pinion gears are mounted on a differential pinion shaft, and the gears are free to rotate on this shaft. The pinion shaft is fitted into a bore in the differential case and is at right angles to the axle shafts. Power is transmitted through the differential as follows: the drive pinion rotates the ring gear. The ring gear, which is bolted to the differential case, rotates the case. The differential pinion, as it rotates the case, forces the pinion gears against the side gears. When both wheels have equal traction, the pinion gears do not rotate on the pinion shaft because the input force on the pinion gear is equally divided between the two side gears. Therefore, the pinion gears revolve with the pinion shaft, but do not rotate around the shaft itself. The side gears, being splined to the axle shafts and in mesh with the pinion

gears rotate the axle shafts. If a vehicle were always driven in a straight line, the ring and pinion gears would be sufficient. The axle shaft could be solidly attached to the ring gear and both driving wheels would turn at equal speed. However, if it became necessary to turn a corner, the tires would scuff and slide because the differential allows the axle shafts to rotate at different speeds. When the vehicle turns a corner, the inner wheel turns slower than the outer wheel and slows it's rear axle side gear because the shaft is splined to the side gear. The rear axle pinion gears will roll around the slowed rear axle side gear, driving the rear axle side gear wheel faster.

Locking/Limited Slip Rear Axle Description and Operation

The locking differential consists of the following components:

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

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

Limited-Slip Function

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

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

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

Locking Function

Locking action occurs through the use of some special parts:

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

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

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

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

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

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

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

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

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

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

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

Locking Differential Torque-Limiting Disc

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

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

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

Transfer Case - NVG 246-NP8 (Two Speed Automatic)

Transfer Case Circuit Description

Transfer Case Shift Control Module

The transfer case shift control module uses the VIN information for calculations that are required for the different calibrations used based on axle ratio, transmission, tire size, and engine. The system does not know which calibration to use without this information.

Transfer Case Encoder Motor

The transfer case encoder motor consists of a permanent magnet (PM) DC motor and gear reduction assembly. It is located on the left hand side (drivers side) of the transfer case. When activated it turns the sector shaft of the transfer case (clockwise or counter clockwise) to shift the transfer case. The encoder motor is controlled with a pulse width modulated (PWM) circuit within the transfer case shift control module. This circuit consists of a driver on both the Motor Feed A and Motor Feed B circuits. The encoder motor is bi-directional to allow the motor to shift the transfer case from 2HI or 4HI to NEUTRAL and 4LO positions.

Transfer Case Encoder

The encoder is mounted to the transfer case encoder motor assembly and is replaced as an assembly. The encoder converts the sector shaft position (representing a mode or range) into electrical signals inputs to the transfer case shift control module. The module can detect what position the transfer case is in by monitoring the 4 encoder channels (P, A, B, and C). These inputs translates into AUTO 4WD, 2H, 4H, NEUTRAL, and 4L or in transition between gears.

Transfer Case Motor Lock

The transfer case motor lock is used to provide a 2H, 4H, and 4L lock-up feature. When the lock circuit is energized, the transfer case encoder motor is allowed to turn. When the transfer case is placed 2H, 4H, or 4L the motor lock circuit has no power provided to it and the lock is applied. This assures that the transfer case remains in the current gear position. When AUTO 4WD is selected the motor lock remains applied until an adaptive mode (torque is applied to the front propshaft) is required. During an adaptive mode the motor lock circuit is energized and the motor lock is released, enabling the encoder motor to turn and apply torque to the front propshaft.

Transfer Case Speed Sensors

There are three speed sensors on the automatic transfer case (ATC), two on the rear output shaft and one on the front output shaft. Each speed sensor is a permanent magnet (PM) generator. The PM generator produces a pulsing AC voltage. The AC voltage level and number of pulses increases as speed increases.

Vehicle Speed Sensor

One of the two on the rear output shaft is the vehicle speed sensor (VSS) input to the/powertrain control module (PCM). The PCM sends this information to the transfer case shift control module via the Class 2 Serial Data bus.

Rear Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the rear transfer case speed sensor to a rear propshaft speed in RPM to be used for calculations. The rear propshaft speed can be displayed with a scan tool.

Front Propshaft Speed Sensor

The transfer case shift control module converts the pulsating AC voltage from the front transfer case speed sensor to front propshaft speed in RPM to be used for calculations, and to monitor the difference between the front and rear sensor speed. It is also used in the AUTO 4WD mode of operation to determine the amount of slip and the percent of torque to apply to the front axle. The front propshaft speed can be displayed with a scan tool.

SERVICE indicator (4WD/AWD) Lamp

The SERVICE indicator (4WD/AWD) lamp is an integral part of the cluster and cannot be serviced separately. This lamp is used to inform the driver of the vehicle of malfunctions within the automatic transfer case (ATC) system. The SERVICE indicator (4WD/AWD) lamp is controlled by the transfer case shift control module via a Class 2 message or by a Sevice Indicator Control Circuit.

Braking System Description and Operation

Hydraulic Brake System Description and Operation

System Component Description

The hydraulic brake system consists of the following:

Hydraulic Brake Master Cylinder Fluid Reservoir

Contains supply of brake fluid for the hydraulic brake system.

Hydraulic Brake Master Cylinder

Converts mechanical input force into hydraulic output pressure.

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

Hydraulic Brake Pressure Balance Control System

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

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

Hydraulic Brake Pipes and Flexible Brake Hoses

Carries brake fluid to and from hydraulic brake system components.

Hydraulic Brake Wheel Apply Components

Converts hydraulic input pressure into mechanical output force.

System Operation

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

Brake Assist System Description and Operation

System Component Description

The brake assist system consists of the following:

Brake Pedal

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

Brake Pedal Pushrod

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

Vacuum Brake Booster

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

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

Vacuum Source

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

Vacuum Source Delivery System

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

System Operation

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

Disc Brake System Description and Operation

System Component Description

The disc brake system consists of the following components:

Disc Brake Pads

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

Disc Brake Rotors

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

Disc Brake Pad Hardware

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

Disc Brake Caliper Hardware

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

System Operation

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

Park Brake System Description and Operation

The park brake system is applied by depressing the park brake pedal. Applying the park brake pedal places tension on the park brake cables, which actuates the rear park brake mechanism. The system mechanically forces the parking brake shoes against the drum of the rotor, locking the rear brakes.

All vehicles are equipped with a four-wheel disc braking system. The park brake system uses brake shoes which are inside a brake drum that is part of a one-piece drum/rotor casting. The brake shoes are mechanically applied to lock the rear brakes.

This section covers park brake component replacement and adjustment. The park brake must be adjusted any time the park brake cables have been replaced or disconnected, or if the park brake holding ability is inadequate. The lever on the disc brakes must also be properly seated when this procedure is performed.

The park brake is not designed for use in the place of service brakes and should be applied only after the vehicle is brought to a complete stop, except in an emergency. Before working on the park brake system, make sure the service brakes are in good working order and adjusted properly.

Park Brake Lever

The park brake lever is located on the left side of the driver's compartment and is activated by foot pressure. The park brake lever incorporates a cable self adjusting mechanism. The park brake release handle under the instrument panel allows the driver to release the park brake and control the foot lever release velocity. The park brake lever requires minimal pedal effort to engage the park brake.

Cable System

The park brake uses a cable system that includes a front cable, an intermediate cable with a threaded rod and an equalizer, and two rear cables. The front cable connects to the park brake lever on one end and to the intermediate cable at the other end. The rear cables attach to the equalizer on one end and to the lever on the disc brakes at the other end.

This vehicle is equipped with coated park brake cable assemblies. The wire strand is coated with a nylon material that slides over plastic seals inside the conduit end fittings. This is for corrosion protection and reduced park brake effort.

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 – 4.8L, 5.3L & 6.0L

Engine Mechanical Specifications 4.8L LR4 (VIN V)

Application	Metric	English
General Data		
• Engine Type	V8	
• Displacement	4.8L	293 CID
• Bore	96.009 mm	3.779 in
• Stroke	83.0 mm	3.268 in
• Compression Ratio	9.45:1	
• Firing Order	1-8-7-2-6-5-4-3	
• Spark Plug Gap	1.524 mm	0.06 in
Lubrication System		
• Oil Capacity (without Oil Filter Change)	4.73 Liters	5.0 Quarts
• Oil Capacity (with Oil Filter Change)	5.68 Liters	6.0 Quarts
• Oil Pressure (Minimum--Hot)	41 kPa at 1,000 engine RPM 124 kPa at 2,000 engine RPM 165 kPa at 4,000 engine RPM	6 psig at 1,000 engine RPM 18 psig at 2,000 engine RPM 24 psig at 4,000 engine RPM
• Oil Type	5W-30	

Engine Mechanical Specifications 5.3L LM7 (VIN T)

Application	Metric	English
General Data		
• Engine Type	V8	
• Displacement	5.3L	325 CID
• Bore	96.009 mm	3.779 in
• Stroke	92.0 mm	3.622 in
• Compression Ratio	9.45:1	
• Firing Order	1-8-7-2-6-5-4-3	
• Spark Plug Gap	1.524 mm	0.06 in
Lubrication System		
• Oil Capacity (without Oil Filter Change)	4.73 Liters	5.0 Quarts
• Oil Capacity (with Oil Filter Change)	5.68 Liters	6.0 Quarts
• Oil Pressure (Minimum--Hot)	41 kPa at 1,000 engine RPM 124 kPa at 2,000 engine RPM 165 kPa at 4,000 engine RPM	6 psig at 1,000 engine RPM 18 psig at 2,000 engine RPM 24 psig at 4,000 engine RPM
• Oil Type	5W-30	

