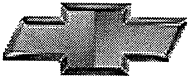


Chevrolet



Avalanche



2002

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Product Information

Chevy Avalanche is the only vehicle that can go from a full-size SUV...
...to a full-size pickup with a protected eight-foot cargo box.

Rugged Design

Just one look and it's clear that the all-new Chevy Avalanche is ready for anything, anytime, anywhere. Its breakthrough styling and design set it apart from the full-size truck crowd, and with its exclusive Midgate, it is truly a one-of-a-kind vehicle.



Vortec V8 Power

Avalanche is equipped with the powerful Vortec 5300 V8 engine and a smooth-shifting four-speed automatic transmission. The Vortec 5300 produces 285 horsepower and 325 lb-ft of torque. Combined with the electronically controlled automatic transmission, with its tow/haul mode feature, Avalanche offers outstanding performance and cargo-hauling capability unmatched by any competitor.

Cargo Box Lamps

Finding items in the Top-Box Storage units and the cargo box is easy thanks to the built-in cargo lamps. The lamps light up the storage unit on one side and illuminate the interior of the cargo box on the other side.

4'x8' Cargo Box Capacity

Avalanche offers plenty of space for all kinds of cargo. With the Midgate lowered, the opening at the cargo box is a wide 49 inches and the box is eight-feet, one-inch long – room enough for 4x8 sheets of plywood and other materials, even with the tailgate closed.

PRO-TEC Material

The Midgate and tailgate are made of GM's PRO-TEC composite material. The lightweight composite provides protection from dents and scratches along with outstanding strength and durability.

Folding Rear Seat

The 60/40 split-folding rear seat provides three-passenger seating, or when folded down, additional room for cargo. The back side of the seat has a durable SMC (Sheet-Molded Compound) surface that is designed to support the Midgate when it is lowered.

Open Air Driving

Convertible style driving can be had by removing the rear window and lowering the Midgate. With the optional power sunroof, the open-air feeling is enhanced even more. The aerodynamic design of the Avalanche helps smooth airflow over the vehicle, practically eliminating wind noise and turbulence.



Midgate Lowered, Window In

The Midgate of the Avalanche can be lowered in order to extend the cargo box from five feet, three inches to eight feet, one inch. With the rear window in place and the cargo cover on, the cargo box is a fully secured, weather-resistant enclosure.

Midgate Up, Removable Window Stowed

The rear window in Avalanche is easily removed and stowed on board in a compartment specially molded into the Midgate. Removing the rear window adds to the open-air driving feel in the Avalanche.

Midgate Lowered, Window Stowed

For carrying taller cargo, fold the rear seat, remove and stow the rear window and lower the Midgate to expand the cargo box to eight feet, one inch.

Bumper Steps and Grab Handles

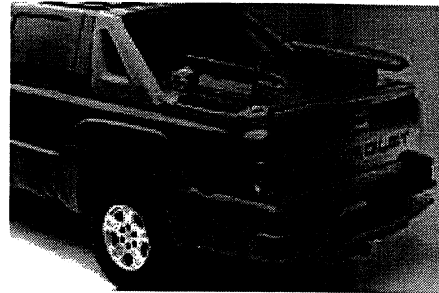
It's easy to access items stored in the cargo box of the Avalanche. The rear bumper features built-in steps at each corner along with grab handles at the top corners of the cargo box. The steps can be used with the tailgate down, and since the grab handles are bolted into the body, they can be used as tie-downs too.

Trailer-Ready Design

The trailer-ready design of the Avalanche means it's ready to tow. No additional packages are necessary. The standard heavy-duty trailering package includes a 12,000-lb. weight-distributing hitch platform, a seven-pin trailer harness connector and a trailer brake controller jumper harness. Maximum trailering capacity is 8,300 lb. on 2WD models and 8,100 lb. on 4WD models when properly equipped with the 4.10:1 axle ratio, a no-cost option.

Top-Box Storage

Top-Box Storage units are located on the sides of the cargo box, providing about 3.5 cu. ft. of extra storage space for tools and camping gear – or fill them with ice and they can be used as coolers. Both units are equipped with drains for easy clean up.



Go-Anywhere Capability

The 130-inch wheelbase enhances maneuverability and ride and handling both on and off road. On 4WD models, the Autotrac active transfer case can handle all types of terrain. Ground clearance is 8.6 inches with the standard 16-inch wheels and tires and 8.8 inches with the optional 17-inch wheels and tires.

Cargo Cover and Locking Tailgate

Avalanche comes with a standard three-piece rigid cargo cover and a locking tailgate that secure the cargo box just like a passenger car trunk. Each section of the cargo cover can be stored on board the vehicle when not in use. A soft cargo cover is optional.

Design and Development

Avalanche Designed to Offer More Versatility and Functionality than Any Other Light-Duty Truck

Form follows function. The Avalanche team followed this mantra when designing a new vehicle for a new market, while stretching the envelope to include a range of new possibilities. The result is a vehicle with a "one-of-a-kind" form to match its unprecedented function.

The design team of the Avalanche looked for ways to turn the ordinary into the extraordinary. For example, many passenger cars offer some kind of pass-through capability between the passenger compartment and the cargo area. Avalanche is the first truck to take advantage of this concept. Its innovative Convert-a-Cab System allows for either the Midgate to be lowered, the rear glass window to be removed, or both, to provide access to an expanded cargo area as well as unparalleled open-air driving in a full-size truck.

It was this type of thinking that led to the concept of a vehicle that offers more rear-seat passenger space and the flexibility to carry large cargo loads without any loss of maneuverability.

Avalanche Joins Award-Winning Family of Trucks

The development of the Avalanche required the efforts of many groups within GM, sharing ideas and drawing on outside research data to supplement and verify their feelings for where the market was headed.

GM sensed that many truck customers were seeking more function and flexibility. The Avalanche team looked at many sources to determine what a new vehicle should offer.

They reviewed new vehicle sales, where customers were demonstrating a growing preference for large, roomy, four-door trucks. Aftermarket accessory sales trends showed customers were buying pickup caps, covers and camper shells, looking to add more functionality to their vehicles. And throughout the industry, there were trends toward developing new kinds of "crossover" vehicles.

All of this information identified a new kind of full-size truck owner. One who was looking for more capability and space as well as more personal expression from a full-size pickup or SUV. These aren't hard-core type pickup owners who want extreme work capability. Nor are they SUV owners who are driving a vehicle because of the image it portrays. These are people who like to challenge themselves to do things, and Avalanche is the type of vehicle that can help them in those endeavors.

Based on this in-depth knowledge of full-size truck and SUV customers, the design team studied ways to remix the passenger/cargo split. At the same time, the vehicle needed to be a Chevy Truck, which meant it was expected to be able to perform, haul and tow just like any other full-size Chevrolet light-duty pickup or SUV.

The resulting design of the Avalanche delivers performance according to every definition. It takes advantage of some of the best attributes of GM's award-winning full-size truck family. And it adds a new look and a technical breakthrough with its Convert-a-Cab System and Midgate to the light-duty truck market.

Styling All Its Own

One look and it's clear that the Avalanche is more than a pickup and more than an SUV. It boasts one of the boldest and most expressive designs ever for a Chevy truck.

The unique headlamp arrangement and the machined look of the large mid-grille band create an aggressive look. Ruggedness is portrayed through the front tow hooks and fog lamps recessed in the front bumper. The highly elevated, aerodynamically styled hood also displays a sense of power and strength. Together, the integrated front end flows seamlessly into the sheet metal of the vehicle with its powerful, sharply chiseled "rock-face" features and angular wheel openings.

The entire front fascia of the vehicle is flush-mounted to the body, creating a smooth look and reducing body gaps. Premium, internal-aim headlamps add to the seamless fashion of the Avalanche. Their lenses and housings are fixed to the body so that only the inside lamp parabolas are adjustable.

The aerodynamic design continues with the functionally strong rear quarter pillars, or sail panels, that are an integral part of the C-ring. The C-ring, which helps support the back-end structure of the vehicle, acts as a halo bar across the back of the roof. The flush-fitting sail panels and the halo bar, made of TPO (Thermal Plastic Olefin), meet the extended rear roofline to help smooth out the flow of air over the vehicle and eliminate the normal swirling of air that occurs between a cab and a pickup box. In fact, the Avalanche is the most aerodynamic full-size pickup on the market.

The integrated lower body-side cladding furthers the vehicle's rugged appearance. At the same time, it provides protection against parking lot dents and dings as well as branches and stones while traveling off-road. The giant one-piece bumper cover in the front of the vehicle also adds to the vehicle's go-anywhere attitude.

Using the Suburban platform as the basis for the Avalanche not only laid the foundation for the styling of the vehicle, it also provided many of the great design and technology features.

With the Suburban platform, an eight-foot cargo box could be offered, which full-size truck owners said was important for their needs. It also could support two full rows of seating and two conventional rear doors, which gave SUV owners what they said they wanted in a full-size vehicle.

And with a 130-inch wheelbase, the Suburban platform would give Avalanche owners all the space they needed for passengers and cargo, but would not limit the vehicle's maneuverability. With a wheelbase and an overall length that is more than a foot shorter than a typical extended-cab pickup, Avalanche's tight turning circle and exceptional handling allow it to easily navigate parking lots and garages as well as off-road trails.

Innovation Defines Avalanche

Customers stated that there were things they wanted in a new full-size vehicle:

- An eight-foot cargo box that was secured from theft as well as from inclement weather
- An easily reconfigurable design that could be changed by one person
- On-vehicle storage for reconfigurable parts, so the vehicle could be reconfigured at any time.

With these things in mind, the Avalanche designers went to work. Many of the designers also are outdoor enthusiasts, just like many prospective Avalanche customers, who took their inspiration for the features and styling of the Avalanche from many nontraditional influences, such as camping and hiking equipment, military vehicles, desert racers and recreational gear.

Armed with their own insight about what outdoor enthusiasts would want from a vehicle, the design team conducted customer simulations, where the Avalanche was used in every conceivable way. Prototype vehicles were loaded with just about everything possible, including, literally, the kitchen sink.

These activities led to several vehicle innovations:

- A sturdy, hard cargo cover that could support a large amount of weight would add to the functionality of the vehicle. This was determined when one team member physically stepped on top of a more conventional box cover.
- Steps were built in the corners of each side of the rear bumper and assist handles were placed at the top rail above the steps when a shorter team member tried unsuccessfully to get up into the cargo box.
- The protective, molded-in recessed storage area for the rear glass in the Midgate was developed after team members found that customers who removed the rear glass might lean it against the vehicle and then forget about it as they drove off.

Under the bold exterior and innovative capability offered by the Avalanche are the features that make the vehicle a Chevy Truck.

2002 Chevrolet Avalanche Restoration Kit

The powerful and durable Vortec 5300 V8 engine has a broad, flat torque curve for excellent towing and hauling capability. New modifications to the engine for 2002 also allow it to operate more cleanly and with even greater reliability.

The modular, three-piece frame design incorporates a number of hydroformed components, which offer outstanding strength, stiffness and dimensional accuracy.

A well-balanced ride is due in large part to the multi-link coil spring rear suspension that delivers the comfort and ride quality of a family vehicle with the load-carrying capability of a pickup. The independent torsion bar front suspension also is specially tuned to optimize ride quality.

On four-wheel-drive models, the Autotrac system is standard. When activated, the computer-operated transfer case delivers power to the front wheels for additional traction under all types of road conditions.

Refined features, such as an optional sunroof and the available OnStar system help give Avalanche a personal touch. And the segment-exclusive Driver Message Center keeps the driver aware of the operating conditions of the vehicle at all times.

Interior Offers Space, Comfort and Flexibility

The Avalanche provides one of Chevrolet's roomiest, most comfortable and flexible full-size truck interior, with access through four large doors and plenty of space for passengers.

Avalanche offers six-passenger seating with a standard 40/20/40 front bench seat or five-passenger seating with three front bucket seat options. A 60/40 split-fold rear seat is standard.

The seat fabrics and styles were developed to complement the vehicle's rugged, outdoor character and include a range of custom cloth, sport cloth, sport leather (a combination leather/flat woven fabric), and leather seats.

The front bench seat includes a power-adjustable driver seat with manual driver and passenger lumbar adjustment and a fold-down center armrest with storage. The optional front bucket seats include standard power-adjustable driver and passenger seats and manual driver and passenger lumbar adjustment. The optional full-feature leather seats also include power lumbar adjustment, power recline, heated cushions and seatbacks, and a two-position driver's seat memory system.

Convertible style driving can be had by removing and stowing the rear window. Also lower the Midgate and the whole back end of the passenger compartment becomes open. Add in the optional power sliding/tilt-glass sunroof and the open-air feeling is enhanced even more. And because of the aerodynamic design of the halo bar and sail panels that help smooth airflow over the vehicle, wind noise and turbulence are practically eliminated.

The HVAC system of the Avalanche provides quick "best-in-segment" passenger compartment warm-up or cool-down comfort. The powerful system has a 32,000-BTU (British Thermal Unit) A/C compressor, a large A/C condenser and a quietly efficient blower motor to quickly cool the cabin. Rear-seat passengers are able to regulate airflow through ducts in the center floor console on vehicles equipped with front bucket seats.

The optional Electronic Climate Control system is fully automatic and uses an onboard computer to provide automatic comfort any time of the year.

A standard rear defroster is included in the tinted rear window. The electrical contacts for the defroster operate through the rear window latches, making it easy to remove the glass.

The Avalanche audio system features an electronically tuned receiver AM/FM stereo with speed-compensated volume and a CD player. The system provides outstanding sound quality with two enhanced six-inch front-door high-sensitivity speakers, two front-door tweeters and two six-inch extended-range rear door-mounted speakers.

Environmental Awareness

Avalanche was designed to make the outdoors more accessible. Chevrolet took the responsibility of making it as environmentally friendly as possible by equipping it with a highly efficient, clean-running powertrain; using long-life fluids and components; and focusing on recyclable components.

Avalanches sold in California and Northeastern states that require low emissions levels meet the Ultra Low Emission Vehicle (ULEV) requirements.

Hazardous mercury is eliminated from underhood lamp switches, which will help avoid possible exposure to the toxic metal.

GM's Oil Life system senses driving factors affecting engine oil life and determines appropriate oil changing intervals based on operating conditions, potentially eliminating unnecessary oil changes.

The use of hydroformed frame sections reduces steel scrap by nearly 66 pounds per frame.

Lifestyle Accessories Enhance Avalanche Versatility

Two separate accessory packages and several additional individual accessories designed specifically for Avalanche offer customers personalization opportunities to fit their specific lifestyles.

The protection package includes:

- a molded hood protector to repel road debris and insects
- vent visors to keep out unpleasant weather elements like rain and snow when windows are slightly opened and reduce sunlight
- glare for a cooler interior
- designed specific molded splash guards that resist chipping, cracking or tearing and withstand extreme temperatures to help protect the vehicle from mud, dirt, snow, salt, and gravel

The appearance package includes a roof rack for extra versatile cargo space that allows consumers to "add onto" their vehicles a variety of enhancements.

An optional bike carrier mounts to the roof rack with quick release attachments making loading and unloading a snap. An optional soft luggage carrier easily attaches to the cross rails of the roof rack for extra storage.

Attractive ground-effect styled assist steps help provide convenient entrance and exit of the vehicle. The extruded aluminum support structure provides added stability and durability for heavy load-bearing capacity.

A self-contained camping tent fits snugly into the truck bed. The tent has water-resistant vents covering three large meshed windows that allow for excellent ventilation and rain protection. The lightweight tent is roomy enough to sleep two adults and fits into a small carrying pouch for convenient storage.

A variety of additional Avalanche accessories are also available. A second-row seat liner helps protect seats with maximum coverage when transporting pets, plants and messy cargo.

An easy-to-use bed extender helps secure loads that are longer than the cargo bed. With a flip inward, the bed extender divides the cargo area keeping smaller objects like toolboxes, coolers or groceries from sliding around while on the road. Securing loads are a snap with the tough cam-lock design and durable weatherproof hardware. The latch-pin system nylon strap uses the tailgate latches to keep the bed extender locked down over rough terrain and bumpy roads.

GM accessories permanently installed on new GM vehicles at the time of delivery are covered under the GM New Vehicle Limited Bumper-to-Bumper Warranty. GM Parts and Accessories permanently installed by a GM Dealer after vehicle purchase also are covered for the balance of the New Vehicle Warranty, but in any event no less than 12 months or 12,000 miles.

All Avalanche lifestyle accessory packages and individual additional accessories will be available through Chevrolet dealerships beginning in Spring of 2001.

Overview

The Rugged, New Chevy Avalanche Stands Alone as the Ultimate Utility Vehicle

Detroit, Mich. — It all started with a simple question from a customer during a truck research session. At that time, many pickup customers were asking for more interior room and rear-seat passenger space, and some customers expressed a willingness to trade off cargo box size to achieve this. Other customers, however, wanted it all, including garagability and maneuverability.

"Have you ever thought of putting a trunk pass-through (found on many passenger cars) on a truck? That way you can have both — room for passengers and, when you need it, an eight-foot cargo box."

Our first thought was, "Why not?"

That question kicked off the development of what has become the Ultimate Utility Vehicle: the Chevy Avalanche. It is truly a unique vehicle — with the benefits of both a pickup and a sport utility vehicle (SUV) — thanks to its unique combination of capability and spontaneous adaptability.

Increasing numbers of customers who are looking for power, roominess and versatility have made full-size pickups and SUVs among the fastest-growing segments in the industry. But, despite the different configurations of pickups and SUVs, customers were often never completely satisfied. Chevrolet knew that a new kind of vehicle was needed that would bridge the gap between full-size pickups and SUVs. The Avalanche team explored hundreds of ideas to come up with the perfect design: one that gives customers all the features they want and the flexibility they need. To that end, Avalanche stands alone.

At the heart of the Avalanche is the exclusive Convert-a-Cab System, featuring the Midgate design, which makes it the only vehicle available that can reconfigure from six-passenger seating* to a vehicle with a protected eight-foot cargo box. One person can reconfigure it in less than one minute, with no tools, anytime, anywhere.

* With standard 40/20/40 bench seat

"Avalanche's innovative design allows it to provide the roominess of Suburban-style first- and second-row seating with the practicality of a Silverado-style cargo box," Chevrolet General Manager Kurt Ritter explains. "It can be reconfigured to function as either a pickup or an SUV or both at the same time."

"We believe the world is ready for an Ultimate Utility Vehicle — and Avalanche is ready to meet the need."

Convert-a-Cab System Serves Up Spontaneous Adaptability

The unique cargo system of the Avalanche has a number of innovative features that allow owners to spontaneously change the passenger and cargo space configuration. It only takes one person to reconfigure the vehicle, and all its removable components can be stored on board.

The ingeniously designed Midgate permits a pass-through between the cab and the cargo box. It is constructed of GM's PRO-TEC composite material, making it lightweight, yet durable and strong. When the Midgate is in place, the vehicle offers a five-foot, three-inch long protected cargo box. With the Midgate lowered, the opening to the cargo box is a wide 49 inches and the box is eight-feet, one-inch long — plenty of room for 4'x8' sheets of plywood and other items.

The standard three-piece rigid cargo cover provides protected, weather-resistant storage in the cargo box. Each section is strong enough to hold an average man's weight, up to approximately 250 pounds. The sections also can be easily removed or installed by one person and stored on board the vehicle. An integrated soft tonneau cover also is available.

The combination of the rigid cargo cover and the locking tailgate provides secure storage in the cargo box, performing like a passenger car trunk.

When taller items need to be carried, simply remove and store the cargo cover and remove the rear glass window. The robust safety glass has convenient handles protruding from an encapsulation at the top that make it easy to lift and hold. It can be safely stored in the Midgate when not in use.

The large, flexible three-passenger 60/40 split-folding rear seat provides more seating space and creates more interior cargo space than any crossover competitor when folded. It has a highly durable, sheet molded compound (SMC) surface on the back side and rubber bumpers to carry the Midgate when lowered.

Additional storage is available in the lockable Top-Box Storage compartments located on both sides of the cargo box. The integrated compartments are strong and impact resistant while offering a convenient place to store a wide array of items, such as jumper cables, tools or outdoor equipment. The compartments also have drains, so they can even be filled with ice and used as coolers.

Each storage compartment has a round cargo lamp that simultaneously lights up the interior of the Top-Box Storage compartment and the cargo box.

To make it easier to reach any items stored in the cargo box, there are built-in steps at each corner of the rear step bumper and grab handles at the top corners of the cargo box.

Designed to Handle Just About Anything

The strikingly bold exterior styling of the Avalanche is uniquely crafted with a form-follows-function design. It backs up its rugged, outdoor looks with design elements that are functionally useful, such as the signature sail panels. The panels provide additional structural support for the back end of the vehicle while visually connecting the rear of the cab with the cargo box.

The design team worked tirelessly to ensure that form and function worked together throughout the vehicle.

"Within our own design staff, a close-knit, highly focused group of hard-core outdoor enthusiasts guided this project from concept to completion," says John Cafaro, Vehicle Chief Designer of Chevy Trucks. "That's why this new vehicle is very much like a piece of highly engineered mountaineering gear. It reveals its purpose with a single glance."

The balanced interior design maximizes passenger roominess and cargo-carrying capability in a body size that is easy to maneuver, park and garage. A wide selection of seating choices and specially designed fabrics, including custom cloth, sport cloth, sport leather with cloth inserts, and leather, are available to fit the needs of customers' active lifestyles. And with the removable rear window and the available power sliding sunroof, open-air driving enjoyment is available at a moment's notice.

Avalanche shares its basic chassis and body structure with the Suburban and has an extremely strong, rigid and dimensionally accurate body structure. The extraordinary body structure with stiffness rated at 23.5 Hertz is achieved with a radical design in which the whole back end, including the cargo box, is fully integrated to the vehicle in a smooth, seamless fashion.

"The Chevrolet Avalanche story is one of not only product innovation, but a great business story too, because we leveraged the strength and resources of the industry's single largest platform," says Gary White, Vehicle Line Executive for GM Full-size Trucks.

With the Suburban platform, an eight-foot cargo box could be alternated with two full rows of seating and two conventional rear doors. And with a wheelbase of 130 inches, all the space customers needed was available, but the overall package was highly maneuver-able and easy to drive. The overall length of the Avalanche is 221.7 inches, less than a Silverado extended-cab pickup, and it has a tight turning radius (curb-to-curb) of 43 feet.

Legendary Vortec Power Drives Chevy Truck Performance

The standard Vortec 5300 V8 engine is mated to the refined, smooth-shifting 4L60-E four-speed automatic transmission. This powertrain combination provides an outstanding balance of performance, economy and towing/hauling capabilities.

Vortec V8 power is something that full-size truck customers have come to expect from Chevrolet. The Vortec 5300 produces 285 hp at 5,200 rpm and 325 lb-ft of torque at 4,000 rpm. With 90 percent of its peak torque available over a very broad range of 1,600 to 5,000 rpm, it delivers excellent pulling power to handle all kinds of cargo hauling and trailering duties.

The reliability and durability of the engine offers peace-of-mind driving with features such as Coolant Loss Protection. This allows the vehicle to continue to be driven without damage to the engine, up to 25 miles if there is a substantial loss of coolant.

The Vortec 5300 also meets Ultra Low Emission Vehicle (ULEV) certification requirements in California and Northeastern states.

The tow/haul mode of the electronically controlled automatic transmission is programmed to hold each gear longer for better towing performance. This results in reduced shift busyness. It is just one feature included in the trailer-ready design of the vehicle. The standard heavy-duty trailering package includes a 12,000-lb. weight-distributing hitch platform, a seven-pin trailer harness connector and a trailer brake controller jumper harness. The Avalanche has an 8,300-lb. maximum trailering capacity on two-wheel-drive models and an 8,100-lb. maximum trailering capacity on four-wheel-drive models, when properly equipped.

The Autotrac active transfer case is standard on four-wheel-drive models. This computer-operated system provides maximum control under most road conditions. It uses an instrument panel-mounted, four-button selector to engage 2HI, AUTO 4WD, 4HI, 4LO and Neutral. In the AUTO 4WD mode, the system monitors wheel speed and transfers torque delivery from the rear to the front wheels, as needed, to optimize traction.

Exceptional Ride, Handling and Safety in a Full-size Vehicle

The Avalanche offers responsive, confident handling and a smooth ride regardless of the number of passengers or amount of cargo thanks to the vehicle's structural rigidity and component selection and tuning.

The independent torsion bar front suspension and five-link coil spring rear suspension help deliver the Avalanche's smooth ride and responsive handling. The torsion bar and shock absorber tuning of the front suspension optimizes the levels of control and ride quality for both two-wheel-drive and four-wheel-drive models.

