2019

Escalade

cadillac.com (U.S.)
cadillac.ca (Canada)

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Introduction

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This manual describes features that may or may not be on the vehicle because of optional equipment that was not purchased on the vehicle, model variants, country specifications, features/applications that may not be available in your region, or changes subsequent to the printing of this owner’s manual.

Refer to the purchase documentation relating to your specific vehicle to confirm the features.

Keep this manual in the vehicle for quick reference.

Canadian Vehicle Owners

A French language manual can be obtained from your dealer, at www.helminc.com, or from:

Propriétaires Canadiens

On peut obtenir un exemplaire de ce guide en français auprès du concessionnaire ou à l'adresse suivante:

Helm, Incorporated
Attention: Customer Service
47911 Halyard Drive
Plymouth, MI 48170
USA

Litho in U.S.A.
Part No. 84161699 A First Printing

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Using this Manual

To quickly locate information about the vehicle, use the Index in the back of the manual. It is an alphabetical list of what is in the manual and the page number where it can be found.

Danger, Warning, and Caution

Warning messages found on vehicle labels and in this manual describe hazards and what to do to avoid or reduce them.

⚠ Danger

Danger indicates a hazard with a high level of risk which will result in serious injury or death.

⚠ Warning

Warning indicates a hazard that could result in injury or death.

Caution

Caution indicates a hazard that could result in property or vehicle damage.

A circle with a slash through it is a safety symbol which means “Do Not,” “Do not do this,” or “Do not let this happen.”

Symbols

The vehicle has components and labels that use symbols instead of text. Symbols are shown along with the text describing the operation or information relating to a specific component, control, message, gauge, or indicator.

: Shown when the owner’s manual has additional instructions or information.

: Shown when the service manual has additional instructions or information.

: Shown when there is more information on another page — “see page.”

Vehicle Symbol Chart

Here are some additional symbols that may be found on the vehicle and what they mean. See the features in this manual for information.

: Air Conditioning System

: Air Conditioning Refrigerant Oil

: Airbag Readiness Light

: Antilock Brake System (ABS)

: Brake System Warning Light

: Dispose of Used Components Properly

: Engine Coolant Temperature

: Flame/Fire Prohibited

: Flammable

: Forward Collision Alert

: Fuses

: ISOFIX/LATCH System Child Restraints

: Lane Change Alert

: Lane Departure Warning

: Lane Keep Assist

: Malfunction Indicator Lamp

: Oil Pressure

: Park Assist

: Pedestrian Ahead Indicator

: Power

: Rear Cross Traffic Alert

: Registered Technician

: Remote Vehicle Start

: Seat Belt Reminders

: Side Blind Zone Alert

: Start/Stop

: Tire Pressure Monitor

: StabiliTrak/Electronic Stability Control (ESC)

: Under Pressure

: Vehicle Ahead Indicator

In Brief

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Instrument Panel

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2. *Head-Up Display (HUD)* ⇨ *151* (If Equipped).
3. Turn Signal Lever. See *Turn and Lane-Change Signals* ⇨ *171*.

   Windshield Wiper/Washer ⇨ *124*.

   Rear Window Wiper/Washer ⇨ *126*.
4. *Hazard Warning Flashers* ⇨ *171*.
5. *Instrument Cluster* ⇨ *134*.
6. Shift Lever. See *Automatic Transmission* ⇨ *210*.

   Tow/Haul Mode Selector Button. See *Tow/Haul Mode* ⇨ *214*.

   Range Selection Mode Buttons (If Equipped). See *Manual Mode* ⇨ *213*.
7. Magnetic Ride Control Button. See *Magnetic Ride Control* ⇨ *225*.

   Pedal Adjust Switch (If Equipped). See *Adjustable Throttle and Brake Pedal* ⇨ *202*.

   Traction Control/Electronic Stability Control ⇨ *222*.
8. Light Sensor. See *Automatic Headlamp System* ⇨ *170*.
9. *Infotainment* ⇨ *176*.
10. Glove Box Button. See *Glove Box* ⇨ *119*.

    Lane Keep Assist (LKA) ⇨ *251* (If Equipped).

    Park Assist Button. See *Assistance Systems for Parking or Backing* ⇨ *238*.
11. *Dual Automatic Climate Control System* ⇨ *177*.

    Instrument Panel Storage ⇨ *119*.
12. CD Player. See the infotainment manual.
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15. *Horn* ⇨ *124*.
16. *Steering Wheel Adjustment* ⇨ *124*.
17. Hood Release. See *Hood* ⇨ *280*.
18. *Cruise Control* ⇨ *226* (If Equipped).

    Adaptive Cruise Control ⇨ *229* (If Equipped).

    Forward Collision Alert (FCA) System ⇨ *244* (If Equipped).

    Heated Steering Wheel ⇨ *124* (If Equipped).

    Phone Button. See the infotainment manual.
19. Automatic Transfer Case Knob (If Equipped). See *Four-Wheel Drive* ⇨ *215*.
20. Data Link Connector (DLC) (Out of View). See *Malfunction Indicator Lamp (Check Engine Light)* ⇨ *140*.
21. *Electric Parking Brake* ⇨ *220* (If Equipped).
22. *Exterior Lamp Controls* ⇨ *167*.
23. *Instrument Panel Illumination Control* ⇨ *172*.

Initial Drive Information

This section provides a brief overview about some of the important features that may or may not be on your specific vehicle.

For more detailed information, refer to each of the features which can be found later in this owner's manual.

Remote Keyless Entry (RKE) System

The Remote Keyless Entry (RKE) transmitter is used to remotely lock and unlock the doors from up to 60 m (197 ft) away from the vehicle.

: Press to unlock the driver door. Press again within three seconds to unlock all remaining doors.

: Press to lock all doors.

Lock and unlock feedback can be personalized. See *Vehicle Personalization* ⇨ *155*.

: Press twice to open or close the liftgate. Press once to stop the liftgate from moving.

: Press twice to open the liftglass.

: Press and release to initiate vehicle locate. The turn signal lamps flash and the horn sound three times.

Press and hold for more than three seconds to sound the panic alarm.

Press again to cancel the panic alarm.

See *Keys* ⇨ *27* and *Remote Keyless Entry (RKE) System* ⇨ *28*.

Remote Vehicle Start

The engine can be started from outside of the vehicle.

Starting the Vehicle

1. Press and release on the RKE transmitter.
2. Immediately press and hold for at least four seconds or until the turn signal lamps flash.

Start the vehicle normally after entering.

When the vehicle starts, the parking lamps will turn on.

Remote start can be extended.

Canceling a Remote Start

To cancel a remote start, do one of the following:

- Press and hold until the parking lamps turn off.
- Turn on the hazard warning flashers.
- Turn the vehicle on and then off.

See *Remote Vehicle Start* ⇨ *35*.

Door Locks

To lock or unlock the doors from inside the vehicle:

- Press or on a power door lock switch.
- Push down the manual lock knob on the driver door to lock all doors. Push down the lock knob on a passenger door to lock that door only.
- Pull the door handle once to unlock that door. Pull the handle again to unlatch it.

To lock or unlock the doors from outside the vehicle press or on the RKE transmitter or use the key in the front doors. The key cylinder is covered by a cap. See *Door Locks* ⇨ *36*. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Power Door Locks

: Press to lock the doors.

: Press to unlock the doors.

See *Door Locks* ⇨ *36*.

Keyless Access

The RKE transmitter must be within 1 m (3 ft) of the liftgate or door being opened. Pressing the button on the driver door handle will unlock the driver door. If the handle button is pressed again within five seconds, the passenger doors and liftgate will unlock. See “Keyless Access Operation” in *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Liftgate

To open the liftgate, press on the power door lock switch or press on the Remote Keyless Entry (RKE) transmitter twice to unlock all doors. Press the touch pad (1) on the underside of the liftgate handle and lift up. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Use the pull cup to lower and close the liftgate. Do not press the touch pad while closing the liftgate. This will cause the liftgate to be unlatched.

To open the liftglass, press the button (2) above the license plate. Close the liftglass before opening the liftgate to avoid damaging it.

Power Liftgate Operation

If equipped with a power liftgate, the switch is on the overhead console. The vehicle must be in P (Park).

Choose the power liftgate mode by selecting MAX or 3/4. Press on the overhead console or on the RKE transmitter press twice quickly.

Press any liftgate button while the liftgate is moving to stop it. Pressing again reverses the direction.

To close, press on the bottom of the liftgate next to the latch.

To disable the power liftgate function, select OFF on the liftgate switch. See *Liftgate* ⇨ *40*.

Windows

Power windows work when the ignition is on, in ACC/ACCESSORY, or when Retained Accessory Power (RAP) is active. See *Retained Accessory Power (RAP)* ⇨ *207*.

Using the window switch, press to open or pull to close the window.

The windows may be temporarily disabled if they are used repeatedly within a short time.

Seat Adjustment

Uplevel Seat Adjustment

If equipped, the ignition must be on to use all uplevel seat features.

Uplevel Seat Control

1. Feature Select
2. Up
3. Rearward

4. Down
5. Forward

- Move Feature Select (1) to display seat adjustments on the infotainment display. Press and release or hold to scroll through features.
- Press Up (2) to make upward adjustments of the selected feature.
- Press Rearward (3) to make rearward adjustments of the selected feature.
- Press Down (4) to make downward adjustments of the selected feature.
- Press Forward (5) to make forward adjustments of the selected feature.

Base Seat Adjustment

To adjust the seat:

- Move the seat forward or rearward by sliding the control forward or rearward.
- Raise or lower the front part of the seat cushion by moving the front of the control up or down.
- Raise or lower the seat by moving the rear of the control up or down.

See *Power Seat Adjustment* ⇨ *62*.

Reclining Seatbacks

To adjust the seatback:

- Tilt the top of the control rearward to recline.
- Tilt the top of the control forward to raise.

See *Reclining Seatbacks* ⇨ *65*.

Memory Features

If equipped, memory seats allow two drivers to save and recall their unique seat positions for driving the vehicle, and a shared exit position for getting out of the vehicle. Other feature positions may also be saved, such as power mirrors and power steering wheel, if equipped. Memory positions are linked to RKE transmitter 1 or 2 for automatic memory recalls.

Before saving, adjust all available memory feature positions. Turn the ignition on and then press and release SET; a beep will sound. Then immediately press and hold 1, 2, or (Exit) until two beeps sound. To manually recall these positions, press and hold 1, 2, or until the saved position is reached.

When Auto Memory Recall is enabled in vehicle personalization, positions previously saved to memory buttons 1 and 2 are recalled when the ignition is changed from off to on or ACC/ ACCESSORY.

When Easy Exit Options is enabled in vehicle personalization, the feature automatically recalls the previously saved exit position when exiting the vehicle.

Memory adjustments may not be available upon delivery or after service until steps in “Saving Memory Positions” section are performed. See *Memory Seats* ⇨ *65*.

Second Row Seats

The second row seatbacks can be folded for additional cargo space, or the seats can be folded and tumbled for easy entry/exit to the third row seats. The seatbacks also recline.

See *Second Row Seats* ⇨ *71*.

Third Row Seats

Third row seatbacks can be folded. See *Third Row Seats* ⇨ *76*.

Heated and Cooled Front Seats

The buttons are near the climate controls on the center stack. To operate, the engine must be running.

Press or to heat the driver or passenger seatback only.

Press or to heat the driver or passenger seat cushion and seatback.

Press or to cool the driver or passenger seat.

See *Heated and Cooled Front Seats* ⇨ *69*.

Head Restraint Adjustment

Do not drive until the head restraints for all occupants are installed and adjusted properly.

To achieve a comfortable seating position, change the seatback recline angle as little as necessary while keeping the seat and the head restraint height in the proper position.

See *Head Restraints* ⇨ *61* and *Power Seat Adjustment* ⇨ *62*.

Seat Belts

Refer to the following sections for important information on how to use seat belts properly:

- *Seat Belts* ⇨ *78*
- *How to Wear Seat Belts Properly* ⇨ *79*
- *Lap-Shoulder Belt* ⇨ *81*
- *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106*

Passenger Sensing System

United States

Canada and Mexico

The passenger sensing system will turn off the front outboard passenger frontal airbag under certain conditions. No other airbag is affected by the passenger sensing system. See *Passenger Sensing System* ⇨ *93*

The passenger airbag status indicator will light on the overhead console when the vehicle is started. See *Passenger Airbag Status Indicator* ⇨ *139*.

Mirror Adjustment

Interior Mirror

Adjustment

Adjust the rearview mirror for a clear view of the area behind the vehicle.

Automatic Dimming Rearview Mirror

The mirror automatically dims to reduce the glare of headlamps from behind. The dimming feature comes on when the vehicle is started.

Rear Camera Mirror

If equipped, this automatic dimming rearview mirror provides a wide angle camera view of the area behind the vehicle. Adjust the mirror with the tab pushed forward so that the display is off. See *Rear Camera Mirror* ⇨ *54*.

Exterior Mirrors

Power Mirrors

To adjust the mirrors:

1. Press (1) or (2) to select the driver or passenger side mirror.
2. Press the arrows on the control pad to move each mirror in the desired direction.
3. Press either (1) or (2) again to deselect the mirror.

See *Power Mirrors* ⇨ *52*.

Power Folding Mirrors

1. Press to fold the mirrors inward.
2. Press again to return the mirrors to the driving position.

Heated Mirrors

Press REAR to heat the outside mirrors.

See “Rear Window Defogger” under *Dual Automatic Climate Control System* ⇨ *177*.

Steering Wheel Adjustment

To adjust the power tilt and telescoping steering wheel:

Press the control to move the steering wheel up and down or forward and rearward.

Do not adjust the steering wheel while driving.

Throttle and Brake Pedal Adjustment

If equipped, the position of the throttle and brake pedals can be changed.

Press the top of the switch to move the pedals closer to your body. Press the bottom of the switch to move the pedals away.

See *Adjustable Throttle and Brake Pedal* ⇨ *202*.

The vehicle may have a memory function, which lets pedal settings be saved and recalled. See *Memory Seats* ⇨ *65*.

Interior Lighting

Dome Lamps

There are dome lamps in the overhead console and the headliner, if equipped.

To change the dome lamp settings, press the following:

OFF : Turns the lamps off, even when a door is open.

DOOR : The lamps come on automatically when a door is opened.

ON : Turns all dome lamps on.

Reading Lamps

There are reading lamps in the overhead console and the headliner, if equipped. To operate, the ignition must be on or in ACC/ACCESSORY or using Retained Accessory Power (RAP).

Press or next to each reading lamp to turn it on or off.

For more information about interior lighting, see *Instrument Panel Illumination Control* ⇨ *172*.

Exterior Lighting

The exterior lamp control is on the instrument panel to the left of the steering wheel.

: Turns off the automatic headlamps and Daytime Running Lamps (DRL). Turning the headlamp control to again will turn the automatic headlamps and DRL back on.

For vehicles first sold in Canada, the off position only works when the vehicle is shifted into the P (Park) position.

AUTO : Automatically turns the exterior lamps on and off, depending on outside lighting.

: Turns on the parking lamps including all lamps, except the headlamps.

: Turns on the headlamps together with the parking lamps and instrument panel lights.

See:

- *Exterior Lamp Controls* ⇨ *167*
- *Daytime Running Lamps (DRL)* ⇨ *169*
- *Automatic Headlamp System* ⇨ *170*

Windshield Wiper/Washer

The windshield wiper control is on the turn signal lever.

The windshield wipers are controlled by turning the band with FRONT on it.

: Fast wipes.

: Slow wipes.

INT : Use this setting for intermittent wipes or Rainsense™. For intermittent wipes, turn the FRONT band up for more frequent wipes or down for less frequent wipes.

To turn on Rainsense, press AUTO on the lever, then turn the FRONT band on the wiper lever to adjust the sensitivity.

- Turn the band up to a higher INT setting for more sensitivity to moisture.
- Turn the band down to the lower INT setting for less sensitivity to moisture.

Move the band out of the INT position to deactivate Rainsense.

OFF : Turns the windshield wipers off.

: For a single wipe, turn the band down, then release. For several wipes, hold the band down.

: Push the paddle at the top of the lever to spray washer fluid on the windshield.

See *Windshield Wiper/Washer* ⇨ *124*.

Climate Controls

The climate control buttons and the touch screen are used to adjust the heating, cooling, and ventilation.

Center Stack Climate Controls

1. Driver and Passenger Temperature Controls
2. Fan Control
3. OFF (Fan)
4. Driver and Passenger Heated and Cooled Seats
5. Recirculation

6. Rear Window Defogger
7. Defrost
8. AUTO (Automatic Operation)

Climate Control Display

1. Outside Temperature Display
2. Driver and Passenger Temperature Controls
3. Fan Control
4. SYNC (Synchronized Temperature)
5. A/C Mode (Air Conditioning)
6. Climate Control Selection (Application Tray Button)
7. Rear (Rear Climate Control Touch Screen)
8. Air Delivery Mode Control

See *Dual Automatic Climate Control System* ⇨ *177* and *Rear Climate Control System* ⇨ *182* (If Equipped).

Transmission

Range Selection Mode

The Range Selection Mode switch, if equipped, is on the shift lever.

1. To enable the Range Selection feature, move the shift lever to the L (Manual Mode) position. The current range will appear next to the L. This is the highest attainable range with all lower gears accessible. As an example, when 5 (Fifth) gear is selected, 1 (First) through 5 (Fifth) gears are available.
2. Press the plus/minus buttons on the shift lever to select the desired range of gears for current driving conditions. See *Manual Mode* ⇨ *213*.

While using Range Selection Mode, cruise control and the Tow/Haul Mode can be used.

Grade Braking is not available when Range Selection Mode is active. See *Tow/Haul Mode* ⇨ *214*.

Four-Wheel Drive

If equipped with four-wheel drive, the engine's driving power can be sent to all four wheels for extra traction.

Automatic Transfer Case

This transfer case knob is to the left of the steering column.

The different drive options that may be available are the following:

2 ↑ (Two-Wheel Drive High) : This setting is used for driving in most street and highway situations.

AUTO (Automatic Four-Wheel Drive) : This setting is ideal for use when road surface traction conditions are variable.

Do not use AUTO mode to park on a steep grade with poor traction such as ice, snow, mud or gravel. In AUTO mode only the rear wheels will hold the vehicle from sliding when parked.

If parking on a steep grade, use 4 ↑ to keep all four wheels engaged.

4 ↑ (Four-Wheel Drive High) : Use this setting when extra traction is needed, such as on snowy or icy roads or in most off-road situations.

N (Neutral) : Shift to this setting only when towing the vehicle. See *Trailer Towing* ⇨ *261*.

4 ↓ (Four-Wheel Drive Low) : Choose 4 ↓ when driving in deep sand, mud, or snow, and while climbing or descending steep hills.

See *Four-Wheel Drive* ⇨ *215*.

Vehicle Features

Infotainment System

See the infotainment manual for information on the radio, audio players, phone, navigation system, Rear Seat Entertainment (RSE), and voice or speech recognition. It also includes information on settings.

Steering Wheel Controls

The infotainment system can be operated by using the steering wheel controls. See “Steering Wheel Controls” in the infotainment manual.

Cruise Control

: Press to turn the system on and off. A white indicator appears in the instrument cluster when cruise is turned on.

+RES : If there is a set speed in memory, press the control up briefly to resume that speed or press and hold to accelerate. If the cruise control is already active, use to increase vehicle speed.

SET– : Press the control down briefly to set the speed and activate cruise control. If the cruise control is already active, use to decrease vehicle speed.

: Press to disengage cruise control without erasing the set speed from memory.

See *Cruise Control* ⇨ *226* or *Adaptive Cruise Control* ⇨ *229* (if equipped).

Driver Information Center (DIC)

The DIC display is in the instrument cluster. It shows the status of many vehicle systems.

∧ or ∨ : Move SEL up or down to go to the previous or next selection.

< or > : Press to move between the interactive display zones in the cluster. Press < to go back to the previous menu.

SEL : Press to open a menu or select a menu item. Press and hold to reset values on certain screens.

See *Driver Information Center (DIC)* ⇨ *149*.

Forward Collision Alert (FCA) System

If equipped, FCA may help avoid or reduce the harm caused by front-end crashes. FCA provides a green indicator, , when a vehicle is detected ahead. This indicator displays amber if you follow a vehicle ahead too closely. When approaching a vehicle ahead too quickly, FCA provides a flashing red alert on the windshield and rapidly beeps or pulses the driver seat.

See *Forward Collision Alert (FCA) System* ⇨ *244*.

Forward Automatic Braking (FAB)

If the vehicle has Forward Collision Alert (FCA), it also has FAB, which includes Intelligent Brake Assist (IBA). When the system detects a vehicle ahead in your path that is traveling in the same direction that you may be about to crash into, it can provide a boost to braking or automatically brake the vehicle. This can help avoid or lessen the severity of crashes when driving in a forward gear.

See *Forward Automatic Braking (FAB)* ⇨ *247*.

Lane Keep Assist (LKA)

If equipped, LKA may help avoid crashes due to unintentional lane departures. It may assist by gently turning the steering wheel if the vehicle approaches a detected lane marking without using a turn signal in that direction. It may also provide a Lane Departure Warning (LDW) alert as the lane marking is crossed. The system will not assist or alert if it detects that you are actively steering. Override LKA by turning the steering wheel. LKA uses a camera to detect lane markings between 60 km/h (37 mph) and 180 km/h (112 mph).

See *Lane Departure Warning (LDW)* ⇨ *250* and *Lane Keep Assist (LKA)* ⇨ *251*.

Lane Change Alert (LCA)

If equipped, the LCA system is a lane-changing aid that assists drivers with avoiding lane change crashes that occur with moving vehicles in the side blind zone (or spot) areas or with vehicles rapidly approaching these areas from behind. The LCA warning display will light up in the corresponding outside mirror and will flash if the turn signal is on. The Side Blind Zone Alert (SBZA) system is included as part of the LCA system.

See *Side Blind Zone Alert (SBZA)* ⇨ *248* and *Lane Change Alert (LCA)* ⇨ *248*.

Surround Vision

If equipped, views around the vehicle appear in the infotainment display to aid with parking and low-speed maneuvers.

See “Surround Vision” under *Assistance Systems for Parking or Backing* ⇨ *238*.

Front Vision Camera

If equipped, a view of the area in front of the vehicle appears on the infotainment display to aid with parking and low-speed maneuvers.

See “Front Vision Camera” under *Assistance Systems for Parking or Backing* ⇨ *238*.

Rear Vision Camera (RVC)

If equipped, RVC shows a view of the area behind the vehicle on the infotainment display when the vehicle is shifted into R (Reverse) to aid with parking and low-speed backing maneuvers.

See *Assistance Systems for Parking or Backing* ⇨ *238*.

Rear Cross Traffic Alert (RCTA) System

If equipped, the RCTA system shows a triangle with an arrow on the infotainment display to warn of traffic behind your vehicle that may cross your vehicle's path while in R (Reverse). In addition, beeps will sound, or the driver seat will pulse.

See *Assistance Systems for Parking or Backing* ⇨ *238*.

Park Assist

If equipped, Front and Rear Park Assist (FRPA) uses sensors on the front and rear bumpers to assist with parking and avoiding objects during low speed parking maneuvers.
It operates at speeds less than 8 km/h (5 mph). FRPA may display a warning triangle on the infotainment display and a graphic on the instrument cluster to provide the object distance. In addition, multiple beeps or seat pulses may occur if very close to an object.

The vehicle may also have a higher speed Backing Warning System and the Reverse Automatic Braking system.

See *Driver Assistance Systems* ⇨ *237*.

Automatic Parking Assist (APA)

If equipped, the APA system helps to search for and maneuver the vehicle into parallel or perpendicular parking spots using automatic steering, displays, and beeps. When the vehicle speed is below 30 km/h (18 mph), touch P to enable the system.

See “Automatic Parking Assist (APA)” under *Assistance Systems for Parking or Backing* ⇨ *238*.

Reverse Automatic Braking (RAB)

If the vehicle has Adaptive Cruise Control (ACC) it also has the RAB system, which is designed to help avoid or reduce the harm caused by backing crashes when the vehicle is shifted into R (Reverse). If the system detects the vehicle is backing too fast to avoid a crash with a detected object behind your vehicle in your path, it may automatically brake hard to a stop.

See *Assistance Systems for Parking or Backing* ⇨ *238*.

Power Outlets

Power Outlets 12 Volt Direct Current

Accessory power outlets can be used to plug in electrical equipment, such as a cell phone, MP3 player, etc.

The vehicle has five accessory power outlets:

- One near the cupholders on the center console
- One inside the center console
- One on the rear of the center console
- One in the third row seat on the driver side
- One in the rear cargo area on the passenger side

Lift the cover to access and replace when not in use.

See *Power Outlets* ⇨ *128*.

Universal Remote System

If equipped with the Universal Remote system, these buttons will be in the front overhead console.

This system provides a way to replace up to three remote control transmitters used to activate devices such as garage door openers, security systems, and home automation devices.

See *Universal Remote System* ⇨ *164*.

Sunroof

1. SLIDE Switch
2. TILT Switch

If equipped, the sunroof only operates when the ignition is on or in ACC/ACCESSORY, or when Retained Accessory Power (RAP) is active. See *Retained Accessory Power (RAP)* ⇨ *207*.

Slide Switch

Express-Open/Express-Close : To express-open the sunroof, fully press and release (1). Press the switch again to stop the movement. To express-close the sunroof, fully press and release (1). Press the switch again to stop the movement.

Open/Close (Manual Mode) : To open the sunroof, press and hold (1). Release the switch to stop the movement. Press and hold (1) to close the sunroof. Release the switch to stop the movement.

Tilt Switch

Vent : From the closed position, press (2) to vent the sunroof. Press (2) to close the sunroof vent.

When the sunroof is opened, an air deflector will automatically raise. The air deflector will retract when the sunroof is closed.

The sunroof also has a sunshade which can be pulled forward to block sun rays. The sunshade must be opened and closed manually.

If an object is in the path of the sunroof while it is closing, the automatic reversal feature will detect the object and stop the sunroof.

See *Sunroof* ⇨ *58*.

Performance and Maintenance

Traction Control/Electronic Stability Control

The vehicle has a Traction Control System (TCS) that limits wheel spin and the StabiliTrak system that assists with directional control of the vehicle in difficult driving conditions. Both systems come on automatically when the vehicle is started and begins to move.

- To turn off TCS, press and release OFF on the center stack. The traction off light displays in the instrument cluster. The appropriate Driver Information Center (DIC) message displays.
- To turn off both TCS and StabiliTrak, press and hold OFF until and OFF illuminate in the instrument cluster and the appropriate DIC message displays.
- Press and release OFF again to turn on both systems.

StabiliTrak will automatically turn on if the vehicle exceeds 56 km/h (35 mph). Traction control will remain off.

See *Traction Control/Electronic Stability Control* ⇨ *222*.

Tire Pressure Monitor

This vehicle may have a Tire Pressure Monitor System (TPMS).

The low tire pressure warning light alerts to a significant loss in pressure of one of the vehicle's tires. If the warning light comes on, stop as soon as possible and inflate the tires to the recommended pressure shown on the Tire and Loading Information label.

See *Vehicle Load Limits* ⇨ *197*. The warning light will remain on until the tire pressure is corrected.

The low tire pressure warning light may come on in cool weather when the vehicle is first started, and then turn off as the vehicle is driven. This may be an early indicator that the tire pressures are getting low and the tires need to be inflated to the proper pressure.

The TPMS does not replace normal monthly tire maintenance. Maintain the correct tire pressures.

See *Tire Pressure Monitor System* ⇨ *322*.

Tire Fill Alert (If Equipped)

This feature provides visual and audible alerts outside the vehicle to help when inflating an underinflated tire to the recommended cold tire pressure. See "Tire Fill Alert (If Equipped)" under *Tire Pressure Monitor Operation* ⇨ *323*.

Fuel

Premium Recommended

Use premium 93 octane — (R+M)/2 — unleaded gasoline in your vehicle. TOP TIER Detergent Gasoline is recommended. Unleaded gasoline with an octane rating as low as 87 may be used, but it will reduce performance and fuel economy. See *Recommended Fuel* ⇨ *253*.

E85 or FlexFuel

No E85 or FlexFuel

Gasoline-ethanol fuel blends greater than E15 (15% ethanol by volume), such as E85, cannot be used in this vehicle.

Engine Oil Life System

The engine oil life system calculates engine oil life based on vehicle use and displays the CHANGE ENGINE OIL SOON message when it is time to change the engine oil and filter. The oil life system should be reset to 100% only following an oil change.

Resetting the Oil Life System

1. Using the DIC controls on the right side of the steering wheel, display OIL LIFE on the DIC. See *Driver Information Center (DIC)* ⇨ *149*. When remaining oil life is low, the CHANGE ENGINE OIL SOON message will appear on the display.

2. Press and hold SEL on the DIC controls for a few seconds to clear the CHANGE ENGINE OIL SOON message and reset the oil life at 100%.

   Be careful not to reset the oil life display accidentally at any time other than after the oil is changed. It cannot be reset accurately until the next oil change.

The oil life system can also be reset as follows:

1. Display OIL LIFE on the DIC. See *Driver Information Center (DIC)* ⇨ *149*.
2. Fully press and release the accelerator pedal three times within five seconds.

   If the CHANGE ENGINE OIL SOON message is not on, the system is reset.

See *Engine Oil Life System* ⇨ *284*.

Driving for Better Fuel Economy

Driving habits can affect fuel mileage. Here are some driving tips to get the best fuel economy possible:

- Set the climate controls to the desired temperature after the engine is started, or turn them off when not required.
- Avoid fast starts and accelerate smoothly.
- Brake gradually and avoid abrupt stops.
- Avoid idling the engine for long periods of time.
- When road and weather conditions are appropriate, use cruise control.
- Always follow posted speed limits or drive more slowly when conditions require.
- Keep vehicle tires properly inflated.
- Combine several trips into a single trip.
- Replace the vehicle's tires with the same TPC Spec number molded into the tire's sidewall near the size.
- Follow recommended scheduled maintenance.

Roadside Service

U.S.: 1-800-224-1400

Canada: 1-800-882-1112

TTY Users (U.S. Only): 1-888-889-2438

New Cadillac owners are automatically enrolled in the Roadside Service Program.

See *Roadside Service* ⇨ *382*.

Keys, Doors, and Windows

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Keys and Locks

Keys

⚠ Warning

Leaving children in a vehicle with a Remote Keyless Entry (RKE) transmitter is dangerous and children or others could be seriously injured or killed. They could operate the power windows or other controls or make the vehicle move. The windows will function with the RKE transmitter in the vehicle, and children or others could be caught in the path of a closing window. Do not leave children in a vehicle with an RKE transmitter.

Press the button on the side of the RKE transmitter to remove the key. Never pull the key out without pressing the button.

The key is used for the driver door.

See your dealer if a replacement key or additional key is needed.

If locked out of the vehicle, see *Roadside Service* ⇨ *382*.

With an active OnStar or connected service plan, an OnStar Advisor may remotely unlock the vehicle. See *OnStar Overview* ⇨ *392*.

Remote Keyless Entry (RKE) System

See *Radio Frequency Statement* ⇨ *388*.

If there is a decrease in the Remote Keyless Entry (RKE) operating range:

- Check the distance. The transmitter may be too far from the vehicle.
- Check the location. Other vehicles or objects may be blocking the signal.
- Check the transmitter's battery. See “Battery Replacement” later in this section.
- If the transmitter is still not working correctly, see your dealer or a qualified technician for service.

Remote Keyless Entry (RKE) System Operation

The Keyless Access system allows for vehicle entry when the Remote Keyless Entry (RKE) transmitter is within 1 m (3 ft). See “Keyless Access Operation” later in this section.

The RKE transmitter functions may work up to 60 m (197 ft) away from the vehicle.

Other conditions can affect the performance of the transmitter. See *Remote Keyless Entry (RKE) System* ⇨ *28*.

🔒 **:** Press to lock all doors.

If enabled, the turn signal lamps flash once on the second press to indicate locking has occurred. If enabled, the horn chirps when 🔒 is pressed again within three seconds. See *Vehicle Personalization* ⇨ *155*.

If the driver door is open when 🔒 is pressed and Unlocked Door Anti-Lockout is enabled, all doors will lock and then the driver door will immediately unlock. See *Vehicle Personalization* ⇨ *155*. If the passenger door is open when 🔒 is pressed, all doors lock.

Pressing 🔒 arms the alarm system. See *Vehicle Alarm System* ⇨ *48*.

If equipped with auto mirror folding, pressing and holding 🔒 for one second will fold the mirrors, if enabled. See *Vehicle Personalization* ⇨ *155*.

🔓 **:** Press once to unlock the driver door. If 🔓 is pressed again within three seconds, all remaining doors unlock. The interior lamps may come on and stay on for 20 seconds or until the ignition is turned on.

If enabled, the turn signal lamps flash twice to indicate unlocking has occurred. If enabled, the exterior lamps may turn on. See *Vehicle Personalization* ⇨ *155*.

Pressing 🔓 on the RKE transmitter disarms the alarm system. See *Vehicle Alarm System* ⇨ *48*.

If equipped with auto mirror folding, pressing and holding 🔓 for one second will unfold the mirrors, if enabled. See *Vehicle Personalization* ⇨ *155*.

Press and hold 🔓 until the windows fully open, if remote window operation is enabled. See *Vehicle Personalization* ⇨ *155*.

x2 **:** Press twice to open the liftglass.

x2 **:** Press twice to open or close the liftgate. Press once to stop the liftgate from moving.

: Press and release to initiate vehicle locator. The turn signal lamps flash and the horn sounds three times.

Press and hold for more than three seconds to activate the panic alarm. The turn signal lamps flash and the horn sounds for 30 seconds, or until is pressed again or the vehicle is started. The ignition must be off for the panic alarm to work.

: If equipped, press and release , then immediately press and hold until the turn signals flash or for at least four seconds. The engine may be started from outside the vehicle using the RKE transmitter. See *Remote Vehicle Start* ⇨ *35*.

Keyless Access Operation

The Keyless Access system allows for the doors and liftgate to be accessed without pressing the RKE transmitter button. The RKE transmitter must be within 1 m (3 ft) of the liftgate or door being opened. The buttons are on the outside door handles.

Keyless Access can be programmed to unlock all doors on the first lock/unlock press from the driver door. See *Vehicle Personalization* ⇨ *155*.

If equipped with memory seats, RKE transmitters 1 and 2 are linked to seating positions of memory 1 or 2. See *Memory Seats* ⇨ *65*.

Keyless Unlocking/Locking from the Driver Door

When the doors are locked and the RKE transmitter is within 1 m (3 ft) of the door handle, pressing the lock/unlock button on the driver door handle will unlock the driver door. If the lock/unlock button is pressed again within five seconds, all passenger doors and the liftgate will unlock.

Driver Side Shown, Passenger Similar

Pressing the lock/unlock button will cause all doors to lock if any of the following occur:

- It has been no more than five seconds since the first lock/unlock button press.
- Two lock/unlock button presses were used to unlock all doors.
- Any vehicle door has been opened and all doors are now closed.

Keyless Unlocking/Locking from the Passenger Doors

When the doors are locked and the RKE transmitter is within 1 m (3 ft) of the door handle, pressing the lock/unlock button on a passenger door handle will unlock all doors. Pressing the lock/unlock button will cause all doors to lock if any of the following occur:

- The lock/unlock button was used to unlock all doors.
- Any vehicle door has been opened and all doors are now closed.

Disable/Enable Keyless Unlocking of Exterior Door Handles and Liftgate

If equipped, keyless unlocking of the exterior door handles and liftgate can be disabled and enabled.

Disabling Keyless Unlocking:

With the vehicle off, press and hold 🔒 and 🔓 on the RKE transmitter at the same time for approximately three seconds. The turn signal lamps will flash four times quickly to indicate access is disabled. Using any exterior handle to unlock the doors or open the liftgate will cause the turn signal lamps to flash four times quickly, indicating access is disabled. If disabled, disarm the alarm system before starting the vehicle.

Enabling Keyless Unlocking:

With the vehicle off, press and hold 🔒 and 🔓 on the RKE transmitter at the same time for approximately three seconds. The turn signal lamps will flash twice quickly to indicate access is enabled.

Passive Locking

Keyless Access will lock the vehicle several seconds after all doors are closed, if the vehicle is off and at least one RKE transmitter has been removed from the interior, or none remain in the interior.

If other electronic devices interfere with the RKE transmitter signal, the vehicle may not detect the RKE transmitter inside the vehicle.
If passive locking is enabled, the doors may lock with the RKE transmitter inside the vehicle. Do not leave the RKE transmitter in an unattended vehicle.

To customize the doors to automatically lock when exiting the vehicle, see “Remote Lock, Unlock, Start” under *Vehicle Personalization* ⇨ *155*.

Temporary Disable of Passive Locking

Temporarily disable passive locking by pressing and holding 🔓 on the interior door switch with a door open for at least four seconds, or until three chimes are heard. Passive locking will then remain disabled until 🔒 on the interior door is pressed, or until the vehicle is turned on.

Remote Left In Vehicle Alert

When the vehicle is turned off and an RKE transmitter is left in the vehicle, the horn will chirp three times after all doors are closed. To turn on or off see *Vehicle Personalization* ⇨ *155*.

Remote No Longer in Vehicle Alert

If the vehicle is on with a door open, and then all doors are closed, the vehicle will check for RKE transmitters inside. If an RKE transmitter is not detected, the Driver Information Center (DIC) will display NO REMOTE DETECTED and the horn will chirp three times. This occurs only once each time the vehicle is driven. To turn on or off see *Vehicle Personalization* ⇨ *155*.

Keyless Liftgate Opening

Press the touch pad on the rear of the liftgate above the license plate to open the liftgate when all doors are unlocked or when the transmitter is within 1 m (3 ft).

Keyless Liftglass Opening

Press the exterior liftglass button to open the liftglass when all doors are unlocked or when the transmitter is within 1 m (3 ft).

Key Access

To access a vehicle with a weak transmitter battery, see *Door Locks* ⇨ *36*.

Programming Transmitters to the Vehicle

Only RKE transmitters programmed to the vehicle will work. If a transmitter is lost or stolen, a replacement can be purchased and programmed through your dealer. The vehicle can be reprogrammed so that lost or stolen transmitters no longer work. Each vehicle can have up to eight transmitters matched to it.

Programming with Recognized Transmitters

A new transmitter can be programmed to the vehicle when there are two recognized transmitters.

To program, the vehicle must be off and all transmitters, both currently recognized and new, must be with you.

1. Remove the key from the recognized transmitter.
2. Place the two recognized transmitters in the cupholder or on the passenger seat.
3. Remove the key lock cylinder cap on the driver door handle. See *Door Locks* ⇨ *36*. Insert the vehicle key into the key lock cylinder on the driver door handle; then turn the key counterclockwise, to the unlock position, five times within 10 seconds.

   The DIC displays READY FOR REMOTE #2, 3, 4, ETC.

4. Open the center console storage area and the storage tray.
5. Place the new transmitter in the transmitter pocket/insert, in front of the center console storage area.
6. Press ENGINE START/STOP. When the transmitter is learned, the DIC display will show that it is ready to program the next transmitter.
7. Remove the transmitter from the transmitter pocket/insert and press 🔒 or 🔓 on the transmitter.

To program additional transmitters, repeat Steps 4–7.

When all additional transmitters are programmed, press and hold ENGINE START/STOP for approximately 12 seconds to exit programming mode.

8. Put the key back into the transmitter.
9. Replace the key lock cylinder cap. See *Door Locks* ⇨ *36*.

Programming without Recognized Transmitters

If two currently recognized transmitters are not available, follow this procedure to program up to eight transmitters. This feature is not available in Canada. This procedure will take approximately 30 minutes to complete. The vehicle must be off and all transmitters to be programmed must be with you.

1. Remove the vehicle key from the transmitter.
2. Remove the key lock cylinder cap on the driver door handle. See *Door Locks* ⇨ *36*. Insert the vehicle key into the key lock cylinder on the driver door handle; then turn the key counterclockwise, to the unlock position, five times within 10 seconds.

   The DIC displays REMOTE LEARN PENDING, PLEASE WAIT.
3. Wait for 10 minutes until the DIC displays PRESS ENGINE START BUTTON TO LEARN, then press ENGINE START/STOP.

   The DIC will again display REMOTE LEARN PENDING, PLEASE WAIT.
4. Repeat Step 3 two additional times. After the third time all previously known transmitters will no longer work with the vehicle. Remaining transmitters can be relearned during the next steps.

   The DIC should now display READY FOR REMOTE # 1.

5. Place the new transmitter in the transmitter pocket/insert, in front of the center console storage area. The storage area will need to be opened to access the transmitter pocket/insert.
6. Press ENGINE START/STOP. When the transmitter is learned, the DIC display will show that it is ready to program the next transmitter.
7. Remove the transmitter from the transmitter pocket/insert and press 🔓 or 🔒 on the transmitter.

   To program additional transmitters, repeat Steps 5–7.

When all additional transmitters are programmed, press and hold ENGINE START/STOP for approximately 12 seconds to exit programming mode.

8. Return the key back into the transmitter.
9. Replace the key lock cylinder cap. See *Door Locks* ⇨ *36*.

Starting the Vehicle with a Low Transmitter Battery

If the transmitter battery is weak or if there is interference with the signal, the DIC may display NO REMOTE DETECTED or NO REMOTE KEY WAS DETECTED PLACE KEY IN TRANSMITTER POCKET THEN START YOUR VEHICLE when starting the vehicle.

To start the vehicle:

1. Open the center console storage area and the storage tray.

2. Place the transmitter in the transmitter pocket/insert.
3. With the vehicle in P (Park) or N (Neutral) press the brake pedal and ENGINE START/STOP.

   Replace the transmitter battery as soon as possible.

Battery Replacement

Caution

When replacing the battery, do not touch any of the circuitry on the transmitter. Static from your body could damage the transmitter.

Replace the battery if the DIC displays REPLACE BATTERY IN REMOTE KEY.

1. Press the button on the side of the RKE transmitter near the bottom to remove the key. Never pull the key out without pressing the button.

2. Separate the two halves of the transmitter using a flat tool inserted into the bottom center of the transmitter. Do not use the key slot.

3. Remove the old battery. Do not use a metal object.
4. Insert the new battery on the back housing, positive side facing down. Replace with a CR2032 or equivalent battery.
5. Align the front and back housing then snap the transmitter together.

Remote Vehicle Start

The climate control system will come on when the vehicle is started remotely depending on the outside temperature.

The rear defog and heated and cooled seats, if equipped, may also come on. See *Heated and Cooled Front Seats* ⇨ *69* and *Vehicle Personalization* ⇨ *155*.

Laws in some communities may restrict the use of remote starters. Check local regulations for any requirements on remote starting of vehicles.

Do not use remote start if the vehicle is low on fuel. The vehicle could run out of fuel.

The vehicle cannot be remote started if:

- The transmitter is in the vehicle.
- The hood is not closed.
- There is an emission control system malfunction and the malfunction indicator lamp is on.
- The hazard flashers are on.
- Two remote vehicle starts or a start with an extension have already been used.
- The vehicle is not in P (Park).

The engine will turn off during a remote vehicle start if:

- The coolant temperature gets too high.
- The oil pressure gets low.

The RKE transmitter range may be less while the vehicle is running.

Other conditions can affect the performance of the transmitter. See *Remote Keyless Entry (RKE) System* ⇨ *28* or *Vehicle Personalization* ⇨ *155*.

Starting the Engine Using Remote Start

1. Press and release 🔓.
2. Immediately press and hold ⟲ until the turn signal lamps flash or for at least four seconds.

   When the vehicle starts, the parking lamps will turn on. The doors will be locked and the climate control system may come on.

   The engine will continue to run for 15 minutes. Repeat Steps 1 and 2 for one 15-minute time extension.

Turn the ignition on to operate the vehicle.

Extending Engine Run Time

The engine run time can be extended by 15 minutes, for a total of 30 minutes, if during the first 15 minutes Steps 1 and 2 are repeated while the engine is still running. An extension can be requested 30 seconds after starting.

A maximum of two remote starts, or a single start with an extension, is allowed between ignition cycles.

The vehicle's ignition must be turned on and then back off to use remote start again.

Canceling a Remote Start

To cancel a remote start, do one of the following:

- Press and hold ⟲ until the parking lamps turn off.
- Turn on the hazard warning flashers.
- Turn the ignition on and then off.

Door Locks

⚠ Warning

Unlocked doors can be dangerous.

- Passengers, especially children, can easily open the doors and fall out of a moving vehicle. The doors can be unlocked and opened while the vehicle is moving. The chance of being thrown out of the vehicle in a crash is increased if the doors are not locked. So, all passengers should wear seat belts properly and the doors should be locked whenever the vehicle is driven.
- Young children who get into unlocked vehicles may be unable to get out. A child can be overcome by extreme heat

(Continued)

Warning (Continued)

and can suffer permanent injuries or even death from heat stroke. Always lock the vehicle whenever leaving it.

- Outsiders can easily enter through an unlocked door when you slow down or stop the vehicle. Locking the doors can help prevent this from happening.

To lock or unlock the doors from inside the vehicle:

- Press 🔒 or 🔓 on a power door lock switch.
- Push down the manual lock knob on the driver door to lock all doors. Push down the lock knob on a passenger door to lock that door only.
- Pull the door handle once to unlock that door. Pull the handle again to unlatch it.

To lock or unlock the doors from outside the vehicle:

- Press 🔒 or 🔓 on the RKE transmitter
- Use the key in the front doors. The key cylinder is covered by a cap. See “Driver Door Key Lock Cylinder Access” later in this section.

Keyless Access

The RKE transmitter must be within 1 m (3 ft) of the liftgate or door being opened. Press the button on the door handle to open. See “Keyless Access Operation” in *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Driver Door Key Lock Cylinder Access (Slotted Cap Access) (In Case of Dead Battery)

To access the driver door key lock cylinder:

1. Pull the door handle (1) to the open position and hold it open until cap removal is complete.
2. Insert the key (4) into the slot (3) on the bottom of the cap (2) and lift the key upward.

3. Remove the cap (2).
4. Use the key (4) in the cylinder.

To replace the slotted cap:

1. Pull the door handle (1) to the open position and hold it open until cap installation is complete.
2. Position the bottom edge of the cap under the lower edge of the metal piece (6). The tabs (7) attach to metal piece (6) at the positions (5).
3. Rotate the cap upward to install into place.
4. Check that the cap is secure.
5. Release the door handle.

Free-Turning Locks

The door key lock cylinder turns freely when either the wrong key is used, or the correct key is not fully inserted. The free turning door lock feature prevents the lock from being forced open. To reset the lock, turn it to the vertical position with the correct key fully inserted. Remove the key and insert it again. If this does not reset the lock, turn the key halfway around in the cylinder and repeat the reset procedure.

Power Door Locks

Press 🔒 or 🔓 on the Remote Keyless Entry (RKE) transmitter. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

🔒 **:** Press to lock the doors.

🔓 **:** Press to unlock the doors.

Delayed Locking

This feature delays the locking of the doors until five seconds after all doors are closed.

Delayed locking can only be turned on when the Unlocked Door Anti-Lockout feature has been turned off.

When 🔒 is pressed on the power door lock switch while a door or the liftgate is open, a chime will sound three times indicating delayed locking is active.

The doors will lock automatically five seconds after all doors are closed. If a door is reopened before that time, the five-second timer will reset when all doors are closed again.

Press 🔒 on the door lock switch again or press 🔒 on the RKE transmitter to lock doors immediately.

This feature can also be programmed. See *Vehicle Personalization* ⇨ *155*.

Automatic Door Locks

The doors will lock automatically when all doors are closed, the ignition is on, and the vehicle is shifted out of P (Park).

If a vehicle door is unlocked and then opened and closed, the doors will lock either when your foot is removed from the brake or the vehicle speed becomes faster than 13 km/h (8 mph).

To unlock the doors:

- Press 🔓 on the power door lock switch.
- Shift the transmission into P (Park).

Automatic door locking cannot be disabled. Automatic door unlocking can be programmed. See *Vehicle Personalization* ⇨ *155*.

Lockout Protection

If the ignition is on or in ACC/ACCESSORY and the power door lock switch is pressed with the driver door open, all the doors will lock and only the driver door will unlock.

If the vehicle is off and locking is requested while a door is open, when all doors are closed the vehicle will check for RKE transmitters inside. If an RKE transmitter is detected and the number of RKE transmitters inside has not reduced, the driver door will unlock and the horn will chirp three times.

Lockout Protection can be manually overridden with the driver door open by pressing and holding 🔒 on the power door lock switch.

Unlocked Door Anti-Lockout

If Unlocked Door Anti-Lockout is turned on and the vehicle is off, the driver door is open, and locking is requested, all the doors will lock and the driver door will remain open. Press the button again to lock the driver door. The Unlocked Door Anti-Lockout feature can be turned on or off. See*Vehicle Personalization* ⇨ *155*.

Safety Locks

The rear door safety locks prevent passengers from opening the rear doors from inside the vehicle.

Press 🔒 to activate the safety locks on the rear doors. The indicator light comes on when activated.

Press 🔒 again to deactivate the safety locks.

Doors

Liftgate

⚠ Warning

Exhaust gases can enter the vehicle if it is driven with the liftgate or trunk/hatch open, or with any objects that pass through the seal between the body and the trunk/hatch or liftgate. Engine exhaust contains carbon monoxide (CO) which cannot be seen or smelled. It can cause unconsciousness and even death.

If the vehicle must be driven with the liftgate or trunk/hatch open:

- Close all of the windows.
- Fully open the air outlets on or under the instrument panel.
- Adjust the climate control system to a setting that brings in only outside air and

(Continued)

Warning (Continued)

set the fan speed to the highest setting. See “Climate Control Systems” in the Index.

- If the vehicle is equipped with a power liftgate, disable the power liftgate function.

See *Engine Exhaust* ⇨ *209*.

Caution

To avoid damage to the liftgate or liftgate glass, make sure the area above and behind the liftgate is clear before opening it.

Power Liftgate Operation

⚠ Warning

You or others could be injured if caught in the path of the power liftgate. Make sure there is no one in the way of the liftgate as it is opening and closing.

Caution

Driving with an open and unsecured liftgate may result in damage to the power liftgate components.

The power liftgate switch is on the overhead console. The vehicle must be in P (Park).

The modes are:

MAX : Opens to maximum height.

3/4 : Opens to a reduced height that can be set from 3/4 to fully open. Use to prevent the liftgate from opening into overhead obstructions such as a garage door or roof-mounted cargo. The liftgate can be manually opened all the way.

OFF : Opens manually only.

To power open or close the liftgate, select MAX or 3/4 mode and then:

- Press x2 twice quickly on the RKE transmitter until the liftgate moves.
- Press on the overhead console. The driver door must be unlocked or locked without the security armed.
- Press the touch pad on the underside of the liftgate handle after unlocking all doors. A locked vehicle can be opened if the RKE transmitter is within 1 m (3 ft) of the touch pad.

- Press on the bottom edge of the liftgate next to the latch to close.

Press any liftgate button, the touch pad, or on the RKE transmitter while the liftgate is moving to stop it. Pressing any liftgate button or pressing twice quickly on the RKE transmitter restarts the operation in the reverse direction. Pressing the touch pad on the liftgate handle will restart the motion, but only in the opening direction.

Caution

Manually forcing the liftgate to open or close during a power cycle can damage the vehicle. Allow the power cycle to complete.

The power liftgate may be temporarily disabled in extremely low temperatures, or after repeated power cycling over a short period of time. If this occurs, the liftgate can still be operated manually.

If the vehicle is shifted out of P (Park) while the power function is in progress, the liftgate will continue to completion. If the vehicle is accelerated before the liftgate has completed moving, the liftgate may stop or reverse direction. Check for Driver Information Center (DIC) messages and make sure the liftgate is closed and latched before driving.

Falling Liftgate Detection

If the power liftgate automatically closes after a power opening cycle, it indicates that the system is reacting to excess weight on the liftgate or a possible support strut failure.
A repetitive chime will sound while the falling liftgate detection feature is operating. Remove any excess weight. If the liftgate continues to automatically close after opening, see your dealer for service before using the power liftgate.

Interfering with the power liftgate motion or manually closing the liftgate too quickly after power opening may resemble a support strut failure. This could also activate the falling liftgate detection feature. Allow the liftgate to complete its operation and wait a few seconds before manually closing the liftgate.

Obstacle Detection Features

If the liftgate encounters an obstacle during a power open or close cycle, the liftgate will automatically reverse direction and move a short distance away from the obstacle. After removing the obstruction, the power liftgate operation can be used again. If the liftgate encounters multiple obstacles on the same power cycle, the power function will deactivate. After removing the obstructions, manually close the liftgate. This will allow normal power operation functions to resume.

If the vehicle is locked while the liftgate is closing, and an obstacle is encountered that prevents the liftgate from completely closing, the horn will sound as an alert that the liftgate did not close.

Pinch sensors are on the side edges of the liftgate. If an object is caught between the liftgate and the vehicle and presses against a sensor, the liftgate will reverse direction and stop at a partially open position. The liftgate will remain open until it is activated again or closed manually.

Setting the 3/4 Mode

To change the position the liftgate stops at when opening:

1. Select MAX or 3/4 mode and power open the liftgate.
2. Stop the liftgate movement at the desired height by pressing any liftgate button. Manually adjust the liftgate position if needed.
3. Press and hold on the bottom edge of the liftgate next to the latch on the outside of the liftgate until the turn signals flash and a beep sounds. This indicates the setting has been recorded.

The liftgate cannot be set below a minimum programmable height. If there is no light flash or sound, then the height adjustment may be too low.

Manual Operation

Select OFF to manually operate the liftgate.

Caution

Attempting to move the liftgate too quickly and with excessive force may result in damage to the vehicle.

Operate the liftgate manually with a smooth motion and moderate speed. The system includes a feature which limits the manual closing speed to protect the components.

To open the liftgate, press 🔓 on the power door lock switch or press 🔓 on the RKE transmitter twice to unlock all doors. Press the touch pad (1) on the underside of the liftgate handle and lift up.

Press the button (2) above the license plate to open the liftglass, or press x2 twice quickly on the RKE transmitter. Do not leave the liftglass open when raising the liftgate.

There will be a delay in the release of the liftglass if there is an attempt to open it while the rear wiper is in motion.

Use the pull cup to lower and close the liftgate. Do not press the touch pad while closing the liftgate. This will cause the liftgate to be unlatched.

The liftgate can be opened when locked if the RKE transmitter is within 1 m (3 ft) of the touch pad. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

The liftgate has an electric latch. If the battery is disconnected or has low voltage, the liftgate will not open. The liftgate will resume operation when the battery is reconnected and charged.

Hands-Free Operation

If equipped, the liftgate may be operated with a kicking motion near the center of the rear bumper at the location of the projected logo. The RKE transmitter must be within 1 m (3 ft) of the rear bumper to operate the power liftgate hands-free.

The hands-free feature will not work while the liftgate is moving. To stop the liftgate while in motion use one of the liftgate switches.

The hands-free feature can be customized. See *Vehicle Personalization* ⇨ *155*. Choose from the following:

On-Open and Close : The kicking motion is activated to both open and close the liftgate.

On-Open Only : The kicking motion is activated to only open the liftgate.

Off : The feature is disabled.

Kick Zone

To operate, move your foot in a forward kicking motion near the center of the rear bumper at the location of the projected logo, then pull it back. The kick must come within 14 cm (6 in) of the rear bumper to activate. Then step back.

Caution

Splashing water may cause the liftgate to open. Keep the RKE transmitter away from the rear bumper detection area or turn the

(Continued)

Caution (Continued)

liftgate mode to OFF when cleaning or working near the rear bumper to avoid accidental opening.

- Do not sweep your foot side to side.
- Do not keep your foot under the bumper; the liftgate will not activate.
- Do not touch the liftgate until it has stopped moving.

This feature may be temporarily disabled under some conditions. If the liftgate does not respond to the kick, open or close the liftgate by another method or start the vehicle. The feature will be re-enabled.

When closing the liftgate using this feature, there will be a short delay. The taillamps will flash and a chime will sound.

Step away from the liftgate before it starts moving.

Projected Logo

If equipped with this feature, a vehicle logo will be projected for one minute onto the ground near the rear bumper when an RKE transmitter is detected within approximately 2 m (6 ft) from the rear bumper. The projected logo may not be visible under brighter daytime conditions.

- 1 m (3 ft) Hands-Free Operation Detection Zone
- 2 m (6 ft) Projected Logo Detection Zone

The projected logo shows where to kick towards the rear bumper.

The projected logo will not be restarted using the same RKE transmitter unless it has been out of range for longer than 20 seconds.

If an RKE transmitter is again detected within approximately 2 m (6 ft) of the liftgate, or another kick has been detected, the one-minute timer will be reset.

The projected logo will not work under these conditions:

- The vehicle battery is low.
- The transmission is not in P (Park).
- Hands Free Liftgate Control is set to off in vehicle personalization. See *Vehicle Personalization* ⇨ *155*.
- Power liftgate is turned off.
- The vehicle remains parked for 72 hours or more, with no RKE transmitter use or Keyless Access operation. To re-enable, press any button on the RKE transmitter or open and close a vehicle door.

The projected logo will not work for a single RKE transmitter when a transmitter:

- Has been left within approximately 5 m (15 ft) of the liftgate for several minutes.
- Has been left inside the vehicle and all vehicle doors are closed.
- Has approached the area outside of the liftgate five times within 10 minutes.

Hands-Free Liftgate and Projected Logo Availability

Action	Hands-Free Liftgate	Projected Logo
RKE transmitter entering projected logo detection zone	Operative	On for one minute
RKE transmitter left inside projected logo detection zone for minimum of 10 minutes	Operative	Off until RKE transmitter button press or a door is opened and closed
RKE transmitter brought in and out of projected logo detection zone five times or more within 10 minutes	Operative	Off for one hour or until RKE transmitter button press or a door is opened and closed
Vehicle remains parked for more than 72 hours	Operative	Off until RKE transmitter button press or a door is opened and closed
Vehicle battery is low	Non-operative	Off
Transmission is not in P (Park)	Non-operative	Off
Power liftgate is turned off	Non-operative	Off
Hands-free liftgate is disabled in vehicle personalization	Non-operative	Off

Power Assist Steps

⚠ Warning

Never place hands or other body parts between the deployed power assist steps and the vehicle. You or others could be seriously injured.

⚠ Warning

Never step on a moving assist step. You or others could be seriously injured.

Disable the assist steps before jacking or placing any object under the vehicle.

Too much ice buildup may prevent deployment of the power assist steps. Check the step position before exiting the vehicle. If this happens, disable the power assist steps, clear the ice, then enable the assist steps and confirm normal function prior to use.

Keep hands, children, pets, objects, and clothing clear of the power assist steps when in motion. The steps will reverse direction if they encounter an obstruction when opening or closing. Remove the obstruction, then open and close the door on the same side to complete the motion of the assist steps. If the obstruction is not cleared, the assist steps remain extended while driving.

To change the settings:

1. Touch ⌂.
2. Touch Running Boards icon.

The options are:

OFF : Disables the power assist steps, so they will not deploy.

ON : Power assist steps will deploy when a door is opened. When a door is closed the assist steps will automatically retract after three seconds.

Extended : Keeps the steps deployed when the vehicle is in P (Park) or N (Neutral). This setting may be used when cleaning the steps.

Vehicle Security

This vehicle has theft-deterrent features; however, they do not make the vehicle impossible to steal.

Vehicle Alarm System

The indicator light, on the instrument panel near the windshield, indicates the status of the system.

Off : Alarm system is disarmed.

On Solid : Vehicle is secured during the delay to arm the system.

Fast Flash : Vehicle is unsecured. A door, the liftgate or the hood is open.

Slow Flash : Alarm system is armed.

Arming the Alarm System

1. Turn off the vehicle.
2. Lock the vehicle in one of three ways:
   - Use the RKE transmitter.
   - Use the Keyless Access system.
   - With a door open, press 🔓 on the interior of the door.
3. After 30 seconds, the alarm system will arm and the indicator light will begin to slowly flash. Pressing 🔓 on the RKE transmitter a second time will bypass the 30-second delay and immediately arm the alarm system.

The vehicle alarm system will not arm if the doors are locked with the key.

If the driver door is opened without first unlocking with the RKE transmitter, the horn will chirp and the lights will flash to indicate pre-alarm. If the vehicle is not started, or the door is not unlocked by pressing 🔓 on the RKE transmitter during the 10-second pre-alarm, the alarm will be activated.

The alarm will also be activated if a passenger door, the liftgate, or the hood is opened without first disarming the system. When the alarm is activated, the turn signals flash and the horn sounds for about 30 seconds. The alarm system will then re-arm to monitor for the next unauthorized event.

Disarming the Alarm System

To disarm the alarm system or turn off the alarm if it has been activated:

- Press 🔓 on the RKE transmitter.
- Unlock the vehicle using the Keyless Access system.
- Start the vehicle.

To avoid setting off the alarm by accident:

- Lock the vehicle after all occupants have exited.
- Always unlock a door with the RKE transmitter, or use the Keyless Access system.

  Unlocking the driver door with the key will not disarm the system or turn off the alarm.

How to Detect a Tamper Condition

If 🔓 is pressed on the RKE transmitter and the horn chirps three times, an alarm occurred previously while the alarm system was armed.

If the alarm has been activated, a message will appear on the DIC.

Power Sounder, Inclination Sensor and Intrusion Sensor

In addition to the standard theft-deterrent system features, this system may also have a power sounder, inclination sensor and intrusion sensor.

The power sounder provides an audible alarm which is distinct from the vehicle's horn. It has its own power source, and can sound an alarm if the vehicle's battery is compromised.

The inclination sensor can set off the alarm if it senses movement of the vehicle, such as a change in vehicle orientation.

The intrusion sensor monitors the vehicle interior, and can activate the alarm if it senses unauthorized entry into the vehicle's interior. Do not allow passengers or pets to remain in the vehicle when the intrusion sensor is activated.

Before arming the theft-deterrent system and activating the intrusion sensor:

- Make sure all doors and windows are completely closed.
- Secure any loose items such as sunshades.
- Make sure there are no obstructions blocking the sensors in the front overhead console.
- Close DVD screens before leaving the vehicle.

Inclination and Intrusion Sensors Disable Switch

It is recommended that the intrusion and inclination sensors be deactivated if pets are left in the vehicle or the vehicle is being transported.

With the vehicle turned off, press in the front overhead console. The indicator light will come on momentarily, indicating that these sensors have been disabled for the next alarm system arming cycle.

Immobilizer

See *Radio Frequency Statement* ⇨ *388*.

Immobilizer Operation

This vehicle has a passive theft-deterrent system.

The system does not have to be manually armed or disarmed.

The vehicle is automatically immobilized when the vehicle is turned off.

The immobilization system is disarmed when the ignition is on and a valid transmitter is found in the vehicle.

The security light in the instrument cluster comes on if there is a problem with arming or disarming the theft-deterrent system.

The system has one or more transmitters matched to an immobilizer control unit in the vehicle. Only a correctly matched transmitter will start the vehicle. If the transmitter is ever damaged, you may not be able to start the vehicle.

If the engine does not start and the security light stays on, there is a problem with the system. Turn the vehicle off and try again.

If the RKE transmitter appears to be undamaged, try another transmitter or place the transmitter in the transmitter pocket/insert next to the center console storage area between the driver and front passenger seats. See “Starting the Vehicle with a Low Transmitter Battery” under *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

If the engine does not start with the other transmitter or when the transmitter is in the pocket/insert, the vehicle needs service. See your dealer who can service the theft-deterrent system and have a new transmitter programmed to the vehicle.

Do not leave the transmitter or device that disarms or deactivates the theft-deterrent system in the vehicle.

Exterior Mirrors

Convex Mirrors

⚠ Warning

A convex mirror can make things, like other vehicles, look farther away than they really are. If you cut too sharply into the right lane, you could hit a vehicle on the right. Check the inside mirror or glance over your shoulder before changing lanes.

The passenger side mirror is convex shaped. A convex mirror's surface is curved so more can be seen from the driver seat.

Power Mirrors

To adjust the mirrors:

1. Press (1) or (2) to select the driver or passenger side mirror. The indicator light comes on.
2. Press the arrows on the control pad to move the mirror up, down, right, or left.
3. Adjust the outside mirror so that the side of the vehicle and the area behind are seen.
4. Press either (1) or (2) again to deselect the mirror. The indicator light goes off.

Exterior Automatic Dimming Mirror

If equipped, the driver outside mirror automatically adjusts for the glare of headlamps behind. This feature comes on when the vehicle is started. See *Automatic Dimming Rearview Mirror* ⇨ *53*.

Turn Signal Indicator

The vehicle may have a turn signal indicator on the mirrors that flashes in the direction of the turn or lane change.

Folding Mirrors

Power Folding

1. Press to fold the mirrors inward.
2. Press again to return the mirrors to the driving position.

Resetting the Power Folding Mirrors

Reset the power folding mirrors if:

- The mirrors are accidentally obstructed while folding.
- They are accidentally manually folded/unfolded.

- The mirrors will not stay in the unfolded position.
- The mirrors vibrate at normal driving speeds.

Fold and unfold the mirrors one time using the mirror controls to reset them to their normal position.
A popping noise may be heard during the resetting of the power folding mirrors. This sound is normal after a manual folding operation.

Auto Mirror Folding

If equipped, press and hold 🔒 on the RKE transmitter for approximately one second to automatically fold the exterior mirrors. Press and hold 🔓 on the RKE transmitter for approximately one second to unfold. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

This feature is turned on or off through vehicle personalization. See *Vehicle Personalization* ⇨ *155*.

Heated Mirrors

REAR : Press to heat the outside mirrors.

See “Rear Window Defogger” under *Dual Automatic Climate Control System* ⇨ *177*.

Reverse Tilt Mirrors

If equipped with memory seats, the passenger and/or driver mirror tilts to a preselected position when the vehicle is in R (Reverse). This allows the curb to be seen when parallel parking.

The mirror(s) return to the original position when:

- The vehicle is shifted out of R (Reverse), or remains in R (Reverse) for about 30 seconds.
- The ignition is turned off.
- The vehicle is driven in R (Reverse) above a set speed.

To turn this feature on or off, see *Vehicle Personalization* ⇨ *155*.

Interior Mirrors

Interior Rearview Mirrors

Adjust the rearview mirror for a clear view of the area behind your vehicle.

If equipped with OnStar, there may be three buttons at the bottom of the mirror. See *OnStar Overview* ⇨ *392*.

To avoid accidental OnStar calls, clean the mirror with the ignition off. Do not spray glass cleaner directly on the mirror. Use a soft towel dampened with water.

Automatic Dimming Rearview Mirror

The rearview mirror automatically dims to reduce the glare of the headlamps from behind. This feature comes on when the vehicle is started.

Rear Camera Mirror

If equipped, this automatic dimming mirror provides a wide angle camera view of the area behind the vehicle.

Pull the tab rearward to turn on the display. Push the tab forward to turn it off. When off, the mirror is automatic dimming. Adjust the mirror for a clear view of the area behind the vehicle while the display is off.

To adjust the brightness, press the button (1) on the back of the rearview mirror without covering the light sensor (2).

Each button press cycles the brightness between five settings.

⚠ Warning

The Rear Camera Mirror (RCM) has a limited view. Portions of the road, vehicles, and other objects may not be seen. Do not drive or park the vehicle using only this camera. Objects may appear closer than they are. Check the outside mirrors or glance over your shoulder when making lane changes or merging. Failure to use proper care may result in injury, death, or vehicle damage.

The camera that provides the Rear Camera Mirror (RCM) image is above the license plate, next to the Rear Vision Camera (RVC).

To clean the rear camera, see *Rear Window Wiper/Washer* ⇨ *126*.

Troubleshooting

If the tab is in the rearward position and a blue screen and are displayed in the mirror and the display shuts off, see your dealer for service.

The RCM may not work properly or display a clear image if:

- There is glare from the sun or headlamps. This may obstruct objects from view.
- Dirt, snow, or other debris blocks the camera lens. Clean the lens with a soft damp cloth.
- The back of the vehicle has been damaged and the position and mounting angle of the camera has changed.

Child-View Mirror

If equipped, the child-view mirror is on the overhead console. Press the fixed button on the cover to release. Push the mirror back up when not in use.

Windows

⚠ Warning

Never leave a child, a helpless adult, or a pet alone in a vehicle, especially with the windows closed in warm or hot weather. They can be overcome by the extreme heat and suffer permanent injuries or even death from heat stroke.

The vehicle aerodynamics are designed to improve fuel economy performance. This may result in a pulsing sound when either rear window is down and the front windows are up. To reduce the sound, open either a front window or the sunroof, if equipped.

Power Windows

⚠ Warning

Children could be seriously injured or killed if caught in the path of a closing window. Never leave the Remote Keyless Entry (RKE) transmitter in a vehicle with children. When there are children in the rear seat, use the window lockout switch to prevent operation of the windows. See *Keys* ⇨ *27*.

Power windows work when the ignition is on, in ACC/ACCESSORY, or when Retained Accessory Power (RAP) is active. See *Retained Accessory Power (RAP)* ⇨ *207*.

Using the window switch, press to open or pull to close the window.

The windows may be temporarily disabled if they are used repeatedly within a short time.

Window Lockout

This feature stops the rear passenger window switches from working.

- Press to engage the rear window lockout feature. The indicator light is on when engaged.
- Press again to disengage.

Window Express Movement

All windows can be opened without holding the window switch. Press the switch down fully and quickly release to express open the window.

If equipped, pull the window switch up fully and quickly release to express close the window.

Briefly press or pull the window switch in the same direction to stop that window's express movement.

Window Automatic Reversal System

The express-close feature will reverse window movement if it comes in contact with an object. Extreme cold or ice could cause the window to auto-reverse. The window will operate normally after the object or condition is removed.

Automatic Reversal System Override

⚠ Warning

If automatic reversal system override is active, the window will not reverse automatically. You or others could be injured and the window could be damaged. Before using automatic reversal system

(Continued)

Warning (Continued)

override, make sure that all people and obstructions are clear of the window path.

When the engine is on, override the automatic reversal system by pulling and holding the window switch if conditions prevent it from closing.

Programming the Power Windows

Programming may be necessary if the vehicle battery has been disconnected or discharged. If the window is unable to express-up, program each express-close window:

1. Close all doors.
2. Turn the ignition on or to ACC/ACCESSORY.
3. Partially open the window to be programmed. Then close it and continue to pull the switch briefly after the window has fully closed.

4. Open the window and continue to press the switch briefly after the window has fully opened.

Remote Window Operation

If equipped, this feature allows the windows to be opened remotely.
If enabled in vehicle personalization, press and hold 🔓 on the RKE transmitter. See *Vehicle Personalization* ⇨ *155*.

Sun Visors

Pull the sun visor down to block glare. Detach the sun visor from the center mount to pivot to the side window and, if equipped, extend along the rod.

Roof

Sunroof

1. SLIDE Switch
2. TILT Switch

If equipped, the sunroof only operates when the ignition is on or in ACC/ACCESSORY, or when Retained Accessory Power (RAP) is active. See *Retained Accessory Power (RAP)* ⇨ *207*.