Engine Mechanical Specifications 6.0L LQ4 (VIN U)

Application	Metric	English
General Data		
• Engine Type	V8	
• Displacement	6.0L	364 CID
• Bore	101.627 mm	4.001 in
• Stroke	92.0 mm	3.622 in
• Compression Ratio	9.40:1	
• Firing Order	1-8-7-2-6-5-4-3	
• Spark Plug Gap	1.524 mm	0.06 in
Lubrication System		
• Oil Capacity (without Oil Filter Change)	4.73 Liters	5.0 Quarts
• Oil Capacity (with Oil Filter Change)	5.68 Liters	6.0 Quarts
• Oil Pressure (Minimum--Hot)	41 kPa at 1,000 engine RPM 124 kPa at 2,000 engine RPM 165 kPa at 4,000 engine RPM	6 psig at 1,000 engine RPM 18 psig at 2,000 engine RPM 24 psig at 4,000 engine RPM
• Oil Type	5W-30	

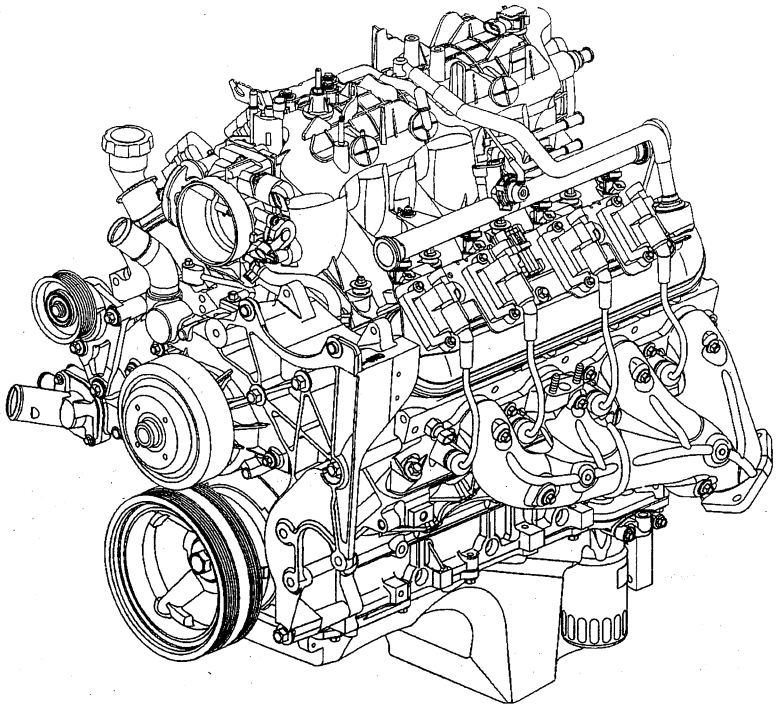
Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accelerator Control Cable Bracket Bolts	10 N·m	89 lb in
Air Conditioning Compressor Bolts	50 N·m	37 lb ft
Air Conditioning Compressor Bracket Bolts	50 N·m	37 lb ft
Air Conditioning Tensioner Bolt	50 N·m	37 lb ft
Air Injection Reaction (AIR) Pipe-to-Exhaust Manifold Nuts	25 N·m	18 lb ft
AIR Pipe-to-Exhaust Manifold Studs	5 N·m	45 lb in
Camshaft Retainer Bolts	25 N·m	18 lb ft
Camshaft Sensor Bolt	25 N·m	18 lb ft
Camshaft Sprocket Bolts	35 N·m	26 lb ft
Connecting Rod Bolts - First Pass	20 N·m	15 lb ft
Connecting Rod Bolts - Final Pass	75 degrees	
Coolant Temperature Gauge Sensor	20 N·m	15 lb ft
Crankshaft Balancer Bolt (Installation Pass-to Ensure the Balancer is Completely Installed)	330 N·m	240 lb ft
Crankshaft Balancer Bolt (First Pass-Install a NEW Bolt After the Installation Pass and Tighten as Described in the First and Final Passes)	50 N·m	37 lb ft
Crankshaft Balancer Bolt (Final Pass)	140 degrees	
Crankshaft Bearing Cap Bolts (Inner Bolts-First Pass in Sequence)	20 N·m	15 lb ft
Crankshaft Bearing Cap Bolts (Inner Bolts-Final Pass in Sequence)	80 degrees	
Crankshaft Bearing Cap Side Bolts	25 N·m	18 lb ft
Crankshaft Bearing Cap Studs (Outer Studs-First Pass in Sequence)	20 N·m	15 lb ft
Crankshaft Bearing Cap Studs (Outer Studs-Final Pass in Sequence)	51 degrees	

Crankshaft Oil Deflector Nuts	25 N·m	18 lb ft
Crankshaft Position Sensor Bolt	25 N·m	18 lb ft
Cylinder Head Bolts (First Pass all M11 Bolts in Sequence)	30 N·m	22 lb ft
Cylinder Head Bolts (Second Pass all M11 Bolts in Sequence)	90 degrees	
Cylinder Head Bolts (Final Pass all M11 Bolts in Sequence-Excluding the Medium Length Bolts at the Front and Rear of Each Cylinder Head)	90 degrees	
Cylinder Head Bolts (Final Pass M11 Medium Length Bolts at the Front and Rear of Each Cylinder Head in Sequence)	50 degrees	
Cylinder Head Bolts (M8 Inner Bolts in Sequence)	30 N·m	22 lb ft
Cylinder Head Coolant Plug	20 N·m	15 lb ft
Cylinder Head Core Hole Plug	20 N·m	15 lb ft
Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Drive Belt Tensioner Bolts	50 N·m	37 lb ft
Engine Block Coolant Drain Plugs	60 N·m	44 lb ft
Engine Block Heater	40 N·m	30 lb ft
Engine Block Oil Gallery Plugs	60 N·m	44 lb ft
Engine Coolant Air Bleed Pipe Bolts	12 N·m	106 lb in
Engine Flywheel Bolts (First Pass)	20 N·m	15 lb ft
Engine Flywheel Bolts (Second Pass)	50 N·m	37 lb ft
Engine Flywheel Bolts (Final Pass)	100 N·m	74 lb ft
Engine Front Cover Bolts	25 N·m	18 lb ft
Engine Oil Cooler Pipe Bolt	10 N·m	89 lb in
Engine Rear Cover Bolts	25 N·m	18 lb ft
Engine Service Lift Bracket M10 Bolts	50 N·m	37 lb ft
Engine Service Lift Bracket M8 Bolt	25 N·m	18 lb ft
Engine Sight Shield Bolts	10 N·m	89 lb in
Engine Sight Shield Bracket Bolts	5 N·m	45 lb in
Engine Valley Cover Bolts	25 N·m	18 lb ft
Engine Wiring Harness Nut	10 N·m	89 lb in
Exhaust Gas Recirculation (EGR) Valve Bolts (First Pass)	10 N·m	89 lb in
EGR Valve Bolts (Final Pass)	30 N·m	22 lb ft
EGR Valve Pipe-to-Cylinder Head Bolts	50 N·m	37 lb ft
EGR Valve Pipe-to-Exhaust Manifold Bolts	30 N·m	22 lb ft
EGR Valve Pipe-to-Intake Manifold Bolt	10 N·m	89 lb in
Exhaust Manifold AIR Pipe Studs	5 N·m	45 lb in
Exhaust Manifold Bolts (First Pass)	15 N·m	11 lb ft
Exhaust Manifold Bolts (Final Pass)	25 N·m	18 lb ft
Exhaust Manifold Heat Shield Bolts	9 N·m	80 lb in
Evaporative Emission (EVAP) Purge Solenoid Bolt	10 N·m	89 lb in
Fuel Rail Bolts	10 N·m	89 lb in
Fuel Rail Crossover Tube Bolts	3.8 N·m	34 lb in
Fuel Rail Stop Bracket Bolt	50 N·m	37 lb ft
Generator and Power Steering Bracket Bolts	50 N·m	37 lb ft
Ignition Coil-to-Bracket Bolts	8 N·m	71 lb in
Ignition Coil Bracket-to-Valve Rocker Arm Cover Studs	12 N·m	106 lb in
Intake Manifold Bolts (First Pass in Sequence)	5 N·m	44 lb in
Intake Manifold Bolts (Final Pass in Sequence)	10 N·m	89 lb in
Intake Manifold Wiring Harness Stud	10 N·m	89 lb in
Knock Sensors	20 N·m	15 lb ft
Oil Filter	30 N·m	22 lb ft
Oil Filter Fitting	55 N·m	40 lb ft
Oil Level Indicator Tube Bolt	25 N·m	18 lb ft
Oil Level Sensor	13 N·m	115 lb in