The versatile five-link coil spring rear suspension system also helps deliver the ride quality and comfort of a family vehicle. In addition, it offers plenty of cargo-carrying capability. The Avalanche has a payload capacity of approximately 1,363 lb. for two-wheel-drive models and 1,322 lb. for four-wheel-drive models.

The five-link system consists of two upper and two lower control arms to control the axle's fore-aft and vertical position while a track bar controls the axle's lateral position. A 1.125 inch (28.6mm) stabilizer bar also helps reduce body roll for better handling.

The braking system includes standard four-wheel anti-lock disc brakes with GM's advanced Dynamic Rear Proportioning (DRP) system. The DRP system automatically modulates pressure applied to the rear brakes to ensure that braking loads are balanced between the front and rear brakes. This provides for smooth, consistent, even braking performance and helps minimize stopping distances under all load conditions.

The large rotors have a generous sweep area and the vented four-wheel discs help to quickly dissipate heat to maintain braking performance under all types of use.

Audible wear sensors on both the inboard and outboard pads of the front and rear brakes warn drivers of impending pad wear-out.

In addition to the standard four-wheel anti-lock brakes, Avalanche offers a long list of safety features.

Standard dual front air bags for the driver and front-seat passenger along with front seat-mounted side-impact air bags offer outstanding occupant protection.

Avalanche also features safety cage construction and side-impact door beams as well as large mirrors, standard fog lamps and automatic door locks and child-security rear door locks.

The optional OnStar service also provides around-the-clock security with instantaneous access to emergency service, whether it's for a flat tire or medical assistance. The OnStar system automatically

notifies the OnStar Communication Center when an air bag is deployed. An OnStar advisor will call the vehicle to check the reason for the deployment and the appropriate assistance personnel will be called.

OnStar also can track a vehicle when it is reported stolen and assist a driver who is locked out of the vehicle in addition to providing many other support services.

Everything about the Avalanche – from the powertrain, to the safety features, the ride and handling characteristics, the reconfigurability of passenger and cargo space, and its expressive design – truly makes a statement about what consumers expect from their vehicles.

"There's a demand out there for something more, and Chevy Avalanche meets that demand on an emotional and utilitarian level," explains Ed Schoener, Chevy Avalanche Brand Manager. "The name 'Avalanche' definitely fits those qualifications. And it's a little edgy and aggressive, like the truck itself."

Product Fact Sheet

The industry-exclusive Convert-a-Cab System and Midgate allow the reconfigurable cargo box to be converted from a 5'3" protected box to a full 8'1" protected box. Standard features include Vortec V8 power, four full-size doors, seating for up to six passengers and a trailering capacity of up to 8,300 lb. (when properly equipped).

Target Buyer

Age	30-45
Average household income	\$80,000
Percent male/female	80%/20%

Model Lineup

- Avalanche 1500 2WD
- Avalanche 1500 4WD

Avalanche is built and packaged as a single, well-contented vehicle. Standard equipment highlights include:

- Vortec 5300 V8 engine (285 hp @ 5200 rpm/325 lb-ft of torque @ 4000 rpm)
- 4-speed automatic transmission
- 16-inch aluminum wheels/P265/70R16 tires
- Four-wheel anti-lock disc brakes
- Air conditioning
- Power windows/locks
- AM/FM Stereo w/CD player
- Heavy-duty Trailering Package

Available Convenience Package includes:

- Electrochromic outside rearview mirror (driver's side)
- OnStar®
- Electronic Climate control
- HomeLink®

Z66 Premium On-Road Package includes:

- 17-inch aluminum wheels with P265/70R17 tires
- Premium On-Road Suspension with self-leveling rear shock absorbers
- Traction assist
- Locking rear differential
- Z66 decals
- Aggressive rubber floor mats

Z71 Off-Road Package includes:

- 17-inch aluminum wheels with P265/70R17 tires
- Z71 Premium Off-Road Suspension
- Skid shields
- Locking rear differential
- High-capacity air cleaner
- Z71 decals
- Aggressive rubber floor mats

Competitors

- Ford F-150 SuperCrew
- Dodge Dakota Quad Cab
- Ford Explorer Sport Trac

Manufacturing Facility:

- Silao Assembly Plant, Silao, Mexico

Powertrain

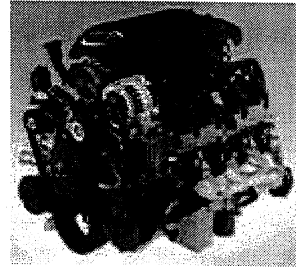
Avalanche Powertrain Is All Chevy Truck

Underneath the bold styling and unique adaptability of the Avalanche is nothing but pure Chevy Truck. And that means Vortec engine power and performance.

Vortec 5300 V8

The powerful and efficient Vortec 5300 V8 engine is the only engine available on the Avalanche. The engine has an established track record for being able to withstand the real-world conditions of recreational and commercial use, while still offering outstanding performance day in and day out.

The durable Vortec 5300 produces 285 hp at 5,200 rpm and 325 lb-ft of torque at 4,000 rpm. Its impressive low-end torque and exceptionally strong, flat torque curve deliver excellent pulling power with 90 percent of its peak torque available from 1,600 to 5,000 rpm.



The engine's durable design includes a deep-skirt cast-iron block with heavy-duty six-bolt cross-bolted main bearing caps. Bridging the two cylinder banks is a structural die-cast aluminum valley cover that enhances the block's torsional strength. A structural oil pan also is used to increase the engine's overall stiffness. These features reduce noise and vibration and help deliver a noticeably smooth, refined performance.

Thanks to the catalytic converter system being moved closer to the engine by using two small-volume pipe converters, the converters reach their operating temperature more quickly for better emission performance. It is so efficient that an A.I.R. (Air Injection Reaction) system is no longer needed, reducing complexity and weight. The result is that the Vortec 5300 meets Ultra Low Emission Vehicle (ULEV) certification requirements in California and Northeastern states.

The Vortec 5300 also monitors oil quality and quantity levels through the GM Oil Life System – a segment exclusive. This system continuously analyzes factors that determine the useful life of the oil. When the system senses that the oil has only 10 percent of its useful life remaining, the driver is notified of the need to "change oil" via the Driver Message Center.

A standard engine coolant level sensor will help avert potential engine damage if there is a sudden loss of coolant protection. The Driver Message Center will notify the driver if the engine is overheating. The engine will go into a "limp home" mode once coolant temperature reaches 265 degrees Fahrenheit by running on alternating banks of four cylinders while using cool air to cool itself. This allows the driver to continue driving for up to 25 miles until reaching a service facility without damaging the engine.

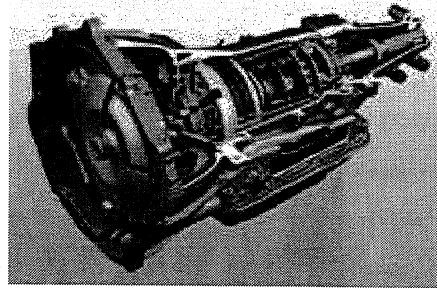
The Vortec 5300 also has incorporated several other enhancements that help deliver better performance and lower emissions. These include:

- A simplified two-point vapor venting system, which reduces complexity and weight.
- A new crankshaft sensor reluctor ring, used by the crankshaft sensor to determine crankshaft position, that improves reliability.
- A recontoured engine cover that provides quieter operation and enhances the appearance of the engine compartment.

4L60-E Automatic Transmission

The 4L60-E electronically controlled 4-speed automatic transmission that is mated to the Vortec 5300 engine offers precise shifting and performance, lending to the smooth operation of the Avalanche's powertrain.

The transmission's high fluid capacity and the efficiency of the torque converter minimize operating temperature, increasing long-term durability. And a full bell-housing design helps maximize the transmission's structural integrity for smoother, quieter operation.



The transmission features GM's segment-exclusive Tow/Haul mode that is geared to heavy hauling or trailering.

By a simple press of a button on the shift lever, the transmission's shift pattern becomes much more aggressive by lengthening the time between gear shifts and making the gear shift itself much more quickly. It also provides higher line pressure for a smoother, more constant shift feel.

Autotrac Four-Wheel-Drive

The Autotrac active transfer case that is standard on four-wheel-drive models provides maximum control under most road conditions. The simple design of this computer-operated system makes it more reliable than similar systems from competitors while offering highly refined operation.

It uses an instrument panel-mounted, four-button selector to engage 2HI, AUTO 4WD, 4HI, 4LO and Neutral. The system is flexible enough to offer different ranges depending on road conditions. The system interactively monitors the road in the AUTO 4WD mode and transfers torque delivery from the rear to the front wheels, as needed, to optimize traction in slippery or changing road conditions.

For serious off-road operation or in snow or mud, the system offers a 4HI mode, which is a part-time four-wheel-drive system using all four wheels to drive the vehicle, and a 4LO mode, for when a high level of torque may be needed such as when climbing steep grades or towing a boat up a launch.

Structural Rigidity Offers Outstanding Ride and Handling, Hauling Capability

Avalanche provides an exceptionally smooth ride and responsive handling, whether carrying six passengers or one, loaded or unloaded with cargo. Its ride and handling are due in part to the Avalanche's exceptional body strength and structural rigidity.

The Avalanche rides on a 130-inch wheelbase with an overall length of 221.7 inches, which is a shorter wheelbase and overall length than a conventional extended-cab pickup. But it maintains all the strength expected of a full-size vehicle.

Fully Integrated Cargo Box

The vehicle is extremely strong, rigid and dimensionally accurate, with a structural stiffness rated at 23.5 Hertz (Hz). Using the 1500 Series Suburban with its body-on-frame design as a basis, engineers created a highly balanced, fully integrated rear-end design by adding large boxed sections for extra support virtually throughout the whole rear of the vehicle. This design produces a back-end structure that is completely integral to the vehicle, with the sheet metal formed to the rear pillar in a smooth seamless fashion. This is unlike major crossover competitors, which have a traditional separate cab and box structure.

The large boxed sections, which act like beams, are used throughout the vehicle. Engineers created one large box section, which forms a whole ring around the opening in the C-pillar area where the Midgate is located, to provide the central support for the whole back of the Avalanche.

As part of the C-ring, there are vertical, tubular pillars in the rear quarter pillar, or "sail" panels, of the vehicle running from the top of the cab to the floor. There also are reinforcements that run down from the roof at a 45-degree angle.

Avalanche also uses a laser-welded ring for the front doors, eliminating the need for hinge pillar reinforcements and multiple welds. The underbody features welded-together cross sills under the driver and passenger seats that form a one-piece floor panel support for maximum rigidity. The roof panel uses reinforced steel for outstanding strength.

Hydroformed Frame

The advantage of GM's advanced, modular 1500 Series truck frame is its strong stable foundation for the body, powertrain and suspension. The fully welded ladder frame features hydroformed front and rear frame rails for added structural rigidity, more frame strength and dimensional precision than a conventional box design.

In the hydroforming process, a hollow, round steel tube is bent to general form, sealed at one end and filled with fluid. In a press, the fluid is pressurized to form the frame rail from the inside out. Because the entire steel tube is pressurized equally, a very consistent shape is achieved without any weak spots.

The use of hydroforming in the construction of the rails and engine cross members eliminates hundreds of inches of weld for improved dimensional control of mounting brackets.

Trailer-Ready Design

Aided by Avalanche's strong frame and body, engineers were able to create a vehicle that is ready for the long haul.

The Avalanche offers a maximum payload capacity of approximately 1,363 lbs. for two-wheel-drive models and approximately 1,322 lbs. for four-wheel-drive models.

Avalanche also features a trailer-ready design. Special suspension or cooling packages are not needed to obtain maximum trailering performance. A 4.10 axle ratio, a no-cost option, is all that is required for maximum trailer capacity. The standard axle ratio is 3.73.

Every Avalanche has a standard pre-installed seven-wire socket to simplify the trailer preparation process. In addition, the standard Z82 Heavy-Duty Trailering Package includes a 12,000-pound weight-distributing hitch platform and a trailer brake controller jumper harness.

The maximum trailer rating of the Avalanche is 8,300 pounds for the two-wheel-drive model and 8,100 pounds for the four-wheel-drive model (when properly equipped with the 4.10 axle ratio).

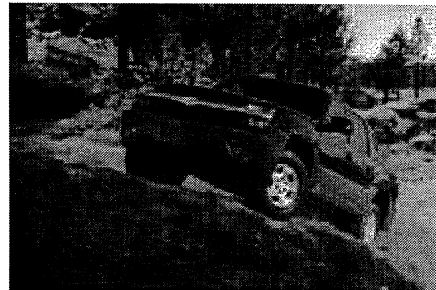
Avalanche Keeps Everything Under Control

The Avalanche emits a sense of control, from its commanding view of the road to its aggressive styling, but keeping everything in control is the work of the specially designed suspension system.

Steering

For less effort and precise control, the Avalanche features an integral power-assisted recirculating ball steering system. This system is standard on two-wheel-drive models and provides excellent control and easy maneuverability at all speeds. The Avalanche has a tight curb-to-curb turning circle of 43 feet.

Four-wheel-drive models benefit from a speed-sensitive (Electronic Variable Orifice) power steering system, which offers additional assistance and ease of use, especially useful for trailering. The system reduces steering effort at lower speeds, such as when parking and reverts to normal steering effort at



higher vehicle speeds. The system also is designed to operate at a lower power steering fluid temperature to help extend the useful life of the fluid.

Independent Front Suspension

The independent front suspension has unique torsion bar and shock absorber tuning to optimize the levels of control and ride quality of both two-wheel-drive and four-wheel-drive models to meet the expectations of those vehicles' drivers.

The front suspension uses precision-machined modular cast-iron lower control arms, which are more dimensionally accurate than stamped or welded components. They complement the hydroformed front frame rails to provide a highly precise front-end alignment for a solid on-center feel and reduced tire wear. A long-life, energy-absorbing microcellular urethane front jounce bumper also helps smooth out severe bumps and the 1.25 inch (32mm) stabilizer bar reduces body roll in cornering for more precise handling.

Five-Link Coil Spring Rear Suspension

The Avalanche's five-link coil spring rear suspension delivers both the comfort and ride quality of a family vehicle and the load-carrying capability of a work truck – something that can't be said of competitors' leaf spring suspension systems.

The five-link system consists of two forged steel upper control arms and two stamped steel lower control arms with bushings on each end for better isolation. These components control the axle's fore-aft and vertical position and a track bar controls the axle's lateral position. A 1.125 inch (28.6mm) stabilizer bar also helps reduce body roll while cornering for better handling.

And for handling even the heaviest loads, the rear suspension features tall jounce bumpers, which act as a second-stage spring to help carry heavy cargo box loads.

Suspension Packages

The ZQ1 Smooth Ride Suspension is standard on all models. It includes 16-inch aluminum wheels and P265/75R16 all-season tires.

Avalanche also offers two suspension packages for improved off-road and on-road ride and handling.

The Z71 Off-Road Suspension for four-wheel-drive models includes P265/70R17 on/off-road tires for maximum traction in loose soil, specially tuned springs, 46mm Bilstein gas-pressurized shock absorbers in the front and rear, specially tuned jounce bumpers and a stabilizer bar to help minimize the impact of large suspension inputs on ride and handling. The package also includes skid plates, a locking rear differential, a high-capacity air cleaner, Z71 decals and aggressively designed rubber floor mats.

The Z66 Premium On-Road Suspension for two-wheel-drive models includes P265/70R17 all-season touring tires, specially tuned springs, 46mm Bilstein high-pressure gas-charged shock absorbers in the front and Sachs self-leveling rear shocks. Electronic traction assist and a locking rear differential are included with the package along with Z66 decals and aggressively designed rubber floor mats.

Brakes

Building on GM's world-class braking systems, the Avalanche features a standard four-wheel anti-lock vented disc brake system. With large rotors for a generous sweep area and vented discs to quickly dissipate heat, the system provides exceptional braking performance.

The system utilizes GM's advanced Dynamic Rear Proportioning (DRP) system as well to provide outstanding brake performance under all conditions and types of vehicle loads, even when trailering.

The DRP system monitors wheel speed and, as needed, automatically modulates the pressure applied to the rear brakes to ensure that braking loads are balanced between the front and rear brakes. This reduces wear on the front brakes and results in more effective braking performance for enhanced safety while increasing front brake pad life.

The four-wheel anti-lock braking system (ABS) recognizes rapid changes in wheel speed and modulates the amount of pressure applied to each brake. This enhances the stability and steering of the vehicle during an emergency stop while improving the overall performance of the brakes.

The front and rear brakes have twin-piston calipers (aluminum calipers up front for more mass savings) for exceptional braking power and even pressure over the brake pad. By applying pressure more evenly, taper wear is reduced and brake feel is more consistent.

The brakes also use large, long-lasting organic brake pads. The pads for both the front and rear discs have audible wear sensors on the inboard and outboard disc brake pads to detect impending pad wear-out. This provides a comprehensive alert of the need for servicing before the pads wear out.

Electrical Technology Adds to Durability, Reliability

With the growing number of components that are controlled electronically on a vehicle, GM has undertaken great efforts to reduce the potential for any electrical system failures. One way to reduce that potential is to eliminate areas in the electrical system that offer possible failure points. One such area is wire splices.

Bussed Electrical Centers

In order to reduce the potential for electrical system failures, the Avalanche features a combined Bussed Electrical Center (BEC) and Class II electrical system architecture. The Avalanche electrical system has just nine splices, a best-in-class design that minimizes the number of possible failure points and dramatically contributes to the durability and reliability of the system.

The four BECs in the vehicle centrally locate electrical system functions, making them easier to service, simplifying wiring connections and allowing the use of lighter gauge wire for reduced mass. The BECs are located under the hood, in the passenger compartment and on the left and right side of the instrument panel.

Driver Message Center

Keeping the driver up-to-date on the functions of the vehicle is the function of the Driver Message Center. A sophisticated liquid-crystal display, the Driver Message Center monitors and reports on the status of up to 15 vital vehicle functions. Status messages are relayed from onboard computers to keep the driver fully aware of the vehicle's operating condition at all times.

Convert-a-Cab

Adaptable, Clever Features Make Avalanche the Ultimate Utility Vehicle

What makes the Avalanche ready for anything, anytime, anywhere? It is the ability to be reconfigured from a six-passenger vehicle to a three-passenger vehicle with an 8'1" protected cargo box – no tools required.

Industry Exclusive Convert-a-Cab System

Avalanche offers a host of innovative features that allow passenger and cargo space to be reconfigured for unprecedented cargo-carrying flexibility. The features of the Convert-a-Cab System include the Midgate, a cargo cover, split-folding 60/40 rear seat and a locking tailgate. There also are several other unique features, such as the lockable Top-Box Storage units and a convenient rear step bumper with assist handles, that enhance the functionality of Avalanche.



Midgate Design Means No Compromises

The Midgate is similar in appearance and function to a tailgate. It separates the rear seat from the cargo box. But when more cargo room is needed, it may be lowered into the cabin to create an eight-foot-long cargo box. The rear glass window, which is made of robust, yet lightweight safety glass, also can be removed and stored in a specially designed pocket in the Midgate itself. A centrally located crossbar helps to protect and secure both the rear glass and the Midgate.

Since the Midgate forms the back of the cab, all of its components have been designed and tested to meet stringent load-impact requirements. The Midgate is constructed of strong, lightweight PRO-TEC composite material, which is dent resistant and rustproof.

The Midgate can be lowered with or without the rear glass in place. When the Midgate is lowered, it creates a 49-inch-wide opening in the rear of the passenger compartment. By lowering the Midgate, for example, but keeping the rear glass in place, longer items, such as 4'x8' sheets of building material, can be carried.

With the tailgate up and the cargo covers in place, all items are in a fully secured, weather-resistant enclosure. By removing the rear glass, lowering the Midgate and removing the cargo cover, long and tall items like furniture or an all-terrain vehicle can be easily carried. And for those looking for a sense of open-air driving, just the rear glass may be removed.

The centrally located crossbar is always retained with either the Midgate or with the rear glass if either of these reconfigurable components is kept in place. A built-in mechanical control mechanism in the Midgate release handle can sense if the rear window is in place or not. If the window has already been removed, the mechanism trips an outer set of latches that release the Midgate and the crossbar. If the window is still in place, the mechanism trips an inner set of latches that releases the Midgate only.

Lowering the Midgate and removing the rear window are both simple operations. To remove the rear window:

1. Flip and fold down the rear seat.
2. Unfasten the top latches, which will cause the window to tip forward slightly. A rear window safety stop prevents the glass from falling forward.
3. Pull the glass out by the two grab handles molded into the upper facing edge and press up on the safety stop.
4. Pull the bottom edge out of a groove in the crossbar.

The glass can be stored in the Midgate.

To lower the Midgate:

1. Flip and fold down the rear seat.
2. Turn the latch release handle at the top of the Midgate to the right.
3. Lower the Midgate down onto the back side of the rear seat.

60/40 Split-Fold Rear Seat

The 60/40 split-folding rear seat of the Avalanche offers three-passenger seating and additional room for cargo or can be easily folded to carry a combination of passengers and cargo.

The back side of the rear seat has a thick, hard Sheet Molded Compound (SMC) surface that allows an owner to place sporting equipment or work items on it with little worry about damaging it. The surface also is designed to support the Midgate.



Cargo Covers

The cargo box itself is constructed mainly of high-grade stamped steel that is capable of handling the loads of any typical pickup box. The rubber cargo mat and the plastic sidewalls help protect against dents and wear from normal cargo box use. Enclosing the cargo box is the standard three-piece rigid cargo cover or the optional soft cargo cover.

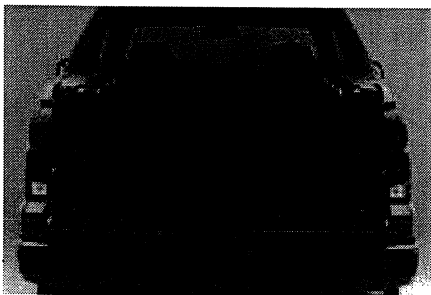
Each composite panel of the rigid cargo cover is strong enough to hold approximately 250 pounds, which allows an individual to stand on the cover to load gear onto the optional dealer-installed roof rack. Yet the panels are light enough for one person to easily install or remove them. Each panel weighs approximately 18 pounds.

The soft cargo cover uses a snapless runner design with two spring-loaded bows for easy removal and installation. Straps with fasteners are located at the front of the cargo box to secure the cover in a rolled position. The cover and rails also can be stored on board in a storage bag that straps to either side of the cargo box.

Each of the cargo covers, along with the Top-Box Storage units, the Midgate and the tailgate, are sealed to provide weather-resistant storage.

The unique water management system of the Avalanche is designed so that water sheds off the vehicle when the cargo covers are in place. There are drains at the front corners, behind the sail panel, to draw off water on the cover. When the covers are removed, the system will drain large quantities of water through multiple drains located in the cargo box. In addition, a secondary system is in place to drain any water that may pass by a seal compromised by foreign material.

PRO-TEC Locking Tailgate



The Avalanche tailgate is one of the tallest on any type of vehicle – pickup or SUV – and when lowered, adds another 25 inches to the load floor support of the cargo box. At a depth of 22.5 inches, the cargo box itself is deeper than any competing full-size pickup box.

The PRO-TEC composite construction of the Avalanche tailgate offers durability, yet is lightweight. And because it can be locked, everything in the cargo box is secure with the rigid three-piece cargo cover in place.

Lowering the tailgate can be handy when carrying extra-long items.

With the Midgate lowered along with the tailgate, the Avalanche provides close to 10 feet of solid load support. Even with passengers in the rear seat, lowering the tailgate provides more than seven feet of solid load support.

A specially designed cargo box extender also is available that further enhances carrying capability at the rear of the cargo box.

Lockable Top-Box Storage

The Avalanche offers many different and functional ways to carry all types of cargo – long or short, tall or small.

The unique Top-Box Storage units run nearly the length of the cargo box and are strong and impact resistant. Each unit is about 3'6" long, six inches wide, and they range from 12 to 21 inches deep. Combined, they offer about 3.5 cubic feet of storage space.

The Top-Box Storage units, along with the tailgate, doors and spare tire, can be conveniently locked using the ignition key in a one-key operation. While all the cylinder locks are the same, the storage units and tailgate are locked/unlocked independently of each other and of the side doors, which have a programmable door lock/unlock feature.