Slide Switch

Express-Open/Express-Close : To express-open the sunroof, fully press and release SLIDE (1). Press the switch again to stop the movement. To express-close the sunroof, fully press and release (1). Press the switch again to stop the movement.

Open/Close (Manual Mode) : To open the sunroof, press and hold SLIDE (1). Release the switch to stop the movement. Press and hold (1) to close the sunroof. Release the switch to stop the movement.

Tilt Switch

Vent : From the closed position, press TILT (2) to vent the sunroof. Press (2) to close the sunroof vent.

When the sunroof is opened, an air deflector will automatically raise. The air deflector will retract when the sunroof is closed.

The sunroof also has a sunshade which can be pulled forward to block sun rays. The sunshade must be opened and closed manually when the sunroof is in the vent or fully closed position.

Automatic Reversal System

The sunroof has an automatic reversal system that is only active when the sunroof is operated in express-close mode.

If an object is in the path while express closing, the reversal system will detect an object, stop, and open the sunroof again.

If frost or other conditions prevent closing, override the feature by closing the sunroof in manual mode. To stop movement, release the switch.

Dirt and debris may collect on the sunroof seal or in the track. This could cause an issue with sunroof operation or noise. It could also plug the water drainage system.

Periodically open the sunroof and remove any obstacles or loose debris. Wipe the sunroof seal and roof sealing area using a clean cloth, mild soap, and water. Do not remove grease from the sunroof.

If water is seen dripping into the water drainage system, this is normal.

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Head Restraints

Front Seats

The vehicle's front seats have adjustable head restraints in the outboard seating positions.

⚠ Warning

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

Adjust the head restraint so that the top of the restraint is at the same height as the top of the occupant's head. This position reduces the chance of a neck injury in a crash.

The height of the head restraint can be adjusted. Pull the head restraint up to raise it. Try to move the head restraint to make sure that it is locked in place.

To lower the head restraint, press the button, located on the top of the seatback, and push the head restraint down. Try to move the head restraint after the button is released to make sure that it is locked in place.

The front seat outboard head restraints are not removable.

Second Row Seats

The vehicle's second row seats have head restraints in the outboard seating positions that cannot be adjusted.

The second row seat outboard head restraints are not removable.

Third Row Seats

The third row seat head restraint can be lowered to allow for better visibility when the rear seat is unoccupied.

To lower the head restraint, press the button located on the top of the seatback and push the head restraint down.

Return the lowered head restraint to the upright position until it locks into place. Push and pull on the head restraint to make sure it is locked.

If you are installing a child restraint in the third row seat, see “Securing a Child Restraint Designed for the LATCH System” under *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106*.

Front Seats

Power Seat Adjustment

⚠ Warning

You can lose control of the vehicle if you try to adjust a driver seat while the vehicle is moving. Adjust the driver seat only when the vehicle is not moving.

⚠ Warning

The power seats will work with the ignition off. Children could operate the power seats and be injured. Never leave children alone in the vehicle.

Uplevel Seat Adjustment

If equipped, the ignition must be on to use all uplevel seat features.

1. Feature Select
2. Up
3. Rearward
4. Down
5. Forward

- Move Feature Select (1) to display seat adjustments on the infotainment display. Press and release or hold to scroll through features.
- Press Up (2) to make upward adjustments of the selected feature.
- Press Rearward (3) to make rearward adjustments of the selected feature.
- Press Down (4) to make downward adjustments of the selected feature.
- Press Forward (5) to make forward adjustments of the selected feature.

Base Seat Adjustment

To adjust the seat:

- Move the seat forward or rearward by sliding the control forward or rearward.
- Raise or lower the front part of the seat cushion by moving the front of the control up or down.
- Raise or lower the seat by moving the rear of the control up or down.

Lumbar Adjustment

Lumbar and Bolster Support

To adjust lumbar support:

- Press and hold the control forward to increase or rearward to decrease upper and lower lumbar support at the same time.
- Press and hold the control up to increase upper lumbar support and decrease lower lumbar support.

  Press and hold the control down to increase lower lumbar support and decrease upper lumbar support.

Uplevel Seat Adjustment

To adjust lumbar support, if equipped:

- Press and release or hold Feature Select (1) to scroll to lumbar support on the infotainment display.
- Press Forward (5) or Rearward (3) to adjust lumbar forward or rearward.
- Press Up (2) or Down (4) to adjust lumbar up or down.

To adjust bolster support, if equipped:

Uplevel Seat Adjustment

- Press and release or hold Feature Select (1) to scroll to bolster support on the infotainment display.
- Press Forward (5) or Rearward (3) to adjust bolster support inward or outward.

Upper Shoulder Support

To adjust upper shoulder support, if equipped:

- Press and release or hold Feature Select (1) to scroll to upper shoulder support on the infotainment display.

- Press Forward (5) or Rearward (3) to adjust shoulder support forward or rearward.

Reclining Seatbacks

To recline the seatback:

- Tilt the top of the control rearward to recline.
- Tilt the top of the control forward to raise.

⚠ Warning

Sitting in a reclined position when the vehicle is in motion can be dangerous. Even when buckled up, the seat belts cannot do their job.

The shoulder belt will not be against your body. Instead, it will be in front of you. In a crash, you could go into it, receiving neck or other injuries.

The lap belt could go up over your abdomen. The belt forces would be there, not at your pelvic bones. This could cause serious internal injuries.

For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear the seat belt properly.

Do not have a seatback reclined if the vehicle is moving.

Memory Seats

If equipped, memory seats allow two drivers to save and recall their unique seat positions for driving the vehicle, and a shared exit position for getting out of the vehicle. Other feature positions may also be saved, such as power mirrors and power steering wheel, if equipped. Memory positions are linked to RKE transmitter 1 or 2 for automatic memory recalls.

Before saving, adjust all available memory feature positions. Turn the ignition on and then press and release SET; a beep will sound. Then immediately press and hold 1, 2, or (Exit) until two beeps sound. To manually recall these positions, press and hold 1, 2, or until the saved position is reached. Follow the instructions under "Saving Memory Positions."

The vehicle identifies the current driver's RKE transmitter number (1–8). See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*. Only RKE transmitters 1 and 2 can be used for automatic memory recalls. A Driver Information Center (DIC) welcome message indicating the transmitter number may display for the first few ignition cycles following a transmitter change. For Auto Memory Recall to work properly, save the positions to the memory button (1 or 2) matching the RKE transmitter number displayed in the DIC welcome message. Carry the linked RKE transmitter when entering the vehicle.

Memory adjustments may not be available upon delivery or after service until steps in "Saving Memory Positions" section are performed.

Vehicle Personalization Settings

- To have the Auto Memory Recall movement begin when the vehicle is started, select the Settings menu, then Vehicle, then Comfort and Convenience, and then Auto Memory Recall. Select On or Off. See "Auto Memory Recall" later in this section.
- To begin Easy Exit Recall movement when the ignition is turned off and the driver door is opened, or when the ignition is turned off with the driver door already opened, select the Settings menu, then Vehicle, then Comfort and Convenience, and then Easy Exit Options. Select On or Off. See "Easy Exit Recall" later in this section.
- See *Vehicle Personalization* ⇨ *155* for additional setting information.

Identifying Driver Number

To identify the driver number:

1. Start the vehicle with a different key or RKE transmitter. The DIC should display the driver number; 1 or 2. Turn the ignition off and remove the key or RKE transmitter from the vehicle.
2. Start the vehicle with the initial key or RKE transmitter. The DIC should display the other driver number not shown in Step 1.

Saving Memory Positions

Read these instructions completely before saving memory positions.

To save preferred driving positions 1 and 2:

1. Turn the ignition on or to ACC/ ACCESSORY.

A DIC welcome message may indicate driver number 1 or 2.

2. Adjust all available memory features to the desired driving position.
3. Press and release SET; a beep will sound.
4. Immediately press and hold the 1 or 2 memory button matching the above DIC welcome message until two beeps sound.

   If too much time passes between releasing SET and pressing 1, the memory position will not be saved and two beeps will not sound. Repeat Steps 3 and 4.

   1 or 2 corresponds to the driver number. See “Identifying Driver Number” previously in this section.
5. Repeat Steps 1–4 for a second driver using 1 or 2.

To save the position for and easy exit features, repeat Steps 1–4 using . This saves the position for getting out of the vehicle.

Save preferred memory feature positions to both 1 and 2 if you are the only driver.

Manually Recalling Memory Positions

Press and hold 1, 2, or to recall the previously saved memory positions.

To stop Manual Memory Recall movement, release 1, 2, or or press any of the following controls:

- Power seat
- Memory SET
- Power mirror, with the driver or passenger side mirror selected
- Power steering wheel, if equipped

Auto Memory Recall

The vehicle identifies the number of the current driver’s RKE transmitter (1–8). See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*. If the RKE transmitter is 1 or 2, and Auto Memory Recall is programmed on in vehicle personalization, the positions saved to the same memory button number 1 or 2 are automatically recalled when the ignition is turned on, or turned from off to ACC/ACCESSORY. RKE transmitters 3–8 will not provide automatic memory recalls.

To turn Auto Memory Recall on or off, see "Vehicle Personalization Settings" previously in this section and *Vehicle Personalization* ⇨ *155*.

The shift lever must be in P (Park) to start Auto Memory Recall. Auto Memory Recall will complete if the vehicle is shifted out of P (Park) prior to reaching the saved memory position.

To stop Auto Memory Recall movement, turn the ignition off or press any of the following controls:

- Power seat
- Memory SET, 1, 2, or
- Power mirror, with the driver or passenger side mirror selected
- Power steering wheel, if equipped

If the saved memory seat position does not automatically recall or recalls to the wrong positions, the driver's RKE transmitter number (1 or 2) may not match the memory button number that positions were saved to. Try saving the position to the other memory button or try the other RKE transmitter.

Easy Exit Recall

Easy Exit Recall is not linked to an RKE transmitter. The position saved to is used for all drivers. To turn Easy Exit Recall on or off, see "Vehicle Personalization Settings" previously in this section and *Vehicle Personalization* ⇨ *155*.

If turned on, the position saved to is automatically recalled when one of the following occurs:

- The vehicle is turned off and the driver door is opened within a short time.
- The vehicle is turned off with the driver door open.

To stop Easy Exit Recall movement, press any of the following memory controls:

- Power seat
- Memory SET, 1, 2, or
- Power mirror, with the driver or passenger side mirror selected
- Power steering wheel, if equipped

Obstructions

If something has blocked the driver seat and/or power steering wheel while recalling a memory position, the recall may stop. Remove the obstruction and try the recall again. If the memory position still does not recall, see your dealer for service.

Massage

If equipped, the ignition must be on to use the massage feature.

To activate and adjust massage:

1. Turn the selection control (1) to view massage options on the infotainment display.
2. Select massage feature.
3. Press up or down to select the massage type.
4. Press forward or rearward to change the intensity.

5. To activate massage at last massage type and intensity settings or to turn massage off, press the massage On/Off control (2).

Heated and Cooled Front Seats

⚠ Warning

If temperature change or pain to the skin cannot be felt, the seat heater may cause burns. To reduce the risk of burns, use care when using the seat heater, especially for long periods of time. Do not place anything on the seat that insulates against heat, such as a blanket, cushion, cover, or similar item. This may cause the seat heater to overheat. An overheated seat heater may cause a burn or may damage the seat.

To operate, the engine must be running.

Press or to heat the driver or passenger seatback only.

Press or to heat the driver or passenger seat cushion and seatback.

Press or to cool the driver or passenger seat.

When this feature is off, the heated and cooled seat symbols on the buttons are white. When a heated seat is turned on, the symbol turns red. When a cooled seat is turned on, the symbol turns blue.

Press the button once for the highest setting. With each press of the button, the seat will change to the next lower setting, and then to the off setting. The indicator lights next to the buttons indicate three for the highest setting and one for the lowest. If the heated seats are on high for an extended time, their level may automatically be lowered.

The passenger seat may take longer to heat up.

Remote Start Auto Heated and Cooled Seats

During a remote start, the heated or cooled seats will turn on if enabled in vehicle personalization. When it is cold outside, the heated seats turn on; when it is hot outside, the cooled seats turn on. The seats will continue to operate depending on the vehicle's internal temperature. If auto heated or cooled seats are not equipped or enabled, seat operation is canceled when the ignition is turned on. Press the heated or cooled seat button to use the heated or cooled seats after the vehicle is started. See *Remote Vehicle Start* ⇨ *35* and *Vehicle Personalization* ⇨ *155*.

The heated or cooled seat indicator lights do not turn on during a remote start.

The temperature performance of an unoccupied seat may be reduced. This is normal.

Auto Heated and Cooled Seats

When the engine is running, the auto heated or cooled seats will automatically activate at the level determined by the vehicle's interior temperature, if enabled in vehicle personalization. See *Vehicle Personalization* ⇨ *155*. The indicator lights next to the buttons indicate the level of operation. Use the heated or cooled seat buttons to turn off auto heated or cooled seats. If the passenger seat is unoccupied, this feature will not activate that seat.

Rear Seats

Rear Seat Reminder

If equipped, the message REAR SEAT REMINDER LOOK IN REAR SEAT displays under certain conditions indicating there may be an item or passenger in the rear seat. Check before exiting the vehicle.

This feature will activate when a second row door is opened while the vehicle is on or up to 10 minutes before the vehicle is turned on. There will be an alert when the vehicle is turned off. The alert does not directly detect objects in the rear seat; instead, under certain conditions, it detects when a rear door is opened and closed, indicating that there may be something in the rear seat.

The feature is active only once each time the vehicle is turned on and off, and will require reactivation by opening and closing the second row doors. There may be an alert even when there is nothing in the rear seat; for example, if a child entered the vehicle through the rear door and left the vehicle without the vehicle being shut off.

The feature can be turned on or off. See *Vehicle Personalization* ⇨ *155*.

Heated Rear Seats

⚠ Warning

If temperature change or pain to the skin cannot be felt, the seat heater may cause burns. See the Warning under *Heated and Cooled Front Seats* ⇨ *69*.

The buttons are on the rear of the center console.

With the engine running, press or to heat the left or right outboard seat cushion. An indicator on the rear climate control display appears when this feature is on.

Press the button once for the highest setting. With each press of the button, the seat will change to the next lower setting, and then to the off setting. The indicator lights next to the buttons indicate three for the highest setting and one for the lowest.

If the heated seats are on high for an extended time, their level may automatically be lowered.

Second Row Seats

The second row seats can be folded for additional cargo space or folded and tumbled for easy entry and exit to the third row seat.

Reclining Seatbacks

To recline the seatback:

1. Lift the lever on the outboard side of the seat.

2. Move the seatback to the desired position, and then release the lever to lock the seatback in place.
3. Push and pull on the seatback to make sure it is locked.

To return the seatback to the upright position:

⚠ Warning

If either seatback is not locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always push and pull on the seatbacks to be sure they are locked.

1. Lift the lever fully while applying pressure to the seatback, and the seatback will return to the upright position. If the lever is lifted without applying pressure, the seat will release to a folded position.
2. Push and pull on the seatback to make sure it is locked.

Manual Fold and Tumble Feature

⚠ Warning

Do not leave the second row seat in a tumbled position while the vehicle is in motion. A tumbled seat is not locked. It can move when the vehicle is in motion. People in the vehicle could be injured in a sudden stop or crash. Be sure to return the seat to the passenger seating position before driving the vehicle. Push and pull on the seat to make sure it is locked into place.

Caution

Folding a rear seat with the seat belts still fastened may cause damage to the seat or the seat belts. Always unbuckle the seat belts and return them to their normal stowed position before folding a rear seat.

Folding and Tumbling the Seat

To fold and tumble the seat:

1. Make sure that there is nothing under, in front of, or on the seat.

2. Lift the lever on the outboard side of the seat to release the seatback.

The seatback will fold forward to create a flat load floor.

If the seatback cannot fold flat, try moving the front seat forward and/or put the front seatback in the upright position.

3. Lift the lever again to release the rear of the seat from the floor. The seat will tumble forward.

Folding and Tumbling the Seat from the Third Row Seat

⚠ Warning

Using the third row seating position while the second row is folded, or folded and tumbled, could cause injury in a sudden stop or crash. Be sure to return the seat to the passenger seating position. Push and pull on the seat to make sure it is locked into place.

To fold and tumble the seat from the third row seat:

1. Make sure that there is nothing under, in front of, or on the seat.

2. Pull the strap on the bottom rear of the second row seat to release the seatback. The seatback will fold forward.

3. Pull the strap again to release the rear of the seat from the floor. The seat will tumble forward.

Automatic Fold and Tumble Feature

⚠ Warning

Do not leave the second row seat in a tumbled position while the vehicle is in motion. A tumbled seat is not locked. It can move when the

(Continued)

Warning (Continued)

vehicle is in motion. People in the vehicle could be injured in a sudden stop or crash. Be sure to return the seat to the passenger seating position before driving the vehicle. Push and pull on the seat to make sure it is locked into place.

⚠ Warning

Automatically folding and tumbling the seat when someone is sitting in the seat, could cause injury to the person sitting there. Always make sure there is no one sitting in the seat before pressing the automatic seat release switch.

Caution

Folding a rear seat with the seat belts still fastened may cause damage to the seat or the seat belts. Always unbuckle the seat belts and return them to their normal stowed position before folding a rear seat.

The transmission must be in P (Park) for this feature to work.

Folding and Tumbling the Seat

To fold and tumble the seat:

1. Make sure that there is nothing under, in front of, or on the seat.

Driver Side Rear Panel Switch

2. Press the automatic seat release switch on the panel behind the rear doors. The seatback automatically folds flat.
3. Press the switch again to release the rear of the seat from the floor. The seat will tumble forward.

Folding and Tumbling the Second Row Seat from the Cargo Area

1. Second Row Power Seat Fold and Tumble Switches
2. Third Row Power Seat Fold and Raise Switches

To fold and tumble the seat from the cargo area:

1. Make sure that there is nothing under, in front of, or on the seat.
2. Press the switch (1) on the side trim of the cargo area to fold the second row seatback. The left switch folds the left seatback, and the right switch folds the right seatback.
3. Press the switch again to release the rear of the seat from the floor. The seat will tumble forward.

The switches (2) can be used to fold the third row seatbacks from the cargo area. See *Third Row Seats* ⇨ *76*.

Returning the Seat to the Sitting Position

⚠ Warning

If either seatback is not locked, it could move forward in a sudden stop or crash. That could cause injury to the person sitting there. Always push and pull on the seatbacks to be sure they are locked.

To return the seat to the sitting position from the tumbled position:

1. Pull the seat down until it latches to the floor. The seatback cannot be raised if the seat is not latched to the floor.
2. Lift the seatback and push it rearward. Push and pull on the seatback to make sure it is locked.
3. For the 60/40 split-bench seat, make sure the seat belt in the center seating position is not caught between the two seats and is not twisted.

Third Row Seats

Folding the Seatback

Caution

Folding a rear seat with the seat belts still fastened may cause damage to the seat or the seat belts. Always unbuckle the seat

(Continued)

Caution (Continued)

belts and return them to their normal stowed position before folding a rear seat.

The transmission must be in P (Park) for this feature to work.

The third row seatbacks can be folded to increase cargo space.

1. Second Row Power Seat Fold and Tumble Switches
2. Third Row Power Seat Fold and Raise Switches

To fold the seatback:

1. Open the liftgate to access the controls for the third row seat.
2. Make sure that there is nothing under, in front of, or on the seat.
3. Fully lower the head restraints. See *Head Restraints* ⇨ *61*. Put the second row seatback in the upright position. See *Second Row Seats* ⇨ *71*.

4. Disconnect the rear seat belt mini-latch, using a key in the slot on the mini-buckle, and let the belt retract into the headliner.

5. Stow the mini-latch in the holder in the headliner.
6. Press and hold the switch (2) on the side trim of the cargo area to fold the third row seatback.

   The left switch folds the left seatback, and the right switch folds the right seatback.
7. Repeat the steps for the other seatback, if desired.

The switches (1) can be used to fold or fold and tumble the second row seats from the cargo area. See *Second Row Seats* ⇨ *71*.

Returning the Third Row Seatback to the Upright Position

1. Second Row Power Seat Fold and Tumble Switches
2. Third Row Power Seat Fold and Raise Switches

To return the third row seatback to the upright position:

1. Open the liftgate to access the controls for the seat.
2. Press and hold the switch (2) on the side trim of the cargo area to raise the third row seatback.

   The left switch raises the left seatback, and the right switch raises the right seatback.

⚠ Warning

A seat belt that is improperly routed, not properly attached, or twisted will not provide the protection needed in a crash. The person wearing the belt could be seriously injured. After raising the rear seatback, always check to be sure that the seat belts are properly routed and attached, and are not twisted.

3. Reconnect the center seat belt mini-latch to the mini-buckle. Do not let it twist.
4. Pull on the seat belt to be sure the mini-latch is secure.
5. Repeat the steps for the other seatback, if desired.

Seat Belts

This section describes how to use seat belts properly, and some things not to do.

⚠ Warning

Do not let anyone ride where a seat belt cannot be worn properly. In a crash, if you or your passenger(s) are not wearing seat belts, injuries can be much worse than if you are wearing seat belts. You can be seriously injured or killed by hitting things inside the vehicle harder or by being ejected from the vehicle. In addition, anyone who is not buckled up can strike other passengers in the vehicle.

It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, passengers riding in these areas are more likely to be seriously injured or killed. Do

(Continued)

Warning (Continued)

not allow passengers to ride in any area of the vehicle that is not equipped with seats and seat belts.

Always wear a seat belt, and check that all passenger(s) are restrained properly too.

This vehicle has indicators as a reminder to buckle the seat belts. See *Seat Belt Reminders* ⇨ *138*.

Why Seat Belts Work

When riding in a vehicle, you travel as fast as the vehicle does. If the vehicle stops suddenly, you keep going until something stops you. It could be the windshield, the instrument panel, or the seat belts!

When you wear a seat belt, you and the vehicle slow down together. There is more time to stop because you stop over a longer distance and, when worn properly, your strongest bones take the forces from the seat belts. That is why wearing seat belts makes such good sense.

Questions and Answers About Seat Belts

Q: Will I be trapped in the vehicle after a crash if I am wearing a seat belt?

A: You *could* be — whether you are wearing a seat belt or not. Your chance of being conscious during and after a crash, so you *can* unbuckle and get out, is *much* greater if you are belted.

Q: If my vehicle has airbags, why should I have to wear seat belts?

A: Airbags are supplemental systems only. They work *with* seat belts — not instead of them. Whether or not an airbag is provided, all occupants still have to buckle up to get the most protection.

Also, in nearly all states and in all Canadian provinces, the law requires wearing seat belts.

How to Wear Seat Belts Properly

Follow these rules for everyone's protection.

There are additional things to know about seat belts and children, including smaller children and infants. If a child will be riding in the vehicle, see *Older Children* ⇨ *99* or *Infants and Young Children* ⇨ *101*. Review and follow the rules for children in addition to the following rules.

It is very important for all occupants to buckle up. Statistics show that unbelted people are hurt more often in crashes than those who are wearing seat belts.

There are important things to know about wearing a seat belt properly.

- Sit up straight and always keep your feet on the floor in front of you (if possible).
- Always use the correct buckle for your seating position.
- Wear the lap part of the belt low and snug on the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones and you would be less likely to slide under the lap belt. If you slid under it, the belt would apply force on your abdomen. This could cause serious or even fatal injuries.
- Wear the shoulder belt over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces. The shoulder belt locks if there is a sudden stop or crash.

⚠ Warning

You can be seriously injured, or even killed, by not wearing your seat belt properly.

Never allow the lap or shoulder belt to become loose or twisted.

Never wear the shoulder belt under both arms or behind your back.

Always use the correct buckle for your seating position.

Never route the lap or shoulder belt over an armrest.

Lap-Shoulder Belt

All seating positions in the vehicle have a lap-shoulder belt.

If you are using a rear seating position with a detachable seat belt, and the seat belt is not attached, see *Third Row Seats* ⇨ *76* for instructions on reconnecting the seat belt to the mini-buckle.

The following instructions explain how to wear a lap-shoulder belt properly.

1. Adjust the seat, if the seat is adjustable, so you can sit up straight. To see how, see “Seats” in the Index.

2. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

   The lap-shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

   If the shoulder portion of a passenger belt is pulled out all the way, the child restraint locking feature may be engaged. If this happens, let the belt go back all the way and start again.

   Engaging the child restraint locking feature in the front outboard seating position may affect the passenger sensing system. See *Passenger Sensing System* ⇨ *93*.

   For front seating positions, if the webbing locks in the latch plate before it reaches the buckle, tilt the latch plate flat to unlock.

3. Push the latch plate into the buckle until it clicks. If the latch plate will not go fully into the buckle, check if the correct buckle is being used.

   Pull up on the latch plate to make sure it is secure. If the belt is not long enough, see *Seat Belt Extender* ⇨ *86*.

   Position the release button on the buckle so that the seat belt could be quickly unbuckled if necessary.

4. If equipped with a shoulder belt height adjuster, move it to the height that is right for you. See "Shoulder Belt Height Adjuster" in this section for instructions on use and important safety information.

5. To make the lap part tight, pull up on the shoulder belt.

   For third row seats, it may be necessary to pull stitching on the seat belt through the latch plate to fully tighten the lap belt on smaller occupants.

To unlatch the belt, push the button on the buckle. The belt should return to its stowed position.

For third row seats, slide the latch plate up the safety webbing when the seat belt is not in use. The latch plate should rest on the stitching on the seat belt.

Always stow the seat belt slowly. If the seat belt webbing returns quickly to the stowed position, the retractor may lock and cannot be pulled out. If this happens, pull the seat belt straight out firmly to unlock the webbing, and then release it. If the webbing is still locked in the retractor, see your dealer.

Before a door is closed, be sure the seat belt is out of the way. If a door is slammed against a seat belt, damage can occur to both the seat belt and the vehicle.

Shoulder Belt Height Adjuster

The vehicle has a shoulder belt height adjuster for the driver and front outboard passenger seating positions.

Adjust the height so the shoulder portion of the belt is on the shoulder and not falling off of it. The belt should be close to, but not contacting, the neck. Improper shoulder belt height adjustment could reduce the effectiveness of the seat belt in a crash. See *How to Wear Seat Belts Properly* ⇨ *79*.

Push down on the release button to move the height adjuster to the desired position.

Move the adjuster up by pushing up on the shoulder belt guide.

After the adjuster is set to the desired position, try to move it down without pushing the release button to make sure it has locked into position.

Automatic Seat Belt Tightening System

The vehicle may have the Automatic Seat Belt Tightening System.

The system activates during emergency braking and/or sudden driving maneuvers and releases when driving conditions return to normal.

The system will not activate if the Traction Control/Electronic Stability Control system is not functioning properly. See *Traction Control/ Electronic Stability Control* ⇨ *222*.
If there is a problem with the Automatic Seat Belt Tightening System, a message displays on the Driver Information Center (DIC). If a system unavailable message displays repeatedly or a service message displays, see your dealer. Other seat belt functions are not affected by the Automatic Seat Belt Tightening System.

Seat Belt Pretensioners

This vehicle has seat belt pretensioners for front outboard occupants. Although the seat belt pretensioners cannot be seen, they are part of the seat belt assembly. They can help tighten the seat belts during the early stages of a moderate to severe frontal, near frontal, or rear

crash if the threshold conditions for pretensioner activation are met. Seat belt pretensioners can also help tighten the seat belts in a side crash or a rollover event.

Pretensioners work only once. If the pretensioners activate in a crash, the pretensioners and probably other parts of the vehicle's seat belt system will need to be replaced. See *Replacing Seat Belt System Parts after a Crash* ⇨ *87*.

Do not sit on the outboard seat belt while entering or exiting the vehicle or at any time while sitting in the seat. Sitting on the seat belt can damage the webbing and hardware.

Rear Seat Belt Comfort Guides

⚠ Warning

A seat belt that is not properly worn may not provide the protection needed in a crash. The person wearing the belt could be seriously injured. The shoulder belt

(Continued)

Warning (Continued)

should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces.

Rear seat belt comfort guides may provide added seat belt comfort for older children who have outgrown booster seats and for some adults. When installed on a shoulder belt, the comfort guide positions the shoulder belt away from the neck and head.

Second Row Outboard Seating Positions

The vehicle has comfort guides for the second row outboard seating positions. The comfort guides are stored on a clip on the interior trim next to the outboard seatback.

To install:

1. Remove the guide from its storage clip on the interior trim next to the outboard seatback.

2. Place the guide over the belt, and insert the two edges of the belt into the slots of the guide.

3. Be sure that the belt is not twisted and it lies flat. The elastic cord must be behind the belt with the plastic guide on the front.

4. Buckle, position, and release the seat belt as described previously in this section. Make sure the shoulder portion of the belt is on the shoulder and not falling off of it. The belt should be close to, but not contacting, the neck.

To remove and store the comfort guide, squeeze the belt edges together so that the seat belt can be removed from the guide. Slide the guide onto its storage clip.

Third Row Seating Positions

Comfort guides are available through your dealer for third row seating positions. Instructions are included with the guides.

Seat Belt Use During Pregnancy

Seat belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they do not wear seat belts.

A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a seat belt is worn properly, it is more likely that the fetus will not be hurt in a crash. For pregnant women, as for anyone, the key to making seat belts effective is wearing them properly.

Seat Belt Extender

If the vehicle's seat belt will fasten around you, you should use it. But if a seat belt is not long enough, your dealer will order you an extender. When you go in to order it, take the heaviest coat you will wear, so the extender will be long enough for you. To help avoid personal injury, do not let someone else use it, and use it only for the seat it is made to fit. The extender has been designed for adults. Never use it for securing child restraints. For more information on the proper use and fit of seat belt extenders see the instruction sheet that comes with the extender.

Safety System Check

Periodically check the seat belt reminder, seat belts, buckles, latch plates, retractors, shoulder belt height adjusters (if equipped), and seat belt anchorages to make sure they are all in working order. Look for any other loose or damaged seat belt system parts that might keep a seat belt system from performing properly. See your dealer to have it repaired. Torn, frayed, or twisted seat belts may not protect you in a crash. Torn or frayed seat belts can rip apart under impact forces. If a belt is torn or frayed, have it replaced immediately. If a belt is twisted, it may be possible to untwist by reversing the latch plate on the webbing. If the twist cannot be corrected, ask your dealer to fix it.

Make sure the seat belt reminder light is working. See *Seat Belt Reminders* ⇨ *138*.

Keep seat belts clean and dry. See *Seat Belt Care* ⇨ *86*.

Seat Belt Care

Keep belts clean and dry.

Seat belts should be properly cared for and maintained.

Seat belt hardware should be kept dry and free of dust or debris. As necessary, exterior hard surfaces and seat belt webbing may be lightly cleaned with mild soap and water. Ensure there is not excessive dust or debris in the mechanism. If dust or debris exists in the system please see the dealer. Parts may need to be replaced to ensure proper functionality of the system.

⚠ Warning

Do not bleach or dye seat belt webbing. It may severely weaken the webbing. In a crash, they might not be able to provide adequate protection. Clean and rinse seat belt webbing only with mild soap and lukewarm water. Allow the webbing to dry.

Replacing Seat Belt System Parts after a Crash

⚠ Warning

A crash can damage the seat belt system in the vehicle. A damaged seat belt system may not properly protect the person using it, resulting in serious injury or even death in a crash. To help make sure the seat belt systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

After a minor crash, replacement of seat belts may not be necessary. But the seat belt assemblies that were used during any crash may have been stressed or damaged. See your dealer to have the seat belt assemblies inspected or replaced.

New parts and repairs may be necessary even if the seat belt system was not being used at the time of the crash.

Have the seat belt pretensioners checked if the vehicle has been in a crash, or if the airbag readiness light stays on after you start the vehicle or while you are driving. See *Airbag Readiness Light* ⇨ *139*.

Airbag System

The vehicle has the following airbags:

- A frontal airbag for the driver
- A frontal airbag for the front outboard passenger
- A front center airbag for the driver and front outboard passenger
- A seat-mounted side impact airbag for the driver
- A seat-mounted side impact airbag for the front outboard passenger
- A roof-rail airbag for the driver and for the second and third row passengers seated directly behind the driver
- A roof-rail airbag for the front outboard passenger and the second and third row passengers seated directly behind the front outboard passenger

All vehicle airbags have the word AIRBAG on the trim or on a label near the deployment opening.

For frontal airbags, the word AIRBAG is on the center of the steering wheel for the driver and on the instrument panel for the front outboard passenger.

For the front center airbag, the word AIRBAG is on the inboard side of the driver seatback.

For seat-mounted side impact airbags, the word AIRBAG is on the side of the seat closest to the door.

For roof-rail airbags, the word AIRBAG is on the ceiling or trim.

Airbags are designed to supplement the protection provided by seat belts. Even though today's airbags are also designed to help reduce the risk of injury from the force of an inflating bag, all airbags must inflate very quickly to do their job.

Here are the most important things to know about the airbag system:

⚠ Warning

You can be severely injured or killed in a crash if you are not wearing your seat belt, even with airbags. Airbags are designed to work with seat belts, not replace them. Also, airbags are not designed to inflate in every crash. In some crashes seat belts are the only restraint. See *When Should an Airbag Inflate?* ➪ *90*.

Wearing your seat belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Airbags are “supplemental restraints” to the seat belts. Everyone in the vehicle should wear a seat belt properly, whether or not there is an airbag for that person.

⚠ Warning

Because airbags inflate with great force and faster than the blink of an eye, anyone who is up against, or very close to any airbag when it inflates can be seriously injured or killed. Do not sit unnecessarily close to any airbag, as you would be if sitting on the edge of the seat or leaning forward. Seat belts help keep you in position before and during a crash. Always wear a seat belt, even with airbags. The driver should sit as far back as possible while still maintaining control of the vehicle. The seat belts and the front outboard passenger airbags are most effective when you are sitting well back and upright in the seat with both feet on the floor.

Occupants should not lean on or sleep against the front center armrest or console in vehicles with a front center airbag.

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Warning (Continued)

Occupants should not lean on or sleep against the door or side windows in seating positions with seat-mounted side impact airbags and/or roof-rail airbags.

⚠ Warning

Children who are up against, or very close to, any airbag when it inflates can be seriously injured or killed. Always secure children properly in the vehicle. To read how, see *Older Children* ⇨ *99* or *Infants and Young Children* ⇨ *101*.

There is an airbag readiness light on the instrument cluster, which shows the airbag symbol.

The system checks the airbag electrical system for malfunctions. The light tells you if there is an electrical problem. See *Airbag Readiness Light* ⇨ *139*.

Where Are the Airbags?

The driver frontal airbag is in the center of the steering wheel.

The front outboard passenger frontal airbag is in the passenger side instrument panel.

The front center airbag is in the inboard side of the driver seatback.

Driver Side Shown, Passenger Side Similar

The driver and front outboard passenger seat-mounted side impact airbags are in the side of the seatbacks closest to the door.

Driver Side Shown, Passenger Side Similar

The roof-rail airbags for the driver, front outboard passenger, and second and third row outboard passengers are in the ceiling above the side windows.

⚠ Warning

If something is between an occupant and an airbag, the airbag might not inflate properly or it might force the object into that person causing severe injury or even death. The path of an inflating

(Continued)

Warning (Continued)

airbag must be kept clear. Do not put anything between an occupant and an airbag, and do not attach or put anything on the steering wheel hub or on or near any other airbag covering.

Do not use seat or console accessories that block the inflation path of a seat-mounted side impact airbag or the front center airbag.

Never secure anything to the roof of a vehicle with roof-rail airbags by routing a rope or tie-down through any door or window opening. If you do, the path of an inflating roof-rail airbag will be blocked.

When Should an Airbag Inflate?

This vehicle is equipped with airbags. See *Airbag System* ⇨ *87*. Airbags are designed to inflate if the impact exceeds the specific airbag system's deployment threshold. Deployment

thresholds are used to predict how severe a crash is likely to be in time for the airbags to inflate and help restrain the occupants. The vehicle has electronic sensors that help the airbag system determine the severity of the impact. Deployment thresholds can vary with specific vehicle design.

Frontal airbags are designed to inflate in moderate to severe frontal or near frontal crashes to help reduce the potential for severe injuries, mainly to the driver's or front outboard passenger's head and chest.

Whether the frontal airbags will or should inflate is not based primarily on how fast the vehicle is traveling. It depends on what is hit, the direction of the impact, and how quickly the vehicle slows down.

Frontal airbags may inflate at different crash speeds depending on whether the vehicle hits an object straight on or at an angle, and whether the object is fixed or moving, rigid or deformable, narrow or wide.

Frontal airbags are not intended to inflate during vehicle rollovers, rear impacts, or many side impacts.

In addition, the vehicle has advanced technology frontal airbags. Advanced technology frontal airbags adjust the restraint according to crash severity.

The vehicle also has a seat position sensor that enables the sensing system to monitor the position of the driver seat. The seat position sensor provides information that is used to adjust the deployment of the driver frontal airbag.

The front center airbag is designed to inflate in moderate to severe side crashes depending upon the location of the impact, when either side of the vehicle is struck. In addition, the front center airbag is designed to inflate when the sensing system predicts that the vehicle is about to roll over on its side. The front center airbag is not designed to inflate in frontal impacts, near frontal impacts, or rear impacts.

Seat-mounted side impact airbags are designed to inflate in moderate to severe side crashes depending on the location of the impact. Seat-mounted side impact airbags are not designed to inflate in frontal impacts, near frontal impacts, rollovers, or rear impacts. A seat-mounted side impact airbag is designed to inflate on the side of the vehicle that is struck.

Roof-rail airbags are designed to inflate in moderate to severe side crashes depending on the location of the impact. In addition, these roof-rail airbags are designed to inflate during a rollover or in a severe frontal impact. Roof-rail airbags are not designed to inflate in rear impacts. Both roof-rail airbags will inflate when either side of the vehicle is struck, if the sensing system predicts that the vehicle is about to roll over on its side, or in a severe frontal impact.

In any particular crash, no one can say whether an airbag should have inflated simply because of the vehicle damage or the repair costs.

What Makes an Airbag Inflate?

In a deployment event, the sensing system sends an electrical signal triggering a release of gas from the inflator. Gas from the inflator fills the airbag causing the bag to break out of the cover. The inflator, the airbag, and related hardware are all part of the airbag module.

For airbag locations, see *Where Are the Airbags?* ⇨ *89*.

How Does an Airbag Restrain?

In moderate to severe frontal or near frontal collisions, even belted occupants can contact the steering wheel or the instrument panel. In moderate to severe side collisions, even belted occupants can contact the inside of the vehicle.

Airbags supplement the protection provided by seat belts by distributing the force of the impact more evenly over the occupant's body.

Rollover capable roof-rail airbags are designed to help contain the head and chest of occupants in the outboard seating positions in the first, second, and third rows. The rollover capable roof-rail airbags are designed to help reduce the risk of full or partial ejection in rollover events, although no system can prevent all such ejections.

But airbags would not help in many types of collisions, primarily because the occupant's motion is not toward those airbags. See *When Should an Airbag Inflate?* ⇨ *90*.

Airbags should never be regarded as anything more than a supplement to seat belts.

What Will You See after an Airbag Inflates?

After frontal and seat-mounted side impact airbags inflate, they quickly deflate, so quickly that some people may not even realize the airbags inflated. The front center airbag and roof-rail airbags may still be at least partially inflated for some time after they inflate. Some components of the airbag module may be hot for several minutes. For location of the airbags, see *Where Are the Airbags?* ⇨ *89*.

The parts of the airbag that come into contact with you may be warm, but not too hot to touch. There may be some smoke and dust coming from the vents in the deflated airbags. Airbag inflation does not prevent the driver from seeing out of the windshield or being able to steer the vehicle, nor does it prevent people from leaving the vehicle.

⚠ Warning

When an airbag inflates, there may be dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but cannot get out of the vehicle after an airbag inflates, then get

(Continued)

Warning (Continued)

fresh air by opening a window or a door. If you experience breathing problems following an airbag deployment, you should seek medical attention.

The vehicle has a feature that may automatically unlock the doors, turn on the interior lamps and hazard warning flashers, and shut off the fuel system after the airbags inflate. The feature may also activate, without airbag inflation, after an event that exceeds a predetermined threshold. After turning the ignition off and then on again, the fuel system will return to normal operation; the doors can be locked, the interior lamps can be turned off, and the hazard warning flashers can be turned off using the controls for those features. If any of these systems are damaged in the crash they may not operate as normal.

⚠ Warning

A crash severe enough to inflate the airbags may have also damaged important functions in the vehicle, such as the fuel system, brake and steering systems, etc. Even if the vehicle appears to be drivable after a moderate crash, there may be concealed damage that could make it difficult to safely operate the vehicle.

Use caution if you should attempt to restart the engine after a crash has occurred.

In many crashes severe enough to inflate the airbag, windshields are broken by vehicle deformation. Additional windshield breakage may also occur from the front outboard passenger airbag.

- Airbags are designed to inflate only once. After an airbag inflates, you will need some new parts for the airbag system. If you do not get them, the airbag system will not be there to help protect you in another crash. A new system will include airbag modules and possibly other parts. The service manual for the vehicle covers the need to replace other parts.
- The vehicle has a crash sensing and diagnostic module which records information after a crash. See *Vehicle Data Recording and Privacy* ⇨ *390* and *Event Data Recorders* ⇨ *390*.
- Let only qualified technicians work on the airbag systems. Improper service can mean that an airbag system will not work properly. See your dealer for service.

Passenger Sensing System

The vehicle has a passenger sensing system for the front outboard passenger position. The passenger airbag status indicator will light on the overhead console when the vehicle is started.

United States

Canada and Mexico

The words ON and OFF, or the symbols for on and off, will be visible during the system check. When the system check is complete, either the word ON or OFF, or the symbol for on or off, will be visible. See *Passenger Airbag Status Indicator* ⇨ *139*.

The passenger sensing system turns off the front outboard passenger frontal airbag under certain conditions. No other airbag is affected by the passenger sensing system.

The passenger sensing system works with sensors that are part of the front outboard passenger seat and seat belt. The sensors are designed to detect the presence of a properly seated occupant and determine if the front outboard passenger frontal airbag should be allowed to inflate or not.

According to accident statistics, children are safer when properly secured in a rear seat in the correct child restraint for their weight and size.

Whenever possible, children aged 12 and under should be secured in a rear seating position.

Never put a rear-facing child seat in the front. This is because the risk to the rear-facing child is so great, if the airbag inflates.

⚠ Warning

A child in a rear-facing child restraint can be seriously injured or killed if the passenger frontal airbag inflates. This is because the back of

(Continued)

Warning (Continued)

the rear-facing child restraint would be very close to the inflating airbag. A child in a forward-facing child restraint can be seriously injured or killed if the passenger frontal airbag inflates and the passenger seat is in a forward position.

Even if the passenger sensing system has turned off the passenger frontal airbag, no system is fail-safe. No one can guarantee that an airbag will not deploy under some unusual circumstance, even though the airbag is turned off.

Never put a rear-facing child restraint in the front seat, even if the airbag is off. If securing a forward-facing child restraint in the front outboard passenger seat, always move the seat as far back as it will go. It is better to secure child restraints in the rear seat. Consider using another vehicle to transport the child when a rear seat is not available.

The passenger sensing system is designed to turn off the front outboard passenger frontal airbag if:

- The front outboard passenger seat is unoccupied.
- The system determines an infant is present in a child restraint.
- A front outboard passenger takes his/her weight off of the seat for a period of time.
- There is a critical problem with the airbag system or the passenger sensing system.

When the passenger sensing system has turned off the front outboard passenger frontal airbag, the OFF indicator will light and stay lit as a reminder that the airbag is off. See *Passenger Airbag Status Indicator* ⇨ *139*.

The passenger sensing system is designed to turn on the front outboard passenger frontal airbag anytime the system senses that a person of adult size is sitting properly in the front outboard passenger seat.

When the passenger sensing system has allowed the airbag to be enabled, the ON indicator will light and stay lit as a reminder that the airbag is active.

For some children, including children in child restraints, and for very small adults, the passenger sensing system may or may not turn off the front outboard passenger frontal airbag, depending upon the person's seating posture and body build. Everyone in the vehicle who has outgrown child restraints should wear a seat belt properly — whether or not there is an airbag for that person.

⚠ Warning

If the airbag readiness light ever comes on and stays on, it means that something may be wrong with the airbag system. To help avoid injury to yourself or others, have the vehicle serviced right away. See *Airbag Readiness Light* ⇨ *139* for more information, including important safety information.

If the On Indicator Is Lit for a Child Restraint

The passenger sensing system is designed to turn off the front outboard passenger frontal airbag if the system determines that an infant is present in a child restraint. If a child restraint has been installed and the ON indicator is lit:

1. Turn the vehicle off.
2. Remove the child restraint from the vehicle.
3. Remove any additional items from the seat such as blankets, cushions, seat covers, seat heaters, or seat massagers.
4. Reinstall the child restraint following the directions provided by the child restraint manufacturer and refer to *Securing Child Restraints (With the Seat Belt in the Rear Seat)* ⇨ *114* or *Securing Child Restraints (With the Seat Belt in the Front Seat)* ⇨ *116*.

Make sure the seat belt retractor is locked by pulling the shoulder belt all the way out of the retractor when installing the child restraint, even if the child restraint is equipped with a seat belt lock off. When the retractor lock is set, the belt can be tightened but not pulled out of the retractor.

5. If, after reinstalling the child restraint and restarting the vehicle, the ON indicator is still lit, turn the vehicle off. Then slightly recline the vehicle seatback and adjust the seat cushion, if adjustable, to make sure that the vehicle seatback is not pushing the child restraint into the seat cushion.

   Also make sure the child restraint is not trapped under the vehicle head restraint. If this happens, adjust the head restraint. See *Head Restraints* ⇨ *61*.

6. Restart the vehicle.

The passenger sensing system may or may not turn off the airbag for a child in a child restraint depending upon the child's size. It is better to secure the child restraint in a rear seat. Never put a rear-facing child restraint in the front seat, even if the ON indicator is not lit.

If the Off Indicator Is Lit for an Adult-Sized Occupant

If a person of adult size is sitting in the front outboard passenger seat, but the OFF indicator is lit, it could be because that person is not sitting properly in the seat or that the child restraint locking feature is engaged.

Use the following steps to allow the system to detect that person and enable the front outboard passenger frontal airbag:

1. Turn the vehicle off.
2. Remove any additional material from the seat, such as blankets, cushions, seat covers, seat heaters, or seat massagers.
3. Place the seatback in the fully upright position.
4. Have the person sit upright in the seat, centered on the seat cushion, with legs comfortably extended.
5. If the shoulder portion of the belt is pulled out all the way, the child restraint locking feature will be engaged. This may unintentionally cause the passenger sensing system to turn the airbag off for some adult-sized occupants. If this happens, unbuckle the belt, let the belt go back all the way, and then buckle the belt again without pulling the belt out all the way.

6. Restart the vehicle and have the person remain in this position for two to three minutes after the ON indicator is lit.

⚠ Warning

If the front outboard passenger airbag is turned off for an adult-sized occupant, the airbag will not be able to inflate and help protect that person in a crash, resulting in an increased risk of serious injury or even death. An adult-sized occupant should not ride in the front outboard passenger seat, if the passenger airbag OFF indicator is lit.

Additional Factors Affecting System Operation

Seat belts help keep the passenger in position on the seat during vehicle maneuvers and braking, which helps the passenger sensing system maintain the passenger airbag status. See “Seat Belts” and “Child Restraints” in the Index for additional information about the importance of proper restraint use.

A thick layer of additional material, such as a blanket or cushion, or aftermarket equipment such as seat covers, seat heaters, and seat massagers can affect how well the passenger sensing system operates. We recommend that you not use seat covers or other aftermarket equipment except when approved by GM for your specific vehicle. See *Adding Equipment to the Airbag-Equipped Vehicle* ⇨ *98* for more information about modifications that can affect how the system operates.

The ON indicator may be lit if an object, such as a briefcase, handbag, grocery bag, laptop, or other electronic device, is put on an unoccupied seat. If this is not desired, remove the object from the seat.

⚠ Warning

Stowing articles under the passenger seat or between the passenger seat cushion and seatback may interfere with the proper operation of the passenger sensing system.

Servicing the Airbag-Equipped Vehicle

Airbags affect how the vehicle should be serviced. There are parts of the airbag system in several places around the vehicle. Your dealer and the service manual have information about servicing the vehicle and the airbag system. To purchase a service manual, see *Publication Ordering Information* ⇨ *387*.

⚠ Warning

For up to 10 seconds after the vehicle is turned off and the battery is disconnected, an airbag can still inflate during improper service. You can be injured if you are close to an airbag when it inflates. Avoid yellow connectors. They are probably part of the airbag system. Be sure to follow proper service procedures, and make sure the person performing work for you is qualified to do so.

Adding Equipment to the Airbag-Equipped Vehicle

Adding accessories that change the vehicle's frame, bumper system, height, front end, or side sheet metal may keep the airbag system from working properly.

The operation of the airbag system can also be affected by changing, including improperly repairing or replacing, any parts of the following:

- Airbag system, including airbag modules, front or side impact sensors, sensing and diagnostic module, airbag wiring, or front center console
- Front seats, including stitching, seams or zippers
- Seat belts
- Steering wheel, instrument panel, overhead console, ceiling trim, or pillar garnish trim
- Inner door seals, including speakers

Your dealer and the service manual have information about the location of the airbag modules and sensors, sensing and diagnostic module, and airbag wiring along with the proper replacement procedures.

In addition, the vehicle has a passenger sensing system for the front outboard passenger position, which includes sensors that are part of the passenger's seat. The passenger sensing system may not operate properly if the original seat trim is replaced with non-GM covers, upholstery, or trim, or with GM covers, upholstery, or trim designed for a different vehicle. Any object, such as an aftermarket seat heater or a comfort enhancing pad or device, installed under or on top of the seat fabric, could also interfere with the operation of the passenger sensing system. This could either prevent proper deployment of the passenger airbag(s) or prevent the passenger sensing system from properly turning off the passenger airbag(s). See *Passenger Sensing System* ⇨ *93*.

If the vehicle has rollover roof-rail airbags, see *Different Size Tires and Wheels* ⇨ *331* for additional important information.

If the vehicle must be modified because you have a disability and you have questions about whether the modifications will affect the vehicle's airbag system, or if you have questions about whether the airbag system will be affected if the vehicle is

modified for any other reason, call Customer Assistance. See *Customer Assistance Offices* ⇨ *380*.

Airbag System Check

The airbag system does not need regularly scheduled maintenance or replacement. Make sure the airbag readiness light is working. See *Airbag Readiness Light* ⇨ *139*.

Caution

If an airbag covering is damaged, opened, or broken, the airbag may not work properly. Do not open or break the airbag coverings. If there are any opened or broken airbag coverings, have the airbag covering and/or airbag module replaced. For the location of the airbags, see *Where Are the Airbags?* ⇨ *89*. See your dealer for service.

Replacing Airbag System Parts after a Crash

⚠ Warning

A crash can damage the airbag systems in the vehicle. A damaged airbag system may not properly protect you and your passenger(s) in a crash, resulting in serious injury or even death. To help make sure the airbag systems are working properly after a crash, have them inspected and any necessary replacements made as soon as possible.

If an airbag inflates, you will need to replace airbag system parts. See your dealer for service.

If the airbag readiness light stays on after the vehicle is started or comes on when you are driving, the airbag system may not work properly. Have the vehicle serviced right away. See *Airbag Readiness Light* ⇨ *139*.

Child Restraints

Older Children

Older children who have outgrown booster seats should wear the vehicle's seat belts.

The manufacturer instructions that come with the booster seat state the weight and height limitations for that booster. Use a booster seat with a lap-shoulder belt until the child passes the fit test below:

- Sit all the way back on the seat. Do the knees bend at the seat edge? If yes, continue. If no, return to the booster seat.
- Buckle the lap-shoulder belt. Does the shoulder belt rest on the shoulder? If yes, continue. If no, try using the rear seat belt comfort guide, if available. See "Rear Seat Belt Comfort Guides" under *Lap-Shoulder Belt* ⇨ *81*. If a comfort guide is not available, or if the shoulder belt still does not rest on the shoulder, then return to the booster seat.
- Does the lap belt fit low and snug on the hips, touching the thighs? If yes, continue. If no, return to the booster seat.
- Can proper seat belt fit be maintained for the length of the trip? If yes, continue. If no, return to the booster seat.

Q: What is the proper way to wear seat belts?

A: An older child should wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. The shoulder belt should not cross the face or neck. The lap belt should fit snugly below the hips, just touching the top of the thighs. This applies belt force to the child's pelvic bones in a crash. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

Also see "Rear Seat Belt Comfort Guides" under *Lap-Shoulder Belt* ⇨ *81*.

According to accident statistics, children are safer when properly restrained in a rear seating position.

In a crash, children who are not buckled up can strike other people who are buckled up, or can be thrown out of the vehicle. Older children need to use seat belts properly.

⚠ Warning

Never allow more than one child to wear the same seat belt. The seat belt cannot properly spread the impact forces. In a crash, they can

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Warning (Continued)

be crushed together and seriously injured. A seat belt must be used by only one person at a time.

⚠ Warning

Never allow a child to wear the seat belt with the shoulder belt behind their back. A child can be seriously injured by not wearing the lap-shoulder belt properly. In a

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Warning (Continued)

crash, the child would not be restrained by the shoulder belt. The child could move too far forward increasing the chance of head and neck injury. The child might also slide under the lap belt. The belt force would then be applied right on the abdomen. That could cause serious or fatal injuries. The shoulder belt should go over the shoulder and across the chest.

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distance traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

⚠ Warning

Children can be seriously injured or strangled if a shoulder belt is wrapped around their neck. The shoulder belt can tighten but cannot be loosened if it is locked. The shoulder belt locks when it is pulled all the way out of the retractor. It unlocks when the shoulder belt is allowed to go all the way back into the retractor, but it cannot do this if it is wrapped around a child's neck. If the shoulder belt is locked and

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Warning (Continued)

tightened around a child's neck, the only way to loosen the belt is to cut it.

Never leave children unattended in a vehicle and never allow children to play with the seat belts.

Every time infants and young children ride in vehicles, they should have the protection provided by appropriate child restraints. Neither the vehicle's seat belt system nor its airbag system is designed for them.

Children who are not restrained properly can strike other people, or can be thrown out of the vehicle.

⚠ Warning

Never hold an infant or a child while riding in a vehicle. Due to crash forces, an infant or a child will become so heavy it is not possible to hold it during a crash.

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Warning (Continued)

For example, in a crash at only 40 km/h (25 mph), a 5.5 kg (12 lb) infant will suddenly become a 110 kg (240 lb) force on a person's arms. An infant or child should be secured in an appropriate restraint.

⚠ Warning

Children who are up against, or very close to, any airbag when it inflates can be seriously injured or killed. Never put a rear-facing child restraint in the front outboard seat. Secure a rear-facing child restraint in a rear seat. It is also better to secure a forward-facing child restraint in a rear seat. If you must secure a forward-facing child restraint in the front outboard seat, always move the front passenger seat as far back as it will go.

Child restraints are devices used to restrain, seat, or position children in the vehicle and are sometimes called child seats or car seats.

There are three basic types of child restraints:

- Forward-facing child restraints
- Rear-facing child restraints
- Belt-positioning booster seats

The proper child restraint for your child depends on their size, weight, and age, and also on whether the child restraint is compatible with the vehicle in which it will be used.

For each type of child restraint, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards. The restraint manufacturer's instructions that come with the restraint state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

⚠ Warning

To reduce the risk of neck and head injury in a crash, infants and toddlers should be secured in a rear-facing child restraint until age two, or until they reach the maximum height and weight limits of their child restraint.

⚠ Warning

A young child's hip bones are still so small that the vehicle's regular seat belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that is unprotected by any bony structure. This alone could cause serious or fatal injuries. To reduce the risk of serious or fatal injuries during a crash, young children should always be secured in appropriate child restraints.

Child Restraint Systems

Rear-Facing Infant Restraint

A rear-facing child restraint provides restraint with the seating surface against the back of the infant.

The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.

Forward-Facing Child Restraint

A forward-facing child restraint provides restraint for the child's body with the harness.

Booster Seats

A belt-positioning booster seat is used for children who have outgrown their forward-facing child restraint. Boosters are designed to improve the fit of the vehicle's seat belt system until the child is large enough for the vehicle seat belts to fit properly without a booster seat. See the seat belt fit test in *Older Children* ⇨ *99*.

Securing an Add-On Child Restraint in the Vehicle

⚠ Warning

A child can be seriously injured or killed in a crash if the child restraint is not properly secured in the vehicle. Secure the child restraint properly in the vehicle using the vehicle's seat belt or LATCH system, following the instructions that came with that child restraint and the instructions in this manual.

To help reduce the chance of injury, the child restraint must be secured in the vehicle. Child restraints must be secured in vehicle seats by lap belts or the lap belt portion of a lap-shoulder belt, or by the LATCH system. See *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106* for more information. Children can be endangered in a crash if the child restraint is not properly secured in the vehicle.

When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both, and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in the vehicle — even when no child is in it.

In some areas of the United States and Canada, Certified Child Passenger Safety Technicians (CPSTs) are available to inspect and demonstrate how to correctly use and install child restraints. In the U.S., refer to the National Highway Traffic Safety Administration (NHTSA) website to locate the nearest child safety seat inspection station. For CPST availability in Canada, check with Transport Canada or the Provincial Ministry of Transportation office.

Securing the Child Within the Child Restraint

⚠ Warning

A child can be seriously injured or killed in a crash if the child is not properly secured in the child restraint. Secure the child properly following the instructions that came with that child restraint.

Where to Put the Restraint

According to accident statistics, children and infants are safer when properly restrained in an appropriate child restraint secured in a rear seating position.

Whenever possible, children aged 12 and under should be secured in a rear seating position.

The vehicle is equipped with a front center airbag in the inboard side of the driver seat. Even with a front center airbag, a child restraint can be installed in any second row seating position.

Never put a rear-facing child restraint in the front. This is because the risk to the rear-facing child is so great if the airbag deploys.

⚠ Warning

A child in a rear-facing child restraint can be seriously injured or killed if the front passenger airbag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating airbag. A child in a forward-facing child restraint can be seriously injured or killed if the front passenger airbag inflates and the passenger seat is in a forward position.

Even if the passenger sensing system has turned off the front passenger frontal airbag, no system is fail-safe. No one can guarantee that an airbag will not deploy under some unusual circumstance, even though it is turned off.

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Warning (Continued)

Secure rear-facing child restraints in a rear seat, even if the airbag is off. If you secure a forward-facing child restraint in the front seat, always move the front passenger seat as far back as it will go. It is better to secure the child restraint in a rear seat.

See *Passenger Sensing System* ⇨ *93* for additional information.

When securing a child restraint with the seat belts in a rear seat position, study the instructions that came with the child restraint to make sure it is compatible with this vehicle.

Child restraints and booster seats vary considerably in size, and some may fit in certain seating positions better than others.

Depending on where you place the child restraint and the size of the child restraint, you may not be able to access adjacent seat belts or LATCH anchors for additional passengers or child restraints. Adjacent seating positions should not be used if the child restraint prevents access to or interferes with the routing of the seat belt.

Wherever a child restraint is installed, be sure to follow the instructions that came with the child restraint and secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in the vehicle — even when no child is in it.

Lower Anchors and Tethers for Children (LATCH System)

The LATCH system secures a child restraint during driving or in a crash. LATCH attachments on the child restraint are used to attach the child restraint to the anchors in the vehicle. The LATCH system is designed to make installation of a child restraint easier.

In order to use the LATCH system in your vehicle, you need a child restraint that has LATCH attachments. LATCH-compatible rear-facing and forward-facing child seats can be properly installed using either the LATCH anchors or the vehicle's seat belts. Do not use both the seat belts and the LATCH anchorage system to secure a rear-facing or forward-facing child seat.

Booster seats use the vehicle's seat belts to secure the child and the booster seat. If the manufacturer recommends that the booster seat be secured with the LATCH system, this can be done as long as the booster seat can be positioned properly and there is no interference with the proper positioning of the lap-shoulder belt on the child.

Make sure to follow the instructions that came with the child restraint, and also the instructions in this manual.

When installing a child restraint with a top tether, you must also use either the lower anchors or the seat belts to properly secure the child restraint.

A child restraint must never be installed using only the top tether and anchor.

The LATCH anchorage system can be used until the combined weight of the child plus the child restraint is 29.5 kg (65 lbs). Use the seat belt alone instead of the LATCH anchorage system once the combined weight is more than 29.5 kg (65 lbs).

See *Securing Child Restraints (With the Seat Belt in the Rear Seat)* ⇨ *114* or *Securing Child Restraints (With the Seat Belt in the Front Seat)* ⇨ *116*.

Child restraints built after March 2014 will be labeled with the specific child weight up to which the LATCH system can be used to install the restraint.

The following explains how to attach a child restraint with these attachments in the vehicle.

Not all vehicle seating positions have lower anchors. In this case, the seat belt must be used (with top tether where available) to secure the child restraint. See *Securing Child Restraints (With the Seat Belt in the Rear Seat)* ⇨ *114* or *Securing Child Restraints (With the Seat Belt in the Front Seat)* ⇨ *116*.

Lower Anchors

Lower anchors (1) are metal bars built into the vehicle. There are two lower anchors for each LATCH seating position that will accommodate a child restraint with lower attachments (2).

Top Tether Anchor

A top tether (3,4) is used to secure the top of the child restraint to the vehicle. A top tether anchor is built into the vehicle. The top tether attachment hook (2) on the child restraint connects to the top tether anchor in the vehicle in order to reduce the forward movement and rotation of the child restraint during driving or in a crash.

The child restraint may have a single tether (3) or a dual tether (4). Either will have a single attachment hook (2) to secure the top tether to the anchor.

Some child restraints with top tethers are designed for use with or without the top tether being attached. Others require the top tether always to be attached. In Canada, the law requires that forward-facing child restraints have a top tether, and that the tether be attached. Be sure to read and follow the instructions for your child restraint.

Lower Anchor and Top Tether Anchor Locations

Second Row — 60/40

: Seating positions with two lower anchors.

: Seating positions with top tether anchors.

Second Row — Bucket

: Seating positions with two lower anchors.

: Seating positions with top tether anchors.

Third Row Seat

: Seating positions with top tether anchors.

To assist in locating the lower anchors, each seating position with lower anchors has two labels, near the crease between the seatback and the seat cushion.

To assist in locating the top tether anchors, the top tether anchor symbol is near the top tether anchors for second row seats. For third row seats, the top tether anchor symbol is on the flipper panel.

Second Row Seat — Bucket

For models with bucket second row seating, the top tether anchors are at the bottom rear of the seat cushion for each seating position in the second row. Be sure to use an anchor on the same side of the vehicle as the seating position where the child restraint will be placed.

Second Row Seat — 60/40

For models with 60/40 second row seating, the top tether anchors are at the bottom rear of the seat cushion for each seating position in the second row. Be sure to use an anchor on the same side of the vehicle as the seating position where the child restraint will be placed.

Third Row Seat

For the third row seat, the top tether anchors are on the back of the seatback. Move the flipper panel rearward to access the anchors. Be sure to use an anchor on the same side of the vehicle as the seating position where the child restraint will be placed.

Do not secure a child restraint in a position without a top tether anchor if a national or local law requires that the top tether be attached, or if the instructions that come with the child restraint say that the top tether must be attached.

According to accident statistics, children and infants are safer when properly restrained in a child restraint system or infant restraint system secured in a rear seating position. See *Where to Put the Restraint* ⇨ *105* for additional information.

Securing a Child Restraint Designed for the LATCH System

⚠ Warning

A child could be seriously injured or killed in a crash if the child restraint is not properly attached to the vehicle using either the LATCH anchors or the vehicle seat belt. Follow the instructions that came with the child restraint and the instructions in this manual.

⚠ Warning

To reduce the risk of serious or fatal injuries during a crash, do not attach more than one child restraint to a single anchor. Attaching more than one child restraint to a single anchor could cause the anchor or attachment to come loose or even break during a crash. A child or others could be injured.

⚠ Warning

Children can be seriously injured or strangled if a shoulder belt is wrapped around their neck. The shoulder belt can tighten but cannot be loosened if it is locked. The shoulder belt locks when it is pulled all the way out of the retractor. It unlocks when the shoulder belt is allowed to go all the way back into the retractor, but

(Continued)

Warning (Continued)

it cannot do this if it is wrapped around a child's neck. If the shoulder belt is locked and tightened around a child's neck, the only way to loosen the belt is to cut it.

Buckle any unused seat belts behind the child restraint so children cannot reach them. Pull the shoulder belt all the way out of the retractor to set the lock, and tighten the belt behind the child restraint after the child restraint has been installed.

Caution

Do not let the LATCH attachments rub against the vehicle's seat belts. This may damage these parts.
If necessary, move buckled seat belts to avoid rubbing the LATCH attachments.

(Continued)

Caution (Continued)

Do not fold the rear seatback when the seat is occupied. Do not fold the empty rear seat with a seat belt buckled. This could damage the seat belt or the seat. Unbuckle and return the seat belt to its stowed position, before folding the seat.

The vehicle is equipped with a front center airbag in the inboard side of the driver seat. Even with a front center airbag, a child restraint can be installed in any second row seating position.

If you need to secure more than one child restraint in the rear seat, see *Where to Put the Restraint* ⇨ *105*.

1. Attach and tighten the lower attachments to the lower anchors. If the child restraint does not have lower attachments or the desired seating position does not have lower anchors, secure the child restraint with the seat belts and top tether when recommended by the child restraint manufacturer. Refer to your child restraint manufacturer instructions and the instructions in this manual. For the third row outboard seating positions, if the head restraint interferes with the proper installation of the child restraint, then the head restraint may be removed. See "Head Restraint Removal and Reinstallation under *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106*.

   1.1. Find the lower anchors for the desired seating position.

   1.2. Put the child restraint on the seat.

   1.3. Attach and tighten the lower attachments on the child restraint to the lower anchors.

2. If the child restraint manufacturer recommends that the top tether be attached, attach and tighten the top tether to the top tether anchor. Refer to the child restraint instructions and the following steps:

   2.1. Find the top tether anchor.

   For the third row seat, move the flipper panel rearward to access the top tether anchors.

   2.2. Route, attach, and tighten the top tether according to your child restraint instructions and the following instructions:

If the position you are using does not have a headrest or head restraint and you are using a single tether, route the tether over the seatback.

If the position you are using does not have a headrest or head restraint and you are using a dual tether, route the tether over the seatback.

If the position you are using has an adjustable headrest or head restraint and you are using a single tether, raise the headrest or head restraint and route the tether under the headrest or head restraint and in between the headrest or head restraint posts.

If the position you are using has a fixed headrest or head restraint and you are using a single tether, route the tether around the inboard or outboard side of the headrest or head restraint.

If the position you are using has a fixed or an adjustable head restraint and you are using a dual tether, route the tether around the head restraint.

3. Before placing a child in the child restraint, make sure it is securely held in place. To check, grasp the child restraint at the LATCH path and attempt to move it side to side and back and forth. There should be no more than 2.5 cm (1 in) of movement, for proper installation.

Head Restraint Removal and Reinstallation

1. Partially fold the seatback forward. See *Third Row Seats* ⇨ *76* for additional information.

2. Press the buttons on the head restraint posts and pull up on the head restraint.
3. Route the top tether of the child restraint under the head restraint.

4. With the head restraint facing rearward, insert the head restraint posts into the holes in the top of the seatback.
5. Push the head restraint down.
6. Try to move the head restraint to make sure that it is locked in place.
7. When the child restraint is removed, reinstall the head restraint before the seating position is used.

⚠ Warning

With head restraints that are not installed and adjusted properly, there is a greater chance that occupants will suffer a neck/spinal injury in a crash. Do not drive until the head restraints for all occupants are installed and adjusted properly.

Replacing LATCH System Parts After a Crash

⚠ Warning

A crash can damage the LATCH system in the vehicle. A damaged LATCH system may not properly secure the child restraint, resulting in serious injury or even death in a crash. To help make sure the LATCH system is working properly after a crash, see your dealer to have the system inspected and any necessary replacements made as soon as possible.

If the vehicle has the LATCH system and it was being used during a crash, new LATCH system parts may be needed.

New parts and repairs may be necessary even if the LATCH system was not being used at the time of the crash.

Securing Child Restraints (With the Seat Belt in the Rear Seat)

When securing a child restraint with the seat belts in a rear seat position, study the instructions that came with the child restraint to make sure it is compatible with this vehicle.

If the child restraint has the LATCH system, see *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106* for how and where to install the child restraint using LATCH. If a child restraint is secured in the vehicle using a seat belt and it uses a top tether, see *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106* for top tether anchor locations.

Do not secure a child seat in a position without a top tether anchor if a national or local law requires that the top tether be anchored, or if the instructions that come with the child restraint say that the top tether must be anchored.

In Canada, the law requires that forward-facing child restraints have a top tether, and that the tether be attached.

If the child restraint or vehicle seat position does not have the LATCH system, you will be using the seat belt to secure the child restraint. Be sure to follow the instructions that came with the child restraint.

If more than one child restraint needs to be installed in the rear seat, be sure to read *Where to Put the Restraint* ⇨ *105*.

1. Put the child restraint on the seat.

   For the third row outboard seating positions, if the head restraint interferes with the proper installation of the child restraint, the head restraint may be removed. See “Head Restraint Removal and Reinstallation” under *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106*.

2. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's seat belt through or around the child restraint. The child restraint instructions will show you how.

3. Push the latch plate into the buckle until it clicks.

   If the latch plate will not go fully into the buckle, check to see if the correct buckle is being used.

Position the release button on the buckle, away from the child restraint, so that the seat belt could be quickly unbuckled if necessary.

4. Pull the shoulder belt all the way out of the retractor to set the lock. When the retractor lock is set, the belt can be tightened but not pulled out of the retractor.

5. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. When installing a forward-facing child restraint, it may be helpful to use your knee to push down on the child restraint as you tighten the belt.

   Try to pull the belt out of the retractor to make sure the retractor is locked. If the retractor is not locked, repeat Steps 4 and 5.

6. If the child restraint has a top tether, follow the child restraint manufacturer's instructions regarding the use of the top tether. Refer to the instructions that came with the child restraint and see *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106*.

7. Before placing a child in the child restraint, make sure it is securely held in place. To check, grasp the child restraint at the seat belt path and attempt to move it side to side and back and forth. When the child restraint is properly installed, there should be no more than 2.5 cm (1 in) of movement.

To remove the child restraint, unbuckle the vehicle seat belt and let it return to the stowed position. If the top tether is attached to a top tether anchor, disconnect it.

If the head restraint was removed for a third row outboard seating position, reinstall it before the seating position is used. See “Head Restraint Removal and Reinstallation” under *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106* for additional information on reinstalling the head restraint properly.

Securing Child Restraints (With the Seat Belt in the Front Seat)

This vehicle has airbags. A rear seat is a safer place to secure a forward-facing child restraint. See *Where to Put the Restraint* ⇨ *105*.