Oil Pan Baffle Bolts	12 N·m	106 lb in
Oil Pan Closeout Cover Bolt (Left Side)	9 N·m	80 lb in
Oil Pan Closeout Cover Bolt (Right Side)	9 N·m	80 lb in
Oil Pan Cover Bolts	12 N·m	106 lb in
Oil Pan Drain Plug	25 N·m	18 lb ft
Oil Pan M8 Bolts (Oil Pan-to-Engine Block and Oil Pan-to-Front Cover)	25 N·m	18 lb ft
Oil Pan M6 Bolts (Oil Pan-to-Rear Cover)	12 N·m	106 lb in
Oil Pressure Sensor	20 N·m	15 lb ft
Oil Pump-to-Engine Block Bolts	25 N·m	18 lb ft
Oil Pump Cover Bolts	12 N·m	106 lb in
Oil Pump Relief Valve Plug	12 N·m	106 lb in
Oil Pump Screen Nuts	25 N·m	18 lb ft
Oil Pump Screen-to-Oil Pump Bolt	12 N·m	106 lb in
Power Steering Pump Bolts	50 N·m	37 lb ft
Power Steering Pump Bracket Bolts/Nuts	50 N·m	37 lb ft
Spark Plugs (Aluminum Cylinder Heads-New)	20 N·m	15 lb ft
Spark Plugs (Aluminum Cylinder Heads-all Subsequent Installations)	15 N·m	11 lb ft
Spark Plugs (Iron Cylinder Heads-New)	30 N·m	22 lb ft
Spark Plugs (Iron Cylinder Heads-all Subsequent Installations)	15 N·m	11 lb ft
Throttle Body Nuts	10 N·m	89 lb in
Throttle Body Studs	6 N·m	53 lb in
Transmission Housing Bolt	50 N·m	37 lb ft
Valve Lifter Guide Bolts	12 N·m	106 lb in
Valve Rocker Arm Bolts	30 N·m	22 lb ft
Valve Rocker Arm Cover Bolts	12 N·m	106 lb in
Water Inlet Housing Bolts	15 N·m	11 lb ft
Water Pump Bolts (First Pass)	15 N·m	11 lb ft
Water Pump Bolts (Final Pass)	30 N·m	22 lb ft
Water Pump Cover Bolts	15 N·m	11 lb ft
Water Pump Pulley Bolts (First Pass)	10 N·m	89 lb in
Water Pump Pulley Bolts (Final Pass)	25 N·m	18 lb ft

Engine Component Description



The 4.8, 5.3, and 6.0 Liter V8 engines are identified as RPO LR4 VIN V (4.8L), RPO LM7 VIN T (5.3L), and RPO LQ4 VIN U (6.0L).

Camshaft and Drive System

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

Crankshaft

The crankshaft is cast nodular iron. The crankshaft is supported by five crankshaft bearings. The bearings are retained by crankshaft bearing caps which are machined with the engine block for proper alignment and clearance. The crankshaft journals are undercut and rolled. The center main journal is the thrust journal. A crankshaft position reluctor ring is press fit mounted at the rear of the crankshaft. The reluctor ring is not serviceable separately.

Cylinder Heads

The cylinder head assemblies are either cast aluminum (4.8L and 5.3L) or cast iron (6.0L). The aluminum heads have pressed in place powdered metal valve guides. The iron heads have machined integral valve guides. Aluminum and iron cylinder heads have pressed in place powdered metal valve seats. Passages for the engine coolant air bleed system are at the front and rear of each cylinder head. There are no additional exhaust gas passages within the cylinder heads.

Engine Block

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

Exhaust Manifolds

The exhaust manifolds are a one piece cast iron design. The exhaust manifolds direct exhaust gasses from the combustion chambers to the exhaust system. Each manifold has a single inlet for the Air Injection Reaction (AIR) system (California applications) and the right manifold has an outlet for the Exhaust Gas Recirculation (EGR) system. Exhaust system gasses are directed from the right exhaust manifold through the EGR pipe assembly and valve to the intake manifold. The EGR pipe assembly is retained to the exhaust manifold by two bolts and sealed at the exhaust manifold flange with a gasket. The EGR pipe assembly is retained to the intake manifold by one bolt and sealed by an O-ring seal. Each manifold also has an externally mounted heat shield that is retained by bolts.

Intake Manifold

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

Oil Pan

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

Piston and Connecting Rod Assembly

The pistons are cast aluminum. The pistons use two compression rings and one oil control ring assembly. The piston is a low friction, lightweight design with a flat top and barrel shaped skirt. The piston pins are chromium steel. They have floating fit in the piston and are retained by a press fit in the connecting rod. The connecting rods are powdered metal. The connecting rods are fractured at the connecting rod journal and then machined for the proper clearance. The piston, pin, and connecting rod are to be serviced as an assembly.

Valve Rocker Arm Cover Assemblies

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

Valve Train

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

Drive Belt System Description

The drive belt system consists of the following components:

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

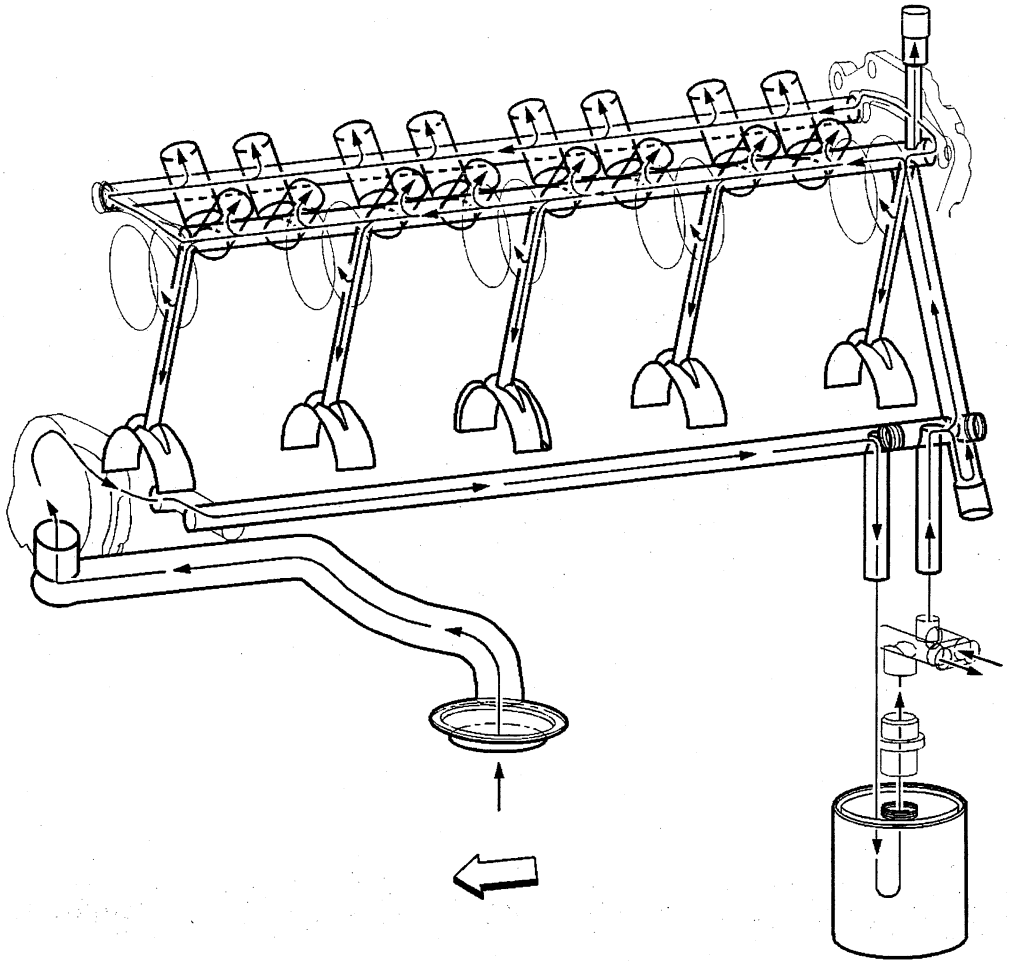
The drive belt system may use one belt or two belts. The drive belt is thin so that it can bend backwards and has several ribs to match the grooves in the pulleys. There also may be a V-belt style belt used to drive certain accessory drive components. The drive belts are made of different types of rubbers (chloroprene or EPDM) and have different layers or plys containing either fiber cloth or cords for reinforcement.

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

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

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

Lubrication



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

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

Engine Cooling

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Coolant Heater Cord to Frame Bolts	8 N·m	71 lb in
Coolant Heater to Engine Block (4.3L)	2 N·m	18 lb in
Coolant Heater to Engine Block (4.8L, 5.3L, 6.0L)	40 N·m	30 lb ft
Coolant Outlet Bolts (4.3L)	19 N·m	14 lb ft
Fan Blade Clutch Bolts	23 N·m	17 lb ft
Fan Clutch Nut	56 N·m	41 lb ft
Fan Shroud Bolts	9 N·m	80 lb in
Oil Cooler Line Clip Bolt	50 N·m	37 lb ft
Oil Cooler Line Junction Block Bolt	9 N·m	80 lb in
Radiator Mounting Bolt	25 N·m	18 lb ft
Surge Tank Nut	10 N·m	89 lb in
Thermostat to Coolant Pump Bolts (4.8L,5.3L,6.0L)	15 N·m	11 lb ft

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. It's purpose is to help regulate the operating temperature of the engine. It utilizes a temperature sensitive wax-pellet element. The element connects to a valve through a small piston. When the element is heated, it expands and exerts pressure against the small piston. This pressure forces the valve to open. As the element is cooled, it contracts. This contraction allows a spring to push the valve closed.