Because of the size, strength and security of the storage units, they can be used as toolboxes, much the same way a steel side box or crossbox would be, or they are capable of holding jumper cables, camping gear or anything a car owner might store in the trunk. They can even be filled with ice and used as a cooler. There is a drain at the bottom, so cleaning the compartments is as easy as simply hosing them out.

Finding items in the compartments is easy too. Each unit has a unique, round cargo lamp built into its side. When turned on by using a switch on the instrument panel, the lamps light up the storage units as well as the inside of the cargo box.

Because the lamps are close to the floor of the cargo box, they provide more effective illumination for the whole interior of the cargo box than typical pickup lighting, which is usually located up high by the Center High-Mounted Stop Lamp (CHMSL) on the back of the cab. The cargo lamps also can be operated independently of the vehicle's interior lamps. A "cargo light on" message in the Driver Message Center

provides a reminder that the lamps are on. The lamps also are controlled by the body computer to turn off after 20 minutes with the ignition key off.

Two-Tier Loading

Avalanche's two-tier loading capability, with pocket shelves molded into the upper cargo box walls so that 2'x4' boards and a sheet of plywood can be laid across the box to form a "second floor," provides added flexibility.

By lowering the Midgate, cargo of one type, such as sheets of drywall, can be carried in the upper half of the cargo box with another type of cargo in the lower half. And with the rear glass in place, the full cargo cover on and the tailgate up, all the cargo is fully secured and weather protected.

The cargo box itself is 22.5 inches deep. Using two-tier loading and keeping the cargo cover on for protection, there is approximately 11 inches of load height from the top of the loading board to the cargo cover and another approximately 11 inches of space between the board and the floor at the rear of the vehicle.

Cargo Mat

The cargo box of the Avalanche features a standard, heavy, one-piece rubber mat. The mat covers the stamped steel floor surface completely to help protect the floor against scratching or any damage. The rubber surface of the mat also helps in keeping cargo from shifting while being transported.

Embosses on the metal floor of the cargo box help the mat to nest tightly to the floor, so once installed, it won't move or slide around. But since the mat is not affixed to the floor, it still may be removed for cleaning. It weighs approximately 44 pounds.

Rear Bumper Steps

The Avalanche has highly functional rear corner bumper steps. Using the steps along with the grab handles located on the top rail corners makes it easier to step up into the cargo box. The grab handles are bolted into the body, enabling them to be used as tie-downs as well.

Safety and Security

Safety and Security Are Built Into Every Avalanche

As the demand rises for trucks that will be used as passenger vehicles, GM engineers thought about the need to equip Avalanche with the latest safety and security features. That's why safety and security are built into the Avalanche from the ground up.

Structural Integrity

Avalanche's highly protective design includes safety cage construction. Drivers are provided with full-frame protection – one of the strongest and most advanced design frames available – with unique features like front frame section "crush caps" that absorb 25 percent more energy for added protection and crashworthiness.

Safer Seats

Easy-to-use standard seat-mounted safety belts are used in the outboard front seating positions of the front bench seat and front bucket seats. The three-point lap/shoulder belts are anchored to the seat and move with every adjustment made to the seat to optimize fit and comfort.

For additional safety for younger passengers, there are child seat top-tether anchors provided in the front-passenger bucket seat and in the two front-passenger positions of the bench seat, as well as in all three rear-seat positions.

Side-Impact Air Bags

The Avalanche features seat-mounted side-impact air bags in addition to the standard dual front air bags for the driver and outboard front passenger. Since the side air bags are seat-mounted, the bag is

consistently in the correct position to the occupant at all times, maximizing occupant protection during side impacts.

Energy-absorbing foam also is used throughout the vehicle to help protect occupants from potential head injury. Additional passenger safety is provided by the adjustable head restraints at the outboard seating positions.

Protective Midgate

The Midgate of the Avalanche is more than a reconfigurable part of the Avalanche's Convert-a-Cab System. It forms the back of the passenger cabin, and as such is required to protect passengers from loads carried in the cargo box. The Midgate was designed and tested to the highest impact standards for this reason.

The Midgate itself is made of very strong PRO-TEC composite material construction. It is made of structural reaction injection-molded (SRIM) panels with a thermoplastic covering on the cabin-facing side of the panel.

The hinges and latches of the Midgate also were designed to meet the same stringent load and strength requirements as the tailgate.

To ensure that the Midgate and the rear glass are fully protected at all times, a crossbar is used that also meets rigorous strength and impact-resistance standards. A built-in sensing device in the Midgate release handle determines which set of latches needs to be triggered on the crossbar. If the rear glass is removed, the sensing device controls the release of the latches so that the crossbar stays with the Midgate. If only the Midgate is lowered and the rear glass is kept intact, the crossbar stays with the glass.

Anti-lock Brakes and Traction Control

The four-wheel anti-lock braking system (ABS) is standard on all Avalanche models. The system recognizes rapid changes in wheel speed and modulates the amount of pressure applied to each brake. This enhances the stability and steering of the vehicle during an emergency stop while improving the overall performance of the brakes.

Electronic traction assist is included with the optional Z66 Premium On-Road Package on two-wheel-drive models. The system provides for more controlled acceleration on slippery surfaces.

When excessive rear-wheel spin is detected, the system reduces unnecessary torque to the rear wheels by retarding engine spark and airflow into the engine. It also modifies the transmission upshifts accordingly. As the electronic throttle control limits the torque coming into the rear axle, the locking rear differential (also included in the Z66 package) distributes the right amount of torque between the left and right side wheels for the best traction.

Lighting System

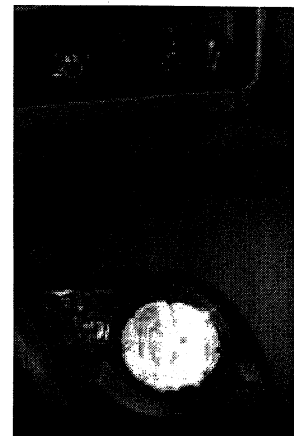
Making sure that the driver can see and be seen also helps dramatically reduce the chance of an accident. As with all GM vehicles, the Avalanche has standard Daytime Running Lamps that allows other drivers to easily see the Avalanche on the road.

The standard automatic headlamp system helps optimize the driver's ability to see well at night with a low beam setting that provides a range of 400 feet for exceptional visibility.

And on foggy nights, the large, standard fog lamps will help drivers better see the road.

Security

The Avalanche offers a number of security features that offer protection for passengers as well as cargo.



2002 Chevrolet Avalanche Restoration Kit

The standard programmable automatic lock and unlock feature automatically locks the doors when the vehicle is shifted out of park. The doors will then unlock automatically when the transmission is shifted into park.

Drivers can program the system to their preference: on, off, driver's door only, or all doors. In addition, the driver lockout prevention feature will not allow the doors to be locked with the engine off and the key in the ignition.

The Passlock theft-deterrent system also is standard on the Avalanche. The system looks for the correct signal from the ignition system before allowing the vehicle to be started.

Avalanche makes it easier and more convenient to carry all types of cargo without any security worries while traveling. With the rigid three-piece cargo cover in place, locking the tailgate will secure any items in the cargo box as safely as any passenger car trunk. There also is completely secure storage for smaller items in the lockable Top-Box Storage compartments.

The single key operation for all the vehicle's locks used on the Avalanche also enhances the security of the vehicle. An operator can unlock the tailgate, the Top-Box Storage compartments, side doors and spare tire quickly and conveniently by using one key – the ignition key – for all of them. When using the keyless entry transmitter, only the doors will lock or unlock. The keyless entry system does not lock or unlock the Top-Box Storage locks, the spare tire lock or the tailgate lock.

OnStar®

Avalanche also features around-the-clock security with the optional OnStar Communication System. The three-button OnStar system allows vehicle owners to communicate through a standard cell phone link.



A Class II serial link also keeps the OnStar Communication Center in constant contact with the vehicle. It allows the Center to interpret vehicle diagnostic codes, automatically notify the Center if an air bag is deployed (the Center will contact the vehicle to determine the cause of the deployment and if assistance is needed), unlock the doors remotely and help police determine the vehicle's location if it is reported stolen.

Two OnStar plans are available. A Safety and Security Plan provides emergency service, theft notification, remote diagnostics and accident and medical assistance. The Premium Service Plan includes all these features as well as navigation support, concierge service and Ride Assist.

Features

Standard Equipment

Air Bags

- Driver and front passenger
- Dual side, front seating positions

Air conditioning with HVAC filter (includes rear air conditioning vents with bucket seat option)

Alternator, 105-amp

Assist handle, Front passenger and second-row outboard seats

Battery, heavy-duty, 600 CCA

Brakes, Four-wheel disc anti-lock braking system (ABS) with dynamic rear proportioning (DRP)

Bumper, rear, step bumper, Light Charcoal with side assist steps

Cargo cover, 3-piece rigid composite, stowable on board

Cargo mat, rubber, black

Cladding, Light Charcoal, body-side, front and rear fascia

Convert-a-Cab System, Includes Midgate, removable rear window, cargo cover and lockable tailgate

Console

- Overhead storage for eyeglasses and garage door opener. Map lights and map light switches.
- Floor storage between front seats including cupholders (bucket seat option only)

Cruise control with telltale in instrument panel cluster

Cupholders, Dual front and rear

Daytime Running Lamps

Defogger, rear window electric

Door handles, color-keyed

Door Guard beams, side

Door locks, Programmable power with Key Ignition Lockout Prevention

Driver Message Center

Monitors 15 vehicle functions. Telltale warning messages include Battery, Change Engine Oil, Check Coolant Temp, Check Engine Oil Level, Check Engine Oil Pressure, Engine Overheated, Low Coolant, Low Fuel, Low Washer Fluid, Reduced Engine Power, Cargo Light On, Security, Service 4WD, Trans Fluid Hot, Trans Hot... Idle Engine

Engine, Vortec 5300 V8 SFI

Floor covering, Color-keyed carpet with carpeted floor mats

Fog Lamps, halogen

Headlamps, dual composite halogen

Headliner, Full cloth

Instrumentation

Includes analog speedometer, tachometer, odometer with trip odometer, voltmeter, oil pressure, engine hour meter and engine temperature

Key, single, 2-sided

Keyless entry, Includes 2 transmitters, panic button and content theft alarm

Lighting

Includes dome with LH and RH door switch, delayed entry feature, ashtray, glove box, underhood and cargo lamps, door handle-activated illuminated entry with ground illumination and map lights in front and second-row seat positions

Midgate, separates the cab from the cargo box. Midgate is located behind the rear seat and can be lowered to extend the cargo box to eight feet

Mirrors, Inside

Light-sensitive inside rearview with 8-point compass and outside temperature indicator

Mirrors, Outside

Foldaway outside rearview, electric, heated, body-colored with ground illumination lamps

Power outlets, Dual covered in instrument panel

Rear axle ratio, 3.73

Safety belts, Outboard lap and shoulder, inboard lap, with all belts to seat in front row

2002 Chevrolet Avalanche Restoration Kit

Seats

Front, reclining 40/20/40 split-bench with Custom Cloth, power driver side, dual adjustable head restraints, manual lumbar, fold-down center armrest with storage and back of seat map pockets Rear, 60/40 split-folding bench seat with outboard head restraints

Security, Passlock II content theft-deterrent system

Sound System

AM/FM stereo with CD player, seek-scan, auto-tone control, speed-sensitive volume, electronic tuning, six speakers and TheftLock

Spare tire, P265/70R16 tire with 16-inch steel wheel (mounted under rear frame; includes lock)

Steering, power (EVO variable assist on 4WD models)

Steering column, Tilt-Wheel adjustable

Steering Wheel, leather-wrapped

Storage, integrated Top-Box Storage with locks and lights

Sunshades, Cloth-covered with lighted visor vanity mirrors with extenders and secondary shade

Suspension, smooth ride

- Front, independent torsion bar
- Rear, multi-link coil spring

Tires, P265/70R16, blackwall

Trailer Package

Includes trailer hitch platform, 7-pin wiring connector and trailer brake prewire harness

Transmission

Electronically controlled 4-speed automatic with overdrive and tow/haul modes

Wheels, 16-inch aluminum with 16-inch steel spare

Windows

Power with backlit switches, driver express-down and lockout features: tinted Solar-Ray on all windows and deep tint on second-row windows

Windshield wipers, intermittent with pulse washers

Optional

2WD Models

Convenience Package

- Mirror, self-dimming OSRV, driver's side
- Electronic climate control
- OnStar system with first year Safety and Security service
- HomeLink universal transmitter

Premium On-Road Package (Z66)

- Tires, P265/70R17 all-season touring blackwall
- 17-inch aluminum wheels
- Premium suspension with specially tuned springs and shocks (Bilstein front shocks and Sachs load-leveling rear shocks)
- Rear Locking differential
- Traction Assist
- Z66 decal on rear quarter panels
- Aggressive rubber floor mats

4WD Models

Convenience Package

- Mirror, self-dimming OSRV, driver's side
- Electronic climate control
- OnStar system with first year Safety and Security service
- HomeLink universal transmitter

Off-Road Package (Z71)

- Tires, P265/70R17 on/off-road blackwall
- 17-inch aluminum wheels
- Springs and shocks absorbers, specially tuned (Bilstein shocks, front and rear)
- Rear locking differential
- Skid shields
- Air cleaner, high-capacity
- Z71 decal on rear quarter panels
- Aggressive rubber floor mats

Free-Flow Options

- Power Bucket Seats Sport Cloth
- Power Bucket Seats Sport Leather (combination of cloth and leather)
- Power Bucket Seats Leather/Heated/Memory
- Power Sunroof (includes HomeLink Universal Transmitter)
- Rear Locking Differential
- 4.10:1 Rear Axle Ratio
- Engine Block Heater
- Soft Tonneau Cover
- Roof Rack
- Running Boards

Dealer-Installed Accessories

- Bed extender
- Tubular side steps (chrome or gray)
- Assist steps (running boards)
- 2-D splash guards
- Bed tent
- Roof rack
- Molded hood protector
- Molded splash guards
- Vent visors
- Front end cover
- Roof-mounted luggage basket
- Soft luggage carrier
- Hard cargo carrier
- Floor console liner
- Carpeted floor mats (carpet/rubber)
- Top-Box Storage bags
- Brush/grille guard
- Security system
- Engine block heater
- Vehicle cover
- Wheel locks
- Highway safety kit
- Hot/cold beverage holder
- Mobile office organizer
- Trailer hitch/ball mount/ball/
- trailer wiring

Specifications

Engine

	Vortec 5300 V8 (LM7)	Vortec 8100 V8 (L18)
Type:	5.3-liter V8 with cast iron block	8.1-liter V8 with cast iron block
Displacement (cu in / cc):	327 / 5358	496 / 8128
Bore & stroke (in / mm):	3.78 x 3.62 / 96 x 92	4.25 x 4.37 / 108 x 111
Cylinder head material:	cast aluminum	cast iron
Valvetrain:	overhead valves, hydraulic roller follower, two valves per cylinder, chain cam drive	hydraulic roller follower, two valves per cylinder, chain cam drive
Fuel delivery:	sequential fuel injection	sequential fuel injection
Compression ratio:	9.5:1	9.1:1
Horsepower (hp / kw @ rpm):	285 / 212.61 @ 5200	340 / 253 @ 4200
Torque (lb-ft / Nm @ rpm):	325 / 441 @ 4000	455 / 617 @ 3200
Recommended fuel:	87 octane	87 octane
Maximum engine speed (rpm):	5600	5000
Emissions controls:	three-way catalytic converter, positive crankcase ventilation, evaporative collection system	exhaust gas recirculation, Air Injection Reaction (available)
Estimated fuel economy (mpg city / hwy / combined):	2WD: 14 / 18 / 16 4WD: 13 / 17 / 15	Not Rated

Transmission

	4L60-E	4L85-E
Type:	four-speed electronic automatic	four-speed electronic automatic
Gear ratios (:1):		
First:	3.06	2.48
Second:	1.63	1.48
Third:	1.00	1.00
Fourth:	0.70	0.75
Reverse:	2.29	2.08
Axle ratio:	3.73 standard (4.10 optional)	3.73 standard (4.10 optional)

Chassis/Suspension

	1500	2500
Front:	independent with torsion bars	independent with torsion bars
Rear:	five-link coil spring with automatic load leveling	two-stage leaf spring
Traction assist system:	part of Z66 package on 2WD models	
Steering type:	2WD: power recirculating ball 4WD: power, recirculating ball with EVO. Variable assist.	2WD & 4WD: power recirculating ball
Ratio:	12.0:1	16.4:1
Steering wheel turns, lock-to-lock:	3.3	3.25
Turning circle, curb-to-curb (ft):	43.3 (2WD & 4WD)	44.1 (2WD & 4WD)

Brakes

Type:	four-wheel vented disc with front aluminum dual piston calipers, rear drum-in-hat parking brake, four-wheel ABS
Rotor diameter x thickness (in / mm):	front: 12 / 305 x 1.14 / 29; rear: 13 / 330 x 1.18 / 30
Swept area (sq in / sq cm):	front: 133.6 / 862; rear: 133.6 / 862

Wheels/Tires

	1500	2500
Wheel size & type, 1/2-ton:	16-inch x 7-inch aluminum (17-inch x 7.5-inch aluminum, optional)	16-inch x 7-inch aluminum
Tire size & type, 1/2-ton:	P265/70R16 all-season, steel-belted radials	LT245/75R16 steel-belted radials

Dimensions**Exterior**

	1500	2500
Wheelbase (in / mm):	130 / 3302	130 / 3302
Overall length (in / mm):	221.7 / 5631	221.7 / 5631
Overall width (in / mm):	79.8 / 2027	79.8 / 2027
Overall height, 2WD & 4WD (in / mm):	73.5 / 1867	73.5 / 1867
Tread (in / mm):	front: 65 / 1651 rear: 66 / 1676	front: 65 / 1651 rear: 66 / 1676
Min. ground clearance (in / mm):		
P265/70R-16 tires:	8.6 / 218 (2WD and 4WD)	7.0 / 178 (2WD and 4WD)
P265/70R-17 tires:	8.8 / 224 (2WD and 4WD)	
Ground to top of load floor (in / mm):	31 / 787	31 / 787
Approach angle:	27.4°	25.0°
Departure angle:	23.8°	18.0°
Base curb weight (lbs / kg):	2WD: 5437 / 2466 4WD: 5678 / 2576	2WD: 6353 / 2883 4WD: 6642 / 3013
Weight distribution (front / rear):	2WD: 52 / 48; 4WD: 53 / 47	2WD: 52 / 48; 4WD: 53 / 47

Interior

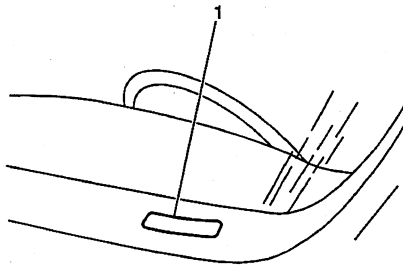
	First Row	Second Row
Seating capacity, five or six total:	3 with bench seat, 2 with bucket seats	3
Head room (in / mm):	40.7 / 1034	38.6 / 980
Leg room (in / mm):	41.3 / 1049	38.9 / 988
Shoulder room (in / mm):	65.2 / 1656	65.2 / 1656
Hip room (in / mm):	61.4 / 1560	62.0 / 1575
Cargo box volume, midgate up (cu ft):	41	41

Capacities

	1500	2500
EPA passenger volume (cu ft):	120.2	120.2
Interior cargo volume (cu ft):	53.9 with midgate up, 2nd row seat folded	53.9 with midgate up, 2nd row seat folded
GVWR, standard (lbs / kg):	2WD: 6800 / 3090.9 4WD: 7000 / 3181.8	8600 / 3901 (2WD or 4WD)
Payload, (lbs / kg):	base 2WD: 1363 / 618 base 4WD: 1322 / 599.5	max 2WD: 2247 / 1018 max 4WD: 1958 / 888
Trailer towing maximum, with trailer brakes (lbs / kg):	2WD: 8300 / 3765 4WD: 8100 / 3674	2WD: 12,000 / 5443 4WD: 12,000 / 5443
Fuel tank (gal / liters):	31 / 117.3	37.5 / 141.9
Engine oil with filter (qts / liters):	6 / 5.7	6 / 5.7
Engine coolant (qts / liters):	29 / 27.4	29 / 27.4

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 N K	Chevrolet Incomplete Chevrolet Truck GMC Incomplete GMC Truck Chevrolet Multi Purpose Vehicle GMC Multi Purpose Vehicle
4	GVWR/Brake System	B C D E F G H J K	3001-4000/Hydraulic 4001-5000/Hydraulic 5001-6000/Hydraulic 6001-7000/Hydraulic 7001-8000/Hydraulic 8001-9000/Hydraulic 9001-10000/Hydraulic 10001-14000/Hydraulic 14001-16000/Hydraulic
5	Truck Line/Chassis Type	C K	Conventional Cab/4x2 Conventional Cab/4x4
6	Series	1 2 3 6 7 8	Half Ton ¾ Ton 1 Ton 1/2 Ton Luxury ¾ Ton Luxury 1 Ton Luxury
7	Body Type	3 4 6 9	Four-Door Cab/Utility Two-Door Cab Suburban/Denali XL Two-Door Utility Extended Cab/Extended Van
8	Engine Type	T G	(LM7) 5.3L Gas (L18) 8.1L Gas

9	Check Digit	--	Check Digit
10	Model Year	2	2002
11	Plant Location	G	Silao, Mexico
12-17	Plant Sequence Number	--	Plant Sequence Number

VIN Derivative

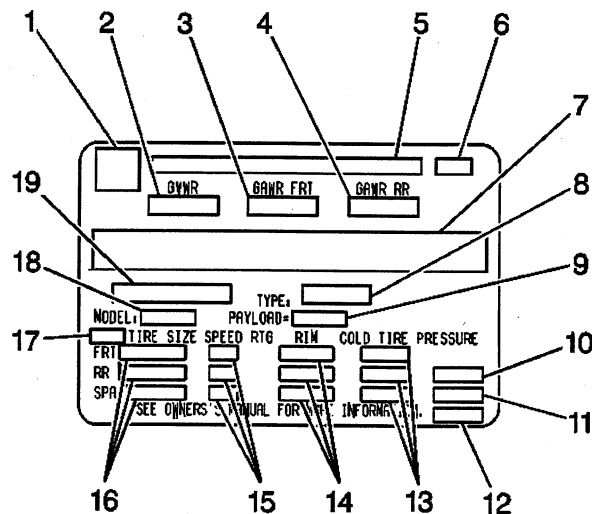
All engines and transmissions are stamped or laser etched with a partial vehicle identification number (VIN), which was derived from the complete VIN. A VIN derivative contains the following nine positions:

Position	Definition	Character	Description
1	Division	B C	Chevrolet Incomplete Chevrolet Truck
2	Model Year	1	2001
3	Plant Location	G	Silao
4-9	Plant Sequence Number	--	--

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

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

Label Certification w/o RPO Z49



- (1) GM Logo
- (2) Gross Vehicle Weight Rating
- (3) Gross Axle Weight Rating - Front
- (4) Gross Axle Weight Rating - Rear
- (5) Name Of Manufacturer
- (6) Final Manufacturer's Date
- (7) Manufacturer's Statement
- (8) Model Designation
- (9) Payload
- (10) DUAL - When Equipped
- (11) Front Axle Reserve - When Equipped
- (12) Total Capacity - When Required
- (13) Tire Pressure
- (14) Rim Size
- (15) Speed Rating - When Required
- (16) Tire Size
- (17) GVW Rating Code
- (18) Engineering Model
- (19) Vehicle Identification Number

The vehicle certification label displays the following assessments:

- The Gross Vehicle Weight Rating (GVWR)
- The Gross Axle Weight Rating (GAWR) -- Front and Rear
- The vehicle's payload rating
- The original equipment tire sizes and the recommended tire pressures

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

- The base vehicle weight (factory weight)
- The weight of all vehicle accessories, like 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 Gross Vehicle Weight Rating.

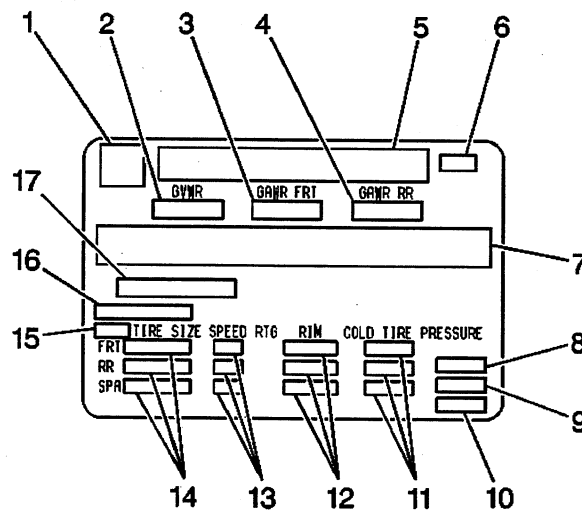
The front gross axle weight rating (GAWR FRT) is the weight exerted on the front axle. The rear gross axle weight rating (GAW RR) is the weight exerted on the rear axle. The front and rear gross axle weights must not exceed the front and rear gross axle weight ratings.