In addition, the vehicle has a passenger sensing system which is designed to turn off the front outboard passenger frontal airbag under certain conditions. See *Passenger Sensing System* ⇨ *93* and *Passenger Airbag Status Indicator* ⇨ *139* for more information, including important safety information.

Never put a rear-facing child seat in the front. This is because the risk to the rear-facing child is so great if the airbag deploys.

⚠ Warning

A child in a rear-facing child restraint can be seriously injured or killed if the front outboard passenger frontal airbag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating airbag. A child in a forward-facing child restraint can be seriously injured or killed if the front outboard passenger frontal airbag inflates and the passenger seat is in a forward position.

Even if the passenger sensing system has turned off the front outboard passenger frontal airbag, no system is fail-safe. No one can guarantee that an airbag will not

(Continued)

Warning (Continued)

deploy under some unusual circumstance, even though it is turned off.

Secure rear-facing child restraints in a rear seat, even if the airbag is off. If you secure a forward-facing child restraint in the front outboard passenger seat, always move the seat as far back as it will go. It is better to secure the child restraint in a rear seat.

See *Passenger Sensing System* ⇨ *93* for additional information.

If the child restraint uses a top tether, see *Lower Anchors and Tethers for Children (LATCH System)* ⇨ *106* for top tether anchor locations.

Do not secure a child seat in a position without a top tether anchor if a national or local law requires that the top tether be anchored, or if the instructions that come with the child restraint say that the top tether must be anchored.

In Canada, the law requires that forward-facing child restraints have a top tether, and that the tether be attached.

When using the lap-shoulder belt to secure the child restraint in this position, follow the instructions that came with the child restraint and the following instructions:

1. Move the seat as far back as it will go before securing the forward-facing child restraint. Move the seat upward or the seatback to an upright position, if needed, to get a tight installation of the child restraint.

   When the passenger sensing system has turned off the front outboard passenger frontal airbag, the OFF indicator on the passenger airbag status indicator should light and stay lit when you start the vehicle. See *Passenger Airbag Status Indicator* ⇨ *139*.

2. Put the child restraint on the seat.

3. Pick up the latch plate, and run the lap and shoulder portions of the vehicle's seat belt through or around the child restraint. The child restraint instructions will show you how.

   Tilt the latch plate to adjust the belt, if needed.

4. Push the latch plate into the buckle until it clicks.

   Position the release button on the buckle, away from the child restraint, so that the seat belt could be quickly unbuckled if necessary.

5. Pull the shoulder belt all the way out of the retractor to set the lock. When the retractor lock is set, the belt can be tightened but not pulled out of the retractor.

6. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt, and feed the shoulder belt back into the retractor. When installing a forward-facing child restraint, it may be helpful to use your knee to push down on the child restraint as you tighten the belt.

   Try to pull the belt out of the retractor to make sure the retractor is locked. If the retractor is not locked, repeat Steps 5 and 6.

7. Before placing a child in the child restraint, make sure it is securely held in place. To check, grasp the child restraint at the seat belt path and attempt to move it side to side and back and forth. When the child restraint is properly installed, there should be no more than 2.5 cm (1 in) of movement.

If the airbag is off, the OFF indicator in the passenger airbag status indicator will come on and stay on when the vehicle is started.

If a child restraint has been installed and the ON indicator is lit, see “If the On Indicator Is Lit for a Child Restraint” under *Passenger Sensing System* ⇨ *93*.

To remove the child restraint, unbuckle the vehicle seat belt and let it return to the stowed position.

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Storage Compartments

⚠ Warning

Do not store heavy or sharp objects in storage compartments. In a crash, these objects may cause the cover to open and could result in injury.

Instrument Panel Storage

Touch the bottom of the climate control system panel until the door automatically starts to open. The storage area may contain a USB port. See the infotainment manual.

Keep the storage area door closed while driving.

Touch the bottom of the climate control system again until the door automatically starts to close.

Glove Box

To open, press the button. Close the glove box manually.

Cupholders

To access the cupholders, press the cover and release.

There is storage in front of the cupholders. Push forward on the handle to open.

Sunglasses Storage

If equipped, sunglasses storage is on the overhead console. Press the fixed button on the cover and release to access.

Armrest Storage

For vehicles with a rear seat armrest, pull the loop at the top of the armrest down to access the cupholders.

Rear Storage

There is storage in the floor of the rear cargo area. Lift the handle to access. There is a removable divider to help organize.

Center Console Storage

Pull the handle and lift to access. There are auxiliary jacks, USB ports, an accessory power outlet, a tote compartment, and a device holder inside.

On the rear of the console there are auxiliary jacks, a power outlet, and a storage area.

See *Power Outlets* ⇨ *128* and the infotainment manual.

If equipped, press to turn on the cooled compartment inside the center console storage.

The cooled compartment will help keep cold liquids cold, but is not intended to chill warm liquids. Do not use for items that need to be refrigerated.

Additional Storage Features

Cargo Tie-Downs

There are four cargo tie-downs in the rear cargo area. These can be used to strap cargo down and keep it from moving inside the vehicle.

Convenience Net

Use the convenience net, located in the rear, to store small loads as far forward as possible. The net should not be used to store heavy loads.

Roof Rack System

⚠ Warning

If something is carried on top of the vehicle that is longer or wider than the roof rack — like paneling, plywood, or a mattress — the wind can catch it while the vehicle is being driven. The item being carried could be violently torn off, and this could cause a collision and damage the vehicle. Never carry something longer or wider than the roof rack on top of the vehicle unless using a GM certified accessory carrier.

If equipped, the roof rack can be used to load items. For roof racks that do not have crossrails included, GM Certified crossrails can be purchased as an accessory. See your dealer for additional information.

Caution

Loading cargo on the roof rack that weighs more than 100 kg (220 lb) or hangs over the rear or sides of the vehicle may damage the vehicle. Load cargo so that it rests evenly between the crossrails, making sure to fasten cargo securely.

To prevent damage or loss of cargo when driving, check to make sure crossrails and cargo are securely fastened. Loading cargo on the roof rack will make the vehicle's center of gravity higher. Avoid high speeds, sudden starts, sharp turns, sudden braking, or abrupt maneuvers, otherwise it may result in loss of control. If driving for a long distance, on rough roads, or at high speeds, occasionally stop the vehicle to make sure the cargo remains in its place.

Do not exceed the maximum vehicle capacity when loading the vehicle. For more information on vehicle capacity and loading, see *Vehicle Load Limits* ⇨ *197*.

A Center High-Mounted Stoplamp (CHMSL) is located above the rear window glass. Make sure items loaded on the roof of the vehicle do not block or damage the CHMSL.

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Controls

Steering Wheel Adjustment

To adjust the power tilt and telescoping steering wheel:

Press the control to move the steering wheel up and down or forward and rearward.

Do not adjust the steering wheel while driving.

Steering Wheel Controls

The infotainment system can be operated by using the steering wheel controls. See “Steering Wheel Controls” in the infotainment manual.

Heated Steering Wheel

: If equipped, press to turn the heated steering wheel on or off. An indicator next to the button is lit when the feature is turned on.

The steering wheel takes about three minutes to start heating.

Horn

To sound the horn, press on the steering wheel.

Windshield Wiper/Washer

The windshield wiper control is on the turn signal lever.

The windshield wipers are controlled by turning the band with FRONT on it.

: Fast wipes.

: Slow wipes.

INT : If Rainsense is turned off, turn the FRONT band up for more frequent wipes or down for less frequent wipes. If Rainsense is turned on, see “Rainsense” later in this section.

OFF : Turns the windshield wipers off.

: For a single wipe, turn the band down, then release. For several wipes, hold the band down.

Clear ice and snow from the wiper blades before using them. If frozen to the windshield, carefully loosen or thaw them. Damaged wiper blades should be replaced. See *Wiper Blade Replacement* ⇨ *299*.

Heavy snow or ice can overload the wiper motor. An internal circuit breaker to the motor will stop the motor until it cools down.

Wiper Parking

If the ignition is turned off while the wipers are on ▬, ▬, or INT, they will immediately stop.

If FRONT is then moved to OFF before the driver door is opened or within 10 minutes, the wipers will restart and move to the base of the windshield.

If the ignition is turned off while the wipers are performing wipes due to windshield washing or Rainsense, the wipers continue to run until they reach the base of the windshield.

Rainsense

With Rainsense, a sensor near the top center of the windshield detects the amount of water on the windshield and controls the frequency of the windshield wiper.

Keep this area of the windshield clear of debris to allow for best system performance.

INT : Turn the FRONT band on the wiper lever to adjust the sensitivity when Rainsense is turned on.

- Turn the band up for more sensitivity to moisture.
- Turn the band down to lower INT setting for less sensitivity to moisture.

Move the band out of the INT position to deactivate Rainsense.

AUTO : Press to turn Rainsense on or off. When turned on and FRONT is in one of the Rainsense wipe sensitivity positions the wipers can be adjusted for more or less sensitivity to moisture. When turned off, the wipers operate as timed intermittent wipers and can be adjusted for more or less frequent wipes.

If AUTO is turned on when the ignition is turned on, or if the ignition is on and the FRONT band is in one of the sensitivity settings when AUTO is turned on or off, a message may display indicating if Rainsense was turned on or off.

If the ignition is on and FRONT is not in one of the sensitivity settings when AUTO is turned on, a

message may display indicating that the wiper band must be in one of the sensitivity settings for Rainsense to operate.

Wiper Arm Assembly Protection

When using an automatic car wash, move the windshield wiper lever to OFF. This disables the automatic Rainsense windshield wipers.

With Rainsense, if the transmission is in N (Neutral) and the vehicle speed is very slow, the wipers will automatically stop at the base of the windshield.

The wiper operations return to normal when the transmission is no longer in N (Neutral) or the vehicle speed has increased.

Windshield Washer

⚠ Warning

In freezing weather, do not use the washer until the windshield is warmed. Otherwise the washer fluid can form ice on the windshield, blocking your vision.

**: Push the paddle marked with the windshield washer symbol at the top of the turn signal lever to spray washer fluid and activate the wipers. The wipers will continue until the paddle is released or the maximum wash time is reached. When the paddle is released, additional wipes may occur depending on how long the windshield washer had been activated. See *Washer Fluid* ⇨ *292* for information on filling the windshield washer fluid reservoir.

Rear Window Wiper/ Washer

The rear wiper control is on the turn signal lever.

To turn the rear wiper on, slide the lever to a wiper position.

OFF : Turns the wiper off.

INT : Turns on the rear wiper with a delay between wipes.

ON : Turns on the rear wiper.

REAR : Press this button on the end of the lever to spray washer fluid on the rear window. The wipers will clear the rear window and either stop or return to your preset speed. For more washer cycles, press and hold the button.

The rear window wiper/washer will not operate if the liftgate or liftglass is open or ajar. If the liftgate or liftglass is opened while the rear wiper is on, the wiper returns to the parked position and stops.

Rear Camera Mirror Washer :

If equipped, press REAR on the end of the lever to spray washer fluid on the rear mirror camera lens. See *Rear Camera Mirror* ⇨ *54*.

Rear Wiper Arm Assembly Protection

When using an automatic car wash, move the rear wiper control to OFF to disable the rear wiper. In some vehicles, if the transmission is in N (Neutral) and the vehicle speed is very slow, the rear wiper will automatically park under the rear spoiler.

The wiper operations return to normal when the transmission is no longer in N (Neutral) or the vehicle speed has increased.

Reverse Gear Wipes

If the rear wiper control is off, the rear wiper will automatically operate continuously when the shift lever is in R (Reverse), and the front windshield wiper is performing low or high speed wipes. If the rear wiper control is off, the shift lever is in R (Reverse), and the front windshield wiper is performing interval wipes, then the rear wiper automatically performs interval wipes.

This feature can be turned on or off. See *Vehicle Personalization* ⇨ *155*.

The windshield washer reservoir is used for the windshield and the rear window. Check the fluid level in the reservoir if either washer is not working. See *Washer Fluid* ⇨ *292*.

Compass

The vehicle may have a compass display on the Driver Information Center (DIC). The compass receives its heading and other information from the Global Positioning System (GPS) antenna, StabiliTrak/Electronic Stability Control (ESC), and vehicle speed information.

The compass system is designed to operate for a certain number of miles or degrees of turn before needing a signal from the GPS satellites. When the compass display shows CAL, drive the vehicle for a short distance in an open area where it can receive a GPS signal. The compass system will automatically determine when a GPS signal is restored and provide a heading again.

Clock

The infotainment system controls are used to access the time and date settings through the menu system. See “Home Page” in the infotainment manual for information about how to use the menu system.

Setting the Clock

Time

To set the time:

1. From the Home Page, touch SETTINGS, then touch Time and Date.
2. Touch Set Time, then touch + or – to increase or decrease hours or minutes, and change AM or PM.
3. Touch 12-24 Hr for a 12 or 24 hour clock.
4. Touch ❮ Back to go back to the previous menu.

Date

To set the date:

1. From the Home Page, touch SETTINGS, then touch Time and Date.
2. Touch Set Date, then touch + or – to increase or decrease month, day, or year.
3. Touch ❮ Back to go back to the previous menu.

Auto Set

When on, the time and date will automatically update.

To set auto set:

1. From the Home Page, touch SETTINGS, then touch Time and Date.
2. Touch Set Time or Set Date.
3. Touch Auto Set, then select On-Cell Network or Off-Manual to manually set the time and date.
4. Touch ❮ Back to go back to the previous menu.

If auto set is on, the time displayed on the clock may not update immediately when driving into a new time zone.

In some regions, auto set may require an active OnStar or connected service plan, if available.

Clock Display

When on, the digital clock will display on the infotainment screen.

To set the clock display:

1. From the Home Page, touch SETTINGS, then touch Time and Date.
2. Touch Clock Display, then select Off or On.
3. Touch ❮ Back to go back to the previous menu.

Power Outlets

Power Outlets 12-Volt Direct Current

Accessory power outlets can be used to plug in electrical equipment, such as a cell phone or MP3 player.

The vehicle has five accessory power outlets:

- One near the cupholders on the center console
- One inside the center console
- One on the rear of the center console
- One in the third row seat on the driver side
- One in the rear cargo area on the passenger side

Lift the cover to access and replace when not in use.

The accessory power outlets are powered as follows:

- The power outlet near the cupholders on the center console is powered in Retained Accessory Power (RAP) mode. This outlet can be configured to operate using RAP or battery power. If the power outlet is used while in the battery power mode, this could cause interference between the RKE transmitter and the vehicle, and the vehicle may not start. See *Ignition Positions* ⇨ *203*.
- The power outlets inside the center console and on the rear of the center console are powered when the vehicle is started or the ignition is in ACC/ACCESSORY, or until the driver door is opened within 10 minutes of turning off the vehicle. See *Retained Accessory Power (RAP)* ⇨ *207*.
- The power outlets in the third row seat and in the rear cargo area are powered at all times.

⚠ Warning

Power is always supplied to the outlets. Do not leave electrical equipment plugged in when the vehicle is not in use because the vehicle could catch fire and cause injury or death.

Caution

Leaving electrical equipment plugged in for an extended period of time while the vehicle is off will drain the battery. Always unplug electrical equipment when not in use and do not plug in equipment that exceeds the maximum 15 amp rating.

Certain power accessory plugs may not be compatible with the accessory power outlet and could overload vehicle or adapter fuses. If a problem is experienced, see your dealer.

When adding electrical equipment, be sure to follow the proper installation instructions included with the equipment. See *Add-On Electrical Equipment* ⇨ *276*.

Caution

Hanging heavy equipment from the power outlet can cause damage not covered by the vehicle warranty. The power outlets are designed for accessory power plugs only, such as cell phone charge cords.

Power Outlet 110/120 Volt Alternating Current

This power outlet can be used to plug in electrical equipment that uses a maximum limit of 150 watts.

The 110/120 volt power outlet is on the rear of the center console.

An indicator light on the outlet turns on to show it is in use. The light comes on when the vehicle is started, equipment requiring less than 150 watts is plugged into the outlet, and no system fault is detected.

The indicator light does not come on when the ignition is off or if the equipment is not fully seated into the outlet.

If equipment is connected using more than 150 watts or a system fault is detected, a protection circuit shuts off the power supply and the indicator light turns off. To reset the circuit, unplug the item and plug it back in or turn the ignition off and then back to on. The power restarts when equipment using 150 watts or less is plugged into the outlet and a system fault is not detected.

The power outlet is not designed for the following, and may not work properly if they are plugged in:

- Equipment with high initial peak wattage, such as compressor-driven refrigerators and electric power tools
- Other equipment requiring an extremely stable power supply, such as microcomputer-controlled electric blankets and touch sensor lamps
- Medical equipment.

Wireless Charging

The system operates at 145 kHz and wirelessly charges one Qi compatible smartphone. The power output of the system is capable of charging at a rate up to 1 amp (5W), as requested by the compatible smartphone. See *Radio Frequency Statement* ⇨ *388*.

⚠ Warning

Wireless charging can affect the operation of an implanted pacemaker or other medical devices. If you have one, it is recommended to consult with your doctor before using the wireless charging system.

The vehicle must be on, in ACC/ACCESSORY, or Retained Accessory Power (RAP) must be active. The wireless charging feature may not correctly indicate charging when the vehicle is in RAP. See *Retained Accessory Power (RAP)* ⇨ *207*.

The operating temperature is –20 °C (–4 °F) to 60 °C (140 °F) for the charging system and 0 °C (32 °F) to 35 °C (95 °F) for the phone.

⚠ Warning

Remove all objects from the charging pad before charging your compatible smartphone. Objects, such as coins, keys, rings, paper clips, or cards, between the smartphone and charging pad will become very hot. On the rare occasion that the charging system does not detect an object, and the object gets wedged between the smartphone and charger, remove the smartphone and allow the object to cool before removing it from the charging pad, to prevent burns.

To charge a compatible smartphone:

1. Remove all objects from the charging pad. The system may not charge if there are any objects between the smartphone and charging pad.
2. Place the smartphone face up against the rear of the charge pad.

   To maximize the charge rate, ensure the smartphone is fully seated and centered in the holder with nothing under it. A thick smartphone case may prevent the wireless charger from working, or may reduce the charging performance. See your dealer for additional information.
3. The ⚡ will display on the 📞 on the infotainment screen. This indicates that the smartphone is properly positioned and charging. If a smartphone is placed on the charging pad and ⚡ does not display, remove the smartphone from the pad, turn it 180 degrees, and wait three seconds before placing/aligning the smartphone on the pad again.

Software Acknowledgements

Certain Wireless Charging Module product from LG Electronics, Inc. ("LGE") contains the open source software detailed below. Refer to the indicated open source licenses (as are included following this notice) for the terms and conditions of their use.

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Freescale-WCT library

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Cigarette Lighter

If equipped with a cigarette lighter, it is in the center console near the cupholders. Press on the access door to open it and use the lighter.

To use the cigarette lighter, push it in, and let go. When it is ready, it will pop back out by itself.

Caution

Holding a cigarette lighter in while it is heating does not let the lighter back away from the heating element when it is hot. Damage from overheating can occur to the lighter or heating element, or a fuse could be blown. Do not hold a cigarette lighter in while it is heating.

Ashtrays

If equipped, the ashtray is in the center console cupholder.

Caution

If papers, pins, or other flammable items are put in the ashtray, hot cigarettes or other smoking materials could ignite them and possibly damage the vehicle. Never put flammable items in the ashtray.

To remove the ashtray, pull it from the cupholder. Push it back down to be sure it is secure.

Warning Lights, Gauges, and Indicators

Warning lights and gauges can signal that something is wrong before it becomes serious enough to cause an expensive repair or replacement. Paying attention to the warning lights and gauges could prevent injury.

Some warning lights come on briefly when the engine is started to indicate they are working. When one of the warning lights comes on and stays on while driving, or when one of the gauges shows there may be a problem, check the section that explains what to do. Waiting to do repairs can be costly and even dangerous.

Instrument Cluster

English Balanced Cluster Shown, Metric Similar

Reconfigurable Instrument Cluster

The cluster display layout can be changed.

Balanced Configuration

The Balanced configuration has three interactive display zones: one in the center of each of the gauges.

Enhanced Configuration

The Enhanced configuration has three interactive display zones.

Use the five-way control on the right side of the steering wheel to move between the different display zones and scroll through the different displays.

To change the cluster configuration:

1. Find the Options page in one of the interactive display zones on the cluster.
2. Press SEL to enter the Options menu.
3. Scroll down to highlight Display Layout. Then press SEL to select it.
4. Each layout in the menu is represented by a small preview image of the display layout. Scroll up or down and highlight the selection. Press SEL to select the desired cluster configuration.
5. Exit the Display Layout menu by pressing <.

Cluster Application Displays

The cluster can display information regarding Navigation, Audio, and Phone.

Navigation

If there is no active route, a compass will be displayed. If there is an active route, press SEL to end route guidance or turn the voice prompts on or off.

Audio

While the Audio application page is displayed, press SEL to enter the Audio menu. In the Audio menu, search for music, select from favorites, or change the audio source.

Phone

While the Phone application page is displayed, press SEL to enter the Phone menu. In the Phone menu, if there is no active phone call, view recent calls, select from favorites, or scroll through contacts. If there is an active call, mute the phone or switch to handset operation.

Cluster Options Menu

To enter the cluster Options menu:

1. Use the five-way control on the right side of the steering wheel to find the Options page in one of the interactive display zones on the cluster.
2. Press SEL on the center of the five-way control to enter the Options menu.

Units : Press SEL while Units is highlighted to enter the Unit menu. Choose US or metric units by pressing SEL while the desired item is highlighted. A checkmark will be displayed next to the selected item.

Info Pages : Press SEL while Info Pages is highlighted to select the items to be displayed in the DIC info displays. See *Driver Information Center (DIC)* ⇨ *149*.

Fav Button Options : Press SEL while Fav Button Options is highlighted to select between FAV Primary and SEEK Primary. This selection allows for configuration of the △ and ▽ steering wheel controls. When FAV Primary is selected, pressing △ and ▽ will go to the next or previous favorite and pressing and holding △ and ▽ will seek. When SEEK Primary is selected, pressing △ and ▽ will seek and pressing and holding △ and ▽ will go to the next or previous favorite.

Display Layout : Press SEL while Display Layout is highlighted to change the configuration of the cluster. See “Reconfigurable Instrument Cluster” earlier in this section.

Head-up Display (HUD) Rotation : This feature allows for adjusting the angle of the HUD image. Press SEL on the steering wheel controls while Head-up Display Rotation is highlighted to enter Adjust Mode. Press ∧ or ∨ to adjust the angle of the HUD display. Press < or > to highlight OK, then press SEL to save the setting. Cancel can also be selected to cancel the setting. The vehicle must be in P (Park).

Open Source Software : Press SEL while Open Source Software is highlighted to display open source software information.

Speedometer

The speedometer shows the vehicle's speed in either kilometers per hour (km/h) or miles per hour (mph).

Odometer

The odometer shows how far the vehicle has been driven, in either kilometers or miles.

Trip Odometer

The trip odometer shows how far the vehicle has been driven since the trip odometer was last reset.

The trip odometer is accessed and reset through the Driver Information Center (DIC). See *Driver Information Center (DIC)* ⇨ *149*.

Tachometer

The tachometer displays the engine speed in revolutions per minute (rpm).

Fuel Gauge

Balanced Configuration

When the ignition is on, the fuel gauge indicates about how much fuel is left in the tank.

There is an arrow near the fuel gauge pointing to the side of the vehicle the fuel door is on.

When the indicator nears empty, the low fuel light comes on. There still is a little fuel left, but the vehicle should be refueled soon.

Here are four things that some owners ask about. None of these show a problem with the fuel gauge:

- At the service station, the fuel pump shuts off before the gauge reads full.
- It takes a little more or less fuel to fill up than the gauge indicated. For example, the gauge may have indicated the tank was half full, but it actually took a little more or less than half the tank's capacity to fill the tank.
- The gauge moves a little while turning a corner or speeding up.
- The gauge takes a few seconds to stabilize after the ignition is turned on, and goes back to empty when the ignition is turned off.

Engine Coolant Temperature Gauge

Metric Balanced Configuration

English Balanced Configuration

This gauge measures the temperature of the vehicle's engine.

While driving under normal operating conditions, if the needle moves into the red area, the engine is too hot. Pull off the road, stop the vehicle, and turn off the engine as soon as possible.

Seat Belt Reminders

Driver Seat Belt Reminder Light

There is a driver seat belt reminder light on the instrument cluster.

When the vehicle is started, this light flashes and a chime may come on to remind the driver to fasten their seat belt. Then the light stays on solid until the belt is buckled. This cycle may continue several times if the driver remains or becomes unbuckled while the vehicle is moving.

If the driver seat belt is buckled, neither the light nor the chime comes on.

Passenger Seat Belt Reminder Light

There is a passenger seat belt reminder light near the passenger airbag status indicator. See *Passenger Sensing System* ⇨ *93*.

When the vehicle is started, this light flashes and a chime may come on to remind passengers to fasten their seat belt. Then the light stays on solid until the belt is buckled. This cycle continues several times if the passenger remains or becomes unbuckled while the vehicle is moving.

If the passenger seat belt is buckled, neither the chime nor the light comes on.

The front passenger seat belt reminder light and chime may turn on if an object is put on the seat such as a briefcase, handbag, grocery bag, laptop, or other electronic device. To turn off the reminder light and/or chime, remove the object from the seat or buckle the seat belt.

Airbag Readiness Light

This light shows if there is an electrical problem with the airbag system. The system check includes the airbag sensor(s), the passenger sensing system, the pretensioners, the airbag modules, the wiring, and the crash sensing and diagnostic module. For more information on the airbag system, see *Airbag System* ⇨ *87*.

The airbag readiness light comes on for several seconds when the vehicle is started. If the light does not come on then, have it fixed immediately.

⚠ Warning

If the airbag readiness light stays on after the vehicle is started or comes on while driving, it means

(Continued)

Warning (Continued)

the airbag system might not be working properly. The airbags in the vehicle might not inflate in a crash, or they could even inflate without a crash. To help avoid injury, have the vehicle serviced right away.

If there is a problem with the airbag system, a Driver Information Center (DIC) message may also come on.

Passenger Airbag Status Indicator

The vehicle has a passenger sensing system. See *Passenger Sensing System* ⇨ *93* for important safety information. The passenger airbag status indicator is in the overhead console.

United States

Canada and Mexico

When the vehicle is started, the passenger airbag status indicator will light ON and OFF, or the symbols for on and off, for several seconds as a system check. Then, after several more seconds, the status indicator will light either ON or OFF, or the on or off symbol, to let you know the status of the front outboard passenger frontal airbag.

If the word ON or the on symbol is lit on the passenger airbag status indicator, it means that the front outboard passenger frontal airbag is allowed to inflate.

If the word OFF or the off symbol is lit on the airbag status indicator, it means that the passenger sensing system has turned off the front outboard passenger frontal airbag.

If, after several seconds, both status indicator lights remain on, or if there are no lights at all, there may be a problem with the lights or the passenger sensing system. See your dealer for service.

⚠ Warning

If the airbag readiness light ever comes on and stays on, it means that something may be wrong with the airbag system. To help avoid injury to yourself or others, have the vehicle serviced right away. See *Airbag Readiness Light* ⇨ *139* for more information, including important safety information.

Charging System Light

The charging system light comes on briefly when the ignition is turned on, but the engine is not running, as a check to show the light is working. It should go out when the engine is started.

If the light stays on, or comes on while driving, there may be a problem with the electrical charging system. Have it checked by your dealer. Driving while this light is on could drain the battery.

When this light comes on, or is flashing, the Driver Information Center (DIC) also displays a message.

If a short distance must be driven with the light on, be sure to turn off all accessories, such as the radio and air conditioner.

Malfunction Indicator Lamp (Check Engine Light)

This light is part of the vehicle's emission control on-board diagnostic system. If this light is on while the engine is running, a malfunction has been detected and the vehicle may require service. The light should come on to show that it is working when the ignition is in Service Mode. See *Ignition Positions* ⇨ *203*.

Malfunctions are often indicated by the system before any problem is noticeable. Being aware of the light and seeking service promptly when it comes on may prevent damage.

Caution

If the vehicle is driven continually with this light on, the emission control system may not work as well, the fuel economy may be lower, and the vehicle may not run smoothly. This could lead to costly repairs that might not be covered by the vehicle warranty.

Caution

Modifications to the engine, transmission, exhaust, intake, or fuel system, or the use of replacement tires that do not meet the original tire specifications, can cause this light to come on. This could lead to costly repairs not covered by the vehicle warranty. This could also affect the vehicle's ability to pass an Emissions Inspection/Maintenance test. See *Accessories and Modifications* ⇨ *279*.

If the light is flashing : A malfunction has been detected that could damage the emission control system and increase vehicle emissions. Diagnosis and service may be required.

To help prevent damage, reduce vehicle speed and avoid hard accelerations and uphill grades. If towing a trailer, reduce the amount of cargo being hauled as soon as possible.

If the light continues to flash, find a safe place to park. Turn the vehicle off and wait at least 10 seconds before restarting the engine. If the light is still flashing, follow the previous guidelines and see your dealer for service as soon as possible.

If the light is on steady : A malfunction has been detected. Diagnosis and service may be required.

Check the following:

- If fuel has been added to the vehicle using the capless fuel funnel adapter, make sure that it has been removed. See "Filling the Tank with a Portable Gas Can" under *Filling the Tank* ⇨ *254*. The diagnostic system can detect if the adapter has been left installed in the vehicle, allowing fuel to evaporate into the atmosphere. A few driving trips with the adapter removed may turn off the light.
- Poor fuel quality can cause inefficient engine operation and poor driveability, which may go away once the engine is warmed up. If this occurs, change the fuel brand. It may require at least one full tank of the proper fuel to turn the light off. See *Recommended Fuel* ⇨ *253*.

If the light remains on, see your dealer.

Emissions Inspection and Maintenance Programs

If the vehicle requires an Emissions Inspection/Maintenance test, the test equipment will likely connect to the vehicle's Data Link Connector (DLC).

The DLC is under the instrument panel to the left of the steering wheel. Connecting devices that are not used to perform an Emissions Inspection/ Maintenance test or to service the vehicle may affect vehicle operation. See *Add-On Electrical Equipment* ⇨ *276*. See your dealer if assistance is needed.

The vehicle may not pass inspection if:

- The light is on when the engine is running.
- The light does not come on when the ignition is in Service Mode.
- Critical emission control systems have not been completely diagnosed. If this happens, the vehicle would not be ready for inspection and might require several days of routine driving before the system is ready for inspection. This can happen if the 12-volt battery has recently been replaced or run down, or if the vehicle has been recently serviced.

See your dealer if the vehicle will not pass or cannot be made ready for the test.

Brake System Warning Light

The vehicle brake system consists of two hydraulic circuits. If one circuit is not working, the remaining circuit can still work to stop the vehicle. For normal braking performance, both circuits need to be working.

If the warning light comes on, there is a brake problem. Have the brake system inspected right away.

Metric

BRAKE

English

This light should come on briefly when the engine is started. If it does not come on then, have it fixed so it will be ready to warn you if there is a problem.

If the light comes on and stays on, there is a brake problem.

⚠ Warning

The brake system might not be working properly if the brake system warning light is on. Driving with the brake system warning light on can lead to a crash. If the light is still on after the vehicle has been pulled off the road and carefully stopped, have the vehicle towed for service.

Electric Parking Brake Light

PARK

Metric English

This light comes on when the parking brake is applied. If the light continues flashing after the parking brake is released, or while driving, there is a problem with the Electric Parking Brake system. A message may also display in the Driver Information Center (DIC).

If the light does not come on, or remains flashing, see your dealer.

Service Electric Parking Brake Light

If this light comes on and stays on, there is a problem with a system on the vehicle that is causing the parking brake system to work at a reduced level. The vehicle can still be driven, but should be taken to a dealer as soon as possible. See *Electric Parking Brake* ⇨ *220*. A message may also display in the Driver Information Center (DIC).

Antilock Brake System (ABS) Warning Light

This light comes on briefly when the engine is started.

If the light does not come on, have it fixed so it will be ready to warn if there is a problem.

If the light comes on while driving, stop as soon as it is safely possible and turn off the vehicle. Then start the engine again to reset the system. If the ABS light stays on, or comes on again while driving, the vehicle needs service. A chime may also sound when the light comes on steady.

If the ABS light is the only light on, the vehicle has regular brakes, but the antilock brakes are not functioning.

If both the ABS and the brake system warning light are on, the vehicle's antilock brakes are not functioning and there is a problem with the regular brakes. See your dealer for service.

See *Brake System Warning Light* ⇨ *142*.

Sport Mode Light

This light comes on when Sport mode is selected. See *Magnetic Ride Control* ⇨ *225*.

Tow/Haul Mode Light

For vehicles with the Tow/Haul Mode feature, this light comes on when the Tow/Haul Mode has been activated.

See *Tow/Haul Mode* ⇨ *214*.

Winter Driving Mode Light

This light comes on when Snow/Ice mode is selected. See *Magnetic Ride Control* ⇨ *225*.

Lane Keep Assist (LKA) Light

This light is green if LKA is available to assist.

LKA may assist by gently turning the steering wheel if the vehicle approaches a detected lane marking without using the turn signal in that direction. The LKA light will turn amber.

This light is amber and flashes as a Lane Departure Warning (LDW) alert, to indicate that the lane marking has been crossed.

See *Lane Keep Assist (LKA)* ⇨ *251*.

Vehicle Ahead Indicator

If equipped, this indicator will display green when a vehicle is detected ahead and amber when you are following a vehicle ahead much too closely.

See *Forward Collision Alert (FCA) System* ⇨ *244*.

Traction Off Light

This light comes on briefly while starting the engine. If it does not, have the vehicle serviced by your dealer. If the system is working normally, the indicator light then turns off.

The traction off light comes on when the Traction Control System (TCS) has been turned off by pressing and releasing the TCS/StabiliTrak/ESC button.

This light and the StabiliTrak/ESC OFF light come on when StabiliTrak/ Electronic Stability Control (ESC) is turned off.

If the TCS is off, wheel spin is not limited. Adjust driving accordingly.

See *Traction Control/Electronic Stability Control* ⇨ *222*.

StabiliTrak OFF Light

This light comes on briefly while starting the engine. If it does not, have the vehicle serviced by your dealer.

This light comes on when the StabiliTrak/Electronic Stability Control (ESC) system is turned off.
If StabiliTrak/ESC is off, the Traction Control System (TCS) is also off.

If StabiliTrak/ESC and TCS are off, the system does not assist in controlling the vehicle. Turn on the TCS and the StabiliTrak/ESC systems, and the warning light turns off.

See *Traction Control/Electronic Stability Control* ⇨ *222*.

Traction Control System (TCS)/StabiliTrak Light

This light comes on briefly when the engine is started.

If the light does not come on, have the vehicle serviced by your dealer. If the system is working normally, the indicator light turns off.

If the light is on and not flashing, the TCS and potentially the StabiliTrak/ ESC system have been disabled.
A Driver Information Center (DIC) message may display. Check the DIC messages to determine which feature(s) is no longer functioning and whether the vehicle requires service.

If the light is on and flashing, the TCS and/or the StabiliTrak/ESC system is actively working.

See *Traction Control/Electronic Stability Control* ⇨ *222*.

Engine Coolant Temperature Warning Light

This light comes on briefly while starting the vehicle.

If it does not, have the vehicle serviced by your dealer. If the system is working normally the indicator light goes off.

Caution

The engine coolant temperature warning light indicates that the vehicle has overheated. Driving with this light on can damage the engine and it may not be covered by the vehicle warranty. See *Engine Overheating* ⇨ *290*.

The engine coolant temperature warning light comes on when the engine has overheated.

If this happens, pull over and turn off the engine as soon as possible. See *Engine Overheating* ⇨ *290*.

Tire Pressure Light

For vehicles with the Tire Pressure Monitor System (TPMS), this light comes on briefly when the engine is started. It provides information about tire pressures and the TPMS.

When the Light Is On Steady

This indicates that one or more of the tires are significantly underinflated.

A Driver Information Center (DIC) tire pressure message may also display. Stop as soon as possible, and inflate the tires to the pressure value shown on the Tire and Loading Information label. See *Tire Pressure* ⇨ *320*.

When the Light Flashes First and Then Is On Steady

If the light flashes for about a minute and then stays on, there may be a problem with the TPMS. If the problem is not corrected, the light will come on at every ignition cycle. See *Tire Pressure Monitor Operation* ⇨ *323*.

Engine Oil Pressure Light

Caution

Lack of proper engine oil maintenance can damage the engine. Driving with the engine oil low can also damage the engine. The repairs would not be covered by the vehicle warranty. Check the oil level as soon as possible. Add oil if required, but if the oil level is within the operating range and the oil pressure is still low, have the

(Continued)

Caution (Continued)

vehicle serviced. Always follow the maintenance schedule for changing engine oil.

This light should come on briefly as the engine is started. If it does not come on, have the vehicle serviced by your dealer.

If the light comes on and stays on, it means that oil is not flowing through the engine properly. The vehicle could be low on oil and might have some other system problem. See your dealer.

Low Fuel Warning Light

This light is near the fuel gauge and comes on briefly when the ignition is turned on as a check to show it is working.

It also comes on when the fuel tank is low on fuel. The light turns off when fuel is added. If it does not, have the vehicle serviced.

Security Light

The security light should come on briefly as the engine is started. If it does not come on, have the vehicle serviced by your dealer. If the system is working normally, the indicator light turns off.

If the light stays on and the engine does not start, there could be a problem with the theft-deterrent system. See *Immobilizer Operation* ⇨ *50*.

High-Beam On Light

This light comes on when the high-beam headlamps are in use. See *Headlamp High/Low-Beam Changer* ⇨ *169*.

IntelliBeam Light

This light comes on when the IntelliBeam system, if equipped, is enabled. See *Exterior Lamp Controls* ⇨ *167*.

Lamps On Reminder

This light comes on when the exterior lamps are in use, except when only the Daytime Running Lamps (DRL) are active. See *Exterior Lamp Controls* ⇨ *167*.

Cruise Control Light

The cruise control light is white when the cruise control is on and ready, and turns green when the cruise control is set and active.

See *Cruise Control* ⇨ *226*.

Adaptive Cruise Control Light

This light is white when the Adaptive Cruise Control (ACC, if equipped) is on and ready, and turns green when the ACC is set and active. See *Adaptive Cruise Control* ⇨ *229*.

Door Ajar Light

For vehicles equipped with this light, it comes on when a door is open or not securely latched. Before driving, check that all doors are properly closed.

Information Displays

Driver Information Center (DIC)

The DIC is displayed in the instrument cluster. It shows the status of many vehicle systems.

∧ or ∨ : Move SEL up or down to go to the previous or next selection.

< or > : Press to move between the interactive display zones in the cluster. Press < to go back to the previous menu.

SEL : Press to open a menu or select a menu item. Press and hold to reset values on certain screens.

DIC Information Display Options

The info displays on the DIC can be turned on or off through the Settings menu.

1. Press SEL while viewing the Settings page in one of the interactive display zones on the cluster.
2. Scroll to Info Pages and press SEL.
3. Press ∧ or ∨ to move through the list of possible info displays.
4. Press SEL while an item is highlighted to select or deselect that item. When an item is selected, a checkmark will appear next to it.

DIC Information Displays

The following is the list of all possible DIC information displays. Some of the information displays may not be available for your particular vehicle.

Trip 1 or Trip 2 and Average Fuel Economy : The Trip display shows the current distance traveled, in either kilometers (km) or miles (mi), since the trip odometer was last reset. The trip odometer can be reset by pressing and holding SEL while this display is active.

The Average Fuel Economy display shows the approximate average liters per 100 kilometers (L/100 km) or miles per gallon (mpg). This number is calculated based on the number of L/100 km (mpg) recorded since the last time this menu item was reset. This number reflects only the approximate average fuel economy that the vehicle has right now, and will change as driving conditions change. The Average Fuel Economy can be reset along with the trip odometer by pressing and holding SEL while this display is active.

Also shows if the Active Fuel Management is active and in V4 mode, or inactive and in V8 mode. See *Active Fuel Management* ⇨ *209*.

Fuel Range : Shows the approximate distance the vehicle can be driven without refueling. LOW will be displayed when the vehicle is low on fuel. The fuel range estimate is based on an average of the vehicle's fuel economy over recent driving history and the amount of fuel remaining in the fuel tank.

Instantaneous Fuel Economy : Shows the current fuel economy in either liters per 100 kilometers (L/100 km) or miles per gallon (mpg). This number reflects only the approximate fuel economy that the vehicle has right now and changes frequently as driving conditions change.

Average Speed : Shows the average speed of the vehicle in kilometers per hour (km/h) or miles per hour (mph). This average is calculated based on the various vehicle speeds recorded since the last reset of this value. The average speed can be reset by pressing and holding SEL while this display is active.

Timer : This display can be used as a timer. To start the timer, press SEL while this display is active. The display will show the amount of time that has passed since the timer was last reset. To stop the timer, press SEL briefly while this display is active and the timer is running. To reset the timer to zero, press and hold SEL while this display is active.

Turn Arrow : Shows the next maneuver when using route guidance.

Estimated Time to Arrival : Shows the estimated time until arrival at your destination.

Distance to Destination : Shows the distance to the destination when using route guidance.

Speed Limit : Shows the current speed limit. The information for this page comes from a roadway database.

Speed Warning : Allows the driver to set a speed that they do not want to exceed. To set the Speed Warning, press SEL when Speed Warning is displayed. Press ⋀ or ⋁ to adjust the value. This feature can be turned off by pressing and holding SEL while viewing this page. If the selected speed limit is exceeded, a pop-up warning is displayed and a chime may sound.

Cruise Set Speed : Shows the speed the cruise control or Adaptive Cruise Control is set to.

Follow Distance Indicator : When Adaptive Cruise Control (ACC) is not engaged, the current follow time to the vehicle ahead is displayed as a time value on this page. When ACC has been engaged, the display switches to the gap setting page. This page shows the current gap setting along with the vehicle ahead indicator.

Battery Voltage : Shows the current battery voltage.

Oil Life : Shows an estimate of the oil's remaining useful life.
If REMAINING OIL LIFE 99% is displayed, that means 99% of the current oil life remains.

When the remaining oil life is low, the CHANGE ENGINE OIL SOON message will appear on the display. The oil should be changed as soon as possible. See *Engine Oil* ⇨ *282*. In addition to the engine oil life system

monitoring the oil life, additional maintenance is recommended. See *Maintenance Schedule* ⇨ *363*.

The Oil Life display must be reset after each oil change. It will not reset itself. Do not reset the Oil Life display accidentally at any time other than when the oil has just been changed. It cannot be reset accurately until the next oil change. To reset the engine oil life system, press and hold SEL for several seconds while the Oil Life display is active. See *Engine Oil Life System* ⇨ *284*.

Oil Pressure : Shows the engine oil pressure in kPa (kilopascals) or psi (pounds per square inch).

Engine Hours : Shows the total number of hours the engine has run.

Transmission Fluid Temperature : Shows the temperature of the automatic transmission fluid in either degrees Celsius (°C) or degrees Fahrenheit (°F).

Tire Pressure : Shows the approximate pressures of all four tires. Tire pressure is displayed in either kilopascal (kPa) or in pounds per square inch (psi). If the pressure is low, the value for that tire is shown in amber. See *Tire Pressure Monitor System* ⇨ *322* and *Tire Pressure Monitor Operation* ⇨ *323*.

Blank Page : Allows for no information to be displayed in the cluster info display areas.

Head-Up Display (HUD)

⚠ Warning

If the HUD image is too bright or too high in your field of view, it may take you more time to see things you need to see when it is dark outside. Be sure to keep the HUD image dim and placed low in your field of view.

If equipped with HUD, some information concerning the operation of the vehicle is projected onto the windshield. The image is projected through the HUD lens on top of the instrument panel. The information appears as an image focused out toward the front of the vehicle.

Caution

If you try to use the HUD image as a parking aid, you may misjudge the distance and damage your vehicle. Do not use the HUD image as a parking aid.

The HUD information can be displayed in various languages. The speedometer reading and other numerical values can be displayed in either English or metric units.

The language selection is changed through the radio and the units of measurement is changed through the instrument cluster. See *Vehicle Personalization* ⇨ *155* and “Options” under *Instrument Cluster* ⇨ *134*.

HUD Display on the Windshield

The HUD may display some of the following vehicle information and vehicle messages or alerts:

- Speed
- Tachometer
- Audio
- Phone
- Navigation
- Collision Alert
- Adaptive Cruise Control and set speed
- Lane Departure
- Low Fuel

Some vehicle messages or alerts displayed in the HUD may be cleared by using the steering wheel controls. See *Vehicle Messages* ⇨ *154*.

Some information shown may not be available on your vehicle if it is not equipped with these features.

The HUD control is to the left of the steering wheel.

To adjust the HUD image:

1. Adjust the driver seat.
2. Start the engine.
3. Use the following settings to adjust the HUD.

HUD **:** Press or lift to center the HUD image. The HUD image can only be adjusted up and down, not side to side.

INFO **:** Press to select the display view. Each press will change the display view.

± ☼ **:** Lift and hold to brighten the display. Press and hold to dim the display. Continue to hold to turn the display off.

The HUD image will automatically dim and brighten to compensate for outside lighting. The HUD brightness control can also be adjusted as needed.

The HUD image can temporarily light up depending on the angle and position of sunlight on the HUD display. This is normal.

Polarized sunglasses could make the HUD image harder to see.

Head-Up Display (HUD) Rotation Option

This feature allows for adjusting the angle of the HUD image.

Press SEL on the steering wheel controls while Head-up Display Rotation is highlighted to enter Adjust Mode. Press ∧ or ∨ to adjust the

angle of the HUD display. Press < or > to highlight OK, then press SEL to save the setting. CANCEL can also be selected to cancel the setting. The vehicle must be in P (Park). See *Instrument Cluster* ⇨ *134*.

HUD Views

There are four views in the HUD. Some vehicle information and vehicle messages or alerts may be displayed in any view.

Metric

English

Speed View : This displays digital speed in English or metric units, speed limit, vehicle ahead indicator, Lane Departure Warning/Lane Keep Assist, and Adaptive Cruise Control and set speed. Some information only appears on vehicles that have these features, and when they are active.

Metric

English

Audio/Phone View : This displays digital speed, indicators from speed view along with audio/phone information. The current radio station, media type, and incoming calls will be displayed.

All HUD views may briefly display audio information when the driver uses the steering wheel controls to adjust the audio settings appearing in the instrument cluster.

Incoming phone calls appearing in the instrument cluster may also display in any HUD view.

Metric

English

Navigation View : This displays digital speed, indicators from speed view along with Turn-by-Turn Navigation information in some

vehicles. The compass heading is displayed when navigation routing is not active.

Navigation Turn-by-Turn Alerts shown in the instrument cluster may also be displayed in any HUD view.

Metric

English

Performance View : This displays digital speed, indicators from speed view along with rpm reading, transmission positions, and gear shift indicator (if equipped).

Care of the HUD

Clean the inside of the windshield to remove any dirt or film that could reduce the sharpness or clarity of the HUD image.

Clean the HUD lens with a soft cloth sprayed with glass cleaner. Wipe the lens gently, then dry it.

HUD Troubleshooting

If you cannot see the HUD image when the ignition is on, check that:

- Nothing is covering the HUD lens.
- The HUD brightness setting is not too dim or too bright.
- The HUD is adjusted to the proper height.
- Polarized sunglasses are not worn.
- The windshield and HUD lens are clean.

If the HUD image is not correct, contact your dealer.

The windshield is part of the HUD system. See *Windshield Replacement* ⇨ *300*.

Vehicle Messages

Messages displayed on the DIC indicate the status of the vehicle or some action that may be needed to correct a condition. Multiple messages may appear one after another.

The messages that do not require immediate action can be acknowledged and cleared by pressing SEL. The messages that require immediate action cannot be cleared until that action is performed.

All messages should be taken seriously; clearing the message does not correct the problem.

If a SERVICE message appears, see your dealer.

Follow the instructions given in the messages. The system displays messages regarding the following topics:

- Service Messages
- Fluid Levels
- Vehicle Security
- Brakes

- Ride Control Systems
- Driver Assistance Systems
- Cruise Control
- Lighting and Bulb Replacement
- Wiper/Washer Systems
- Doors and Windows
- Seat Belts
- Airbag Systems
- Engine and Transmission
- Tire Pressure
- Battery

Engine Power Messages

ENGINE POWER IS REDUCED

This message displays when the vehicle's propulsion power is reduced. Reduced propulsion power can affect the vehicle's ability to accelerate.
If this message is on, but there is no observed reduction in performance, proceed to your destination. The performance may be reduced the next time the vehicle is driven. The vehicle may be driven while this message is on, but maximum acceleration and speed may be reduced. Anytime this message stays on, or displays repeatedly, the vehicle should be taken to your dealer for service as soon as possible.

Vehicle Speed Messages

SPEED LIMITED TO XXX KM/H (MPH)

This message shows that the vehicle speed has been limited to the speed displayed. The limited speed is a protection for various propulsion and vehicle systems, such as lubrication, thermal, suspension, Teen Driver if equipped, or tires.

Vehicle Personalization

Use the audio system controls to access the personalization menus for customizing vehicle features.

The following are all possible personalization features. Depending on the vehicle, some may not be available.

Audio System Controls

1. Touch the desired feature to display a list of available options.
2. Touch to select the desired feature setting.
3. Touch < Back to return to the previous menu or exit.

Touch SETTINGS from the Home Page on the infotainment display.

Personalization Menus

The following list of menu items may be available:

- Time and Date
- Rear Seat Reminder
- Language

- Video Voice-Over
- Valet Mode
- Teen Driver
- Radio
- Vehicle
- Bluetooth
- Apple CarPlay
- Android Auto
- Voice
- Display
- Rear Camera
- Return to Factory Settings
- Software Information
- Wi-Fi

Detailed information for each menu follows.

Time and Date

Manually set the time and date. See *Clock* ⇨ *127*.

Rear Seat Reminder

This allows for a chime and a message when the rear door has been opened before or during operation of the vehicle.

Select Off or On.

Language

Select Language, then select from the available language(s).

The selected language will display on the system, and voice recognition will reflect the selected language.

Video Voice-Over

When activated, the Rear Seat Infotainment (RSI) system will read aloud menu titles, menu listings, pop-ups, alerts, and file titles from audio and video media.

Select Off or On.

Valet Mode

This will lock the infotainment system and steering wheel controls. It may also limit access to vehicle storage locations, if equipped.

To enable valet mode:

1. Enter a four-digit code on the keypad.
2. Select Enter to go to the confirmation screen.
3. Re-enter the four-digit code.

Touch Lock or Unlock to lock or unlock the system. Touch Back to go back to the previous menu.

Teen Driver

See “Teen Driver” under “Settings” in the infotainment manual.

Radio

Select to display the Radio menu and the following may display:

- Manage Favorites
- Number of Favorites Shown
- Audible Touch Feedback
- Bose AudioPilot
- Auto Volume
- Maximum Startup Volume

Manage Favorites

This allows favorites to be edited. See “Manage Favorites” in “Settings” under “Radio” in the infotainment manual.

Number of Favorites Shown

Touch to set the number of favorites to display.

Select the desired number or select Auto and the infotainment system will automatically adjust the number of favorites shown.

Audible Touch Feedback

This allows Audible Touch Feedback to be turned on or off.

Select Off or On.

Bose AudioPilot

This allows Bose AudioPilot to be turned on or off.

Select Off or On.

Auto Volume

This feature adjusts the volume based on vehicle speed and ambient noise.

Select Off, Low, Medium-Low, Medium, Medium-High, or High.

Maximum Startup Volume

This feature sets the maximum startup volume. If the vehicle is started and the volume is greater than this level, the volume is adjusted to this level. To set the maximum startup volume, touch + or – to increase or decrease.

Vehicle

Select and the following may display:

- Climate and Air Quality
- Collision/Detection Systems
- Comfort and Convenience
- Lighting
- Power Door Locks
- Remote Lock, Unlock, Start

Climate and Air Quality

Select and the following may display:

- Auto Fan Speed
- Auto Cooled Seats
- Auto Heated Seats
- Auto Defog
- Auto Rear Defog

Auto Fan Speed

This feature will set the auto fan speed.

Select Low, Medium, or High.

Auto Cooled Seats

When enabled, this feature will automatically activate the cooled seats at the level required by the interior temperature. See *Heated and Cooled Front Seats* ⇨ *69*.

Select Off or On.

Auto Heated Seats

When the vehicle is on, this feature will automatically activate the heated seats at the level required by the vehicle's interior temperature. See *Heated and Cooled Front Seats* ⇨ *69*.

Select Off or On.

Auto Defog

When set to On, the auto defog comes on when the climate control sensor detects high interior humidity. Air will be directed to the windshield.

Select Off or On.

Auto Rear Defog

If equipped, this feature will automatically turn on the rear window defogger when the vehicle is first started in cold weather and turn off when the vehicle is warmed.

Select Off or On.

Collision/Detection Systems

Select the Collision/Detection Systems menu and the following may display:

- Alert Type
- Forward Collision System
- Rear Cross Traffic Alert
- Adaptive Cruise Go Notifier
- Park Assist
- Lane Change Alert

Alert Type

This feature will set crash alerts to beeps or seat vibrations. See *Driver Assistance Systems* ⇨ *237*.

Select Beeps or Safety Alert Seat.

Forward Collision System

This feature will turn on or off Forward Collision Alert (FCA) and Forward Automatic Braking (FAB). The Off setting disables all FCA and FAB functions. With the Alert and Brake setting, both FCA and FAB are available. The Alert setting disables FAB. See *Forward Automatic Braking (FAB)* ⇨ *247*.

Select Off, Alert and Brake, or Alert.

Rear Cross Traffic Alert

This allows the Rear Cross Traffic Alert feature to be turned on or off. See *Assistance Systems for Parking or Backing* ⇨ *238*.

Select Off or On.

Adaptive Cruise Go Notifier

This feature will give a reminder that Adaptive Cruise Control provides when it has brought the vehicle to a complete stop behind another stopping vehicle, and then that vehicle drives on.

Select Off or On.

Park Assist

If equipped, this allows the feature to be turned on or off. See *Assistance Systems for Parking or Backing* ⇨ *238*.

Select Off, On, or On with Towbar Attached.

Lane Change Alert

This allows the feature to be turned on or off. See *Lane Change Alert (LCA)* ⇨ *248*.

Select Off or On.

Comfort and Convenience

Select and the following may display:

- Auto Running Boards
- Auto Memory Recall
- Easy Exit Options
- Chime Volume
- Hands Free Liftgate Control
- Reverse Tilt Mirror
- Auto Mirror Folding
- Auto Wipe in Reverse Gear

Auto Running Boards

This allows the feature to be turned on or off. See *Power Assist Steps* ⇨ *48*.

Select Off, On, or Extended.

Auto Memory Recall

This feature automatically recalls the current driver's previously stored 1 or 2 button positions when the ignition is changed from off to on or ACC/ACCESSORY. See *Memory Seats* ⇨ *65*.

Select On or Off.

Easy Exit Options

This feature automatically recalls the previously stored exit button position when exiting the vehicle. See *Memory Seats* ⇨ *65*.

Select Off or On.

Chime Volume

This allows the selection of the chime volume level.

Touch + or – to adjust the volume.

Hands Free Liftgate Control

The liftgate may be operated with a kicking motion under the rear bumper. See *Liftgate* ⇨ *40*.

Select Off, On-Open and Close, or On-Open Only.

Reverse Tilt Mirror

When on, the driver and/or passenger mirrors will tilt downward when the vehicle is shifted to R (Reverse) to improve visibility of the ground near the rear wheels. See *Reverse Tilt Mirrors* ⇨ *53*.

Select Off, On - Driver and Passenger, On - Driver, or On - Passenger.

Auto Mirror Folding

When on, the outside mirrors will automatically fold or unfold when the Remote Keyless Entry (RKE) transmitter 🔒 or 🔓 button is pressed and held. See *Folding Mirrors* ⇨ *52*.

Select Off or On.

Auto Wipe in Reverse Gear

When on and the front wiper is on, the rear wiper will automatically activate when the vehicle is shifted to R (Reverse).

Select Off or On.

Lighting

Select the Lighting menu and the following may display:

- Vehicle Locator Lights
- Exit Lighting

Vehicle Locator Lights

This feature will flash the exterior lamps and allows some of the exterior lamps and most of the interior lamps to turn on briefly when 🔓 on the Remote Keyless Entry (RKE) transmitter is pressed to locate the vehicle.

Select On or Off.

Exit Lighting

This allows the selection of how long the exterior lamps stay on when leaving the vehicle when it is dark outside.

Select Off, 30 Seconds, 60 Seconds, or 120 Seconds.

Power Door Locks

Select Power Door Locks and the following may display:

- Unlocked Door Anti-Lockout
- Auto Door Unlock
- Delayed Door Lock

Unlocked Door Anti-Lockout

When on, this feature will keep the driver door from locking when the vehicle is off, the driver door is open, and locking is requested. All the doors will lock and only the driver door will unlock. See *Lockout Protection* ⇨ *39*.

If Off is selected, the Delayed Door Lock menu will be available.

Select Off or On.

Auto Door Unlock

This allows selection of which of the doors will automatically unlock when the vehicle is shifted into P (Park).

Select Off, All Doors, or Driver Door.

Delayed Door Lock

When on, this feature will delay the locking of the doors. To override the delay, press the power door lock switch on the door.

Select Off or On.

Remote Lock, Unlock, Start

Select Remote Lock, Unlock, Start and the following may display:

- Remote Unlock Light Feedback
- Remote Lock Feedback
- Remote Door Unlock
- Remote Start Auto Cool Seats
- Remote Start Auto Heat Seats
- Remote Window Operation
- Passive Door Unlock
- Passive Door Lock
- Remote Left in Vehicle Alert

Remote Unlock Light Feedback

When on, the exterior lamps will flash when unlocking the vehicle with the RKE transmitter.

Select Off or Flash Lights.

Remote Lock Feedback

This allows selection of what type of feedback is given when locking the vehicle with the RKE transmitter.

Select Off, Lights and Horn, Lights Only, or Horn Only.

Remote Door Unlock

This allows selection of which doors will unlock when pressing 🔓 on the RKE transmitter.

Select All Doors or Driver Door.

Remote Start Auto Cool Seats

If equipped and turned on, this feature will turn the cooled seats on when using remote start on warm days.

Select Off or On.

Remote Start Auto Heat Seats

If equipped and turned on, this feature will turn the heated seats on when using remote start on cold days.

Select Off or On.

Remote Window Operation

This allows the windows to be opened when pressing 🔓 on the RKE transmitter. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Select Off or On.

Passive Door Unlock

This allows the selection of what doors will unlock when using the button on the driver door to unlock the vehicle.

Select All Doors or Driver Door.

Passive Door Lock

This allows passive locking to be turned on or off and selects feedback. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

Select Off, On with Horn Chirp, or On.

Remote Left in Vehicle Alert

This feature sounds an alert when the RKE transmitter is left in the vehicle. This menu also enables Remote No Longer in Vehicle Alert.

Select Off or On.

Bluetooth

Select and the following may display:

- Pair New Device
- Device Management
- Ringtones
- Voice Mail Numbers
- Text Message Alerts

Pair New Device

Select to pair a new device. See “Pairing” under “Bluetooth (Infotainment Controls)” in the infotainment manual.

Device Management

Select to connect to a different phone source, disconnect a phone, or delete a phone.

Ringtones

Select to change the ring tone for the specific phone. The phone does not need to be connected to change the ring tone.

Voice Mail Numbers

This feature displays the voice mail number for all connected phones. To change the voice mail number, select EDIT. Type a new number, then select SAVE.

Text Message Alerts

This feature allows text messages to be received. See “Text Messaging” under “Phone” in the infotainment manual.

Select Off or On.

Apple CarPlay

Select and the following may display:

- Apple CarPlay
- Manage Apple CarPlay Devices

Apple CarPlay

This feature allows Apple devices to be connected to the infotainment system through a USB port.

Select Off or On.

Manage Apple CarPlay Devices

Select to manage Apple devices. Apple CarPlay must be on for this feature to be accessed.

Android Auto

Select and the following may display:

- Android Auto
- Manage Android Auto Devices

Android Auto

This feature allows Android devices to be connected to the infotainment system through a USB port.

Select Off or On.

Manage Android Auto Devices

Select to manage Android devices. Android Auto must be on for this feature to be accessed.

Voice

Select and the following may display:

- Confidence Threshold
- Prompt Length
- Audio Feedback Speed
- Display “What Can I Say?” Tips

Confidence Threshold

This feature allows the adjustment of the sensitivity of the speech recognition system.

Select Confirm More or Confirm Less.

Prompt Length

This feature adjusts the voice prompt length.

Select Short or Long.

Audio Feedback Speed

This feature adjusts the audio feedback speed.

Select Slow, Medium, or Fast.

Display “What Can I Say?” Tips

This feature gives voice command tips.

Select Off or On.

Display

Select and the following may display:

- Mode
- Proximity Sensing
- Calibrate Touchscreen
- Turn Display Off

Mode

Select to change the display of the infotainment system.

Select Auto, Day, or Night.

Proximity Sensing

This allows the feature to be turned on or off.

Select Off, On, or On-Map Only.

Calibrate Touchscreen

Select to calibrate the touchscreen, then follow the prompts.

Turn Display Off

Select to turn the display off. Touch anywhere on the infotainment display or press any infotainment controls on the center stack to turn the display on.

Rear Camera

Select and the following may display:

- Guidance Lines
- Rear Park Assist Symbols

Guidance Lines

Select to turn Off or On. See *Assistance Systems for Parking or Backing* ➪ *238*.

Rear Park Assist Symbols

Select to turn Off or On. See *Assistance Systems for Parking or Backing* ➪ *238*.

Return to Factory Settings

Select and the following may display:

- Restore Vehicle Settings
- Clear All Private Data
- Restore Radio Settings

Restore Vehicle Settings

This allows selection of restoring vehicle settings.

Select Restore or Cancel.

Clear All Private Data

This allows selection to clear all private information from the vehicle.

Select Delete or Cancel.

Restore Radio Settings

This allows selection to restore radio settings.

Select Restore or Cancel.

Software Information

Select to view or update the infotainment system current software information.

Wi-Fi

Select and the following may display:

- Wi-Fi
- Manage Wi-Fi Networks

Wi-Fi

This feature allows Wi-Fi networks to be turned off or on.

Select Off or On.

Manage Wi-Fi Networks

Select to manage Wi-Fi networks. Wi-Fi must be on for this feature to be accessed.

Universal Remote System

See *Radio Frequency Statement* ⇨ *388*.

Universal Remote System Programming

If equipped, these buttons are in the overhead console.

This system can replace up to three remote control transmitters used to activate devices such as garage door openers, security systems, and home automation devices. These instructions refer to a garage door opener, but can be used for other devices.

Do not use the Universal Remote system with any garage door opener that does not have the stop and reverse feature. This includes any garage door opener model manufactured before April 1, 1982.

Read these instructions completely before programming the Universal Remote system. It may help to have another person assist with the programming process.

Keep the original hand-held transmitter for use in other vehicles as well as for future programming. Erase the programming when vehicle ownership is terminated. See “Erasing Universal Remote System Buttons” later in this section.

To program a garage door opener, park outside directly in line with and facing the garage door opener receiver. Clear all people and objects near the garage door.

Make sure the hand-held transmitter has a new battery for quicker and more accurate transmission of the radio-frequency signal.

Programming the Universal Remote System

For questions or programming help, see www.homelink.com/gm or call 1-800-355-3515. For calls placed outside the U.S.A, Canada, or Puerto Rico, international rates will apply and may differ based on landline or mobile phone.

Programming involves time-sensitive actions, and may time out causing the procedure to be repeated.

To program up to three devices:

1. Hold the end of the hand-held transmitter about 3 to 8 cm (1 to 3 in) away from the Universal Remote system buttons with the indicator light in view. The hand-held transmitter was supplied by the manufacturer of the garage door opener receiver.

2. At the same time, press and hold both the hand-held transmitter button and one of the three Universal Remote system buttons to be used to operate the garage door. Do not release either button until the indicator light changes from a slow to a rapid flash. Then release both buttons.

   Some garage door openers may require substitution of Step 2 with the procedure under “Radio Signals for Some Gate Operators” later in this section.

3. Press and hold the newly programmed Universal Remote system button for five seconds while watching the indicator light and garage door activation.

   - If the indicator light stays on continuously or the garage door moves when the button is pressed, then programming is complete. There is no need to complete Steps 4–6.
   - If the indicator light does not come on or the garage door does not move, a second button press may be required. For a second time, press and hold the newly programmed button for five seconds. If the light stays on or the garage door moves, programming is complete.
   - If the indicator light blinks rapidly for two seconds, then changes to a solid light and the garage door does not move, continue with programming Steps 4–6.

Learn or Smart Button

4. After completing Steps 1–3, locate the Learn or Smart button inside the garage on the garage door opener receiver. The name and color of the button may vary by manufacturer.

5. Press and release the Learn or Smart button. Step 6 must be completed within 30 seconds of pressing this button.

6. Inside the vehicle, press and hold the newly programmed Universal Remote system button for two seconds, then release it. If the garage door does not move or the lamp on the garage door opener receiver does not flash, press and hold the same button a second time for two seconds, then release it. Again, if the door does not move or the garage door lamp does not flash, press and hold the same button a third time for two seconds, then release it.

The Universal Remote system should now activate the garage door.

Repeat the process for programming the two remaining buttons.

Radio Signals for Some Gate Operators

For questions or programming help, see www.homelink.com/gm or call 1-800-355-3515. For calls placed outside the U.S.A, Canada, or Puerto Rico, international rates will apply and may differ based on landline or mobile phone.

Some radio-frequency laws and gate operators require transmitter signals to time out or quit after several seconds of transmission. This may not be long enough for the Universal Remote system to pick up the signal during programming.

If the programming did not work, replace Step 2 under “Programming the Universal Remote System” with the following:

Press and hold the Universal Remote system button while pressing and releasing the hand-held transmitter button every two seconds until the signal has been successfully accepted by the Universal Remote system. The Universal Remote system indicator light will flash slowly at first and then rapidly. Proceed with Step 3 under “Programming the Universal Remote System” to complete.

Universal Remote System Operation

Using the Universal Remote System

Press and hold the appropriate Universal Remote system button for at least one-half second. The indicator light will come on while the signal is being transmitted.

Erasing Universal Remote System Buttons

Erase all programmed buttons when vehicle ownership is terminated.

To erase:

1. Press and hold the two outside buttons until the indicator light begins to flash. This should take about 10 seconds.
2. Release both buttons.

Reprogramming a Single Universal Remote System Button

To reprogram any of the system buttons:

1. Press and hold any one of the buttons. Do not release the button.
2. The indicator light will begin to flash after 20 seconds. Without releasing the button, proceed with Step 1 under “Programming the Universal Remote System.”

Lighting

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Exterior Lighting

Exterior Lamp Controls

The exterior lamp control is on the instrument panel to the left of the steering wheel.

Turn the control to the following positions:

⏻ **:** Turns off the automatic headlamps and Daytime Running Lamps (DRL). Turning the headlamp control to ⏻ again will turn the automatic headlamps and DRL back on.

For vehicles first sold in Canada, the off position only works when the vehicle is shifted into the P (Park) position.

AUTO : Automatically turns the exterior lamps on and off, depending on outside lighting.

: Turns on the parking lamps including all lamps, except the headlamps.

: Turns on the headlamps together with the parking lamps and instrument panel lights.

When the headlamps are turned on while the vehicle is on, the headlamps will turn off automatically 10 minutes after the ignition is turned off. When the headlamps are turned on while the vehicle is off, the headlamps will stay on for 10 minutes before automatically turning off to prevent the battery from being drained. Turn the headlamp control to off and then back to the headlamp on position to make the headlamps stay on for an additional 10 minutes.

IntelliBeam® System

If equipped, this system turns the vehicle's high-beam headlamps on and off according to surrounding traffic conditions.

The system turns the high-beam headlamps on when it is dark enough and there is no other traffic present.

This light comes on in the instrument cluster when the IntelliBeam system is enabled.

Turning On and Enabling IntelliBeam

To enable the IntelliBeam system, with the turn signal lever in the neutral position, turn the exterior lamp control to AUTO. The blue high-beam on light appears on the instrument cluster when the high beams are on.

Driving with IntelliBeam

The system only activates the high beams when driving over 40 km/h (25 mph).

There is a sensor near the top center of the windshield, which automatically controls the system. Keep this area of the windshield clear of debris to allow for best system performance.

The high-beam headlamps remain on, under the automatic control, until one of the following situations occurs:

- The system detects an approaching vehicle's headlamps.
- The system detects a preceding vehicle's taillamps.
- The outside light is bright enough that high-beam headlamps are not required.
- The vehicle's speed drops below 20 km/h (12 mph).
- The IntelliBeam system can be disabled by the high/low-beam changer or the flash-to-pass feature. If this happens, the high/low-beam changer must be activated on then off within two seconds to reactivate the IntelliBeam system. The instrument cluster light will come on to indicate the IntelliBeam is reactivated. See *Headlamp High/Low-Beam Changer* ⇨ *169* and *Flash-to-Pass* ⇨ *169*.

The high beams may not turn off automatically if the system cannot detect other vehicle's lamps because of any of the following:

- The other vehicle's lamps are missing, damaged, obstructed from view, or otherwise undetected.
- The other vehicle's lamps are covered with dirt, snow, and/or road spray.
- The other vehicle's lamps cannot be detected due to dense exhaust, smoke, fog, snow, road spray, mist, or other airborne obstructions.

- The vehicle's windshield is dirty, cracked, or obstructed by something that blocks the view of the light sensor.
- The vehicle is loaded such that the front end points upward, causing the light sensor to aim high and not detect headlamps and taillamps.
- The vehicle is being driven on winding or hilly roads.

The automatic high-beam headlamps may need to be disabled if any of the above conditions exist.

Exterior Lamps Off Reminder

If a door is open, a reminder chime sounds when the headlamps or parking lamps are manually turned on and the ignition is off. To turn off the chime, turn the exterior lamp control to off or AUTO and then back on, or close and re-open the door. In the AUTO mode, the headlamps turn off once the ignition is off or remain on until the headlamp delay ends (if enabled in the DIC). See “Exit Lighting” under *Vehicle Personalization* ⇨ *155*.

Headlamp High/Low-Beam Changer

Push the turn signal lever toward the instrument panel to change the headlamps from low to high beam.

Pull the turn signal lever toward you and release it to return to low-beam headlamps.

When the high-beam headlamps are on, this indicator light on the instrument cluster will also be on.

Flash-to-Pass

This feature lets you use the high-beam headlamps to signal a driver in front of you that you want to pass. It works even if the headlamps are in the automatic position.

To use it, pull the turn signal lever toward you, then release it.

If the headlamps are in the automatic position or on low beam, the high-beam headlamps will turn on. They will stay on as long as you hold the lever toward you. The high-beam indicator on the instrument cluster will come on. Release the lever to return to normal operation.

Daytime Running Lamps (DRL)

DRL can make it easier for others to see the front of the vehicle during the day. Fully functional DRL are required on all vehicles first sold in Canada.

The DRL system comes on when the following conditions are met:

- The ignition is on.