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

Engine Oil Cooler

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

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

Transmission Oil Cooler

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

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

Engine Electrical

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Auxiliary Negative Battery Cable to Block Bolt (TP2)	16 N·m	12 lb ft
Battery Hold Down Bolt	9 N·m	80 lb in
Battery Tray Bolts (All)	9 N·m	80 lb in
Battery Tray Nuts (Right)	25 N·m	18 lb ft
Camshaft Position Sensor Screws	2.2 N·m	20 lb in
Closeout Cover Bolt	9 N·m	80 lb in
Front Axle Mounting Bracket Thru-bolt Nut	90 N·m	67 lb ft
Generator Left Mounting Bolt (4.3L)	50 N·m	37 lb ft
Generator Mounting Bolts (4.8L,5.3L,6.0L)	50 N·m	37 lb ft
Generator Right Mounting Bolt (4.3L)	25 N·m	18 lb ft
Negative Battery Cable to Battery Bolt	17 N·m	13 lb ft
Negative Battery Cable to Block Bolt (4.8L,5.3L,6.0L)	25 N·m	18 lb ft
Negative Battery Cable to Block Bolt (4.3L)	16 N·m	12 lb ft
Negative Battery Cable to Frame Bolt	9 N·m	80 lb in
Positive Battery Cable to Battery Bolt	17 N·m	13 lb ft
Positive Battery Cable to Engine Bolt (4.8L,5.3L,6.0L)	12 N·m	106 lb in
Positive Battery Cable to Engine Nut (4.3L)	12 N·m	106 lb in
Positive Battery Cable to Generator B+ Nut	18 N·m	13 lb ft
Positive Battery Cable to Relay (TP2, Gas Engines)	9 N·m	80 lb in
Positive Battery Cable to Starter Nut	16 N·m	12 lb in
Positive Battery Cable to UBEC Bolt	9 N·m	80 lb in
Starter Motor Mounting Bolts (PG260-Series, 4.8L,5.3L,6.0L)	50 N·m	37 lb ft
Starter Motor Mounting Bolts (PG260-Series, 4.3L)	43 N·m	32 lb ft
Starter Motor Shift Lever Retaining Nut	4.5 N·m	40 lb in
UBEC Connector Bolts	6 N·m	53 lb in

Battery Usage

Application	Specification
Catalog Number	1810
Cold Cranking Amperage (CCA)	600 A
Reserve Capacity	115 Minutes
Replacement Model Number	78-6YR

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 Load Test @ 10 Volts Specs. PG-260

Engine Type	Starter Type	Load Test @ 10 Volts AMPS Minimum	Load Test @ 10 Volts AMPS Maximum	Load Test @ 10 Volts RPM Minimum	Load Test @ 10 Volts RPM Maximum
Gasoline	PG260	47 AMPS	70 AMPS	6,500 RPM	11,000 RPM

Generator Usage

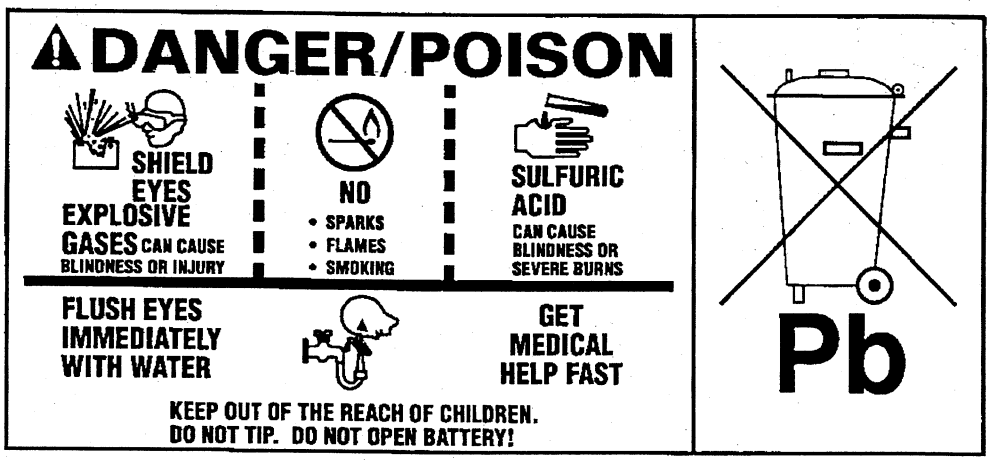
Base	
Application	Specification
Generator Model	AD230
Rated Output	102 A
Load Test Output	71 A
Optional	
Application	Specification
Generator Model	AD244
Rated Output	130 A
Load Test Output	91 A

Battery Description and Operation

Caution

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

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



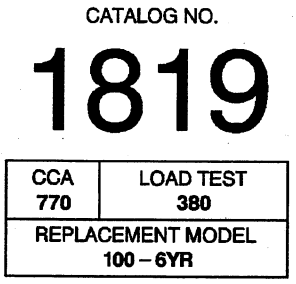
The maintenance free battery is standard. There are no vent plugs in the cover. The battery is completely sealed except for two small vent holes in the side. These vent holes allow the small amount of gas that is produced in the battery to escape.

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

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

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

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



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

Cranking Circuit

The cranking circuit consists of the battery, the starter motor, the ignition switch, and related electrical wiring. There is a fusible link in the wire running from the starter solenoid to the generator. For more information on the cranking circuit, refer to Cranking System Operation.

Starter Motor

The PG-260 starter motor achieves gear reduction at the rate of 5:1 through planetary gears. It's relatively small size and light weight offer improved cranking performance and reduced current requirements.

Solenoid windings are energized when the ignition switch is turned to the START position and the transmission is in the NEUTRAL or PARK. The plunger and shift lever movement causes the pinion to mesh with the engine flywheel ring gear, the solenoid main contacts to close, and the engine cranks. When the engine starts, the pinion overrunning clutch protects the armature from excessive speed until the key is released, at which time the plunger return spring causes the pinion to disengage. To prevent excessive overrunning, the key should be released immediately when the engine starts.

Charging System Description and Operation

Generator

The generator features the following major components:

- The delta stator
- The rectifier bridge
- The rotor with slip rings and brushes
- A conventional pulley
- 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 tightening of mount components. Otherwise, replace the generator as a complete unit.

Regulator

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

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

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

Circuit Description

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

When the engine is running, the generator turn-on signal is sent to the generator from the PCM, turning on the regulator. The generator's voltage regulator controls current to the rotor, thereby controlling the output voltage. The rotor current is proportional to the electrical pulse width supplied by the regulator. When the engine is started, the regulator senses generator rotation by detecting AC voltage at the stator through an internal wire. Once the engine is running, the regulator varies the field current by controlling the pulse width. This regulates the generator output voltage for proper battery charging and electrical system operation. The generator F terminal is connected internally to the voltage regulator and externally to the PCM. When the voltage regulator detects a charging system problem, it grounds this circuit to signal the PCM that a problem exists. The PCM monitors the generator field duty cycle signal circuit. The system voltage sense circuit receives battery positive voltage that is Hot At All Times through a fuse link that is connected to the starter motor. This voltage is used by the regulator as the reference for system voltage control.

Engine Controls

Engine Controls – 4.8, 5.3 & 6.0L

Fastener Tightening Specifications

Application	Specifications	
	Metric	English
Accelerator Control Cable Bracket Nut	10 N·m	89 lb in
AIR Check Valves	23 N·m	17 lb ft
AIR Pipe To Exhaust Manifold Bolts	25 N·m	18 lb ft
AIR Pump Bracket Assembly Hold Down Bolt	25 N·m	18 lb ft
AIR Pump Solenoid to Base	4 N·m	35 lb in
Camshaft Position (CMP) Sensor Bolt	25 N·m	18 lb ft
Crankshaft Position (CKP) Sensor Bolt	25 N·m	18 lb ft
Engine Coolant Temperature (ECT) Sensor	17 N·m	13 lb ft
Engine Sight Shield Bolts	10 N·m	89 lb in
Engine Sight Shield Bracket Bolts	10 N·m	89 lb in
EGR (Exhaust Gas Recirculation) Valve Bolts (First Pass)	10 N·m	89 lb in
EGR Valve Bolts (Final Pass)	25 N·m	18 lb ft
EGR Valve Pipe-to-Cylinder Head Bolts	50 N·m	37 lb ft
EGR Valve Pipe-to-Exhaust Manifold Bolts	25 N·m	18 lb ft
EGR Valve Pipe-to-Intake Manifold	12 N·m	106 lb in
Evaporative Emission (EVAP) Purge Solenoid Shoulder Bolt	10.5 N·m	93 lb in
Fuel Fill Hose Clamp	2.5 N·m	22 lb in
Fuel Fill Pipe Ground Strap Bolt	9 N·m	80 lb in
Fuel Fill Pipe Housing to Fill Pipe Bolts	2.3 N·m	20 lb in
Fuel Filter Fitting	30 N·m	22 lb ft
Fuel Rail Attaching Bolts	10 N·m	89 lb in
Fuel Tank Strap Bolts	40 N·m	30 lb ft
Heated Oxygen Sensor (HO2S)	41 N·m	30 lb ft
Idle Air Control (IAC) Valve Attaching Screws	3 N·m	27 lb in
Knock Sensor (KS)	20 N·m	15 lb ft
Powertrain Control Module (PCM) Connector End Bolts	8 N·m	70 lb in
Throttle Body Attaching Bolts	11 N·m	97 lb in
Throttle Position (TP) Sensor Attaching 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 gasoline. For more information, write to: American Automobile Manufacturer's Association, 7430 Second Ave, Suite 300, Detroit MI 48202.