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 Gross Combination Weight Rating 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.

Label Certification w/o RPO Z49 – Incomplete Vehicle



- (1) Logo
- (2) Gross Vehicle Weight Rating
- (3) Gross Axle Weight Rating - Front
- (4) Gross Axle Weight Rating - Rear
- (5) Name of Manufacturer
- (6) Manufacturer's Date
- (7) Manufacturer's Statement
- (8) DUAL - When Equipped
- (9) Front Axle Reserve - When Required
- (10) Total Capacity - When Required
- (11) Tire Pressure - Spare Optional
- (12) Rim Size - Spare Optional
- (13) Speed Rating - When required - Spare Optional
- (14) Tire Size - Spare Optional
- (15) GVW Rating Code
- (16) Engineering Model
- (17) Vehicle Identification Number

The vehicle certification label displays the following assessments:

- The Gross Vehicle Weight Rating (GVWR)
- The Gross Axle Weight Rating (GAWR) -- Front and Rear

2002 Chevrolet Avalanche Restoration Kit

- The vehicle's payload rating
- The original equipment tire sizes and the recommended tire pressures

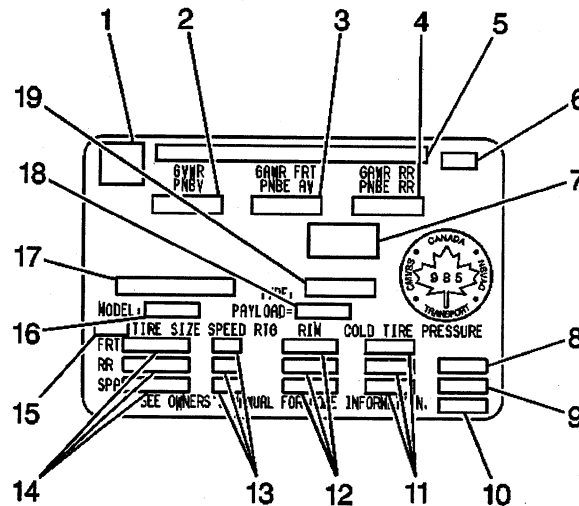
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- The base vehicle weight factory weight
- The weight of all vehicle accessories, like the winches or the plows
- The weight of the driver and the passengers
- The weight of the cargo

The gross vehicle weight must not exceed the Gross Vehicle Weight Rating.

The front gross axle weight rating (GAWR FRT) is the weight exerted on the front axle. The rear gross axle weight rating (GAW RR) is the weight exerted on the rear axle. The front and rear gross axle weights must not exceed the front and rear gross axle weight ratings.

Label Certification with RPO Z49



- (1) Logo
- (2) Gross Vehicle Weight Rating
- (3) Gross Axle Weight Rating - Front
- (4) Gross Axle Weight Rating - Rear
- (5) Name of Manufacturer
- (6) Final Manufacturer's Date
- (7) RFI Statement - Canada Only
- (8) DUAL - When Equipped
- (9) Front Axle Reserve - When Equipped
- (10) Total Capacity - When Required
- (11) Tire Pressure
- (12) Rim Size
- (13) Speed Rating - When Required
- (14) Tire Size
- (15) GVW Rating Code
- (16) Engineering Model
- (17) Vehicle Identification Number
- (18) Payload
- (19) Model Designation

The vehicle certification label displays the following assessments:

- The Gross Vehicle Weight Rating (GVWR)
- The Gross Axle Weight Rating (GAWR) -- Front and Rear
- The vehicle's payload rating
- The original equipment tire sizes and the recommended tire pressures

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

- The base vehicle weight factory weight
- The weight of all vehicle accessories, like 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 Gross Vehicle Weight Rating.

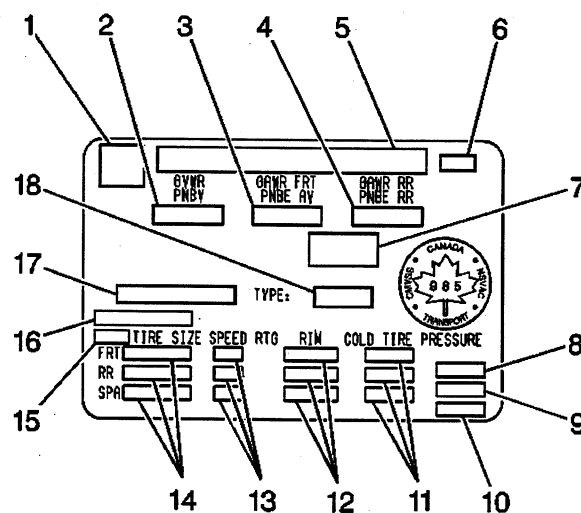
The front gross axle weight rating (GAWR FRT) is the weight exerted on the front axle. The rear gross axle weight rating (GAW RR) is the weight exerted on the rear axle. The front and rear gross axle weights must not exceed the front and rear gross axle weight ratings.

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 Gross Combination Weight Rating refers to the total maximum weight of the loaded tow vehicle including driver and passengers and a loaded trailer.

The vehicle tires must be the proper size and properly inflated for the load the vehicle is carrying.

Label Certification with RPO Z49 – Incomplete Vehicle



- (1) Logo
- (2) Gross Vehicle Weight Rating
- (3) Gross Axle Weight Rating - Front
- (4) Gross Axle Weight Rating - Rear
- (5) Name Of Manufacturer
- (6) Manufacturer's Date
- (7) RFI Statement - Canada Only
- (8) DUAL - When Equipped
- (9) Front Axle Reserve - When Required
- (10) Total Capacity - When Required
- (11) Tire Pressure - Spare Optional
- (12) Rim Size - Spare Optional
- (13) Speed Rating - When Required - Spare Optional
- (14) Tire Size - Spare Optional
- (15) GVW Rating Code
- (16) Engineering Model
- (17) Vehicle Identification Number
- (18) Model Designation

The vehicle certification label displays the following assessments:

- The Gross Vehicle Weight Rating (GVWR)

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- The Gross Axle Weight Rating (GAWR) -- Front and Rear
- The vehicle's payload rating
- The original equipment tire sizes and the recommended tire pressures

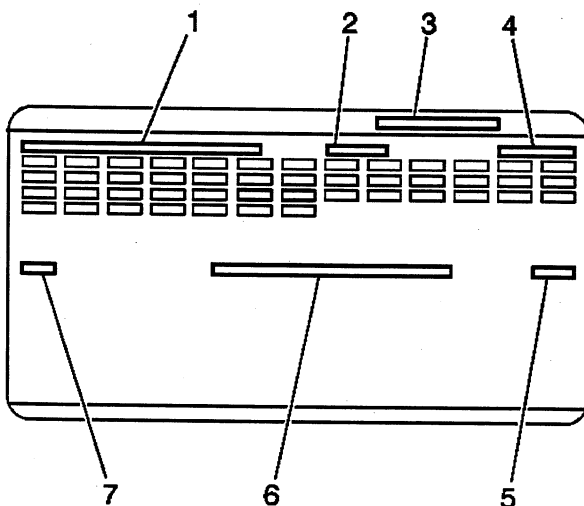
Gross vehicle weight (GVW) is the weight of the vehicle and everything it carries. Include the following items when figuring the GVW:

- The base vehicle weight factory weight
- The weight of all vehicle accessories, like 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 Gross Vehicle Weight Rating.

The front gross axle weight rating (GAWR FRT) is the weight exerted on the front axle. The rear gross axle weight rating (GAW RR) is the weight exerted on the rear axle. The front and rear gross axle weights must not exceed the front and rear gross axle weight ratings.

Service Parts Identification Label (SPID)

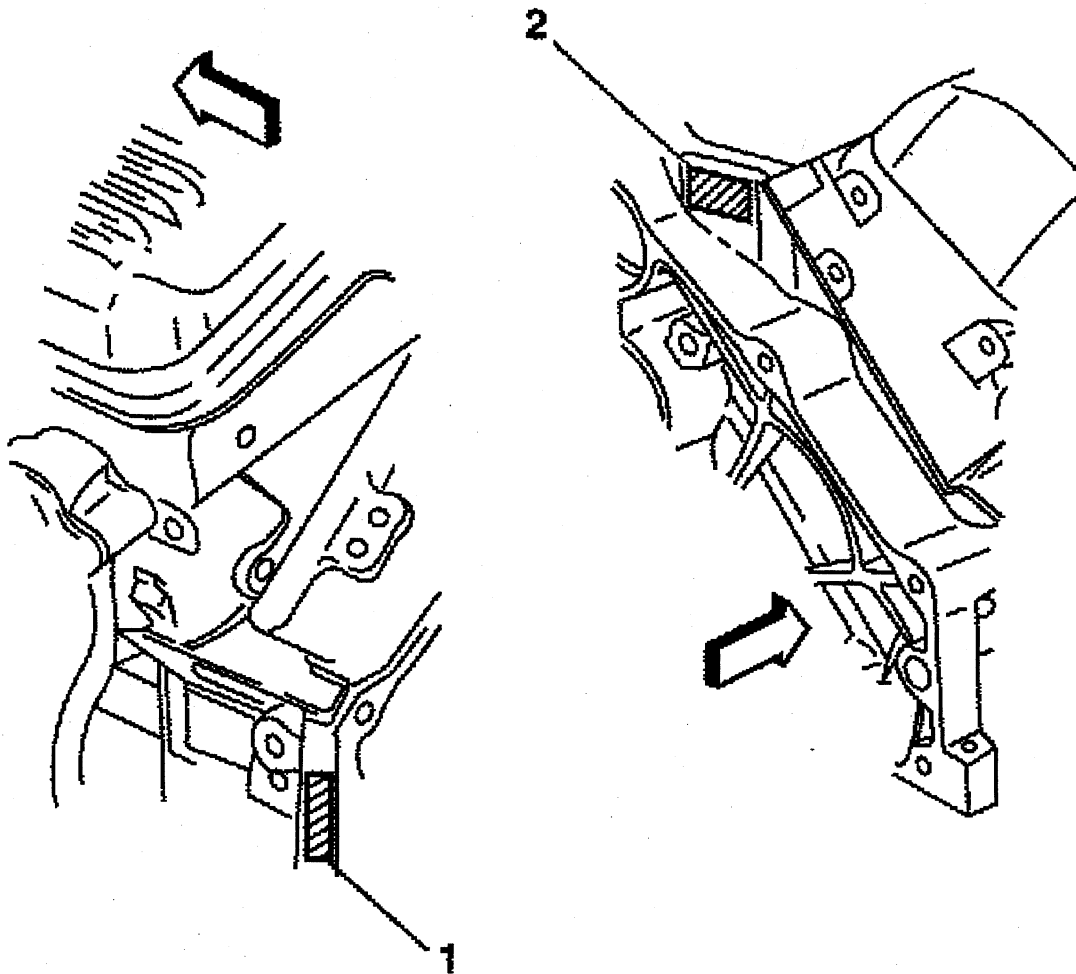


- (1) Vehicle Identification Number
- (2) Wheel Base
- (3) Part Number Location
- (4) Model Designation
- (5) Order Number
- (6) Exterior Color
- (7) Paint Technology

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.

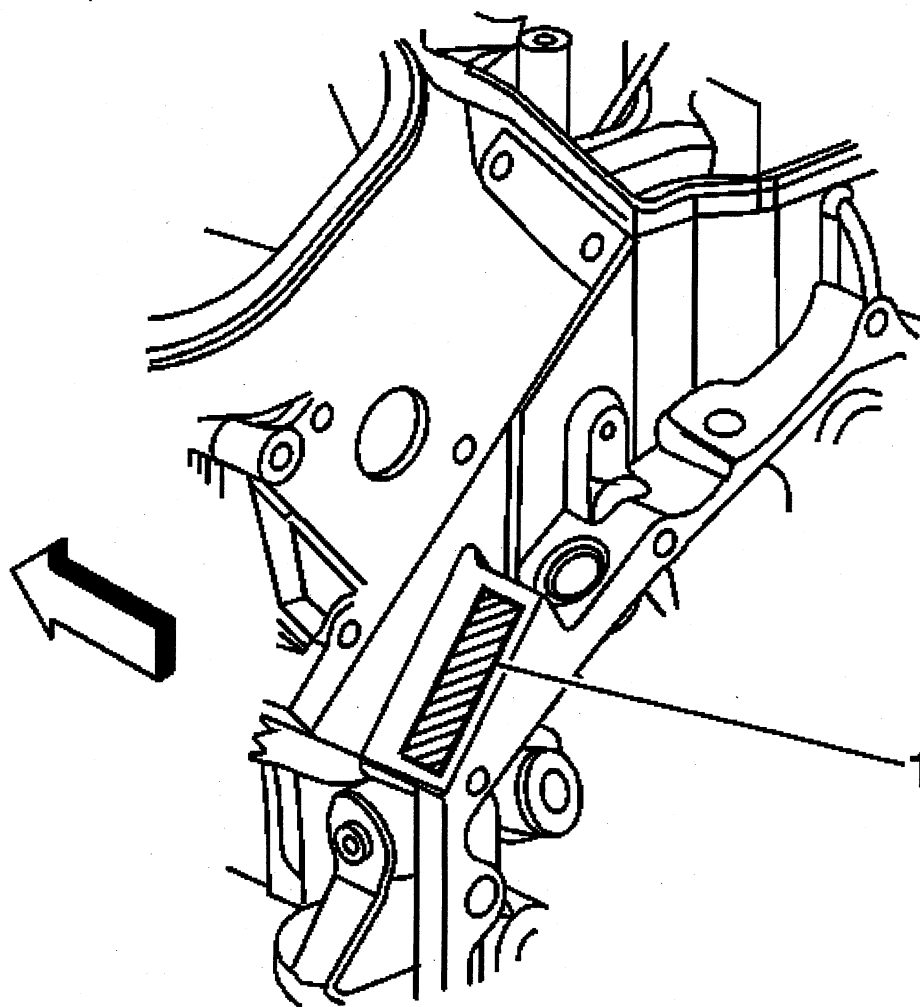
Engine ID and VIN Derivative Location

5.3L V-8 Engines



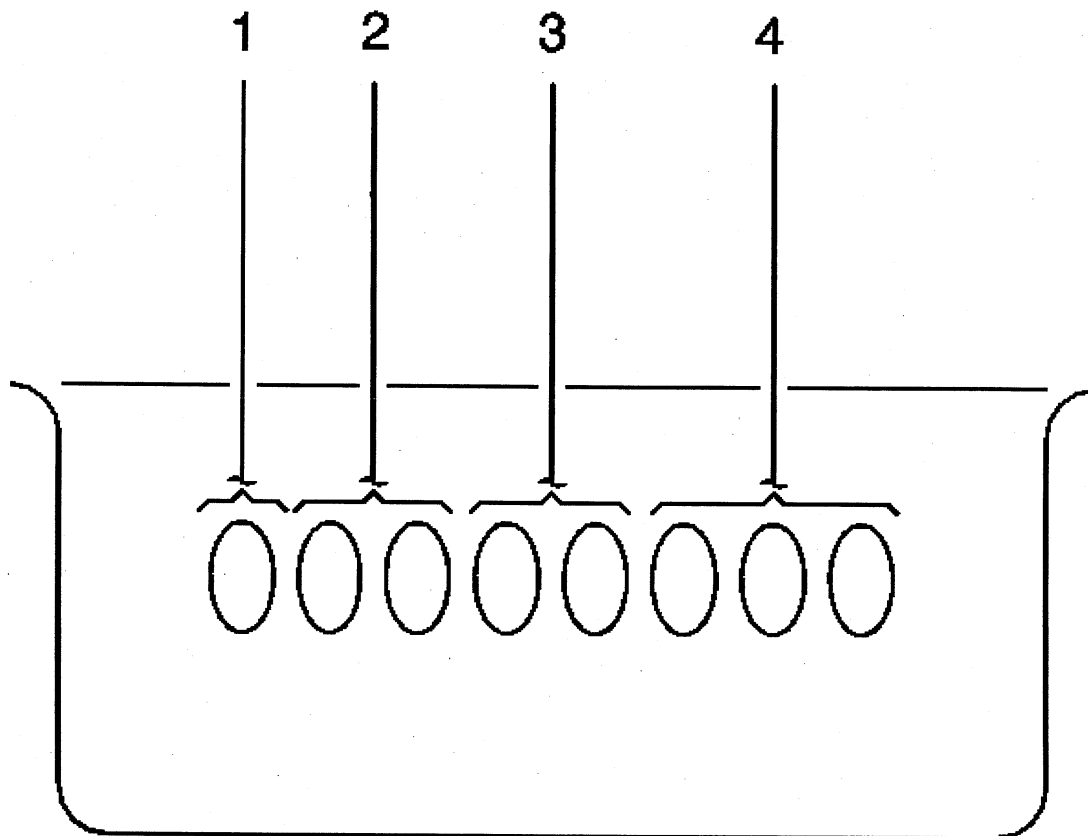
- (1) Primary Engine Identification Number Location
- (2) Secondary Engine Identification Number Location

8.1L V-8 Engine



(1) Engine Identification Number Location

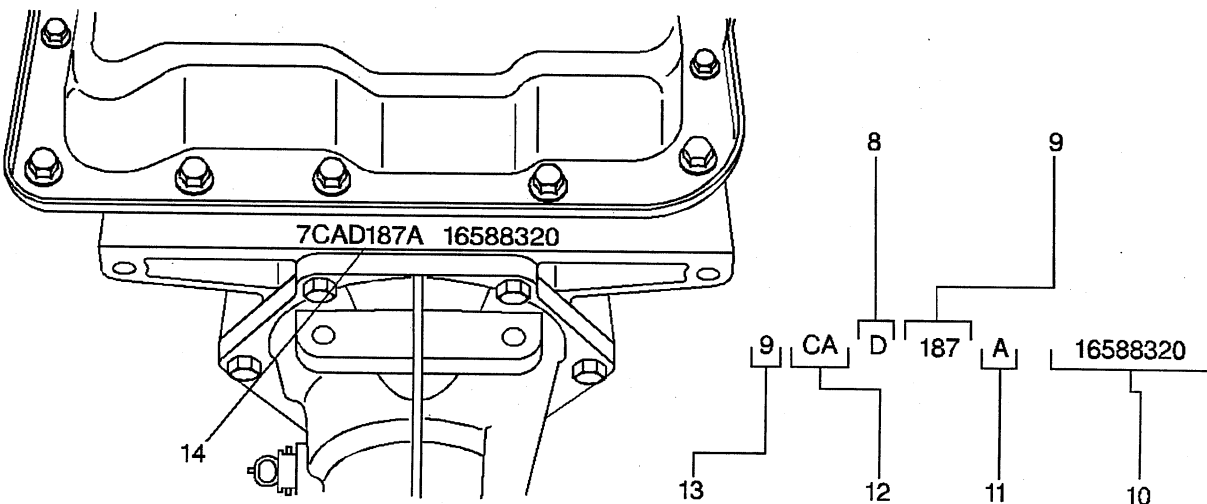
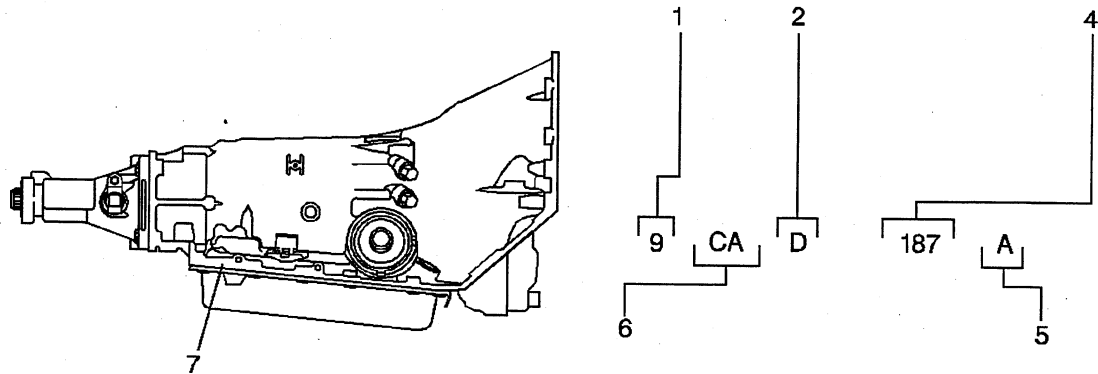
Engine ID Legend



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

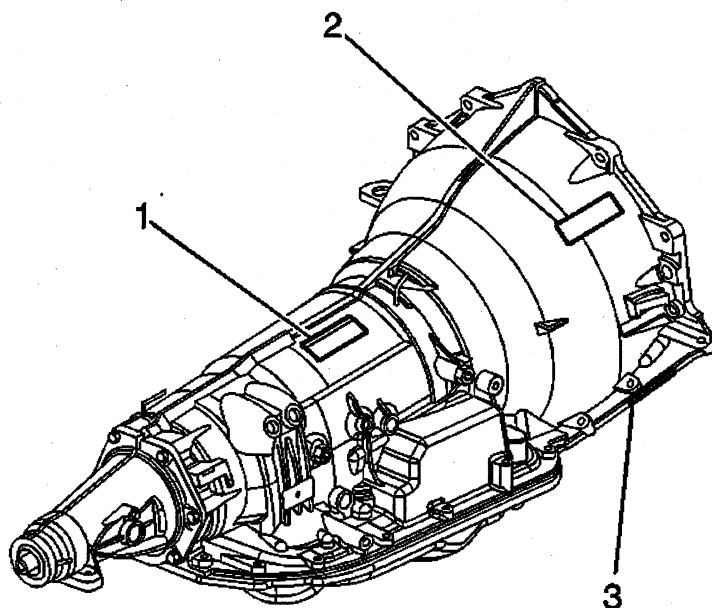
Transmission ID and VIN Derivative Location

4L60-E Transmission ID Location

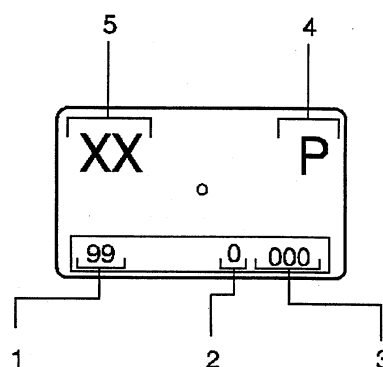
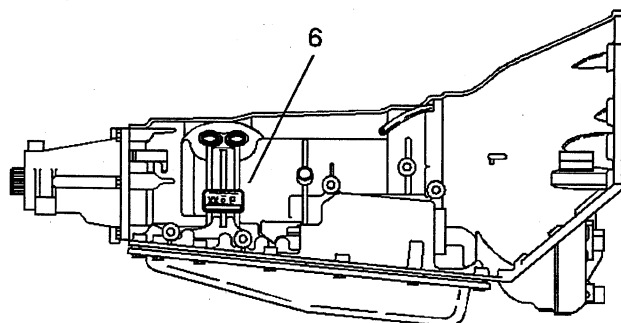


- (1) Model Year
- (2) Hydra-Matic 4L60-E
- (4) Julian Date (or Day of the Year)
- (5) Shift Built (A, B, J = First Shift; C, H, W = Second Shift)
- (6) Model
- (7) Transmission ID Location
- (8) Hydra-Matic 4L60-E
- (9) Julian Date (or Day of the Year)
- (10) Serial No.
- (11) Shift Built (A, B, J =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

4L80-E Transmission ID Location

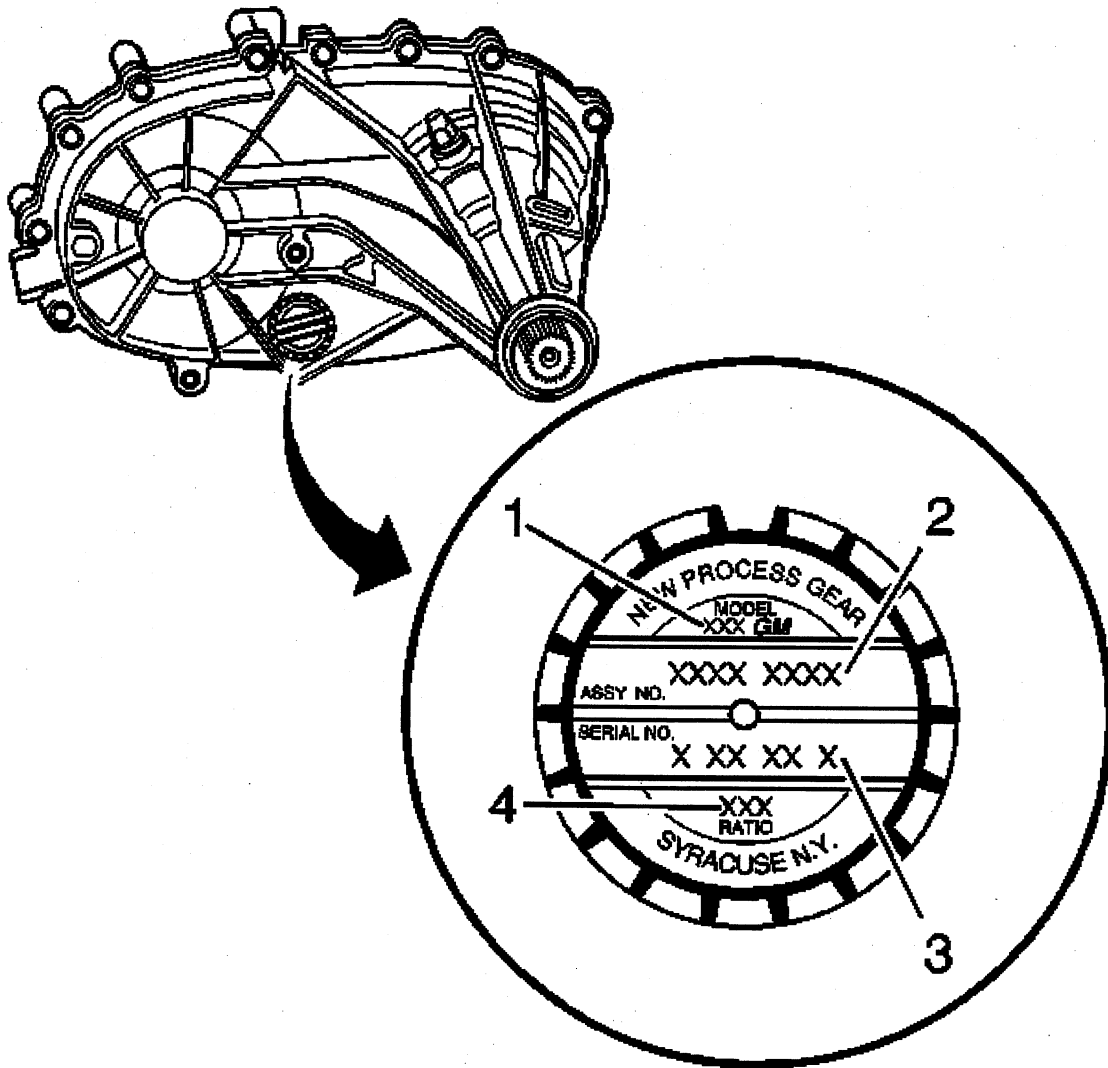


Transmission ID and VIN derivative locations (1, 2). The right hand stamping is shown, left hand is opposite. Pin or hand stamp location (3) for the transmission ID or VIN derivative.