- The exterior lamp control is in AUTO.
- The transmission is not in P (Park).
- The light sensor determines it is daytime.

When the DRL system is on, only the DRL are on. The taillamps, sidemarker lamps, instrument panel lights, and other lamps will not be on.

When it begins to get dark, the automatic headlamp system switches from DRL to the headlamps.

To turn off the DRL, turn the exterior lamp control to ⏻ and then release. For vehicles first sold in Canada, off will only work when the vehicle is parked.

Automatic Headlamp System

When it is dark enough outside, the automatic headlamp system turns on the headlamps at the normal brightness, along with the taillamps, sidemarker, parking lamps, and the instrument panel lights. The radio lights will also be dim.

To turn off the automatic headlamp system, turn the exterior lamp control to ⏻ and then release it.

The vehicle has a light sensor on the top of the instrument panel that controls the automatic headlamp system. Do not cover the sensor, otherwise the headlamps may come on when they are not needed.

The system may also turn on the headlamps when driving through a parking garage, heavy overcast weather, or a tunnel. This is normal.

There is a delay in the transition between the daytime and nighttime operation of the automatic headlamp system so that driving under bridges or bright overhead street lights does not affect the system. The automatic headlamp system is only affected when the light sensor detects a change in lighting lasting longer than the delay.

If the vehicle is started in a dark garage, the automatic headlamp system will come on immediately. Once the vehicle leaves the garage, it takes approximately one minute for the automatic headlamp system to change if it is bright enough outside. During that delay, the instrument cluster may not be as bright as usual. Make sure the instrument panel brightness control is in the full bright position. See *Instrument Panel Illumination Control* ⇨ *172*.

To idle the vehicle with the automatic headlamp system off, turn the control to the off position.

The headlamps will also stay on after you exit the vehicle.

The regular headlamp system can be turned on when needed.

Lights On with Wipers

If the windshield wipers are activated in daylight with the engine on, and the exterior lamp control is in AUTO, the headlamps, parking lamps, and other exterior lamps come on. The transition time for the lamps coming on varies based on wiper speed. When the wipers are not operating, these lamps turn off. Move the exterior lamp control to ⏻ or ≡DO≡ to disable this feature.

Hazard Warning Flashers

⚠ **:** Press to make the front and rear turn signal lamps flash on and off. Press again to turn the flashers off.

When the hazard warning flashers are on, the vehicle's turn signals will not work.

Turn and Lane-Change Signals

An arrow on the instrument cluster flashes in the direction of the turn or lane change.

Move the turn signal lever all the way up or down to signal a turn.

Raise or lower the lever for less than one second until the arrow starts to flash to signal a lane change. This causes the turn signals to automatically flash three times. It will flash six times if Tow/Haul Mode is active. Holding the turn signal lever for more than one second will cause the turn signals to flash until the lever is released.

The lever returns to its starting position whenever it is released.

If after signaling a turn or a lane change the arrows flash rapidly or do not come on, a signal bulb could be burned out.

Replace any burned out bulbs. If a bulb is not burned out, check the fuse. See *Fuses and Circuit Breakers* ⇨ *304*.

Turn Signal On Chime

If the turn signal is left on for more than 1.2 km (0.75 mi), a chime sounds at each flash of the turn signal. The message TURN SIGNAL ON will also appear in the Driver Information Center (DIC). To turn the chime and message off, move the turn signal lever to the off position.

Cornering Lamps

If equipped with cornering lamps, they automatically come on when all of the following occur:

- The low-beam headlamps are on.
- The turn signals are activated or the steering wheel is at a calibrated angle.
- The vehicle speed is below the calibrated speed.

Interior Lighting

Instrument Panel Illumination Control

This feature controls the brightness of the instrument panel lights and is next to the exterior lamp control.

: Move the thumbwheel up or down to brighten or dim the lights.

The brightness of the displays automatically adjusts based on outdoor lighting. The instrument panel illumination control will set the lowest level to which the displays will be automatically adjusted.

Dome Lamps

There are dome lamps in the overhead console and the headliner, if equipped.

To change the dome lamp settings, press the following:

OFF : Turns the lamps off, even when a door is open.

DOOR : The lamps come on automatically when a door is opened.

ON : Turns all dome lamps on.

Reading Lamps

There are reading lamps in the overhead console and the headliner, if equipped. To operate, the ignition must be on or in ACC/ACCESSORY, or using Retained Accessory Power (RAP).

Press or next to each reading lamp to turn it on or off.

Lighting Features

Entry Lighting

Some exterior lamps and the interior lamps turn on briefly at night, or in areas with limited lighting, when 🔓 is pressed on the Remote Keyless Entry (RKE) transmitter. When a door is opened, the interior lamps come on if the dome lamp control is in the DOOR position. After about 30 seconds the exterior lamps turn off. Entry lighting can be disabled manually by changing the ignition out of the OFF position, or by pressing the RKE transmitter 🔒 button.

This feature can be changed. See “Vehicle Locator Lights” under *Vehicle Personalization* ⇨ *155*.

Exit Lighting

Some exterior lamps and interior lamps come on at night, or in areas with limited lighting, when the driver door is opened after the ignition is turned off. The exterior lamps and interior lamps remain on for a set amount of time, then automatically turn off.

The exterior lamps turn off immediately by turning the exterior lamp control off.

This feature can be changed. See *Vehicle Personalization* ⇨ *155*.

Battery Load Management

The vehicle has Electric Power Management (EPM), which estimates the battery's temperature and state of charge. It then adjusts the voltage for best performance and extended life of the battery.

When the battery's state of charge is low, the voltage is raised slightly to quickly bring the charge back up. When the state of charge is high, the voltage is lowered slightly to prevent overcharging. The voltmeter gauge or the voltage display on the Driver Information Center (DIC), if equipped, may show the voltage moving up or down. This is normal. If there is a problem, an alert will be displayed.

The battery can be discharged at idle if the electrical loads are very high. This is true for all vehicles. This is because the generator (alternator) may not be spinning fast enough at idle to produce all the power that is needed for very high electrical loads.

A high electrical load occurs when several of the following are on, such as: headlamps, high beams, fog lamps, rear window defogger, climate control fan at high speed, heated seats, engine cooling fans, trailer loads, and loads plugged into accessory power outlets.

EPM works to prevent excessive discharge of the battery. It does this by balancing the generator's output and the vehicle's electrical needs. It can increase engine idle speed to generate more power, whenever needed. It can temporarily reduce the power demands of some accessories.

Normally, these actions occur in steps or levels, without being noticeable. In rare cases at the highest levels of corrective action, this action may be noticeable to the driver. If so, a DIC message might be displayed and it is

recommended that the driver reduce the electrical loads as much as possible.

Battery Power Protection

This feature shuts off the dome and reading lamps if they are left on for more than 10 minutes when the ignition is off. This will keep the battery from running down.

Exterior Lighting Battery Saver

The exterior lamps turn off about 10 minutes after the ignition is turned off, if the parking lamps or headlamps have been manually left on. This protects against draining the battery. To restart the 10-minute timer, turn the exterior lamp control to the ⏻ position and then back to the ≋ or ≣D position.

To keep the lamps on for more than 10 minutes, the ignition must be on or in ACC/ACCESSORY.

Infotainment System

Introduction

Infotainment 176

Introduction

Infotainment

See the infotainment manual for information on the radio, audio players, phone, navigation system, Rear Seat Entertainment (RSE), and voice or speech recognition, if equipped. It also includes information on settings.

Active Noise Cancellation (ANC)

If equipped, ANC reduces engine noise in the vehicle's interior. ANC requires the factory-installed audio system, radio, speakers, amplifier (if equipped), induction system, and exhaust system to work properly. Deactivation is required by your dealer if related aftermarket equipment is installed.

Climate Controls

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Climate Control Systems

Dual Automatic Climate Control System

The climate control buttons on the center stack and on the climate control display are used to adjust the heating, cooling, and ventilation.

Center Stack Climate Controls

1. Driver and Passenger Temperature Controls
2. Fan Control
3. OFF (Fan)
4. Driver and Passenger Heated and Cooled Seats (If Equipped)
5. Recirculation
6. Rear Window Defogger
7. Defrost
8. AUTO (Automatic Operation)

Climate Control Display

1. Outside Temperature Display
2. Driver and Passenger Temperature Controls
3. Fan Control
4. SYNC (Synchronized Temperature)

5. A/C Mode (Air Conditioning)
6. Climate Control Selection (Application Tray Button)
7. Rear (Rear Climate Control Touch Screen)
8. Air Delivery Mode Control

Climate Control Display

The fan, air delivery mode, air conditioning, driver and passenger temperatures, and SYNC settings can be controlled by pressing CLIMATE on the infotainment home screen or the climate button on the infotainment display application tray. A selection can then be made on the front climate control page displayed. See the infotainment manual.

Climate Control Status Display

The climate control status display appears briefly when the climate control buttons on the center stack are adjusted. The air delivery mode can be adjusted on the climate control display.

Automatic Operation

The system automatically controls the fan speed, air delivery, air conditioning, and recirculation in order to heat or cool the vehicle to the desired temperature.

When AUTO is lit, all four functions operate automatically. Each function can also be manually set and the setting is displayed. Functions not manually set will continue to be automatically controlled, even if the AUTO indicator is not lit.

For automatic operation:

1. Press AUTO.
2. Set the temperature. Allow the system time to stabilize. Then adjust the temperature as needed for best comfort.

To improve fuel efficiency and to cool the vehicle faster, recirculation may be automatically selected in warm weather. The recirculation light will not come on. Press to select recirculation; press it again to select outside air.

English units can be changed to metric units through the instrument cluster. See “Cluster Settings Menu” under *Instrument Cluster* ⇨ *134*.

OFF : Press OFF to turn the fan on or off. When off is selected, the system will stop air from flowing into the

cabin. If on is selected, any other buttons are pressed, or any knobs are turned, the climate control system will turn on and operate at the current setting.

△ / ▽ **:** The temperature can be adjusted separately for the driver and the passenger. Press to increase or decrease the temperature. Press and hold to rapidly increase or decrease the temperature.

The driver and passenger temperatures can also be adjusted by touching the controls on the climate control display.

SYNC : Touch SYNC on the climate control display to link all climate zone settings to the driver settings. Adjust the driver side temperature control to change the linked temperature. When the passenger settings are adjusted, the SYNC button is displayed when the temperatures are unlinked.

Rear : If equipped, touch Rear on the front climate control display to open the rear climate control screen. The rear climate control settings can now be adjusted from the front passenger area.

Manual Operation

∨ ∧ **:** Touch the fan controls on the climate control display or press the fan control buttons, to increase or decrease the fan speed. Touch or press and hold the fan controls to adjust speed more quickly. The fan speed setting displays. Any adjustment of the fan speed cancels automatic fan control and the fan can be controlled manually. Press AUTO to return to automatic operation.

To turn off the fan and climate control system, press OFF on the center stack climate controls. The airflow will be blocked from entering in all air delivery modes, except defrost.

The maximum automatic fan speed can be set to low, medium, or high. To adjust Auto Fan Speed, see “Climate and Air Quality” under *Vehicle Personalization* ⇨ *155*.

Air Delivery Mode Control : When the climate information is displayed, press the desired air delivery mode on the climate control display to change the direction of the airflow. The selected air delivery mode button is lit. Pressing any of the air delivery buttons cancels automatic air delivery control and the direction of the airflow can be controlled manually. Press AUTO to return to automatic operation.

To change the current mode, select one of the following:

: Air is directed to the instrument panel outlets.

: Air is divided between the instrument panel outlets and the floor outlets.

: Air is directed to the floor outlets.

: Clears the windows of fog or moisture. Air is directed to the windshield and floor outlets.

: Clears the windshield of fog or frost more quickly. Air is directed to the windshield. Press to turn on or off. Changing the air delivery mode also turns the defrost off.

A/C Mode : Touch AC Mode on the climate control display to turn the automatic air conditioning on or off. If the fan is turned off or the outside temperature falls below freezing, the air conditioner will not run.

Press AUTO to return to automatic operation and the air conditioner runs as needed.

Automatic Air Recirculation : When the AUTO indicator light is on, the air is automatically recirculated as needed to help quickly cool the inside of the vehicle.

: Press to alternate between recirculating air inside the vehicle or pulling in outside air. The indicator light on the button is lit when recirculation mode is active. This helps to quickly cool the air inside the vehicle and reduce the entry of outside air and odors.

Pressing this button cancels automatic recirculation. Press AUTO to return to automatic operation; recirculation runs automatically as needed.

Manual recirculation mode is not available when in Defrost or Defog modes.

Auto Defog : The climate control system uses a sensor to automatically detect high humidity inside the vehicle. When high humidity is detected, the climate control system may adjust to outside air supply, turn on the air conditioner, and direct more air to the windshield. If the climate control system does not detect possible window fogging, it returns to normal operation. To turn Auto Defog off or on, see “Climate and Air Quality” under *Vehicle Personalization* ⇨ *155*.

Rear Window Defogger

REAR : Press to turn the rear window defogger on or off. An indicator light on the button comes on to show that the rear window defogger is on.

The rear window defogger only works when the ignition is on. The defogger turns off if the ignition is turned off or to ACC/ACCESSORY.

The rear window defogger can be set to automatic operation. When Auto Rear Defog is selected, the rear window defogger turns on automatically when the vehicle is first started in cold weather and turns off when the vehicle is warmed. To turn Auto Rear Defog on or off, see “Climate and Air Quality” under *Vehicle Personalization* ⇨ *155*.

The heated outside mirrors turn on when the rear window defogger button is on and help to clear fog or frost from the surface of the mirrors.

Caution

Do not try to clear frost or other material from the inside of the front windshield and rear window with a razor blade or anything else that is sharp. This may damage the rear window defogger grid and

(Continued)

Caution (Continued)

affect the radio's ability to pick up stations clearly. The repairs would not be covered by the vehicle warranty.

Driver and Passenger Heated and Cooled Seats : If equipped, press or to heat the driver or passenger seatback only.

If equipped, press or to heat the driver or passenger seat cushion and seatback.

If equipped, press or to cool the driver or passenger seat. See *Heated and Cooled Front Seats* ⇨ *69*.

The vehicle also has auto heated and cooled seats that turn on when the vehicle is on. The seats will activate at the level required by the vehicle's interior temperature. The auto heated and cooled seats can be turned on or off. See *Vehicle Personalization* ⇨ *155* and *Heated and Cooled Front Seats* ⇨ *69*.

Remote Start Climate Control Operation : If equipped with the remote start feature, the climate control system may run when the vehicle is started remotely. The system uses the driver's previous settings to heat or cool the inside of the vehicle. The rear defog may come on during remote start based on cold ambient conditions. The rear defog indicator light does not come on during a remote start. If equipped with heated or cooled seats, they may come on during a remote start. See *Remote Vehicle Start* ⇨ *35* and *Heated and Cooled Front Seats* ⇨ *69*.

Sensor

The solar sensor, on top of the instrument panel near the windshield, monitors the solar heat.

The climate control system uses the sensor information to adjust the temperature, fan speed, recirculation, and air delivery mode for best comfort.

If the sensor is covered, the automatic climate control system may not work properly.

Rear Climate Control System

If equipped, the rear climate control system is on the rear of the center console. The settings can be adjusted with the rear climate controls and the rear climate display.

Rear Climate Controls

1. Heated Rear Seats
2. AUTO (Automatic Operation)
3. Temperature Control
4. Fan Control
5. ⏻ (On/Off)
6. Air Delivery Mode Control

Rear Climate Display

1. Outside Temperature Display
2. Rear Climate Temperature Control
3. Fan Control
4. SYNC (Synchronized Temperatures)
5. REAR ⏻ (On/Off)
6. Rear AUTO (Automatic Operation)
7. Front (Front Climate Control Touch Screen)
8. Rear Control Lockout
9. Air Delivery Mode Control

Rear : Touch Rear on the front climate control display to open the rear climate control screen. The rear climate control settings can now be adjusted from the front passenger area.

⏻ : Press ⏻ or REAR ⏻ to turn the rear climate control system on or off. If the rear climate control system is turned off using REAR ⏻ on the rear climate display, the ⏻ button and the temperature or air delivery mode buttons on the rear climate controls must be pressed within five seconds to turn it back on.

SYNC : Touch SYNC on the rear climate display to match the rear climate control temperature to the front climate control driver temperature. The SYNC button will be lit. Press the temperature, MODE, or AUTO button twice to unlink the set driver and rear temperatures. The SYNC button turns off.

Rear Control Lockout : Touch Rear Control Lockout on the rear climate display to lock or unlock control of the rear climate control system from the front climate control display. When locked the rear climate control system cannot be adjusted from the rear climate controls on the rear of the center console.

Automatic Operation

Rear AUTO : Touch to turn on or off. The air delivery and fan speed are controlled automatically. The AUTO indicator appears on the display on the rear of the center console. If the Mode or fan control buttons are manually adjusted, this cancels the automatic operation.

Manual Operation

∧ / ∨ ∧∨ : Touch or press the fan controls on the rear climate display or on the rear of the center console to increase or decrease the airflow. Pressing ∧ when the system is off will turn the system on. The air delivery mode remains in its previous setting.

△ / ▽ : Touch or press and hold the rear temperature controls on the rear climate display or on the rear of the center console to adjust the rear passenger temperature. Press △ for warmer air and press ▽ for cooler air.

/ / : Touch the desired mode on the rear climate display or the MODE button on the rear of the center console to change the direction of the airflow in the rear seating area.

or : Press or to heat the left or right outboard seat cushion. See *Heated Rear Seats* ⇨ *71*.

Air Vents

Adjustable air vents are in the center and on the side of the instrument panel.

1. Slider Knob
2. Thumbwheel

Move the slider knobs (1) to change the direction of the airflow.

Use the thumbwheels (2) near the air vents to open or close off the airflow.

Operation Tips

- Clear away any ice, snow, or leaves from the air inlets at the base of the windshield that could block the flow of air into the vehicle.
- Clear snow off the hood to improve visibility and help decrease moisture drawn into the vehicle.
- When you enter a vehicle in cold weather, press the fan up button to the maximum fan level before driving. This helps clear the intake ducts of snow and moisture, and reduces the chance of fogging the inside of the window.
- Keep the air path under the front seats clear of objects to help circulate the air inside of the vehicle more effectively.
- Use of non-GM approved hood deflectors can adversely affect the performance of the system. Check with your dealer before adding equipment to the outside of the vehicle.

Maintenance

Passenger Compartment Air Filter

The filter reduces the dust, pollen, and other airborne irritants from outside air that is pulled into the vehicle.

The filter should be replaced as part of routine scheduled maintenance. See *Maintenance Schedule* ⇨ *363*. To find out what type of filter to use, see *Maintenance Replacement Parts* ⇨ *373*.

1. Before opening the glove box, remove the two lower screws (out of view).

2. Open the glove box completely and remove the two upper screws.
3. Disconnect the electrical plug and remove the entire glove box.

4. Release the two tabs holding the service door. Open the service door and remove the old filter.
5. Install the new air filter.
6. Close the service door and secure the tabs.
7. Reverse the steps to reinstall the glove box.

See your dealer if additional assistance is needed.

Service

All vehicles have a label underhood that identifies the refrigerant used in the vehicle. The refrigerant system should only be serviced by trained and certified technicians. The air conditioning evaporator should never be repaired or replaced by one from a salvage vehicle. It should only be replaced by a new evaporator to ensure proper and safe operation.

During service, all refrigerants should be reclaimed with proper equipment. Venting refrigerants directly to the atmosphere is harmful to the environment and may also create unsafe conditions based on inhalation, combustion, frostbite, or other health-based concerns.

The air conditioning system requires periodic maintenance. See *Maintenance Schedule* ⇨ *363*.

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Driving Information

Distracted Driving

Distraction comes in many forms and can take your focus from the task of driving. Exercise good judgment and do not let other activities divert your attention away from the road. Many local governments have enacted laws regarding driver distraction. Become familiar with the local laws in your area.

To avoid distracted driving, keep your eyes on the road, keep your hands on the steering wheel, and focus your attention on driving.

- Do not use a phone in demanding driving situations. Use a hands-free method to place or receive necessary phone calls.
- Watch the road. Do not read, take notes, or look up information on phones or other electronic devices.
- Designate a front seat passenger to handle potential distractions.
- Become familiar with vehicle features before driving, such as programming favorite radio stations and adjusting climate control and seat settings. Program all trip information into any navigation device prior to driving.
- Wait until the vehicle is parked to retrieve items that have fallen to the floor.
- Stop or park the vehicle to tend to children.
- Keep pets in an appropriate carrier or restraint.
- Avoid stressful conversations while driving, whether with a passenger or on a cell phone.

⚠ Warning

Taking your eyes off the road too long or too often could cause a crash resulting in injury or death. Focus your attention on driving.

Refer to the infotainment section for more information on using that system and the navigation system, if equipped, including pairing and using a cell phone.

Defensive Driving

Defensive driving means “always expect the unexpected.” The first step in driving defensively is to wear the seat belt. See *Seat Belts* ⇨ *78*.

- Assume that other road users (pedestrians, bicyclists, and other drivers) are going to be careless and make mistakes. Anticipate what they might do and be ready.
- Allow enough following distance between you and the driver in front of you.
- Focus on the task of driving.

Drunk Driving

Death and injury associated with drinking and driving is a global tragedy.

⚠ Warning

Drinking and then driving is very dangerous. Your reflexes, perceptions, attentiveness, and judgment can be affected by even a small amount of alcohol. You can have a serious — or even fatal — collision if you drive after drinking.

Do not drink and drive or ride with a driver who has been drinking. Ride home in a cab; or if you are with a group, designate a driver who will not drink.

Control of a Vehicle

Braking, steering, and accelerating are important factors in helping to control a vehicle while driving.

Braking

Braking action involves perception time and reaction time. Deciding to push the brake pedal is perception time. Actually doing it is reaction time.

Average driver reaction time is about three-quarters of a second. In that time, a vehicle moving at 100 km/h (60 mph) travels 20 m (66 ft), which could be a lot of distance in an emergency.

Helpful braking tips to keep in mind include:

- Keep enough distance between you and the vehicle in front of you.
- Avoid needless heavy braking.
- Keep pace with traffic.

If the engine ever stops while the vehicle is being driven, brake normally but do not pump the brakes. Doing so could make the pedal harder to push down. If the engine stops, there will be some power brake assist but it will be used when the brake is applied. Once the power assist is used up, it can take longer to stop and the brake pedal will be harder to push.

Steering

Electric Power Steering

This vehicle has electric power steering. It does not have power steering fluid. Regular maintenance is not required.

If power steering assist is lost due to a system malfunction, the vehicle can be steered, but may require increased effort.

See your dealer if there is a problem.

If the steering assist is used for an extended period of time while the vehicle is not moving, power assist may be reduced.

If the steering wheel is turned until it reaches the end of its travel, and is held in that position for an extended period of time, power steering assist may be reduced.

Normal use of the power steering assist should return when the system cools down.

See your dealer if there is a problem.

Curve Tips

- Take curves at a reasonable speed.
- Reduce speed before entering a curve.
- Maintain a reasonable steady speed through the curve.
- Wait until the vehicle is out of the curve before accelerating gently into the straightaway.

Steering in Emergencies

- There are some situations when steering around a problem may be more effective than braking.
- Holding both sides of the steering wheel allows you to turn 180 degrees without removing a hand.
- Antilock Brake System (ABS) allows steering while braking.

Off-Road Recovery

The vehicle's right wheels can drop off the edge of a road onto the shoulder while driving. Follow these tips:

1. Ease off the accelerator and then, if there is nothing in the way, steer the vehicle so that it straddles the edge of the pavement.
2. Turn the steering wheel about one-eighth of a turn, until the right front tire contacts the pavement edge.
3. Turn the steering wheel to go straight down the roadway.

Loss of Control

Skidding

There are three types of skids that correspond to the vehicle's three control systems:

- Braking Skid — wheels are not rolling.
- Steering or Cornering Skid — too much speed or steering in a curve causes tires to slip and lose cornering force.
- Acceleration Skid — too much throttle causes the driving wheels to spin.

Defensive drivers avoid most skids by taking reasonable care suited to existing conditions, and by not overdriving those conditions. But skids are always possible.

If the vehicle starts to slide, follow these suggestions:

- Ease your foot off the accelerator pedal and steer the way you want the vehicle to go. The vehicle may straighten out. Be ready for a second skid if it occurs.
- Slow down and adjust your driving according to weather conditions. Stopping distance can be longer and vehicle control can be affected when traction is reduced by water, snow, ice, gravel, or other material on the road. Learn to recognize warning clues — such as enough water, ice, or packed snow on the road to make a mirrored surface — and slow down when you have any doubt.
- Try to avoid sudden steering, acceleration, or braking, including reducing vehicle speed by shifting to a lower gear. Any sudden changes could cause the tires to slide.

Remember: Antilock brakes help avoid only the braking skid.

Off-Road Driving

Four-wheel-drive vehicles can be used for off-road driving. Vehicles without four-wheel drive and vehicles not equipped with All Terrain (AT) or On-Off Road (OOR) tires must not be driven off-road except on a level, solid surface. For contact information about the original equipment tires, see the warranty manual.

One of the best ways for successful off-road driving is to control the speed.

⚠ Warning

When driving off-road, bouncing and quick changes in direction can easily throw you out of position. This could cause you to lose control and crash. You and your passengers should always wear seat belts.

Before Driving Off-Road

- Have all necessary maintenance and service work completed.
- Fuel the vehicle, fill fluid levels, and check inflation pressure in all tires, including the spare, if equipped.
- Read all the information about four-wheel-drive vehicles in this manual.

- Know the local laws that apply to off-road driving.

To gain more ground clearance if needed, it may be necessary to remove the front fascia lower air dam, if equipped. However, driving without the air dam reduces fuel economy.

Caution

Operating the vehicle for extended periods without the front fascia lower air dam installed can cause improper airflow to the engine. Reattach the front fascia air dam after off-road driving.

Loading the Vehicle for Off-Road Driving

⚠ Warning

- Unsecured cargo on the load floor can be tossed about when driving over rough terrain. You or your

(Continued)

Warning (Continued)

passengers can be struck by flying objects. Secure the cargo properly.

- Keep cargo in the cargo area as far forward and as low as possible. The heaviest things should be on the floor, forward of the rear axle.
- Heavy loads on the roof raise the vehicle's center of gravity, making it more likely to roll over. You can be seriously or fatally injured if the vehicle rolls over. Put heavy loads inside the cargo area, not on the roof.

For more information about loading the vehicle, see *Vehicle Load Limits* ⇨ *197* and *Tires* ⇨ *314*.

Environmental Concerns

- Always use established trails, roads, and areas that have been set aside for public off-road recreational driving and obey all posted regulations.
- Do not damage shrubs, flowers, trees, or grasses or disturb wildlife.
- Do not park over things that burn. See *Parking over Things That Burn* ⇨ *209*.

Driving on Hills

Driving safely on hills requires good judgment and an understanding of what the vehicle can and cannot do.

⚠ Warning

Many hills are simply too steep for any vehicle. Driving up hills can cause the vehicle to stall. Driving down hills can cause loss of control. Driving across hills can cause a rollover. You could be injured or killed. Do not drive on steep hills.

Before driving on a hill, assess the steepness, traction, and obstructions. If the terrain ahead cannot be seen, get out of the vehicle and walk the hill before driving further.

When driving on hills:

- Use a low gear and keep a firm grip on the steering wheel.
- Maintain a slow speed.
- When possible, drive straight up or down the hill.
- Slow down when approaching the top of the hill.
- Use headlamps even during the day to make the vehicle more visible.

⚠ Warning

Driving to the top of a hill at high speed can cause a crash. There could be a drop-off, embankment, cliff, or even another vehicle. You could be seriously injured or killed. As you near the top of a hill, slow down and stay alert.

- Never go downhill forward or backward with either the transmission or transfer case in N (Neutral). The brakes could overheat and you could lose control.

⚠ Warning

If the vehicle has the two-speed automatic or electronic transfer case, shifting the transfer case to N (Neutral) can cause your vehicle to roll even if the transmission is in P (Park). This is because the N (Neutral) position on the transfer case overrides the transmission. You or someone else could be injured. If leaving the vehicle, set the parking brake and shift the transmission to P (Park). Shift the transfer case to any position but N (Neutral).

- When driving down a hill, keep the vehicle headed straight down. Use a low gear because the engine will work with the brakes to slow the vehicle and help keep the vehicle under control.

⚠ Warning

Heavy braking when going down a hill can cause your brakes to overheat and fade. This could cause loss of control and you or others could be injured or killed. Apply the brakes lightly when descending a hill and use a low gear to keep vehicle speed under control.

If the vehicle stalls on a hill:

1. Apply the brakes to stop the vehicle, and then apply the parking brake.
2. Shift into P (Park) and then restart the engine.
   - If driving uphill when the vehicle stalls, shift to R (Reverse), release the parking brake, and back straight down.

- Never try to turn the vehicle around. If the hill is steep enough to stall the vehicle, it is steep enough to cause it to roll over.
- If you cannot make it up the hill, back straight down the hill.
- Never back down a hill in N (Neutral) using only the brake. The vehicle can roll backward quickly and you could lose control.
- If driving downhill when the vehicle stalls, shift to a lower gear, release the parking brake, and drive straight down the hill.

3. If the vehicle cannot be restarted after stalling, set the parking brake, shift into P (Park), and turn the vehicle off.
   3.1. Leave the vehicle and seek help.
   3.2. Stay clear of the path the vehicle would take if it rolled downhill.

- Avoid turns that take the vehicle across the incline of the hill. A hill that can be driven straight up or down might be too steep to drive across. Driving across an incline puts more weight on the downhill wheels, which could cause a downhill slide or a rollover.
- Surface conditions can be a problem. Loose gravel, muddy spots, or even wet grass can cause the tires to slip sideways, downhill. If the vehicle slips sideways, it can hit something that will trip it — a rock, a rut, etc. — and roll over.
- Hidden obstacles can make the steepness of the incline more severe. If a rock is driven across with the uphill wheels, or if the downhill wheels drop into a rut or depression, the vehicle can tilt even more.
- If an incline must be driven across, and the vehicle starts to slide, turn downhill. This should help straighten out the vehicle and prevent the side slipping.

⚠ Warning

Getting out of the vehicle on the downhill side when stopped across an incline is dangerous. If the vehicle rolls over, you could be crushed or killed. Always get out on the uphill side of the vehicle and stay well clear of the rollover path.

Driving in Mud, Sand, Snow, or Ice

Use a low gear when driving in mud — the deeper the mud, the lower the gear. Keep the vehicle moving to avoid getting stuck.

Traction changes when driving on sand. On loose sand, such as on beaches or sand dunes, the tires tend to sink into the sand. This affects steering, accelerating, and braking. Drive at a reduced speed and avoid sharp turns or abrupt maneuvers.

Traction is reduced on hard packed snow and ice and it is easy to lose control. Reduce vehicle speed when driving on hard packed snow and ice.

⚠ Warning

Driving on frozen lakes, ponds, or rivers can be dangerous. Ice conditions vary greatly and the vehicle could fall through the ice; you and your passengers could drown. Drive your vehicle on safe surfaces only.

Driving in Water

⚠ Warning

Driving through rushing water can be dangerous. Deep water can sweep your vehicle downstream and you and your passengers could drown. If it is only shallow water, it can still wash away the ground from under your tires. Traction could be lost, and the vehicle could roll over. Do not drive through rushing water.

Caution

Do not drive through standing water if it is deep enough to cover the wheel hubs, axles, or exhaust pipe. Deep water can damage the axle and other vehicle parts.

If the standing water is not too deep, drive through it slowly. At faster speeds, water can get into the engine and cause it to stall. Stalling can occur if the exhaust pipe is under water. Do not turn off the ignition when driving through water. If the exhaust pipe is under water, the engine will not start. When going through water, the brakes get wet and it may take longer to stop. See "Driving on Wet Roads" later in this section.

After Off-Road Driving

Remove any brush or debris that has collected on the underbody or chassis, or under the hood. These accumulations can be a fire hazard.

After operation in mud or sand, have the brake linings cleaned and checked. These substances can cause glazing and uneven braking. Check the body structure, driveline, steering, suspension, wheels, tires, and exhaust system for damage and check the fuel lines and cooling system for any leakage.

More frequent maintenance service is required. See the *Maintenance Schedule* ⇨ *363*.

Driving on Wet Roads

Rain and wet roads can reduce vehicle traction and affect your ability to stop and accelerate. Always drive slower in these types of driving conditions and avoid driving through large puddles and deep-standing or flowing water.

⚠ Warning

Wet brakes can cause crashes. They might not work as well in a quick stop and could cause pulling to one side. You could lose control of the vehicle.

After driving through a large puddle of water or a car/vehicle wash, lightly apply the brake pedal until the brakes work normally.

Flowing or rushing water creates strong forces. Driving through flowing water could cause the vehicle to be carried away. If this happens, you and other vehicle occupants could drown. Do not ignore police warnings and be very cautious about trying to drive through flowing water.

Hydroplaning

Hydroplaning is dangerous. Water can build up under the vehicle's tires so they actually ride on the water. This can happen if the road is wet enough and you are going fast enough. When the vehicle is hydroplaning, it has little or no contact with the road.

There is no hard and fast rule about hydroplaning. The best advice is to slow down when the road is wet.

Other Rainy Weather Tips

Besides slowing down, other wet weather driving tips include:

- Allow extra following distance.
- Pass with caution.
- Keep windshield wiping equipment in good shape.
- Keep the windshield washer fluid reservoir filled.
- Have good tires with proper tread depth. See *Tires* ⇨ *314*.
- Turn off cruise control.

Hill and Mountain Roads

Driving on steep hills or through mountains is different than driving on flat or rolling terrain. Tips include:

- Keep the vehicle serviced and in good shape.
- Check all fluid levels and brakes, tires, cooling system, and transmission.
- Shift to a lower gear when going down steep or long hills.

⚠ Warning

Using the brakes to slow the vehicle on a long downhill slope can cause brake overheating, can reduce brake performance, and could result in a loss of braking. Shift the transmission to a lower gear to let the engine assist the brakes on a steep downhill slope.

⚠ Warning

Coasting downhill in N (Neutral) or with the ignition off is dangerous. This can cause overheating of the brakes and loss of steering assist. Always have the engine running and the vehicle in gear.

- Drive at speeds that keep the vehicle in its own lane. Do not swing wide or cross the center line.
- Be alert on top of hills; something could be in your lane (e.g., stalled car, crash).
- Pay attention to special road signs (e.g., falling rocks area, winding roads, long grades, passing or no-passing zones) and take appropriate action.

Winter Driving

Driving on Snow or Ice

Snow or ice between the tires and the road creates less traction or grip, so drive carefully. Wet ice can occur at about 0 °C (32 °F) when freezing rain begins to fall. Avoid driving on wet ice or in freezing rain until roads can be treated.

For Slippery Road Driving:

- Accelerate gently. Accelerating too quickly causes the wheels to spin and makes the surface under the tires slick.
- Turn on Traction Control. See *Traction Control/Electronic Stability Control* ⇨ *222*.
- Antilock Brake System (ABS) improves vehicle stability during hard stops, but the brakes should be applied sooner than when on dry pavement. See *Antilock Brake System (ABS)* ⇨ *219*.
- Allow greater following distance and watch for slippery spots. Icy patches can occur on otherwise clear roads in shaded areas. The surface of a curve or an overpass can remain icy when the surrounding roads are clear. Avoid sudden steering maneuvers and braking while on ice.
- Turn off cruise control.

Blizzard Conditions

Stay with the vehicle unless there is help nearby. If possible, use Roadside Assistance. See *Roadside Service* ⇨ *382*. To get help and keep everyone in the vehicle safe:

- Turn on the hazard warning flashers.
- Tie a red cloth to an outside mirror.

⚠ Warning

Snow can trap engine exhaust under the vehicle. This may cause exhaust gases to get inside. Engine exhaust contains carbon monoxide (CO), which cannot be seen or smelled. It can cause unconsciousness and even death.

If the vehicle is stuck in snow:

- Clear snow from the base of the vehicle, especially any blocking the exhaust pipe.
- Open a window about 5 cm (2 in) on the vehicle side that is away from the wind, to bring in fresh air.
- Fully open the air outlets on or under the instrument panel.
- Adjust the climate control system to circulate the air inside the vehicle and set the

(Continued)

Warning (Continued)

fan speed to the highest setting. See "Climate Control Systems."

For more information about CO, see *Engine Exhaust* ⇨ *209*.

To save fuel, run the engine for short periods to warm the vehicle and then shut the engine off and partially close the window. Moving about to keep warm also helps.

If it takes time for help to arrive, when running the engine, push the accelerator pedal slightly so the engine runs faster than the idle speed. This keeps the battery charged to restart the vehicle and to signal for help with the headlamps. Do this as little as possible, to save fuel.

If the Vehicle Is Stuck

Slowly and cautiously spin the wheels to free the vehicle when stuck in sand, mud, ice, or snow.

If stuck too severely for the traction system to free the vehicle, turn the traction system off and use the rocking method. See *Traction Control/ Electronic Stability Control* ⇨ *222*.

⚠ Warning

If the vehicle's tires spin at high speed, they can explode, and you or others could be injured. The vehicle can overheat, causing an engine compartment fire or other damage. Spin the wheels as little as possible and avoid going above 56 km/h (35 mph).

Rocking the Vehicle to Get it Out

Turn the steering wheel left and right to clear the area around the front wheels. Turn off any traction system. Shift back and forth between R (Reverse) and a low forward gear, spinning the wheels as little as possible. To prevent transmission wear, wait until the wheels stop spinning before shifting gears. Release the accelerator pedal while shifting, and press lightly on the accelerator pedal when the transmission is in gear. Slowly spinning the wheels in the forward and reverse directions causes a rocking motion that could free the vehicle. If that does not get the vehicle out after a few tries, it might need to be towed out. If the vehicle does need to be towed out, see *Towing the Vehicle* ⇨ *348*.

Vehicle Load Limits

It is very important to know how much weight the vehicle can carry. This weight is called the vehicle capacity weight and includes the weight of all occupants, cargo, and all nonfactory-installed options. Two labels on the vehicle may show how much weight it was designed to carry, the Tire and Loading Information label and the Certification/Tire label.

⚠ Warning

Do not load the vehicle any heavier than the Gross Vehicle Weight Rating (GVWR), or either the maximum front or rear Gross Axle Weight Rating (GAWR). This can cause systems to break and change the way the vehicle handles. This could cause loss of control and a crash. Overloading can also reduce stopping distance, damage the tires, and shorten the life of the vehicle.

Tire and Loading Information Label

Label Example

A vehicle specific Tire and Loading Information label is attached to the center pillar (B-pillar). The tire and loading information label shows the number of occupant seating positions (1), and the maximum vehicle capacity weight (2) in kilograms and pounds.

The Tire and Loading Information label also shows the size of the original equipment tires (3) and the recommended cold tire inflation pressures (4). For more information on tires and inflation see *Tires* ⇨ *314* and *Tire Pressure* ⇨ *320*.

There is also important loading information on the vehicle Certification/Tire label. It may show the Gross Vehicle Weight Rating (GVWR) and the Gross Axle Weight Rating (GAWR) for the front and rear axles. See “Certification/Tire Label” later in this section.

“Steps for Determining Correct Load Limit–

1. Locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs." on your vehicle’s placard.

2. Determine the combined weight of the driver and passengers that will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kg or XXX lbs.
4. The resulting figure equals the available amount of cargo and luggage load capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb passengers in your vehicle, the amount of available cargo and luggage load capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.)
5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity calculated in Step 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult this manual to determine how this reduces the available cargo and luggage load capacity of your vehicle."

See *Trailer Towing* ⇨ *261* for important information on towing a trailer, towing safety rules, and trailering tips.

Example 1

1. Maximum Vehicle Capacity Weight for Example 1 = 453 kg (1,000 lbs)
2. Subtract Occupant Weight @ 68 kg (150 lbs) × 2 = 136 kg (300 lbs)
3. Available Occupant and Cargo Weight = 317 kg (700 lbs)

Example 2

1. Vehicle Capacity Weight for Example 2 = 453 kg (1,000 lbs)
2. Subtract Occupant Weight @ 68 kg (150 lbs) × 5 = 136 kg (750 lbs)
3. Available Cargo Weight = 113 kg (250 lbs)

Example 3

1. Maximum Vehicle Capacity Weight for Example 3 = 453 kg (1,000 lbs)
2. Subtract Occupant Weight @ 91 kg (200 lbs) × 5 = 453 kg (1,000 lbs)
3. Available Cargo Weight = 0 kg (0 lbs)

Refer to the vehicle's Tire and Loading Information label for specific information about the vehicle's capacity weight and seating positions. The combined weight of the driver, passengers, and cargo should never exceed the vehicle's capacity weight.

Certification/Tire Label

Label Example

A vehicle specific Certification/Tire label is attached to the B-pillar. The label may show the size of the vehicle's original tires and the inflation pressures needed to obtain the gross weight capacity of the vehicle. This is called Gross Vehicle Weight Rating (GVWR). The GVWR includes the weight of the vehicle, all occupants, fuel, and cargo.

The Certification/Tire label may also show the maximum weights for the front and rear axles, called Gross Axle Weight Rating (GAWR). To find out the actual loads on the front and rear axles, weigh the vehicle at a weigh station. Your dealer can help with this. Be sure to spread the load equally on both sides of the center line.

The warranty does not cover parts or components that fail because of overloading.

The label will help determine how much cargo and installed equipment the vehicle can carry.

Using heavier suspension components to get added durability might not change the weight ratings. Ask your dealer to help load the vehicle properly.

⚠ Warning

Things you put inside the vehicle can strike and injure people in a sudden stop or turn, or in a crash.

- Put things in the cargo area of the vehicle. Try to spread the weight evenly.
- Never stack heavier things, like suitcases, inside the vehicle so that some of them are above the tops of the seats.
- Do not leave an unsecured child restraint in the vehicle.
- When you carry something inside the vehicle, secure it whenever you can.
- Do not leave a seat folded down unless you need to.

There is also important loading information for off-road driving in this manual. See "Loading the Vehicle for Off-Road Driving" under *Off-Road Driving* ⇨ *190*.

Add-On Equipment

There may be a limit on how many people can be inside the vehicle when carrying removable items. Be sure to weigh the vehicle before buying and installing the new equipment.

Caution

Overloading the vehicle may cause damage. Repairs would not be covered by the vehicle warranty. Do not overload the vehicle.

Remember not to exceed the Gross Axle Weight Rating (GAWR) of the front or rear axle.

Automatic Level Control

See *Automatic Level Control* ⇨ *226*.

If a weight-distributing hitch is being used, it is recommended to allow the shocks to inflate, thereby leveling the vehicle prior to adjusting the height. See "Hitches" under *Towing Equipment* ⇨ *266*.

Starting and Operating

New Vehicle Break-In

Caution

The vehicle does not need an elaborate break-in. But it will perform better in the long run if you follow these guidelines:

- Keep the vehicle speed at 88 km/h (55 mph) or less for the first 805 km (500 mi).
- Do not drive at any one constant speed, fast or slow, for the first 805 km (500 mi). Do not make full-throttle starts. Avoid downshifting to brake or slow the vehicle.
- Avoid making hard stops for the first 322 km (200 mi) or so. During this time the new brake linings are not yet broken in. Hard stops with new linings can mean premature wear and earlier

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Caution (Continued)

replacement. Follow this breaking-in guideline every time you get new brake linings.

- Do not tow a trailer during break-in. See *Trailer Towing* ⇨ *261* for the trailer towing capabilities of the vehicle and more information.

Following break-in, engine speed and load can be gradually increased.

Adjustable Throttle and Brake Pedal

If equipped, the position of the throttle and brake pedals can be changed.

The pedals can only be adjusted when the vehicle is in P (Park).

Press the top of the switch to move the pedals closer to your body. Press the bottom of the switch to move the pedals away.

Before you start driving, fully press the brake pedal to confirm the adjustment is right for you.

The vehicle may have a memory function, which lets pedal settings be saved and recalled. See *Memory Seats* ⇨ *65*.

Ignition Positions

The vehicle is equipped with Keyless Access and has pushbutton start.

The Remote Keyless Entry (RKE) transmitter must be in the vehicle for the system to operate. If the pushbutton start is not working, the vehicle may be near a strong radio antenna signal causing interference to the Keyless Access system. See *Remote Keyless Entry (RKE) System Operation* ⇨ *28*.

To shift out of P (Park), the vehicle must be on or in service mode, and the brake pedal must be applied.

Stopping the Engine/LOCK/OFF (No Indicator Lights) : When the vehicle is stopped, press ENGINE START/STOP once to turn the engine off.

If the vehicle is in P (Park), the ignition will turn off, and Retained Accessory Power (RAP) will remain active. See *Retained Accessory Power (RAP)* ⇨ *207*.

If the vehicle is not in P (Park), the ignition will return to ACC/ACCESSORY and display the message SHIFT TO PARK in the Driver Information Center (DIC). When the vehicle is shifted into P (Park), the ignition will turn off.

Do not turn the engine off when the vehicle is moving. This will cause a loss of power assist in the brake and steering systems and disable the airbags.

The vehicle may have an electric steering column lock. The lock is activated when the ignition is turned off and either front door is opened. A sound may be heard as the lock actuates or releases. The steering column lock may not release with the wheels turned off center. If this happens, the vehicle may not start. Move the steering wheel from left to right while attempting to start the vehicle. If this does not work, the vehicle needs service.

If the vehicle must be shut off in an emergency:

1. Brake using a firm and steady pressure. Do not pump the brakes repeatedly. This may deplete power assist, requiring increased brake pedal force.
2. Shift the vehicle to N (Neutral). This can be done while the vehicle is moving. After shifting to N (Neutral), firmly apply the brakes and steer the vehicle to a safe location.
3. Come to a complete stop, shift to P (Park), and turn the ignition off. On vehicles with an automatic transmission, the shift lever must be in P (Park) to turn the ignition off.
4. Set the parking brake. See *Parking Brake* ⇨ *219* or *Electric Parking Brake* ⇨ *220*.

⚠ Warning

Turning off the vehicle while moving may cause loss of power assist in the brake and steering systems and disable the airbags. While driving, only shut the vehicle off in an emergency.

If the vehicle cannot be pulled over, and must be shut off while driving, press and hold ENGINE START/STOP for longer than two seconds, or press twice in five seconds.

ACC/ACCESSORY (Amber Indicator Light) : This mode allows some electrical accessories to be used when the engine is off.

With the ignition off, pressing the button one time without the brake pedal applied will place the ignition system in ACC/ACCESSORY.

The ignition will switch from ACC/ACCESSORY to off after five minutes to prevent battery rundown.

ON/RUN/START (Green Indicator Light) : This mode is for driving and starting. With the ignition off, and the brake pedal applied, pressing the button once will turn the ignition on. Once engine cranking begins, release the button. Engine cranking will continue until the engine starts. See *Starting the Engine* ⇨ *204*. The ignition will then remain on.

Service Mode

This power mode is available for service and diagnostics, and to verify the proper operation of the malfunction indicator lamp as may be required for emission inspection purposes. With the vehicle off, and the brake pedal not applied, pressing and holding the button for more than five seconds will place the vehicle in Service Mode. The instruments and audio systems will operate as they do when the ignition is on, but the vehicle will not be able to be driven. The engine will not start in Service Mode. Press the button again to turn the ignition off.

Starting the Engine

Move the shift lever to P (Park) or N (Neutral). The engine will not start in any other position. To restart the engine when the vehicle is already moving, use N (Neutral) only.

Caution

Do not try to shift to P (Park) if the vehicle is moving. If you do, you could damage the transmission. Shift to P (Park) only when the vehicle is stopped.

Caution

If you add electrical parts or accessories, you could change the way the engine operates. Any resulting damage would not be covered by the vehicle warranty. See *Add-On Electrical Equipment* ⇨ *276*.

Starting Procedure

1. With the Keyless Access system, the RKE transmitter must be in the vehicle. Press ENGINE START/STOP with the brake pedal applied. When the engine begins cranking, let go of the button.

   The idle speed will go down as the engine gets warm. Do not race the engine immediately after starting it.

   If the RKE transmitter is not in the vehicle, if there is interference, or if the RKE battery is low, the Driver Information Center (DIC) will display a message.

Caution

Cranking the engine for long periods of time, by returning the ignition to the START position immediately after cranking has ended, can overheat and damage the cranking motor, and drain the

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Caution (Continued)

battery. Wait at least 15 seconds between each try, to let the cranking motor cool down.

2. If the engine does not start after five to 10 seconds, especially in very cold weather (below –18 °C or 0 °F), it could be flooded with too much gasoline. Try pushing the accelerator pedal all the way to the floor and holding it there as you press ENGINE START/STOP, for up to a maximum of 15 seconds. Wait at least 15 seconds between each try, to allow the cranking motor to cool down. When the engine starts, let go of the button, and the accelerator. If the vehicle starts briefly but then stops again, do the same thing. This clears the extra gasoline from the engine. Do not race the engine immediately after starting it. Operate the engine and transmission gently until the oil warms up and lubricates all moving parts.

Engine Heater

⚠ Warning

Do not plug in the engine block heater while the vehicle is parked in a garage or under a carport. Property damage or personal injury may result. Always park the vehicle in a clear open area away from buildings or structures.

If equipped, the engine heater can provide easier starting and better fuel economy during engine warm-up in cold weather conditions at or below –18 °C (0 °F). Vehicles with an engine heater should be plugged in at least four hours before starting. There may be an internal thermostat in the plug end of the cord, which will prevent engine heater operation at temperatures above –18 °C (0 °F).

To Use the Engine Heater

1. Turn off the engine.
2. Open the hood and unwrap the electrical cord. The cord is by the left front fender, next to the engine compartment fuse block.

   Check the heater cord for damage. If it is damaged, do not use it. See your dealer for a replacement. Inspect the cord for damage yearly.
3. Plug the cord into a normal, grounded 110-volt AC outlet.

⚠ Warning

Improper use of the heater cord or an extension cord can damage the cord and may result in overheating and fire.

- Plug the cord into a three-prong electrical utility receptacle that is protected by a ground fault detection

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Warning (Continued)

function. An ungrounded outlet could cause an electric shock.

- Use a weatherproof, heavy-duty, 15 amp-rated extension cord if needed. Failure to use the recommended extension cord in good operating condition, or using a damaged heater or extension cord, could make it overheat and cause a fire, property damage, electric shock, and injury.
- Do not operate the vehicle with the heater cord permanently attached to the

(Continued)

Warning (Continued)

vehicle. Possible heater cord and thermostat damage could occur.

- While in use, do not let the heater cord touch vehicle parts or sharp edges. Never close the hood on the heater cord.
- Before starting the vehicle, unplug the cord, reattach the cover to the plug, and securely fasten the cord. Keep the cord away from any moving parts.

4. Before starting the engine, be sure to unplug and store the cord as it was before to keep it away from moving engine parts. If you do not, it could be damaged.

The length of time the heater should remain plugged in depends on several factors. Ask a dealer in the area where you will be parking the vehicle for the best advice on this.

Retained Accessory Power (RAP)

Some vehicle accessories may be used after the ignition is turned off.

The power windows and sunroof, if equipped, will continue to work for up to 10 minutes or until any door is opened.

The infotainment system will continue to work for 10 minutes, until the driver door is opened, or until the ignition is turned on or placed in ACC/ACCESSORY.

Shifting Into Park

⚠ Warning

It can be dangerous to get out of the vehicle if the shift lever is not fully in P (Park) with the parking brake firmly set. The vehicle can roll. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure the vehicle will

(Continued)

Warning (Continued)

not move, even when you are on fairly level ground, use the steps that follow. If the vehicle has a four-wheel-drive transfer case with an N (Neutral) position, and the transfer case is in N (Neutral), the vehicle will be free to roll, even if the shift lever is in P (Park). Be sure the transfer case is in a drive gear. If towing a trailer, see *Driving Characteristics and Towing Tips* ⇨ *256*.

1. Hold the brake pedal down, then set the parking brake. See *Parking Brake* ⇨ *219* or *Electric Parking Brake* ⇨ *220*.
2. Move the shift lever into the P (Park) position by pulling the shift lever toward you and moving it up as far as it will go.
3. Be sure the transfer case is in a drive gear – not in N (Neutral).
4. Turn the ignition off.

Leaving the Vehicle with the Engine Running

⚠ Warning

It can be dangerous to leave the vehicle with the engine running. The vehicle could move suddenly if the shift lever is not fully in P (Park) with the parking brake firmly set.

If you have four-wheel drive and the transfer case is in N (Neutral), the vehicle will be free to roll, even if the shift lever is in P (Park). So be sure the transfer case is in a drive gear – not in N (Neutral).

And, if you leave the vehicle with the engine running, it could overheat and even catch fire. You or others could be injured. Do not leave the vehicle with the engine running unless you have to.

If you have to leave the vehicle with the engine running, be sure the vehicle is in P (Park) and the parking brake is firmly set before you leave it. After you move the shift lever into P (Park), hold the regular brake pedal down. Then, see if you can move the shift lever away from P (Park) without first pulling it toward you. If you can, it means that the shift lever was not fully locked into P (Park).

Torque Lock

If you are parking on a hill and you do not shift the transmission into P (Park) properly, the weight of the vehicle may put too much force on the parking pawl in the transmission. You may find it difficult to pull the shift lever out of P (Park). This is called torque lock. To prevent torque lock, set the parking brake and then shift into P (Park) properly before you leave the driver seat.

When you are ready to drive, move the shift lever out of P (Park) before you release the parking brake.

If torque lock does occur, you may need to have another vehicle push yours a little uphill to take some of the pressure from the parking pawl in the transmission. You will then be able to pull the shift lever out of P (Park).

Shifting out of Park

This vehicle is equipped with an electronic shift lock release system. The shift lock release system is designed to prevent movement of the shift lever out of P (Park), unless the ignition is on and the brake pedal is applied.

The shift lock release is always functional except in the case of an uncharged or low voltage (less than 9 volt) battery.

If the vehicle has an uncharged battery or a battery with low voltage, try charging or jump starting the battery. See *Jump Starting - North America* ⇨ *345*.

To shift out of P (Park):

1. Apply the brake pedal.
2. Move the shift lever to the desired position.

If you still are unable to shift out of P (Park):

1. Ease the pressure on the shift lever.
2. While holding down the brake pedal, push the shift lever all the way into P (Park).
3. Move the shift lever to the desired position.

If you are still having a problem shifting, then have the vehicle serviced soon.

Parking over Things That Burn

⚠ Warning

Things that can burn could touch hot exhaust parts under the vehicle and ignite. Do not park over papers, leaves, dry grass, or other things that can burn.

Active Fuel Management

This system allows the engine to operate on either all or half of its cylinders, depending on the driving conditions.

When less power is required, such as cruising at a constant vehicle speed, the system will operate in the half cylinder mode, allowing the vehicle to achieve better fuel economy. When greater power demands are required, such as accelerating from a stop, passing, or merging onto a freeway, the system will maintain full-cylinder operation.

Extended Parking

It is best not to park with the vehicle running. If the vehicle is left running, be sure it will not move and there is adequate ventilation.

See *Shifting Into Park* ⇨ *207* and *Engine Exhaust* ⇨ *209*.

If the vehicle is left parked and running with the RKE transmitter outside the vehicle, it will continue to run for up to half an hour.

If the vehicle is left parked and running with the RKE transmitter inside the vehicle, it will continue to run for up to an hour.

The vehicle could turn off sooner if it is parked on a hill, due to lack of available fuel.

The timer will reset if the vehicle is taken out of P (Park) while it is running.

Engine Exhaust

⚠ Warning

Engine exhaust contains carbon monoxide (CO), which cannot be seen or smelled. Exposure to CO can cause unconsciousness and even death.

Exhaust may enter the vehicle if:

- The vehicle idles in areas with poor ventilation (parking garages, tunnels, deep snow that may block underbody airflow or tail pipes).
- The exhaust smells or sounds strange or different.
- The exhaust system leaks due to corrosion or damage.
- The vehicle exhaust system has been modified, damaged, or improperly repaired.

(Continued)

Warning (Continued)

- There are holes or openings in the vehicle body from damage or aftermarket modifications that are not completely sealed.

If unusual fumes are detected or if it is suspected that exhaust is coming into the vehicle:

- Drive it only with the windows completely down.
- Have the vehicle repaired immediately.

Never park the vehicle with the engine running in an enclosed area such as a garage or a building that has no fresh air ventilation.

Running the Vehicle While Parked

It is better not to park with the engine running.

If the vehicle is left with the engine running, follow the proper steps to be sure the vehicle will not move. See *Shifting Into Park* ⇨ *207* and *Engine Exhaust* ⇨ *209*.

If parking on a hill and pulling a trailer, see *Driving Characteristics and Towing Tips* ⇨ *256*.

Automatic Transmission

If equipped, there is an electronic shift lever position indicator within the instrument cluster. This display comes on when the ignition is on or in service mode.

There are several different positions for the shift lever.

See “Range Selection Mode” under *Manual Mode* ⇨ *213*.

P : This position locks the drive wheels. Use P (Park) when starting the engine because the vehicle cannot move easily. When parked on a hill, especially when the vehicle has a heavy load, you might notice an increase in the effort to shift out of P (Park). See “Torque Lock” under *Shifting Into Park* ⇨ *207*.

⚠ Warning

It is dangerous to get out of the vehicle if the shift lever is not fully in P (Park) with the parking brake firmly set. The vehicle can roll.

Do not leave the vehicle when the engine is running. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure the vehicle will not move, even when you are on fairly level ground, always set the parking brake and move the shift lever to P (Park). See *Shifting Into Park* ⇨ *207* and *Driving Characteristics and Towing Tips* ⇨ *256*.

⚠ Warning

If you have four-wheel drive, the vehicle will be free to roll — even if the shift lever is in P (Park) — if the transfer case is in N (Neutral). So,

(Continued)

Warning (Continued)

be sure the transfer case is in a drive gear, Two-Wheel Drive High or Four-Wheel Drive High or Four-Wheel Drive Low — not in N (Neutral). See *Shifting Into Park* ⇨ *207*.

R : Use this gear to back up.

Caution

Shifting to R (Reverse) while the vehicle is moving forward could damage the transmission. The repairs would not be covered by the vehicle warranty. Shift to R (Reverse) only after the vehicle is stopped.

To rock the vehicle back and forth to get out of snow, ice, or sand without damaging the transmission, see *If the Vehicle Is Stuck* ⇨ *197*.

N : In this position, the engine does not connect with the wheels. To restart the engine when the vehicle is already moving, use N (Neutral) only.

⚠ Warning

Shifting into a drive gear while the engine is running at high speed is dangerous. Unless your foot is firmly on the brake pedal, the vehicle could move very rapidly. You could lose control and hit people or objects. Do not shift into a drive gear while the engine is running at high speed.

Caution

Shifting out of P (Park) or N (Neutral) with the engine running at high speed may damage the transmission. The repairs would not be covered by the vehicle warranty. Be sure the engine is not running at high speed when shifting the vehicle.

Caution

A transmission hot message may display if the automatic transmission fluid is too hot. Driving under this condition can damage the vehicle. Stop and idle the engine to cool the automatic transmission fluid. This message clears when the transmission fluid has cooled sufficiently.

D : This position is for normal driving. If more power is needed for passing, press the accelerator pedal down.

Use D (Drive) and Tow/Haul Mode when towing a trailer, carrying a heavy load, driving on steep hills, or driving off-road. Shift the transmission to a lower gear selection if the transmission shifts too often.

Downshifting the transmission in slippery road conditions could result in skidding. See “Skidding” under *Loss of Control* ⇨ *190*.

The vehicle has a shift stabilization feature that adjusts the transmission shifting to the current driving conditions in order to reduce rapid upshifts and downshifts. This shift stabilization feature is designed to determine, before making an upshift, if the engine is able to maintain vehicle speed by analyzing things such as vehicle speed, throttle position, and vehicle load. If the shift stabilization feature determines that a current vehicle speed cannot be maintained, the transmission does not upshift and instead holds the current gear.
In some cases, this could appear to be a delayed shift, however the transmission is operating normally.

The transmission uses adaptive shift controls. The adaptive shift control process continually compares key shift parameters to pre-programmed ideal shifts stored in the transmission’s computer. The transmission constantly makes adjustments to improve vehicle performance according to how the vehicle is being used, such as with a heavy load or when the temperature changes. During this adaptive shift control process, shifting might feel different as the transmission determines the best settings.

When temperatures are very cold, the transmission's gear shifting could be delayed providing more stable shifts until the engine warms up. Shifts could be more noticeable with a cold transmission. This difference in shifting is normal.

L : This position allows selection of a range of gears appropriate for current driving conditions. If equipped, see “Range Selection Mode” under *Manual Mode* ⇨ *213*.

Caution

Spinning the tires or holding the vehicle in one place on a hill using only the accelerator pedal may damage the transmission. The repair will not be covered by the vehicle warranty. If the vehicle is stuck, do not spin the tires. When stopping on a hill, use the brakes to hold the vehicle in place.

Normal Mode Grade Braking

This mode is enabled when the vehicle is started, but is not enabled in Range Selection Mode. It assists in maintaining desired vehicle speeds when driving on downhill grades by using the engine and transmission to slow the vehicle. The first time the system engages for each ignition cycle, a DIC message will be displayed.

To disable or enable Normal Mode Grade Braking within the current ignition cycle, press and hold the Tow/Haul button for five seconds. When the button is released, the requested mode change is made. A DIC message displays.

For other forms of grade braking, see *Tow/Haul Mode* ⇨ *214* and *Cruise Control* ⇨ *226*.

Kickdown Mode

The accelerator pedal provides an additional downshift after pressing through the kickdown feature.

It requires extra pedal pressure near the end of its travel to engage.

Manual Mode

Range Selection Mode

If equipped, Range Selection Mode helps control the vehicle's transmission and vehicle speed while driving downhill or towing a trailer by letting you select a desired range of gears.

To use this feature:

1. Move the shift lever to L (Manual Mode).
2. Press the plus/minus buttons on the shift lever to select the desired range of gears for current driving conditions. Or, hold the plus/minus buttons to select the highest or lowest range available for the current vehicle speed.

When the shift lever is moved from D (Drive) to L (Manual Mode), a number displays next to the L, indicating the current transmission range.

This number is the highest gear that the transmission will command while operating in L (Manual Mode). All gears below that number are available. As driving conditions change, the transmission can automatically shift to lower gears. For example, when 5 (Fifth) is selected, 1 (First) through 5 (Fifth) gears are automatically shifted by the transmission, but 6 (Sixth) cannot be used until the plus/minus button on the shift lever is used to change to the range.

When the shift lever is moved from D (Drive) to L (Manual Mode), a downshift may occur. The gear that the transmission is operating in when the shift lever is moved from D (Drive) to L (Manual Mode) determines if a downshift occurs. See the following chart.

Gear before shifting from D (Drive) to L (Manual Mode)	10th	9th	8th	7th	6th	5th	4th	3rd	2nd	1st
Range after shifting from D (Drive) to L (Manual Mode) - Tow/Haul not engaged	L7	L7	L7	L6	L5	L4	L3	L3	L2	L1
Range after shifting from D (Drive) to L (Manual Mode) - Tow/Haul engaged	L7	L7	L6	L5	L4	L3	L3	L3	L2	L1

Grade Braking is not available when Range Selection Mode is active. See *Tow/Haul Mode* ⇨ *214*.

While using Range Selection Mode, cruise control and the Tow/Haul Mode can be used.

Caution

Spinning the tires or holding the vehicle in one place on a hill using only the accelerator pedal may damage the transmission. The repair will not be covered by the vehicle warranty. If the vehicle is stuck, do not spin the tires. When stopping on a hill, use the brakes to hold the vehicle in place.

Tow/Haul Mode

The Tow/Haul Mode adjusts the transmission shift pattern to reduce shift cycling. This provides increased performance, vehicle control, and enhanced transmission and engine cooling when driving down steep hills or mountain grades, towing, or hauling heavy loads.

Turn the Tow/Haul Mode on and off by pressing the button. When the Tow/Haul Mode is enabled, a light on the instrument cluster will come on.

See *Tow/Haul Mode Light* ⇨ *144* and *Hill and Mountain Roads* ⇨ *195*.

Also see “Tow/Haul Mode” under *Driver Mode Control* ⇨ *224*.

Tow/Haul Mode Grade Braking

Tow/Haul Mode Grade Braking is only enabled while the Tow/Haul Mode is selected and the vehicle is not in the Range Selection Mode. See "Tow/Haul Mode" listed previously and *Manual Mode* ⇨ *213*. Tow/Haul Mode Grade Braking assists in maintaining desired vehicle speeds when driving on downhill grades by using the engine and transmission to slow the vehicle.

To disable or enable Tow/Haul Grade Braking within the current ignition cycle, press and hold the Tow/Haul button for five seconds. When the button is released, the requested mode change is made. A DIC message is displayed.

See *Towing Equipment* ⇨ *266*.

For other forms of grade braking, see *Automatic Transmission* ⇨ *210* and *Cruise Control* ⇨ *226*.

Drive Systems

Four-Wheel Drive

If equipped, four-wheel drive engages the front axle for extra traction.

Caution

Do not drive on clean, dry pavement in 4 ↑ and 4 ↓ (if equipped) for an extended period of time. These conditions may cause premature wear on the vehicle's powertrain.

Driving on clean, dry pavement in 4 ↑ or 4 ↓ may:

- Cause a vibration to be felt in the steering system.
- Cause tires to wear faster.
- Make the transfer case harder to shift, and cause it to run noisier.

⚠ Warning

If equipped with four-wheel drive, the vehicle will be free to roll if the transfer case is in N (Neutral), even when the shift lever is in P (Park). Be sure the transfer case is in a drive gear — 2 ↑, 4 ↑, or 4 ↓ — not in N (Neutral). See *Shifting Into Park* ⇨ *207*.

Caution

Extended high-speed operation in 4 ↓ may damage or shorten the life of the drivetrain.

Engagement noise and bump when shifting between 4 ↓ and 4 ↑ or from N (Neutral), with the engine running, is normal.

Shifting into 4 ↓ will turn Traction Control and StabiliTrak/ESC off. See *Traction Control/Electronic Stability Control* ⇨ *222*.

Automatic Transfer Case

If equipped, use the transfer case knob next to the steering wheel to shift into and out of four-wheel drive.

All of the lights will flash on then off momentarily when the ignition is turned on. The light that remains on will indicate the state of the transfer case.

If the indicator mark on the knob below does not match up with the light, then most likely the knob below was moved when the ignition was off. The indicator mark on the knob below must line up with the indicator light before a shift can be commanded. To command a shift, rotate the transfer case knob below to the new desired position. The light will flash meaning that the shift is in progress. When the shift is completed the new position will be illuminated. If the transfer case cannot complete a shift command, it will go back to its last chosen setting.

The settings are:

N (Neutral) : Use only when the vehicle needs to be towed. See *Recreational Vehicle Towing* ⇨ *349* or *Towing the Vehicle* ⇨ *348*.

2 ↑ (Two-Wheel Drive High) : Use for driving on most streets and highways. The front axle is not engaged. This setting provides the best fuel economy.

AUTO (Automatic Four-Wheel Drive) : Use when road surface traction conditions are variable. When driving in AUTO, the front axle is engaged, and the vehicle's power is sent to the front and rear wheels automatically based on driving conditions. This setting provides slightly lower fuel economy than 2 ↑.

Do not use AUTO mode to park on a steep grade with poor traction such as ice, snow, mud, or gravel. In AUTO mode only the rear wheels will hold the vehicle from sliding when parked. If parking on a steep grade, use 4 ↑ to keep all four wheels engaged.

4 ↑ (Four-Wheel Drive High) : Use this position when extra traction is needed, such as when driving on snowy or icy roads, when off-roading, or when plowing snow.

4 ↓ (Four-Wheel Drive Low) : This setting engages the front axle and delivers extra torque. Choose 4 ↓ when driving off-road in deep sand, deep mud, or deep snow, and while climbing or descending steep hills.

Shifting into 4 ↓ will turn Traction Control and StabiliTrak/ESC off. See *Traction Control/Electronic Stability Control* ⇨ *222*.

Shifting Into 4 ↑ or AUTO

Turn the knob to the 4 ↑ or AUTO position at any speed, except from 4 ↓. The indicator light will flash while shifting and will remain on when the shift is completed.

Shifting Into 2 ↑

Turn the knob to 2 ↑ at any speed, except when shifting from 4 ↓. The indicator light will flash while shifting and will remain on when the shift is completed.

Shifting Into 4 ↓

When 4 ↓ is engaged, keep vehicle speed below 72 km/h (45 mph).

To shift:

1. The ignition must be on and the vehicle must be stopped or moving less than 5 km/h (3 mph) with the transmission in N (Neutral). It is best for the vehicle to be moving 1.6 to 3.2 km/h (1 to 2 mph).
2. Turn the knob to 4 ↓. Wait for the 4 ↓ indicator light to stop flashing before shifting the transmission into gear.

Caution

Shifting the transmission into gear before the requested mode indicator light has stopped flashing could damage the transfer case.

If the transmission is in gear and/or moving more than 5 km/h (3 mph), the 4 ↓ indicator light will flash for 30 seconds and the shift will not be completed. After 30 seconds the transfer case will shift to 4 ↑. Turn the knob to 4 ↑ to display the indicator. With the vehicle moving less than 5 km/h (3 mph), and the transmission in N (Neutral), attempt the shift again.

Shifting Out of 4 ↓

To shift:

1. The vehicle must be stopped or moving less than 5 km/h (3 mph) with the transmission in N (Neutral) and the ignition on. It is best for the vehicle to be moving 1.6 to 3.2 km/h (1 to 2 mph).
2. Turn the knob to 4 ↑, AUTO, or 2 ↑. Wait for the 4 ↑, AUTO, or 2 ↑ indicator light to stop flashing before shifting the transmission into gear.

Caution

Shifting the transmission into gear before the requested mode indicator light has stopped flashing could damage the transfer case.

If the transmission is in gear and/or moving more than 5 km/h (3 mph), the 4 ↑, AUTO, or 2 ↑ indicator light will flash for 30 seconds but the shift will not be completed. With the vehicle moving less than 5 km/h (3 mph), and the transmission in N (Neutral), attempt the shift again.

Shifting Into N (Neutral)

To shift into N (Neutral):

1. Park the vehicle on a level surface.
2. Set the parking brake and press and hold the brake pedal. See *Parking Brake* ⇨ *219* or *Electric Parking Brake* ⇨ *220*.
3. Start the vehicle or turn the ignition on.
4. Shift the transmission to N (Neutral).
5. Shift the transfer case to 2 ↑.
6. Turn the transfer case knob clockwise to N (Neutral) until it stops and hold it there until the N (Neutral) light starts to flash. This will take at least 10 seconds. Then slowly release the knob to the 4 ↓ position. The N (Neutral) light will come on when the transfer case shift to N (Neutral) is complete.
7. With the engine running, verify that the transfer case is in N (Neutral) by shifting the transmission to R (Reverse), then shift the transmission to D (Drive). There should be no movement of the vehicle while shifting the transmission.
8. Turn the engine off, and the ignition to ACC/ACCESSORY.
9. Place the transmission shift lever in P (Park). See *Recreational Vehicle Towing* ⇨ *349*.
10. Turn the ignition off.