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

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

Notice

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

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

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

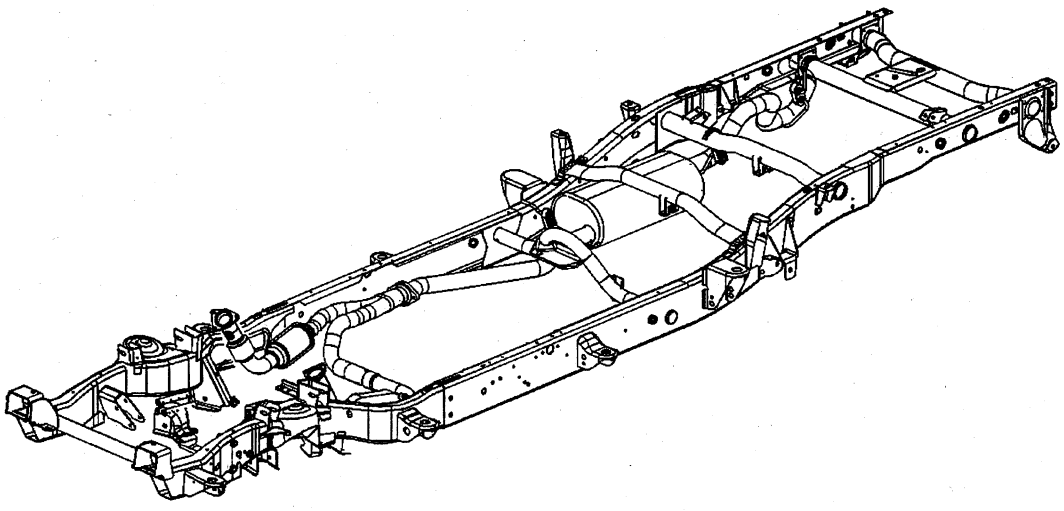
Exhaust System

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Exhaust Manifold Nuts (4.3L, 4.8L, 5.3L, 6.0L)	50 N·m	39 lb ft
Exhaust Manifold Stud (4.3L, 4.8L, 5.3L, 6.0L)	22 N·m	16 lb ft
Exhaust Pipe Hanger Bracket Bolts (6.0L)	12 N·m	106 lb in
Flange Stud Nuts (4.3L, 4.8L, 5.3L, 6.0L)	40 N·m	30 lb ft
Slip Joint Clamp Nut (6.0L)	40 N·m	30 lb ft

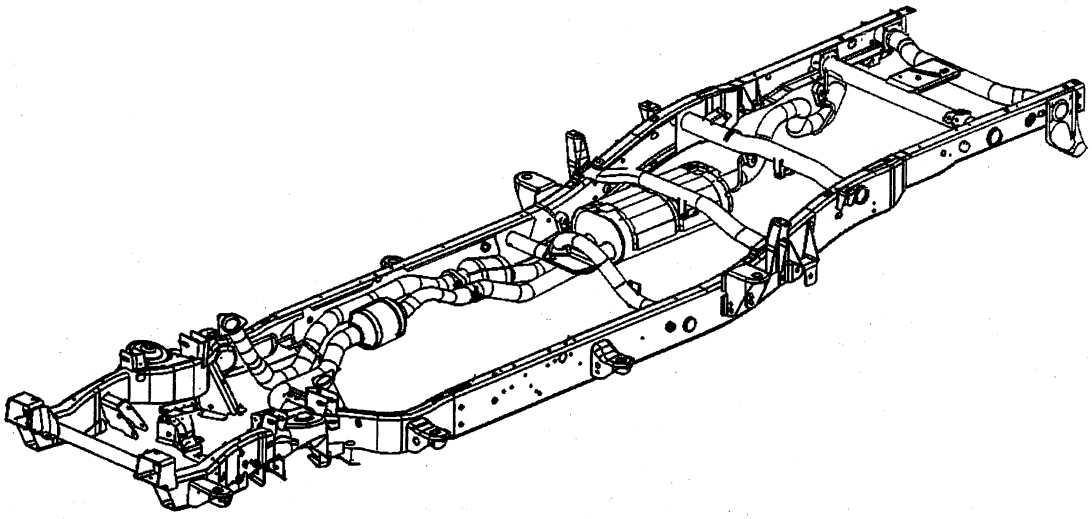
Exhaust System Description

Light Duty Emissions Pickup



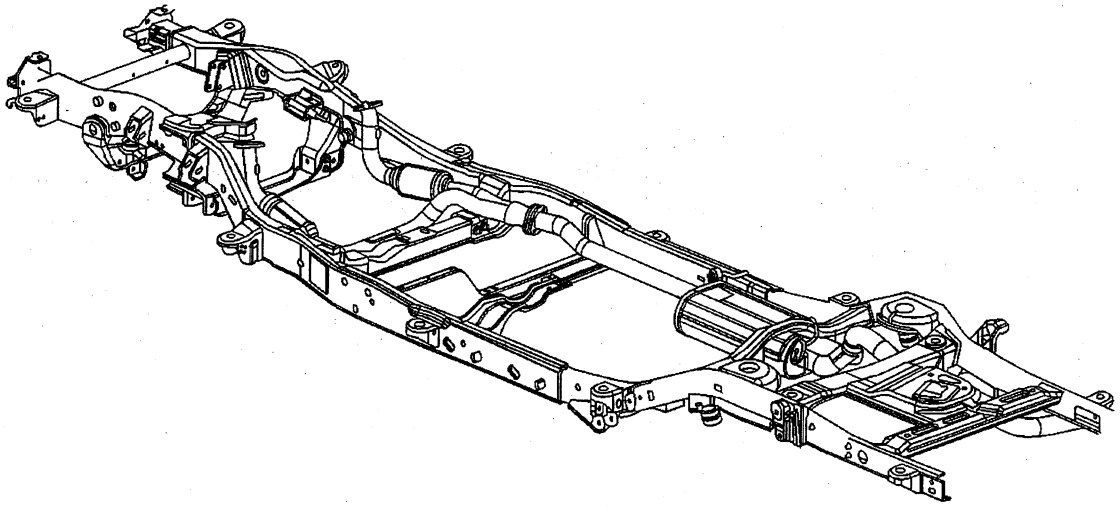
The 4.3L, 4.8L, and 5.3L engines utilize a flat flange and a seal on the left exhaust manifold and a ball joint and seal on the right exhaust manifold. The ball joint allows for the system to self-align. A flat flange and a gasket are used at the junction of the rear system and the catalytic converter.

Heavy Duty Emissions Pickup



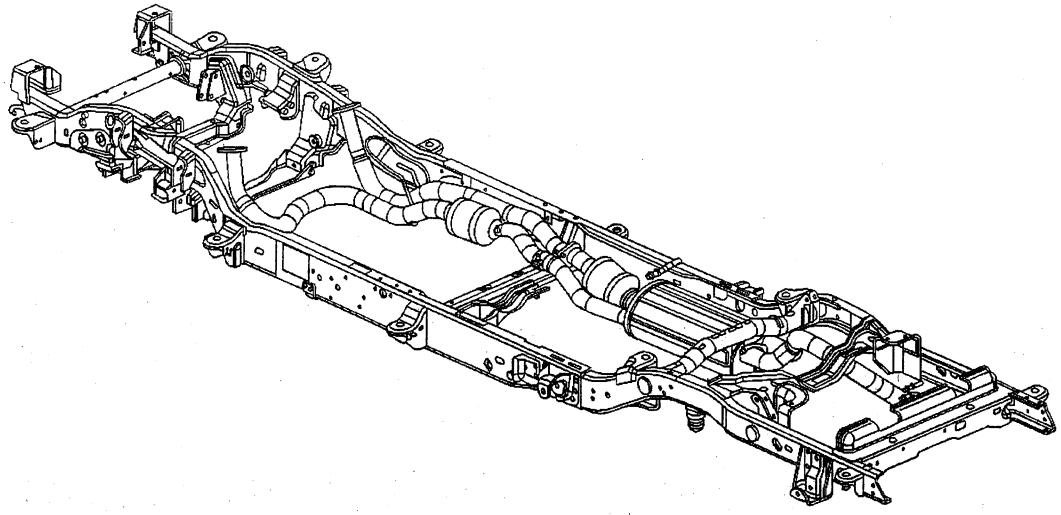
The 6.0L engine uses a flat flange and a seal for both the exhaust manifold connections and a combination of a slip joint for the front pipe and a flat flange for the catalytic converter at the junction of the rear system.

Light Duty Emissions Utility



The 4.8L and 5.3L engines utilize a flat flange and a seal on the left exhaust manifold and a ball joint and seal on the right exhaust manifold. The ball joint allows for the system to self-align. A flat flange and a gasket are used at the junction of the rear system and the catalytic converter. The utility exhaust systems employ a tuning chamber at the rear of the muffler which is connected to the tailpipe with a separate tube. This chamber is utilized to improve sound quality. The tube/chamber is not designed to flow exhaust gas.