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

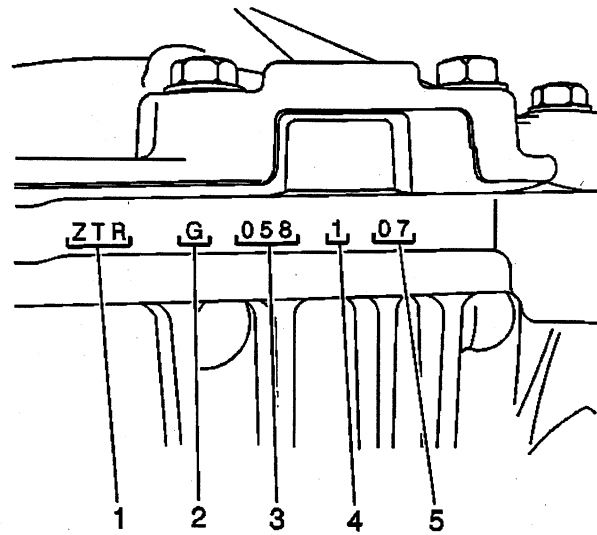


An identification tag is attached to the rear half of the transfer case. The tag provides the following information:

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

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

Axle Identification – Front



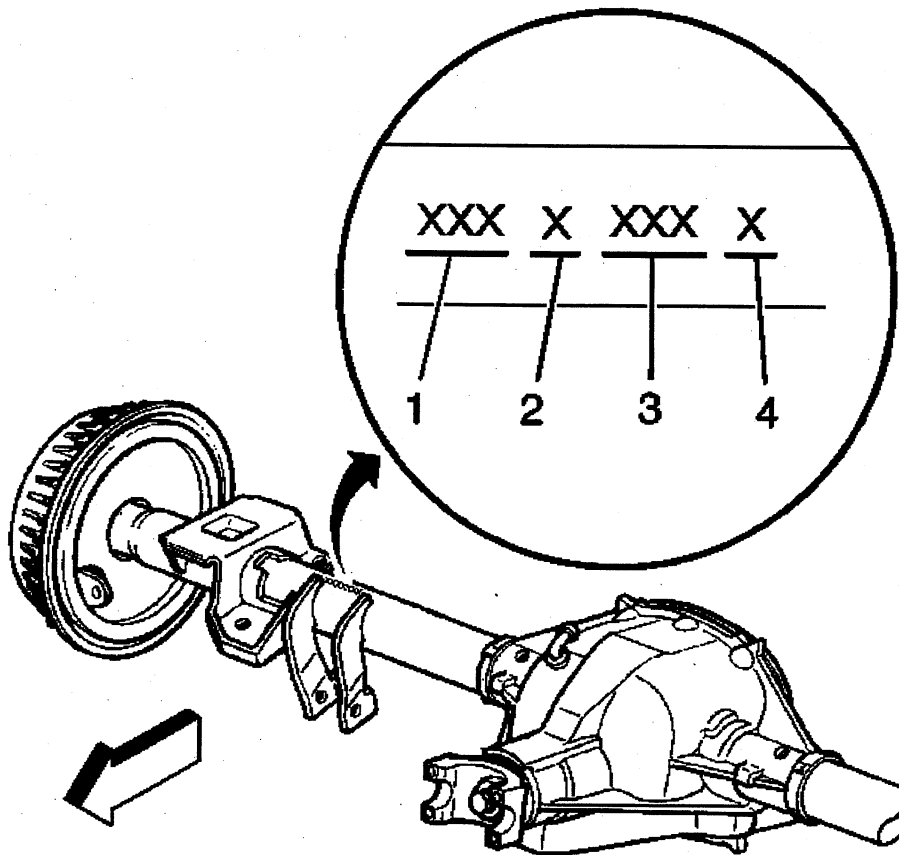
- (1) Broadcast Code
- (2) Supplier Code (G = American Axle)
- (3) Julian Date (Day of Year)
- (4) Shift Built (1 = First Shift; 2 = Second Shift) (Optional for 8.25" and 9.25" axles)
- (5) Hour Built

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

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

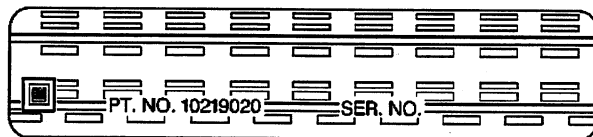
Axle Identification – Rear



- (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
AC7	Pipe Fuel Tank Fill Vent-Unrestricted
AE7	Seat FRT Split, Driver, PASS
AG1	Adjuster FRT ST Power, Multi-Directional, Driver
AG2	Adjuster PASS ST Power, Multi-Directional
AJ1	Windows Deep Tint, All Except W/S And DRS
AL4	Seat RR BKT
AM7	Seat RR Folding
AN3	Seat FRT, Individual (Non BKT)
ARL	Plant Code Arlington, TX USA
AS3	Seat RR
AT5	Seat Rear CTR, Folding
AU0	Remote Function Actuation - Keyless Entry - Domestic
AU3	Lock Control Side Door, Electric
AU8	Remote Function Actuation, Specific Frequency
AX4	Restraint Conversion Seat, MAN, European
A04	Windshield Tinted, Less Upper Shadeband
A31	Window Power Operated, All Doors
A95	Seat FRT BKT, High Back, Driver and PASS RECL
BAG	Parts Package Export
BA5	Ornamentation Extr, Custom
BG9	Covering Floor Rubber
BPH	Appearance Package Chevrolet "Off Road"
BS1	Insulation Acoustical PKG
BVE	Side Steps Runningboard
BVF	Side Steps Runningboard, Color Keyed
BW1	Ornamentation EXTR, RR End
BW2	Molding B/S Deluxe
B30	Floor Covering Carpet
B32	Covering FRT Floor Mats, AUX
B33	Covering Rear Floor MATS, AUX
B35	Covering Rear Floor Mats, Carpet Insert
B37	Covering Floor IMat, Front and Rear, Auxiliary
B39	Covering Floor Carpet, Load Floor
B58	Covering Floor MAT, FRT And RR, Carpeted Insert
B71	Wheel Opening Flares
B85	Molding - Body Side , Exterior, Bright
B96	Molding Wheel Opening
CF5	Roof Sun Glass, Sliding, Electric
CKD	Vehicle Completely Knocked Down
C25	Wiper System, Rear Window, Intermittent
C36	Heater Auxiliary
C49	Defogger RR Window, Electric
C5F	GVW Rating 8, %00 LBS
C5H	GVW Rating 6,900 LBS
C5M	GVW Rating 6,100 LBS
C5U	GVW Rating 6,800 LBS
C5W	GVW Rating 7,000 LBS

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C6P	GVW Rating 8,600 LBS/3, 900KG
C60	HVAC System Air Conditioner FRT, MAN Controls
C68	HVAC System Air Conditioner FRT, Auto, Electronic Controls
C69	HVAC System RearAir Conditioner
C7H	GVW Rating 6,400 LBS/2, 900 KG
C7K	GVW Rating 6, 500 LBS
DE2	Mirror, O/S LH And RH, Manual Control, Folding, Color
DF2	Mirror, O/S LH And RH, Wide Load, Folding, Stainless Steel
DF5	Mirror, I/S R/V LT Sensitive, Compass, O/S Temp Display
DG5	Mirror O/S LH & RH, Wide Load, Large
DH2	Mirror, I/S Front Van, LH And RH, Illumination with Dual Sunshade
DK2	Mirror, O/S LH And RH, Remote Control, Electric, Heated, Color
DK6	Console Roof Interior
DK7	Console Roof Interior, Custom
DK8	Console Roof Interior, Deluxe
DL7	Mirror, O/S LH And RH, Remote Control, Electric, Heated, Power Folding, Color
DL8	Mirror, O/S LH And RH, Remote Control, Electric, Heated
DR2	Mirror, O/S LH And RH, Remote Control, Electric, Heated, Light Sensitive, Manual Folding, Color
D07	Console Front Compartment, Floor, Custom
D44	Mirror O/S Color
D48	Mirror O/S LH & RH, Remote Control, Electric, Color
D55	Console Front Compartment, Floor
EVA	Test DVT, EVAP Emission Requirement
E37	Pickup Box Inner DK Composite
E52	Body Equipment One Piece Lift Gate With Lift Glass
E62	Body Equipment Stepside, PUBX
E63	Body Equipment Fleetside Pick-UP Box
E95	Cover Tonneau, Rear Compartment
FF4	Arm LH Torsion Bar Spring Adj (C)
FF5	Arm RH Torsion Bar Spring Adj (D)
FF6	Arm LH Torsion Bar Spring Adj (E)
FF7	Arm RH Torsion Bar Spring Adj (F)
FK2	Arm LH Torsion Bar Spring Adj (A)
FK3	Arm RH Torsion Bar Spring Adj (B)
FT2	Arm LH Torsion Bar Spring Adj (FT2)
FT3	Arm RH Torsion Bar Spring Adj (FT3)
FWI	Plant Code Ft Wayne, IN, USA
FW1	Ride and Handling Manual Electronic Controlled
F60	Spring Front Heavy Duty
GMC	Plant Code Pontiac, MI, USA
GT4	Axle Rear 3.73 Ratio (DUP With 5 x 1)
GT5	Axle Rear 4.10 Ratio (DUP With GT8)
GU4	Axle Rear 3.08 Ratio
G65	Level Control Manual, Self-Adjusting
G69	Level Control Auto, Air, HD
G80	Axle Positraction Limited Slip
HOT	Apperance Package GMC "HOT Truck"
JAN	Plant Code Janesville, WI, USA
JC5	Brake Vac Power, 4-Wheel Disc, 7,200 lb
JE1	Brake System, Europe
JH5	Brake Hyd Power, 4-Wheel Disc, 7,200 lb
JH6	Brake Hyd Power, 4-Wheel Disc, 9,900 lb
J81	Indicator Switch, Export

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KA6	Heater Seat, Rear
KC4	Heavy Duty Engine Oil Cooling
KC5	Receptacle Electrical, Accessory
KG8	Generator 130 Amp
KL5	Modification Engine, Natural Gas
KL6	Provisions Natural Gas
KNP	Cooling System Trans, HD
KUP	Throttle Control Electronic
K05	Heater Engine Block
K34	Cruise Control, Automatic, Electronic
K47	Air Cleaner High Capacity
K53	Fuel Sender Assembly, Robust Fuel System
LB7	Engine Diesel, 8 Cyl, 6.6L, DI, V8, Turbo. HO, Duramax
LM7	Engine Gas, 8 CYL, 5.3L, MFI, Iron, GM
LQ4	Engine Gas, 8 CYC, 6.0L, MFI, Iron, GM
LQ9	Engine Gas, 8 CYC, 6.0L, MFI, Iron, GM, HO
LR4	Engine Gas, 8 Cechy, 4.8L MFI, Iron, GM
LU3	Engine Gas, 6 Cyl, 4.3L, MFI, V6, 90 Deg
L18	Engine Gas, 8 CYL, 8.1L, MFI
L35	Engine Gas, 6 Cyl, 4.3L, CPI, V6, 90 Deg, HO
L59	Engine Flexible Fuel, (Gas/Alc), 8 CYL, 5.3L, MFI, V8, GM
MG5	Transmission Man 5 Spd, Getrag, 84mm, 4.001st, O/D
ML6	Transmission Man 6 Spd, ZF, 105 mm, 5.79 1st, 0.72 6th, O/D
MN8	Transmission Auto 4-Speed, HMD, 4L80-E, Heavy Duty
MT1	Transmission 4-Speed Auto W/Elect Controls H.D. - Hydra - Matic 4L80 - E
MW3	Transmission Man 5 Spd, NVG, 109 mm, 5.61 1st, O/D
M30	Transmission Auto 4-Speed, HMD, 4L60-E, Electronic
M32	Transmission - 4 Speed Auto W/Electric Controls L.D. - Hydra-Matic 4L60-E
NA1	Emission System GVW less than 8,500 lb
NA4	Emission System GVW greater than 8,500 lb
NC1	Emission System California, LEV
NC8	Emission System California, ULEV
NF2	Emission System Federal Tier 1
NF4	Emission System Clean Fuel Fleet
NM2	Emission System Export, Leaded Fuel
NN8	Emission Override, Unleaded Fuel, Export
NP1	Transfer Case Electric Shift Cont, Two Speed
NP2	Transfer Case Manual Shift Cont, Two Speed
NP3	Transfer Case All-Wheel Drive (AWD)
NP5	Steering Wheel Leather Wrapped
NP7	Steering Column EEC Approved
NP8	Transfer Case - (Active) - Push Button Control, 2 Speed
NT3	Emission System EEC OO
NW7	Traction Control - Electronic
NYS	Steering Four Wheel
NZZ	Skid Plate Off-Road
N05	Lock Control Fuel Filler Cap
N12	Rear Exit Tail Pipe
N30	Steering Wheel Deluxe
N88	Wheel - New - Aluminum - 17 x 7.5, Premium
N93	Wheel - New - Aluminum - 17 x 7.5
OSG	Plant Code Oshawa, ONT, Canada (TRK)
PF4	Wheel - Cast - Aluminum- 16 X 7.0

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PF9	Wheel - Cast - Aluminum- 16 X 7.0
PRO	Apperance Package Sierra Professional
PY0	Wheel - New - Aluminum - 16 X 6.5
PY2	Wheel - Bright Chrome Appearance- 16 X 6.5
QAN	Tire All P265/70R 17 - 113S BW R/PE ST TL AL2
QAQ	Tire All P265/70R 17 - 113H BW R/PE ST TL AL2
QBN	Tire All LT245/75R16/C BW R/PE ST TL 00R
QBX	Tire All LT245/75R16/C WOL R/PE ST TL OOR
QCC	Tire all P255/70R16 BW R/PE ST TL ALS
QCJ	Tire all P255/70R16 WOL R/PE ST TL ALS
QCP	Tire All P255/70R16 - 109H BW R/PE ST TL ALS
QC3	Wheel 16 x 7, Aluminum, Special
QE4	Wheel Spare 16 x 6.5, Aluminum
QGA	Tire All P245/75R16 - 109S BW R/PE ST TL AT
QGB	Tire All P245/75R16 - 109S WOL R/PE ST TL AT
QGC	Tire All P265/75R16 - 114S BW R/PE ST TL AT
QGD	Tire All P265/75R16 - 114S WOL R/PE ST TL AT
QHS	Tire All P265/75R16 - 114H BW R/PE ST TL AT "A" TEMP Rating
QIW	Tire All LT245/75R16E R/PE ST TL OOR BL
QIX	Tire All LT265/75R16/C BW R/PE ST TL OOR 120Q
QIZ	Tire All LT245/75R16/E BW R/PE ST TL OOR 120Q
QJP	Tire All P265/70R17 - 113S BW R/PE ST TL OOR
QMJ	Tire All P265/70R16 - 111S BW R/PE ST TL AL2
QMK	Tire All P265/70R16 - 111S WOL R/PE ST TL AL2
QNF	Tire All P245/75R16 - 106S BW R/PE ST TL ALS
QNG	Tire All P265/75R16 - 106S WOL R/PE ST TL ALS
QNK	Tire All P245/75R16 - 109S BW R/PE ST TL ALS
QNL	Tire All P245/75R16 - 109S WOL R/PE ST TL ALS
R4W	Tire Brand All Michelin
R4Y	Tire Brand All Goodyear
SLT	Equipment Chevrolet 'LT' Sales Package
TL1	Grille Special
TP2	Battery Auxiliary
TRB	Grille Radiator, Body Color
TRW	Provisions Lamp, Roof Mounted
TR2	Lamp Turn Signal, Enlarged
TR6	Headlamps Control Leveling System, Manual
TS9	Lamp Stop, High Level - Delete
T2H	Ornamentation Extr, Export Unique Requirements
T2J	Ornamentation Interior, Export Unique Requirements
T62	Lamp System Daytime Running - Delete
T74	Headlamps Control Automatic, Delay
T78	Headlamps Control - Delete
T79	Lamp Fog, RR
T84	Headlamps RH Rule of the Road, E Mark
T89	Lamp Tail and Stop, Export
T96	Fog Lamps - Front
UC2	Speedometer INST, Kilo And Miles, Kilo Odometer, Positive Bias
UD4	Alarm Vehicle Speed, 120 K/H
UD7	Sensor Indicator Rear Parking Assist
UE1	Communication System Vehicle, G.P.S. 1
UG1	Garage Door Opened, Universal
UK3	Control Steering Wheel, Accessory

UK6	Radio Control RR Seat And Earphone Jacks
UL0	Radio - AM/FM Stereo, Cass. - Europe Compliant
UL9	Radio - AM/FM Stereo, Seek/Scan, Auto Reverse Music Search CASS, CD, Auto Tone, Clock, ETR, Bose
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 4, Dual Front Door Mounted, Dual Extended Range Quarter Mounted
UQ7	Speaker System Premium Performance, Enhanced Audio, Bose®
UW3	Radio AM/FM Stereo, Seek/Scan, Auto REV Music Search Cassette, Data System, Clock, ETR
UY2	Wiring Provisions Camper & 5th Wheel Trailer
UY7	Wiring Harness Truck Trailer, HD
U01	Roof Marker Lamps
U1Z	Player Multiple Compac Disc, Passenger Compartment
U19	Speedometer INST, Kilo And Miles, Kilo Odometer
U34	Display Celsius Temperature
U68	Display Driver Info Center
U84	Antenna Body Side Window, Radio
VB3	Bumper Rear Step, Chrome, Impact Strip
VF7	Bumper RR Step - Delete
VGC	Protector Film, Paint Etch Preventive
VG3	Bumper Front Impact Strip
VJ3	Label, Plate ECE Approval Vehicle Identification
VJ4	Label, Export Child Seat Location
VJ7	Label, Fuel Unleaded Only
VK3	License Plate, Front Mounting Package
VPH	Vehicle Preparation Overseas Delivery
VP6	Noise Control
VR4	Trailer Hitch Weight Distributing Platform
VR6	Hook Tie-Down Shipping
VR7	Hook Tow, Second, Rear
VXS	Vehicle Complete
VZ2	Calibration Speedometer A
V22	Grille Radiator, Chrome
V76	Front Towing Hook
V92	Trailer Provisions
XAN	Tire Front P265/70R17-113S BW R/PE ST TL AL2
XAQ	Tire Front P265/70R17-113H BW R/PE ST TL AL2
XBN	Tire Front LT245/75R16/C BW R/PE ST TL OOR
XBX	Tire Front LT245/75R16/C WOL R/PE ST TL OOR
XCC	Tire Front P255/70R16 BW R/PE ST TL ALS
XCJ	Tire Front P255/70R16 WOL R/PE ST TL ALS
XCP	Tire Front P255/70R16-109H BW R/PE ST TL ALS
XGA	Tire Front P245/75R16-109S BW R/PE STTL AT
XGB	Tire Front P245/75R16-109S WOL R/PE STTL AT
XGC	Tire Front P265/75R16-114S BW R/PE ST TL AT
XGD	Tire Front P265/75R16-114S WOL R/PE ST TL AT
XGK	Tire Front LT245/75R16/E BW R/PE ST TL OOR 120Q

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XGL	Tire Front LT265/75R16/C BL R/PE ST TL OOR
XHH	Tire Front LT245/75R16/E BW R/PE ST TL ALS 120Q
XHS	Tire Front P265/75R16-114H BW R/PE ST TL AT "A" Temp Rating
XJP	Tire Front P265/70R17-113S BW R/PE ST TL OOR
XMJ	Tire Front P265/70R16-111S BW R/PE ST TL AL2
XMK	Tire Front P265/70R16-111S WOL R/PE ST TL AL2
XNF	Tire Front P235/75R16-106S BW R/PE ST TL ALS
XNG	Tire Front P235/75R16-106S WOL R/PE ST TL ALS
XNK	Tire Front P245/75R16-109S BW R/PE ST TL ALS
XNL	Tire Front P245/75R16-109S WOL R/PE ST TL ALS
X88	Conversion Name Plate Chevrolet
YAN	Tire Rear P265/70R17-113S BW R/PE ST TL AL2
YAQ	Tire Rear P265/70R17-113H BW R/PE ST TL AL2
YBN	Tire Rear LT245/75R16/C BW R/PE ST TL OOR
YBX	Tire Rear LT245/75R16/C WOL R/PE ST TL OOR
YCC	Tire Rear P255/70R16 BW R/PE ST TL ALS
YCJ	Tire Rear P255/70R16 WOL R/PE ST TL ALS
YCP	Tire Rear P255/70R16-109H BW R/PE ST TL ALS
YE9	Convenience Package Comfort and Decor Level #3
VF2	Sales Package Ambulance Upfitter
YGA	Tire Rear P245/75R16-109S BW R/PE ST TL AT
YGB	Tire Rear P245/75R16-109S WOL R/PE ST TL AT
YGC	Tire Rear P265/75R16-114S BW R/PE ST TL AT
YGD	Tire Rear P265/75R16-114S WOL R/PE ST TL AT
YGK	Tire Rear LT245/75R16/E BW R/PE ST TL OOR 120Q
YGL	Tire Rear LT265/75R16/C BL R/PE ST OOR
YHH	Tire Rear LT245/75R16/E BW R/PE ST TL ALS 120Q
YHS	Tire Rear P265/75R16-114H BW R/PE ST TL AT "A" Temp Rating
YJP	Tire Rear P265/70R17-113S BW R/PE ST TL OOR
YMJ	Tire Rear P265/70R16-111S BW R/PE ST TL AL2
YMK	Tire Rear P265/70R16-111S WOL R/PE ST TL AL2
YNF	Tire Rear P235/75R16-106S BW R/PE ST TL ALS
YNG	Tire Rear P235/75R16-106S WOL R/PE ST TL ALS
YNK	Tire Rear P245/75R16-109S BW R/PE ST TL ALS
YNL	Tire Rear P245/75R16-109S WOL R/PE ST TL ALS
Y91	Merchandised PKG Luxury Edition
ZBN	Tire Spare LT245/75R16/C BL R/PE ST TBL OOR
ZBX	Tire Spare LT245/75R16/C WOL R/PE ST TL OOR
ZCC	Tire Spare LT245/70R16 BW R/PE ST TL ALS
ZCJ	Tire Spare LT245/70R16 WOL R/PE ST TL ALS
ZCP	Tire Spare P255/70R16-109H BW R/PE ST TL ALS
ZEC	Tire Spare P215/85R16/E BW R/PE ST TL HWY
ZEF	Tire Spare P215/85R16/E BW R/PE ST TL OOR
ZGA	Tire Spare P245/75R16-109S BW R/PE ST TL AT
ZGB	Tire Spare P245/75R16-109S WOL R/PE ST TL AT
ZGC	Tire Spare P265/75R16-114S BW R/PE ST TL AT
ZGD	Tire Spare P265/75R16-114S WOL R/PE ST TL AT
ZGK	Tire Spare LT245/75R16/E BW R/PE ST TL OOR 120Q
ZGL	Tire Spare LT265/75R16/C BL R/PE ST OOR
ZHH	Tire Spare LT245/75R16/E BW R/PE ST TL ALS 120Q
ZHS	Tire Spare P265/75R16-114H BW R/PE ST TL AT "A" Temp Rating
ZMJ	Tire Spare LT265/70R16-111S BW R/PE ST TL AL2
ZMK	Tire Spare LT265/70R16-111S WOL R/PE ST TL AL2