Shifting Out of N (Neutral)

To shift out of N (Neutral):

1. Set the parking brake.
2. Press and hold ENGINE START/STOP for five seconds with your foot off the brake to place the vehicle in Service Mode.
3. Shift the transmission to N (Neutral).
4. Turn the transfer case knob to the desired setting.

   After the transfer case has shifted out of N (Neutral), the N (Neutral) light will go out.
5. Release the parking brake.
6. Start the engine and shift the transmission to the desired gear.

Brakes

Antilock Brake System (ABS)

This vehicle has an Antilock Brake System (ABS), an advanced electronic braking system that helps prevent a braking skid.

When the vehicle begins to drive away, ABS checks itself. A momentary motor or clicking noise may be heard while this test is going on, and it may even be noticed that the brake pedal moves a little. This is normal.

If there is a problem with ABS, this warning light stays on. See *Antilock Brake System (ABS) Warning Light* ⇨ *143*.

If driving safely on a wet road and it becomes necessary to slam on the brakes and continue braking to avoid a sudden obstacle, a computer senses the wheels are slowing down. If one of the wheels is about to stop rolling, the computer will separately work the brakes at each wheel.

ABS can change the brake pressure to each wheel, as required, faster than any driver could. This can help you steer around the obstacle while braking hard.

As the brakes are applied, the computer keeps receiving updates on wheel speed and controls braking pressure accordingly.

Remember: ABS does not change the time needed to get a foot up to the brake pedal or always decrease stopping distance. If you get too close to the vehicle in front of you, there will not be enough time to apply the brakes if that vehicle suddenly slows or stops. Always leave enough room up ahead to stop, even with ABS.

Using ABS

Do not pump the brakes. Just hold the brake pedal down firmly and let ABS work. You may hear the ABS pump or motor operating and feel the brake pedal pulsate. This is normal.

Braking in Emergencies

ABS allows you to steer and brake at the same time. In many emergencies, steering can help more than even the very best braking.

Parking Brake

Set the parking brake by holding the regular brake pedal down, then pushing down the parking brake pedal.

If the ignition is on, the brake system warning light will come on. See *Brake System Warning Light* ⇨ *142*.

Caution

Driving with the parking brake on can overheat the brake system and cause premature wear or damage to brake system parts. Make sure that the parking brake is fully released and the brake warning light is off before driving.

To release the parking brake, hold the regular brake pedal down, then push down momentarily on the parking brake pedal until you feel the pedal release. Slowly pull your foot up off the parking brake pedal. If the parking brake is not released when you begin to drive, a DIC message will appear and a chime will sound warning you that the parking brake is still on.

Electric Parking Brake

This vehicle may have an Electric Parking Brake (EPB). The EPB can always be activated, even if the ignition is off. To prevent draining the battery, avoid repeated cycles of the EPB system when the engine is not running.

The system has a Ⓟ or PARK Electric Parking Brake light, and a Ⓟ Service Parking Brake light. See *Electric Parking Brake Light* ⇨ *143* and *Service Electric Parking Brake Light* ⇨ *143*.

Before leaving the vehicle, check for the Ⓟ or PARK light to ensure that the parking brake is applied.

EPB Apply

To apply the EPB:

1. Be sure the vehicle is at a complete stop.
2. Lift up the EPB switch momentarily.

The Ⓟ or PARK light will flash and then stay on once the EPB is fully applied. If the Ⓟ or PARK light flashes continuously, then the EPB is only partially applied or there is a problem with the EPB. A DIC message will display. Release the EPB and try to apply it again. If the light does not come on, or keeps flashing, have the vehicle serviced. Do not drive the vehicle if the Ⓟ or PARK light is flashing. See your dealer. See *Electric Parking Brake Light* ⇨ *143*.

If the light is on, press the EPB switch and hold it. Continue to hold the switch until the or PARK light remains on. If the light remains on, see your dealer.

If the EPB is applied while the vehicle is moving, the vehicle will decelerate as long as the switch is pressed. If the switch is pressed until the vehicle comes to a stop, the EPB will remain applied.

The vehicle may automatically apply the EPB in some situations when the vehicle is not moving. This is normal, and is done to periodically check the correct operation of the EPB system.

If the EPB fails to apply, block the rear wheels to prevent vehicle movement.

EPB Release

To release the EPB:

1. Turn the ignition on or to ACC/ ACCESSORY.
2. Apply and hold the brake pedal.
3. Press the EPB switch momentarily.

The EPB is released when the or PARK light is off.

If the light is on, release the EPB by pressing and holding the EPB switch. Continue to hold the switch until the or PARK light is off. If either light stays on after release is attempted, see your dealer.

Caution

Driving with the parking brake on can overheat the brake system and cause premature wear or damage to brake system parts. Make sure that the parking brake is fully released and the brake warning light is off before driving.

Automatic EPB Release

The EPB will automatically release if the vehicle is running, placed into gear, and an attempt is made to drive away. Avoid rapid acceleration when the EPB is applied, to preserve parking brake lining life.

Brake Assist

The Brake Assist feature is designed to assist the driver in stopping or decreasing vehicle speed in emergency driving conditions. This feature uses the stability system hydraulic brake control module to supplement the power brake system under conditions where the driver has quickly and forcefully applied the brake pedal in an attempt to quickly stop or slow down the vehicle. The stability system hydraulic brake control module increases brake pressure at each corner of the vehicle until the ABS activates. Minor brake pedal pulsation or pedal movement during this time is normal and the driver should continue to apply the brake pedal as the driving situation dictates. The Brake Assist feature will automatically disengage when the brake pedal is released or brake pedal pressure is quickly decreased.

Hill Start Assist (HSA)

This vehicle has a Hill Start Assist (HSA) feature, which may be useful when the vehicle is stopped on a grade sufficient enough to activate HSA. This feature is designed to prevent the vehicle from rolling, either forward or rearward, during vehicle drive off. After the driver completely stops and holds the vehicle in a complete standstill on a grade, HSA will be automatically activated. During the transition period between when the driver releases the brake pedal and starts to accelerate to drive off on a grade, HSA holds the braking pressure for a maximum of two seconds to ensure that there is no rolling. The brakes will automatically release when the accelerator pedal is applied within the two-second window. It will not activate if the vehicle is in a drive gear and facing downhill, or if the vehicle is facing uphill and in R (Reverse).

Ride Control Systems

Traction Control/Electronic Stability Control

System Operation

The vehicle has a Traction Control System (TCS) and StabiliTrak®, an electronic stability control system. These systems help limit wheel spin and assist the driver in maintaining control, especially on slippery road conditions.

TCS activates if it senses any of the drive wheels are spinning or beginning to lose traction. When this happens, TCS applies the brakes to the spinning wheels and reduces engine power to limit wheel spin.

StabiliTrak activates when the vehicle senses a difference between the intended path and the direction the vehicle is actually traveling. StabiliTrak selectively applies braking pressure to any one of the vehicle wheel brakes to assist the driver in keeping the vehicle on the intended path. Trailer Sway Control (TSC) is also on automatically when the vehicle is started. See *Trailer Sway Control (TSC)* ⇨ *274*.

If cruise control is being used and traction control or StabiliTrak begins to limit wheel spin, cruise control will disengage. Cruise control may be turned back on when road conditions allow.

Both systems come on automatically when the vehicle is started and begins to move. The systems may be heard or felt while they are operating or while performing diagnostic checks. This is normal and does not mean there is a problem with the vehicle.

It is recommended to leave both systems on for normal driving conditions, but it may be necessary to turn TCS off if the vehicle gets stuck in sand, mud, ice, or snow. See *If the Vehicle Is Stuck* ⇨ *197* and “Turning the Systems Off and On” later in this section.

When the transfer case (if equipped) is in Four-Wheel Drive Low, the stability system is automatically disabled, OFF comes on, and the

appropriate message will appear on the DIC. Both traction control and StabiliTrak are automatically disabled in this condition.

The indicator light for both systems is in the instrument cluster. This light will:

- Flash when TCS is limiting wheel spin
- Flash when StabiliTrak is activated
- Turn on and stay on when either system is not working

If either system fails to turn on or to activate, a message displays in the Driver Information Center (DIC), and comes on and stays on to indicate that the system is inactive and is not assisting the driver in maintaining control. The vehicle is safe to drive, but driving should be adjusted accordingly.

If comes on and stays on:

1. Stop the vehicle.
2. Turn the engine off and wait 15 seconds.
3. Start the engine.

Drive the vehicle. If comes on and stays on, the vehicle may need more time to diagnose the problem. If the condition persists, see your dealer.

Turning the Systems Off and On

The button for TCS and StabiliTrak is on the center stack.

Caution
Do not repeatedly brake or accelerate heavily when TCS is off. The vehicle driveline could be damaged.

To turn off only TCS, press and release . The traction off light displays in the instrument cluster. The appropriate message will display in the DIC. To turn TCS on again, press and release . The traction off light displayed in the instrument cluster will turn off.

If TCS is limiting wheel spin when is pressed, the system will not turn off until the wheels stop spinning.

To turn off both TCS and StabiliTrak, press and hold until the traction off light and the StabiliTrak OFF light come on and stay on in the instrument cluster, then release. The appropriate message will display in the DIC.

To turn TCS and StabiliTrak on again, press and release . The traction off light and the StabiliTrak OFF light in the instrument cluster turn off.

StabiliTrak will automatically turn on if the vehicle exceeds 56 km/h (35 mph). Traction control will remain off.

The vehicle has a Trailer Sway Control (TSC) feature and a Hill Start Assist (HSA) feature. See *Trailer Sway Control (TSC)* ⇨ *274* or *Hill Start Assist (HSA)* ⇨ *222*.

Adding accessories can affect the vehicle performance. See *Accessories and Modifications* ⇨ *279*.

Driver Mode Control

Driver Mode Control attempts to add a sportier feel, provide a more comfortable ride, or assist in different weather conditions or terrain. This system simultaneously changes the software settings of various sub-systems. Depending on the option package, available features, and mode selected, the suspension, steering, and powertrain will change settings to achieve the desired mode characteristics. If the vehicle is equipped with Magnetic Ride Control, selecting the various Driver Modes adjusts the ride of the vehicle to enhance the ride performance for the road conditions and the selected mode.

The Driver Mode Control has four modes: Tour, Sport, Snow/Ice, and Tow/Haul.

Press the Tow/Haul button to activate and deactivate the Tow/Haul Mode.

Press the MODE switch on the center console to select Tour, Sport, or Snow/Ice. Pressing the switch will display a graphic of all available ride modes and change to the next mode. The Tour and Sport Modes will feel similar on a smooth road. Select a new setting whenever driving conditions change.

Tour Mode

Use for normal city and highway driving to provide a smooth, soft ride.

When selected, there will be no indication in the DIC.

Sport Mode

Use where road conditions or personal preference demand a more controlled response.

The steering will change to provide more precise control. The Magnetic Ride Control will change to provide better cornering performance.

When selected, the Sport Mode indicator will display in the DIC.

Snow/Ice Mode

Use when more traction is needed during slippery conditions.

The vehicle will upshift normally when the vehicle is moving. The acceleration will adjust to help provide a smoother launch.

When selected, the Snow/Ice Mode indicator will display in the DIC.

Tow/Haul Mode

Tow/Haul is a feature that assists when pulling a heavy trailer or a large or heavy load. See *Tow/Haul Mode* ⇨ *214*.

Tow/Haul is designed to be most effective when the vehicle and trailer combined weight is at least 75 percent of the vehicle's Gross Combined

Weight Rating (GCWR). See "Weight of the Trailer" under *Trailer Towing* ⇨ *261*.

Tow/Haul is most useful under the following conditions:

- When pulling a heavy trailer or a large or heavy load through rolling terrain
- When pulling a heavy trailer or a large or heavy load in stop-and-go traffic
- When pulling a heavy trailer or a large or heavy load in busy parking lots where improved low speed control of the vehicle is desired

Operating the vehicle in Tow/Haul when lightly loaded or with no trailer at all will not cause damage. However, there is no benefit to the selection of Tow/Haul when the vehicle is unloaded. Such a selection when unloaded may result in unpleasant engine and transmission driving characteristics and reduced fuel economy. Tow/Haul is recommended only when pulling a heavy trailer or a large or heavy load.

When selected, the Tow/Haul indicator will display in the instrument cluster.

Magnetic Ride Control

The Magnetic Ride Control monitors the suspension system.

Based on road conditions, steering wheel angle, and vehicle speed, the system automatically adjusts to provide the best handling while providing a smooth ride. The Tour and Sport Modes will feel similar on a smooth road.

Tour : Use for normal city and highway driving. This setting provides a smooth, soft ride.

Sport : Use where road conditions or personal preference demand more control. This setting provides more "feel," or response to road conditions.

Snow/Ice : Use when more traction is needed during slippery conditions.

The vehicle is normally in Tour Mode. Sport Mode and Snow/Ice Mode are engaged when the Magnetic Ride Control MODE button on the center stack is pressed. Press the button to select the desired mode.

The Driver Information Center (DIC) briefly displays the appropriate message on vehicle startup or when a new mode is selected.

Locking Rear Axle

Vehicles with a locking rear axle can give more traction on snow, mud, ice, sand, or gravel. It works like a standard axle most of the time, but when traction is low, this feature will allow the rear wheel with the most traction to move the vehicle.

Automatic Level Control

The automatic level control rear suspension comes as a part of the Magnetic Ride Control system.

This type of level control is fully automatic and will provide a better leveled riding position as well as better handling under a variety of passenger and loading conditions. An air compressor connected to the rear shocks will raise or lower the rear of the vehicle to maintain proper vehicle height. The system is activated when the ignition is on and will automatically adjust vehicle height thereafter. The system may exhaust (lower vehicle height) for up to 10 minutes after the ignition has been turned off. You may hear the air compressor operating when the height is being adjusted.

If a weight-distributing hitch is being used, it is recommended to allow the shocks to inflate, leveling the vehicle prior to adjusting the hitch.

Cruise Control

⚠ Warning

Cruise control can be dangerous where you cannot drive safely at a steady speed. Do not use cruise control on winding roads or in heavy traffic.

Cruise control can be dangerous on slippery roads. On such roads, fast changes in tire traction can cause excessive wheel slip, and you could lose control. Do not use cruise control on slippery roads.

If equipped with cruise control, a speed of about 40 km/h (25 mph) or more can be maintained without keeping your foot on the accelerator. Cruise control does not work at speeds below about 40 km/h (25 mph).

If the Traction Control/Electronic Stability Control system begins to limit wheel spin while using cruise control, the cruise control automatically disengages. See *Traction Control/Electronic Stability Control* ⇨ *222*. If a collision alert occurs when cruise control is activated, cruise control is disengaged. See *Forward Collision Alert (FCA) System* ⇨ *244*. When road conditions allow you to safely use it again, the cruise control can be turned back on.

If the brakes are applied, cruise control disengages.

: Press to turn the system on and off. A white indicator appears in the instrument cluster when cruise is turned on.

+RES : If there is a set speed in memory, press the control up briefly to resume that speed or press and hold to accelerate. If the cruise control is already active, use to increase vehicle speed.

SET– : Press the control down briefly to set the speed and activate cruise control. If the cruise control is already active, use to decrease vehicle speed.

: Press to disengage cruise control without erasing the set speed from memory.

Setting Cruise Control

If is on when not in use, SET– or +RES could get pressed and go into cruise when not desired. Keep off when cruise is not being used.

To set cruise control:

1. Press .
2. Get up to the desired speed.
3. Press and release SET–.
4. Remove your foot from the accelerator.

When the cruise control has been set to the desired speed, a green cruise control indicator appears on the instrument cluster and a cruise set speed message appears on the Driver Information Center (DIC) and Head-Up Display (HUD), if equipped.

Resuming a Set Speed

If the cruise control is set at a desired speed and then the brakes are applied or is pressed, the cruise control is disengaged without erasing the set speed from memory.

Once the vehicle speed reaches about 40 km/h (25 mph) or more, press +RES up briefly. The vehicle returns to the previous set speed.

Increasing Speed While Cruise Control is at a Set Speed

If the cruise control system is already activated:

- Press and hold +RES up until the vehicle accelerates to the desired speed, then release it.
- To increase vehicle speed in small increments, press +RES up briefly. For each press, the vehicle goes about 1 km/h (1 mph) faster.

The speedometer reading can be displayed in either English or metric units. See *Instrument Cluster* ⇨ *134*. The increment value used depends on the units displayed.

Reducing Speed While Cruise Control is at a Set Speed

If the cruise control system is already activated:

- Press and hold SET– down until the desired lower speed is reached, then release it.
- To decrease the vehicle speed in small increments, press SET– down briefly. For each press, the vehicle goes about 1 km/h (1 mph) slower.

The speedometer reading can be displayed in either English or metric units. See *Instrument Cluster* ⇨ *134*. The increment value used depends on the units displayed.

Passing Another Vehicle While Using Cruise Control

Use the accelerator pedal to increase the vehicle speed. When you take your foot off the pedal, the vehicle will slow down to the previous set cruise speed.

While pressing the accelerator pedal or shortly following the release to override cruise, briefly applying the SET– control will result in cruise set to the current vehicle speed.

Using Cruise Control on Hills

How well the cruise control works on hills depends on the vehicle speed, the load, and the steepness of the hills. When going up steep hills, pressing the accelerator pedal may be necessary to maintain vehicle speed. When going downhill, Cruise Grade Braking helps maintain the driver selected speed.

Cruise Grade Braking is enabled when the vehicle is started and cruise control is active. It is not enabled in Range Selection Mode. It assists in maintaining driver selected speed when driving on downhill grades by using the engine and transmission to slow the vehicle.

To disable and enable Cruise Grade Braking for the current ignition cycle, press and hold the Tow/Haul button for five seconds. A Driver Information Center (DIC) message displays.

For other forms of Grade Braking, see *Automatic Transmission* ⇨ *210* and *Tow/Haul Mode* ⇨ *214*.

Ending Cruise Control

There are four ways to end cruise control:

- Step lightly on the brake pedal.
- Press ⊗.

- Shift the transmission to N (Neutral).
- To turn off cruise control, press .

Erasing Speed Memory

The cruise control set speed is erased from memory if is pressed or if the ignition is turned off.

Adaptive Cruise Control

If equipped with Adaptive Cruise Control (ACC), it allows for selecting the cruise control set speed and following gap. Read this entire section before using this system. ACC uses a camera and radar sensors to detect other vehicles. See *Radio Frequency Statement* ⇨ *388*. The following gap is the following time (or distance) between your vehicle and a vehicle detected directly ahead in your path, moving in the same direction. If no vehicle is detected in your path, ACC works like regular cruise control.

If a vehicle is detected in your path, ACC can speed up the vehicle or apply limited, moderate braking to maintain the selected following gap. To disengage ACC, apply the brake. If the Traction Control System (TCS) or electronic stability control system activates while ACC is engaged, ACC may automatically disengage. See *Traction Control/Electronic Stability Control* ⇨ *222*. When road conditions allow ACC to be safely used, the ACC can be turned back on.

ACC will not engage if the TCS or StabiliTrak electronic stability control system is disabled.

⚠ Warning

ACC has limited braking ability and may not have time to slow the vehicle down enough to avoid a collision with another vehicle you are following. This can occur when vehicles suddenly slow or stop ahead, or enter your lane. Also see "Alerting the Driver" in this section. Complete attention is always required while driving and you

(Continued)

Warning (Continued)

should be ready to take action and apply the brakes. See *Defensive Driving* ⇨ *188*.

⚠ Warning

ACC will not detect or brake for children, pedestrians, animals, or other objects.

Do not use ACC when:

- On winding and hilly roads or when the sensors are blocked by snow, ice, or dirt. The system may not detect a vehicle ahead. Keep the entire front of the vehicle clean.
- Visibility is low, such as in fog, rain, or snow conditions. ACC performance is limited under these conditions.
- On slippery roads where fast changes in tire traction can cause excessive wheel slip.

: Press to turn the system on or off. The indicator turns white on the instrument cluster when ACC is turned on.

+RES : Press the control up briefly to resume the previous set speed or hold upwards to accelerate. If ACC is already engaged, use to increase vehicle speed.

SET– : Press the control down briefly to set the speed and activate ACC. If ACC is already engaged, use to decrease vehicle speed.

: Press to disengage ACC without erasing the selected set speed.

: Press to select a following gap time (or distance) setting for ACC of Far, Medium, or Near.

The speedometer reading can be displayed in either English or metric units. See *Instrument Cluster* ⇨ *134*. The increment value used depends on the units displayed.

Switching Between ACC and Regular Cruise Control

If equipped, to switch between ACC and regular cruise control, press and hold . A Driver Information Center (DIC) message displays. See *Vehicle Messages* ⇨ *154*.

ACC Indicator

Regular Cruise Control Indicator

When ACC is engaged, a green indicator will be lit on the instrument cluster and the following gap will be displayed. When the regular cruise control is engaged, a green indicator will be lit on the instrument cluster; the following gap will not display.

When the vehicle is turned on, the cruise control mode will be set to the last mode used before the vehicle was turned off.

⚠ Warning

Always check the cruise control indicator on the instrument cluster to determine which mode cruise control is in before using the feature. If ACC is not active, the vehicle will not automatically brake for other vehicles, which could cause a crash if the brakes are not applied manually. You and others could be seriously injured or killed.

Setting Adaptive Cruise Control

If is on when not in use, it could get pressed and go into ACC when not desired. Keep off when cruise is not being used.

Select the set speed desired for ACC. This is the vehicle speed when no vehicle is detected in its path.

While the vehicle is moving, ACC will not set at a speed less than 25 km/h (15 mph), although it can be resumed when driving at lower speeds.

To set ACC while moving:

1. Press .
2. Get up to the desired speed.
3. Press and release SET–.
4. Remove your foot from the accelerator.

After ACC is set, it may immediately apply the brakes if a vehicle ahead is detected closer than the selected following gap.

ACC can also be set while the vehicle is stopped if ACC is on and the brake pedal is applied.

The ACC indicator displays on the instrument cluster and Head-Up Display (HUD). When ACC is active, the indicator will be lit green.

Be mindful of speed limits, surrounding traffic speeds, and weather conditions when selecting the set speed.

Resuming a Set Speed

If ACC is set at a desired speed and then the brakes are applied, ACC is disengaged without erasing the set speed from memory.

To begin using ACC again, press RES+ up briefly.

- If the vehicle is moving, it returns to the previous set speed.
- If the vehicle is stopped with the brake pedal applied, press RES+ and release the brake pedal. ACC will hold the vehicle until RES+ or the accelerator pedal is pressed.

A green ACC indicator and the set speed display on the instrument cluster. The vehicle ahead indicator may be flashing if a vehicle ahead was present and moved. See “Approaching and Following a Vehicle” later in this section.

Once ACC has resumed, if there is no vehicle ahead, if the vehicle ahead is beyond the selected following gap, or if the vehicle has exited a sharp curve, then the vehicle speed will increase to the set speed.

Increasing Speed While ACC is at a Set Speed

Do one of the following:

- Use the accelerator to get to the higher speed. Press SET– down. Release the control and the accelerator pedal. The vehicle will now cruise at the higher speed.

When the accelerator pedal is pressed, ACC will not brake because it is overridden. The ACC indicator will turn blue on the instrument cluster.

- Press and hold +RES up until the desired set speed appears on the display, then release it.
- To increase speed in small increments, briefly press +RES up. For each press, the vehicle speed increases by 1 km/h (1 mph).
- To increase speed in larger increments, press and briefly hold +RES up. For each press, the vehicle speed increases by 5 km/h (5 mph).

When it is determined there is no vehicle ahead or the vehicle ahead is beyond the selected following gap, the vehicle speed will increase to the set speed.

The set speed can also be increased while the vehicle is stopped.

- If stopped with the brake applied, press RES+ until the desired set speed is displayed.
- If ACC is holding the vehicle at a stop and there is another vehicle directly ahead, pressing RES+ will increase the set speed. Pressing RES+ when there is no longer a vehicle ahead will cause ACC to resume.

Reducing Speed While ACC is at a Set Speed

Do one of the following:

- Use the brake to get to the desired lower speed. Release the brake and press SET– . The vehicle will now cruise at the lower speed.
- Press and hold SET– down until the desired lower speed is reached, then release it.
- To decrease speed in smaller increments, briefly press SET– down. For each press, the vehicle speed increases by 1 km/h (1 mph).
- To decrease speed in larger increments, press and briefly hold SET– down. For each press, the vehicle speed decreases by 5 km/h (5 mph).
- To decrease speed while the vehicle is stopped, press SET– until the desired set speed is displayed.

Selecting the Follow Distance Gap

When a slower moving vehicle is detected ahead within the selected following gap, ACC will adjust the vehicle's speed and attempt to maintain the follow distance gap selected.

Press on the steering wheel to adjust the following gap. Each press cycles the gap button through three settings: Far, Medium, or Near.

When pressed, the current gap setting displays briefly on the DIC and HUD. The gap setting will be maintained until it is changed.

Since each gap setting corresponds to a following time (Far, Medium, or Near), the following distance will vary based on vehicle speed. The faster the vehicle speed, the further back your vehicle will follow a vehicle detected ahead. Consider traffic and weather conditions when selecting the

following gap. The range of selectable gaps may not be appropriate for all drivers and driving conditions.

Changing the gap setting automatically changes the alert timing sensitivity (Far, Medium, or Near) for the Forward Collision Alert (FCA) feature. See *Forward Collision Alert (FCA) System* ⇨ *244*.

Alerting the Driver

If ACC is engaged, driver action may be required when ACC cannot apply sufficient braking when approaching a vehicle too rapidly.

When this condition occurs, the collision alert symbol on the HUD will flash on the windshield. Either eight beeps will sound from the front, or both sides of the Safety Alert Seat will pulse five times. See "Collision/ Detection Systems" under *Vehicle Personalization* ⇨ *155*.

See *Defensive Driving* ⇨ *188*.

Approaching and Following a Vehicle

The vehicle ahead indicator is in the instrument cluster and HUD display.

This indicator only displays when a vehicle is detected in your vehicle's path moving in the same direction.

If this indicator is not displaying, ACC will not respond to or brake to vehicles ahead.

ACC automatically slows the vehicle down and adjusts vehicle speed to follow the vehicle in front at the selected following gap. The vehicle speed increases or decreases to follow the vehicle in front of you, but will not exceed the set speed. It may apply limited braking, if necessary. When braking is active, the brake lights will come on. The automatic braking may feel or sound different than if the brakes were applied manually. This is normal.

Stationary or Very Slow-Moving Objects

⚠ Warning

ACC may not detect and react to stopped or slow-moving vehicles ahead of you. For example, the system may not brake for a vehicle it has never detected moving. This can occur in stop-and-go traffic or when a vehicle suddenly appears due to a vehicle ahead changing lanes. Your vehicle may not stop and could cause a crash. Use caution when using ACC. Your complete attention is always required while driving and you should be ready to take action and apply the brakes.

ACC Automatically Disengages

ACC may automatically disengage and the driver will need to manually apply the brakes to slow the vehicle if:

- The sensors are blocked.
- The Traction Control System (TCS) or electronic stability control system has activated or been disabled.
- There is a fault in the system.
- The radar falsely reports blockage when driving in a desert or remote area with no other vehicles or roadside objects. A DIC message may display to indicate that ACC is temporarily unavailable.

The ACC active indicator will turn white when ACC is no longer active.

In some cases, when ACC will not activate, regular Cruise Control may be used. See “Switching Between ACC and Regular Cruise Control” previously in this section. Always consider driving conditions before using either cruise control system.

Notification to Resume ACC

ACC will maintain a following gap behind a detected vehicle and slow your vehicle to a stop behind the detected vehicle.

If the stopped vehicle ahead has driven away and ACC has not resumed, the vehicle ahead indicator will flash as a reminder to check traffic ahead before proceeding. In addition, the left and right sides of the Safety Alert Seat will pulse three times, or three beeps will sound. See ”Alert Type” and “Adaptive Cruise Go Notifier” in “Collision/Detection Systems” under *Vehicle Personalization* ⇨ *155*.

When the vehicle ahead drives away, press +RES or the accelerator pedal to resume cruise control. If stopped for more than two minutes or if the driver door is opened and the driver seat belt is unbuckled, the ACC automatically applies the Electric Parking Brake (EPB) to hold the vehicle. The EPB status light will turn on. See *Electric Parking Brake* ⇨ *220*. To resume ACC and release the EPB, press the accelerator pedal.

A DIC warning message may display indicating to shift to P (Park) before exiting the vehicle. See *Vehicle Messages* ⇨ *154*.

⚠ Warning

If ACC has stopped the vehicle, and if ACC is disengaged, turned off, or canceled, the vehicle will no longer be held at a stop. The vehicle can move. When ACC is holding the vehicle at a stop, always be prepared to manually apply the brakes.

⚠ Warning

Leaving the vehicle without placing it in P (Park) can be dangerous. Do not leave the vehicle while it is being held at a stop by ACC. Always place the vehicle in P (Park) and turn off the ignition before leaving the vehicle.

ACC Override

If using the accelerator pedal while ACC is active, the ACC indicator turns blue on the instrument cluster. ACC will resume operation when the accelerator pedal is not being pressed.

⚠ Warning

The ACC will not automatically apply the brakes if your foot is resting on the accelerator pedal. You could crash into a vehicle ahead of you.

Curves in the Road

⚠ Warning

On curves, ACC may not detect a vehicle ahead in your lane. You could be startled if the vehicle accelerates up to the set speed, especially when following a vehicle exiting or entering exit ramps. You could lose control of the vehicle or crash. Do not use ACC while driving

(Continued)

Warning (Continued)

on an entrance or exit ramp. Always be ready to use the brakes if necessary.

⚠ Warning

On curves, ACC may respond to a vehicle in another lane, or may not have time to react to a vehicle in your lane. You could crash into a vehicle ahead of you, or lose control of your vehicle. Give extra attention in curves and be ready to use the brakes if necessary. Select an appropriate speed while driving in curves.

ACC may operate differently in a sharp curve. It may reduce the vehicle speed if the curve is too sharp.

When following a vehicle and entering a curve, ACC may not detect the vehicle ahead and accelerate to the set speed. When this happens, the vehicle ahead indicator will not appear.

ACC may detect a vehicle that is not in your lane and apply the brakes.

ACC may occasionally provide an alert and/or braking that is considered unnecessary. It could respond to

vehicles in different lanes, signs, guardrails, and other stationary objects when entering or exiting a curve. This is normal operation. The vehicle does not need service.

Other Vehicle Lane Changes

ACC will not detect a vehicle ahead until it is completely in the lane. The brakes may need to be manually applied.

Do Not Use ACC on Hills and When Towing a Trailer

Do not use ACC when driving on steep hills or when towing a trailer. ACC will not detect a vehicle in the lane while driving on steep hills. The driver will often need to take over acceleration and braking on steep hills, especially when towing a trailer. If the brakes are applied, the ACC disengages.

Disengaging ACC

There are three ways to disengage ACC:

- Step lightly on the brake pedal.
- Press .
- Press .

Erasing Speed Memory

The cruise control set speed is erased from memory if is pressed or if the ignition is turned off.

Cleaning the Sensing System

The camera sensor on the windshield ahead of the rearview mirror and the radar sensors on the front of the vehicle can become blocked by snow, ice, dirt, or mud. These areas need to be cleaned for ACC to operate properly.

If ACC will not operate, regular Cruise Control may be available. See “Switching Between ACC and Regular Cruise Control” previously in this section. Always consider driving conditions before using either cruise control system.

For cleaning instructions, see “Washing the Vehicle” under *Exterior Care* ⇨ *353*.

System operation may also be limited under snow, heavy rain, or road spray conditions.

Driver Assistance Systems

This vehicle may have features that work together to help avoid crashes or reduce crash damage while driving, backing, and parking. Read this entire section before using these systems.

⚠ Warning

Do not rely on the Driver Assistance Systems. These systems do not replace the need for paying attention and driving safely. You may not hear or feel alerts or warnings provided by these systems. Failure to use proper care when driving may result in injury, death, or vehicle damage. See *Defensive Driving* ⇨ *188*.

Under many conditions, these systems will not:

- Detect children, pedestrians, bicyclists, or animals.

(Continued)

Warning (Continued)

- Detect vehicles or objects outside the area monitored by the system.
- Work at all driving speeds.
- Warn you or provide you with enough time to avoid a crash.
- Work under poor visibility or bad weather conditions.
- Work if the detection sensor is not cleaned or is covered by ice, snow, mud, or dirt.
- Work if the detection sensor is covered up, such as with a sticker, magnet, or metal plate.
- Work if the area surrounding the detection sensor is damaged or not properly repaired.

Complete attention is always required while driving, and you should be ready to take action and apply the brakes and/or steer the vehicle to avoid crashes.

Audible or Safety Alert Seat

Some driver assistance features alert the driver of obstacles by beeping. To change the volume of the warning chime, see “Comfort and Convenience” under *Vehicle Personalization* ⇨ *155*.

If equipped with the Safety Alert Seat, the driver seat cushion may provide a vibrating pulse alert instead of beeping. To change this, see “Collision/Detection Systems” under *Vehicle Personalization* ⇨ *155*.

Cleaning

Depending on vehicle options, keep these areas of the vehicle clean to ensure the best driver assistance feature performance. Driver Information Center (DIC) messages may display when the systems are unavailable or blocked.

- Front and rear bumpers and the area below the bumpers
- Front grille and headlamps
- Front camera lens in the front grille or near the front emblem
- Front side and rear side panels
- Outside of the windshield in front of the rearview mirrors
- Side camera lens on the bottom of the outside mirrors
- Rear side corner bumpers
- Rear Vision Camera above the license plate

Assistance Systems for Parking or Backing

If equipped, the Rear Vision Camera (RVC), Rear Park Assist (RPA), Front Park Assist (FPA), Surround Vision, Front Vision Camera, Reverse Automatic Braking (RAB) and Backing Warning System, Rear Cross Traffic Alert (RCTA), and Automatic Parking Assist (APA) may help the driver park or avoid objects. Always check around the vehicle when parking or backing.

Rear Vision Camera (RVC)

When the vehicle is shifted into R (Reverse), the RVC displays an image of the area behind the vehicle in the infotainment display. The previous screen displays when the vehicle is shifted out of R (Reverse) after a short delay. To return to the previous screen sooner, press any button on the infotainment system, shift into P (Park), or reach a vehicle speed of approximately 12 km/h (8 mph). The rear vision camera is above the license plate.

1. View Displayed by the Rear Vision Camera

1. View Displayed by the Rear Vision Camera
2. Corners of the Rear Bumper

Displayed images may be farther or closer than they appear. The area displayed is limited and objects that are close to either corner of the bumper or under the bumper do not display.

A warning triangle may display to show that Rear Park Assist (RPA) has detected an object. This triangle changes from amber to red and increases in size the closer the object.

Surround Vision

If equipped, Surround Vision displays an image of the area surrounding the vehicle, along with the front or rear camera views in the infotainment display. The front camera is in the grille or near the front emblem, the side cameras are on the bottom of the outside rearview mirrors, and the rear camera is above the license plate.

⚠ Warning

The Surround Vision cameras have blind spots and will not display all objects near the corners of the vehicle. Folding outside mirrors that are out of position may not display surround view correctly. Always check around the vehicle when parking or backing.

1. Views Displayed by the Surround Vision Cameras
2. Area Not Shown

1. Views Displayed by the Surround Vision Cameras
2. Area Not Shown

Front Vision Camera

If equipped, a view of the area in front of the vehicle shows in the infotainment display. The view displays after shifting from R (Reverse) to a forward gear, or by touching CAMERA on the infotainment display, and when the vehicle is moving forward slower than 8 km/h (5 mph). If equipped, the front view camera also displays when the Park Assist system detects an object within 30 cm (12 in).

⚠ Warning

The camera(s) do not display children, pedestrians, bicyclists, crossing traffic, animals, or any other object outside of the cameras' field of view, below the bumper, or under the vehicle. Shown distances may be different from actual distances. Do not drive or park the vehicle using only these camera(s). Always check behind and around the vehicle before driving. Failure to use proper care may result in injury, death, or vehicle damage.

Park Assist

With Front and Rear Park Assist, as the vehicle moves at speeds of less than 8 km/h (5 mph) the sensors on the bumpers may detect objects up to 1.2 m (4 ft) in front and 2.5 m (8 ft) behind the vehicle within a zone 25 cm (10 in) high off the ground and below bumper level. These detection distances may be shorter during warmer or humid weather. Blocked sensors will not detect objects and can also cause false detections. Keep the sensors clean of mud, dirt, snow, ice, and slush; and clean sensors after a car wash in freezing temperatures.

⚠ Warning

The Park Assist system does not detect children, pedestrians, bicyclists, animals, or objects located below the bumper or that are too close or too far from the vehicle. It is not available at speeds greater than 8 km/h (5 mph). To prevent injury, death, or vehicle

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Warning (Continued)

damage, even with Park Assist, always check the area around the vehicle and check all mirrors before moving forward or backing.

The instrument cluster may have a Park Assist display with bars that show "distance to object" and object location information for the Front and Rear Park Assist system. As the object gets closer, more bars light up and the bars change color from yellow to amber to red.

When an object is first detected in the rear, one beep will be heard from the rear, or both sides of the Safety Alert Seat will pulse two times. When an object is very close (<0.6 m (2 ft) in the vehicle rear, or <0.3 m (1 ft) in the vehicle front), a continuous beep will sound from the front or rear depending on object location, or both sides of the Safety Alert Seat will pulse five times. Beeps for FPA are higher pitched than for RPA.

Backing Warning and Reverse Automatic Braking

Vehicles with Adaptive Cruise Control (ACC) have the Backing Warning and Reverse Automatic Braking (RAB). The Backing Warning part of this system can warn of rear objects when backing up at speeds greater than 8 km/h (5 mph).

The Backing Warning System will beep once from the rear when an object is first detected, or pulse twice on both sides of the Safety Alert Seat. When the system detects a potential crash, beeps will be heard from the rear, or five pulses will be felt on both sides of the Safety Alert Seat. There may also be a brief, sharp application of the brakes.

⚠ Warning

The Backing Warning System only operates at speeds greater than 8 km/h (5 mph). It does not detect children, pedestrians, bicyclists, animals, or objects below the

(Continued)

Warning (Continued)

bumper or that are too close or too far from the vehicle. In some situations, such as at higher backing speeds, there may not be enough time for the short, sharp application of the vehicle brake system to occur. To prevent injury, death, or vehicle damage, even with the Backing Warning System, always check the area around the vehicle and check all mirrors before backing.

When the vehicle is in R (Reverse), if the system detects the vehicle is backing too fast to avoid a crash with a detected object behind your vehicle in your path, it may automatically brake hard to a stop to help avoid or reduce the harm caused by a backing crash.

⚠ Warning

RAB may not avoid many types of backing crashes. Do not wait for the automatic braking to apply. This system is not designed to replace driver braking and only works in R (Reverse) when an object is detected directly behind the vehicle. It may not brake or stop in time to avoid a crash. It will not brake for objects when the vehicle is moving at very low speeds. It does not detect children, pedestrians, bicyclists, animals, or objects below the bumper or that are too close or too far from the vehicle. To prevent injury, death, or vehicle damage, even with RAB, always check the area around the vehicle before and while backing.

Pressing the brake pedal after the vehicle comes to a stop will release RAB. If the brake pedal is not pressed soon after the stop, the Electric

Parking Brake may be set. When it is safe, press the accelerator pedal firmly at any time to override RAB.

⚠ Warning

There may be instances where unexpected or undesired automatic braking occurs. If this happens, either press the brake pedal or firmly press the accelerator pedal to release the brakes from the RAB system. Before releasing the brakes, check the RVC and check the area around the vehicle to make sure it is safe to proceed.

Rear Cross Traffic Alert (RCTA)

If equipped, when the vehicle is shifted into R (Reverse), RCTA shows a red warning triangle with a left or right pointing arrow on the infotainment display to warn of traffic coming from the left or right. This system detects objects coming from up to 20 m (65 ft) from the left or right side of the vehicle. When an object is detected, either three beeps sound from the left or right or three Safety Alert Seat pulses occur on the left or right side, depending on the direction of the detected vehicle.

Use caution while backing up when towing a trailer, as the RCTA detection zones that extend out from the back of the vehicle do not move further back when a trailer is towed.

Turning the Features On or Off

Press P on the center stack to turn on or off the Front and Rear Park Assist, Rear Cross Traffic Alert, Reverse Automatic Braking, and Backing Warning System at the same time. The indicator light next to the button comes on when the features are on and turns off when the features have been disabled.

Front and Rear Park Assist can be set to Off, On, or On with Towbar through vehicle personalization. See “Park Assist” under *Vehicle Personalization* ⇨ *155*. If Park Assist is turned off through vehicle personalization, the Park Assist button will be disabled. To turn Park Assist on again, select On in the vehicle personalization menu. The On with Towbar setting allows for Park Assist to work properly with the trailer hitch.

Turn off Park Assist and Reverse Automatic Braking when towing a trailer.

To turn the RPA symbols, guidance lines (on some models), or Rear Cross Traffic Alert on or off, see “Rear Camera” and “Collision/Detection Systems” under *Vehicle Personalization* ⇨ *155*. On some models, select the guidance lines button on the infotainment display to turn them on or off.

On some vehicles the RCTA setting can be turned off through “Collision/Detection Systems” under *Vehicle Personalization* ⇨ *155*.

Automatic Parking Assist (APA)

If equipped, APA searches for and steers the vehicle into parallel and perpendicular parking spots. When using APA, you must still shift gears, and control the brakes and accelerator. A display and audible beeps help to guide parking maneuvers.

⚠ Warning

APA does not apply the brakes. APA may not detect objects in the parking space, objects that are soft or narrow, objects high off the ground such as flatbed trucks, or objects below ground level such as large potholes. Always verify that the parking space is appropriate for parking a vehicle. APA does not respond to changes in the parking space, such as movement of an adjacent vehicle, or a person or object entering the parking space. APA does not detect or avoid traffic that is behind or alongside of the vehicle. Always be prepared to stop the vehicle during the parking maneuver.

Press P on the center stack to enable the system to search for a parking space that is large enough and within 1.5 m (5 ft) of the vehicle. The vehicle speed must be below 30 km/h (18 mph). APA does not work in 4↑ or 4↓.

The system cannot:

- Detect whether it is a legal parking space.
- Park exactly lined up with the vehicle next to it if the spot is approached at an angle or if the parking space is angled.
- Park exactly centered in a spot that is marked too large.
- Always detect short curbs.

When enabled, APA searches for parallel parking spaces to the right of the vehicle. To search for a parking space to the left, turn on the left turn signal or, if available, change the side selection in the infotainment display. To switch the parking mode between parallel and perpendicular, press and hold P during the search process or, if available, change the parking mode in the infotainment display.

After completely passing a large enough space, an audible beep occurs and a red stop symbol is displayed.

If the vehicle is in R (Reverse), but does not steer into the expected space, this may be because the system is maneuvering the vehicle into a previously detected space. The APA system does not need service.

APA will instruct the vehicle to stop once a large enough space is found. Follow the displayed instructions. When instructed, shift to R (Reverse) to engage automatic steering. The steering wheel will briefly vibrate as a reminder to remove hands from the steering wheel. Check surroundings and continue braking or accelerating as needed, and be prepared to stop to avoid vehicles, pedestrians, or objects.

If the vehicle exceeds 10 km/h (6 mph), APA is automatically disengaged and automatic steering will turn off. A progress arrow displays the status of the parking maneuver. Depending on the space size, additional maneuvers may be required, and there will be additional instructions. When changing gears, allow the automatic steering to complete before continuing the parking maneuver. Upon successful completion of a maneuver, APA will beep and display a PARKING COMPLETE message. Place the vehicle in P (Park).

APA may automatically disengage if:

- The steering wheel is used by the driver.
- The maximum allowed speed is exceeded.
- There is a failure with the APA system.
- Electronic stability control or antilock brakes are activated.
- A high priority vehicle message is displayed in the DIC.

To cancel APA, press P again.

When the System Does Not Seem to Work Properly

The APA system may require a short period of driving along curves to calibrate.

Assistance Systems for Driving

If equipped, when driving the vehicle in a forward gear, Forward Collision Alert (FCA), Lane Departure Warning (LDW), Lane Keep Assist (LKA), Side Blind Zone Alert (SBZA), Lane Change Alert (LCA), and/or Forward Automatic Braking (FAB) can help to avoid a crash or reduce crash damage.

Forward Collision Alert (FCA) System

If equipped, the FCA system may help to avoid or reduce the harm caused by front-end crashes. When approaching a vehicle ahead too quickly, FCA provides a red flashing alert on the windshield and rapidly beeps or pulses the driver seat. FCA also lights an amber visual alert if following another vehicle much too closely.

FCA detects vehicles within a distance of approximately 60 m (197 ft) and operates at speeds above 8 km/h (5 mph). If the vehicle has Adaptive Cruise Control (ACC), it can detect vehicles to distances of approximately 110 m (360 ft) and operates at all speeds. See *Adaptive Cruise Control* ➪ *229*.

⚠ Warning

FCA is a warning system and does not apply the brakes. When approaching a slower-moving or stopped vehicle ahead too rapidly, or when following a vehicle too closely, FCA may not provide a warning with enough time to help avoid a crash. It also may not provide any warning at all. FCA does not warn of pedestrians, animals, signs, guardrails, bridges, construction barrels, or other objects. Be ready to take action and apply the brakes. See *Defensive Driving* ⇨ *188*.

FCA can be disabled with either the FCA steering wheel control or, if equipped, through vehicle personalization. See "Collision/ Detection Systems" under *Vehicle Personalization* ⇨ *155*.

Detecting the Vehicle Ahead

FCA warnings will not occur unless the FCA system detects a vehicle ahead. When a vehicle is detected, the vehicle ahead indicator will display green. Vehicles may not be detected on curves, highway exit ramps, or hills, due to poor visibility; or if a vehicle ahead is partially blocked by pedestrians or other objects. FCA will not detect another vehicle ahead until it is completely in the driving lane.

⚠ Warning

FCA does not provide a warning to help avoid a crash, unless it detects a vehicle. FCA may not detect a vehicle ahead if the FCA sensor is blocked by dirt, snow, or ice, or if

(Continued)

Warning (Continued)

the windshield is damaged. It may also not detect a vehicle on winding or hilly roads, or in conditions that can limit visibility such as fog, rain, or snow, or if the headlamps or windshield are not cleaned or in proper condition. Keep the windshield, headlamps, and FCA sensors clean and in good repair.

Collision Alert

When your vehicle approaches another detected vehicle too rapidly, the red FCA display will flash on the windshield. Also, eight rapid high-pitched beeps will sound from

the front, or both sides of the Safety Alert Seat will pulse five times. When this Collision Alert occurs, the brake system may prepare for driver braking to occur more rapidly which can cause a brief, mild deceleration. Continue to apply the brake pedal as needed. Cruise control may be disengaged when the Collision Alert occurs.

Tailgating Alert

The vehicle ahead indicator will display amber when you are following a vehicle ahead much too closely.

Selecting the Alert Timing

The Collision Alert control is on the steering wheel. Press to set the FCA timing to Far, Medium, Near, or on some vehicles, Off. The first button press shows the current setting on the Driver Information Center (DIC). Additional button presses will change this setting. The chosen setting will remain until it is changed and will affect the timing of both the Collision Alert and the Tailgating Alert features. The timing of both alerts will vary based on vehicle speed. The faster the vehicle speed, the farther away the alert will occur.

Consider traffic and weather conditions when selecting the alert timing. The range of selectable alert timing may not be appropriate for all drivers and driving conditions.

If your vehicle is equipped with Adaptive Cruise Control (ACC), changing the FCA timing setting automatically changes the ACC following gap setting (Far, Medium, or Near).

Unnecessary Alerts

FCA may provide unnecessary alerts for turning vehicles, vehicles in other lanes, objects that are not vehicles, or shadows. These alerts are normal operation and the vehicle does not need service.

Cleaning the System

If the FCA system does not seem to operate properly, this may correct the issue:

- Clean the outside of the windshield in front of the rearview mirror.
- Clean the entire front of the vehicle.

- Clean the headlamps.

For cleaning instructions, see "Washing the Vehicle" under *Exterior Care* ⇨ *353*.

System operation may also be limited under snow, heavy rain, or road spray conditions.

Forward Automatic Braking (FAB)

If the vehicle has Forward Collision Alert (FCA), it also has FAB, which includes Intelligent Brake Assist (IBA). When the system detects a vehicle ahead in your path that is traveling in the same direction that you may be about to crash into, it can provide a boost to braking or automatically brake the vehicle. This can help avoid or lessen the severity of crashes when driving in a forward gear. Depending on the situation, the vehicle may automatically brake moderately or hard. This forward automatic braking can only occur if a vehicle is detected. This is shown by the FCA vehicle ahead indicator being lit. See *Forward Collision Alert (FCA) System* ⇨ *244*.

The system works when driving in a forward gear between 8 km/h (5 mph) and 80 km/h (50 mph), or on vehicles with Adaptive Cruise Control (ACC), above 4 km/h (2 mph). It can detect vehicles up to approximately 60 m (197 ft).

⚠ Warning

FAB is an emergency crash preparation feature and is not designed to avoid crashes. Do not rely on FAB to brake the vehicle. FAB will not brake outside of its operating speed range and only responds to detected vehicles.

FAB may not:

- Detect a vehicle ahead on winding or hilly roads.
- Detect all vehicles, especially vehicles with a trailer, tractors, muddy vehicles, etc.
- Detect a vehicle when weather limits visibility, such as in fog, rain, or snow.

(Continued)

Warning (Continued)

- Detect a vehicle ahead if it is partially blocked by pedestrians or other objects.

Complete attention is always required while driving, and you should be ready to take action and apply the brakes and/or steer the vehicle to avoid crashes.

FAB may slow the vehicle to a complete stop to try to avoid a potential crash. If this happens, FAB may engage the Electric Parking Brake (EPB) to hold the vehicle at a stop. Release the EPB or firmly press the accelerator pedal.

⚠ Warning

FAB may automatically brake the vehicle suddenly in situations where it is unexpected and undesired. It could respond to a turning vehicle ahead, guardrails,

(Continued)

Warning (Continued)

signs, and other non-moving objects. To override FAB, firmly press the accelerator pedal, if it is safe to do so.

Intelligent Brake Assist (IBA)

IBA may activate when the brake pedal is applied quickly by providing a boost to braking based on the speed of approach and distance to a vehicle ahead.

Minor brake pedal pulsations or pedal movement during this time is normal and the brake pedal should continue to be applied as needed. IBA will automatically disengage only when the brake pedal is released.

⚠ Warning

IBA may increase vehicle braking in situations when it may not be necessary. You could block the flow

(Continued)

Warning (Continued)

of traffic. If this occurs, take your foot off the brake pedal and then apply the brakes as needed.

FAB and IBA can be disabled through vehicle personalization. See “Collision/Detection Systems” under *Vehicle Personalization* ⇨ *155*.

⚠ Warning

Using FAB or IBA while towing a trailer could cause you to lose control of the vehicle and crash. Turn the system to Alert, or if the vehicle has ACC to Off, when towing a trailer.

A system unavailable message may display if:

- The front of the vehicle or windshield is not clean.
- Heavy rain or snow is interfering with object detection.
- There is a problem with the StabiliTrak/Electronic Stability Control (ESC) system.

The FAB system does not need service.

Side Blind Zone Alert (SBZA)

If equipped, the SBZA system is a lane-changing aid that assists drivers with avoiding crashes that occur with moving vehicles in the side blind zone (or spot) areas. When the vehicle is in a forward gear, the left or right side mirror display will light up if a moving vehicle is detected in that blind zone. If the turn signal is activated and a vehicle is also detected on the same side, the display will flash as an extra warning not to change lanes. Since this system is part of the Lane Change Alert (LCA) system, read the entire LCA section before using this feature.

Lane Change Alert (LCA)

If equipped, the LCA system is a lane-changing aid that assists drivers with avoiding lane change crashes

that occur with moving vehicles in the side blind zone (or spot) areas or with vehicles rapidly approaching these areas from behind. The LCA warning display will light up in the corresponding outside mirror and will flash if the turn signal is on.

⚠ Warning

LCA does not alert the driver to vehicles outside of the system detection zones, pedestrians, bicyclists, or animals. It may not provide alerts when changing lanes under all driving conditions. Failure to use proper care when changing lanes may result in injury, death, or vehicle damage. Before making a lane change, always check mirrors, glance over your shoulder, and use the turn signals.

LCA Detection Zones

1. SBZA Detection Zone
2. LCA Detection Zone

The LCA sensor covers a zone of approximately one lane over from both sides of the vehicle, or 3.5 m (11 ft). The height of the zone is approximately between 0.5 m (1.5 ft) and 2 m (6 ft) off the ground. The Side Blind Zone Alert (SBZA) warning area starts at approximately the middle of the vehicle and goes back 5 m (16 ft). Drivers are also warned of vehicles rapidly approaching from up to 70 m (230 ft) behind the vehicle.

How the System Works

The LCA symbol lights up in the outside mirrors when the system detects a moving vehicle in the next lane over that is in the side blind zone or rapidly approaching that zone from behind. A lit LCA symbol indicates it may be unsafe to change lanes. Before making a lane change, check the LCA display, check mirrors, glance over your shoulder, and use the turn signals.

Left Outside Mirror Display

Right Outside Mirror Display

When the vehicle is started, both outside mirror LCA displays will briefly come on to indicate the system is operating. When the vehicle is in a forward gear, the left or right outside mirror display will light up if a moving vehicle is detected in the next lane over in that blind zone or rapidly approaching that zone. If the turn

signal is activated in the same direction as a detected vehicle, this display will flash as an extra warning not to change lanes.

LCA can be disabled. See “Collision/ Detection Systems” under *Vehicle Personalization* ⇨ *155*. If LCA is disabled by the driver, the LCA mirror displays will not light up.

When the System Does Not Seem to Work Properly

The LCA system requires some driving for the system to calibrate to maximum performance. This calibration may occur more quickly if the vehicle is driving on a straight highway road with traffic and roadside objects (e.g., guardrails, barriers).

LCA displays may not come on when passing a vehicle quickly, for a stopped vehicle, or when towing a trailer. The LCA detection zones that extend back from the side of the vehicle do not move further back when a trailer is towed. Use caution while changing lanes when towing a trailer. LCA may alert to objects attached to the vehicle, such as a trailer, bicycle, or object extending out to either side of the vehicle. Attached objects may also interfere with the detection of vehicles. This is normal system operation; the vehicle does not need service.

LCA may not always alert the driver to vehicles in the next lane over, especially in wet conditions or when driving on sharp curves. The system does not need to be serviced. The system may light up due to guardrails, signs, trees, shrubs, and other non-moving objects. This is normal system operation; the vehicle does not need service.

LCA may not operate when the LCA sensors in the left or right corners of the rear bumper are covered with mud, dirt, snow, ice, or slush, or in heavy rainstorms. For cleaning instructions, see "Washing the Vehicle" under *Exterior Care* ⇨ *353*. If the DIC still displays the system unavailable message after cleaning both sides of the vehicle toward the rear corners of the vehicle, see your dealer.

If the LCA displays do not light up when moving vehicles are in the side blind zone or are rapidly approaching this zone and the system is clean, the system may need service. Take the vehicle to your dealer.

Radio Frequency Information

See *Radio Frequency Statement* ⇨ *388*.

Lane Departure Warning (LDW)

If equipped, LDW may help avoid crashes due to unintentional lane departures. It may provide a warning if the vehicle is crossing a detected lane marking without using a turn signal in the lane departure direction. Since this system is part of the Lane Keep Assist (LKA) system, read the entire LKA section before using this feature.

Lane Keep Assist (LKA)

If equipped, LKA may help avoid crashes due to unintentional lane departures. It may assist by gently turning the steering wheel if the vehicle approaches a detected lane marking without using a turn signal in that direction. It may also provide a Lane Departure Warning (LDW) system alert as the lane marking is crossed. The LKA system will not assist or provide an LDW alert if it detects that you are actively steering. Override LKA by turning the steering wheel. LKA uses a camera to detect lane markings between 60 km/h (37 mph) and 180 km/h (112 mph).

⚠ Warning

The LKA system does not continuously steer the vehicle. It may not keep the vehicle in the lane or give a Lane Departure Warning (LDW) alert, even if a lane marking is detected.

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Warning (Continued)

The LKA and LDW systems may not:

- Provide an alert or enough steering assist to avoid a lane departure or crash.
- Detect lane markings under poor weather or visibility conditions. This can occur if the windshield or headlamps are blocked by dirt, snow, or ice, if they are not in proper condition, or if the sun shines directly into the camera.
- Detect road edges.
- Detect lanes on winding or hilly roads.

If LKA only detects lane markings on one side of the road, it will only assist or provide an LDW alert when approaching the lane on the side where it has detected a lane marking. Even with LKA and LDW,

(Continued)

Warning (Continued)

you must steer the vehicle. Always keep your attention on the road and maintain proper vehicle position within the lane, or vehicle damage, injury, or death could occur. Always keep the windshield, headlamps, and camera sensors clean and in good repair. Do not use LKA in bad weather conditions.

⚠ Warning

Using LKA while towing a trailer or on slippery roads could cause loss of control of the vehicle and a crash. Turn the system off.

How the System Works

The LKA camera sensor is on the windshield ahead of the rearview mirror.

To turn LKA on and off, press on the center stack.

LKA Indicator Light

When on, the LKA indicator is green if LKA is available to assist and provide LDW alerts. It may assist by gently turning the steering wheel and display amber if the vehicle approaches a detected lane marking without using a turn signal in that direction. It may also provide an LDW alert by flashing amber as the lane marking is crossed. Additionally, there may be three beeps, or the driver seat may pulse three times, on the right or left, depending on the lane departure direction.

Take Steering

The LKA system does not continuously steer the vehicle. If LKA does not detect active driver steering, an alert, chime, or DIC message may be provided. Steer the vehicle to dismiss.

When the System Does Not Seem to Work Properly

The system performance may be affected by:

- Close vehicles ahead.
- Sudden lighting changes, such as when driving through tunnels.
- Banked roads.
- Roads with poor lane markings, such as two-lane roads.

If the LKA system is not functioning properly when lane markings are clearly visible, cleaning the windshield may help.

A camera blocked message may display if the camera is blocked. Cleaning the outside of the windshield behind the rearview mirror may correct the issue. Some driver assistance systems may have reduced performance or not work at all. An LKA or LDW unavailable message may display if the systems are temporarily unavailable. This message could be due to a blocked camera. The LKA system does not need service. Clean the outside of the windshield behind the rearview mirror.

LKA assistance and/or LDW alerts may occur due to tar marks, shadows, cracks in the road, temporary or construction lane markings, or other road imperfections. This is normal system operation; the vehicle does not need service. Turn LKA off if these conditions continue.

Fuel

Top Tier Fuel

GM recommends the use of TOP TIER Detergent Gasoline to keep the engine clean, reduce engine deposits, and maintain optimal vehicle performance. Look for the TOP TIER Logo or see www.toptiergas.com for a list of TOP TIER Detergent Gasoline marketers and applicable countries.

Recommended Fuel

Do not use any fuel labeled E85 or FlexFuel. Do not use gasoline with ethanol levels greater than 15% by volume.

Premium unleaded gasoline meeting ASTM specification D4814 with a posted octane rating of 93 is highly recommended for best performance and fuel economy. Unleaded gasoline with an octane rated as low as 87 can be used. Using unleaded gasoline rated below 93 octane, however, will lead to reduced acceleration and fuel economy. If knocking occurs, use a gasoline rated at 93 octane as soon as possible, otherwise, the engine could be damaged. If heavy knocking is heard when using gasoline with a 93 octane rating, the engine needs service.

Prohibited Fuels

Caution

Do not use fuels with any of the following conditions; doing so may damage the vehicle and void its warranty:

- For vehicles that are not FlexFuel, fuel labeled greater than 15% ethanol by volume, such as mid-level ethanol blends (16–50% ethanol), E85, or FlexFuel.
- Fuel with any amount of methanol, methylal, ferrocene, and aniline. These fuels can corrode metal fuel system parts or damage plastic and rubber parts.
- Fuel containing metals such as methylcyclopentadienyl manganese tricarbonyl (MMT), which can damage the emissions control system and spark plugs.

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Caution (Continued)

- Fuel with a posted octane rating of less than the recommended fuel. Using this fuel will lower fuel economy and performance, and may decrease the life of the emissions catalyst.

Fuels in Foreign Countries

The U.S., Canada, and Mexico post fuel octane ratings in anti-knock index (AKI). For fuel not to use in a foreign country, see *Prohibited Fuels* ⇨ *253*.

Fuel Additives

TOP TIER Detergent Gasoline is highly recommended for use with your vehicle. If your country does not have TOP TIER Detergent Gasoline, add ACDelco Fuel System Treatment Plus -Gasoline to the vehicle's gasoline fuel tank at every oil change or 15,000 km (9,000 mi), whichever occurs first. TOP TIER Detergent Gasoline and ACDelco Fuel System Treatment Plus-Gasoline will help keep your vehicle's engine fuel deposit free and performing optimally.

Filling the Tank

⚠ Warning

Fuel vapors and fuel fires burn violently and can cause injury or death.

- To help avoid injuries to you and others, read and follow all the instructions on the fuel pump island.
- Turn off the engine when refueling.
- Keep sparks, flames, and smoking materials away from fuel.
- Do not leave the fuel pump unattended.
- Avoid using electronic devices while refueling.

(Continued)

Warning (Continued)

- Do not reenter the vehicle while pumping fuel.
- Keep children away from the fuel pump and never let children pump fuel.
- Fuel can spray out if the refueling nozzle is inserted too quickly. This spray can happen if the tank is nearly full, and is more likely in hot weather. Insert the refueling nozzle slowly and wait for any hiss noise to stop prior to beginning to flow fuel.

Locate the fuel door. The fuel gauge has an arrow to indicate the side of the vehicle the fuel door is on. To open the fuel door, push and release the rearward center edge of the door.

The vehicle has a capless refueling system and does not have a fuel cap. The filling nozzle must be fully inserted and latched prior to starting fuel flow.

⚠ Warning

Overfilling the fuel tank by more than three clicks of a standard fill nozzle may cause:

- Vehicle performance issues, including engine stalling and damage to the fuel system.
- Fuel spills.
- Potential fuel fires.

Be careful not to spill fuel. Wait a few seconds after you have finished pumping before removing the nozzle. Clean fuel from painted surfaces as soon as possible. See *Exterior Care* ⇨ *353*.

⚠ Warning

If a fire starts while you are refueling, do not remove the nozzle. Shut off the flow of fuel by shutting off the pump or by notifying the station attendant. Leave the area immediately.

Filling the Tank With a Portable Gas Can

If the vehicle runs out of fuel and must be filled from a portable gas can:

1. Locate the capless funnel adapter from inside the vehicle.
2. Insert and latch the funnel into the capless fuel system.

⚠ Warning

Attempting to refuel without using the funnel adapter may cause fuel spillage and damage the capless fuel system. This could cause a fire and you or others could be badly burned and the vehicle could be damaged.

3. Remove and clean the funnel adapter and return to the storage location.

Filling a Portable Fuel Container

⚠ Warning

Never fill a portable fuel container while it is in the vehicle. Static electricity discharge from the container can ignite the fuel vapor. You can be badly burned and the vehicle damaged if this occurs. To help avoid injury to you and others:

- Dispense fuel only into approved containers.
- Do not fill a container while it is inside a vehicle, in a vehicle's trunk, pickup bed, or on any surface other than the ground.

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Warning (Continued)

- Bring the fill nozzle in contact with the inside of the fill opening before operating the nozzle. Contact should be maintained until the filling is complete.
- Do not smoke while pumping fuel.
- Avoid using electronic devices.

Trailer Towing

General Towing Information

Only use towing equipment that has been designed for the vehicle. Contact your dealer or trailering dealer for assistance with preparing the vehicle to tow a trailer. Read the entire section before towing a trailer.

To tow a disabled vehicle, see *Towing the Vehicle* ⇨ *348*. To tow the vehicle behind another vehicle such as a motor home, see *Recreational Vehicle Towing* ⇨ *349*.

Driving Characteristics and Towing Tips

⚠ Warning

You can lose control when towing a trailer if the correct equipment is not used or the vehicle is not driven properly. For example, if the trailer is too heavy or the trailer brakes are

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Warning (Continued)

inadequate for the load, the vehicle may not stop as expected. You and others could be seriously injured. The vehicle may also be damaged, and the repairs would not be covered by the vehicle warranty. Pull a trailer only if all the steps in this section have been followed. Ask your dealer for advice and information about towing a trailer with the vehicle.

Driving with a Trailer

Trailering is different than just driving the vehicle by itself. Trailering means changes in handling, acceleration, braking, durability, and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

The following information has many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. Read this section carefully before pulling a trailer.

When towing a trailer:

- Become familiar with and follow all state and local laws that apply to trailer towing. These requirements vary from state to state.
- State laws may require the use of extended side view mirrors. Even if not required, you should install extended side view mirrors if your visibility is limited or restricted while towing.
- Do not tow a trailer during the first 800 km (500 mi) of vehicle use to prevent damage to the engine, axle, or other parts.
- During the first 800 km (500 mi) of trailer towing, do not drive over 80 km/h (50 mph) and do not make starts at full throttle.
- Vehicles can tow in D (Drive). Tow/Haul Mode is recommended for heavier trailers. See *Tow/Haul Mode* ⇨ *214*. If the transmission downshifts too often, a lower gear may be selected using Manual Mode. See *Manual Mode* ⇨ *213*.

If equipped, the following driver assistance features should be turned off when towing a trailer:

- Adaptive Cruise Control (ACC)
- Super Cruise Control
- Lane Keep Assist (LKA)
- Park Assist
- Automatic Parking Assist (APA)
- Reverse Automatic Braking (RAB)

If equipped, the following driver assistance features should be turned to alert or off when towing a trailer:

- Forward Automatic Braking System (FAB)
- Intelligent Brake Assist (IBA)
- Front Pedestrian Braking (FPB)

If equipped with Lane Change Alert (LCA), the LCA detection zones that extend back from the side of the vehicle do not move further back

when a trailer is towed. Use caution while changing lanes when towing a trailer.

If equipped with Rear Cross Traffic Alert (RCTA), use caution while backing up when towing a trailer, as the RCTA detection zones that extend out from the back of the vehicle do not move further back when a trailer is towed.

⚠ Warning

When towing a trailer, exhaust gases may collect at the rear of the vehicle and enter if the liftgate, trunk/hatch, or rear-most window is open.

When towing a trailer:

- Do not drive with the liftgate, trunk/hatch, or rear-most window open.
- Fully open the air outlets on or under the instrument panel.

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Warning (Continued)

- Also adjust the climate control system to a setting that brings in only outside air. See “Climate Control Systems” in the Index.

For more information about carbon monoxide, see *Engine Exhaust* ⇨ *209*.

Towing a trailer requires experience. The combination of the vehicle and trailer is longer and not as responsive as the vehicle itself. Get used to the handling and braking of the combination by driving on a level road surface before driving on public roads.

The trailer structure, the tires, and the brakes must be all be rated to carry the intended cargo. Inadequate trailer equipment can cause the combination to operate in an unexpected or unsafe manner. Before driving, inspect all trailer hitch parts and attachments, safety chains, electrical connectors, lamps, tires, and mirrors. See *Towing Equipment* ⇨ *266*. If the trailer has electric brakes, start the combination moving and then manually apply the trailer brake controller to check the trailer brakes work. During the trip, occasionally check that the cargo and trailer are secure and that the lamps and any trailer brakes are working.

Towing with a Stability Control System

When towing, the stability control system might be heard. The system reacts to vehicle movement caused by the trailer, which mainly occurs during cornering. This is normal when towing heavier trailers.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving without a trailer. This can help to avoid heavy braking and sudden turns.

Passing

More passing distance is needed when towing a trailer. The combination of the vehicle and trailer will not accelerate as quickly and is much longer than the vehicle alone. It is

necessary to go much farther beyond the passed vehicle before returning to the lane. Pass on level roadways. Avoid passing on hills if possible.

Backing Up

Hold the bottom of the steering wheel with one hand. To move the trailer to the left, move that hand to the left. To move the trailer to the right, move that hand to the right. Always back up slowly and, if possible, have someone guide you.

Making Turns

Caution

Turn more slowly and make wider arcs when towing a trailer to prevent damage to your vehicle. Making very sharp turns could cause the trailer to contact the vehicle.

Make wider turns than normal when towing, so trailer will not go over soft shoulders, over curbs, or strike road signs, trees, or other objects. Always signal turns well in advance. Do not steer or brake suddenly.

Driving on Grades

Reduce speed and shift to a lower gear before starting down a long or steep downhill grade. If the transmission is not shifted down, the brakes may overheat and result in reduced braking efficiency.

The vehicle can tow in D (Drive). Shift the transmission to a lower gear if the transmission shifts too often under heavy loads and/or hilly conditions.

When towing at higher altitudes, engine coolant will boil at a lower temperature than at lower altitudes. If the engine is turned off immediately after towing at high altitude on steep uphill grades, the vehicle could show signs similar to engine overheating. To avoid this, let the engine run, preferably on level ground, with the transmission in P (Park) for a few minutes before turning the engine off. If the overheat warning comes on, see *Engine Overheating ⇨ 290*.

Parking on Hills

⚠ Warning

To prevent serious injury or death, always park your vehicle and trailer on a level surface when possible.

When parking your vehicle and your trailer on a hill:

1. Press the brake pedal, but do not shift into P (Park) yet. Turn the wheels into the curb if facing downhill or into traffic if facing uphill.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, gradually release the brake pedal to allow the chocks to absorb the load of the trailer.
4. Reapply the brake pedal. Then apply the parking brake and shift into P (Park).
5. Release the brake pedal.

Leaving After Parking on a Hill

1. Apply and hold the brake pedal.
   - Start the engine.
   - Shift into a gear.
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and store the chocks.

Launching and Retrieving a Boat

Backing the Trailer into the Water

⚠ Warning

- Have all passengers get out of the vehicle before backing onto the sloped part of the ramp. Lower the driver and passenger side windows before backing onto the ramp. This will provide a means of

(Continued)

Warning (Continued)

escape in the unlikely event the vehicle slides into the water.

- If the boat launch surface is slippery, have the driver remain in the vehicle with the brake pedal applied while the boat is being launched. The boat launch can be especially slippery at low tide when part of the ramp was previously submerged at high tide. Do not back onto the ramp to launch the boat if you are not sure the vehicle can maintain traction.
- Do not move the vehicle if someone is in the path of the trailer. Some parts of the trailer might be underwater and not visible to people who are assisting in launching the boat.

Disconnect the wiring to the trailer before backing the trailer into the water to prevent damage to the electrical circuits on the trailer. Reconnect the wiring to the trailer after removing the trailer from the water. If the trailer has electric brakes that can function when the trailer is submerged, it might help to leave the electrical trailer connector attached to maintain trailer brake functionality while on the boat ramp.