Heavy Duty Emissions Utility



The 6.0L engine uses a flat flange and a seal for both the exhaust manifold connections and a combination of a slip joint for the front pipe and a flat flange for the catalytic converter at the junction of the rear system. The utility exhaust systems employ a tuning chamber at the rear of the muffler which is connected to the tailpipe with a separate tube. This chamber is utilized to improve sound quality. The tube/chamber is not designed to flow exhaust gas.

Catalytic Converters

The catalytic converter is an emission control device added to the engine exhaust system in order to reduce the hydrocarbon, the carbon monoxide and the nitrogen oxide pollutants from the exhaust gases. The catalyst in the converter is not serviceable.

Transmission/Transaxle Description and Operation

Automatic Transmission – 4L60E

Transmission General Specifications

Name	Hydra-matic 4L60-E
RPO Codes	M30
Production Location	Toledo, Ohio Romulus, MI Ramos Arizpe, Mexico
Vehicle Platform (Engine/Transmission) Usage	C/K, C/K 800, F, G, M/L, S/T, Y
Transmission Drive	Longitudinally-Mounted Rear Wheel Drive
1st Gear Ratio	3.059:1
2nd Gear Ratio	1.625:1
3rd Gear Ratio	1.000:1
4th Gear Ratio	0.696:1
Reverse	2.294:1
Torque Converter Size (Diameter of Torque Converter Turbine)	245 mm 258 mm 298 mm 300 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	DEXRON® III
Transmission Fluid Capacity (Approximate)	245 mm Converter Dry: 8.3 l (8.8 qt) 258 mm Converter Dry: 8.8 l (9.3 qt) 298 mm Converter Dry: 11.25 l (11.9 qt) 300 mm Converter Dry: 11.50 l (12.1 qt)
Transmission Type: 4	Four Forward Gears
Transmission Type: L	Longitudinal Mount
Transmission Type: 60	Product Series
Transmission Type: E	Electronic Controls
Position Quadrant	P, R, N, Overdrive, D, 2, 1 P, R, N, Overdrive, 3, 2, 1
Case Material	Die Cast Aluminum
Transmission Weight Dry (Approximate)	245 mm Converter 65.4 kg (144.30 lb) 258 mm Converter 79.9 kg (176.6 lb) 298 mm Converter 70.5 kg (155.70 lb) 300 mm Converter 86.17 kg (190.5 lb)
Transmission Weight Wet (Approximate)	245 mm Converter 72.4 kg (159.55 lb) 258 mm Converter 89.2 kg (197.7 lb) 298 mm Converter 80.5 kg (176.16 lb) 300 mm Converter 98.4 kg (218.0 lb)
Maximum Trailer Towing Capacity	6 130 kg (13,500 lb)
Maximum Gross Vehicle Weight (GVW)	3 900 kg (8,600 lb)

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accumulator Cover to Case Bolt	8.0-14.0 N·m	6-10 lb ft
Case Extension to Case Bolt	42.0-48.0 N·m	31-35 lb ft
Case Extension to Case Bolt (4WD Shipping)	11.2-22.6 N·m	8.3-16.7 lb ft
Converter Cover Bolt	10 N·m	89 lb in
Converter Housing to Case Screw	65.0-75.0 N·m	48-55 lb ft
Cooler Pipe Connector	35.0-41.0 N·m	26-30 lb ft
Detent Spring to Valve Body Bolt	20.0-27.0 N·m	15-20 lb ft
Floorshift Control Bolt	10 N·m	89 lb in
Flywheel to Torque Converter Bolt	63 N·m	46 lb ft
Forward Accumulator Cover to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Heat Shield to Transmission Bolt	17 N·m	13 lb ft
Line Pressure Plug	8.0-14.0 N·m	6-10 lb ft
Manual Shaft to Inside Detent Lever Nut	27.0-34.0 N·m	20-25 lb ft
Negative Battery Cable Bolt	15 N·m	11 lb ft
Oil Level Indicator Bolt	47 N·m	35 lb ft
Oil Pan to Transmission Case Bolt	11 N·m	97 lb in
Oil Passage Cover to Case Bolt	8-14.0 N·m	6-10 lb ft
Park Brake Bracket to Case Bolt	27.0-34.0 N·m	20-25 lb ft
Park/Neutral Position Switch Screw	3 N·m	27 lb in
Plate to Case Bolt (Shipping)	27.0-34.0 N·m	20-25 lb ft
Plate to Converter Bolt (Shipping)	27.0-34.0 N·m	20-25 lb ft
Plug Assembly, Automatic Transmission Oil Pan (C/K)	30-40 N·m	22.1-29.5 lb ft
Plug Assembly, Automatic Transmission Oil Pan (Y)	28-32 N·m	20.7-23.6 lb ft
Pressure Control Solenoid Bracket to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Pump Assembly to Case Bolt	26.0-32.0 N·m	19-24 lb ft
Pump Cover to Pump Body Bolt	20.0-27.0 N·m	15-20 lb ft
Shift Cable Grommet Screw	1.7 N·m	15 lb in
Shift Control Cable Attachment	20 N·m	15 lb ft
Speed Sensor Retainer Bolt	10.5-13.5 N·m	7.7-10 lb ft
Stud, Automatic Transmission Case Extension (Y-car)	18.0-22.0 N·m	13-16 lb ft
TCC Solenoid Assembly to Case Bolt	8.0-14.0 N·m	6-10 lb ft
Trans Mount to Transmission Bolt	25 N·m	18 lb ft
Transmission Fluid Pressure Manual Valve Position Switch to Valve Body Bolt	8.0-14.0 N·m	6-10 lb ft
Transmission Oil Cooler Pipe Fitting	35.0-41.0 N·m	26-30 lb ft
Transmission Oil Pan to Case Bolt	9.5-13.8 N·m	7-10 lb ft
Transmission to Engine Bolt	47 N·m	35 lb ft
Valve Body to Case Bolt	8.0-14.0 N·m	6-10 lb ft

Fluid Capacity Specifications

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

Transmission Component and System Description

The 4L60E transmission consists primarily of the following components:

- Torque converter assembly
- Servo assembly and 2-4 band assembly
- Reverse input clutch and housing
- Overrun clutch
- Forward clutch
- 3-4 clutch
- Forward sprag clutch assembly
- Lo and reverse roller clutch assembly
- Lo and reverse clutch assembly
- Two planetary gear sets: Input and Reaction
- Oil pump assembly
- Control valve body assembly

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

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

Adapt Function

Transmission Adapt Function

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

- The clutch fiber plates
- The seals
- The springs

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

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

Automatic Transmission Shift Lock Control Description

The automatic transmission shift lock control is a safety device that prevents an inadvertent shift out of PARK when the ignition is ON. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system 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. This allows current to flow through the switch to the automatic transmission shift lock control switch. The circuit continues through the normally-closed switch to the automatic transmission shift lock control solenoid. The automatic transmssion shift lock control soleniod is permanently grounded. This energizes the automatic transmission shift lock control solenoid, locking the shift linkage in the PARK position. When the driver presses the brake pedal the contacts in the automatic transmission shift lock control switch open, causing the automatic transmission shift lock control solenoid to release. This allows the shift lever to move from the PARK position.

Automatic Transmission – 4L80E

Transmission General Specifications

Name	Hydra-matic 4L80-E
RPO Codes	MT1
Production Location	Ypsilanti, MI
Vehicle Platform (Engine/Transmission) Usage	C/K, C/K 800, G, P32/42
Transmission Drive	Longitudinally Mounted Rear Wheel Drive
1st Gear Ratio	2.482:1
2nd Gear Ratio	1.482:1
3rd Gear Ratio	1.000:1
4th Gear Ratio	0.750:1
Reverse	2.077:1
Torque Converter Size (Diameter of Torque Converter Turbine)	310 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	DEXRON® III
Transmission Fluid Capacity (Approximate)	Bottom Pan Removal: 7.3L (7.7 qts) Dry: 12.8L (13.5 qts)
Transmission Type: 4	Four Forward Gears
Transmission Type: L	Longitudinal Mount
Transmission Type: 80	Product Series
Transmission Type: E	Electronic Controls
Position Quadrant	P, R, N, Overdrive, D, 2, 1
Case Material	Die Cast Aluminum
Transmission Weight Dry	107 kg (236 lbs)
Transmission Weight Wet	118 kg (260 lbs)
Maximum Trailer Towing Capacity	9,525 kg (21,000 lbs)
Maximum Gross Vehicle Weight (GVW)	7,258 kg (16,000 lbs)

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accumulator Housing to Valve Body	11 N·m	97 lb in
Case Center Support	44 N·m	32 lb ft
Control Valve Assembly to Case	11 N·m	97 lb in
Cooler Pipe Connector Nut at Case and Radiator	38 N·m	28 lb ft
Engine Rear Mount to Transmission Bolt	44 N·m	32 lb ft
Engine Rear Support Bracket to Frame Nut	44 N·m	32 lb ft
Extension Housing to Case	34 N·m	25 lb ft
Flywheel Housing Cover to Transmission	7 N·m	62 lb in
Flywheel to Converter	44 N·m	32 lb ft
Fourth Clutch	23 N·m	17 lb ft
Manual Shaft to Detent Lever Nut	24 N·m	18 lb ft
Oil Pan Drain Plug	34 N·m	25 lb ft
Oil Pan to Case	24 N·m	18 lb ft
Oil Test Hole Plug	11 N·m	97 lb in
Parking Pawl Bracket to Case	24 N·m	18 lb ft
Pressure Control Solenoid Bracket to Valve Body	8 N·m	71 lb in
Pump Assembly to Case	24 N·m	18 lb ft
Pump Body to Cover	24 N·m	18 lb ft
Rear Servo Cover to Case	24 N·m	18 lb ft