2002 Chevrolet Avalanche Restoration Kit

ZM9	Sales Package Comfort & Convenience
ZNF	Tire Spare P235/75R16-106S BW R/PE ST TL ALS
ZNG	Tire Spare P235/75R16-106S WOL R/PE ST TL ALS
ZNK	Tire Spare P245/75R16-109S BW R/PE ST TL ALS
ZNL	Tire Spare P245/75R16-109S WOL R/PE ST TL ALS
ZQ1	Chassis Package Smooth Ride
ZW7	Chassis Package Premium Smooth Ride
ZW9	Base Body or Chassis
ZX3	Chassis Package manual Select Damping
ZYK	Tire Spare LT215/85R16/D BL R/PE ST TL HWY
ZYL	Tire Spare LT215/85R16/D BL R/PE ST TL OOR
Z71	Chassis Package "Off Road"
Z75	Conversion Name Plate Cadillac
Z82	Trailer Provisions Special Equipment, H. D.
Z83	Chassis Package Solid Smooth Ride
Z85	Chassis Package Increased Capacity
Z88	Conversion Name PLT GMC

Technical Information

Maintenance and Lubrication

Capacities - Approximate Fluid

Application	Specification	
	Metric	English
Axle Capacities		
• Front Drive Axle (8.25")	1.66 liters	1.75 quarts
• Front Drive Axle (9.25")	1.73 liters	1.83 quarts
• Rear Drive Axle (8.6")	2.28 liters	2.41 quarts
• Rear Drive Axle (9.5")	2.6 liters	2.75 quarts
• Rear Drive Axle (10.5")	2.6 liters	2.75 quarts
• Rear Drive Axle (11.5")	3.62 liters	3.83 quarts
Engine Cooling System		
• 5.3L (VIN T) Automatic Transmission	13.7 liters	14.4 quarts
• 5.3L (VIN T) Automatic Transmission with Optional Air Conditioning	13.7 liters	14.4 quarts
• 5.3L (VIN T) Automatic Transmission with Front A/C	13.6 liters	14.4 quarts
• 5.3L (VIN T) Automatic Transmission with Front and Rear A/C	15.0 liters	15.8 quarts
• 8.1L (VIN G) Automatic Transmission	19.6 liters	20.7 quarts
• 5.3L (VIN T) with Filter	5.7 liters	6.0 quarts
• 8.1L (VIN G) with Filter	6.1 liters	6.5 quarts
Transmission		
• 4L60-E 4 Spd. HMD Auto (M30)	4.7 liters	5.0 quarts
• 4L60-E 4 Spd. HMD Auto (M30) After Complete Overhaul	10.6 liters	11.2 quart
• 4L60-E 4 Spd HM Auto (M32)	4.7 liters	5.0 quarts
• 4L60-E 4 Spd HM Auto (M32) After Complete Overhaul	10.6 liters	11.2 quart
• 4L80-E Auto (MT1)	7.3 liters	7.7 quarts
• 4L80-E Auto (MT1) After Complete Overhaul	12.8 liters	13.5 quart
Fuel Tank		
• 4 Door Utility	98.4 liters	26.0 gallons
• Chassis Cab (Single Tank)	128.0 liters	34.0 gallons
Fuel Tank-Federal		
• Chassis Cab-Standard Side Tank	102.2 liters	27.0 gallons
• Chassis Cab-Optional Rear Tank	87.0 liters	23.0 gallons
Fuel Tank-California		
• Chassis Cab-Standard Side Tank	91.0 liters	24.0 gallons
• Chassis Cab-Rear Tank	102.2 liters	23.0 gallons
• Chassis Cab-Optional Rear Tank	102.2 liters	27.0 gallons
Power Steering Capacities-approximate	0.77-1.25 liters	0.81-1.32 quarts

Maintenance Items

Usage	Type
Air Cleaner	
• 5.3L (VIN T)	A1518C
• 8.1L (VIN G)	A1518C
Engine Oil Filter	
• 5.3L (VIN T)	PF46
• 8.1L (VIN G)	PF454
PCV Valve	
• 5.3L (VIN T)	CV948C
Spark Plugs and Gaps	
• 5.3L (VIN T)	PTJ14R15 (GAP 1.52 mm, 0.060 in)
• 8.1L (VIN G)	PTJ14R15 (GAP 1.52 mm, 0.060 in)
Fuel Filter	
• 5.3L (VIN T)	GF626
• 8.1L (VIN G)	GF626
Wiper Blades	P/N 15706394
Passenger Compartment Air Filter	P/N 52485513

Fluid and Lubricant Recommendations

Usage	Fluid/Lubricant
Automatic Transfer Case	Automatic transfer case fluid AUTO-TRAK II Fluid (GM P/N 12378508)
Automatic Transfer Case (Diesel Engine)	Automatic transfer case fluid (GM P/N 12378396)
Transfer Case (Pickup)	DEXRON®-III, Automatic Transmission Fluid
Automatic Transmission	DEXRON®-III, Automatic Transmission Fluid
Body Door Hinge Pins, Tailgate Hinge and Linkage, Folding Seat and Fuel Door Hinge	Multi-Purpose lubricant, Superlube® (GM P/N 12346241 or equivalent).
Chassis Lubrication	Chassis Lubricant (GM Part No. 12377985 or equivalent) or lubricant meeting requirements of NLGI # 2 Category LB or GC-LB.
Engine Coolant	50/50 mixture of clean drinkable water and use only GM Goodwrench® DEX-COOL® or Havoline® DEX-COOL® coolant.
Engine Oil	Engine oil with the American Petroleum Institute Certified For Gasoline Engines STARBURST symbol of the proper viscosity
Engine Oil (Diesel Engine)	Engine oil with the letters CH-4 or CG-4 is best for this vehicle. The CH-4 or CG-4 designation may appear either alone, or in combination with other API designations, such as API CH-4/SJ, CG-4/SH or CH-4/CG-4/SJ. These letters show American Petroleum Institute (API) level of quality.
Floor Shift Linkage	Lubriplate ® Lubricant Aerosol (GM Part No. 12346293 or equivalent) or lubricant meeting requirements of NLGI # 2 Category LB or GC-LB.
Front Axle (S4WD)	SAE 80W-90 Axle Lubricant (GM P/N 1052271 or equivalent).
Front Axle (F4WD)	SAE 75W-90 Synthetic Axle Lubricant (GM part No. 12378261) or equivalent meeting GM Specification 9986115.

Front Axle Propshaft Spline or One-Piece Propshaft Spline (Two-Wheel Drive with Auto. Trans.)	Spline Lubricant, Special Lubricant (GM Part No. 12345879) or lubricant meeting requirements of GM 9985830.
Hood Hinges	Multi-Purpose lubricant, Superlube® (GM Part No. 12346241 or equivalent).
Hood Latch Assembly, Secondary Latch, Pivots, Spring Anchor and Release Pawl	Lubriplate® Lubricant Aerosol (GM Part No. 12346293 or equivalent) or lubricant meeting requirements of NLGI # 2, Category LB or GC-LB.
Hydraulic Brake System	Delco Supreme 11® Brake Fluid (GM P/N 12377967 or equivalent DOT-3 brake fluid).
Hydraulic Clutch System	Hydraulic Clutch Fluid (GM Part No. 12345347 or equivalent DOT-3 brake fluid).
Key Lock Cylinders	Multi-Purpose Lubricant, Superlube® (GM P/N 12346241 or equivalent).
Manual Transfer Case	DEXRON®-III Automatic Transmission Fluid
Manual Transmission (5-Speed with Low Gear, RPO MW3)	GM Goodwrench Synthetic Manual Transmission Fluid (GM Part No. 12346190-1 qt.) or equivalent SAE 75W-85 GL-4 gear oil.
Manual Transmission (5-Speed without Low Gear, RPO MG5)	Synchromesh Transmission Fluid (GM Part No. 12345349 or equivalent).
Manual Transmission (6-Speed)	TransSynd™ Synthetic Automatic Transmission Fluid (GM Par No. 12378515).
Outer Tailgate Handle Pivot Points	Multi-Purpose lubricant, Superlube® (GM P/N 12346241 or equivalent).
Parking Brake Cable Guides	Chassis Lubricant (GM Part No. 12377985 or equivalent) or lubricant meeting requirements of NLGI # 2, Category LB or GC-LB.
Power Steering System	GM Power Steering Fluid (GM P/N 1052884 - 1 pint, 1050017 - 1 quart, or equivalent).
Weatherstrip Conditioning	Dielectric Silicone Grease (GM P/N 12345579 or equivalent).
Windshield Washer Solvent	GM Optikleen® Washer Solvent (GM Part No. 1051515) or equivalent.
Weatherstrip Squeaks	Synthetic Grease with Teflon, Superlube® (GM Part No. 12371287 or equivalent).
Tailgate Handle Pivot Points, Hinges, Latch Bolt and Linkage	Multi-Purpose lubricant, Superlube® (GM P/N 12346241 or equivalent).
Rear Axle	SAE 75W-90 Synthetic Axle Lubricant, GM Part No. 12378261 (in Canada use Part No. 10953455) or equivalent meeting GM Specification 9986115.
Rear Driveline Center Spline	Chassis Lubricant (GM Par No. 12377985 or equivalent) or lubricant meeting requirements of NLGI # 2, Category LB or GC-LB.

Descriptions and Operations

Power Steering System

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

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

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

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

- A recirculating ball system
- A rack and pinion system

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

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

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

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

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

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

Steering Linkage Description and Operation (Non-Rack and Pinion)

The steering linkage consists of the following components:

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

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

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

Steering Wheel and Column - 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

Coil Spring

The front suspension has 2 primary purposes:

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

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

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

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. The vertical movement of the steering knuckle as the vehicle travels over irregular road surfaces will tend to compress the spring and spring tension will lead the spring to return to the original, at-rest state. This action isolates the vehicle from the road surface. The upper and lower control arms are allowed to pivot at the vehicle frame in a vertical fashion. The ball joint allows the steering knuckle to maintain the perpendicular relationship to the road surface.

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

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

Torsion Bar

The front suspension has 2 primary purposes:

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

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

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

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

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

Rear Suspension

All pickup models and 25 series Utility 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.

Real Time Damping Description and Operation

The RTD system is bi-state real time damping, two corner rear leveling (if equipped), and a electronic variable orifice, (EVO) power steering system, (if equipped).

The RTD system consists of the following:

- Suspension Control Module
- Compressor/Leveling Module
 - Pressure Sensor
 - Exhaust Solenoid
- Compressor Motor Relay
- Steering Handwheel Speed/Position Sensor
- Electronic Variable Orifice (EVO) Solenoid
- Shock Solenoid Valves
- Position Sensors

The objective of the suspension control module is to provide ride and handling results that are superior to a passive damper system, both on and off road at all load conditions. The suspension control module monitors body-to-wheel height, vehicle speed, handwheel position/speed, lift/dive status and a driver tow/haul input switch status in real time and instantly selects a "normal" or "firm" mode. This is done for each of the front and rear shock absorbers in order to adjust the vehicle for specific road and driving conditions.

The suspension control module will use the rear body-to-wheel displacements and vehicle speed inputs to keep the rear trim height of the vehicle at its desired level. This is done to optimize suspension geometry, headlight aiming, ride travel and keep the vehicle visually level. The system utilizes the compressor motor relay and the compressor/leveling module which contains the exhaust solenoid, pressure sensor and compressor motor. The vehicles's rear leveling compressor motor is switched ON and OFF via a compressor motor relay which is controlled by the suspension control module. The suspension control module provides a switched path to ground whenever compressor activity is required. The suspension control module supplies 5 volts to the RTD air pressure sensor. The pressure sensor uses this reference voltage to produce an analog output of approximately 0.15 to 4.85 volts. The signal voltage is a reference of the air pressure in the rear leveling system. The exhaust solenoid valve is switched ON and OFF via the suspension control module. The suspension control module provides a switched path to ground whenever the exhaust "head relief" sequence occurs at compressor start-up (If system pressure is lower than 10 psi).

The suspension control module also uses the steering handwheel position/speed sensor and vehicle speed inputs to control a power steering effort control valve. The suspension control module varies the steering assist by adjusting the current flow through the electronic variable orifice (EVO) solenoid control circuits. The amount of steering assist is dependent upon vehicle speed and input from the steering handwheel position/speed sensor. As the vehicle speed increases, the steering assist decreases and the driver effort increases. As the vehicle speed decreases, the steering assist increases and the driver effort decreases.

The shock solenoid valve is driven ON and OFF by the suspension control module. To activate the solenoid, it is initially subjected to full battery voltage for a short period of time. Once the solenoid is pulled-in, the supply voltage is pulse width modulated (PWM). The amount the shock solenoid valve is activated is based on inputs from the driver Tow/Haul switch, road inputs and the PCM. The suspension control module provides a common ground (low reference) for all 4 of the shock solenoid valves.

The suspension control module provides a common regulated voltage of approximately 5 volts to all four of the (body-to-wheel) position sensors, RTD air pressure sensor and the steering handwheel position/speed sensor. The suspension control module receives VSS from the PCM and over the class 2 circuit. The position sensors provide an analog signal voltage between 0.5 and 4.5 volts to the suspension control module. This signal voltage represents the wheel's position relative to the body. The suspension control module provides a 5 volt reference and a low reference to the position sensors.

Automatic Level Control Description and Operation

The RTD system is bi-state real time damping system. The Suspension Control module controls the suspension damper solenoids and suspension position sensors, along with parts of the automatic level control (ALC) system and electronic variable orifice (EVO) power steering system.

The Automatic Level Control system consists of the following:

- Suspension Control Module
- Compressor/Leveling Module
 - Air Pressure Sensor
 - Exhaust Solenoid
- Compressor Motor Relay

The objective of the Automatic Level Control System is to provide constant ride height at all load conditions. The Suspension Control module monitors body-to-wheel height, and vehicle speed.

The Suspension Control module will use the rear body-to-wheel displacements and vehicle speed inputs to keep the rear trim height of the vehicle at its desired level.

Wheels and Tires

Fastener Tightening Specifications

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

General Description

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

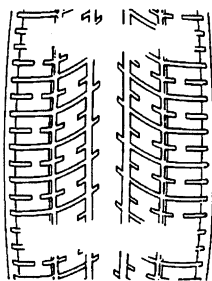
The following factors have an important influence on tire life:

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

The following factors increase tire wear:

- Heavy cornering
- Excessively rapid acceleration
- Heavy braking

Tread Wear Indicators Description



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

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

Metric Wheel Nuts and Bolts Description

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

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

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

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

Tire Inflation Description

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

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

- Tire overloading

Inspect the tire pressure when the following conditions apply:

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

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

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

Inflation Pressure Conversion (Kilopascals to PSI)

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

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

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

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

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

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

- Uneven braking
- Steering lead
- Reduced vehicle handling

Tire Description

Caution

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

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

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

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

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

The following is required of replacement tires:

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

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

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

Conditions for Tire Replacement

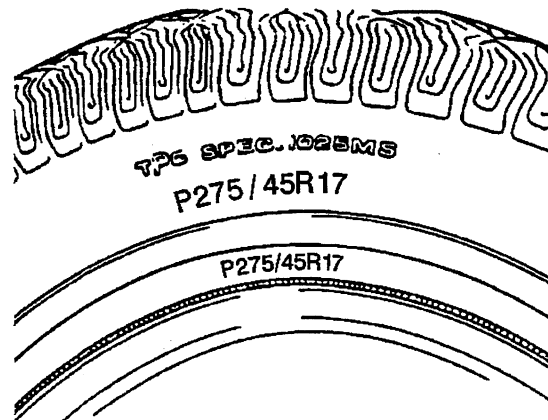
Replace the tires when one and/or all of the following conditions are evident:

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

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

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

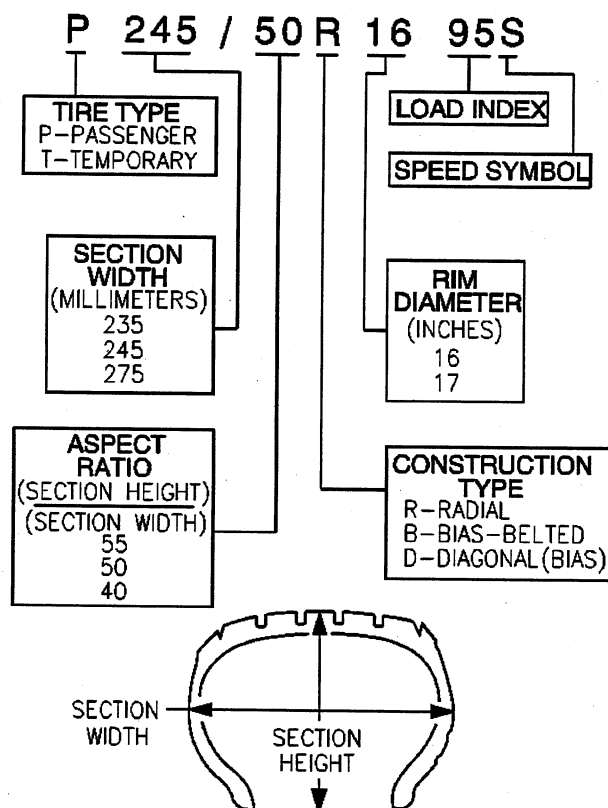
All Seasons Tires Description



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

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

P-Metric Sized Tires Description



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

Driveline System Description and Operation

Driveline/Axle – Propeller Shaft

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

Front Propeller Shaft Description

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

One Piece Propeller Shaft Description

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

Propeller Shaft Phasing Description

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

Universal Joint Description

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

Center Bearing Description

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

Wheel Drive Shafts Description and Operation

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

- Front wheel drive shaft constant velocity joint outer joint.
- Front wheel drive shaft tri-pot joint inner joint.
- The front wheel drive shaft connects the front wheel drive shaft tri-pot joint and the front wheel drive shaft constant velocity joint.
- Wheel Drive Shaft Seal Cover 15 Series

- The front wheel drive shaft tri-pot joint is completely flexible, and moves with an in and out motion.
- The front wheel drive shaft constant velocity joint is flexible but can not move in and out.

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

Front Drive Axle Description and Operation

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

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

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

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

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

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

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

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

Rear Drive Axle Description and Operation

Rear Axles for this vehicle consist of the following components:

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

The 800 series utility vehicles use either the 8.60, 9.50 or the 10.50 inch axles. The type of the axle can be identified by the stamping on the right side axle tube. They may also be identified by the ring gear size. The ring gear sizes include the 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.

An open differential has a set of 4 gears. 2 are side gears and 2 are pinion gears. Each side gear is splined to an axle shaft so each axle shaft ; so each axle shaft turns when its 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 which is bolted to the differential case assembly. The differential pinion, as it rotates with 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 2 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. When the vehicle turns a corner the inner wheel turns slower than the outer wheel which slows the rear axles' side gear (as the shaft is splined to the side gear). The rear axle pinion gears will roll around the slower moving 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 236/246-NP8 (Two Speed Automatic)

The NVG 236/246 transfer case features a 4 button shift control switch located on the instrument panel. When the vehicle has the ignition key in the RUN position, the transfer case shift control module starts monitoring the transfer case shift control switch to determine if the driver desires a new mode/gear position. At a single press of the transfer case shift control switch, the lamp of the new desired position will begin flashing to inform the driver that the transfer case shift control module has received the request for a new mode/gear position. The lamp will continue to flash until all shifting criteria has been met and the new mode/gear position has been reached, or has been engaged. Once the new mode/gear position is fully active, the switch indicator lamp for the new position will remain ON constantly.

During normal driving situations the transfer case can operate in the Auto 4WD mode. In the Auto 4WD mode the transfer case shift control module monitors rear wheel slip speed, based on the inputs from both the front and rear propshaft speed sensors. When the vehicle experiences a rear wheel slip condition, the transfer case shift control module sends a pulse width modulated (PWM) signal to an electronic motor, which is the transfer case encoder motor. This motor rotates the transfer case sector shaft, applying a clutch pack. This clutch pack is designed to deliver a variable amount of torque, normally delivered to the rear wheels, and transfers it to the front wheels. Torque is then ramped up to the front wheels until the front propshaft speed sensor matches that of the rear propshaft speed sensor. Torque is then ramped down until torque is completely removed from the front wheels or until rear wheel slip is once again detected. The process would then repeat.

The NVG 236/246 transfer case has the added feature of also providing the driver with 3 manual mode/gear positions:

- 4HI - 4 Wheel Drive high range
- 2HI - 2 Wheel Drive high range
- 4LO - 4 Wheel Drive low range

The driver may choose to select any of these mode/gear positions while driving the vehicle. However, the transfer case will not allow a shift into or out of 4LO unless the following criteria has been met:

- The engine is running.
- The automatic transmission is in Neutral, clutch depressed on manual transmissions.
- The vehicle speed is below 5 km/h (3 mph).

This transfer case also has a Neutral position. A shift to the Neutral position allows the vehicle to be towed without the rear axle rotating the transfer case main shaft and the transmission output shaft. Neutral position may be obtained only if the following criteria has been met:

- The key is ON.
- The automatic transmission is in Neutral, clutch depressed on manual transmissions.
- The vehicle speed is below 5 km/h (3 mph).
- The transfer case is in 2HI mode.

Once these conditions have been met, press and hold both the 2HI and 4LO buttons for 10 seconds. When the system completes the shift to neutral, the red neutral lamp will illuminate.

View the list of major components that make up the automatic transfer case (ATC) system below.

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. This information is provided to the transfer case shift control module via Class 2 data bus from the powertrain control module (PCM).

The transfer case shift control module monitors front and rear propshaft speed as well as controlling the operation of the transfer case encoder motor assembly and the engaging and disengaging of the front axle.

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 of the transfer case. When activated it turns the sector shaft of the transfer case, clockwise or counterclockwise to shift the transfer case and to apply the clutch that applies the front propshaft. The encoder motor is controlled with a pulse width modulated (PWM) circuit provided by the transfer case shift control module. This circuit consists of a driver on both the Motor Control A and Motor Control 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.

The transfer case encoder motor can be turned ON and OFF using a scan tool. You may also monitor Motor Control A and B circuits using a scan tool.

Transfer Case Encoder

The encoder is mounted to the transfer case encoder motor assembly and is replaced only as an assembly. The encoder converts the sector shaft position, representing a mode or range, into electrical signal inputs to the transfer case shift control module. The module detects what position the transfer case is in by monitoring the 4 encoder channels (P, A, B, and C). These inputs translate into AUTO 4WD, 2HI, 4HI, NEUTRAL, and 4LO or whether the motor is still in transition between gears.