To back the trailer into the water:

1. If equipped, place the vehicle in four-wheel-drive high.
2. Slowly back down the boat ramp until the boat is floating, but no further than necessary.
3. Press and hold the brake pedal, but do not shift into P (Park) yet.
4. Have someone place chocks under the front wheels of the vehicle.
5. Gradually release the brake pedal to allow the chocks to absorb the load of the trailer.

6. Reapply the brake pedal. Then apply the parking brake and shift into P (Park). If equipped with a manual transmission, turn off the engine and move the shift lever into 1 (First) gear.
7. Release the brake pedal.

Pulling the Trailer from the Water

1. Press and hold the brake pedal.
2. Start the engine and shift into a gear.
3. Release the parking brake.
4. Let up on the brake pedal.
5. Drive slowly until the tires are clear of the chocks.
6. Stop and have someone pick up and store the chocks.
7. Slowly pull the trailer from the water.
8. Once the vehicle and trailer have been driven from the sloped part of the boat ramp, the vehicle can be shifted from four-wheel-drive high. Shift into the drive mode that is appropriate for the road conditions.

Caution

If the vehicle tires begin to spin and the vehicle begins to slide toward the water, remove your foot from the accelerator pedal and apply the brake pedal. Seek help to have the vehicle towed up the ramp.

Maintenance when Trailer Towing

The vehicle needs service more often when used to tow trailers. See *Maintenance Schedule* ⇨ *363*. It is especially important to check the automatic transmission fluid, engine oil, axle lubricant, belts, cooling system, and brake system before and during each trip.

Check periodically that all nuts and bolts on the trailer hitch are tight.

Engine Cooling when Trailer Towing

The cooling system may temporarily overheat during severe operating conditions. See *Engine Overheating* ⇨ *290*.

Trailer Towing

Caution

Towing a trailer improperly can damage the vehicle and result in costly repairs not covered by the vehicle warranty. To tow a trailer correctly, follow the directions in this section and see your dealer for important information about towing a trailer with the vehicle.

Trailer Weight

⚠ Warning

Never exceed the towing capacity for your vehicle.

Safe trailering requires monitoring the weight, speed, altitude, road grades, outside temperature, dimensions of the front of the trailer, and how frequently the vehicle is used to tow a trailer.

Trailering Weight Ratings

When towing a trailer, the combined weight of the vehicle, vehicle contents, trailer, and trailer contents must be below all of the maximum weight ratings for the vehicle, including:

- GCWR: Gross Combined Weight Rating
- GVWR: Gross Vehicle Weight Rating
- Maximum Trailer Weight Rating
- GAWR-RR: Gross Axle Weight Rating-Rear
- Maximum Trailer Tongue Weight Rating

See “Weight-Distributing Hitch Adjustment” under *Towing Equipment* ⇨ *266* to determine if equalizer bars are required to obtain the maximum trailer weight rating.

See “Trailer Brakes” under *Towing Equipment* ⇨ *266* to determine if brakes are required based on your trailer's weight.

The only way to be sure the weight is not exceeding any of these ratings is to weigh the tow vehicle and trailer combination, fully loaded for the trip, getting individual weights for each of these items.

⚠ Warning

You and others could be seriously injured or killed if the trailer is too heavy or the trailer brakes are inadequate for the load. The vehicle may be damaged, and the repairs would not be covered by the vehicle warranty.

Only tow a trailer if all the steps in this section have been followed. Ask your dealer for advice and information about towing a trailer.

Gross Combined Weight Rating (GCWR)

GCWR is the total allowable weight of the completely loaded vehicle and trailer including any fuel, passengers, cargo, equipment, and accessories. Do not exceed the GCWR for your vehicle. The GCWR for the vehicle is on the Tow Rating Chart following.

To check that the weight of the vehicle and trailer are within the GCWR for the vehicle, follow these steps:

- Start with the "curb weight" from the trailering information label
- Add the weight of the trailer loaded with cargo and ready for the trip
- Add the weight of all passengers
- Add the weight of all cargo in the vehicle
- Add the weight of hitch hardware such as a draw bar, ball, load equalizer bars, or sway bars
- Add the weight of any accessories or aftermarket equipment added to the vehicle

The resulting weight cannot exceed the GCWR value shown on the Trailering Information Label.

The gross combined weight can also be confirmed by weighing the vehicle and trailer on a public scale. The vehicle and trailer should be loaded for the trip with passengers and cargo.

Gross Vehicle Weight Rating (GVWR)

For information about the vehicle's maximum load capacity, see *Vehicle Load Limits* ⇨ *197*. When calculating the GVWR with a trailer attached, the trailer tongue weight must be included as part of the weight the vehicle is carrying.

Maximum Trailer Weight

The maximum trailer weight rating is calculated assuming only the driver is in the tow vehicle and it has all the required trailering equipment. The weight of additional optional equipment, passengers, and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

Use the tow rating chart to determine how much the trailer can weigh, based on the vehicle model and options.

Vehicle	Axle Ratio	Maximum Trailer Weight	GCWR*
Escalade 2WD Short Wheelbase	3.23	3 765 kg (8,300 lb)	6 350 kg (14,000 lb)
Escalade 4WD Short Wheelbase	3.23	3 674 kg (8,100 lb)	6 350 kg (14,000 lb)
Escalade 2WD Long Wheelbase	3.23	3 674 kg (8,100 lb)	6 350 kg (14,000 lb)
Escalade 4WD Long Wheelbase with 20 inch wheels	3.23	3 583 kg (7,900 lb)	6 350 kg (14,000 lb)
Escalade 4WD Long Wheelbase with 22 inch wheels	3.23	3 538 kg (7,800 lb)	6 350 kg (14,000 lb)
*The Gross Combination Weight Rating (GCWR) is the total allowable weight of the completely loaded vehicle and trailer including any passengers, cargo, equipment, and conversions. The GCWR for the vehicle should not be exceeded.			

Maximum Trailer Tongue Weight Rating

The Maximum Trailer Tongue Weight Rating is the allowable trailer tongue weight that the vehicle can support using a conventional trailer hitch.

It may be necessary to reduce the overall trailer weight to stay within the maximum trailer tongue weight rating while still maintaining the correct trailer load balance.

Vehicle Series	Hitch Type	Maximum Tongue Weight
1500	Weight Carrying	272 kg (600 lb)
1500	Weight Distributing	453 kg (1,000 lb)

The trailer tongue weight contributes to the Gross Vehicle Weight (GVW). GVW includes the CURB WEIGHT of your vehicle, any passengers, cargo, equipment and the trailer tongue weight. Vehicle options, passengers, cargo, and equipment reduce the maximum allowable tongue weight the vehicle can carry, which also reduces the maximum allowable trailer weight.

Trailer Load Balance

The correct trailer load balance must be maintained to ensure trailer stability. Incorrect load balance is a leading cause of trailer sway.

The trailer tongue weight (1) should be 10–15% of the total loaded trailer weight (2). Some specific trailer types, such as boat trailers, fall outside of this range. Always refer to the trailer owner's manual for the recommended trailer tongue weight for each trailer. Never exceed the maximum loads for your vehicle, hitch and trailer.

The trailer load balance percentage is calculated as: weight (1) divided by weight (2) times 100.

After loading the trailer, separately weigh the trailer and then the trailer tongue and calculate the trailer load balance percentage to see if the weights and distribution are appropriate for your vehicle. If the trailer weight is too high, it may be possible to trasfer some of the cargo into your vehicle. If the trailer tongue weight is too high or too low, it may be possible to rearrange some of the cargo inside of the trailer.

Do not exceed the maximum allowable tongue weight for your vehicle. Use the shortest hitch extension available to position the hitch ball closer to your vehicle. This will help reduce the effect of the trailer tongue weight on the trailer hitch and the rear axle.

If a cargo carrier is used in the trailer hitch receiver, choose a carrier that positions the load as close to the vehicle as possible. Make sure the total weight, including the carrier, is no more than half of the maximum allowable tongue weight for the vehicle or 227 kg (500 lb), whichever is less.

Rear Gross Axle Weight Rating (GAWR-RR)

The GAWR-RR is the total weight that can be supported by the rear axle of the vehicle. Do not exceed the GAWR-RR for the vehicle, with the tow vehicle and trailer fully loaded for the trip including the weight of the trailer tongue. If using a weight-distributing hitch, do not exceed the GAWR-RR before applying the weight distribution spring bars.

Ask your dealer for trailering information or assistance.

Towing Equipment

Hitches

Always use the correct hitch equipment for your vehicle. Crosswinds, large trucks going by, and rough roads can affect the trailer and the hitch.

Proper hitch equipment for your vehicle helps maintain control of the vehicle-trailer combination. Many trailers can be towed using a weight-carrying hitch which has a coupler latched to the hitch ball, or a tow eye latched to a pintle hook. Other trailers may require a weight-distributing hitch that uses spring bars to distribute the trailer tongue weight between your vehicle and trailer axles. See “Maximum Trailer Tongue Weight Rating” under *Trailer Towing* ➪ *261* for weight limits with various hitch types.

Never attach rental hitches or other bumper-type hitches. Only use frame-mounted hitches that do not attach to the bumper.

Hitch Cover

To remove hitch cover, if equipped:

1. Remove the two fasteners on the lower tabs.
2. Pull the lower edge of the cover to about a 45 degree angle.
3. Pull the cover downward to disengage the upper attachments.

To reinstall hitch cover:

1. Hold cover at a 45 degree angle to the vehicle and push the upper tabs into the slots in the bumper.
2. Push the bottom of the cover forward until the lower tabs line up with the lower slots.
3. Snap the hitch cover into place by pushing the upper corners forward.
4. Reinstall the two fasteners on the lower tabs.

Consider using mechanical sway controls with any trailer. Ask a trailering professional about sway controls or refer to the trailer manufacturer's recommendations and instructions.

Weight-Distributing Hitch Adjustment

A weight-distributing hitch may be useful with some trailers. Use the following guidelines to determine if a weight-distributing hitch should be used.

Vehicle Series	Trailer Weight	Weight-Distributing Hitch Usage	Hitch Distribution
1500	Up to 3 175 kg (7,000 lb)	Optional	Refer to trailer manufacturer's recommendation
1500	Over 3 175 kg (7,000 lb)	Required	50%

1. Front of Vehicle
2. Body to Ground Distance

When using a weight-distributing hitch, measure the front fender height above the front axle distance (2) before and after connecting trailer. Adjust the spring bars until the front fender height distance (2) is approximately half way between the first and second measurements.

If equipped with *Automatic Level Control* ⇨ *226*, it is recommended to allow the shocks to inflate, leveling the vehicle prior to adjusting the hitch.

Tires

- Do not tow a trailer while using a compact spare tire on the vehicle.
- Tires must be properly inflated to support loads while towing a trailer. See *Tires* ⇨ *314* for instructions on proper tire inflation.

Safety Chains

Always attach chains between the vehicle and the trailer, and attach the chains to the holes on the trailer hitch platform. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer.

Cross the safety chains under the tongue of the trailer to help prevent the tongue from contacting the road if it becomes separated from the hitch. Always leave just enough slack so the combination can turn. Never allow safety chains to drag on the ground.

Trailer Brakes

Loaded trailers over 900 kg (2,000 lb) must be equipped with brake systems and with brakes for each axle. Trailer braking equipment conforming to Canadian Standards Association (CSA) requirement CAN3-D313, or its equivalent, is recommended.

State or local regulations may require trailers to have their own braking system if the loaded weight of the trailer exceeds certain minimums that can vary from state to state. Read and follow the instructions for the trailer brakes so they are installed, adjusted, and maintained properly. Never attempt to tap into your vehicle's hydraulic brake system. If you do, both the vehicle anti-lock brakes and the trailer brakes may not function, which could result in a crash.

Trailer Wiring Harness

The seven-pin trailer connector is mounted in the bumper. This connector can be plugged into a seven-pin universal heavy-duty trailer connector available through your dealer.

Use only a round, seven-wire connector with flat blade terminals meeting SAE J2863 specifications for proper electrical connectivity.

The seven-wire harness contains the following trailer circuits:

- Yellow/Grey: Left Stop/Turn Signal
- Green/Violet: Right Stop/Turn Signal
- Grey/Brown: Taillamps
- White: Ground
- White/Green: Back-up Lamps
- Red/Green: Battery Feed
- Dark Blue: Trailer Brake

To help charge a remote (non-vehicle) battery, press the Tow/Haul Mode button at the end of the shift lever. If the trailer is too light for Tow/Haul Mode, turn on the headlamps to help charge the battery.

Electric Brake Control Wiring Provisions

These wiring provisions are included with the vehicle as part of the trailer wiring package. These provisions are for an electric brake controller.

The harness should be installed by your dealer or a qualified service center.

Refer to the aftermarket electric trailer brake controller owner's manual to determine wire color coding of the electric trailer brake controller. The wire colors on the brake controller may be different from the vehicle.

Trailer Lamps

Always check all trailer lamps are working at the beginning of each trip, and periodically on longer trips.

Turn Signals When Towing a Trailer

When properly connected, the trailer turn signals should will illuminate to indicate the vehicle is turning, changing lanes, or stopping. When towing a trailer, the arrows on the

instrument cluster will illuminate even if the trailer is not properly connected or the bulbs are burned out.

Tow/Haul Mode

For instructions on how to enter Tow/Haul mode, see *Tow/Haul Mode* ⇨ *214*.

Tow/Haul assists when pulling a heavy trailer or a large or heavy load.

Tow/Haul Mode is designed to be most effective when the vehicle and trailer combined weight is at least 75% of the vehicle's Gross Combined Weight Rating (GCWR). See “Maximum Trailer Weight” under *Trailer Towing* ⇨ *261*.

Tow/Haul Mode is most useful when towing a heavy trailer or carrying a large or heavy load:

- through rolling terrain
- in stop-and-go traffic
- in busy parking lots

Operating the vehicle in Tow/Haul Mode when lightly loaded or not towing will not cause damage; however, it is not recommended and may result in unpleasant engine and transmission driving characteristics and reduced fuel economy.

Integrated Trailer Brake Control System

The vehicle may have an Integrated Trailer Brake Control (ITBC) system for use with electric trailer brakes or most electric over hydraulic trailer brake systems. These instructions apply to both types of electric trailer brakes.

This symbol is on the Trailer Brake Control Panel on vehicles with an ITBC system. The power output to the trailer brakes is proportional to the amount of vehicle braking. This available power output to the trailer brakes can be adjusted to a wide range of trailering situations.

The ITBC system is integrated with the vehicle’s brake, anti-lock brake, and StabiliTrak systems. In trailering conditions that cause the vehicle’s anti-lock brake or StabiliTrak systems to activate, power sent to the trailer's brakes will be automatically adjusted to minimize trailer wheel lock-up. This does not imply that the trailer has StabiliTrak.

If the vehicle’s brake, anti-lock brake, or StabiliTrak systems are not functioning properly, the ITBC system may not function fully or at all. Make sure all of these systems are fully operational to allow the ITBC system to function properly.

The ITBC system is powered through the vehicle's electrical system. Turning the ignition off will also turn off the ITBC system. The ITBC system is fully functional only when the ignition is in ON/RUN.

⚠ Warning

Connecting a trailer that has an air brake system may result in reduced or complete loss of trailer braking, including increased stopping distance or trailer instability which could result in serious injury, death, or property damage. Only use the ITBC system with electric or electric over hydraulic trailer brake systems.

Trailer Brake Control Panel

1. Manual Trailer Brake Apply Lever
2. Trailer Gain Adjustment Buttons

The ITBC control panel is on the instrument panel to the left of the steering column. See *Instrument Panel* ⇨ *6*. The control panel allows adjustment to the amount of output, referred to as Trailer Gain, available to the trailer brakes and allows manual application of the trailer brakes. Use the ITBC control panel and the DIC trailer brake display page to adjust and display power output to the trailer brakes.

Trailer Brake DIC Display Page

The ITBC display page indicates:

- Trailer Gain setting
- Output to the trailer brakes
- Trailer connection
- System operational status.

To display:

- Scroll through the DIC menu pages
- Press a Trailer Gain (+) or (-) button
- Activate the Manual Trailer Brake Apply Lever

TRAILER GAIN:

Press a Trailer Gain button to recall the current Trailer Gain setting. Each press and release of the gain buttons will then change the Trailer Gain setting. Press the Trailer Gain (+) or (-) to adjust. Press and hold to continuously adjust the Trailer Gain. To turn the output to the trailer off, adjust the Trailer Gain setting to 0.0. This setting can be adjusted from 0.0 to 10.0 with a trailer connected or disconnected.

TRAILER OUTPUT: This displays anytime a trailer with electric brakes is connected. Output to the trailer brakes is based on the amount of vehicle braking present and relative to the Trailer Gain setting. Output is displayed from 0 to 100% for each gain setting.

The Trailer Output will indicate "- - - - - -" on the Trailer Brake Display Page whenever the following occur:

- No trailer is connected.

- A trailer without electric brakes is connected, no DIC message will display
- A trailer with electric brakes has become disconnected, a CHECK TRAILER WIRING message displays on the DIC
- There is a fault present in the wiring to the trailer brakes, a CHECK TRAILER WIRING message displays on the DIC
- The ITBC system is not working due to a fault, a SERVICE TRAILER BRAKE SYSTEM message displays in the DIC

Manual Trailer Brake Apply Lever

Slide this lever left to apply the trailer's electric brakes independent of the vehicle's brakes. Use this lever to adjust Trailer Gain to achieve the proper power output to the trailer brakes. The trailer's and the vehicle's brake lamps will come on when either vehicle brakes or manual trailer brakes are applied and properly connected.

Trailer Gain Adjustment Procedure

Trailer Gain should be set for a specific trailering condition and it must be readjusted anytime vehicle loading, trailer loading, or road surface conditions change.

⚠ Warning

Trailer brakes that are over-gained or under-gained may not stop the vehicle and the trailer as intended and can result in a crash. Always follow the instructions to set the Trailer Gain for the proper trailer stopping performance.

To adjust Trailer Gain for each towing condition:

1. Drive the vehicle with the trailer attached on a level road surface representative of the towing condition and free of traffic at about 32 to 40 km/h (20 to 25 mph) and fully apply the Manual Trailer Brake apply lever.

Note

Adjusting Trailer Gain at speeds lower than 32 to 40 km/h (20 to 25 mph) may result in an incorrect gain setting.

2. Adjust the Trailer Gain, using the Trailer Gain adjustment buttons, to just below the point of trailer wheel lock-up, indicated by trailer wheel squeal or tire smoke when a trailer wheel locks.

Note

Trailer wheel lock-up may not occur if towing a heavily loaded trailer. In this case, adjust the Trailer Gain to the highest allowable setting for the towing condition.

3. Readjust Trailer Gain any time vehicle loading, trailer loading, or road surface conditions change or if trailer wheel lock-up is noticed at any time while towing.

Other ITBC-Related DIC Messages

TRAILER CONNECTED: This message will briefly display when a trailer with electric brakes is first connected to

the vehicle. This message will automatically turn off in about 10 seconds. This message can be acknowledged before it automatically turns off.

CHECK TRAILER WIRING: This message will display if:

- The ITBC system first determines connection to a trailer with electric brakes and then the trailer harness becomes disconnected the vehicle.

  If the disconnect occurs while the vehicle is stationary, this message will automatically turn off in about 30 seconds. This message will also turn off if it is acknowledged or if the trailer harness is reconnected.

  If the disconnect occurs while the vehicle is moving, this message will continue until the ignition is turned off. This message will also turn off if it is acknowledged or if the trailer harness is reconnected.

- There is an electrical fault in the wiring to the trailer brakes. This message will continue as long as there is an electrical fault in the trailer wiring. This message will also turn off if it is acknowledged.

To determine whether the electrical fault is on the vehicle side or trailer side of the trailer wiring harness connection:

1. Disconnect the trailer wiring harness from the vehicle.
2. Turn the ignition off.
3. Wait 10 seconds, then turn the ignition back to RUN.
4. If the CHECK TRAILER WIRING message reappears, the electrical fault is on the vehicle side.

   If the CHECK TRAILER WIRING message only reappears when connecting the trailer wiring harness to the vehicle, the electrical fault is on the trailer side.

SERVICE TRAILER BRAKE SYSTEM: This message will display when there is a problem with the ITBC system. If this message continues over multiple ignition cycles, there is a problem with the ITBC system. Have the vehicle serviced.

If either the CHECK TRAILER WIRING or SERVICE TRAILER BRAKE SYSTEM message displays while driving, the ITBC system may not be fully functional or may not function at all. When traffic conditions allow, carefully pull the vehicle over to the side of the road and turn the ignition off. Check the wiring connection to the trailer and turn the ignition back on. If either of these messages continues, either the vehicle or trailer needs service.

A GM dealer may be able to diagnose and repair problems with the trailer. However, any diagnosis and repair of the trailer is not covered under the vehicle warranty. Contact your trailer dealer for assistance with trailer repairs and trailer warranty information.

Trailer Sway Control (TSC)

Vehicles with StabiliTrak have a Trailer Sway Control (TSC) feature. Trailer sway is unintended side-to-side motion of a trailer while towing. If the vehicle is towing a trailer and the TSC detects that sway is increasing, the vehicle brakes are selectively applied at each wheel, to help reduce excessive trailer sway. If equipped with the Integrated Trailer Brake Control (ITBC) system, and the trailer has an electric brake system, StabiliTrak may also apply the trailer brakes.

If TSC is enabled, the Traction Control System (TCS)/StabiliTrak warning light will flash on the instrument cluster. Reduce vehicle speed by gradually removing your foot from the accelerator. If trailer sway continues, StabiliTrak can reduce engine torque to help slow the vehicle. TSC will not function if StabiliTrak is turned off. See *Traction Control/Electronic Stability Control* ⇨ *222*.

⚠ Warning

Trailer sway can result in a crash and in serious injury or death, even if the vehicle is equipped with TSC.

If the trailer begins to sway, reduce vehicle speed by gradually removing your foot from the accelerator. Then pull over to check the trailer and vehicle to help correct possible causes, including an improperly or overloaded trailer, unrestrained cargo, improper trailer hitch configuration, or improperly inflated or incorrect vehicle or

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Warning (Continued)

trailer tires. See *Towing Equipment* ⇨ *266* for trailer ratings and hitch setup recommendations.

Aftermarket Electronic Trailer Sway Control Devices

Some trailers may come equipped with an electronic device designed to reduce or control trailer sway. Aftermarket equipment manufacturers also offer similar devices that connect to the wiring between the trailer and the vehicle. These devices may interfere with the vehicle's trailer brake systems or other systems, including integrated anti-sway systems, if equipped. Messages related to trailer connections or trailer brakes could appear on the DIC. The effects of these aftermarket devices on vehicle handling or trailer brake performance is not known.

⚠ Warning

Use of aftermarket electronic trailer sway control devices could result in reduced trailer brake performance, loss of trailer brakes, or other malfunctions, and result in a crash. You or others could be seriously injured or killed. Before using one of these devices:

- Ask the device or trailer manufacturer if the device has been thoroughly tested for compatibility with the make, model, and year of your vehicle and any optional equipment installed on your vehicle.
- Before driving, check the trailer brakes are working properly, if equipped. Drive the vehicle with the trailer attached on a level road surface that is free of traffic at about 32-40 km/h (20-25 mph) and fully apply

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Warning (Continued)

the manual trailer brake apply lever. Also, check the trailer brake lamps and other lamps are functioning correctly.

- If the trailer brakes are not operating properly at any time, or if a DIC message indicates problems with the trailer connections or trailer brakes, carefully pull the vehicle over to the side of the road when traffic conditions allow.

Trailer Tires

Special Trailer (ST) tires differ from vehicle tires. Trailer tires are designed with stiff sidewalls to help prevent sway and to support heavy loads. These features can make it difficult to determine if the trailer tire pressures are low only based on a visual inspection.

Always check all trailer tire pressures before each trip when the tires are cool. Low trailer tire pressure is a leading cause of trailer tire blow-outs.

Trailer tires deteriorate over time. The trailer tire sidewall will show the week and year the tire was manufactured. Many trailer tire manufacturers recommend replacing tires more than six years old.

Overloading is another leading cause of trailer tire blow-outs. Never load your trailer with more weight than the tires are designed to support. The load rating is located on the trailer tire sidewall.

Always know the maximum speed rating for the trailer tires before driving. This may be significantly lower than the vehicle tire speed rating. The speed rating may be on the trailer tire sidewall. If the speed rating is not shown, the default trailer tire speed rating is 105 km/h (65 mph).

Conversions and Add-Ons

Add-On Electrical Equipment

⚠ Warning

The Data Link Connector (DLC) is used for vehicle service and Emission Inspection/Maintenance testing. See *Malfunction Indicator Lamp (Check Engine Light)* ⇨ *140*. A device connected to the DLC — such as an aftermarket fleet or driver-behavior tracking device — may interfere with vehicle systems. This could affect vehicle operation and cause a crash. Such devices may also access information stored in the vehicle's systems.

Caution

Some electrical equipment can damage the vehicle or cause components to not work and would not be covered by the vehicle warranty. Always check with your dealer before adding electrical equipment.

Add-on equipment can drain the vehicle's 12-volt battery, even if the vehicle is not operating.

The vehicle has an airbag system. Before attempting to add anything electrical to the vehicle, see *Servicing the Airbag-Equipped Vehicle* ⇨ *97* and *Adding Equipment to the Airbag-Equipped Vehicle* ⇨ *98*.

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General Information

For service and parts needs, visit your dealer. You will receive genuine GM parts and GM-trained and supported service people.

Genuine GM parts have one of these marks:

ACDelco

GM GENUINE PARTS

GMC

ACCESSORIES

California Proposition 65 Warning

⚠ Warning

Most motor vehicles, including this one, as well as many of its service parts and fluids, contain and/or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Engine exhaust, many parts and systems, many fluids, and some component wear by-products contain and/or emit these chemicals. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

See *Battery - North America* ⇨ *295* and *Jump Starting - North America* ⇨ *345* and the back cover.

California Perchlorate Materials Requirements

Certain types of automotive applications, such as airbag initiators, seat belt pretensioners, and lithium batteries contained in Remote Keyless Entry transmitters, may contain perchlorate materials. Special handling may be necessary. For additional information, see www.dtsc.ca.gov/hazardouswaste/perchlorate.

Accessories and Modifications

Adding non-dealer accessories or making modifications to the vehicle can affect vehicle performance and safety, including such things as airbags, braking, stability, ride and handling, emissions systems, aerodynamics, durability, and electronic systems like antilock brakes, traction control, and stability control. These accessories or modifications could even cause malfunction or damage not covered by the vehicle warranty.

Damage to suspension components caused by modifying vehicle height outside of factory settings will not be covered by the vehicle warranty.

Damage to vehicle components resulting from modifications or the installation or use of non-GM certified parts, including control module or software modifications, is not covered under the terms of the vehicle warranty and may affect remaining warranty coverage for affected parts.

GM Accessories are designed to complement and function with other systems on the vehicle. See your dealer to accessorize the vehicle using genuine GM Accessories installed by a dealer technician.

Also, see *Adding Equipment to the Airbag-Equipped Vehicle* ⇨ *98*.

Vehicle Checks

Doing Your Own Service Work

⚠ Warning

It can be dangerous to work on your vehicle if you do not have the proper knowledge, service manual, tools, or parts. Always follow owner's manual procedures and consult the service manual for your vehicle before doing any service work.

If doing some of your own service work, use the proper service manual. It tells you much more about how to service the vehicle than this manual can. To order the proper service manual, see *Publication Ordering Information* ⇨ *387*.

This vehicle has an airbag system. Before attempting to do your own service work, see *Servicing the Airbag-Equipped Vehicle* ⇨ *97*.

If equipped with remote vehicle start, open the hood before performing any service work to prevent remote starting the vehicle accidentally. See *Remote Vehicle Start* ⇨ *35*.

Keep a record with all parts receipts and list the mileage and the date of any service work performed. See *Maintenance Records* ⇨ *374*.

Caution

Even small amounts of contamination can cause damage to vehicle systems. Do not allow contaminants to contact the fluids, reservoir caps, or dipsticks.

Hood

To open the hood:

1. Pull the handle with this symbol on it. It is inside the vehicle under the steering wheel.

2. Go to the front of the vehicle to find the secondary hood release. The handle is under the front edge of the hood near the center. Push the handle to the right and at the same time raise the hood.

Before closing the hood, be sure all the filler caps are on properly. Then bring the hood from full open to within 15 cm (6 in) from the closed position, pause, and push the front center of the hood with a swift, firm motion to fully close the hood.

Engine Compartment Overview

1. Positive (+) Terminal. See *Jump Starting - North America* ⇨ *345*.
2. *Battery - North America* ⇨ *295*.
3. Coolant Surge Tank and Pressure Cap. See *Cooling System* ⇨ *287*.
4. *Engine Air Cleaner/Filter* ⇨ *286*.
5. Remote Negative (–) Location (Out of View). See *Jump Starting - North America* ⇨ *345*.
6. Engine Cooling Fans (Out of View). See *Cooling System* ⇨ *287*.
7. Engine Oil Fill Cap. See "When to Add Engine Oil" under *Engine Oil* ⇨ *282*.
8. Engine Oil Dipstick. See "Checking Engine Oil" under *Engine Oil* ⇨ *282*.
9. Windshield Washer Fluid Reservoir. See "Adding Washer Fluid" under *Washer Fluid* ⇨ *292*.
10. Brake Fluid Reservoir. See *Brake Fluid* ⇨ *294*.
11. *Engine Compartment Fuse Block* ⇨ *304*.

Engine Oil

To ensure proper engine performance and long life, careful attention must be paid to engine oil. Following these simple, but important steps will help protect your investment:

- Use engine oil approved to the proper specification and of the proper viscosity grade. See "Selecting the Right Engine Oil" in this section.
- Check the engine oil level regularly and maintain the proper oil level. See "Checking Engine Oil" and "When to Add Engine Oil" in this section.
- Change the engine oil at the appropriate time. See *Engine Oil Life System* ⇨ *284*.
- Always dispose of engine oil properly. See "What to Do with Used Oil" in this section.

Checking Engine Oil

Check the engine oil level regularly, every 650 km (400 mi), especially prior to a long trip. The engine oil dipstick handle is a loop. See *Engine Compartment Overview* ⇨ *281* for the location.

⚠ Warning

The engine oil dipstick handle may be hot; it could burn you. Use a towel or glove to touch the dipstick handle.

If a low oil Driver Information Center (DIC) message displays, check the oil level.

Follow these guidelines:

- To get an accurate reading, park the vehicle on level ground. Check the engine oil level after the engine has been off for at least two hours. Checking the engine oil level on steep grades or too soon after engine shutoff can result in incorrect readings. Accuracy improves when checking a cold engine prior to starting. Remove the dipstick and check the level.

- If unable to wait two hours, the engine must be off for at least 15 minutes if the engine is warm, or at least 30 minutes if the engine is not warm. Pull out the dipstick, wipe it with a clean paper towel or cloth, then push it back in all the way. Remove it again, keeping the tip down, and check the level.

When to Add Engine Oil

If the oil is below the cross-hatched area at the tip of the dipstick and the engine has been off for at least 15 minutes, add 1 L (1 qt) of the recommended oil and then recheck the level. See "Selecting the Right Engine Oil" later in this section for an explanation of what kind of oil to use. For engine oil crankcase capacity, see *Capacities and Specifications* ⇨ *376*.

Caution

Do not add too much oil. Oil levels above or below the acceptable operating range shown on the dipstick are harmful to the engine. If you find that you have an oil level above the operating range, i.e., the engine has so much oil that the oil level gets above the cross-hatched area that shows the proper operating range, the engine could be damaged. You should drain out the excess oil or limit driving of the vehicle and seek a service professional to remove the excess amount of oil.

See *Engine Compartment Overview* ⇨ *281* for the location of the engine oil fill cap.

Add enough oil to put the level somewhere in the proper operating range. Push the dipstick all the way back in when through.

Selecting the Right Engine Oil

Selecting the right engine oil depends on both the proper oil specification and viscosity grade. See *Recommended Fluids and Lubricants* ⇨ *372*.

Specification

Use full synthetic engine oils that meet the dexos1 specification. Engine oils that have been approved by GM as meeting the dexos1 specification are marked with the dexos1 approved logo. See www.gmdexos.com.

Caution

Failure to use the recommended engine oil or equivalent can result in engine damage not covered by the vehicle warranty.

Viscosity Grade

Use SAE 0W-20 viscosity grade engine oil.

When selecting an oil of the appropriate viscosity grade, it is recommended to select an oil of the correct specification. See “Specification” earlier in this section.

Engine Oil Additives/Engine Oil Flushes

Do not add anything to the oil. The recommended oils meeting the dexos1 specification are all that is needed for good performance and engine protection.

Engine oil system flushes are not recommended and could cause engine damage not covered by the vehicle warranty.

What to Do with Used Oil

Used engine oil contains certain elements that can be unhealthy for your skin and could even cause cancer. Do not let used oil stay on your skin for very long. Clean your skin and nails with soap and water, or a good hand cleaner. Wash or properly dispose of clothing or rags containing used engine oil. See the manufacturer's warnings about the use and disposal of oil products.

Used oil can be a threat to the environment. If you change your own oil, be sure to drain all the oil from the filter before disposal. Never dispose of oil by putting it in the trash or pouring it on the ground, into sewers, or into streams or bodies of water. Recycle it by taking it to a place that collects used oil.

Engine Oil Life System

When to Change Engine Oil

This vehicle has a computer system that indicates when to change the engine oil and filter. This is based on a combination of factors which include engine revolutions, engine temperature, and miles driven. Based on driving conditions, the mileage at which an oil change is indicated can vary considerably. For the oil life system to work properly, the system must be reset every time the oil is changed.

When the system has calculated that oil life has been diminished, it indicates that an oil change is necessary. A CHANGE ENGINE OIL SOON message comes on. Change the oil as soon as possible within the next 1 000 km (600 mi). It is possible that, if driving under the best conditions, the oil life system might indicate that an oil change is not necessary for up to a year. The engine oil and filter must be changed at least once a year and at this time the system must be reset. Your dealer has trained service people who will perform this work and reset the system. It is also important to check the oil regularly over the course of an oil drain interval and keep it at the proper level.

If the system is ever reset accidentally, the oil must be changed at 5 000 km (3,000 mi) since the last oil change. Remember to reset the oil life system whenever the oil is changed.

How to Reset the Engine Oil Life System

Reset the system whenever the engine oil is changed so that the system can calculate the next engine oil change. To reset the system:

1. Using the DIC controls on the right side of the steering wheel, display OIL LIFE on the DIC. See *Driver Information Center (DIC)* ⇨ *149*. When remaining oil life is low, the CHANGE ENGINE OIL SOON message will appear on the display.
2. Press and hold SEL on the DIC controls for a few seconds to clear the CHANGE ENGINE OIL SOON message and reset the oil life at 100%.

   Be careful not to reset the oil life display accidentally at any time other than after the oil is changed. It cannot be reset accurately until the next oil change.

The oil life system can also be reset as follows:

1. Display OIL LIFE on the DIC. See *Driver Information Center (DIC)* ⇨ *149*.
2. Fully press and release the accelerator pedal three times within five seconds.

   If the CHANGE ENGINE OIL SOON message is not on, the system is reset.

The system is reset when the CHANGE ENGINE OIL SOON message is off.

If the CHANGE ENGINE OIL SOON message comes back on when the vehicle is started, the engine oil life system has not been reset. Repeat the procedure.

Automatic Transmission Fluid

When to Check and Change Automatic Transmission Fluid

It is usually not necessary to check the transmission fluid level. The only reason for fluid loss is a transmission leak or overheated transmission. This vehicle is not equipped with a transmission fluid level dipstick. There is a special procedure for checking and changing the transmission fluid in these vehicles. Because this procedure is difficult, this should be done at the dealer. Contact the dealer for additional information or the procedure can be found in the service manual. See *Publication Ordering Information* ⇨ *387*.

Caution

Use of the incorrect automatic transmission fluid may damage the vehicle, and the damage may not be covered by the vehicle warranty.

(Continued)

Caution (Continued)

Always use the correct automatic transmission fluid. See *Recommended Fluids and Lubricants* ⇨ *372*.

Change the fluid and filter at the scheduled maintenance intervals listed in *Maintenance Schedule* ⇨ *363*. Be sure to use the transmission fluid listed in *Recommended Fluids and Lubricants* ⇨ *372*.

Engine Air Cleaner/Filter

See *Engine Compartment Overview* ⇨ *281* for the location of the engine air cleaner/filter.

When to Inspect the Engine Air Cleaner/Filter

For intervals on changing and inspecting the engine air cleaner/filter see *Maintenance Schedule* ⇨ *363*.

How to Inspect the Engine Air Cleaner/Filter

Do not start the engine or have the engine running with the engine air cleaner/filter housing open. Before removing the engine air cleaner/filter, make sure that the engine air cleaner/filter housing and nearby components are free of dirt and debris. Remove the engine air cleaner/filter. Lightly tap and shake the engine air cleaner/filter (away from the vehicle), to release loose dust and dirt. Inspect the engine air cleaner/filter for damage, and replace if damaged. Do not clean the engine air cleaner/filter or components with water or compressed air.

To inspect or replace the engine air cleaner/filter:

1. Screws
2. Electrical Connector
3. Air Duct Clamp

1. Locate the air cleaner/filter assembly. See *Engine Compartment Overview* ⇨ *281*.
2. Disconnect the outlet duct by loosening the air duct clamp (3).
3. Disconnect the electrical connector (2) and the connector harness from the cover.

4. Remove the four screws (1) on top of the cover of the housing and lift up the cover.
5. Remove the engine air cleaner/filter from the housing. Take care to dislodge as little dirt as possible.
6. Clean the engine air cleaner/filter sealing surfaces and the housing.
7. Inspect or replace the engine air cleaner/filter.
8. Reverse Steps 2-4 to reinstall the filter cover housing.

⚠ Warning

Operating the engine with the air cleaner/filter off can cause you or others to be burned. Use caution when working on the engine. Do not start the engine or drive the vehicle with the air cleaner/filter off, as flames may be present if the engine backfires.

Caution

If the air cleaner/filter is off, dirt can easily get into the engine, which could damage it. Always have the air cleaner/filter in place when driving.

Cooling System

The cooling system allows the engine to maintain the correct working temperature.

1. Coolant Surge Tank
2. Coolant Surge Tank Pressure Cap
3. Engine Cooling Fan

⚠ Warning

An underhood electric fan can start up even when the engine is not running and can cause injury. Keep hands, clothing, and tools away from any underhood electric fan.

⚠ Warning

Do not touch heater or radiator hoses, or other engine parts. They can be very hot and can burn you. Do not run the engine if there is a leak; all coolant could leak out. That could cause an engine fire and can burn you. Fix any leak before driving the vehicle.

Engine Coolant

The cooling system in the vehicle is filled with DEX-COOL engine coolant. This coolant is designed to remain in the vehicle for 5 years or 240 000 km (150,000 mi), whichever occurs first.

The following explains the cooling system and how to check and add coolant when it is low. If there is a problem with engine overheating, see *Engine Overheating ⇨ 290*.

What to Use

⚠ Warning

Plain water, or other liquids such as alcohol, can boil before the proper coolant mixture will. With plain water or the wrong mixture, the engine could get too hot but there would not be an overheat warning. The engine could catch fire and you or others could be burned.

Use a 50/50 mixture of clean, drinkable water and DEX-COOL coolant. This mixture:

- Gives freezing protection down to –37 °C (–34 °F), outside temperature.
- Gives boiling protection up to 129 °C (265 °F), engine temperature.
- Protects against rust and corrosion.
- Will not damage aluminum parts.
- Helps keep the proper engine temperature.

Caution

Do not use anything other than a mix of DEX-COOL coolant that meets GM Standard GMW3420 and clean, drinkable water. Anything else can cause damage to the engine cooling system and the vehicle, which would not be covered by the vehicle warranty.

Never dispose of engine coolant by putting it in the trash, or by pouring it on the ground or into sewers, streams, or bodies of water. Have the coolant changed by an authorized service center, familiar with legal requirements regarding used coolant disposal. This will help protect the environment and your health.

Checking Coolant

The coolant surge tank is in the engine compartment on the passenger side of the vehicle. See *Engine Compartment Overview ⇨ 281*.

The vehicle must be on a level surface when checking the coolant level.

Check to see if coolant is visible in the coolant surge tank. If the coolant inside the coolant surge tank is boiling, wait until it cools down. The coolant level should be at or above the full cold mark. If it is not, there may be a leak in the cooling system.

If coolant is visible but the coolant level is not at or above the full cold mark, see “How to Add Coolant to the Coolant Surge Tank” following.

How to Add Coolant to the Coolant Surge Tank

⚠ Warning

Spilling coolant on hot engine parts can burn you. Coolant contains ethylene glycol and it will burn if the engine parts are hot enough.

⚠ Warning

Plain water, or other liquids such as alcohol, can boil before the proper coolant mixture will. With plain water or the wrong mixture, the engine could get too hot but there would not be an overheat warning. The engine could catch fire and you or others could be burned.

⚠ Warning

Steam and scalding liquids from a hot cooling system are under pressure. Turning the pressure cap, even a little, can cause them to come out at high speed and you could be burned. Never turn the cap when the cooling system, including the pressure cap, is hot. Wait for the cooling system and pressure cap to cool.

Caution

Failure to follow the specific coolant fill procedure could cause the engine to overheat and could cause system damage. If coolant is not visible in the surge tank, contact your dealer.

If no coolant is visible in the surge tank, add coolant:

1. Remove the coolant surge tank pressure cap when the cooling system, including the coolant surge tank pressure cap and upper radiator hose, is no longer hot.

   Turn the pressure cap slowly counterclockwise about one full turn. If a hiss is heard, wait for that to stop. A hiss means there is still some pressure left.

2. Keep turning the pressure cap slowly, and remove it.

3. Fill the coolant surge tank with the proper mixture to the full cold mark.

4. With the coolant surge tank pressure cap off, start the engine and let it run until the engine coolant temperature gauge indicates approximately 90 °C (195 °F).

   By this time, the coolant level inside the coolant surge tank may be lower. If the level is lower, add more of the proper mixture to the coolant surge tank until the level reaches the full cold mark.

5. Replace the pressure cap tightly.

6. Verify coolant level after the engine is shut off and the coolant is cold. If necessary, repeat coolant fill procedure Steps 1-6.

Caution

If the pressure cap is not tightly installed, coolant loss and engine damage may occur. Be sure the cap is properly and tightly secured.

Engine Overheating

Caution

Do not run the engine if there is a leak in the engine cooling system. This can cause a loss of all coolant and can damage the system and vehicle. Have any leaks fixed right away.

The vehicle has several indicators to warn of engine overheating.

There is a coolant temperature gauge in the vehicle's instrument cluster. See *Engine Coolant Temperature Gauge* ⇨ *137*.

In addition, there are ENGINE OVERHEATED STOP ENGINE, ENGINE OVERHEATED IDLE ENGINE, and ENGINE POWER IS REDUCED messages in the Driver Information Center (DIC).

If the decision is made not to lift the hood when this warning appears, get service help right away. See *Roadside Service* ⇨ *382*.

If the decision is made to lift the hood, make sure the vehicle is parked on a level surface.

Check to see if the engine cooling fan(s) are running. If the engine is overheating, the fans should be running. If they are not, do not continue to run the engine. Have the vehicle serviced.

If Steam is Coming from the Engine Compartment

⚠ Warning

Steam and scalding liquids from a hot cooling system are under pressure. Turning the pressure cap, even a little, can cause them to come out at high speed and you could be burned. Never turn the cap when the cooling system, including the pressure cap, is hot. Wait for the cooling system and pressure cap to cool.

If No Steam is Coming from the Engine Compartment

The ENGINE OVERHEATED STOP ENGINE or the ENGINE OVERHEATED IDLE ENGINE message, along with a low coolant condition, can indicate a serious problem.

If there is an engine overheat warning, but no steam is seen or heard, the problem may not be too serious. Sometimes the engine can get a little too hot when the vehicle:

- Climbs a long hill on a hot day.
- Stops after high-speed driving.
- Idles for long periods in traffic.
- Tows a trailer; see *Trailer Towing* ⇨ *261*.

If the ENGINE OVERHEATED STOP ENGINE or the ENGINE OVERHEATED IDLE ENGINE message appears with no sign of steam, try this for a minute or so:

1. Turn the air conditioning off.
2. Turn the heater on to the highest temperature and to the highest fan speed. Open the windows as necessary.
3. When it is safe to do so, pull off the road, shift to P (Park) or N (Neutral), and let the engine idle.

If the engine coolant temperature gauge is no longer in the overheat zone or an overheat warning no longer displays, the vehicle can be driven. Continue to drive the vehicle slowly for about 10 minutes. Keep a safe vehicle distance from the vehicle in front. If the warning does not come back on, continue to drive normally and have the cooling system checked for proper fill and function.

If the warning continues, pull over, stop, and park the vehicle right away.

If there is still no sign of steam and the vehicle is equipped with an engine driven cooling fan, push down the accelerator until the engine speed is about twice as fast as normal idle speed for at least five minutes while the vehicle is parked. If the warning is

still there, turn off the engine and get everyone out of the vehicle until it cools down.

If there is no sign of steam, idle the engine for five minutes while parked. If the warning is still displayed, turn off the engine until it cools down.

Engine Fan

If the vehicle has electric cooling fans, the fans may be heard spinning at low speed during most everyday driving. The fans may turn off if no cooling is required. Under heavy vehicle loading, trailer towing, high outside temperatures, or operation of the air conditioning system, the fans may change to high speed and an increase in fan noise may be heard. This is normal and indicates that the cooling system is functioning properly. The fans will change to low speed when additional cooling is no longer required.

The electric engine cooling fans may run after the engine has been turned. off. This is normal and no service is required.

Washer Fluid

What to Use

When windshield washer fluid needs to be added, be sure to read the manufacturer's instructions before use. Use a fluid that has sufficient protection against freezing in an area where the temperature may fall below freezing.

Adding Washer Fluid

The vehicle has a low washer fluid message on the DIC that comes on when the washer fluid is low. The message is displayed for 15 seconds at the start of each ignition cycle. When the WASHER FLUID LOW ADD FLUID message displays, washer fluid will need to be added to the windshield washer fluid reservoir.

Open the cap with the washer symbol on it. Add washer fluid until the tank is full. See *Engine Compartment Overview* ⇨ *281* for reservoir location.

Caution

- Do not use washer fluid that contains any type of water repellent coating. This can cause the wiper blades to chatter or skip.
- Do not use engine coolant (antifreeze) in the windshield washer. It can damage the windshield washer system and paint.
- Do not mix water with ready-to-use washer fluid. Water can cause the solution to freeze and damage the washer fluid tank and other parts of the washer system.
- When using concentrated washer fluid, follow the manufacturer instructions for adding water.

(Continued)

Caution (Continued)

- Fill the washer fluid tank only three-quarters full when it is very cold. This allows for fluid expansion if freezing occurs, which could damage the tank if it is completely full.

Brakes

Disc brake pads have built-in wear indicators that make a high-pitched warning sound when the brake pads are worn and new pads are needed. The sound can come and go or can be heard all the time when the vehicle is moving, except when applying the brake pedal firmly.

⚠ Warning

The brake wear warning sound means that soon the brakes will not work well. That could lead to a

(Continued)

Warning (Continued)

crash. When the brake wear warning sound is heard, have the vehicle serviced.

Caution

Continuing to drive with worn-out brake pads could result in costly brake repair.

Some driving conditions or climates can cause a brake squeal when the brakes are first applied or lightly applied. This does not mean something is wrong with the brakes.

Properly torqued wheel nuts are necessary to help prevent brake pulsation. When tires are rotated, inspect brake pads for wear and evenly tighten wheel nuts in the proper sequence to torque specifications. See *Capacities and Specifications* ⇨ *376*.

Brake pads should be replaced as complete sets.

Brake Pedal Travel

See your dealer if the brake pedal does not return to normal height, or if there is a rapid increase in pedal travel. This could be a sign that brake service may be required.

Replacing Brake System Parts

Always replace brake system parts with new, approved replacement parts. If this is not done, the brakes may not work properly. The braking performance expected can change in many other ways if the wrong replacement brake parts are installed or if parts are improperly installed.

Brake Fluid

The brake master cylinder reservoir is filled with GM approved DOT 3 brake fluid as indicated on the reservoir cap. See *Engine Compartment Overview* ⇨ *281* for the location of the reservoir.

Checking Brake Fluid

With the vehicle in P (Park) on a level surface, the brake fluid level should be between the minimum and maximum marks on the brake fluid reservoir.

There are only two reasons why the brake fluid level in the reservoir may go down:

- Normal brake lining wear. When new linings are installed, the fluid level goes back up.
- A fluid leak in the brake hydraulic system. Have the brake hydraulic system fixed. With a leak, the brakes will not work well.

Always clean the brake fluid reservoir cap and the area around the cap before removing it.

Do not top off the brake fluid. Adding fluid does not correct a leak. If fluid is added when the linings are worn, there will be too much fluid when new brake linings are installed. Add or remove fluid, as necessary, only when work is done on the brake hydraulic system.

⚠ Warning

If too much brake fluid is added, it can spill on the engine and burn, if the engine is hot enough. You or others could be burned, and the vehicle could be damaged. Add brake fluid only when work is done on the brake hydraulic system.

When the brake fluid falls to a low level, the brake warning light comes on. See *Brake System Warning Light* ⇨ *142*.

Brake fluid absorbs water over time which degrades the effectiveness of the brake fluid. Replace brake fluid at the specified intervals to prevent increased stopping distance. See *Maintenance Schedule* ⇨ *363*.

What to Add

Use only GM approved DOT 3 brake fluid from a clean, sealed container. See *Recommended Fluids and Lubricants* ⇨ *372*.

⚠ Warning

The wrong or contaminated brake fluid could result in damage to the brake system. This could result in the loss of braking leading to a possible injury. Always use the proper GM approved brake fluid.

Caution

If brake fluid is spilled on the vehicle's painted surfaces, the paint finish can be damaged. Immediately wash off any painted surface.

Battery - North America

The original equipment battery is maintenance free. Do not remove the cap and do not add fluid.

Refer to the replacement number shown on the original battery label when a new battery is needed. See *Engine Compartment Overview* ⇨ *281* for battery location.

⚠ Warning

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

(Continued)

Warning (Continued)

Batteries also contain other chemicals known to the State of California to cause cancer. **WASH HANDS AFTER HANDLING.** For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

See *California Proposition 65 Warning* ⇨ *278* and the back cover.

Vehicle Storage

⚠ Warning

Batteries have acid that can burn you and gas that can explode. You can be badly hurt if you are not careful. See *Jump Starting - North America* ⇨ *345* for tips on working around a battery without getting hurt.

Infrequent Usage: Remove the black, negative (-) cable from the battery to keep the battery from running down.

Extended Storage: Remove the black, negative (-) cable from the battery or use a battery trickle charger.

Four-Wheel Drive

Transfer Case

If the vehicle is equipped with Four-Wheel Drive, be sure to perform the lubricant checks described in this section.

When to Check Lubricant

Refer to *Maintenance Schedule* ⇨ *363* to determine how often to check the lubricant.

How to Check Lubricant

To get an accurate reading, the vehicle should be on a level surface.

1. Fill Plug
2. Drain Plug

If the level is below the bottom of the fill plug (1) hole, located on the transfer case, some lubricant will need to be added. Add enough lubricant to raise the level to the bottom of the fill plug (1) hole. Use care not to overtighten the plug.

What to Use

Refer to *Recommended Fluids and Lubricants* ⇨ *372* to determine what kind of lubricant to use.

Front Axle

When to Check and Change Lubricant

It is not necessary to regularly check front axle fluid unless a leak is suspected, or an unusual noise is heard. A fluid loss could indicate a problem. Have it inspected and repaired.

How to Check Lubricant

To get an accurate reading, the vehicle should be on a level surface.

1. Fill Plug
2. Drain Plug

- When the differential is cold, add enough lubricant to raise the level from 0 mm (0 in) to 3.2 mm (1/8 in) below the fill plug (1) hole.
- When the differential is at operating temperature (warm), add enough lubricant to raise the level to the bottom of the fill plug (1) hole.

What to Use

Refer to *Recommended Fluids and Lubricants* ⇨ *372* to determine what kind of lubricant to use.

Rear Axle

When to Check Lubricant

It is not necessary to regularly check rear axle fluid unless a leak is suspected or an unusual noise is heard. A fluid loss could indicate a problem. Have it inspected and repaired.

All axle assemblies are filled by volume of fluid during production. They are not filled to reach a certain level. When checking the fluid level on any axle, variations in the readings can be caused by factory fill differences between the minimum and the maximum fluid volume. Also, if a vehicle has just been driven before checking the fluid level, it may appear lower than normal because fluid has traveled out along the axle tubes and has not drained back to the sump area. Therefore, a reading taken five minutes after the vehicle has been driven will appear to have a lower fluid level than a vehicle that has been stationary for an hour or two. The rear axle assembly must be supported on a flat, level surface to get a true reading.

How to Check Lubricant

To get an accurate reading, the vehicle should be on a level surface.

The proper level is 1.0 mm to 19.0 mm (0.04 in to 0.7 in) below the bottom of the fill hole, located on the rear axle. Add only enough fluid to reach the proper level.

What to Use

Refer to *Recommended Fluids and Lubricants* ⇨ *372* to determine what kind of lubricant to use.

Starter Switch Check

⚠ Warning

When you are doing this inspection, the vehicle could move suddenly. If the vehicle moves, you or others could be injured.

1. Before starting this check, be sure there is enough room around the vehicle.
2. Apply both the parking brake and the regular brake.

   Do not use the accelerator pedal, and be ready to turn off the engine immediately if it starts.
3. Try to start the engine in each gear. The vehicle should start only in P (Park) or N (Neutral).

If the vehicle starts in any other position, contact your dealer for service.

Automatic Transmission Shift Lock Control Function Check

⚠ Warning

When you are doing this inspection, the vehicle could move suddenly. If the vehicle moves, you or others could be injured.

1. Before starting this check, be sure there is enough room around the vehicle. It should be parked on a level surface.
2. Apply the parking brake. Be ready to apply the regular brake immediately if the vehicle begins to move.
3. With the engine off, turn the ignition on, but do not start the engine. Without applying the regular brake, try to move the shift lever out of P (Park) with normal effort. If the shift lever moves out of P (Park), contact your dealer for service.

Park Brake and P (Park) Mechanism Check

⚠ Warning

When you are doing this check, the vehicle could begin to move. You or others could be injured and property could be damaged. Make sure there is room in front of the vehicle in case it begins to roll. Be ready to apply the regular brake at once should the vehicle begin to move.

Park on a fairly steep hill, with the vehicle facing downhill. Keeping your foot on the regular brake, set the parking brake.

- To check the parking brake's holding ability: With the engine running and the transmission in N (Neutral), slowly remove foot pressure from the regular brake pedal. Do this until the vehicle is held by the parking brake only.
- To check the P (Park) mechanism's holding ability: With the engine running, shift to P (Park). Then release the parking brake followed by the regular brake.

Contact your dealer if service is required.

Wiper Blade Replacement

Windshield wiper blades should be inspected for wear or cracking.

For the proper type and size, see *Maintenance Replacement Parts* ⇨ *373*.

Caution

Allowing the wiper arm to touch the windshield when no wiper blade is installed could damage the windshield. Any damage that occurs would not be covered by the vehicle warranty. Do not allow the wiper arm to touch the windshield.

Front Wiper Blade Replacement

To replace the wiper blade assembly:

1. Pull the windshield wiper assembly away from the windshield.

2. Lift up on the latch in the middle of the wiper blade where the wiper arm attaches.
3. With the latch open, pull the wiper blade down toward the windshield far enough to release it from the J-hooked end of the wiper arm.
4. Remove the wiper blade.
5. Reverse Steps 1–3 for wiper blade replacement.

Rear Wiper Blade Replacement

To replace the rear wiper blade:

1. With the rear wiper in the off position, open the liftglass to access the rear wiper arm/blade.

   The rear wiper blade will not lock in a vertical position so use care when pulling it away from the vehicle.

2. Push the release lever (2) to disengage the hook and push the wiper arm (1) out of the blade assembly (3).

3. Push the new blade assembly securely in the wiper arm hook until the release lever clicks into place.
4. Return the wiper arm and blade assembly to the rest position on the glass.

Glass Replacement

If the windshield or front side glass must be replaced, see your dealer to determine the correct replacement glass.

Windshield Replacement

HUD System

The windshield is part of the HUD system. If the windshield must be replaced, get one that is designed for HUD or the HUD image may look out of focus.

Driver Assistance Systems

If the windshield needs to be replaced and the vehicle is equipped with a front camera sensor for the Driver Assistance Systems, a GM replacement windshield is recommended. The replacement windshield must be installed according to GM specifications for proper alignment. If it is not, these systems may not work properly, they may display messages, or they may not work at all. See your dealer for proper windshield replacement.

Gas Strut(s)

This vehicle is equipped with gas strut(s) to provide assistance in lifting and holding open the hood/trunk/liftgate system in full open position.

⚠ Warning

If the gas struts that hold open the hood, trunk, and/or liftgate fail, you or others could be seriously injured. Take the vehicle to your dealer for service immediately. Visually inspect the gas struts for signs of wear, cracks, or other damage periodically. Check to make sure the hood/trunk/liftgate is held open with enough force. If struts are failing to hold the hood/trunk/liftgate, do not operate. Have the vehicle serviced.

Caution

Do not apply tape or hang any objects from gas struts. Also do not push down or pull on gas struts. This may cause damage to the vehicle.

See *Maintenance Schedule* ⇨ *363*.

Hood

Trunk

Liftgate

Headlamp Aiming

Headlamp aim has been preset and should need no further adjustment.

If the vehicle is damaged in a crash, the headlamp aim may be affected. If adjustment to the headlamps is necessary, see your dealer.

Bulb Replacement

For the proper type of replacement bulbs, or any bulb changing procedure not listed in this section, contact your dealer.

Caution

Do not replace incandescent bulbs with aftermarket LED replacement bulbs. This can cause damage to the vehicle electrical system.

LED Lighting

This vehicle has several LED lamps. For replacement of any LED lighting assembly, contact your dealer.

License Plate Lamp

Passenger Side Shown, Driver Side Similar

1. Bulb Socket
2. Bulb
3. Lamp Assembly

To replace one of these bulbs:

1. Push the lamp assembly (3) toward the center of the vehicle.
2. Pull the lamp assembly down to remove.

3. Turn the bulb socket (1) counterclockwise to remove it from the lamp assembly (3).
4. Pull the bulb (2) straight out of the bulb socket (1).
5. Push the replacement bulb straight into the bulb socket and turn the bulb socket clockwise to install it into the lamp assembly.
6. Push the lamp assembly back into position until the release tab locks into place.

Electrical System

Electrical System Overload

The vehicle has fuses to protect against an electrical system overload. Fuses also protect power devices in the vehicle.

Replace a bad fuse with a new one of the identical size and rating.

If there is a problem on the road and a fuse needs to be replaced, there are some spare fuses and a fuse puller in the left instrument panel fuse block. The same amperage fuse can also be borrowed. Choose some feature of the vehicle that is not needed to use and replace it as soon as possible.

Headlamp Wiring

An electrical overload may cause the lamps to go on and off, or in some cases to remain off. Have the headlamp wiring checked right away if the lamps go on and off or remain off.

Windshield Wipers

If the wiper motor overheats due to heavy snow or ice, the windshield wipers will stop until the motor cools and will then restart.

Although the circuit is protected from electrical overload, overload due to heavy snow or ice may cause wiper linkage damage. Always clear ice and heavy snow from the windshield before using the windshield wipers.

If the overload is caused by an electrical problem and not snow or ice, be sure to get it fixed.

Fuses and Circuit Breakers

The wiring circuits in the vehicle are protected from short circuits by a combination of fuses and circuit breakers. This greatly reduces the chance of damage caused by electrical problems.

⚠ Danger

Fuses and circuit breakers are marked with their ampere rating. Do not exceed the specified amperage rating when replacing fuses and circuit breakers. Use of an oversized fuse or circuit breaker can result in a vehicle fire. You and others could be seriously injured or killed.

To check a fuse, look at the silver-colored band inside the fuse. If the band is broken or melted, replace the fuse. Be sure to replace a bad fuse with a new one of the identical size and rating.

Fuses of the same amperage can be temporarily borrowed from another fuse location, if a fuse goes out. Replace the fuse as soon as possible.

Engine Compartment Fuse Block

The engine compartment fuse block is in the engine compartment, on the driver side of the vehicle.

Lift the cover to access the fuse block.

Caution

Spilling liquid on any electrical component on the vehicle may damage it. Always keep the covers on any electrical component.

A fuse puller is available in the left instrument panel fuse block.

Fuses	Usage	Fuses	Usage	Fuses	Usage
1	Electric running boards	2	Antilock brake system pump	3	Interior BEC LT1

Fuses	Usage
4	Passenger motorized seat belt
5	Suspension leveling compressor
6	4WD transfer case electronic control
7	–
8	–
10	Electric parking brake/–
11	–
12	–
13	Interior BEC LT2
14	Rear BEC 1
15	–
16	–
17	Driver motorized seat belt
18	–
19	–
20	–

Fuses	Usage
21	Automatic headlamp leveling/Exhaust solenoid
22	Fuel pump
23	Integrated chassis control module
24	Real time dampening
25	Fuel pump power module
26	Active Hydraulic Assist/ Battery regulated voltage control
27	–
28	Upfitter 2
30	Wiper
31	Trailer interface module
32	–
33	–
34	Reverse lamps

Fuses	Usage
35	Antilock brake system valve
36	Trailer brakes
38	–
39	Right trailer stoplamp/Turn signal lamp
40	Left trailer stoplamp/turn signal lamp
41	Trailer parking lamps
42	Right parking lamps
43	Left parking lamps
44	Upfitter 3
45	Automatic level control/Run/Crank
46	–
47	Upfitter 4
49	Reverse lamps
50	–
52	–

Fuses	Usage
53	–
54	–
55	–
56	–
57	–
58	–
59	Euro trailer
60	Air conditioning control
61	–
62	–
63	Upfitter 1
64	–
65	–
66	–
67	Trailer battery
68	Secondary fuel pump
69	RC upfitter 3 and 4
70	VBAT upfitter 3 and 4

Fuses	Usage
71	–
73	–
74	Engine control module/Ignition
75	Miscellaneous/ Ignition/–
76	Transmission/ Ignition
77	RC upfitter 1 and 2
78	VBAT upfitter 1 and 2
79	–
80	–
81	–
82	–
83	Euro trailer/RC
85	–
86	–
87	MAF/IAT/Humidity/ TIAP sensor
88	Injector A – odd

Fuses	Usage
89	Injector B – even
90	O2 sensor B
91	Throttle control
93	Horn
94	Fog lamps
95	High-beam headlamps
96	–
97	–
98	–
99	–
100	O2 sensor A
101	Engine control module
102	Engine control module/ Transmission control module
103	Auxiliary interior heater
104	Starter
105	–

Fuses	Usage
106	–
107	Aeroshutter
108	–
109	Police upfitter
110	–
111	–
113	–
114	Front windshield washer
115	Rear window washer
116	Left cooling fan
117	Fuel pump prime
118	–
119	–
120	–
121	Right HID headlamp
122	Left HID headlamp
123	Right cooling fan

Relays	Usage
9	Fuel pump
29	Upfitter 2
37	Upfitter 3
48	Upfitter 4
51	Parking lamp
64	Secondary fuel pump
72	Upfitter 1
84	Run/Crank
92	Engine control module
112	Starter
120	Fuel pump prime

Instrument Panel Fuse Block (Right)

The right instrument panel fuse block access door is on the passenger side edge of the instrument panel.

Pull off the cover to access the fuse block.

There are relays on the back of the fuse block. To access, press the tabs and remove the fuse block.

The vehicle may not be equipped with all of the fuses, relays, and features shown.

Fuses	Usage
1	–
2	–
3	–
4	Accessory power outlet 4
5	–
6	–
7	–
8	Glove box
9	–
10	–
11	–
12	Steering wheel controls
13	Body control module 8
14	–
15	–
16	–
17	–
18	–
19	Body control module 4

Fuses	Usage
20	Rear seat entertainment
21	Sunroof
22	–
23	–
24	–
25	–
26	Infotainment/Airbag
27	–/RF window switch/ Rain sensor
28	Obstacle detection/USB
29	Radio
30	–
31	–
32	–
33	–
34	–
35	–
36	Special equipment option B2

Fuses	Usage
37	Special equipment option
38	Body control module 2
39	DC to AC inverter
40	–
41	–
42	–
43	–
44	Right door window motor
45	Front blower
46	Body control module 6
47	Body control module 7
48	Amplifier
49	Right front seat
50	Accessory power outlet 3
51	–
53	–
54	–
55	–

Fuses	Usage
56	–

Relays	Usage
52	Retained accessory power

Instrument Panel Fuse Block (Left)

The left instrument panel fuse block access door is on the driver side edge of the instrument panel.

Pull off the cover to access the fuse block.

There are relays on the back of the fuse block. To access, press the tabs and remove the fuse block.

The vehicle may not be equipped with all of the fuses, relays, and features shown.

Fuses	Usage
1	–
2	–
3	–
4	Accessory power outlet 1
5	Accessory power outlet from retained accessory power
6	Accessory power outlet from battery power
7	Universal remote system/Interior rearview mirror
8	SEO/Retained accessory power
9	–
10	Body control module 3
11	Body control module 5
12	Steering wheel control backlighting
13	–
14	–

Fuses	Usage
15	–
16	Discrete logic ignition sensor
17	Video processing module/Virtual key module
18	Mirror window module
19	Body control module 1
20	Front bolster
21	–
22	–
23	–
24	HVAC ignition/AUX HVAC ignition
25	Instrument cluster/ Ignition sensing diagnostic module ignition
26	Tilt column/Tilt column lock 1/SEO 1/ SEO 2
27	Data link connector/ Driver seat module

Fuses	Usage
28	Passive locking, Passive theft-deterrent/HVAC battery
29	Content theft deterrent
30	–
31	–
32	–
33	SEO/Left heated seat
34	Park enable/Electric adjustable pedal
35	–
36	Miscellaneous run crank loads
37	Heated steering wheel
38	Steering column lock 2
39	Instrument cluster battery
40	–
41	–
42	Euro trailer
43	Left door

Fuses	Usage
44	Driver power seat
45	–
46	Right heated, cooled, or ventilated seat
47	Left heated, cooled, or ventilated seat
48	–
49	–

Relays	Usage
50	Accessory power outlet 2
51	–
52	Retained accessory power
53	Miscellaneous run crank
54	–
55	–
56	–

Rear Compartment Fuse Block

The rear compartment fuse block is behind the access panel on the left side of the compartment.

Pull the panel out by grabbing the finger access slot at the rear edge.

The vehicle may not be equipped with all of the fuses, relays, and features shown.

Fuses	Usage
2	–
3	Right heated second row seat
4	Heated mirrors
5	Liftgate
6	Glass breakage
7	Liftglass
8	Liftgate module logic
9	Rear wiper
10	Rear heating, ventilation, and air conditioning blower
11	Second row seat
12	Liftgate module
13	Third row seat
14	Rear accessory power outlet
15	Rear window defogger
19	Rear fog lamp (if equipped)

Relays	Usage
1	Rear window defogger
16	Liftgate
17	Liftglass
18	Rear fog lamp
20	Heated mirror

Wheels and Tires

Tires

Every new GM vehicle has high-quality tires made by a leading tire manufacturer. See the warranty manual for information regarding the tire warranty and where to get service. For additional information refer to the tire manufacturer.

⚠ Warning

- Poorly maintained and improperly used tires are dangerous.
- Overloading the tires can cause overheating as a result of too much flexing. There could be a blowout and a serious crash. See *Vehicle Load Limits* ⇨ *197*.

(Continued)

Warning (Continued)

- Underinflated tires pose the same danger as overloaded tires. The resulting crash could cause serious injury. Check all tires frequently to maintain the recommended pressure. Tire pressure should be checked when the tires are cold.
- Overinflated tires are more likely to be cut, punctured, or broken by a sudden impact — such as when hitting a pothole. Keep tires at the recommended pressure.
- Worn or old tires can cause a crash. If the tread is badly worn, replace them.

(Continued)

Warning (Continued)

- Replace any tires that have been damaged by impacts with potholes, curbs, etc.
- Improperly repaired tires can cause a crash. Only the dealer or an authorized tire service center should repair, replace, dismount, and mount the tires.
- Do not spin the tires in excess of 56 km/h (35 mph) on slippery surfaces such as snow, mud, ice, etc. Excessive spinning may cause the tires to explode.

See *Tire Pressure for High-Speed Operation* ⇨ *322* for inflation pressure adjustment for high-speed driving.

All-Season Tires

This vehicle may come with all-season tires. These tires are designed to provide good overall performance on most road surfaces and weather conditions. Original equipment tires designed to GM's specific tire performance criteria have a TPC specification code molded onto the sidewall. Original equipment all-season tires can be identified by the last two characters of this TPC code, which will be “MS.”

Consider installing winter tires on the vehicle if frequent driving on snow or ice-covered roads is expected. All-season tires provide adequate performance for most winter driving conditions, but they may not offer the same level of traction or performance as winter tires on snow or ice-covered roads. See *Winter Tires* ⇨ *315*.

Winter Tires

This vehicle was not originally equipped with winter tires. Winter tires are designed for increased traction on snow and ice-covered roads. Consider installing winter tires on the vehicle if frequent driving on ice or snow covered roads is expected. See your dealer for details regarding winter tire availability and proper tire selection. Also, see *Buying New Tires* ⇨ *329*.

With winter tires, there may be decreased dry road traction, increased road noise, and shorter tread life. After changing to winter tires, be alert for changes in vehicle handling and braking.

If using winter tires:

- Use tires of the same brand and tread type on all four wheel positions.
- Use only radial ply tires of the same size, load range, and speed rating as the original equipment tires.

Winter tires with the same speed rating as the original equipment tires may not be available for H, V, W, Y, and ZR speed rated tires. If winter tires with a lower speed rating are chosen, never exceed the tire's maximum speed capability.

Low-Profile Tires

The vehicle has low profile tires that are classified as touring tires and are designed for on road use. The low-profile, wide tread design is not recommended for off-road driving. See *Off-Road Driving* ⇨ *190*, for additional information.

Caution

Low-profile tires are more susceptible to damage from road hazards or curb impact than standard profile tires. Tire and/or wheel assembly damage can occur when coming into contact with road hazards like potholes, or sharp edged objects, or when sliding into a curb. The warranty does not cover this type of damage. Keep tires set to the correct inflation pressure and when possible, avoid contact with curbs, potholes, and other road hazards.

All-Terrain Tires

This vehicle may have all-terrain tires. These tires provide good performance on most road surfaces, weather conditions, and for off-road driving. See *Off-Road Driving* ⇨ *190*.

The tread pattern on these tires may wear more quickly than other tires. Consider rotating the tires more frequently than at 12 000 km (7,500 mi) intervals if irregular wear is noted when the tires are inspected. See *Tire Inspection* ⇨ *327*.

Tire Sidewall Labeling

Useful information about a tire is molded into the sidewall. The example shows a typical passenger vehicle tire sidewall.