Solenoid to Valve Body	8 N·m	71 lb in
Speed Sensor and Bracket Assembly to Case	11 N·m	97 lb in
Transmission Case to Engine	44 N·m	32 lb ft
Valve Body to Case/Lube Pipe	11 N·m	97 lb in
Valve Body to Case/PSM	11 N·m	97 lb in

Fluid Capacity Specifications Overhaul

Application	Specification	
	Metric	English
Oil Pan Removal	7.3 liters	7.7 quarts
Overhaul	12.8 liters	13.5 quarts

Transmission General Description

The 4L80-E is a fully automatic rear wheel drive electronically controlled transmission. The 4L80-E provides four forward ranges including overdrive and reverse. A gear type of oil pump controls shift points. The VCM/PCM and the pressure control (PC) solenoid (force motor) regulate these shift points. The VCM/PCM also controls shift schedules and TCC apply rates. Transmission temperature also influences shift schedules and TCC apply rates.

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 on vehicles less than 15,000 G.V.W. 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.
- OD - 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.
- D - DRIVE position is used for city traffic, and hilly terrain. Drive provides three gear ranges. Depress the accelerator in order to downshift.
- 2 - Manual SECOND provides acceleration and engine braking or greater traction from a stop. When you choose manual SECOND, the vehicle will start out in first gear and upshift to second gear. You may select this gear at a vehicle speed of up to 22 km/h (35 mph).
- 1 - Manual LOW provides maximum engine braking. You may select this gear at a vehicle speed of up to 13 km/h (20 mph).

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Abbreviations and Meanings

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

BLK	Black
BLU	Blue
BP	Back Pressure
BPCM	Battery Pack Control Module
BPMV	Brake Pressure Modulator Valve
BPP	Brake Pedal Position
BRN	Brown
BTDC	Before Top Dead Center
BTM	Battery Thermal Module
BTSI	Brake Transmission Shift Interlock
Btu	British Thermal Units
C	
°C	Degrees Celsius
CAC	Charge Air Cooler
CAFE	Corporate Average Fuel Economy
Cal	Calibration
Cam	Camshaft
CARB	California Air Resources Board
CC	Coast Clutch
cm^3	Cubic Centimeters
CCM	Convenience Charge Module, Chassis Control Module
CCOT	Cycling Clutch Orifice Tube
CCP	Climate Control Panel
CD	Compact Disc
CE	Commutator End
CEAB	Cold Engine Air Bleed
CEMF	Counter Electromotive Force
CEX	Cabin Exchanger
cfm	Cubic Feet per Minute
cg	Center of Gravity
CID	Cubic Inch Displacement
CKP	Crankshaft Position
CKT	Circuit
C/Ltr	Cigar Lighter
CL	Closed Loop
CLS	Coolant Level Switch
CMC	Compressor Motor Controller
CMP	Camshaft Position
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
Coax	Coaxial
COMM	Communication

Conn	Connector
CPA	Connector Position Assurance
CPP	Clutch Pedal Position
CPS	Central Power Supply
CPU	Central Processing Unit
CRT	Cathode Ray Tube
CRTC	Cathode Ray Tube Controller
CS	Charging System
CSFI	Central Sequential Fuel Injection
CTP	Closed Throttle Position
cu ft	Cubic Foot/Feet
cu in	Cubic Inch/Inches
CV	Constant Velocity Joint
CVRSS	Continuously Variable Road Sensing Suspension
Cyl	Cylinder(s)
D	
DAB	Delayed Accessory Bus
dB	Decibels
dBA	Decibels on A-weighted Scale
DC	Direct Current, Duty Cycle
DCM	Door Control Module
DE	Drive End
DEC	Digital Electronic Controller
DERM	Diagnostic Energy Reserve Module
DI	Distributor Ignition
dia	Diameter
DIC	Driver Information Center
Diff	Differential
DIM	Dash Integration Module
DK	Dark
DLC	Data Link Connector
DMCM	Drive Motor Control Module
DMM	Digital Multimeter
DMSDS	Drive Motor Speed and Direction Sensor
DMU	Drive Motor Unit
DOHC	Dual Overhead Camshafts
DR, Drvr	Driver
DRL	Daytime Running Lamps
DTC	Diagnostic Trouble Code
E	
EBCM	Electronic Brake Control Module
EBTCM	Electronic Brake and Traction Control Module

EC	Electrical Center, Engine Control
ECC	Electronic Climate Control
ECI	Extended Compressor at Idle
ECL	Engine Coolant Level
ECM	Engine Control Module, Electronic Control Module
ECS	Emission Control System
ECT	Engine Coolant Temperature
EEPROM	Electrically Erasable Programmable Read Only Memory
EEVIR	Evaporator Equalized Values in Receiver
EFE	Early Fuel Evaporation
EGR	Exhaust Gas Recirculation
EGR TVV	Exhaust Gas Recirculation Thermal Vacuum Valve
EHPS	Electro-Hydraulic Power Steering
EI	Electronic Ignition
ELAP	Elapsed
ELC	Electronic Level Control
E/M	English/Metric
EMF	Electromotive Force
EMI	Electromagnetic Interference
Eng	Engine
EOP	Engine Oil Pressure
EOT	Engine Oil Temperature
EPA	Environmental Protection Agency
EPR	Exhaust Pressure Regulator
EPROM	Erasable Programmable Read Only Memory
ESB	Expansion Spring Brake
ESC	Electronic Suspension Control
ESD	Electrostatic Discharge
ESN	Electronic Serial Number
ETC	Electronic Throttle Control, Electronic Temperature Control, Electronic Timing Control
ETCC	Electronic Touch Climate Control
ETR	Electronically Tuned Receiver
ETS	Enhanced Traction System
EVAP	Evaporative Emission
EVO	Electronic Variable Orifice
Exh	Exhaust

F	
°F	Degrees Fahrenheit
FC	Fan Control
FDC	Fuel Data Center
FED	Federal All United States except California
FEDS	Fuel Enable Data Stream
FEX	Front Exchanger
FF	Flexible Fuel
FFH	Fuel-Fired Heater
FI	Fuel Injection
FMVSS	Federal U.S. Motor Vehicle Safety Standards
FP	Fuel Pump
ft	Foot/Feet
FT	Fuel Trim
F4WD	Full Time Four-Wheel Drive
4WAL	Four-Wheel Antilock
4WD	Four-Wheel Drive
FW	Flat Wire
FWD	Front Wheel Drive, Forward
G	
g	Grams, Gravitational Acceleration
GA	Gage, Gauge
gal	Gallon
gas	Gasoline
GCW	Gross Combination Weight
Gen	Generator
GL	Gear Lubricant
GM	General Motors
GM SPO	General Motors Service Parts Operations
gnd	Ground
gpm	Gallons per Minute
GRN	Green
GRY	Gray
GVWR	Gross Vehicle Weight Rating
H	
H	Hydrogen
H2O	Water
Harn	Harness
HC	Hydrocarbons
H/CMPR	High Compression

HD	Heavy Duty
HDC	Heavy Duty Cooling
hex	Hexagon, Hexadecimal
Hg	Mercury
Hi Alt	High Altitude
HO2S	Heated Oxygen Sensor
hp	Horsepower
HPL	High Pressure Liquid
HPS	High Performance System
HPV	High Pressure Vapor
HPVS	Heat Pump Ventilation System
Htd	Heated
HTR	Heater
HUD	Head-up Display
HVAC	Heater-Ventilation-Air Conditioning
HVACM	Heater-Vent-Air Conditioning Module
HVIL	High Voltage Interlock Loop
HVM	Heater Vent Module
Hz	Hertz
	I
IAC	Idle Air Control
IAT	Intake Air Temperature
IC	Integrated Circuit, Ignition Control
ICCS	Integrated Chassis Control System
ICM	Ignition Control Module
ID	Identification, Inside Diameter
IDI	Integrated Direct Ignition
IGBT	Insulated Gate Bi-Polar Transistor
ign	Ignition
ILC	Idle Load Compensator
in	Inch/Inches
INJ	Injection
inst	Instantaneous, Instant
IP	Instrument Panel
IPC	Instrument Panel Cluster
IPM	Instrument Panel Module
I/PEC	Instrument Panel Electrical Center
ISC	Idle Speed Control
ISO	International Standards Organization
ISS	Input Speed Shaft, Input Shaft Speed