The transfer case encoder channel circuits may be monitored using a scan tool.

Transfer Case Motor Lock

The transfer case motor lock is used to prevent the transfer case from changing mode/gear positions or popping out of position when the vehicle is in 2HI, 4HI, and 4LO. When the lock circuit is energized, the transfer case encoder motor is allowed to rotate. When the transfer case is placed 2HI, 4HI, or 4LO the motor lock circuit has no voltage provided to it, applying the lock which assures that the transfer case remains in the current mode/gear position. When AUTO 4WD is selected the motor lock remains applied until an adaptive mode, torque being applied to the front propshaft is required. During an adaptive mode the motor lock circuit is energized, the locking mechanism is released, enabling the encoder motor to turn and apply torque to the front propshaft.

The transfer case motor lock circuit can be turned ON and OFF using a scan tool. You may also monitor the lock circuit using a scan tool.

Transfer Case Speed Sensors

There are three speed sensors mounted on the transfer case, 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 AC voltage. The AC voltage level and number of pulses increases as speed increases.

Vehicle Speed Sensor

One of the two speed sensors 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 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 4WD Indicator

The SERVICE 4WD message is displayed on the driver information center and is an integral part of the cluster and cannot be serviced separately. This message is used to inform the driver of the vehicle of malfunctions within the automatic transfer case (ATC) system. The SERVICE 4WD message is controlled by the transfer case shift control module via a Class 2 message.

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

General Description

The park brake system consists of the following:

Park Brake Pedal Assembly

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

Park Brake Release Handle Assembly

Releases applied park brake system when pulled.

Park Brake Cables

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

Park Brake Cable Equalizer

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

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

Park Brake Apply Lever

Multiplies and transfers input force to park brake actuator.

Park Brake Actuator/Adjuster

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

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

Park Brake Shoe

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

System Operation

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

ABS Description and Operation

Antilock Brake System

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

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

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

Engine Description and Operation

Engine Mechanical – 5.3L

General Specifications 5.3L (LM7 VIN T)

Application	Metric	English
General Data		
• Engine Type	V8	
• Displacement	5.3L	325 CID
• Bore	96.000-96.018 mm	3.779-3.78 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	
Camshaft		
• Camshaft End Play	0.025-0.305 mm	0.001-0.012 in
• Camshaft Journal Diameter	54.99-55.04 mm	2.164-2.166 in
• Camshaft Journal Diameter Out-of-Round	0.025 mm	0.001 in
• Camshaft Lobe Lift (Intake)	6.82 mm	0.268 in
• Camshaft Lobe Lift (Exhaust)	6.96 mm	0.274 in
• Camshaft Runout (Measured at the Intermediate Journals)	0.05 mm	0.002 in
Connecting Rod		
• Connecting Rod Bearing Bore Diameter	56.505-56.525 mm	2.224-2.225 in
• Connecting Rod Bearing Bore Out-of-Round	0.004-0.008 mm	0.00015-0.0003 in
• Connecting Rod Bearing Clearance (Production)	0.023-0.065 mm	0.0009-0.0025 in
• Connecting Rod Bearing Clearance (Service Limit)	0.023-0.076 mm	0.0009-0.003 in
• Connecting Rod Side Clearance	0.11-0.51 mm	0.00433-0.02 in
Crankshaft		
• Crankshaft Bearing Clearance (Production)	0.020-0.052 mm	0.0008-0.0021 in
• Crankshaft Bearing Clearance (Service)	0.020-0.065 mm	0.0008-0.0025 in
• Crankshaft Connecting Rod Journal Diameter (Production)	53.318-53.338 mm	2.099-2.1 in
• Crankshaft Connecting Rod Journal Diameter (Service Limit)	53.308 mm (Minimum)	2.0987 in (Minimum)
• Crankshaft Connecting Rod Journal Taper (Production)	0.005 mm (Maximum for one half of the Journal Length)	0.0002 in (Maximum for one half of the Journal Length)

• Crankshaft Connecting Rod Journal Taper (Service Limit)	0.02 mm (Maximum)	0.00078 in (Maximum)
• Crankshaft Connecting Rod Journal Out-of-Round (Production)	0.005 mm	0.0002 in
• Crankshaft Connecting Rod Journal Out-of-Round (Service Limit)	0.01 mm	0.0004 in
• Crankshaft End Play	0.04-0.2 mm	0.0015-0.0078 in
• Crankshaft Main Journal Diameter (Production)	64.993-65.007 mm	2.558-2.5593 in
• Crankshaft Main Journal Diameter (Service Limit)	64.993 mm	2.558 in
• Crankshaft Main Journal Out-of-Round (Production)	0.003 mm	0.0001 in
• Crankshaft Main Journal Out-of-Round (Service Limit)	0.008 mm	0.0003 in
• Crankshaft Main Journal Taper (Production)	0.01 mm	0.0004 in
• Crankshaft Main Journal Taper (Service Limit)	0.02 mm	0.00078 in
• Crankshaft Reluctor Ring Runout (Measured 1.0 mm (0.04 in) Below the Tooth Diameter)	0.7 mm (Maximum)	0.028 in (Maximum)
• Crankshaft Runout (at Rear Flange)	0.05 mm (Maximum)	0.002 in (Maximum)
• Crankshaft Thrust Wall Runout	0.025 mm	0.001 in
• Crankshaft Thrust Wall Width (Production)	26.14-26.32 mm	1.029-1.0315 in
• Crankshaft Thrust Wall Width (Service)	26.2 mm (Maximum)	1.0315 in (Maximum)
Cylinder Bore		
• Cylinder Bore Diameter (Production)	96.0-96.018 mm	3.779-3.78 in
Cylinder Head		
• Cylinder Head Engine Block Deck Flatness (Measured within a 156 mm (6.1 in) area)	0.08 mm	0.003 in
• Cylinder Head Engine Block Deck Flatness (Measuring the Overall Length of the Cylinder Head)	0.1 mm	0.004 in
• Cylinder Head Exhaust Manifold Deck Flatness	0.13 mm	0.005 in
• Cylinder Head Height (Measured from the Head Deck to the Valve Rocker Arm Cover Seal Surface)	120.2 mm	4.732 in
• Cylinder Head Intake Manifold Deck Flatness	0.08 mm	0.003 in
Engine Block		
• Camshaft Bearing Bore 1 and 5 Diameter	59.12-59.17 mm	2.327-2.329 in
• Camshaft Bearing Bore 2 and 4 Diameter	58.87-58.92 mm	2.317-2.319 in
• Camshaft Bearing Bore 3 Diameter	58.62-58.67 mm	2.307-2.309 in
• Engine Block Cylinder Head Deck Surface Flatness (Measured within a 156 mm (6.1 in) area)	0.11 mm	0.004 in
• Engine Block Cylinder Head Deck Surface Flatness (Measuring the Overall Length of the Block Deck)	0.22 mm	0.008 in
• Engine Block Cylinder Head Deck Height (Measuring from the Centerline of Crankshaft to the Deck Face)	234.57-234.82 mm	9.235-9.245 in
• Main Bearing Bore Diameter (Production)	69.871-69.889 mm	2.750-2.751 in
• Main Bearing Bore Diameter Out-of-Round	0.006 mm	0.0002 in
• Valve Lifter Bore Diameter (Production)	21.417-21.443 mm	0.843-0.844 in

Intake Manifold		
<ul style="list-style-type: none"> Intake Manifold Cylinder Head Deck Flatness (Measured within a 200 mm (7.87 in) Area that Includes Two Runner Port Openings) 	0.3 mm	0.118 in
Oil Pan and Front/Rear Cover Alignment		
<ul style="list-style-type: none"> Oil Pan to Rear of Engine Block Alignment (at Transmission Bellhousing Mounting Surface) 	0.0-0.25 mm (Maximum)	0.0-0.01 in (Maximum)
<ul style="list-style-type: none"> Front Cover Alignment (at Oil Pan Surface) 	0.0-0.5 mm	0.0-0.02 in
<ul style="list-style-type: none"> Rear Cover Alignment (at Oil Pan Surface) 	0.0-0.5 mm	0.0-0.02 in
Piston		
<ul style="list-style-type: none"> Piston - Piston Diameter - Measured Over Skirt Coating 	96.002-96.036 mm	3.779-3.78 in
<ul style="list-style-type: none"> Piston - Piston-to-Bore Clearance - Production 	-0.036 to +0.016 mm	-0.0014 to +0.0006 in
<ul style="list-style-type: none"> Piston - Piston-to-Bore Clearance - Service Limit with Skirt Coating Worn Off 	0.07 mm	0.0028 in
Piston Pin		
<ul style="list-style-type: none"> Piston Pin Clearance to Piston Bore (Production) 	0.007-0.020 mm	0.00027-0.00078 in
<ul style="list-style-type: none"> Piston Pin Clearance to Piston Bore (Service Limit) 	0.007-0.021 mm (Maximum)	0.00027-0.00082 in (Maximum)
<ul style="list-style-type: none"> Piston Pin Diameter 	23.997-24.0 mm	0.9447-0.9448 in
<ul style="list-style-type: none"> Piston Pin Fit in Connecting Rod 	0.020-0.043 mm (Interference)	0.00078-0.00169 in (Interference)
Piston Rings		
<ul style="list-style-type: none"> Piston Compression Ring End Gap (Production--Top) (Measured in Cylinder Bore) 	0.23-0.44 mm	0.009-0.017 in
<ul style="list-style-type: none"> Piston Compression Ring End Gap (Production--2nd) (Measured in Cylinder Bore) 	0.44-0.70 mm	0.0173-0.0275 in
<ul style="list-style-type: none"> Piston Oil Ring End Gap (Production) (Measured in Cylinder Bore) 	0.18-0.75 mm	0.007-0.0295 in
<ul style="list-style-type: none"> Piston Compression Ring End Gap (Service--Top) (Measured in Cylinder Bore) 	0.23-0.50 mm (Maximum)	0.009-0.02 in (Maximum)
<ul style="list-style-type: none"> Piston Compression Ring End Gap (Service--2nd) (Measured in Cylinder Bore) 	0.44-0.76 mm (Maximum)	0.0173-0.03 in (Maximum)
<ul style="list-style-type: none"> Piston Oil Ring End Gap-Service Limit (Measured in Cylinder Bore) 	0.18-0.81 mm (Maximum)	0.007-0.032 in (Maximum)
<ul style="list-style-type: none"> Piston Compression Ring Groove Clearance (Production--Top) 	0.04-0.085 mm	0.00157-0.003346 in
<ul style="list-style-type: none"> Piston Compression Ring Groove Clearance (Production--2nd) 	0.04-0.078 mm	0.00157-0.0031 in
<ul style="list-style-type: none"> Piston Oil Ring Groove Clearance (Production) 	0.012-0.20 mm	0.0005-0.0078 in
<ul style="list-style-type: none"> Piston Compression Ring Groove Clearance (Service--Top) 	0.04-0.085 mm (Maximum)	0.00157-0.003346 in (Maximum)
<ul style="list-style-type: none"> Piston Compression Ring Groove Clearance (Service--2nd) 	0.04-0.078 mm (Maximum)	0.00157-0.0031 in (Maximum)
<ul style="list-style-type: none"> Piston Oil Ring Groove Clearance (Service Limit) 	0.012-0.20 mm (Maximum)	0.0005-0.0078 in (Maximum)

Valve System		
• Valve Face Angle	45 degrees	
• Valve Guide Installed Height (Measured from the Cylinder Head Spring Seat Surface to the Top of the Valve Guide)	17.32 mm	0.682 in
• Valve Lash	Net Lash - No Adjustment	
• Valve Lift (Exhaust)	11.85 mm	0.466 in
• Valve Lift (Intake)	11.6 mm	0.457 in
• Valve Lifter	Hydraulic Roller	
• Valve Margin	1.25 mm	0.05 in
• Valve Rocker Arm Ratio	1.70:1	
• Valve Seat Angle	46 degrees	
• Valve Seat Runout	0.05 mm (Maximum)	0.002 in (Maximum)
• Valve Seat Width (Exhaust)	1.78 mm	0.07 in
• Valve Seat Width (Intake)	1.02 mm	0.04 in
• Valve Spring Free Length	52.9 mm	2.08 in
• Valve Spring Installed Height (Exhaust)	45.75 mm	1.8 in
• Valve Spring Installed Height (Intake)	45.75 mm	1.8 in
• Valve Spring Pressure (Closed)	340 N at 45.75 mm	76 lb at 1.8 in
• Valve Spring Pressure (Open)	980 N at 33.55 mm	220 lb at 1.32 in
• Valve Stem Clearance (Production--Exhaust)	0.025-0.066 mm	0.001-0.0026 in
• Valve Stem Clearance (Production--Intake)	0.025-0.066 mm	0.001-0.0026 in
• Valve Stem Clearance (Service--Exhaust)	0.093 mm (Maximum)	0.0037 in (Maximum)
• Valve Stem Clearance (Service--Intake)	0.093 mm (Maximum)	0.0037 in (Maximum)
• Valve Stem Diameter (Production)	7.955-7.976 mm	0.3132-0.314 in
• Valve Stem Diameter (Service)	7.95 mm (Minimum)	0.313 in (Minimum)
• Valve Stem Oil Seal Installed Height (Measured from the Valve Spring Shim to Top Edge of Seal Body - First Design Seal)	18.1-19.1 mm	0.712-0.752 in

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accelerator Control Cable Bracket Bolt	10 N·m	89 lb in
Accessory Drive Belt Tensioner Bolt	50 N·m	37 lb ft
Air Conditioning (A/C) Belt Tensioner Bolt	50 N·m	37 lb ft
Automatic Transmission Oil Level Indicator Tube Nut	18 N·m	13 lb ft
Battery Cable Channel Bolt	12 N·m	106 lb in
Camshaft Retainer Bolt	25 N·m	18 lb ft
Camshaft Sensor Bolt	25 N·m	18 lb ft
Camshaft Sprocket Bolt	35 N·m	26 lb ft
Clutch Pressure Plate Bolt	70 N·m	52 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 Oil Deflector Nut	25 N·m	18 lb ft
Crossbar Bolt	100 N·m	74 lb ft
Cylinder Head Bolt (First Pass all M11 Bolts in Sequence)	30 N·m	22 lb ft
Cylinder Head Bolt (Second Pass all M11 Bolts in Sequence)	90 degrees	

Cylinder Head Bolt (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 Bolt (Final Pass M11 Medium Length Bolts at the Front and Rear of Each Cylinder Head in Sequence)	50 degrees	
Cylinder Head Bolt (M8 Inner Bolts in Sequence)	30 N·m	22 lb ft
Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Engine Flywheel Bolt (First Pass)	20 N·m	15 lb ft
Engine Flywheel Bolt (Second Pass)	50 N·m	37 lb ft
Engine Flywheel Bolt (Final Pass)	100 N·m	74 lb ft
Engine Front Cover Bolt	25 N·m	18 lb ft
Engine Mount Bolt	50 N·m	37 lb ft
Engine Mount Bracket Bolt	75 N·m	55 lb ft
Engine Mount-to-Engine Mount Bracket Bolt	50 N·m	37 lb ft
Engine Rear Cover Bolt	25 N·m	18 lb ft
Engine Service Lift Bracket (M10 Bolt)	50 N·m	37 lb ft
Engine Service Lift Bracket (M8 Bolt)	25 N·m	18 lb ft
Engine Shield Bolt	20 N·m	15 lb ft
Engine Sight Shield Bolt (4.8 L, 5.3 L, and 6.0 L without RPO's Y91 and Z88)	10 N·m	89 lb in
Engine Sight Shield Bolt (6.0 L with RPO's Y91 and Z88)	9 N·m	80 lb in
Engine Sight Shield Retainer Bolt	5 N·m	44 lb in
Engine Wiring Harness Bracket Nut	5 N·m	44 lb in
Engine Valley Cover Bolt	25 N·m	18 lb ft
EGR Valve Pipe-to-Cylinder Head Bolt	50 N·m	37 lb ft
EGR Valve Pipe-to-Exhaust Manifold Bolt	30 N·m	22 lb ft
EGR Valve Pipe-to-Intake Manifold Bolt	10 N·m	89 lb in
Evaporative Emission (EVAP) Purge Solenoid Bolt	10 N·m	89 lb in
Fuel Rail Cover Bolt	9 N·m	80 lb in
Generator Bracket Bolt	50 N·m	37 lb ft
Generator Output Terminal Nut	9 N·m	80 lb in
Harness Ground Bolt	25 N·m	18 lb ft
Harness Ground Bolt (ar Rear of Block)	16 N·m	12 lb ft
Hood Hinge Bolt	25 N·m	18 lb ft
Ignition Coil Bracket Stud	12 N·m	106 lb in
Intake Manifold Bolt (First Pass in Sequence)	5 N·m	44 lb in
Intake Manifold Bolt (Final Pass in Sequence)	10 N·m	89 lb in
Knock Sensor	20 N·m	15 lb ft
Oil Filter	30 N·m	22 lb ft
Oil Level Indicator Tube Bolt	25 N·m	18 lb ft
Oil Level Sensor	13 N·m	115 lb in
Oil Pan Drain Plug	25 N·m	18 lb ft
Oil Pan Bolt	25 N·m	18 lb ft
Oil Pan (to Front Cover)	25 N·m	18 lb ft
Oil Pan (to Rear Cover)	12 N·m	106 lb in
Oil Pan Skid Plate Bolt	20 N·m	15 lb ft
Oil Pump Bolt	25 N·m	18 lb ft
Oil Pump Screen Nut	25 N·m	18 lb ft
Oil Pump Screen Bolt	12 N·m	106 lb in
Positive Battery Cable Clip Bolt	9 N·m	80 lb in
Power Steering Pump Rear Bolt	50 N·m	37 lb ft
Secondary Air Injection (AIR) Pipe Bolt	25 N·m	18 lb ft
Spark Plug	15 N·m	11 lb ft

Transmission Bolt/Stud	50 N·m	37 lb ft
Transmission Cover Bolt	12 N·m	106 lb in
Valve Lifter Guide Bolt	12 N·m	106 lb in
Valve Rocker Arm Bolt	30 N·m	22 lb ft
Valve Rocker Arm Cover Bolt	12 N·m	106 lb in

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 1 belt or 2 belts. The drive belt is thin so that it can bend backwards and has several ribs to match the grooves in the pulleys. There also may be a V-belt style belt used to drive certain accessory drive components. The drive belts are made of different types of rubbers -- chloroprene or EPDM -- and have different layers or plys containing either fiber cloth or cords for reinforcement.

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

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

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

Engine Mechanical – 8.1L**General Specifications**

Application	Specification	
	Metric	English
General Data		
• Engine Type	V8	
• Regular Production Option (RPO)	L18	
• Displacement	8.1 Liter	496 CID
• Bore	107.950 mm	4.250 in
• Stroke	111.00 mm	4.370 in
• Compression Ratio	9.1:1	
• Firing Order	1-8-7-2-6-5-4-3	
Lubrication System		
Oil Filter Type	PF454	
Oil Type	5W-30	
Oil Capacity		
• With Filter Change	6.1 Liters	6.5 Quarts
• Without Filter Change	5.7 Liters	6.0 Quarts
Oil Pressure - Hot		
• Minimum	34 kPa @ 1,000 RPM	5 psi @ 1,000 RPM
• Minimum	69 kPa @ 2,000 RPM	10 psi @ 2,000 RPM

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accessory Drive Belt Tensioner Bolt	50 N·m	37 lb ft
Air Cleaner Outlet Duct Clamp	4 N·m	35 lb in
Air Conditioning (A/C) Belt Tensioner Bolt	50 N·m	37 lb ft
Battery Cable Channel Bolt	9 N·m	80 lb in
Camshaft Position (CMP) Sensor Bolt	12 N·m	106 lb in
Camshaft Retainer Bolt	12 N·m	106 lb in
Camshaft Sprocket Bolt		
• First Pass	30 N·m	22 lb ft
• Final Pass	30 N·m	22 lb ft
Crankshaft Balancer Bolt	255 N·m	189 lb ft
Crankshaft Oil Deflector Nut	50 N·m	37 lb ft
Crossbar Bolt	100 N·m	74 lb ft
Cylinder Head Bolt		
• First Pass	30 N·m	22 lb ft
• Second Pass	30 N·m + additional 120 degrees	22 lb ft + additional 120 degrees
• Final Pass		
• Bolts 1, 2, 3, 6, 7, 8, 9, 10, 11, 14, 16, and 17	+ additional 60 degrees	
• Bolts 15 and 18	+ additional 45 degrees	
• Bolts 4, 5, 12, and 13	+ additional 30 degrees	
Drive Belt Idler Pulley Bolt	50 N·m	37 lb ft
Engine Coolant Temperature (ECT) Sensor Bracket Bolt	50 N·m	37 lb ft
Engine Coolant Temperature (ECT) Sensor	20 N·m	15 lb ft

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Engine Front Cover Bolt		
• First Pass	6 N·m	53 lb in
• Final Pass	12 N·m	106 lb in
Engine Harness Bolt	5 N·m	44 lb in
Engine Harness Ground Bolt	16 N·m	12 lb ft
Engine Harness Stud	10 N·m	89 lb in
Engine Mount Bracket Through Bolt	75 N·m	55 lb ft
Engine Mount-to-Engine Bolt	50 N·m	37 lb ft
Engine Mount-to-Engine Mount Bracket Bolt	65 N·m	48 lb ft
Engine Shield Bolt	20 N·m	15 lb ft
Engine Wiring Harness Bolt	16 N·m	12 lb ft
Exhaust Gas Recirculation (EGR) Pipe Bolt	30 N·m	22 lb ft
Fuel Rail Stud	12 N·m	106 lb in
Flywheel Bolt		
• First Pass	80 N·m	59 lb ft
• Final Pass	100 N·m	74 lb ft
Heater Hose Bracket Bolt	50 N·m	37 lb ft
Hood Hinge Bolt	25 N·m	18 lb ft
Ignition Coil Harness Bolt	12 N·m	106 lb in
Intake Manifold Bolt		
• First Pass	5 N·m	44 lb in
• Second Pass	5 N·m	44 lb in
• Third Pass	10 N·m	89 lb in
• Final Pass	12 N·m	106 lb in
Intake Manifold Sight Shield Bolt	10 N·m	89 lb in
Intake Manifold Sight Shield Bracket Nut	5 N·m	44 lb in
J 42847 Flywheel Holding Tool Bolt	50 N·m	37 lb ft
Lift Bracket Bolt	40 N·m	30 lb ft
Oil Filter Fitting	66 N·m	49 lb ft
Oil Level Indicator Tube Nut	18 N·m	13 lb ft
Oil Level Sensor	20 N·m	15 lb ft
Oil Pan Bolt		
• First Pass	10 N·m	89 lb in
• Final Pass	25 N·m	18 lb ft
Oil Pan Drain Plug	28 N·m	21 lb ft
Oil Pan Skid Plate Bolt	20 N·m	15 lb ft
Oil Pump Bolt	75 N·m	56 lb ft
Oil Pump Drive Bolt	25 N·m	18 lb ft
Power Steering Pump Bracket Bolt/Nut	50 N·m	37 lb ft
Secondary Air Injection (AIR) Pipe Bolt	25 N·m	18 lb ft
Secondary Air Injection Pump Pipe Bolt	50 N·m	37 lb ft
Secondary Air Injection Pipe Nut	12 N·m	106 lb in
Valve Lifter Guide Retainer Bolt	25 N·m	18 lb ft
Valve Rocker Arm Cover Bolt		
• First Pass	6 N·m	53 lb in
• Final Pass	12 N·m	106 lb in
Valve Rocker Arm Nut	25 N·m	18 lb ft
Valve Rocker Arm Stud	50 N·m	37 lb ft

Drive Belt System Description

See Drive Belt System Description above.