Passenger (P-Metric)/Spare Tire

(1) Tire Size : The tire size code is a combination of letters and numbers used to define a particular tire's width, height, aspect ratio, construction type, and service description. See the “Tire Size” illustration later in this section for more detail.

(2) TPC Spec (Tire Performance Criteria Specification) : Original equipment tires designed to GM's specific tire performance criteria have a TPC specification code

molded onto the sidewall. GM's TPC specifications meet or exceed all federal safety guidelines.

(3) DOT (Department of Transportation) : The Department of Transportation (DOT) code indicates that the tire is in compliance with the U.S. Department of Transportation Motor Vehicle Safety Standards.

DOT Tire Date of Manufacture : The last four digits of the TIN indicate the tire manufactured date. The first two digits represent the week (01-52) and the last two digits, the year. For example, the third week of the year 2010 would have a four-digit DOT date of 0310.

(4) Tire Identification Number (TIN) : The letters and numbers following the DOT code are the Tire Identification Number (TIN). The TIN shows the manufacturer and plant code, tire size, and date the tire was manufactured. The TIN is molded onto both sides of the tire, although only one side may have the date of manufacture.

(5) Tire Ply Material : The type of cord and number of plies in the sidewall and under the tread.

(6) Uniform Tire Quality Grading (UTQG) : Tire manufacturers are required to grade tires based on three performance factors: treadwear, traction, and temperature resistance. For more information, see *Uniform Tire Quality Grading* ⇨ *331*.

(7) Maximum Cold Inflation Load Limit : Maximum load that can be carried and the maximum pressure needed to support that load. For information on recommended tire pressure see *Tire Pressure* ⇨ *320* and *Vehicle Load Limits* ⇨ *197*.

(8) Temporary Use Only : Only use a temporary spare tire until the road tire is repaired and replaced. This spare tire should not be driven on over 112 km/h (70 mph), or 88 km/h (55 mph) when pulling a trailer, with the proper inflation pressure. See *Full-Size Spare Tire* ⇨ *344*.

Tire Designations

Tire Size

The example shows a typical passenger vehicle tire size.

Passenger (P-Metric) Tire

(1) Passenger (P-Metric) Tire : The United States version of a metric tire sizing system. The letter P as the first character in the tire size means a passenger

vehicle tire engineered to standards set by the U.S. Tire and Rim Association.

(2) Tire Width : The three-digit number indicates the tire section width in millimeters from sidewall to sidewall.

(3) Aspect Ratio : A two-digit number that indicates the tire height-to-width measurements. For example, if the tire size aspect ratio is 75, as shown in item C of the tire illustration, it would mean that the tire's sidewall is 75 percent as high as it is wide.

(4) Construction Code : A letter code is used to indicate the type of ply construction in the tire. The letter R means radial ply construction; the letter D means diagonal or bias ply construction; and the letter B means belted-bias ply construction.

(5) Rim Diameter : Diameter of the wheel in inches.

(6) Service Description : These characters represent the load index and speed rating of the tire. The load index represents the load carrying capacity a tire is certified to carry. The speed rating is the maximum speed a tire is certified to carry a load.

Tire Terminology and Definitions

Air Pressure : The amount of air inside the tire pressing outward on each square inch of the tire. Air pressure is expressed in kPa (kilopascal) or psi (pounds per square inch).

Accessory Weight : The combined weight of optional accessories. Some examples of optional accessories are automatic transmission, power windows, power seats, and air conditioning.

Aspect Ratio : The relationship of a tire's height to its width.

Belt : A rubber coated layer of cords between the plies and the tread. Cords may be made from steel or other reinforcing materials.

Bead : The tire bead contains steel wires wrapped by steel cords that hold the tire onto the rim.

Bias Ply Tire : A pneumatic tire in which the plies are laid at alternate angles less than 90 degrees to the centerline of the tread.

Cold Tire Pressure : The amount of air pressure in a tire, measured in kPa (kilopascal) or psi (pounds per square inch) before a tire has built up heat from driving. See *Tire Pressure* ⇨ *320*.

Curb Weight : The weight of a motor vehicle with standard and optional equipment including the maximum capacity of fuel, oil, and coolant, but without passengers and cargo.

DOT Markings : A code molded into the sidewall of a tire signifying that the tire is in compliance with the U.S. Department of Transportation (DOT) Motor Vehicle Safety Standards. The DOT code includes the Tire Identification Number (TIN), an alphanumeric designator which can also identify the tire manufacturer, production plant, brand, and date of production.

GVWR : Gross Vehicle Weight Rating. See *Vehicle Load Limits* ⇨ *197*.

GAWR FRT : Gross Axle Weight Rating for the front axle. See *Vehicle Load Limits* ⇨ *197*.

GAWR RR : Gross Axle Weight Rating for the rear axle. See *Vehicle Load Limits* ⇨ *197*.

Intended Outboard Sidewall : The side of an asymmetrical tire that must always face outward when mounted on a vehicle.

Kilopascal (kPa) : The metric unit for air pressure.

Light Truck (LT-Metric) Tire : A tire used on light duty trucks and some multipurpose passenger vehicles.

Load Index : An assigned number ranging from 1 to 279 that corresponds to the load carrying capacity of a tire.

Maximum Inflation Pressure : The maximum air pressure to which a cold tire can be inflated. The maximum air pressure is molded onto the sidewall.

Maximum Load Rating : The load rating for a tire at the maximum permissible inflation pressure for that tire.

Maximum Loaded Vehicle Weight : The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

Normal Occupant Weight : The number of occupants a vehicle is designed to seat multiplied by 68 kg (150 lb). See *Vehicle Load Limits* ⇨ *197*.

Occupant Distribution : Designated seating positions.

Outward Facing Sidewall : The side of an asymmetrical tire that has a particular side that faces outward when mounted on a vehicle. The side of the tire that contains a whitewall, bears white lettering, or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same moldings on the other sidewall of the tire.

Passenger (P-Metric) Tire : A tire used on passenger cars and some light duty trucks and multipurpose vehicles.

Recommended Inflation Pressure : Vehicle manufacturer's recommended tire inflation pressure as shown on the tire placard. See *Tire Pressure* ⇨ *320* and *Vehicle Load Limits* ⇨ *197*.

Radial Ply Tire : A pneumatic tire in which the ply cords that extend to the beads are laid at 90 degrees to the centerline of the tread.

Rim : A metal support for a tire and upon which the tire beads are seated.

Sidewall : The portion of a tire between the tread and the bead.

Speed Rating : An alphanumeric code assigned to a tire indicating the maximum speed at which a tire can operate.

Traction : The friction between the tire and the road surface. The amount of grip provided.

Tread : The portion of a tire that comes into contact with the road.

Treadwear Indicators : Narrow bands, sometimes called wear bars, that show across the tread of a tire when only 1.6 mm (1/16 in) of tread remains. See *When It Is Time for New Tires* ⇨ *328*.

UTQGS (Uniform Tire Quality Grading Standards) : A tire information system that provides consumers with ratings for a tire's traction, temperature, and treadwear. Ratings are determined by tire manufacturers using government testing procedures. The ratings are molded into the sidewall of the tire. See *Uniform Tire Quality Grading* ⇨ *331*.

Vehicle Capacity Weight : The number of designated seating positions multiplied by 68 kg (150 lb) plus the rated cargo load. See *Vehicle Load Limits* ⇨ *197*.

Vehicle Maximum Load on the Tire : Load on an individual tire due to curb weight, accessory weight, occupant weight, and cargo weight.

Vehicle Placard : A label permanently attached to a vehicle showing the vehicle capacity weight and the original equipment tire size and recommended inflation pressure. See “Tire and Loading Information Label” under *Vehicle Load Limits* ⇨ *197*.

Tire Pressure

Tires need the correct amount of air pressure to operate effectively.

⚠ Warning

Neither tire underinflation nor overinflation is good. Underinflated tires, or tires that do not have enough air, can result in:

(Continued)

Warning (Continued)

- Tire overloading and overheating which could lead to a blowout.
- Premature or irregular wear.
- Poor handling.
- Reduced fuel economy.

Overinflated tires, or tires that have too much air, can result in:

- Unusual wear.
- Poor handling.
- Rough ride.
- Needless damage from road hazards.

The Tire and Loading Information label on the vehicle indicates the original equipment tires and the correct cold tire inflation pressures. The recommended pressure is the minimum air pressure needed to support the vehicle's maximum load carrying capacity.

For additional information regarding how much weight the vehicle can carry, and an example of the Tire and Loading Information label, see *Vehicle Load Limits* ⇨ *197*. How the vehicle is loaded affects vehicle handling and ride comfort. Never load the vehicle with more weight than it was designed to carry.

When to Check

Check the pressure of the tires once a month or more.

Do not forget the spare tire, if the vehicle has one. See *Full-Size Spare Tire* ⇨ *344* for additional information.

How to Check

Use a good quality pocket-type gauge to check tire pressure. Proper tire inflation cannot be determined by looking at the tire.

Check the tire inflation pressure when the tires are cold, meaning the vehicle has not been driven for at least three hours or no more than 1.6 km (1 mi).

Remove the valve cap from the tire valve stem. Press the tire gauge firmly onto the valve to get a pressure measurement. If the cold tire inflation pressure matches the recommended pressure on the Tire and Loading Information label, no further adjustment is necessary. If the inflation pressure is low, add air until the recommended pressure is reached. If the inflation pressure is high, press on the metal stem in the center of the tire valve to release air.

Re-check the tire pressure with the tire gauge.

Put the valve caps back on the valve stems to keep out dirt and moisture and prevent leaks. Use only valve caps designed for the

vehicle by GM. TPMS sensors could be damaged and would not be covered by the vehicle warranty.

Tire Pressure for High-Speed Operation

⚠ Warning

Driving at high speeds, 160 km/h (100 mph) or higher, puts additional strain on tires. Sustained high-speed driving causes excessive heat buildup and can cause sudden tire failure. This could cause a crash, and you or others could be killed. Some high-speed rated tires require inflation pressure adjustment for high-speed operation. When speed limits and road conditions allow the vehicle to be driven at high speeds, make sure the tires are rated for high-speed operation, are in excellent condition, and are set to the correct cold tire inflation pressure for the vehicle load.

When driving the vehicle at speeds of 160 km/h (100 mph) or higher, set the cold inflation pressure to 20 kPa (3 psi) above the recommended tire pressure shown on the Tire and Loading Information label. Return the tires to the recommended cold tire inflation pressure when high-speed driving has ended. See *Vehicle Load Limits* ➪ *197* and *Tire Pressure* ➪ *320*.

Tire Pressure Monitor System

The Tire Pressure Monitor System (TPMS) uses radio and sensor technology to check tire pressure levels. The TPMS sensors monitor the air pressure in your tires and transmit tire pressure readings to a receiver located in the vehicle.

Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a tire pressure monitoring system (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated.

Accordingly, when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale.

Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly. The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists.

When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly. Always check the TPMS malfunction telltale after replacing one or more tires or wheels on your vehicle to ensure that the replacement or alternate tires and wheels allow the TPMS to continue to function properly.

See *Tire Pressure Monitor Operation* ⇨ *323*.

See *Radio Frequency Statement* ⇨ *388*.

Tire Pressure Monitor Operation

This vehicle may have a Tire Pressure Monitor System (TPMS). The TPMS is designed to warn the driver when a low tire pressure condition exists. TPMS sensors are mounted onto each tire and wheel assembly, excluding the spare tire and wheel assembly. The TPMS sensors monitor the air pressure in the tires and transmit the tire pressure readings to a receiver located in the vehicle.

When a low tire pressure condition is detected, the TPMS illuminates the low tire pressure warning light on the instrument cluster. If the warning light comes on, stop as soon as possible and inflate the tires to the recommended pressure shown on the Tire and Loading Information label. See *Vehicle Load Limits* ⇨ *197*.

A message to check the pressure in a specific tire displays in the Driver Information Center (DIC). The low tire pressure warning light and the DIC warning message come on at each ignition cycle until the tires are inflated to the correct inflation pressure. Using the DIC, tire pressure levels can be viewed. For additional information and details about the DIC operation and displays see *Driver Information Center (DIC)* ⇨ *149*.

The low tire pressure warning light may come on in cool weather when the vehicle is first started, and then turn off as the vehicle is driven. This could be an early indicator that the air pressure is getting low and needs to be inflated to the proper pressure.

A Tire and Loading Information label, attached to your vehicle, shows the size of the original equipment tires and the correct inflation pressure for the tires when they are cold. See *Vehicle Load Limits* ⇨ *197* for an example of the Tire and Loading Information label and its location. Also see *Tire Pressure* ⇨ *320*.

The TPMS can warn about a low tire pressure condition but it does not replace normal tire maintenance. See *Tire Inspection* ⇨ *327*, *Tire Rotation* ⇨ *327*, and *Tires* ⇨ *314*.

Caution

Tire sealant materials are not all the same. A non-approved tire sealant could damage the TPMS sensors. TPMS sensor damage caused by using an incorrect tire sealant is not covered by the vehicle warranty. Always use only the GM approved tire sealant available through your dealer or included in the vehicle.

TPMS Malfunction Light and Message

The TPMS will not function properly if one or more of the TPMS sensors are missing or inoperable. When the system detects a malfunction, the low tire pressure warning light flashes for about one minute and then stays on for the remainder of the ignition cycle. A DIC warning message also displays. The malfunction light and DIC warning message come on at each ignition cycle until the problem is corrected. Some of the conditions that can cause these to come on are:

- One of the road tires has been replaced with the spare tire. The spare tire does not have a TPMS sensor. The malfunction light and DIC message should go off after the road tire is replaced and the sensor matching process is performed successfully. See “TPMS Sensor Matching Process” later in this section.
- The TPMS sensor matching process was not done or not completed successfully after rotating the tires. The malfunction light and the DIC message should go off after successfully completing the sensor matching process. See "TPMS Sensor Matching Process" later in this section.
- One or more TPMS sensors are missing or damaged. The malfunction light and the DIC message should go off when the TPMS sensors are installed and the sensor matching process is performed successfully. See your dealer for service.
- Replacement tires or wheels do not match the original equipment tires or wheels. Tires and wheels other than those recommended could prevent the TPMS from functioning properly. See *Buying New Tires* ⇨ *329*.
- Operating electronic devices or being near facilities using radio wave frequencies similar to the TPMS could cause the TPMS sensors to malfunction.

If the TPMS is not functioning properly, it cannot detect or signal a low tire pressure condition. See your dealer for service if the TPMS malfunction light and DIC message come on and stay on.

Tire Fill Alert (If Equipped)

This feature provides visual and audible alerts outside the vehicle to help when inflating an underinflated tire to the recommended cold tire pressure.

When the low tire pressure warning light comes on:

1. Park the vehicle in a safe, level place.
2. Set the parking brake firmly.
3. Place the vehicle in P (Park).
4. Add air to the tire that is underinflated. The turn signal lamp will flash.

   When the recommended pressure is reached, the horn sounds once and the turn signal lamp will stop flashing and briefly turn solid.

Repeat these steps for all underinflated tires that have illuminated the low tire pressure warning light.

⚠ Warning

Overinflating a tire could cause the tire to rupture and you or others could be injured. Do not exceed the maximum pressure listed on the tire sidewall. See *Tire Sidewall Labeling* ⇨ *316* and *Vehicle Load Limits* ⇨ *197*.

If the tire is overinflated by more than 35 kPa (5 psi), the horn will sound multiple times and the turn signal lamp will continue to flash for several seconds after filling stops. To release and correct the pressure, while the turn signal lamp is still flashing, briefly press the center of the valve stem. When the recommended pressure is reached, the horn sounds once.

If the turn signal lamp does not flash within 15 seconds after starting to inflate the tire, the tire fill alert has not been activated or is not working.

If the hazard warning flashers are on, the tire fill alert visual feedback will not work properly.

The TPMS will not activate the tire fill alert properly under the following conditions:

- There is interference from an external device or transmitter.
- The air pressure from the inflation device is not sufficient to inflate the tire.
- There is a malfunction in the TPMS.
- There is a malfunction in the horn or turn signal lamps.
- The identification code of the TPMS sensor is not registered to the system.
- The battery of the TPMS sensor is low.

If the tire fill alert does not operate due to TPMS interference, move the vehicle about 1 m (3 ft) back or forward and try again. If the tire fill alert feature is not working, use a tire pressure gauge.

TPMS Sensor Matching Process

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions, using a TPMS relearn tool, in the following order: driver side front tire, passenger side front tire, passenger side rear tire, and driver side rear tire. See your dealer for service or to purchase a relearn tool. A TPMS relearn tool can also be purchased. See Tire Pressure Monitor Sensor Activation Tool at www.gmtoolsandequipment.com or call 1-800-GM TOOLS (1-800-468-6657).

There are two minutes to match the first tire/wheel position, and five minutes overall to match all four tire/wheel positions. If it takes longer, the matching process stops and must be restarted.

The TPMS sensor matching process is:

1. Set the parking brake.
2. Place the vehicle in Service Mode. See *Ignition Positions* ⇨ *203*.
3. Make sure the Tire Pressure info display option is turned on. The info displays on the DIC can be turned on and off through the Settings menu. See *Driver Information Center (DIC)* ⇨ *149*.
4. Use the five-way DIC control on the right side of the steering wheel to scroll to the Tire Pressure screen under the DIC info page. See *Driver Information Center (DIC)* ⇨ *149*.
5. Press and hold SEL in the center of the five-way DIC control.

   The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
6. Start with the driver side front tire.
7. Place the relearn tool against the tire sidewall, near the valve stem. Then press the button to activate the TPMS sensor. A horn chirp confirms that the sensor identification code has been matched to this tire and wheel position.
8. Proceed to the passenger side front tire, and repeat the procedure in Step 7.
9. Proceed to the passenger side rear tire, and repeat the procedure in Step 7.
10. Proceed to the driver side rear tire, and repeat the procedure in Step 7. The horn sounds two times to indicate the sensor

identification code has been matched to the driver side rear tire, and the TPMS sensor matching process is no longer active. The TIRE LEARNING ACTIVE message on the DIC display screen goes off.

11. Turn the vehicle off.
12. Set all four tires to the recommended air pressure level as indicated on the Tire and Loading Information label.

Tire Inspection

We recommend that the tires, including the spare tire, if the vehicle has one, be inspected for signs of wear or damage at least once a month.

Replace the tire if:

- The indicators at three or more places around the tire can be seen.
- There is cord or fabric showing through the tire's rubber.
- The tread or sidewall is cracked, cut, or snagged deep enough to show cord or fabric.
- The tire has a bump, bulge, or split.
- The tire has a puncture, cut, or other damage that cannot be repaired well because of the size or location of the damage.

Tire Rotation

Tires should be rotated every 12 000 km (7,500 mi). See *Maintenance Schedule* ⇨ *363*.

Tires are rotated to achieve a uniform wear for all tires. The first rotation is the most important.

Anytime unusual wear is noticed, rotate the tires as soon as possible, check for proper tire inflation pressure, and check for damaged tires or wheels. If the unusual wear continues after the rotation, check the wheel alignment. See *When It Is Time for New Tires* ⇨ *328* and *Wheel Replacement* ⇨ *333*.

Use this rotation pattern when rotating the tires.

Do not include the spare tire in the tire rotation.

Adjust the front and rear tires to the recommended inflation pressure on the Tire and Loading Information label after the tires have been rotated. See *Tire Pressure* ⇨ *320* and *Vehicle Load Limits* ⇨ *197*.

Reset the Tire Pressure Monitor System. See *Tire Pressure Monitor Operation* ⇨ *323*.

Check that all wheel nuts are properly tightened. See "Wheel Nut Torque" under *Capacities and Specifications* ⇨ *376*, and "Removing the Flat Tire and Installing the Spare Tire" under *Tire Changing* ⇨ *335*.

⚠ Warning

Rust or dirt on a wheel, or on the parts to which it is fastened, can make wheel nuts become loose after time. The wheel could come off and cause a crash. When

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Warning (Continued)

changing a wheel, remove any rust or dirt from places where the wheel attaches to the vehicle. In an emergency, a cloth or a paper towel can be used; however, use a scraper or wire brush later to remove all rust or dirt.

Lightly coat the inner diameter of the wheel hub opening with wheel bearing grease after a wheel change or tire rotation to prevent corrosion or rust buildup. Do not get grease on the wheel mounting surface or on the wheel nuts or bolts.

When It Is Time for New Tires

Factors, such as maintenance, temperatures, driving speeds, vehicle loading, and road conditions affect the wear rate of the tires.

Treadwear indicators are one way to tell when it is time for new tires. Treadwear indicators appear when the tires have only 1.6 mm (1/16 in) or less of tread remaining. Some commercial truck tires may not have treadwear indicators. See *Tire Inspection* ⇨ *327* and *Tire Rotation* ⇨ *327* for additional information.

The rubber in tires ages over time. This also applies to the spare tire, if the vehicle has one, even if it is never used. Multiple factors including temperatures, loading conditions, and inflation pressure maintenance affect how fast aging takes place. GM recommends that tires, including the

spare if equipped, be replaced after six years, regardless of tread wear. To identify the age of a tire, use the tire manufacture date which is the last four digits of the DOT Tire Identification Number (TIN) which is molded into one side of the tire sidewall. The first two digits represent the week (01-52) and the last two digits, the year. For example, the third week of the year 2010 would have a four-digit DOT date of 0310.

Vehicle Storage

Tires age when stored normally mounted on a parked vehicle. Park a vehicle that will be stored for at least a month in a cool, dry, clean area away from direct sunlight to slow aging. This area should be free of grease, gasoline, or other substances that can deteriorate rubber.

Parking for an extended period can cause flat spots on the tires that may result in vibrations while driving. When storing a vehicle for at least a month, remove the tires or raise the vehicle to reduce the weight from the tires.

Buying New Tires

GM has developed and matched specific tires for the vehicle. The original equipment tires installed were designed to meet General Motors Tire Performance Criteria Specification (TPC Spec) system rating. When replacement tires are needed, GM strongly recommends buying tires with the same TPC Spec rating.

GM's exclusive TPC Spec system considers over a dozen critical specifications that impact the overall performance of the vehicle, including brake system performance, ride and handling, traction control, and tire pressure monitoring performance. GM's TPC Spec number is molded onto the tire's sidewall near the tire size. If the tires have an all-season tread design, the TPC Spec number will be followed by MS for mud and snow. See *Tire Sidewall Labeling* ⇨ *316* for additional information.

GM recommends replacing worn tires in complete sets of four. Uniform tread depth on all tires will help to maintain the performance of the vehicle. Braking and handling performance may be adversely affected if all the tires are not replaced at the same time. If proper rotation and maintenance have been done, all four tires should wear out at about the same time. See *Tire Rotation* ⇨ *327* for information on proper tire rotation. However, if it is necessary to replace only one axle set of worn tires, place the new tires on the rear axle.

⚠ Warning

Tires could explode during improper service. Attempting to mount or dismount a tire could

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Warning (Continued)

cause injury or death. Only your dealer or authorized tire service center should mount or dismount the tires.

⚠ Warning

Mixing tires of different sizes, brands, or types may cause loss of control of the vehicle, resulting in a crash or other vehicle damage. Use the correct size, brand, and type of tires on all wheels.

This vehicle may have a different size spare than the road tires originally installed on the vehicle. When new, the vehicle included a spare tire and wheel assembly with a similar overall diameter as the road tires and wheels, so it is all

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Warning (Continued)

right to drive on it. The spare tire was developed for use on this vehicle and will not affect vehicle handling.

⚠ Warning

Using bias-ply tires on the vehicle may cause the wheel rim flanges to develop cracks after many miles of driving. A tire and/or wheel could fail suddenly and cause a crash. Use only radial-ply tires with the wheels on the vehicle.

Winter tires with the same speed rating as the original equipment tires may not be available for H, V, W, Y and ZR speed rated tires. Never exceed the winter tires' maximum speed capability when using winter tires with a lower speed rating.

If the vehicle tires must be replaced with a tire that does not have a TPC Spec number, make sure they are the same size, load range, speed rating, and construction (radial) as the original tires.

Vehicles that have a tire pressure monitoring system could give an inaccurate low-pressure warning if non-TPC Spec rated tires are installed. See *Tire Pressure Monitor System* ⇨ *322*.

The Tire and Loading Information label indicates the original equipment tires on the vehicle. See *Vehicle Load Limits* ⇨ *197* for the label location and more information about the Tire and Loading Information label.

Different Size Tires and Wheels

If wheels or tires are installed that are a different size than the original equipment wheels and tires, vehicle performance, including its braking, ride and handling characteristics, stability, and resistance to rollover may be affected. If the vehicle has electronic systems such as antilock brakes, rollover airbags, traction control, electronic stability control, or All-Wheel Drive, the performance of these systems can also be affected.

⚠ Warning

If different sized wheels are used, there may not be an acceptable level of performance and safety if tires not recommended for those wheels are selected. This increases the chance of a crash and serious injury. Only use GM specific wheel and tire systems developed for the vehicle, and have them properly installed by a GM certified technician.

See *Buying New Tires* ➪ *329* and *Accessories and Modifications* ➪ *279*.

Uniform Tire Quality Grading

The following information relates to the system developed by the United States National Highway Traffic Safety Administration (NHTSA), which grades tires by treadwear, traction, and temperature performance. This applies only to vehicles sold in the United States. The grades are molded on the sidewalls of most passenger car tires. The Uniform Tire Quality Grading (UTQG) system does not apply to deep tread, winter tires, compact spare tires, tires with nominal rim diameters of 10 to 12 inches (25 to 30 cm), or to some limited-production tires.

While the tires available on General Motors passenger cars and light trucks may vary with respect to these grades, they must also conform to federal safety requirements and additional General Motors Tire Performance Criteria (TPC) standards.

Quality grades can be found where applicable on the tire sidewall between tread shoulder and maximum section width. For example:

Treadwear 200 Traction AA Temperature A

All Passenger Car Tires Must Conform to Federal Safety Requirements In Addition To These Grades.

Treadwear

The treadwear grade is a comparative rating based on the wear rate of the tire when tested under controlled conditions on a specified government test course. For example, a tire graded 150 would wear one and one-half (1½) times as well on the

government course as a tire graded 100. The relative performance of tires depends upon the actual conditions of their use, however, and may depart significantly from the norm due to variations in driving habits, service practices and differences in road characteristics and climate.

Traction

The traction grades, from highest to lowest, are AA, A, B, and C. Those grades represent the tire's ability to stop on wet pavement as measured under controlled conditions on specified government test surfaces of asphalt and concrete. A tire marked C may have poor traction performance. Warning: The traction grade assigned to this tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

Temperature

The temperature grades are A (the highest), B, and C, representing the tire's resistance to the generation of heat and its ability to dissipate heat when tested under controlled conditions on a specified indoor laboratory test wheel. Sustained high temperature can cause the material of the tire to degenerate and reduce tire life, and excessive temperature can lead to sudden tire failure. The grade C corresponds to a level of performance which all passenger car tires must meet under the Federal Motor Safety Standard No. 109. Grades B and A represent higher levels of performance on the laboratory test wheel than the minimum required by law. Warning: The temperature grade for this tire is established for a tire that is properly inflated and not overloaded. Excessive speed, underinflation, or excessive loading, either separately or in combination, can cause heat buildup and possible tire failure.

Wheel Alignment and Tire Balance

The tires and wheels were aligned and balanced at the factory to provide the longest tire life and best overall performance. Adjustments to wheel alignment and tire balancing are not necessary on a regular basis. Consider an alignment check if there is unusual tire wear or the vehicle is significantly pulling to one side or the other. Some slight pull to the left or right, depending on the crown of the road and/or other road surface variations such as troughs or ruts, is normal. If the vehicle is vibrating when driving on a smooth road, the tires and wheels may need to be rebalanced. See your dealer for proper diagnosis.

Wheel Replacement

Replace any wheel that is bent, cracked, or badly rusted or corroded. If wheel nuts keep coming loose, the wheel, wheel bolts, and wheel nuts should be replaced. If the wheel leaks air, replace it. Some aluminum wheels can be repaired. See your dealer if any of these conditions exist.

Your dealer will know the kind of wheel that is needed.

Each new wheel should have the same load-carrying capacity, diameter, width, offset, and be mounted the same way as the one it replaces.

Replace wheels, wheel bolts, wheel nuts, or Tire Pressure Monitor System (TPMS) sensors with new GM original equipment parts.

⚠ Warning

Using the wrong replacement wheels, wheel bolts, or wheel nuts can be dangerous. It could affect the braking and handling of the

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Warning (Continued)

vehicle. Tires can lose air, and cause loss of control, causing a crash. Always use the correct wheel, wheel bolts, and wheel nuts for replacement.

Caution

The wrong wheel can also cause problems with bearing life, brake cooling, speedometer or odometer calibration, headlamp aim, bumper height, vehicle ground clearance, and tire or tire chain clearance to the body and chassis.

Used Replacement Wheels

⚠ Warning

Replacing a wheel with a used one is dangerous. How it has been used or how far it has been driven may

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Warning (Continued)

be unknown. It could fail suddenly and cause a crash. When replacing wheels, use a new GM original equipment wheel.

Tire Chains

⚠ Warning

Do not use tire chains. There is not enough clearance. Tire chains used on a vehicle without the proper amount of clearance can cause damage to the brakes, suspension, or other vehicle parts. The area damaged by the tire chains could cause loss of control and a crash. Use another type of traction device only if its manufacturer recommends it for the vehicle's tire size combination and road conditions. Follow that manufacturer's instructions. To avoid vehicle damage, drive slowly

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Warning (Continued)

and readjust or remove the traction device if it contacts the vehicle. Do not spin the wheels. If traction devices are used, install them on the rear tires.

If a Tire Goes Flat

It is unusual for a tire to blowout while driving, especially if the tires are maintained properly. If air goes out of a tire, it is much more likely to leak out slowly. But if there ever is a blowout, here are a few tips about what to expect and what to do:

If a front tire fails, the flat tire creates a drag that pulls the vehicle toward that side. Take your foot off the accelerator pedal and grip the steering wheel firmly. Steer to maintain lane position, and then gently brake to a stop, well off the road, if possible.

A rear blowout, particularly on a curve, acts much like a skid and may require the same correction as used in a skid. Stop pressing the accelerator pedal and steer to straighten the vehicle. It may be very bumpy and noisy. Gently brake to a stop, well off the road, if possible.

⚠ Warning

Driving on a flat tire will cause permanent damage to the tire. Re-inflating a tire after it has been driven on while severely underinflated or flat may cause a blowout and a serious crash. Never attempt to re-inflate a tire that has been driven on while severely underinflated or flat. Have your dealer or an authorized tire service center repair or replace the flat tire as soon as possible.

⚠ Warning

Lifting a vehicle and getting under it to do maintenance or repairs is dangerous without the appropriate safety equipment and training. If a

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Warning (Continued)

jack is provided with the vehicle, it is designed only for changing a flat tire. If it is used for anything else, you or others could be badly injured or killed if the vehicle slips off the jack. If a jack is provided with the vehicle, only use it for changing a flat tire.

If a tire goes flat, avoid further tire and wheel damage by driving slowly to a level place, well off the road, if possible. Turn on the hazard warning flashers. See *Hazard Warning Flashers* ⇨ *171*.

⚠ Warning

Changing a tire can be dangerous. The vehicle can slip off the jack and roll over or fall causing injury or death. Find a level place to change the tire. To help prevent the vehicle from moving:

(Continued)

Warning (Continued)

1. Set the parking brake firmly.
2. Put the shift lever in P (Park).
3. For vehicles with four-wheel drive with an N (Neutral) transfer case position, be sure the transfer case is in a drive gear — not in N (Neutral).
4. Turn off the engine and do not restart while the vehicle is raised.
5. Do not allow passengers to remain in the vehicle.
6. Place wheel blocks, if equipped, on both sides of the tire at the opposite corner of the tire being changed.

When the vehicle has a flat tire (2), use the following example as a guide to assist in the placement of the wheel blocks (1), if equipped.

1. Wheel Block (If Equipped)
2. Flat Tire

The following information explains how to use the jack and change a tire.

Tire Changing

Before changing a flat tire, see "Hands-Free Operation" under *Liftgate* ⇨ *40*.

Removing the Spare Tire and Tools

The equipment needed to change a flat tire is stored in the rear of the vehicle, on the driver side, behind a door in the trim panel.

1. Jack Knob
2. Wing Nut Retaining the Wheel Blocks
3. Wing Nut Retaining the Tool Bag

If equipped, the tow eye bolt will be in a bag secured to the tool bag.

1. Pull to open the trim panel door.

   The third row driver side seat may need to be folded to access the trim panel door.

2. Lift the acoustic pad to access the jack and tools.

3. Turn the wing nut retaining the tool bag (3) counterclockwise to remove it.

   Pull the tool bag toward the front of the vehicle and lift the rear portion of the bag upward to remove it.

4. Turn the jack knob (1) counterclockwise to release the jack and wheel blocks from the bracket.

5. Turn the wing nut retaining the wheel blocks (2) counterclockwise to remove the wheel blocks and the wheel block retainer.

Use the following tools:

1. Jack
2. Wheel Blocks
3. Jack Handle
4. Jack Handle Extensions
5. Wheel Wrench

To access the spare tire, refer to the following graphics and instructions:

1. Hoist Assembly
2. Hoist Shaft
3. Hoist Shaft Access Cover/Hole
4. Jack Handle Extensions
5. Wheel Wrench
6. Spare Tire Lock
7. Hoist End of Extension Tool
8. Hoist Shaft Access Hole
9. Spare Tire (Valve Stem Pointed Down)
10. Tire/Wheel Retainer
11. Hoist Cable

1. Open the hoist shaft access door (3) on the bumper to access the spare tire lock (6).

If equipped with a hitch cover, turn the hitch cover retainers counterclockwise and pull the cover downward to remove it before removing the hoist shaft access door.

2. To remove the spare tire lock (6), insert the key located inside the remote, turn it clockwise, and then pull it straight out.

3. Assemble the two jack handle extensions (4) and wheel wrench (5), as shown.

4. Insert the open end of the extension (7) through the hole in the rear bumper (8) (hoist shaft access hole).

   Be sure the hoist end of the extension (7) connects to the hoist shaft. The ribbed square end of the extension is used to lower the spare tire.

5. Turn the wheel wrench counterclockwise to lower the spare tire to the ground. Continue to turn the wheel wrench until the spare tire can be pulled out from under the vehicle.

6. Pull the spare tire out from under the vehicle.

7. Tilt the tire toward the vehicle with some slack in the cable to access the tire/wheel retainer.

Tilt the retainer and pull it and the cable and spring through the center of the wheel.

8. Put the spare tire near the flat tire.

Removing the Flat Tire and Installing the Spare Tire

1. Do a safety check before proceeding. See *If a Tire Goes Flat* ⇨ *334* for more information.

2. If the vehicle has a center cap that covers the wheel fasteners, place the chisel end of the wheel wrench in the slot on the wheel and gently pry the cap out.

3. Use the wheel wrench to loosen all the wheel nuts. Turn the wheel wrench counterclockwise to loosen the wheel nuts. Do not remove the wheel nuts yet.

Jacking Locations (Overall View)

4. Position the jack under the vehicle, as shown.

Left Front Shown, Right Front Similar

Front Tire Flat: If the flat tire is on a front tire of the vehicle, use the jack handle and only one jack handle extension. Attach the wheel wrench to the jack handle extension. Attach the jack handle to the jack. Position the jack on the frame behind the flat tire where the frame sections overlap. Turn the wheel wrench clockwise to raise the vehicle. Raise the vehicle far enough off the ground so there is enough room for the spare tire to clear the ground.

Rear Position

Rear Tire Flat: If the flat tire is on a rear tire of the vehicle, use the jack handle (2) and both jack handle extensions (3). Attach the wheel wrench (4) to the jack handle extensions (3). Attach the jack handle (2) to the jack (1). Use the jacking pad (5) provided on the rear axle. Turn the wheel wrench (4) clockwise to raise the vehicle. Raise the vehicle far enough off the ground so there is enough room for the spare tire to clear the ground.

⚠ Warning

Getting under a vehicle when it is lifted on a jack is dangerous. If the vehicle slips off the jack, you could be badly injured or killed. Never get under a vehicle when it is supported only by a jack.

⚠ Warning

Raising the vehicle with the jack improperly positioned can damage the vehicle and even make the vehicle fall. To help avoid personal injury and vehicle damage, be sure to fit the jack lift head into the proper location before raising the vehicle.

5. Remove all of the wheel nuts.
6. Take off the flat tire.

7. Remove any rust or dirt from the wheel bolts, mounting surfaces, and spare wheel.

⚠ Warning

Rust or dirt on a wheel, or on the parts to which it is fastened, can make wheel nuts become loose after time. The wheel could come off and cause a crash. When changing a wheel, remove any rust or dirt from places where the wheel attaches to the vehicle. In an emergency, a cloth or a paper towel can be used; however, use a scraper or wire brush later to remove all rust or dirt.

8. Put the wheel nuts back on with the rounded end of the nuts toward the wheel after mounting the spare tire.

⚠ Warning

Never use oil or grease on bolts or nuts because the nuts might come loose. The vehicle's wheel could fall off, causing a crash.

9. Tighten each wheel nut by hand. Then use the wheel wrench to tighten the nuts until the wheel is held against the hub.
10. Turn the wheel wrench counterclockwise to lower the vehicle. Lower the jack completely.

11. Tighten the nuts firmly in a crisscross sequence as shown by turning the wheel wrench clockwise.

⚠ Warning

Wheel nuts that are improperly or incorrectly tightened can cause the wheels to become loose or come off. The wheel nuts should be tightened with a torque wrench to the proper torque specification after replacing. Follow the torque specification supplied by the aftermarket manufacturer when using accessory locking wheel nuts. See *Capacities and Specifications* ⇨ *376* for original equipment wheel nut torque specifications.

Caution

Improperly tightened wheel nuts can lead to brake pulsation and rotor damage. To avoid expensive

(Continued)

Caution (Continued)

brake repairs, evenly tighten the wheel nuts in the proper sequence and to the proper torque specification. See *Capacities and Specifications* ⇨ *376* for the wheel nut torque specification.

When reinstalling the regular wheel and tire, also reinstall the center cap, if equipped. Line up the tab on the center cap with the slot in the wheel. The cap only goes in one way. Place the cap on the wheel and press until it snaps into place.

Storing a Flat or Spare Tire and Tools

⚠ Warning

Storing a jack, a tire, or other equipment in the passenger compartment of the vehicle could cause injury. In a sudden stop or

(Continued)

Warning (Continued)

collision, loose equipment could strike someone. Store all these in the proper place.

⚠ Warning

Failure to follow these tire storage instructions carefully could result in personal injury or property damage if the hoist cable fails or if the tire comes loose. Make sure the tire is stored securely before driving.

Caution

Storing an aluminum wheel with a flat tire under your vehicle for an extended period of time or with the valve stem pointing up can damage the wheel. Always stow the wheel

(Continued)

Caution (Continued)

with the valve stem pointing down and have the wheel/tire repaired as soon as possible.

Caution

The tire hoist can be damaged if there is no tension on the cable when using it. To have the necessary tension, the spare or road tire and wheel assembly must be installed on the tire hoist to use it.

⚠ Warning

An improperly stored spare tire could come loose and cause a crash. To avoid personal injury or property damage, always store the spare tire when the vehicle is parked on a level surface.

Store the tire under the rear of the vehicle in the spare tire carrier. Refer to the following graphics and instructions:

1. Hoist Assembly
2. Hoist Shaft
3. Hoist Shaft Access Cover/Hole
4. Jack Handle Extensions
5. Wheel Wrench
6. Spare Tire Lock
7. Hoist End of Extension Tool
8. Hoist Shaft Access Hole
9. Spare Tire (Valve Stem Pointed Down)
10. Tire/Wheel Retainer
11. Hoist Cable

1. Put the tire (9) on the ground at the rear of the vehicle with the valve stem pointed down, and to the rear.
2. Tilt the tire toward the vehicle. Separate the tire/wheel retainer from the guide pin. Pull the pin through the center of the wheel. Tilt the retainer down through the center wheel opening.

   Make sure the retainer is fully seated across the underside of the wheel.

3. Assemble the two jack handle extensions (4) and wheel wrench (5).

Caution

Use of an air wrench or other power tools with the hoist mechanism is not recommended and could damage the system. Use only the tools supplied with the hoist mechanism.

4. Insert the open end of the extension (7) through the hole in the rear bumper (8) (hoist shaft access hole).
5. Raise the tire part way upward. Make sure the retainer is seated in the wheel opening.
6. Raise the tire fully against the underside of the vehicle by turning the wheel wrench clockwise until you hear two clicks or feel it skip twice. The cable cannot be overtightened.

7. Make sure the tire is stored securely. Push, pull, and then try to turn the tire. If the tire moves, use the wheel wrench to tighten the cable.

   Repeat this tightness check procedure when checking the spare tire pressure according to the scheduled maintenance information or any time the spare tire is handled due to service of other components.

Correctly Stored

Incorrectly Stored

8. Reinstall the spare tire lock.
9. Reinstall the hoist shaft access cover.

   If equipped, reinstall the hitch cover and turn the retainers clockwise.

To store the tools:

1. Return the tools (wheel wrench, jack handle, and jack handle extensions) to the tool bag.
2. Assemble the wheel blocks and jack together with the wing nut.
3. Position the jack and wheel blocks in the driver side trim panel over the wheelhouse.
4. Turn the jack knob clockwise until the jack is secured tight in the mounting bracket. Be sure to position the holes in the base of the jack onto the pin in the mounting bracket.
5. Use the retaining bracket to fasten the tool bag on the stud and turn the wing nut clockwise to secure.
6. Close the trim panel door.

Full-Size Spare Tire

If this vehicle came with a full-size spare tire, it was fully inflated when new, however, it can lose air over time. Check the inflation pressure regularly. See *Tire Pressure* ⇨ *320* and *Vehicle Load Limits* ⇨ *197*. For instructions on how to remove, install, or store a spare tire, see *Tire Changing* ⇨ *335*.

If equipped with a temporary use full-size spare tire, it is indicated on the tire sidewall. See *Tire Sidewall Labeling* ⇨ *316*. This spare tire should not be driven on over 112 km/h (70 mph), or 88 km/h (55 mph) when pulling a trailer, at the proper inflation pressure. Repair and replace the road tire as soon as it is convenient, and stow the spare tire for future use.

Caution

If the vehicle has four-wheel drive and a different size spare tire is installed, do not drive in four-wheel drive until the flat tire is repaired and/or replaced. The vehicle could be damaged and the repairs would not be covered by the warranty. Never use four-wheel drive when a different size spare tire is installed on the vehicle.

The vehicle may have a different size spare tire than the road tires originally installed on the vehicle. This spare tire was developed for use on this vehicle,

so it is all right to drive on it. If the vehicle has four-wheel drive and a different size spare tire is installed, drive only in two-wheel drive.

After installing the spare tire on the vehicle, stop as soon as possible and check that the spare tire is correctly inflated.

Have the damaged or flat road tire repaired or replaced and installed back onto the vehicle as soon as possible so the spare tire will be available in case it is needed again.

Do not mix tires and wheels of different sizes, because they will not fit. Keep your spare tire and its wheel together. If the vehicle has a spare tire that does not match the original road tires and wheels in size and type, do not include the spare in the tire rotation.

Jump Starting

Jump Starting - North America

For more information about the vehicle battery, see *Battery - North America* ⇨ *295*.

If the vehicle's battery has run down, you may want to use another vehicle and some jumper cables to start your vehicle. Be sure to use the following steps to do it safely.

⚠ Warning

WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Batteries also contain other chemicals known to the State of California to cause cancer. **WASH HANDS AFTER HANDLING.** For

(Continued)

Warning (Continued)

more information go to www.P65Warnings.ca.gov/passenger-vehicle.

See *California Proposition 65 Warning* ⇨ *278* and the back cover.

⚠ Warning

Batteries can hurt you. They can be dangerous because:

- They contain acid that can burn you.
- They contain gas that can explode or ignite.
- They contain enough electricity to burn you.

If you do not follow these steps exactly, some or all of these things can hurt you.

Caution

Ignoring these steps could result in costly damage to the vehicle that would not be covered by the vehicle warranty. Trying to start the vehicle by pushing or pulling it will not work, and it could damage the vehicle.

1. Check the other vehicle. It must have a 12-volt battery with a negative ground system.

Caution

If the other vehicle does not have a 12-volt system with a negative ground, both vehicles can be damaged. Only use a vehicle that has a 12-volt system with a negative ground for jump starting.

2. Get the vehicles close enough so the jumper cables can reach, but be sure the vehicles are not touching each other. If they are, it could cause an unwanted ground connection. You would not be able to start your vehicle, and the bad grounding could damage the electrical systems.

   To avoid the possibility of the vehicles rolling, set the parking brake firmly on both vehicles involved in the jump start procedure. Put the automatic transmission in P (Park) or a manual transmission in Neutral before setting the parking brake. For vehicles with four-wheel-drive with a N (Neutral) transfer case position, be sure the transfer case is in a drive gear — not N (Neutral).

Caution

If any accessories are left on or plugged in during the jump starting procedure, they could be damaged. The repairs would not be covered by the vehicle warranty. Whenever possible, turn off or unplug all accessories on either vehicle when jump starting.

3. Turn the ignition off on both vehicles. Unplug unnecessary accessories plugged into the accessory power outlets. Turn off the radio and all the lamps that are not needed. This will avoid sparks and help save both batteries. And it could save the radio!

4. Open the hood on the other vehicle and locate the positive (+) and negative (–) terminal locations on that vehicle.

   The positive (+) terminal is under a red plastic cover at the positive battery post. To uncover the positive (+) terminal, open the red plastic cover.

   For more information on the location of the remote positive (+) and remote negative (–) terminals, see *Engine Compartment Overview* ⇨ *281*.

⚠ Warning

An electric fan can start up even when the engine is not running and can injure you. Keep hands, clothing, and tools away from any underhood electric fan.

⚠ Warning

Using a match near a battery can cause battery gas to explode. People have been hurt doing this, and some have been blinded. Use a flashlight if you need more light.

Battery fluid contains acid that can burn you. Do not get it on you. If you accidentally get it in your eyes or on your skin, flush the place with water and get medical help immediately.

⚠ Warning

Fans or other moving engine parts can injure you badly. Keep your hands away from moving parts once the engine is running.

5. Check that the jumper cables do not have loose or missing insulation. If they do, you could get a shock. The vehicles could be damaged too.

   Before you connect the cables, here are some basic things you should know. Positive (+) will go to positive (+) or to a remote positive (+) terminal if the vehicle has one. Negative (-) will go to a heavy, unpainted metal engine part or to a remote negative (-) terminal if the vehicle has one.

   Do not connect positive (+) to negative (-) or you will get a short that would damage the battery and maybe other parts too. And do not connect the negative (-) cable to the negative (-) terminal on the dead battery because this can cause sparks.

6. Connect the red positive (+) cable to the positive (+) terminal of the vehicle with the dead battery.
7. Do not let the other end touch metal. Connect it to the positive (+) terminal of the good battery. Use a remote positive (+) terminal if the vehicle has one.
8. Connect the black negative (-) cable to the negative (-) terminal of the good battery. Use a remote negative (-) terminal if the vehicle has one.

Do not let the other end touch anything until the next step.

9. Connect the other end of the negative (-) cable to the metal bracket that is bolted to the engine and supports the resonator, on the vehicle with the dead battery.
10. Start the vehicle with the good battery and run the engine for a while.
11. Try to start the vehicle that had the dead battery. If it will not start after a few tries, it probably needs service.

Caution

If the jumper cables are connected or removed in the wrong order, electrical shorting may occur and damage the vehicle. The repairs would not be covered by the vehicle warranty. Always connect and remove the jumper cables in the correct order, making sure that the cables do not touch each other or other metal.

Jumper Cable Removal

Reverse the sequence exactly when removing the jumper cables.

After starting the disabled vehicle and removing the jumper cables, allow it to idle for several minutes.

Towing the Vehicle

Caution

Incorrectly towing a disabled vehicle may cause damage. The damage would not be covered by the vehicle warranty. Do not lash or hook to suspension components. Use the proper straps around the tires to secure the vehicle. Do not drag a locked wheel/tire while loading the vehicle. Do not use a sling type lift to tow the vehicle. This could damage the vehicle.

GM recommends a flatbed tow truck to transport a disabled vehicle. Use ramps to help reduce approach angles, if necessary. A towed vehicle should have its drive wheels off the ground. Contact Roadside Service or a professional towing service if the disabled vehicle must be towed.

Front Attachment Points

The vehicle is equipped with specific attachment points to be used to pull the vehicle onto a flatbed car carrier from a flat road surface. Do not use these attachment points to pull the vehicle from snow, mud or sand.

Recreational Vehicle Towing

Recreational vehicle towing means towing the vehicle behind another vehicle, such as a motor home. The two most common types of recreational vehicle towing are dinghy and dolly towing. Dinghy towing is towing the vehicle with all four wheels on the ground. Dolly towing is towing the vehicle with two wheels on the ground and two wheels on a dolly.

Follow the tow vehicle manufacturer's instructions. See your dealer or trailering professional for additional advice and equipment recommendations.

Here are some important things to consider before recreational vehicle towing:

- Before towing the vehicle, become familiar with the local laws that apply to recreational vehicle towing. These laws may vary by region.
- What is the towing capacity of the towing vehicle? Be sure to read the tow vehicle manufacturer's recommendations.
- What is the distance that will be traveled? Some vehicles have restrictions on how far and how long they can tow.
- Is the proper towing equipment going to be used? See your dealer or trailering professional for additional advice and equipment recommendations.
- Is the vehicle ready to be towed? Just as preparing the vehicle for a long trip, make sure the vehicle is prepared to be towed.

Caution

Use of a shield mounted in front of the vehicle grille could restrict airflow and cause damage to the transmission. The repairs would not be covered by the vehicle warranty. If using a shield, only use one that attaches to the towing vehicle.

Dinghy Towing

Two-Wheel-Drive Vehicles

Caution

If the two-wheel-drive vehicle is towed with all four wheels on the ground, the drivetrain components could be damaged. The repairs would not be covered by the vehicle warranty.

Two-wheel-drive vehicles should not be towed with all four wheels on the ground.

Four-Wheel-Drive Vehicles

Only dinghy tow four-wheel-drive vehicles with a two-speed transfer case that have an N (Neutral) and a Four-Wheel Drive Low (4 ↓) setting.

⚠ Warning

Shifting a four-wheel-drive vehicle's transfer case into N (Neutral) can cause the vehicle to roll even if the transmission is in P (Park). You or others could be injured. Set the parking brake before shifting the transfer case to N (Neutral).

To dinghy tow:

1. Position the vehicle being towed behind the tow vehicle, facing forward and on a level surface.
2. Securely attach the vehicle being towed to the tow vehicle.
3. Apply the parking brake and start the engine.

   For vehicles with Electric Parking Brakes (EPB), the EPB cannot be applied and the tires must be chocked.
4. Shift the transfer case to N (Neutral). See “Shifting into N (Neutral)” under *Four-Wheel Drive* ⇨ *215*. Check that the vehicle is in N (Neutral) by shifting the transmission to R (Reverse) and then to D (Drive). There should be no movement of the vehicle while shifting.
5. Shift the transmission into D (Drive). Turn the engine off.

Caution

Failure to disconnect the negative battery cable or to have it contact the terminals can cause damage to the vehicle.

6. Disconnect the negative battery cable at the battery and secure the nut and bolt. Cover the negative battery post with a non-conductive material to prevent any contact with the negative battery terminal.
7. Shift the transmission to P (Park).

Caution

If the steering column is locked, vehicle damage may occur.

8. Move the steering wheel to make sure the steering column is unlocked.
9. With a foot on the brake pedal, release the parking brake.
10. If equipped with Keyless Access, keep the RKE transmitter outside of the vehicle, and manually lock the doors. Access the vehicle as if it has a dead RKE transmitter battery, by using the key in the door lock.

Disconnecting the Towed Vehicle

Before disconnecting the towed vehicle:

1. Park on a level surface.
2. Set the parking brake, then shift the transmission to P (Park).
3. Connect the battery.
4. Apply the brake pedal.
5. Turn the ignition to ON/RUN with the engine off. Shift the transfer case out of N (Neutral) to 2 ↑. See “Shifting out of N (Neutral)” under *Four-Wheel Drive* ⇨ *215*. See your dealer if the transfer case cannot be shifted out of N (Neutral).
6. Check that the vehicle is in 2 ↑ by starting the engine and shifting the transmission to R (Reverse) and then to D (Drive). There should be movement of the vehicle while shifting.
7. Shift the transmission to P (Park) and turn off the ignition.
8. Disconnect the vehicle from the tow vehicle.
9. Release the parking brake.
10. Reset any lost presets.

    The outside temperature display will default to 0 °C (32 °F) but will reset with normal usage.

Dolly Towing – Front Towing (Front Wheels Off the Ground)

Caution

If a two-wheel-drive vehicle is towed with the rear wheels on the ground, the transmission could be damaged. The repairs would not be covered by the vehicle warranty. Never tow the vehicle with the rear wheels on the ground.

Caution

Towing a four-wheel-drive vehicle with all four wheels on the ground, or even with only two of its wheels on the ground, will damage drivetrain components. Do not tow a four-wheel-drive vehicle with any of its wheels on the ground.

This vehicle should not be towed with the rear wheels on the ground.

Dolly Towing – Rear Towing (Rear Wheels Off the Ground) – Four-Wheel-Drive Vehicles

Caution

Towing a four-wheel-drive vehicle with all four wheels on the ground, or even with only two of its wheels on the ground, will damage drivetrain components. Do not tow a four-wheel-drive vehicle with any of its wheels on the ground.

This vehicle should not be towed with any wheels on the ground.

Dolly Towing – Rear Towing (Rear Wheels Off the Ground) – Two-Wheel-Drive Vehicles

To dolly tow the vehicle from the rear:

1. Attach the dolly to the tow vehicle following the dolly manufacturer's instructions.
2. Drive the rear wheels onto the dolly.
3. Firmly set the parking brake. See *Parking Brake* ⇨ *219*.
4. Put the transmission in P (Park).
5. Secure the vehicle to the dolly following the manufacturer's instructions.
6. Use an adequate clamping device designed for towing to ensure that the front wheels are locked into the straight position.
7. Turn the ignition to OFF.

Appearance Care

Exterior Care

Locks

Locks are lubricated at the factory. Use a de-icing agent only when absolutely necessary, and have the locks greased after using. See *Recommended Fluids and Lubricants* ⇨ *372*.

Washing the Vehicle

To preserve the vehicle's finish, wash it often and out of direct sunlight.

Caution

Do not use petroleum-based, acidic, or abrasive cleaning agents as they can damage the vehicle's paint, metal, or plastic parts. If damage occurs, it would not be covered by the vehicle warranty. Approved cleaning products can be obtained from your dealer. Follow all manufacturer directions regarding

(Continued)

Caution (Continued)

correct product usage, necessary safety precautions, and appropriate disposal of any vehicle care product.

Caution

Avoid using high-pressure washes closer than 30 cm (12 in) to the surface of the vehicle. Use of power washers exceeding 8,274 kPa (1,200 psi) can result in damage or removal of paint and decals.

Caution

Do not power wash any component under the hood that has this symbol.

This could cause damage that would not be covered by the vehicle warranty.

If using an automatic car wash, follow the car wash instructions. The windshield wiper and rear window wiper, if equipped, must be off. Remove any accessories that may be damaged or interfere with the car wash equipment.

Rinse the vehicle well, before washing and after, to remove all cleaning agents completely. If they are allowed to dry on the surface, they could stain.

Dry the finish with a soft, clean chamois or an all-cotton towel to avoid surface scratches and water spotting.

Finish Care

Application of aftermarket clearcoat sealant/wax materials is not recommended. If painted surfaces are damaged, see your dealer to have the damage assessed and repaired. Foreign materials such as calcium chloride and other salts, ice melting agents, road oil and tar, tree sap, bird droppings, chemicals from industrial chimneys, etc., can damage the vehicle's finish if they remain on painted surfaces. Wash the vehicle as soon as possible. If necessary, use non-abrasive cleaners that are marked safe for painted surfaces to remove foreign matter.

Occasional hand waxing or mild polishing should be done to remove residue from the paint finish. See your dealer for approved cleaning products.

Do not apply waxes or polishes to uncoated plastic, vinyl, rubber, decals, simulated wood, or flat paint as damage can occur.

Caution

Machine compounding or aggressive polishing on a basecoat/clearcoat paint finish may damage it. Use only non-abrasive waxes and polishes that are made for a basecoat/clearcoat paint finish on the vehicle.

To keep the paint finish looking new, keep the vehicle garaged or covered whenever possible.

Protecting Exterior Bright Metal Moldings

Caution

Failure to clean and protect the bright metal moldings can result in a hazy white finish or pitting. This damage would not be covered by the vehicle warranty.

The bright metal moldings on the vehicle are aluminum, chrome or stainless steel. To prevent damage always follow these cleaning instructions:

- Be sure the molding is cool to the touch before applying any cleaning solution.
- Use only approved cleaning solutions for aluminum, chrome or stainless steel. Some cleaners are highly acidic or contain alkaline substances and can damage the moldings.
- Always dilute a concentrated cleaner according to the manufacturer's instructions.
- Do not use cleaners that are not intended for automotive use.
- Use a nonabrasive wax on the vehicle after washing to protect and extend the molding finish.

Cleaning Exterior Lamps/Lenses, Emblems, Decals, and Stripes

Use only lukewarm or cold water, a soft cloth, and a car washing soap to clean exterior lamps, lenses, emblems, decals, and stripes. Follow instructions under "Washing the Vehicle" previously in this section.

Lamp covers are made of plastic, and some have a UV protective coating. Do not clean or wipe them when dry.

Do not use any of the following on lamp covers:

- Abrasive or caustic agents.
- Washer fluids and other cleaning agents in higher concentrations than suggested by the manufacturer.
- Solvents, alcohols, fuels, or other harsh cleaners.
- Ice scrapers or other hard items.
- Aftermarket appearance caps or covers while the lamps are illuminated, due to excessive heat generated.

Caution

Failure to clean lamps properly can cause damage to the lamp cover that would not be covered by the vehicle warranty.

Caution

Using wax on low gloss black finish stripes can increase the gloss level and create a non-uniform finish. Clean low gloss stripes with soap and water only.

Air Intakes

Clear debris from the air intakes, between the hood and windshield, when washing the vehicle.

Windshield and Wiper Blades

Clean the outside of the windshield with glass cleaner.

Clean rubber blades using a lint-free cloth or paper towel soaked with windshield washer fluid or a mild detergent. Wash the windshield thoroughly when cleaning the blades. Bugs, road grime, sap, and a buildup of vehicle wash/wax treatments may cause wiper streaking.

Replace the wiper blades if they are worn or damaged. Damage can be caused by extreme dusty conditions, sand, salt, heat, sun, snow, and ice.

Weatherstrips

Apply weatherstrip lubricant on weatherstrips to make them last longer, seal better, and not stick or squeak. Lubricate weatherstrips at least once a year. Hot, dry climates may require more frequent application. Black marks from rubber material on painted surfaces can be removed by rubbing with a clean cloth. See *Recommended Fluids and Lubricants* ⇨ *372*.

Tires

Use a stiff brush with tire cleaner to clean the tires.

Caution

Using petroleum-based tire dressing products on the vehicle may damage the paint finish and/or tires. When applying a tire dressing, always wipe off any overspray from all painted surfaces on the vehicle.

Wheels and Wheel Trim

Use a soft, clean cloth with mild soap and water to clean the wheels. After rinsing thoroughly with clean water, dry with a soft, clean towel. A wax may then be applied.

Caution

Chrome wheels and chrome wheel trim may be damaged if the vehicle is not washed after driving on roads that have been sprayed with

(Continued)

Caution (Continued)

magnesium chloride or calcium chloride. These are used on roads for conditions such as dust and ice. Always wash the chrome with soap and water after exposure.

Caution

To avoid surface damage on wheels and wheel trim, do not use strong soaps, chemicals, abrasive polishes, cleaners, or brushes. Use only GM approved cleaners. Do not drive the vehicle through an automatic car wash that uses silicone carbide tire/wheel cleaning brushes. Damage could occur and the repairs would not be covered by the vehicle warranty.

Brake System

Visually inspect brake lines and hoses for proper hook-up, binding, leaks, cracks, chafing, etc. Inspect disc brake

pads for wear and rotors for surface condition. Inspect drum brake linings/shoes for wear or cracks. Inspect all other brake parts.

Steering, Suspension, and Chassis Components

Visually inspect steering, suspension, and chassis components for damaged, loose, or missing parts or signs of wear at least once a year.

Inspect power steering for proper attachment, connections, binding, leaks, cracks, chafing, etc.

Visually check constant velocity joint boots and axle seals for leaks.

For 1500 Series vehicles, at least every other oil change lubricate the outer tie rod ends.

Control arm ball joints on 1500 Series vehicles are maintenance-free.

Caution

Lubrication of applicable steering/suspension points should not be done unless the temperature is –12 °C (10 °F) or higher, or damage could result.

Body Component Lubrication

Lubricate all key lock cylinders, hood hinges, liftgate hinges, steel fuel door hinge and power assist step hinges, unless the components are plastic. Applying silicone grease on weatherstrips with a clean cloth will make them last longer, seal better, and not stick or squeak.

Underbody Maintenance

At least twice a year, spring and fall, use plain water to flush any corrosive materials from the underbody. Take care to thoroughly clean any areas where mud and other debris can collect. If equipped with power assist steps, extend them and then use a high pressure wash to clean all joints and gaps.

Do not directly power wash the transfer case and/or front/rear axle output seals. High pressure water can overcome the seals and contaminate the fluid. Contaminated fluid will decrease the life of the transfer case and/or axles and should be replaced.

Sheet Metal Damage

If the vehicle is damaged and requires sheet metal repair or replacement, make sure the body repair shop applies anti-corrosion material to parts repaired or replaced to restore corrosion protection.

Original manufacturer replacement parts will provide the corrosion protection while maintaining the vehicle warranty.

Finish Damage

Quickly repair minor chips and scratches with touch-up materials available from your dealer to avoid corrosion. Larger areas of finish damage can be corrected in your dealer's body and paint shop.

Chemical Paint Spotting

Airborne pollutants can fall upon and attack painted vehicle surfaces causing blotchy, ring-shaped discolorations, and small, irregular dark spots etched into the paint surface. See “Finish Care” previously in this section.

Interior Care

To prevent dirt particle abrasions, regularly clean the vehicle's interior. Immediately remove any soils. Newspapers or dark garments can transfer color to the vehicle’s interior.

Use a soft bristle brush to remove dust from knobs and crevices on the instrument cluster. Using a mild soap solution, immediately remove hand lotions, sunscreen, and insect repellent from all interior surfaces or permanent damage may result.

Use cleaners specifically designed for the surfaces being cleaned to prevent permanent damage. Apply all cleaners directly to the cleaning cloth. Do not spray cleaners on any switches or controls. Remove cleaners quickly.

Before using cleaners, read and follow all safety instructions on the label. While cleaning the interior, open the doors and windows to get proper ventilation.

To prevent damage, do not clean the interior using the following cleaners or techniques:

- Never use a razor or any other sharp object to remove soil from any interior surface.
- Never use a brush with stiff bristles.
- Never rub any surface aggressively or with too much pressure.
- Do not use laundry detergents or dishwashing soaps with degreasers. For liquid cleaners, use approximately 20 drops per 3.8 L (1 gal) of water. A concentrated soap solution will create streaks and attract dirt. Do not use solutions that contain strong or caustic soap.
- Do not heavily saturate the upholstery when cleaning.
- Do not use solvents or cleaners containing solvents.

Interior Glass

To clean, use a terry cloth fabric dampened with water. Wipe droplets left behind with a clean dry cloth. If necessary, use a commercial glass cleaner after cleaning with plain water.

Caution

To prevent scratching, never use abrasive cleaners on automotive glass. Abrasive cleaners or aggressive cleaning may damage the rear window defogger.

Cleaning the windshield with water during the first three to six months of ownership will reduce tendency to fog.

Speaker Covers

Vacuum around a speaker cover gently, so that the speaker will not be damaged. Clean spots with water and mild soap.

Coated Moldings

Coated moldings should be cleaned.

- When lightly soiled, wipe with a sponge or soft, lint-free cloth dampened with water.
- When heavily soiled, use warm soapy water.

Fabric/Carpet/Suede

Start by vacuuming the surface using a soft brush attachment. If a rotating vacuum brush attachment is being used, only use it on the floor carpet. Before cleaning, gently remove as much of the soil as possible:

- Gently blot liquids with a paper towel. Continue blotting until no more soil can be removed.
- For solid soils, remove as much as possible prior to vacuuming.

To clean:

1. Saturate a clean, lint-free colorfast cloth with water. Microfiber cloth is recommended to prevent lint transfer to the fabric or carpet.
2. Remove excess moisture by gently wringing until water does not drip from the cleaning cloth.
3. Start on the outside edge of the soil and gently rub toward the center. Fold the cleaning cloth to a clean area frequently to prevent forcing the soil in to the fabric.
4. Continue gently rubbing the soiled area until there is no longer any color transfer from the soil to the cleaning cloth.
5. If the soil is not completely removed, use a mild soap solution followed only by plain water.

If the soil is not completely removed, it may be necessary to use a commercial upholstery cleaner or spot lifter. Test a small hidden area for colorfastness before using a commercial upholstery cleaner or spot lifter. If ring formation occurs, clean the entire fabric or carpet.

After cleaning, use a paper towel to blot excess moisture.

Cleaning High Gloss Surfaces and Vehicle Information and Radio Displays

Use a microfiber cloth on high gloss surfaces or vehicle displays. First, use a soft bristle brush to remove dirt that can scratch the surface. Then gently clean by rubbing with a microfiber cloth. Never use window cleaners or solvents. Periodically hand wash the microfiber cloth separately, using mild soap. Do not use bleach or fabric softener. Rinse thoroughly and air dry before next use.

Caution

Do not attach a device with a suction cup to the display. This may cause damage and would not be covered by the vehicle warranty.

Instrument Panel, Leather, Vinyl, Other Plastic Surfaces, Low Gloss Paint Surfaces, and Natural Open Pore Wood Surfaces

Use a soft microfiber cloth dampened with water to remove dust and loose dirt. For a more thorough cleaning, use a soft microfiber cloth dampened with a mild soap solution.

Caution

Soaking or saturating leather, especially perforated leather, as well as other interior surfaces, may cause permanent damage. Wipe excess moisture from these surfaces after cleaning and allow them to dry naturally. Never use heat, steam, or spot removers. Do not use cleaners that contain silicone or wax-based products. Cleaners containing these solvents can permanently change the appearance and feel of leather or soft trim, and are not recommended.

Do not use cleaners that increase gloss, especially on the instrument panel. Reflected glare can decrease visibility through the windshield under certain conditions.

Caution

Use of air fresheners may cause permanent damage to plastics and painted surfaces. If an air freshener comes in contact with any plastic or painted surface in the vehicle, blot immediately and clean with a soft cloth dampened with a mild soap solution. Damage caused by air fresheners would not be covered by the vehicle warranty.

Cargo Cover and Convenience Net

If equipped, wash with warm water and mild detergent. Do not use chlorine bleach. Rinse with cold water, and then dry completely.

Care of Seat Belts

Keep belts clean and dry.

⚠ Warning

Do not bleach or dye seat belt webbing. It may severely weaken the webbing. In a crash, they might not be able to provide adequate protection. Clean and rinse seat belt webbing only with mild soap and lukewarm water. Allow the webbing to dry.

Floor Mats

⚠ Warning

If a floor mat is the wrong size or is not properly installed, it can interfere with the pedals. Interference with the pedals can cause unintended acceleration and/or increased stopping distance which can cause a crash and injury. Make sure the floor mat does not interfere with the pedals.

Use the following guidelines for proper floor mat usage:

- The original equipment floor mats were designed for your vehicle. If the floor mats need replacing, it is recommended that GM certified floor mats be purchased. Non-GM floor mats may not fit properly and may interfere with the pedals. Always check that the floor mats do not interfere with the pedals.
- Do not use a floor mat if the vehicle is not equipped with a floor mat retainer on the driver side floor.
- Use the floor mat with the correct side up. Do not turn it over.
- Do not place anything on top of the driver side floor mat.
- Use only a single floor mat on the driver side.
- Do not place one floor mat on top of another.

Removing and Replacing the Floor Mats

Pull up on the rear of the floor mat to unlock each retainer and remove.

Reinstall by lining up the floor mat retainer openings over the carpet retainers and snapping into position.

Make sure the floor mat is properly secured in place.

Verify the floor mat does not interfere with the pedals.

Service and Maintenance

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General Information

Your vehicle is an important investment. This section describes the required maintenance for the vehicle. Follow this schedule to help protect against major repair expenses resulting from neglect or inadequate maintenance. It may also help to maintain the value of the vehicle if it is sold. It is the responsibility of the owner to have all required maintenance performed.

Your dealer has trained technicians who can perform required maintenance using genuine replacement parts. They have up-to-date tools and equipment for fast and accurate diagnostics. Many dealers have extended evening and Saturday hours, courtesy transportation, and online scheduling to assist with service needs.

Your dealer recognizes the importance of providing competitively priced maintenance and repair services. With trained technicians, the dealer is the place for routine maintenance such as oil changes and tire rotations and additional maintenance items like tires, brakes, batteries, and wiper blades.

Caution

Damage caused by improper maintenance can lead to costly repairs and may not be covered by the vehicle warranty. Maintenance intervals, checks, inspections, recommended fluids, and lubricants are important to keep the vehicle in good working condition.

Do not have chemical flushes that are not approved by GM performed on the vehicle. The use of flushes, solvents, cleaners, or lubricants that are not approved by GM could damage the vehicle, requiring expensive repairs that are not covered by the vehicle warranty.

The Tire Rotation and Required Services are the responsibility of the vehicle owner. It is recommended to have your dealer perform these services every 12 000 km/7,500 mi.

Proper vehicle maintenance helps to keep the vehicle in good working condition, improves fuel economy, and reduces vehicle emissions.

Because of the way people use vehicles, maintenance needs vary. There may need to be more frequent checks and services. The Additional Required Services - Normal are for vehicles that:

- Carry passengers and cargo within recommended limits on the Tire and Loading Information label. See *Vehicle Load Limits* ⇨ *197*.
- Are driven on reasonable road surfaces within legal driving limits.
- Use the recommended fuel. See *Recommended Fuel* ⇨ *253*.

Refer to the information in the Maintenance Schedule Additional Required Services - Normal chart.

The Additional Required Services - Severe are for vehicles that are:

- Mainly driven in heavy city traffic in hot weather.
- Mainly driven in hilly or mountainous terrain.
- Frequently towing a trailer.
- Used for high speed or competitive driving.
- Used for taxi, police, or delivery service.

Refer to the information in the Maintenance Schedule Additional Required Services - Severe chart.

⚠ Warning

Performing maintenance work can be dangerous and can cause serious injury. Perform maintenance work only if the required information, proper tools, and equipment are available. If they are not, see your dealer to have a trained technician do the work. See *Doing Your Own Service Work* ⇨ *279*.