K	
KAM	Keep Alive Memory
KDD	Keyboard Display Driver
kg	Kilogram
kHz	Kilohertz
km	Kilometer
km/h	Kilometers per Hour
km/l	Kilometers per Liter
kPa	Kilopascals
KS	Knock Sensor
kV	Kilovolts
L	
L	Liter
L4	Four Cylinder Engine, In-Line
L6	Six-Cylinder Engine, In-Line
lb	Pound
lb ft	Pound Feet Torque
lb in	Pound Inch Torque
LCD	Liquid Crystal Display
LDCL	Left Door Closed Locking
LDCM	Left Door Control Module
LDM	Lamp Driver Module
LED	Light Emitting Diode
LEV	Low Emissions Vehicle
LF	Left Front
lm	Lumens
LR	Left Rear
LT	Left
LT	Light
LT	Long Term
LTPI	Low Tire Pressure Indicator
LTPWS	Low Tire Pressure Warning System
M	
MAF	Mass Air Flow
Man	Manual
MAP	Manifold Absolute Pressure
MAT	Manifold Absolute Temperature
max	Maximum
M/C	Mixture Control
MDP	Manifold Differential Pressure

MFI	Multiport Fuel Injection
mi	Miles
MIL	Malfunction Indicator Lamp
min	Minimum
MIN	Mobile Identification Number
mL	Milliliter
mm	Millimeter
mpg	Miles per Gallon
mph	Miles per Hour
ms	Millisecond
MST	Manifold Surface Temperature
MSVA	Magnetic Steering Variable Assist, Magnasteer®
M/T	Manual Transmission/Transaxle
MV	Megavolt
mV	Millivolt
N	
NAES	North American Export Sales
NC	Normally Closed
NEG	Negative
Neu	Neutral
NI	Neutral Idle
NiMH	Nickel Metal Hydride
NLGI	National Lubricating Grease Institute
N·m	Newton-meter Torque
NO	Normally Open
NOx	Oxides of Nitrogen
NPTC	National Pipe Thread Coarse
NPTF	National Pipe Thread Fine
NOVRAM	Non-Volatile Random Access Memory
O	
O2	Oxygen
O2S	Oxygen Sensor
OBD	On-Board Diagnostics
OBD II	On-Board Diagnostics Second Generation
OC	Oxidation Converter Catalytic
OCS	Opportunity Charge Station
OD	Outside Diameter
ODM	Output Drive Module
ODO	Odometer
OE	Original Equipment
OEM	Original Equipment Manufacturer
OHC	Overhead Camshaft

ohms	Ohm
OL	Open Loop, Out of Limits
ORC	Oxidation Reduction Converter Catalytic
ORN	Orange
ORVR	On-Board Refueling Vapor Recovery
OSS	Output Shaft Speed
oz	Ounce(s)
P	
PAG	Polyalkylene Glycol
PAIR	Pulsed Secondary Air Injection
PASS, PSGR	Passenger
PASS-Key®	Personalized Automotive Security System
P/B	Power Brakes
PC	Pressure Control
PCB	Printed Circuit Board
PCM	Powertrain Control Module
PCS	Pressure Control Solenoid
PCV	Positive Crankcase Ventilation
PEB	Power Electronics Bay
PID	Parameter Identification
PIM	Power Inverter Module
PM	Permanent Magnet Generator
P/N	Part Number
PNK	Pink
PNP	Park/Neutral Position
PRNDL	Park, Reverse, Neutral, Drive, Low
POA	Pilot Operated Absolute Valve
POS	Positive, Position
POT	Potentiometer Variable Resistor
PPL	Purple
ppm	Parts per Million
PROM	Programmable Read Only Memory
P/S, PS	Power Steering
PSCM	Power Steering Control Module, Passenger Seat Control Module
PSD	Power Sliding Door
PSP	Power Steering Pressure
psi	Pounds per Square Inch
psia	Pounds per Square Inch Absolute
psig	Pounds per Square Inch Gauge
pt	Pint
PTC	Positive Temperature Coefficient
PWM	Pulse Width Modulated

Q	
QDM	Quad Driver Module
qt	Quart(s)
R	
R-12	Refrigerant-12
R-134a	Refrigerant-134a
RAM	Random Access Memory, Non-permanent memory device, memory contents are lost when power is removed.
RAP	Retained Accessory Power
RAV	Remote Activation Verification
RCDLR	Remote Control Door Lock Receiver
RDCM	Right Door Control Module
Ref	Reference
Rev	Reverse
REX	Rear Exchanger
RIM	Rear Integration Module
RF	Right Front, Radio Frequency
RFA	Remote Function Actuation
RFI	Radio Frequency Interference
RH	Right Hand
RKE	Remote Keyless Entry
Rly	Relay
ROM	Read Only Memory, Permanent memory device, memory contents are retained when power is removed.
RPM	Revolutions per Minute Engine Speed
RPO	Regular Production Option
RR	Right Rear
RSS	Road Sensing Suspension
RTD	Real Time Damping
RT	Right
RTV	Room Temperature Vulcanizing Sealer
RWAL	Rear Wheel Antilock
RWD	Rear Wheel Drive
S	
s	Second(s)
SAE	Society of Automotive Engineers
SC	Supercharger
SCB	Supercharger Bypass
SCM	Seat Control Module
SDM	Sensing and Diagnostic Module
SEO	Special Equipment Option
SFI	Sequential Multiport Fuel Injection

SI	System International Modern Version of Metric System
SIAB	Side Impact Air Bag
SIR	Supplemental Inflatable Restraint
SLA	Short/Long Arm Suspension
sol	Solenoid
SO2	Sulfur Dioxide
SP	Splice Pack
S/P	Series/Parallel
SPO	Service Parts Operations
SPS	Service Programming System, Speed Signal
sq ft, ft²	Square Foot/Feet
sq in, in²	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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Conversion - English/Metric

English	Multiply/ Divide by	Metric
In order to calculate English measurement, divide by the number in the center column. In order to calculate metric measurement, multiply by the number in the center column.		
Length		
in	25.4	mm
ft	0.3048	m
yd	0.9144	
mi	1.609	km
Area		
sq in	645.2	sq mm
	6.45	sq cm
sq ft	0.0929	sq m
sq yd	0.8361	
Volume		
cu in	16,387.00	cu mm
	16.387	cu cm
	0.0164	L
qt	0.9464	
gal	3.7854	
cu yd	0.764	cu m
Mass		
lb	0.4536	kg
ton	907.18	
	0.907	tonne (t)
Force		
Kg F	9.807	newtons (N)
oz F	0.278	
lb F	4.448	
Acceleration		
ft/s²	0.3048	m/s²
In/s²	0.0254	
Torque		
Lb in	0.11298	N·m
lb ft	1.3558	
Power		
hp	0.745	kW

Pressure (Stress)		
inches of H2O	0.2488	kPa
lb/sq in	6.895	
Energy (Work)		
Btu	1055	J (J= one Ws)
lb ft	1.3558	
kW hour	3,600,000.00	
Light		
Foot Candle	10.764	lm/m²
Velocity		
mph	1.6093	km/h
Temperature		
(°F - 32) 5/9	=	°C
°F	=	(9/5 °C + 32)
Fuel Performance		
235.215/mpg	=	100 km/L

Equivalents - Decimal and Metric

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

Fraction (in)	Decimal (in)	Metric (mm)
5/8	0.625	15.875
41/64	0.640625	16.27187
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

Fasteners

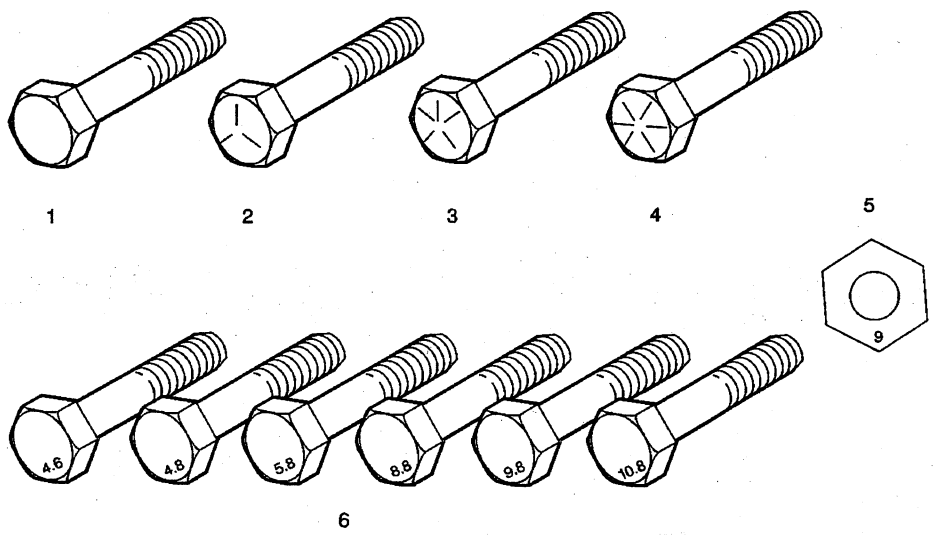
Metric Fasteners

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

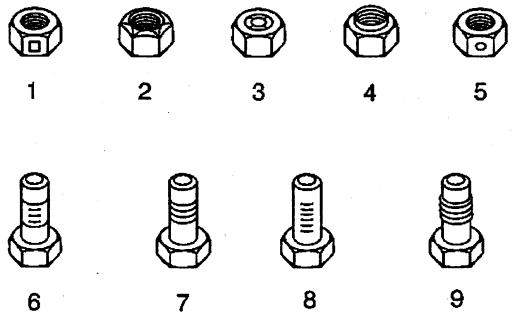
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

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