Engine Cooling

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Cleaner Outlet Duct Clamp Screw - 4.8L, 5.3L, and 6.0L Engines	7 N·m	62 lb in
Coolant Air Bleed Pipe Stud/Bolt - 4.8L, 5.3L, and 6.0L Engines	12 N·m	106 lb in
Coolant Crossover Bolt - 8.1L Engine	50 N·m	37 lb ft
Coolant Heater Cord Bolt	8 N·m	71 lb in
Coolant Heater	50 N·m	37 lb ft
Engine Block Coolant Drain Plug	60 N·m	44 lb ft
Fan Clutch Bolt	23 N·m	17 lb ft
Fan Clutch Nut	56 N·m	41 lb ft
Fan Shroud Bolt	9 N·m	80 lb in
Oil Cooler Hose Adapter Bolt - 6.0L Engine	12 N·m	106 lb in
Oil Cooler Hose Bracket Bolt - 6.0L Engine	25 N·m	18 lb ft
Radiator Bolt	25 N·m	18 lb ft
Surge Tank Bolt/Nut	9 N·m	80 lb in
Thermostat Housing Bolt		
• 4.8L, 5.3L, and 6.0L Engines	15 N·m	11 lb ft
• 8.1L Engine	37 N·m	27 lb ft
Transmission Control Module (TCM) Cover Bolt	9 N·m	80 lb in
Transmission Control Module (TCM) Electrical Connector Bolt	8 N·m	71 lb in
Water Outlet Bolt - 8.1L Engine	30 N·m	22 lb ft
Water Pump Bolt - 4.8L, 5.3L, and 6.0L Engines		
• First Pass	15 N·m	11 lb ft
• Final Pass	30 N·m	22 lb ft
Water Pump Bolt - 8.1L Engine	50 N·m	37 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. Its purpose is to help regulate the operating temperature of the engine. It utilizes a temperature sensitive wax-pellet element. The element connects to a valve through a small piston. When the element is heated, it expands and exerts pressure against the small piston. This pressure forces the valve to open. As the element is cooled, it contracts. This contraction allows a spring to push the valve closed.

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

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 Battery Cable Clip Bolt	10 N·m	89 lb in
Auxiliary Battery Positive Cable Nut	9 N·m	80 lb in
Auxiliary Battery Relay Nut	9 N·m	80 lb in
Auxiliary Negative Battery Cable Bolt	17 N·m	13 lb ft
Auxiliary Positive Battery Cable Bolt	17 N·m	13 lb ft
Auxiliary Positive Battery Cable Nut	8 N·m	71 lb in
Battery Cable Bracket Bolt	25 N·m	18 lb ft
Battery Cable Channel Bolt	12 N·m	106 lb in
Battery Hold Down Retainer Bolt	25 N·m	18 lb ft
Battery Positive Cable Nut - 8.1L Engine	10 N·m	89 lb in
Battery Terminal Nut - 8.1L Engine	8 N·m	71 lb in
Battery Tray Bolt	9 N·m	80 lb in
Battery Tray Nut	25 N·m	18 lb ft
Engine Wiring Harness Auxiliary Negative Battery Cable Bolt	16 N·m	12 lb ft
Engine Wiring Harness Ground Bolt	16 N·m	12 lb ft
Engine Wiring Harness Ground/Negative Cable Bolt	25 N·m	18 lb ft
Front Axle Mounting Bracket Nut	95 N·m	70 lb ft
Forward Lamp Wiring Harness Ground/Negative Cable Bolt	9 N·m	80 lb in
Front End Diagonal Brace Bolt	9 N·m	80 lb in
Generator Bracket Bolt - 4.8L, 5.3L, and 6.0L Engines	50 N·m	37 lb ft
Generator Bolt	50 N·m	37 lb ft
Generator Cable Nut	9 N·m	80 lb in
Ground Strap Nut	9 N·m	80 lb in
Negative Battery Cable Bolt	17 N·m	13 lb ft
Positive Battery Cable Bolt	17 N·m	13 lb ft
Positive Cable Clip Nut - 8.1L Engine	8 N·m	71 lb in)
Positive Cable Nut	9 N·m	80 lb in
Positive Cable at Underhood Bussed Electrical Center (UBEC) Bolt	9 N·m	80 lb in
Starter Bolt	50 N·m	37 lb ft
Starter Heat Shield Bolt - 8.1L Engine	3 N·m	35 lb in
Starter Heat Shield Nut - 8.1L Engine	5 N·m	44 lb in
Starter Lead Nut	3.4 N·m	30 lb in
Surge Tank Bolt/Nut	9 N·m	80 lb in
Transmission Cover Bolt	9 N·m	80 lb in

Battery Usage

Base	
GM Part Number	19001810
Cold Cranking Amperage (CCA)	600 A
Reserve Capacity Rating	115 Minutes
Replacement Battery Number	78-6YR
Optional (Dual)	
GM Part Number	19001814
Cold Cranking Amperage (CCA)	770 A
Reserve Capacity Rating	115 Minutes
Replacement Battery Number	78-7YR

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

Applications	Starter Model
5.3L (LM7)	PG-260F2
8.1L (L18)	PG-260M

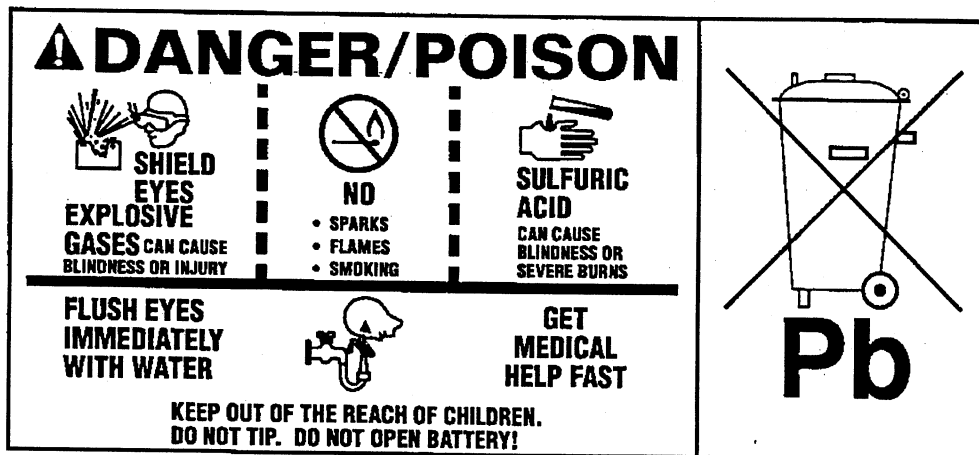
Generator Usage

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

Battery Description and Operation**Caution**

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

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



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

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

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

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

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

CATALOG NO.

1819

CCA 770	LOAD TEST 380
REPLACEMENT MODEL 100 - 6YR	

A battery has 2 ratings:

- Reserve capacity
- Cold cranking amperage

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

Reserve Capacity

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

Cold Cranking Amperage

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

Circuit Description

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

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

Starting System Description and Operation

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

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

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

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

Charging System Description and Operation

Generator

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

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

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

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

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

Regulator

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

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

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

Auxiliary Battery Charging

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

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

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

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

Engine Controls

Fuel System Specifications

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

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

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

Notice

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

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

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

Engine Controls –5.3L**Ignition System Specifications**

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

Fastener Tightening Specifications

Application	Specifications	
	Metric	English
Accelerator Control Cable Bracket Bolts	10 N·m	89 lb in
Accelerator Pedal Mounting Bolts	20 N·m	15 lb ft
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	20 N·m	15 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
Engine Wiring Harness Retaining Nut	5.5 N·m	49 lb in
EVAP Canister Bracket Bolt	25 N·m	18 lb ft
EVAP Canister Mounting Bolt	25 N·m	18 lb ft
EVAP Canister Mounting Nuts	10 N·m	89 lb in
EVAP Canister Purge Valve Shoulder Bolt	10.5 N·m	93 lb in
EVAP Canister Vent Valve Bracket Mount Bolt	12 N·m	106 lb in
Fuel Fill Hose Clamp	2.5 N·m	22 lb in
Fuel Fill Pipe Bracket Bolt	12 N·m	106 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 Fill Vent Hose Clamps	2.5 N·m	22 lb in
Fuel Filler Bracket Bolt	12 N·m	106 lb in
Fuel Filter Fitting	25 N·m	18 lb ft
Fuel Rail Attaching Bolts	10 N·m	89 lb in
Fuel Rail Crossover Pipe Retainer Clip Attaching Screw	3.8 N·m	34 lb in
Fuel Return Pipe Attaching Screw	5 N·m	44 lb in
Fuel Tank Shield-to-Frame Bolts	18 N·m	13 lb ft
Fuel Tank Strap Bolts	40 N·m	30 lb ft
Heated Oxygen Sensor (HO2S)	42 N·m	31 lb ft
Idle Air Control (IAC) Valve Attaching Screws	3 N·m	27 lb in
Ignition Coil Mounting Bolts	8 N·m	71 lb in
Intake Manifold Sight Shield Fasteners	10 N·m	89 lb in
Knock Sensor (KS)	20 N·m	15 lb ft
Powertrain Control Module (PCM) Connector End Bolts	8 N·m	71 lb in
Throttle Body Attaching Bolts and Nuts	10 N·m	89 lb in
Throttle Position (TP) Sensor Attaching Screws	2 N·m	18 lb in
Upper Engine Wiring Harness Nut	5.5 N·m	49 lb in

Engine Controls – 8.1L**Ignition System Specifications**

Application	Specification	
	Metric	English
Firing Order	1-8-7-2-6-5-4-3	
Spark Plug Wire Resistance	1,000 ohms per ft	
Spark Plug Torque	20 N·m	15 lb ft
Spark Plug Gap	1.52 mm	0.060 in
Spark Plug Type	TJ14R-P15 Denso plug type	

Fastener Tightening Specifications

Application	Specifications	
	Metric	English
Accelerator Control Assembly to Floor Fasteners	20 N·m	15 lb ft
Camshaft Position (CMP) Sensor Bolt	12 N·m	106 lb in
Crankshaft Position (CKP) Sensor Bolt	12 N·m	106 lb in
Engine Coolant Temperature (ECT) Sensor	20 N·m	15 lb ft
Engine Sight Shield Bolts	10 N·m	89 lb in
Engine Sight Shield Bracket Bolts	10 N·m	89 lb in
Exhaust Gas Recirculation (EGR) Valve Bolts (First Pass)	10 N·m	89 lb in
Exhaust Gas Recirculation (EGR) Valve Bolts (Final Pass)	25 N·m	18 lb ft
Exhaust Gas Recirculation (EGR) Valve Bracket Nuts	22 N·m	16 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe-to-Cylinder Head Bolts	50 N·m	37 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe-to-Exhaust Manifold Nuts	30 N·m	22 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe-to-Intake Manifold	12 N·m	106 lb in
Evaporative Emission (EVAP) Canister Purge Valve Shoulder Bolt	10 N·m	89 lb in
Evaporative Emission (EVAP) Canister Vent Bracket Retaining Bolt	12 N·m	106 lb in
Evaporative Emission (EVAP) Canister Vent Valve bracket mount bolt	12 N·m	106 lb in
Evaporative Emission (EVAP) Canister Vent Valve Retaining Bolt	10 N·m	89 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 Bracket Bolt	12 N·m	106 lb in
Fuel Filter Fitting	25 N·m	18 lb ft
Fuel Injection Sight Shield Retaining Bolt	10 N·m	89 lb in
Fuel Rail Attaching Bolts	12 N·m	106 lb in
Fuel Tank Shield to Flame Bolt	18 N·m	13 lb ft
Fuel Tank Strap Bolts	40 N·m	30 lb ft
Fuel Tank Vent Hose Clamp	2.5 N·m	22 lb in
Heated Oxygen Sensor (HO2S)	41 N·m	30 lb ft
Ignition Coil Attaching Bolts	10 N·m	89 lb in
Intake Manifold Sight Shield Bolt	12 N·m	106 lb in
Knock Sensor (KS)	19 N·m	14 lb ft
Manifold Pipe Fastener to Exhaust Manifold	25 N·m	18 lb ft
Manifold Absolute Pressure (MAP) Sensor Retaining Bolt	12 N·m	106 lb in
Manifold Pipe Fastener to Fuel Rail Stud	12 N·m	106 lb in
Powertrain Control Module (PCM) Connector End Bolts	8 N·m	71 lb in
Spark Plug Existing Iron Head	20 N·m	15 lb ft
Spark Plug New Iron Head	30 N·m	22 lb ft
Throttle Body Attaching Bolts	10 N·m	89 lb in
Upper Engine Wire Harness Retainer Stud	10 N·m	89 lb in

Exhaust System

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Engine Shield Bolt	20 N·m	15 lb ft
Exhaust Gas Recirculation (EGR) Pipe Bolt (8.1L Engine)	30 N·m	22 lb ft
Exhaust Gas Recirculation (EGR) Pipe Bracket Bolt (8.1L Engine)	50 N·m	37 lb ft
Exhaust Gas Recirculation (EGR) Pipe Nut (8.1L Engine)	30 N·m	22 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe to Cylinder Head Bolt	50 N·m	37 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe to Exhaust Manifold Bolt	30 N·m	22 lb ft
Exhaust Gas Recirculation (EGR) Valve Pipe to Intake Manifold Bolt	10 N·m	89 lb in
Exhaust Heat Shield Bolt	9 N·m	80 lb in
Exhaust Heat Shield Nut (Body Panel)	9 N·m	80 lb in
Exhaust Manifold Bolts (First Pass in Sequence) (4.3L, 4.8L, 5.3L, and 6.0L Engines)	15 N·m	11 lb ft
Exhaust Manifold Bolts (Final Pass in Sequence) (4.3L Engine)	30 N·m	22 lb ft
Exhaust Manifold Bolts (Final Pass in Sequence) (4.8L, 5.3L, and 6.0L Engines)	25 N·m	18 lb ft
Exhaust Manifold Bolt (8.1L Engine)	35 N·m	26 lb ft
Exhaust Manifold Heat Shield Bolt (4.8L, 5.3L, and 6.0L Engines)	9 N·m	80 lb in
Exhaust Manifold Heat Shield Bolt/Nut (8.1L Engine)	25 N·m	18 lb ft
Exhaust Manifold Nut (8.1L Engine)	16 N·m	12 lb ft
Exhaust Manifold Pipe Nut	50 N·m	37 lb ft
Exhaust Muffler Clamp Bolt	30 N·m	22 lb ft
Exhaust Muffler Hanger Nut	50 N·m	39 lb ft
Exhaust Muffler Nut	40 N·m	30 lb ft
Exhaust Pipe Clamp	40 N·m	30 lb ft
Exhaust Pipe Hanger Bracket Bolt	12 N·m	106 lb in
Hood Hinge Bolts	25 N·m	18 lb ft
Oxygen Sensor	42 N·m	31 lb ft
Rear Shock Absorber Lower Bolt	95 N·m	70 lb ft
Secondary Air Injection (AIR) Check Valve Pipe (Crossover) Bolt	50 N·m	37 lb ft
Secondary Air Injection (AIR) Check Valve Pipe Nut	25 N·m	18 lb ft
Secondary Air Injection (AIR) Pipe Bolt (8.1L Engine)	25 N·m	18 lb ft
Secondary Air Injection (AIR) Pipe Nut (8.1L Engine)	12 N·m	106 lb in
Secondary Air Injection (AIR) Pump Pipe Bolt (8.1L Engine)	25 N·m	18 lb ft
Transmission Bolt	100 N·m	74 lb ft
Transmission Mount Nut	40 N·m	30 lb ft
Transmission Support Crossmember Bolt	70 N·m	52 lb ft

Exhaust System Description

Important

Use of non-OEM parts may cause driveability concerns.

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

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

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

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

Resonator

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

Catalytic Converter

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

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

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

The catalyst in the converter is not serviceable.

Muffler

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

Transmission/Transaxle Description and Operation

Automatic Transmission – 4L60E

Transmission General Specifications

Name	Hydra-matic 4L60-E
RPO Codes	M30, M32
Production Location	Toledo, Ohio Romulus, MI Ramos Arizpe, Mexico
Vehicle Platform (Engine/Transmission) Usage	C/K 800
Transmission Drive	Longitudinally-Mounted Rear Wheel Drive
1st Gear Ratio	3.059:1
2nd Gear Ratio	1.625:1
3rd Gear Ratio	1.000:1
4th Gear Ratio	0.696:1
Reverse	2.294:1
Torque Converter Size (Diameter of Torque Converter Turbine)	300 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	DEXRON® III
Transmission Fluid Capacity (Approximate)	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)	300 mm Converter 86.17 kg (190.5 lb)
Transmission Weight Wet (Approximate)	300 mm Converter 98.4 kg (218.0 lb)
Maximum Trailer Towing Capacity	6 130 kg (13,500 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 consists of the following components:

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

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

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).

Abbreviations and Meanings

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

BHP	Brake Horsepower
BLK	Black
BLU	Blue
BP	Back Pressure
BPCM	Battery Pack Control Module
BPMV	Brake Pressure Modulator Valve
BPP	Brake Pedal Position
BRN	Brown
BTDC	Before Top Dead Center
BTM	Battery Thermal Module
BTSI	Brake Transmission Shift Interlock
Btu	British Thermal Units
C	
°C	Degrees Celsius
CAC	Charge Air Cooler
CAFE	Corporate Average Fuel Economy
Cal	Calibration
Cam	Camshaft
CARB	California Air Resources Board
CC	Coast Clutch
cm ³	Cubic Centimeters
CCM	Convenience Charge Module, Chassis Control Module
CCOT	Cycling Clutch Orifice Tube
CCP	Climate Control Panel
CD	Compact Disc
CE	Commutator End
CEAB	Cold Engine Air Bleed
CEMF	Counter Electromotive Force
CEX	Cabin Exchanger
cfm	Cubic Feet per Minute
cg	Center of Gravity
CID	Cubic Inch Displacement
CKP	Crankshaft Position
CKT	Circuit
C/Ltr	Cigar Lighter
CL	Closed Loop
CLS	Coolant Level Switch
CMC	Compressor Motor Controller
CMP	Camshaft Position
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide

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

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

F	
°F	Degrees Fahrenheit
FC	Fan Control
FDC	Fuel Data Center
FED	Federal All United States except California
FEDS	Fuel Enable Data Stream
FEX	Front Exchanger
FF	Flexible Fuel
FFH	Fuel-Fired Heater
FI	Fuel Injection
FMVSS	Federal U.S. Motor Vehicle Safety Standards
FP	Fuel Pump
ft	Foot/Feet
FT	Fuel Trim
F4WD	Full Time Four-Wheel Drive
4WAL	Four-Wheel Antilock
4WD	Four-Wheel Drive
FW	Flat Wire
FWD	Front Wheel Drive, Forward
G	
g	Grams, Gravitational Acceleration
GA	Gage, Gauge
gal	Gallon
gas	Gasoline
GCW	Gross Combination Weight
Gen	Generator
GL	Gear Lubricant
GM	General Motors
GM SPO	General Motors Service Parts Operations
gnd	Ground
gpm	Gallons per Minute
GRN	Green
GRY	Gray
GVWR	Gross Vehicle Weight Rating
H	
H	Hydrogen
H ₂ O	Water
Harn	Harness
HC	Hydrocarbons
H/CMPR	High Compression

HD	Heavy Duty
HDC	Heavy Duty Cooling
hex	Hexagon, Hexadecimal
Hg	Mercury
Hi Alt	High Altitude
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	
O ₂	Oxygen
O ₂ S	Oxygen Sensor
OBD	On-Board Diagnostics
OBD II	On-Board Diagnostics Second Generation
OC	Oxidation Converter Catalytic
OCS	Opportunity Charge Station
OD	Outside Diameter
ODM	Output Drive Module
ODO	Odometer
OE	Original Equipment
OEM	Original Equipment Manufacturer
OHC	Overhead Camshaft

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

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

SI	System International Modern Version of Metric System
SIAB	Side Impact Air Bag
SIR	Supplemental Inflatable Restraint
SLA	Short/Long Arm Suspension
sol	Solenoid
SO ₂	Sulfur Dioxide
SP	Splice Pack
S/P	Series/Parallel
SPO	Service Parts Operations
SPS	Service Programming System, Speed Signal
sq ft, ft ²	Square Foot/Feet
sq in, in ²	Square Inch/Inches
SRC	Service Ride Control
SRI	Service Reminder Indicator
SRS	Supplemental Restraint System
SS	Shift Solenoid
ST	Scan Tool
STID	Station Identification Station ID
S4WD	Selectable Four-Wheel Drive
Sw	Switch
SWPS	Steering Wheel Position Sensor
syn	Synchronizer
T	
TAC	Throttle Actuator Control
Tach	Tachometer
TAP	Transmission Adaptive Pressure, Throttle Adaptive Pressure
TBI	Throttle Body Fuel Injection
TC	Turbocharger, Transmission Control
TCC	Torque Converter Clutch
TCS	Traction Control System
TDC	Top Dead Center
TEMP	Temperature
Term	Terminal
TFP	Transmission Fluid Pressure
TFT	Transmission Fluid Temperature
THM	Turbo Hydro-Matic
TIM	Tire Inflation Monitoring, Tire Inflation Module
TOC	Transmission Oil Cooler
TP	Throttle Position
TPA	Terminal Positive Assurance
TPM	Tire Pressure Monitoring, Tire Pressure Monitor
TR	Transmission Range

TRANS	Transmission/Transaxle
TT	Tell Tail Warning Lamp
TV	Throttle Valve
TVRS	Television and Radio Suppression
TVV	Thermal Vacuum Valve
TWC	Three Way Converter Catalytic
TWC+OC	Three Way + Oxidation Converter Catalytic
TXV	Thermal Expansion Valve
U	
UART	Universal Asynchronous Receiver Transmitter
U/H	Underhood
U/HEC	Underhood Electrical Center
U-joint	Universal Joint
UTD	Universal Theft Deterrent
UV	Ultraviolet
V	
V	Volt(s), Voltage
V6	Six-Cylinder Engine, V-Type
V8	Eight-Cylinder Engine, V-Type
Vac	Vacuum
VAC	Vehicle Access Code
VATS	Vehicle Anti-Theft System
VCIM	Vehicle Communication Interface Mode
VCM	Vehicle Control Module
V dif	Voltage Difference
VDOT	Variable Displacement Orifice Tube
VDV	Vacuum Delay Valve
vel	Velocity
VES	Variable Effort Steering
VF	Vacuum Fluorescent
VIO	Violet
VIN	Vehicle Identification Number
VLR	Voltage Loop Reserve
VMV	Vacuum Modulator Valve
VR	Voltage Regulator
V ref	Voltage Reference
VSES	Vehicle Stability Enhancement System
VSS	Vehicle Speed Sensor

W	
w/	With
W/B	Wheel Base
WHL	Wheel
WHT	White
w/o	Without
WOT	Wide Open Throttle
W/P	Water Pump
W/S	Windshield
WSS	Wheel Speed Sensor
WU-OC	Warm Up Oxidation Converter Catalytic
WU-TWC	Warm Up Three-Way Converter Catalytic
X	
X-valve	Expansion Valve
Y	
yd	Yard(s)
YEL	Yellow

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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
ln/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

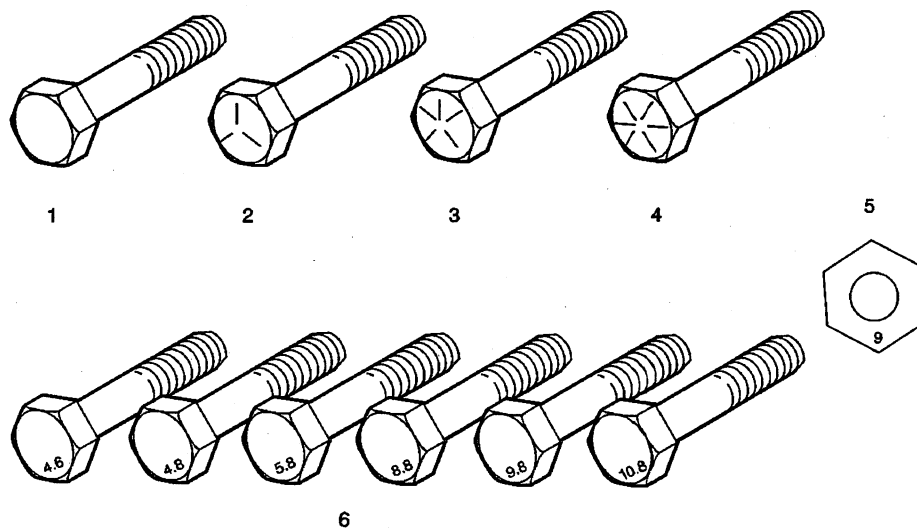
Metric Fasteners

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

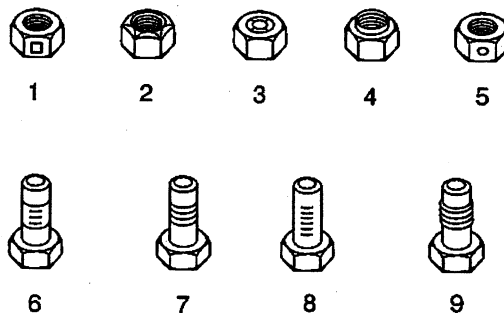
These fasteners accomplish the thread interface by a designed distortion or deformation in the fastener.

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