Maintenance Schedule

Owner Checks and Services

At Each Fuel Stop

- Check the engine oil level. See *Engine Oil* ⇨ *282*.

Once a Month

- Check the tire inflation pressures, including the spare. See *Tire Pressure* ⇨ *320*.
- Inspect the tires for wear. See *Tire Inspection* ⇨ *327*.
- Check the windshield washer fluid level. See *Washer Fluid* ⇨ *292*.

Engine Oil Change

When the CHANGE ENGINE OIL SOON message displays, have the engine oil and filter changed within the next 1 000 km/600 mi. If driven under the best conditions, the engine oil life system may not indicate the need for vehicle service for up to a year. The engine oil and filter must be changed at least once a year and the oil life system must be reset. Your trained dealer technician can perform

this work. If the engine oil life system is reset accidentally, service the vehicle within 5 000 km/3,000 mi since the last service. Reset the oil life system when the oil is changed. See *Engine Oil Life System* ⇨ *284*.

Power Take Off (PTO) and Extended Idle Use

When the vehicle is used with the PTO equipment or used in a way that requires extended idle time, one hour of use shall be deemed the same as 53 km (33 mi). See *Driver Information Center (DIC)* ⇨ *149* for hourmeter.

Air Conditioning Desiccant (Replace Every Seven Years)

The air conditioning system requires maintenance every seven years. This service requires replacement of the desiccant to help the longevity and efficient operation of the air conditioning system. This service can be complex. See your dealer.

Tire Rotation and Required Services Every 12 000 km/ 7,500 mi

Rotate the tires, if recommended for the vehicle, and perform the following services. See *Tire Rotation* ⇨ *327*.

- Check engine oil level and oil life percentage. If needed, change engine oil and filter, and reset oil life system. See *Engine Oil* ⇨ *282* and *Engine Oil Life System* ⇨ *284*.
- Check engine coolant level. See *Cooling System* ⇨ *287*.
- Check windshield washer fluid level. See *Washer Fluid* ⇨ *292*.
- Check tire inflation pressures, including the spare. See *Tire Pressure* ⇨ *320*.
- Inspect tire wear. See *Tire Inspection* ⇨ *327*.
- Visually check for fluid leaks.
- Inspect engine air cleaner filter. See *Engine Air Cleaner/Filter* ⇨ *286*.
- Inspect brake system. See *Exterior Care* ⇨ *353*.
- Visually inspect steering, suspension, and chassis components for damage, including cracks or tears in the rubber boots, loose or missing parts, or signs of wear at least once a year. See *Exterior Care* ⇨ *353*.
- Inspect power steering for proper attachment, connections, binding, leaks, cracks, chafing, etc.
- Visually inspect halfshafts and drive shafts for excessive wear, lubricant leaks, and/or damage including: tube dents or cracks, constant velocity joint or universal joint looseness, cracked or missing boots, loose or missing boot clamps, center bearing excessive looseness, loose or missing fasteners, and axle seal leaks.
- Lubricate the suspension and steering components at least every other oil change (if equipped with grease fittings).
- Check restraint system components. See *Safety System Check* ⇨ *86*.

- Visually inspect fuel system for damage or leaks.
- Visually inspect exhaust system and nearby heat shields for loose or damaged parts.
- Lubricate body components. See *Exterior Care* ⇨ *353*.
- Check starter switch. See *Starter Switch Check* ⇨ *297*.
- Check automatic transmission shift lock control function. See *Automatic Transmission Shift Lock Control Function Check* ⇨ *298*.
- Check parking brake and automatic transmission park mechanism. See *Park Brake and P (Park) Mechanism Check* ⇨ *298*.
- Check accelerator pedal for damage, high effort, or binding. Replace if needed.
- Visually inspect gas strut for signs of wear, cracks, or other damage. Check the hold open ability of the strut. If the hold open is low, service the gas strut. See *Gas Strut(s)* ⇨ *300*.
- Inspect sunroof track and seal, if equipped. See *Sunroof* ⇨ *58*.
- Verify spare tire key lock operation and lubricate as needed. See *Tire Changing* ⇨ *335*.
- Visually inspect the spare tire to ensure that it is tightly stowed under the vehicle. Push, pull, and try to turn the tire. If the spare tire moves, tighten as necessary. Verify that the wheel retainer plate compression spring is fully compressed. See *Tire Changing* ⇨ *335*.

Maintenance Schedule Additional Required Services - Normal	**12 000 km/7,500 mi**	**24 000 km/15,000 mi**	**36 000 km/22,500 mi**	**48 000 km/30,000 mi**	**60 000 km/37,500 mi**	**72 000 km/45,000 mi**	**84 000 km/52,500 mi**	**96 000 km/60,000 mi**	**108 000 km/67,500 mi**	**120 000 km/75,000 mi**	**132 000 km/82,500 mi**	**144 000 km/90,000 mi**	**156 000 km/97,500 mi**	**168 000 km/105,000 mi**	**180 000 km/112,500 mi**	**192 000 km/120,000 mi**	**204 000 km/127,500 mi**	**216 000 km/135,000 mi**	**228 000 km/142,500 mi**	**240 000 km/150,000 mi**
Rotate tires and perform Required Services. Check engine oil level and oil life percentage. Change engine oil and filter, if needed.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Replace passenger compartment air filter. (1)			✓			✓			✓			✓			✓			✓		
Inspect evaporative control system. (2)						✓						✓						✓		
Replace engine air cleaner filter. (3)						✓						✓						✓		
Change transfer case fluid, if equipped with 4WD. (4)													✓							
Replace spark plugs. Inspect spark plug wires.													✓							
Drain and fill engine cooling system. (5)																				✓
Visually inspect accessory drive belts. (6)																				✓
Replace brake fluid. (7)																				
Replace windshield wiper blades. (8)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Replace hood and/or body lift support gas struts.										✓										✓

Footnotes — Maintenance Schedule Additional Required Services - Normal

(1) Or every two years, whichever comes first. More frequent passenger compartment air filter replacement may be needed if driving in areas with heavy traffic, poor air quality, high dust levels, or environmental allergens. Passenger compartment air filter replacement may also be needed if there is reduced airflow, window fogging, or odors. Your GM dealer can help determine when to replace the filter.

(2) Visually check all fuel and vapor lines and hoses for proper attachment, connection, routing, and condition.

(3) Or every four years, whichever comes first. If driving in dusty conditions, inspect the filter at each oil change or more often as needed.

(4) Do not directly power wash the transfer case and/or front/rear axle output seals. High pressure water can overcome the seals and contaminate the transfer case fluid. Contaminated fluid will decrease the life of the transfer case and/or axles and should be replaced.

(5) Or every five years, whichever comes first. See *Cooling System* ⇨ *287*.

(6) Or every 10 years, whichever comes first. Inspect for fraying, excessive cracking, or damage; replace, if needed.

(7) Replace brake fluid every five years. See *Brake Fluid* ⇨ *294*.

(8) Or every 12 months, whichever comes first. See *Wiper Blade Replacement* ⇨ *299*.

Maintenance Schedule Additional Required Services - Severe	12 000 km/7,500 mi	24 000 km/15,000 mi	36 000 km/22,500 mi	48 000 km/30,000 mi	60 000 km/37,500 mi	72 000 km/45,000 mi	84 000 km/52,500 mi	96 000 km/60,000 mi	108 000 km/67,500 mi	120 000 km/75,000 mi	132 000 km/82,500 mi	144 000 km/90,000 mi	156 000 km/97,500 mi	168 000 km/105,000 mi	180 000 km/112,500 mi	192 000 km/120,000 mi	204 000 km/127,500 mi	216 000 km/135,000 mi	228 000 km/142,500 mi	240 000 km/150,000 mi
Rotate tires and perform Required Services. Check engine oil level and oil life percentage. Change engine oil and filter, if needed.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Replace passenger compartment air filter. (1)			✓			✓			✓			✓			✓			✓		
Inspect evaporative control system. (2)						✓						✓						✓		
Replace engine air cleaner filter. (3)						✓						✓						✓		
Change automatic transmission fluid and filter.						✓						✓						✓		
Change transfer case fluid, if equipped with 4WD. (4)						✓						✓						✓		
Replace spark plugs. Inspect spark plug wires.													✓							
Drain and fill engine cooling system. (5)																				✓
Visually inspect accessory drive belts. (6)																				✓
Replace brake fluid. (7)																				
Replace windshield wiper blades. (8)		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓
Replace hood and/or body lift support gas struts.										✓										✓

Footnotes — Maintenance Schedule Additional Required Services - Severe

(1) Or every two years, whichever comes first. More frequent passenger compartment air filter replacement may be needed if driving in areas with heavy traffic, poor air quality, high dust levels, or environmental allergens. Passenger compartment air filter replacement may also be needed if there is reduced airflow, window fogging, or odors. Your GM dealer can help determine when to replace the filter.

(2) Visually check all fuel and vapor lines and hoses for proper attachment, connection, routing, and condition.

(3) Or every four years, whichever comes first. If driving in dusty conditions, inspect the filter at each oil change or more often as needed.

(4) Do not directly power wash the transfer case and/or front/rear axle output seals. High pressure water can overcome the seals and contaminate the transfer case fluid. Contaminated fluid will decrease the life of the transfer case and/or axles and should be replaced.

(5) Or every five years, whichever comes first. See *Cooling System* ⇨ *287*.

(6) Or every 10 years, whichever comes first. Inspect for fraying, excessive cracking, or damage; replace, if needed.

(7) Replace brake fluid every five years. See *Brake Fluid* ⇨ *294*.

(8) Or every 12 months, whichever comes first. See *Wiper Blade Replacement* ⇨ *299*.

Special Application Services

- Severe Commercial Use Vehicles Only: Lubricate chassis components every oil change.
- Have underbody flushing service performed. See "Underbody Maintenance" in *Exterior Care* ⇨ *353*.

Additional Maintenance and Care

Your vehicle is an important investment and caring for it properly may help to avoid future costly repairs. To maintain vehicle performance, additional maintenance services may be required.

It is recommended that your dealer perform these services — their trained dealer technicians know your vehicle best. Your dealer can also perform a thorough assessment with a multi-point inspection to recommend when your vehicle may need attention.

The following list is intended to explain the services and conditions to look for that may indicate services are required.

Battery

The 12-volt battery supplies power to start the engine and operate any additional electrical accessories.

- To avoid break-down or failure to start the vehicle, maintain a battery with full cranking power.
- Trained dealer technicians have the diagnostic equipment to test the battery and ensure that the connections and cables are corrosion-free.

Belts

- Belts may need replacing if they squeak or show signs of cracking or splitting.
- Trained dealer technicians have access to tools and equipment to inspect the belts and recommend adjustment or replacement when necessary.

Brakes

Brakes stop the vehicle and are crucial to safe driving.

- Signs of brake wear may include chirping, grinding, or squealing noises, or difficulty stopping.
- Trained dealer technicians have access to tools and equipment to inspect the brakes and recommend quality parts engineered for the vehicle.

Fluids

Proper fluid levels and approved fluids protect the vehicle's systems and components. See *Recommended Fluids and Lubricants* ⇨ *372* for GM approved fluids.

- Engine oil and windshield washer fluid levels should be checked at every fuel fill.
- Instrument cluster lights may come on to indicate that fluids may be low and need to be filled.

Hoses

Hoses transport fluids and should be regularly inspected to ensure that there are no cracks or leaks. With a multi-point inspection, your dealer can inspect the hoses and advise if replacement is needed.

Lamps

Properly working headlamps, taillamps, and brake lamps are important to see and be seen on the road.

- Signs that the headlamps need attention include dimming, failure to light, cracking, or damage. The brake lamps need to be checked periodically to ensure that they light when braking.
- With a multi-point inspection, your dealer can check the lamps and note any concerns.

Shocks and Struts

Shocks and struts help aid in control for a smoother ride.

- Signs of wear may include steering wheel vibration, bounce/sway while braking, longer stopping distance, or uneven tire wear.
- As part of the multi-point inspection, trained dealer technicians can visually inspect the shocks and struts for signs of leaking, blown seals, or damage, and can advise when service is needed.

Tires

Tires need to be properly inflated, rotated, and balanced. Maintaining the tires can save money and fuel, and can reduce the risk of tire failure.

- Signs that the tires need to be replaced include three or more visible treadwear indicators; cord or fabric showing through the rubber; cracks or cuts in the tread or sidewall; or a bulge or split in the tire.
- Trained dealer technicians can inspect and recommend the right tires. Your dealer can also provide tire/wheel balancing services to ensure smooth vehicle operation at all speeds. Your dealer sells and services name brand tires.

Vehicle Care

To help keep the vehicle looking like new, vehicle care products are available from your dealer. For information on how to clean and protect the vehicle's interior and exterior, see *Interior Care* ➪ *358* and *Exterior Care* ➪ *353*.

Wheel Alignment

Wheel alignment is critical for ensuring that the tires deliver optimal wear and performance.

- Signs that the alignment may need to be adjusted include pulling, improper vehicle handling, or unusual tire wear.
- Your dealer has the required equipment to ensure proper wheel alignment.

Windshield

For safety, appearance, and the best viewing, keep the windshield clean and clear.

- Signs of damage include scratches, cracks, and chips.
- Trained dealer technicians can inspect the windshield and recommend proper replacement if needed.

Wiper Blades

Wiper blades need to be cleaned and kept in good condition to provide a clear view.

- Signs of wear include streaking, skipping across the windshield, and worn or split rubber.
- Trained dealer technicians can check the wiper blades and replace them when needed.

Recommended Fluids, Lubricants, and Parts

Recommended Fluids and Lubricants

Fluids and lubricants identified below by name, part number, or specification can be obtained from your dealer.

Usage	Fluid/Lubricant
Automatic Transmission	DEXRON ULV Automatic Transmission Fluid (GM Part No. 19352619, in Canada 19352620).
Chassis Lubrication	Chassis Lubricant (GM Part No. 12377985, in Canada 88901242) or lubricant meeting requirements of NLGI #2, Category LB or GC-LB.
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL Coolant. See *Cooling System* ⇨ *287*.
Engine Oil	Engine oil meeting the dexos1 specification of the proper SAE viscosity grade. ACDelco dexos1 full synthetic is recommended. See *Engine Oil* ⇨ *282*.
Front Axle (4WD Only)	SAE 75W-90 Synthetic Axle Lubricant (GM Part No. 88900401, in Canada 89021678).
Hydraulic Brake System	DOT 3 Hydraulic Brake Fluid (GM Part No. 19353126, in Canada 19353127).
Key Lock Cylinders, Hood Hinges, Body Door Hinge Pins, Power Assist Steps, Liftgate Hinge, Linkage, and Outer Liftgate Handle Pivot Points, and Fuel Door Hinge	Multi-Purpose Lubricant, Superlube (GM Part No. 12346241, in Canada 10953474).
Rear Axle	SAE 75W-85 Synthetic Axle Lubricant (GM Part No. 19300457, in Canada 19300458).

Usage	Fluid/Lubricant
Transfer Case	DEXRON-VI Automatic Transmission Fluid.
Weatherstrip Conditioning	Weatherstrip lubricant (GM Part No. 3634770, in Canada 10953518) or equivalent.
Weatherstrip Squeaks	Synthetic Grease with Teflon, Superlube (GM Part No. 12371287, in Canada 10953437).
Windshield Washer	Automotive windshield washer fluid that meets regional freeze protection requirements.

Maintenance Replacement Parts

Replacement parts identified below by name, part number, or specification can be obtained from your dealer.

Part	GM Part Number	ACDelco Part Number
Engine Air Cleaner/Filter	22845992	A3181C
Oil Filter	19330000	PF63E
Passenger Compartment Air Filter	23281440	CF188
Spark Plugs	12622441	41-114
Wiper Blades		
Front Driver Side – 55 cm (21.7 in)	23360288	—
Front Passenger Side – 55 cm (21.7 in)	23360288	—
Rear – 33 cm (13.0 in)	22956295	—

Maintenance Records

After the scheduled services are performed, record the date, odometer reading, who performed the service, and the type of services performed in the boxes provided. Retain all maintenance receipts.

Date	Odometer Reading	Serviced By	Maintenance Stamp	Services Performed

Technical Data

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Vehicle Identification

Vehicle Identification Number (VIN)

This legal identifier is in the front corner of the instrument panel, on the driver side of the vehicle. It can be seen through the windshield from outside. The Vehicle Identification Number (VIN) also appears on the Vehicle Certification and Service Parts labels and certificates of title and registration.

Engine Identification

The eighth character in the VIN is the engine code. This code identifies the vehicle's engine, specifications, and replacement parts. See “Engine Specifications” under *Capacities and Specifications* ⇨ *376* for the vehicle's engine code.

Service Parts Identification Label

There may be a label on the inside of the glove box that contains the following information:

- Vehicle Identification Number (VIN)
- Model designation
- Paint information
- Production options and special equipment

If there is no label, there is a barcode on the certification label on the center (B) pillar to scan for this same information.

Vehicle Data

Capacities and Specifications

The following approximate capacities are given in metric and English conversions. See *Recommended Fluids and Lubricants* ⇨ *372* for more information.

Application	Capacities	
	Metric	**English**
Air Conditioning Refrigerant	For the air conditioning system refrigerant type and charge amount, see the refrigerant label under the hood. See your dealer for more information.	
Cooling System	16.8 L	17.8 qt
Engine Oil with Filter	7.6 L	8.0 qt
Fuel Tank		
Short Wheelbase	98.4 L	26.0 gal
Long Wheelbase	119.2 L	31.5 gal
Transfer Case Fluid	1.5 L	1.6 qt
Wheel Nut Torque	190 N•m	140 lb ft
All capacities are approximate. When adding, be sure to fill to the approximate level, as recommended in this manual. Recheck fluid level after filling.		

Engine Specifications

Engine	VIN Code	Spark Plug Gap
6.2L V8	J	0.95–1.10mm (0.037–0.043 in)

Engine Drive Belt Routing

Customer Information

Customer Information

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Customer Information

Customer Satisfaction Procedure

Your satisfaction and goodwill are important to your dealer and to Cadillac. Normally, any concerns with the sales transaction or the operation of the vehicle will be resolved by your dealer's sales or service departments. Sometimes, however, despite the best intentions of all concerned, misunderstandings can occur. If your concern has not been resolved to your satisfaction, the following steps should be taken:

STEP ONE : Discuss your concern with a member of dealership management. Normally, concerns can be quickly resolved at that level. If the matter has already been reviewed with the sales, service or parts manager, contact the owner of your dealership or the general manager.

STEP TWO : If after contacting a member of dealership management, it appears your concern cannot be resolved by your dealership without further help, in the U.S., call the Cadillac Customer Assistance Center at 1-800–458–8006. In Canada, call the Canadian Cadillac Customer Care Centre at 1-888-446-2000.

We encourage you to call the toll-free number in order to give your inquiry prompt attention. Have the following information available to give the Customer Assistance representative:

- Vehicle Identification Number (VIN). This is available from the vehicle registration or title, or the plate at the top left of the instrument panel and visible through the windshield.
- Dealership name and location.
- Vehicle delivery date and present mileage.

When contacting Cadillac, remember that your concern will likely be resolved at a dealer's facility. That is why we suggest following Step One first.

STEP THREE — U.S. Owners : Both General Motors and your dealer are committed to making sure you are completely satisfied with the new vehicle. However, if you continue to remain unsatisfied after following the procedure outlined in Steps One and Two, you can file with the Better Business Bureau (BBB) Auto Line Program to enforce your rights.

The BBB Auto Line Program is an out-of-court program administered by the Council of Better Business Bureaus to settle automotive disputes regarding vehicle repairs or the interpretation of the New Vehicle Limited Warranty. Although you may be required to resort to this informal dispute resolution program prior to filing a court action, use of the program is free of charge and your case will generally be heard within 40 days. If you do not agree with the decision given in your case, you may reject it and proceed with any other venue for relief available to you.

You may contact the BBB Auto Line Program using the toll-free telephone number or write them at the following address:

BBB Auto Line Program
Council of Better Business Bureaus, Inc.
3033 Wilson Boulevard
Suite 600
Arlington, VA 22201

Telephone: 1-800-955-5100
http://www.bbb.org/council/programs-services/dispute-handling-and-resolution/bbb-auto-line

This program is available in all 50 states and the District of Columbia. Eligibility is limited by vehicle age, mileage, and other factors. General Motors reserves the right to change eligibility limitations and/or discontinue its participation in this program.

STEP THREE — Canadian Owners : In the event that you do not feel your concerns have been addressed after following the procedure outlined in Steps One and Two, General Motors of Canada Company wants you to be aware of its participation in a no-charge mediation/arbitration program. General Motors of Canada Company has committed to binding arbitration of owner disputes involving factory-related vehicle service claims. The program provides for the review of the facts involved by an impartial third party arbiter, and may include an informal hearing before the arbiter. The program is designed so that the entire dispute settlement process, from the time you file your complaint to the final decision, should be completed in about 70 days. We believe our impartial program offers advantages over courts in most jurisdictions because it is informal, quick, and free of charge.

For further information concerning eligibility in the Canadian Motor Vehicle Arbitration Plan (CAMVAP), call toll-free 1-800-207-0685, or call the Cadillac Customer Care Centre, 1-888-446-2000, or write to:

General Motors Cadillac Customer Care Centre
General Motors of Canada Company
Mail Code: CA1-163-005
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

The inquiry should be accompanied by the Vehicle Identification Number (VIN).

Customer Assistance Offices

Cadillac encourages customers to call the toll-free number for assistance. However, if a customer wishes to write or e-mail Cadillac, the letter should be addressed to:

United States and Puerto Rico

Cadillac Customer Assistance Center
Cadillac Motor Car Division
P.O. Box 33169
Detroit, MI 48232-5169
www.Cadillac.com

1-800-458-8006
1-800-833-2622 (For Text Telephone devices (TTYs))
Roadside Service: 1-800-224-1400

From U.S. Virgin Islands:

1-800-496-9994

Canada

General Motors of Canada Company
Cadillac Customer Care Centre,
Mail Code: CA1-163-005
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7
www.gm.ca

1-888-446-2000 (English/French)
Cadillac Roadside Service:
1-800-882-1112

Overseas

Contact the local General Motors Business Unit.

Customer Assistance for Text Telephone (TTY) Users

To assist customers who are deaf, hard of hearing, or speech-impaired and who use Text Telephones (TTYs), Cadillac has TTY equipment available at its Customer Assistance Center. Any TTY user can communicate with Cadillac by dialing: 1-800-833-2622. TTY users in Canada can dial 1-800-263-3830.

Online Owner Center

Online Owner Experience (U.S.) my.cadillac.com

The Cadillac online owner experience allows interaction with Cadillac and keeps important vehicle-specific information in one place.

Membership Benefits

: Download owner's manuals and view vehicle-specific how-to videos.

: View maintenance schedules, alerts, and Vehicle Diagnostic Information. Schedule service appointments.

: View printable dealer-recorded service records and self-recorded service records.

: Select a dealer and view locations, maps, phone numbers, and hours.

: Track your vehicle's warranty information.

: View active recalls or search by Vehicle Identification Number (VIN). See *Vehicle Identification Number (VIN)* ⇨ *375*.

: View GM Card, SiriusXM Satellite radio (if equipped), and OnStar account information.

: Chat with online help representatives.

See my.cadillac.com to register your vehicle.

Cadillac Owner Centre (Canada) www.cadillacowner.ca

Visit the Cadillac Owner Centre:

- Chat live with online help representatives.
- Locate owner resources such as lease-end, financing, and warranty information.
- Retrieve favorite articles, quizzes, tips, and multimedia galleries organized into the Featured Articles and Auto Care Sections.
- Download owner's manuals.

- Find Cadillac-recommended maintenance services.

GM Mobility Reimbursement Program

GENERAL MOTORS MOBILITY

This program is available to qualified applicants for cost reimbursement, up to certain limits, of eligible aftermarket adaptive equipment required for the vehicle, such as hand controls or a wheelchair/scooter lift for the vehicle.

To learn about the GM Mobility program, see www.gmmobility.com or call the GM Mobility Assistance Center at 1-800-323-9935. Text Telephone (TTY) users, call 1-800-833-9935.

General Motors of Canada also has a Mobility program. See www.gm.ca or call 1-800-GM-DRIVE (800-463-7483) for details. TTY users call 1-800-263-3830.

Roadside Service

U.S.: 1-800-224-1400.

Canada: 1-800-882-1112.

Text Telephone (TTY) Users (U.S. Only): 1-888-889-2438.

Service is available 24 hours a day, 365 days a year.

Calling for Service

When calling Roadside Service, have the following information ready:

- Your name, home address, and home telephone number
- Telephone number of your location
- Location of the vehicle
- Model, year, color, and license plate number of the vehicle
- Odometer reading, Vehicle Identification Number (VIN), and delivery date of the vehicle
- Description of the problem

Coverage

Services are provided for the duration of the vehicle's powertrain warranty.

In the U.S., anyone driving the vehicle is covered. In Canada, a person driving the vehicle without permission from the owner is not covered.

Roadside Service is not a part of the New Vehicle Limited Warranty. General Motors North America and Cadillac reserve the right to make any changes or discontinue the Roadside Service program at any time without notification.

General Motors North America and Cadillac reserve the right to limit services or payment to an owner or driver if they decide the claims are made too often, or the same type of claim is made many times.

Cadillac Owner Privileges™

- **Emergency Fuel Delivery:** Delivery of enough fuel for the vehicle to get to the nearest service station.
- **Lock-Out Service:** Service to unlock the vehicle if you are locked out. A remote unlock may be available if you have OnStar. For security reasons, the driver must present identification before this service is given.
- **Emergency Tow from a Public Road or Highway:** Tow to the nearest Cadillac dealer for warranty service, or if the vehicle was in a crash and cannot be driven. Assistance is not given when the vehicle is stuck in the sand, mud, or snow.
- **Flat Tire Change:** Service to change a flat tire with a spare tire. The spare tire, if equipped, must be in good condition and properly inflated. It is your responsibility for the repair or replacement of the tire if it is not covered by the warranty.
- **Battery Jump Start:** Service to jump start a dead battery.
- **Trip Interruption Benefits and Service:** If your trip is interrupted due to a warranty failure, incidental expenses may be reimbursed during the Powertrain warranty period. Items considered are hotel, meals, and rental car or a vehicle being delivered back to the customer, up to 500 miles.

Cadillac Technician Roadside Service (U.S. Only)

Cadillac's exceptional Roadside Service is more than an auto club or towing service. It provides every Cadillac owner in the United States with the advantage of contacting a Cadillac advisor and, where available, a Cadillac trained dealer technician who can provide on-site service.

A dealer technician will travel to your location within a 30-mile radius of a participating Cadillac dealership. If beyond this radius, we will arrange to have your car towed to the nearest Cadillac dealership. Each technician travels with a specially equipped service vehicle complete with the necessary Cadillac parts and tools required to handle most roadside repairs.

Services Not Included in Roadside Service

- Impound towing caused by violation of any laws
- Legal fines
- Mounting, dismounting, or changing of snow tires, chains, or other traction devices

Service is not provided if a vehicle is in an area that is not accessible to the service vehicle or is not a regularly traveled or maintained public road, which includes ice and winter roads. Off-road use is not covered.

Services Specific to Canadian-Purchased Vehicles

- **Fuel delivery:** Reimbursement is up to 7 liters. Diesel fuel delivery may be restricted. Propane and other fuels are not provided through this service.

- **Lock-Out Service:** Vehicle registration is required.
- **Trip Interruption Benefits and Service:** Pre-authorization, original detailed receipts, and a copy of the repair orders are required. Once authorization has been received, the Roadside Service advisor will help you make arrangements and explain how to receive payment. Items considered are hotel, meals, and rental car or a vehicle being delivered back to the customer, up to 800 km.
- **Alternative Service:** If assistance cannot be provided right away, the Roadside Service advisor may give you permission to get local emergency road service. You will receive payment, up to $100, after sending the original receipt to Roadside Service. Mechanical failures may be covered, however any cost for parts and labor for repairs not covered by the warranty are the owner responsibility.

Scheduling Service Appointments

When the vehicle requires warranty service, contact your dealer and request an appointment. By scheduling a service appointment and advising the service consultant of your transportation needs, your dealer can help minimize your inconvenience.

If the vehicle cannot be scheduled into the service department immediately, keep driving it until it can be scheduled for service, unless, of course, the problem is safety related. If it is, please call your dealership, let them know this, and ask for instructions.

If your dealer requests you to bring the vehicle for service, you are urged to do so as early in the work day as possible to allow for same-day repair.

Courtesy Transportation Program

To enhance your ownership experience, we and our participating dealers are proud to offer Courtesy Transportation, a customer support program for vehicles with the Bumper-to-Bumper (Base Warranty Coverage period in Canada), extended powertrain, and/or hybrid-specific warranties in both the U.S. and Canada.

Several Courtesy Transportation options are available to assist in reducing inconvenience when warranty repairs are required.

Courtesy Transportation is not a part of the New Vehicle Limited Warranty. A separate booklet entitled “Limited Warranty and Owner Assistance Information” furnished with each new vehicle provides detailed warranty coverage information.

Transportation Options

Warranty service can generally be completed while you wait. However, if you are unable to do so, your dealer may offer the following transportation options:

Shuttle Service

This includes one-way or round-trip shuttle service within reasonable time and distance parameters of your dealer's area.

Public Transportation or Fuel Reimbursement

If overnight warranty repairs are needed, and public transportation is used, the expense must be supported by original receipts and within the maximum amount allowed by GM for shuttle service. If U.S. customers arrange their own transportation, limited reimbursement for reasonable fuel expenses may be available. Claim amounts should reflect actual costs and be supported by original receipts. See your dealer for information.

Courtesy Rental Vehicle

For an overnight warranty repair, the dealer may provide an available courtesy rental vehicle or provide for reimbursement of a rental vehicle. Reimbursement is limited and must be supported by original receipts as well as a signed and completed rental agreement and meet state/provincial, local, and rental vehicle provider requirements. Requirements vary and may include minimum age requirements, insurance coverage, credit card, etc. Additional fees such as fuel usage charges, taxes, levies, usage fees, excessive mileage, or rental usage beyond the completion of the repair are also your responsibility.

It may not be possible to provide a like vehicle as a courtesy rental.

Additional Program Information

All program options, such as shuttle service, may not be available at every dealer. Contact your dealer for specific availability.

General Motors reserves the right to unilaterally modify, change, or discontinue Courtesy Transportation at any time and to resolve all questions of claim eligibility pursuant to the terms and conditions described herein at its sole discretion.

Collision Damage Repair

If the vehicle is involved in a collision and it is damaged, have the damage repaired by a qualified technician using the proper equipment and quality replacement parts. Poorly performed collision repairs diminish the vehicle resale value, and safety performance can be compromised in subsequent collisions.

Collision Parts

Genuine GM Collision parts are new parts made with the same materials and construction methods as the parts with which the vehicle was originally built. Genuine GM Collision parts are the best choice to ensure that the vehicle's designed appearance, durability, and safety are preserved. The use of Genuine GM parts can help maintain the GM New Vehicle Limited Warranty.

Recycled original equipment parts may also be used for repair. These parts are typically removed from vehicles that were total losses in prior crashes. In most cases, the parts being recycled are from undamaged sections of the vehicle. A recycled original equipment GM part may be an acceptable choice to maintain the vehicle's originally designed appearance and safety performance; however, the history of these parts is not known. Such parts are not covered by the GM New Vehicle Limited Warranty, and any related failures are not covered by that warranty.

Aftermarket collision parts are also available. These are made by companies other than GM and may not have been tested for the vehicle. As a result, these parts may fit poorly, exhibit premature durability/corrosion problems, and may not perform properly in subsequent collisions. Aftermarket parts are not covered by the GM New Vehicle Limited Warranty, and any vehicle failure related to such parts is not covered by that warranty.

Repair Facility

GM also recommends that you choose a collision repair facility that meets your needs before you ever need collision repairs. Your dealer may have a collision repair center with GM-trained technicians and state-of-the-art equipment, or be able to recommend a collision repair center that has GM-trained technicians and comparable equipment.

Insuring the Vehicle

Protect your investment in the GM vehicle with comprehensive and collision insurance coverage. There are significant differences in the quality of coverage afforded by various insurance policy terms. Many insurance policies provide reduced protection to the GM vehicle by limiting compensation for damage repairs by using aftermarket collision parts. Some insurance companies will not specify aftermarket collision parts. When purchasing insurance, we recommend that you ensure that the vehicle will be repaired with GM original equipment collision parts.

If such insurance coverage is not available from your current insurance carrier, consider switching to another insurance carrier.

If the vehicle is leased, the leasing company may require you to have insurance that ensures repairs with Genuine GM Original Equipment Manufacturer (OEM) parts or Genuine Manufacturer replacement parts. Read the lease carefully, as you may be charged at the end of the lease for poor quality repairs.

If a Crash Occurs

If there has been an injury, call emergency services for help. Do not leave the scene of a crash until all matters have been taken care of. Move the vehicle only if its position puts you in danger, or you are instructed to move it by a police officer.

Give only the necessary information to police and other parties involved in the crash.

For emergency towing see *Roadside Service* ⇨ *382*.

Gather the following information:

- Driver name, address, and telephone number
- Driver license number
- Owner name, address, and telephone number
- Vehicle license plate number
- Vehicle make, model, and model year
- Vehicle Identification Number (VIN)
- Insurance company and policy number
- General description of the damage to the other vehicle

Choose a reputable repair facility that uses quality replacement parts. See "Collision Parts" earlier in this section.

If the airbag has inflated, see *What Will You See after an Airbag Inflates?* ⇨ *92*.

Managing the Vehicle Damage Repair Process

In the event that the vehicle requires damage repairs, GM recommends that you take an active role in its repair. If you have a pre-determined repair facility of choice, take the vehicle there, or have it towed there. Specify to the facility that any required replacement collision parts be original equipment parts, either new Genuine GM parts or recycled original GM parts. Remember, recycled parts will not be covered by the GM vehicle warranty.

Insurance pays the bill for the repair, but you must live with the repair. Depending on your policy limits, your insurance company may initially value the repair using aftermarket parts. Discuss this with the repair professional, and insist on Genuine GM parts. Remember, if the vehicle is leased, you may be obligated to have the vehicle repaired with Genuine GM parts, even if your insurance coverage does not pay the full cost.

If another party's insurance company is paying for the repairs, you are not obligated to accept a repair valuation based on that insurance company's collision policy repair limits, as you have no contractual limits with that company. In such cases, you can have control of the repair and parts choices as long as the cost stays within reasonable limits.

Publication Ordering Information

Service Manuals

Service manuals have the diagnosis and repair information on the engine, transmission, axle, suspension, brakes, electrical system, steering system, body, etc.

Customer Literature

Owner's manuals are written specifically for owners and are intended to provide basic operational information about the vehicle. The owner's manual includes the Maintenance Schedule for all models.

Customer literature publications available for purchase include owner's manuals, warranty manuals, infotainment manuals, and portfolios. Portfolios include an owner's manual, warranty manual, infotainment manual, if applicable, and zip lock bag or pouch.

Current and Past Models

Service manuals and customer literature are available for many current and past model year GM vehicles.

To order, call 1-800-551-4123 Monday–Friday, 8:00 a.m.–6:00 p.m. eastern time

For credit card orders only (VISA, MasterCard, or Discover), see Helm, Inc. at: www.helminc.com.

To order by mail, write to:

Helm, Incorporated
Attention: Customer Service
47911 Halyard Drive
Plymouth, MI 48170

Make checks payable in U.S. funds.

Radio Frequency Statement

This vehicle has systems that operate on a radio frequency that complies with Part 15/Part 18 of the Federal Communications Commission (FCC) rules and with Innovation, Science and Economic Development (ISED) Canada's RSP-100 / license-exempt RSS's / ICES-001.

Operation is subject to the following two conditions:

1. The device may not cause harmful interference.
2. The device must accept any interference received, including interference that may cause undesired operation of the device.

Changes or modifications to any of these systems by other than an authorized service facility could void authorization to use this equipment.

Reporting Safety Defects

Reporting Safety Defects to the United States Government

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying General Motors.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or General Motors.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to *http://www.safercar.gov;* or write to:

Administrator, NHTSA
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

You can also obtain other information about motor vehicle safety from *http://www.safercar.gov.*

Reporting Safety Defects to the Canadian Government

If you live in Canada, and you believe that the vehicle has a safety defect, notify Transport Canada immediately, and notify General Motors of Canada Company. Call Transport Canada at 1-800-333-0510; go to:

www.tc.gc.ca/recalls (English)

www.tc.gc.ca/rappels (French)

or write to:

Transport Canada
Motor Vehicle Safety Directorate
Defect Investigations and Recalls Division
80 Noel Street
Gatineau, QC J8Z 0A1

Reporting Safety Defects to General Motors

In addition to notifying NHTSA (or Transport Canada) in a situation like this, notify General Motors.

In the U.S., call 1-800-458-8006, or write:

Cadillac Customer Assistance Center
Cadillac Motor Car Division
P.O. Box 33169
Detroit, MI 48232-5169

In Canada, call 1-888-446-2000, or write:

Canadian Cadillac Customer Care Centre, Mail Code: CA1-163-005
General Motors of Canada Company
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

In Mexico, call 01-800-466-0805 or 01-800-212-234-5522.

In other Central America and Caribbean Countries, call 52-722-236-0680.

Vehicle Data Recording and Privacy

The vehicle has a number of computers that record information about the vehicle's performance and how it is driven. For example, the vehicle uses computer modules to monitor and control engine and transmission performance, to monitor the conditions for airbag deployment and deploy them in a crash, and, if equipped, to provide antilock braking to help the driver control the vehicle. These modules may store data to help the dealer technician service the vehicle. Some modules may also store data about how the vehicle is operated, such as rate of fuel consumption or average speed. These modules may retain personal preferences, such as radio presets, seat positions, and temperature settings.

Event Data Recorders

This vehicle is equipped with an event data recorder (EDR). The main purpose of an EDR is to record, in certain crash or near crash-like situations, such as an air bag deployment or hitting a road obstacle, data that will assist in understanding how a vehicle's systems performed. The EDR is designed to record data related to vehicle dynamics and safety systems for a short period of time, typically 30 seconds or less. The EDR in this vehicle is designed to record such data as:

- How various systems in your vehicle were operating;
- Whether or not the driver and passenger safety belts were buckled/fastened;
- How far (if at all) the driver was depressing the accelerator and/or brake pedal; and,
- How fast the vehicle was traveling.

These data can help provide a better understanding of the circumstances in which crashes and injuries occur.

Note

EDR data are recorded by your vehicle only if a non-trivial crash situation occurs; no data are recorded by the EDR under normal driving conditions and no personal data (e.g., name, gender, age, and crash location) are recorded. However, other parties, such as law enforcement, could combine the EDR data with the type of personally identifying data routinely acquired during a crash investigation.

To read data recorded by an EDR, special equipment is required, and access to the vehicle or the EDR is needed. In addition to the vehicle manufacturer, other parties, such as law enforcement, that have the special equipment, can read the information if they have access to the vehicle or the EDR.

GM will not access these data or share it with others except: with the consent of the vehicle owner or, if the vehicle is leased, with the consent of the lessee; in response to an official request by police or similar government office; as part of GM's defense of litigation through the discovery process; or, as required by law. Data that GM collects or receives may also be used for GM research needs or may be made available to

others for research purposes, where a need is shown and the data is not tied to a specific vehicle or vehicle owner.

OnStar

If the vehicle is equipped with OnStar and has an active service plan, additional data may be collected through the OnStar system. This includes information about the vehicle's operation; collisions involving the vehicle; the use of the vehicle and its features; and, in certain situations, the location and approximate GPS speed of the vehicle. Refer to the OnStar Terms and Conditions and Privacy Statement on the OnStar website.

See *OnStar Additional Information* ⇨ *394*.

Infotainment System

Using the navigation system may result in the storage of destinations, addresses, telephone numbers, and other trip information. See the infotainment manual for information on stored data and for deletion instructions.

OnStar

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OnStar Overview

Voice Command Button

Blue OnStar Button

Red Emergency Button

This vehicle may be equipped with a comprehensive, in-vehicle system that can connect to an OnStar Advisor for Emergency, Security, Navigation, Connections, and Diagnostics Services. OnStar services may require a paid service plan and data plan. OnStar requires the vehicle battery and electrical system, cellular service, and GPS satellite signals to be available and operating. OnStar acts as a link to existing emergency service providers. OnStar may collect information about you and your vehicle, including location information. See OnStar User Terms, Privacy Statement, and Software Terms for more details including system limitations at www.onstar.com (U.S.) or www.onstar.ca (Canada).

The OnStar system status light is next to the OnStar buttons. If the status light is:

- Solid Green: System is ready.
- Flashing Green: On a call.
- Red: Indicates a problem.
- Off: System is off. Press twice to speak with an OnStar Advisor.

Press or call 1-888-4ONSTAR (1-888-466-7827) to speak to an Advisor.

Functionality of the Voice Command button may vary by vehicle and region.

Press to:

- Open the OnStar app on the infotainment display. See the infotainment manual for information on how to use the OnStar app.

Or

- Make a call, end a call, or answer an incoming call.
- Give OnStar Hands-Free Calling voice commands.
- Give OnStar Turn-by-Turn Navigation voice commands.
- Obtain and customize the Wi-Fi hotspot name or SSID and password, if equipped.

Press On to connect to an Advisor to:

- Verify account information or update contact information.
- Get driving directions.
- Receive a Diagnostic check of the vehicle's key operating systems.
- Receive Roadside Assistance.
- Manage Wi-Fi Settings, if equipped.

Press SOS to get a priority connection to an OnStar Advisor available 24/7 to:

- Get help for an emergency.
- Be a Good Samaritan or respond to an AMBER Alert.
- Get assistance in severe weather or other crisis situations and find evacuation routes.

OnStar Services

Emergency

Emergency Services require an active safety and security plan. With Automatic Crash Response, built-in sensors can automatically alert a specially trained OnStar Advisor who is immediately connected in to the vehicle to help.

Press SOS for a priority connection to an OnStar Advisor who can contact emergency service providers, direct them to your exact location, and relay important information.

With OnStar Crisis Assist, specially trained Advisors are available 24 hours a day, 7 days a week, to provide a central point of contact, assistance, and information during a crisis.

With Roadside Assistance, Advisors can locate a nearby service provider to help with a flat tire, a battery jump, or an empty gas tank.

Security

If equipped, OnStar provides these services:

- With Stolen Vehicle Assistance, OnStar Advisors can use GPS to pinpoint the vehicle and help authorities quickly recover it.
- With Remote Ignition Block, if equipped, OnStar can block the engine from being restarted.
- With Stolen Vehicle Slowdown, if equipped, OnStar can work with law enforcement to gradually slow the vehicle down.

Theft Alarm Notification

If equipped, if the doors are locked and the vehicle alarm sounds, a notification by text, e-mail, or phone call will be sent. If the vehicle is stolen, an OnStar Advisor can work with authorities to recover the vehicle.

OnStar Additional Information

In-Vehicle Audio Messages

Audio messages may play important information at the following times:

- Prior to vehicle purchase. Press to set up an account.
- After change in ownership and at 90 days.

Transferring Service

Press to request account transfer eligibility information. The Advisor can cancel or change account information.

Selling/Transferring the Vehicle

Call 1-888-4ONSTAR (1-888-466-7827) immediately to terminate your OnStar or connected services if the vehicle is disposed of, sold, transferred, or if the lease ends.

Reactivation for Subsequent Owners

Press and follow the prompts to speak to an Advisor as soon as possible. The Advisor will update vehicle records and explain OnStar or connected service options.

How OnStar Service Works

Automatic Crash Response, Emergency Services, Crisis Assist, Stolen Vehicle Assistance, Remote Services, Roadside Assistance, and Hands-Free Calling are available on most vehicles. Not all OnStar services are available everywhere or on all vehicles. For more information, a full description of OnStar services, system limitations, and OnStar User Terms, Privacy Statement, and Software Terms:

- Call 1-888-4ONSTAR (1-888-466-7827).
- See www.onstar.com (U.S.).
- See www.onstar.ca (Canada).
- Call TTY 1-877-248-2080.
- Press to speak with an Advisor.

OnStar or connected services cannot work unless the vehicle is in a place where OnStar has an agreement with a wireless service provider for service in that area. The wireless service provider must also have coverage, network capacity, reception, and technology compatible with OnStar or connected services. Service involving location information about the vehicle cannot work unless GPS signals are available, unobstructed, and compatible with the OnStar hardware. OnStar or connected services may not work if the OnStar equipment is not properly installed or it has not been properly maintained. If equipment or software is added, connected, or modified, OnStar or connected services may not work. Other problems beyond the control of OnStar — such as hills, tall buildings, tunnels, weather, electrical system design and architecture of the vehicle, damage to the vehicle in a crash, or wireless phone network congestion or jamming — may prevent service.

See *Radio Frequency Statement* ⇨ *388*.

Services for People with Disabilities

Advisors provide services to help with physical disabilities and medical conditions.

Press OnStar to help:

- Locate a gas station with an attendant to pump gas.
- Find a hotel, restaurant, etc., that meets accessibility needs.
- Provide directions to the closest hospital or pharmacy in urgent situations.

TTY Users

OnStar has the ability to communicate to deaf, hard-of-hearing, or speech-impaired customers while in the vehicle. The available dealer-installed TTY system can provide in-vehicle access to all OnStar services, except Virtual Advisor and OnStar Turn-by-Turn Navigation.

If equipped, TTY mode can be turned on or off by touching Settings, then Apps, and then Phone. When TTY mode is on, phone calls can be made or received with OnStar using the infotainment display.

OnStar Personal Identification Number (PIN)

A PIN is needed to access some OnStar services. The PIN will need to be changed the first time when speaking with an Advisor. To change the OnStar PIN, contact an OnStar Advisor by pressing OnStar or calling 1-888-4ONSTAR.

Warranty

OnStar equipment may be warranted as part of the vehicle warranty.

Languages

The vehicle can be programmed to respond in multiple languages. Press OnStar and ask for an Advisor. Advisors are available in English, Spanish, and French. Available languages may vary by country.

Potential Issues

OnStar cannot perform Remote Door Unlock or Stolen Vehicle Assistance after the vehicle has been off continuously for 10 days without an ignition cycle. If the vehicle has not been started for 10 days, OnStar can contact Roadside Assistance or a locksmith to help gain access to the vehicle.

Global Positioning System (GPS)

- Obstruction of the GPS can occur in a large city with tall buildings; in parking garages; around airports; in tunnels and underpasses; or in an area with very dense trees. If GPS signals are not available, the OnStar system should still operate to call OnStar. However, OnStar could have difficulty identifying the exact location.
- In emergency situations, OnStar can use the last stored GPS location to send to emergency responders.

A temporary loss of GPS can cause loss of the ability to send a Turn-by-Turn Navigation route. The Advisor may give a verbal route or may ask for a call back after the vehicle is driven into an open area.

Cellular and GPS Antennas

Cellular reception is required for OnStar to send remote signals to the vehicle. Do not place items over or near the antenna to prevent blocking cellular and GPS signal reception.

Unable to Connect to OnStar Message

If there is limited cellular coverage or the cellular network has reached maximum capacity, this message may come on. Press to try the call again or try again after driving a few miles into another cellular area.

Vehicle and Power Issues

OnStar services require a vehicle electrical system, wireless service, and GPS satellite technologies to be available and operating for features to function properly. These systems may not operate if the battery is discharged or disconnected.

Add-on Electrical Equipment

The OnStar system is integrated into the electrical architecture of the vehicle. Do not add any electrical equipment. See *Add-On Electrical Equipment* ⇨ *276*. Added electrical equipment may interfere with the operation of the OnStar system and cause it to not operate.

Vehicle Software Updates

OnStar or GM may remotely deliver software updates or changes to the vehicle without further notice or consent. These updates or changes may enhance or maintain safety, security, or the operation of the vehicle or the vehicle systems. Software updates or changes may affect or erase data or settings that are stored in the vehicle, such as OnStar Hands-Free Calling name tags, saved navigation destinations, or pre-set radio stations. Neither OnStar nor GM is responsible for any affected or erased data or settings.

These updates or changes may also collect personal information. Such collection is described in the OnStar privacy statement or separately disclosed at the time of installation. These updates or changes may also cause a system to automatically communicate with GM servers to collect information about vehicle system status, identify whether updates or changes are available, or deliver updates or changes. An active OnStar agreement constitutes consent to these software updates or changes and agreement that either OnStar or GM may remotely deliver them to the vehicle.

Privacy

The complete OnStar Privacy Statement may be found at www.onstar.com (U.S.), or www.onstar.ca (Canada). We recommend that you review it. If you have any questions, call 1-888-4ONSTAR (1-888-466-7827) or press to speak with an Advisor. Users of wireless communications are cautioned that the privacy of any information sent via wireless cellular communications cannot be assured. Third parties may unlawfully intercept or access transmissions and private communications without consent.

OnStar - Software Acknowledgements

Certain OnStar components include libcurl and unzip software and other third party software. Below are the notices and licenses associated with libcurl and unzip and for other third party software please see http://opensource.lge.com/index

www.onstar.com/us/en/

libcurl:

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unzip:

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Connected Services

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Connected Services

Navigation

Navigation requires a specific OnStar or connected service plan.

Press to receive Turn-by-Turn directions or have them sent to the vehicle's navigation screen, if equipped.

Turn-by-Turn Navigation

1. Press to connect to an Advisor.
2. Request directions to be downloaded to the vehicle.
3. Follow the voice-guided commands.

Using Voice Commands During a Planned Route

Functionality of the Voice Command button, if equipped, may vary by vehicle and region. For some vehicles, press to open the OnStar app on the infotainment display. For other vehicles press as follows.

Cancel Route

1. Press . System responds: "OnStar ready," then a tone.
2. Say "Cancel route." System responds: "Do you want to cancel directions?"
3. Say "Yes." System responds: "OK, request completed, thank you, goodbye."

Route Preview

1. Press . System responds: "OnStar ready," then a tone.
2. Say "Route preview." System responds with the next three maneuvers.

Repeat

1. Press . System responds: "OnStar ready," then a tone.
2. Say "Repeat." System responds with the last direction given, then responds with "OnStar ready," then a tone.

Get My Destination

1. Press . System responds: “OnStar ready,” then a tone.
2. Say “Get my destination.” System responds with the address and distance to the destination, then responds with “OnStar ready,” then a tone.

Send Destination to Vehicle

Directions can be sent to the vehicle’s navigation screen, if equipped.

Press , then ask the Advisor to download directions to the vehicle’s navigation system, if equipped. After the call ends, the navigation screen will provide prompts to begin driving directions. Routes that are sent to the navigation screen can only be canceled through the navigation system.

See www.onstar.com (U.S.) or www.onstar.ca (Canada).

Connections

The following services help with staying connected.

For coverage maps, see www.onstar.com (U.S.) or www.onstar.ca (Canada).

Ensuring Security

- Change the default passwords for the Wi-Fi hotspot and myCadillac mobile app. Make these passwords different from each other and use a combination of letters, numbers, and symbols to increase the security.
- Change the default name of the SSID (Service Set Identifier). This is your network’s name that is visible to other wireless devices. Choose a unique name and avoid family names or vehicle descriptions.

Wi-Fi Hotspot (If Equipped)

The vehicle may have a built-in Wi-Fi hotspot that provides access to the Internet and web content at 4G LTE speed. Up to seven mobile devices can be connected. A data plan is required. Use the in-vehicle controls only when it is safe to do so.

1. To retrieve Wi-Fi hotspot information, press to open the OnStar app on the infotainment display, then select Wi-Fi Hotspot. On some vehicles, touch Wi-Fi or Wi-Fi Settings on the screen.
2. The Wi-Fi settings will display the Wi-Fi hotspot name (SSID), password, and on some vehicles, the connection type (no Internet connection, 3G, 4G, 4G LTE), and signal quality (poor, good, excellent).
3. To change the SSID or password, press or call 1-888-4ONSTAR to connect with an Advisor. On some vehicles, the SSID and password can be changed in the Wi-Fi Hotspot menu.

After initial set-up, your vehicle’s Wi-Fi hotspot will connect automatically to your mobile devices. Manage data usage by turning Wi-Fi on or off on your mobile device, by using the myCadillac mobile app, or by contacting an OnStar Advisor.

On some vehicles, Wi-Fi can also be managed from the Wi-Fi Hotspot menu.

MyCadillac Mobile App (If Available)

Download the myCadillac mobile app to compatible Apple and Android smartphones. Cadillac users can access the following services from a smartphone:

- Remotely start/stop the vehicle, if factory-equipped.
- Lock/unlock doors, if equipped with automatic locks.
- Activate the horn and lamps.
- Check the vehicle's fuel level, oil life, or tire pressure, if factory-equipped with the Tire Pressure Monitor System.
- Send destinations to the vehicle.
- Locate the vehicle on a map (U.S. market only).
- Turn the vehicle's Wi-Fi hotspot on/off, manage settings, and monitor data consumption, if equipped.
- Locate a dealer and schedule service.
- Request roadside assistance.
- Set a parking reminder with pin drop, take a photo, make a note, and set a timer.
- Connect with Cadillac on social media.

Features are subject to change. For myCadillac mobile app information and compatibility, see my.cadillac.com.

An active OnStar or connected service plan may be required. A compatible device, factory-installed remote start, and power locks are required. Data rates apply. See www.onstar.com for details and system limitations.

Remote Services

Contact an OnStar Advisor to unlock the doors or sound the horn and flash the lamps.

Marketplace

OnStar Advisors can provide offers from restaurants and retailers on your route, help locate hotels, or book a room. These services vary by market.

OnStar Hands-Free Calling

Make and receive calls with the built-in wireless calling service, which requires available minutes. Functionality of the Voice Command button may vary by vehicle and region. For some vehicles, press to open the OnStar app on the infotainment display, then select Hands-Free calling. For other vehicles press as follows.

Make a Call

1. Press . System responds: "OnStar ready."
2. Say "Call." System responds: "Call. Please say the name or number to call."
3. Say the entire number without pausing, including a "1" and the area code. System responds: "OK, calling."

Calling 911 Emergency

1. Press . System responds: "OnStar ready."

2. Say “Call.” System responds: “Call. Please say the name or number to call.”
3. Say “911” without pausing. System responds: “911.”
4. Say “Call.” System responds: “OK, dialing 911.”

Retrieve My Number

1. Press . System responds: “OnStar ready.”
2. Say “My number.” System responds: “Your OnStar Hands-Free Calling number is,” then says the number.

End a Call

Press . System responds: “Call ended.”

Verify Minutes and Expiration

Press and say “Minutes” then “Verify” to check how many minutes remain and their expiration date.

If equipped, press and touch Account Services to view the number of remaining minutes, available Wi-Fi data, and other account information.

Diagnostics

By monitoring and reporting on the vehicle’s key systems, OnStar Advanced Diagnostics, if equipped, provides a way to keep up on maintenance. Capabilities vary by model. See www.onstar.com for details and system limitations. Features are subject to change. For updates on feature capabilities, see my.cadillac.com. Message and data rates may apply.

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WARNING

Operating, servicing and maintaining a passenger vehicle or off-highway motor vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

U.S. Only

84161699 A

EMISSION CONTROL ABBREVIATIONS

Gasoline & Diesel

"A"

A/C

Air Conditioning

A/C-ISUS

A/C Idle Speed-Up Solenoid

A/F

Air/Fuel

AAI

Air Assist Injector

ACL

Air Cleaner (Thermostatic Air Cleaner)

ACL-BMS

ACL Bimetallic Sensor

ACL-CKV

ACL Check Valve

ACL-DV

ACL Delay Valve

ACL-ESC

Electronic Spark Control

ACL-PVS

ACL Ported Vacuum Switch

ACL-RDV

ACL Reverse Delay Valve

ACL-RDVS

ACL Reverse Delay Valve (Single)

ACL-TCV

ACL Thermal Control Valve

ACL-TS

ACL Temperature Sensor

ACL-TSOV

ACL Temperature Sensor Override Valve

ACL-TVS

ACL Thermal Vacuum Switch

ACL-TVV

ACL Thermal Vacuum Valve

ACL-VCDV

ACL Vacuum Control Delay Valve

ACL-VCV

ACL Vacuum Control Valve

ACL-VM

ACL Vacuum Motor

ACL-WP

ACL Wax Pellet Type Motor

ADS

Anti-Dieseling Solenoid

AFR

Air/Fuel Ratio Sensor

AFS

Air/Fuel Ratio Sensor

AIH

Air Intake Heaters

AIH-TS

AIH Temperature Sensor

AIR

Air Injection System

AIS

Air Injection System

AIS-ACV

AIS Air Control Valve

AIS-AF

Air Injection System Air Filter

AIS-AMV

AIS Air Management Valve

AIS-ASV

AIS Air Switching Valve

AIS-BPV

AIS By-Pass Valve

AIS-CC

AIS Computer Controlled

AIS-CKV

AIS Check Valve

AIS-CSV

AIS Control Solenoid Valve

AIS-CV

AIS Combination Valve

AIS-DV

AIS Diverter Valve

AIS-IMCV

AIS Intake Manifold Change-Over Valve

AIS-MCV

AIS Manifold Change-Over Valve

AIS-OWV

AIS One Way Valve

AIS-PAF

AIS Pulse Air Feeder

AIS-PM

AIS Pump Motor

AIS-PV

AIS Pneumatic Valve

AIS-RV

AIS Relief Valve

AIS-SAV

AIS Secondary Air Valve

AIS-SOL

AIS Solenoid

AIS-SV

AIS Solenoid Valve

AIS-VCV

AIS Vacuum Control Valve

AIS-VSV

AIS Vacuum Switching Valve

AIS-VT

AIS Vacuum Tank

AIS-VCV

AIS Vacuum Control Valve

AIS-VSV

AIS Vacuum Switching Valve

AIV

Air Injection Valve

AIV-SOL

Air Injection Valve Solenoid

ALVW

Adjusted Loaded Vehicle Weight

AMV

Air Management Valve

AP

Air Pump Injection System

AP-ABV

Air Pump Air Bypass Valve

AP-ACV

AP Air Control Valve

AP-AMV

AP Air Management Valve

AP-ASRV

AP Air Switching Relief Valve

AP-ASS

AP Air Switching Solenoid

AP-ASV

AP Air Switching Valve

AP-BP

AP By-Pass Valve

AP-BPV

AP By-Pass Valve

AP-CKV

AP Check Valve

AP-CS

AP Control Solenoid

AP-CV

AIR Cut-Off Valve

AP-DCTO

AP Dual Coolant Temperature Override

AP-DLY

AP Delay Valve

AP-DV

AP Diverter Valve

AP-EADV

AP Electric Air Control Diverter Valve

AP-EAMR

AP Electric Air Management Relay

AP-EAMS

AP Electric Air Management Solenoid

AP-EAP

AP Electric Air Pump

AP-EC

AP Electromagnetic Clutch

AP-ERLY

AP Electric Air Pump Relay

AP/PAIR

Pulsed Secondary Air Injection

AP-RDV

AP Reed Valve

AP-RV

AP Relief Valve

AP-SOL

AP Solenoid

AP-SOV

AP Shut-Off Valve

AP-SV

AP Solenoid Valve

AP-SWV

AP Switchover Valve

AP-TV

AP Transmitting Valve

AP-VCS

AP Vacuum Control Solenoid

AP-VCSV

AP Vacuum Controlled Air Shut-Off Valve

AP-VCV

AP Vacuum Control Valve

AP-VSV

AP Vacuum Switching Valve

A/T

Automatic Transmission

ATCV

Air Temperature Control Valve

"B"

BP/EGR

Backpressure EGR System

BP/EGR-BPS

BP/EGR Backpressure Sensor

BP/EGR-BPT

BP/EGR Backpressure Transducer

BP/EGR-BPV

BP/EGR Backpressure Valve

BP/EGR-BS

BP/EGR Bleed Solenoid

BP/EGR-BVSV

BP/EGR Bimetallic Vacuum Switching Valve

BP/EGR-C

BP/EGR Controller

BP/EGR-CLR

BP/EGR Cooler

BP/EGR-CS

BP/EGR Control Solenoid

BP/EGR-CTO

BP/EGR Coolant Temperature Override

BP/EGR-CV

BP/EGR Control Valve

BP/EGR-DCTO

BP/EGR Dual Coolant Temperature Override

BP/EGR-DS

BP/EGR Diagnostic Solenoid

BP/EGR-DSOL

BP/EGR Duty Solenoid

BP/EGR-DTVSW

BP/EGR Distributor Thermal Vacuum Switch

BP/EGR-DV

BP/EGR Delay Valve

BP/EGR-EET

BP/EGR Electric Transducer

BP/EGR-EPV

BP/EGR External Pressure Valve

BP/EGR-FDV

BP/EGR Forward Delay Valve

BP/EGR-LCV

BP/EGR Vacuum Control Valve

BP/EGR-LC

BP/EGR Load Control Valve

BP/EGR-OVS

BP/EGR Orifice Valve Sensing

BP/EGR-PS

BP/EGR Position Sensor

BP/EGR-PT

BP/EGR Pressure Tranducer

BP/EGR-PVS

BP/EGR Ported Vacuum Switch

BP/EGR-RES

BP/EGR Reservoir

BP/EGR-RST

BP/EGR Restrictor

BP/EGR-SOL

BP/EGR Solenoid

BP/EGR-TCTVS

BP/EGR Torque Converter Thermal Vacuum Switch

BP/EGR-TCV

BP/EGR Thermal Control Valve

BP/EGR-TCVLV

BP/EGR Temperature Control Valve

BP/EGR-T

BP/EGR Temperature Sensor

BP/EGR-TS

BP/EGR Temperature Sensor

BP/EGR-TVC

BP/EGR Thermal Control Valve

BP/EGR-TVS

BP/EGR Thermal Vacuum Switch

BP/EGR-TVV

BP/EGR Thermal Vacuum Valve

BP/EGR-VC

BP/EGR Diagnostic Valve

BP/EGR-VCV

BP/EGR Vacuum Control Valve

BP/EGR-VM

BP/EGR Vacuum Modulator

BP/EGR-VRV

BP/EGR Vacuum Regulator Valve

BP/EGR-VS

BP/EGR Vacuum Switch

BP/EGR-VSOL

BP/EGR Vent Solenoid

BP/EGR-VSV

BP/EGR Vacuum Switching Valve

"C"

C-4

Computer Controlled Catalytic Converter

CAC

Charge Air Cooler

CAS

Clean Air System

CB

Crankcase Breather

CB-VC

Crankcase Breather-Vapor Canister

CBPS

Coasting By-Pass System

CBVC

Crankcase Breather Vapor Canister

CCIEV

Coolant Controlled Idle Enrichment Valve

CCO

Computerized Engine Controls

CCS

Controlled Combustion System

CCV

Closed Crankcase Ventilation

CD-REGVLV

Crankcase Depression Regulator Valve

CDRV

Crankcase Depression Relief Valve

CEAB

Cold Engine Air Bleed

CEAB-TVS

CEAB Thermal Vacuum Switch

CEAB-TVV

CEAB Thermal Vacuum Valve

CEC

Computerized Engine Controls

CESS

Cold Engine Sensor Switch

CETS

Cold Engine Temperature Switch

CFI

Continuous Fuel Injection

CMH

Cold Mixture Heater

CNG

Compressed Natural Gas

CO

Carbon Monoxide

CO2

Carbon Dioxide

CPI

Central Port Injection

CRV

Coasting Richer Valve

CSI

Central Sequential Injection

CTAVS

Cold Temperature Activated Vacuum System

CTOX

Continous Trap Oxidizer

CVOT

Crankcase Ventilation Orifice Tube

CVOT-CKV

Crankcase Ventilation Orifice Tube Check Valve

"D"

DCLV

Deceleration Valve

DCS

Deceleration Control System

DDI

Direct Diesel Injection

DFI

Direct Diesel Injection

DI

Direct Injection

DKV

Deceleration Kick Valve

DLCV

Deceleration Mixture Control Valve

DM-TL

Diagnostic Module Tank Leakage

DMS

Dual Manifold System

DOC

Diesel Oxidation Catalyst

DOHC

Dual Overhead Cam

DPD

Dual Point Distributor

DPF

Diesel Particulate Filter

DPF/TWC

Combination Diesel Particulate Filter and Three Way Catalyst

DPFE

Differential Pressure Feedback EGR Valve

DPFEGR

Differential Pressure Feedback EGR Valve

DTM

Deceleration Throttle Modulator

"E"

EAIR

Electric Air Injection System

EAIR-DV

EAIR Diverter Valve

EC

Computerized Engine Controls

ECM

Electronic Control Module

ECU

Electronic Control Unit

EDC

Electronic Diesel Control

EDS

Electronic Diesel System

EEC

Electronic Engine Control

EFE

Early Fuel Evaporation

EFE-CKV

EFE Check Valve

EFE-CV

EFE Control Valve

EFE-DTVS

EFE Delay Thermal Vacuum Switch

EFE-HTR

EFE Heater

EFE-HCV

EFE Heat Control Valve

EFE-OTS

EFE Oil Temperature Switch

EFE-PTC

EFE Positive Temperature Coefficient (Intake Heater Grid)

EFE-PVS

EFE Ported Vacuum Switch

EFE-SOL

EFE Solenoid

EFE-TVS

EFE Thermal Vacuum Switch

EFE-TVV

EFE Thermal Vacuum Valve

EFE-VSV

EFE Vacuum Switching Valve

EFI

Electronic Fuel Injection

EFI-MA

EFI Mass Airflow Sensor

EFI-MAF

EFI Mass Airflow Sensor

EGR

Exhaust Gas Recirculation System

EGR-BCS

EGR Boost Check Solenoid

EGR-BPBV

EGR By-Pass Backpressure Valve

EGR-BPT

EGR Backpressure Transducer

EGR-BPV

EGR By-Pass Valve

EGR-BS

EGR Bleed Solenoid

EGR-BSSV

EGR Boost Sensor Solenoid Valve

EGR-BV

EGR Bypass Valve

EGR-BVSV

EGR Bimetallic Vacuum Switching Valve

EGR-C

EGR Controller

EGR-CC

EGR Coolant Controlled

EGR-CLR

EGR Cooler

EGR-VSOL

EGR Vacuum Solenoid

EGR-CKV

EGR Check Valve

EGR-CS

EGR Control Solenoid

EGR-CSOL

EGR Cut-Off Solenoid

EGR-CSV

EGR Control Solenoid

EGR-CTO

EGR Coolant Temperature Override

EGR-CTS

EGR Charge Temperature Sensor

EGR-CTSW

EGR Charge Temperature Switch

EGR-CTTS

EGR Coolant Temperature Thermoswitch

EGR-CV

EGR Control Valve

EGR-CVCV

EGR Constant Vacuum Control Valve

EGR-CVS

EGR Control Vent Solenoid

EGR-DC

EGR Digital Control

EGR-DCTO

EGR Dual Coolant Temperature Override

EGR-DPFE

Differential Pressure Feedback EGR Sensor

EGR-DPFS

EGR Differential Pressure Feedback Sensor

EGR-DS

EGR Diagnostic Solenoid

EGR-DSOL

EGR Duty Solenoid

EGR-DTVS

EGR Delay Thermal Vacuum Switch

EGR-DTVSW

EGR Distributor Thermal Vacuum Switch

EGR-DV

EGR Delay Valve

EGR-EPRS

EGR Exhaust Pressure Regulator Solenoid

EGR-EPRV

EGR Exhaust Pressure Regulator Valve

EGR-EPV

EGR External Pressure Valve

EGR/EVAP-CSV

EGR/EVAP Control Solenoid Valve

EGR-EVR

EGR Vacuum Regulator

EGR-EVRV

EGR Electronic Vacuum Regulator Valve

EGR-FDV

EGR Forward Delay Valve

EGR-FJS

EGR Floor Jet System

EGR-FPS

EGR Feedback Pressure Sensor

EGR-LCV

EGR Load Control Valve

EGR-MAP

EGR Manifold Absolute Pressure Sensor

EGR-PFE

EGR-PFE Sensor

EGR-PS

EGR Position Sensor

EGR-PSW

EGR Pulse Switch

EGR-PVS

EGR Ported Vacuum Switch

EGR-REG

EGR Regulator

EGR-RES

EGR Reservoir

EGR-RST

EGR Restrictor

EGR-SC

EGR Signal Converter

EGR-SEC

EGR, Secondary

EGR-SEN

EGR Sensor

EGR-SM

EGR Stepper Motor

EGR-SOL

EGR Solenoid

EGR-SU

EGR Switchover Valve

EGR-SUB

Sub-EGR Valve

EGR-SV

EGR Switchover Valve

EGR-SVV

EGR Solenoid Vacuum Valve

EGR-T

EGR Temperature Sensor

EGR-TC

EGR Transmission Controlled

EGR-TCTVS

EGR Torque Converter Thermal Vacuum Switch

EGR-TCV

EGR Thermal Control Valve

EGR-TCVLV

EGR Temperature Control Valve

EGR-TRANS

EGR Transducer

EGR-TS

EGR Temperature Sensor

EGR-TSW

EGR Temperature Switch

EGR-TV

EGR Thermal Valve

EGR-TVD

EGR Throttle Valve Diaphragm

EGR-TVS

EGR Thermal Vacuum Switch

EGR-TVSOL

EGR Throttle Valve Solenoid

EGR-TVV

EGR Thermal Vacuum Valve

EGR-V

EGR Valve

EGR-VA

EGR Vacuum Amplifier

EGR-VCV

EGR Vacuum Control Valve

EGR-VM

EGR Vacuum Modulator

EGR-VR

EGR Vacuum Regulator

EGR-VRS

EGR Vacuum Regulator Solenoid

EGR-VRSV

EGR Vacuum Regulator Solenoid Valve

EGR-VRV

EGR Vacuum Regulator Valve

EGR-VS

EGR Vacuum Switch

EGR-VSDV

EGR Vacuum Switch Dump Valve

EGR-VSEN

EGR Vacuum Sensor

EGR-VSOL

EGR Vent Solenoid

EGR-VSS

EGR Vacuum Switching Solenoid

EGR-VST

EGR Vacuum Surge Tank

EGR-VSV

EGR Vacuum Switching Valve

EGR-VVCS

EGR Venturi Vacuum Control System

EGRB

EGR Boost Sensor

EGRC

EGR Control Solenoid

EGRC-BPT

EGR Control Backpressure Transducer

EGRC-SV

EGR Control Solenoid Valve

EHOC

Electronically Heated Oxidation Catalyst

EHTWC

Electronically Heated Three-Way Catalyst

EI

Electronic Ignition System

EIS

Electronic Ignition System

ELB

Electronic Lean Burn

EPR

Exhaust Pressure Regulator

EPR-SOL

EPR Solenoid

ESA

Electronic Spark Advance

ESIM

Evaporative System Integrity Monitor

EVAP

Fuel Evaporative System

EVAP-AAC

EVAP Auxiliary Air Control

EVAP-BPSV

EVAP By-Pass Solenoid Valve

EVAP-BVSV

EVAP Bimetallic Vacuum Switching Valve

EVAP-CAV

EVAP Canister Air Valve

EVAP-CCV

EVAP Control Canister Close Valve

EVAP-CCVSV

EVAP Control Canister Vent Shut Valve

EVAP-CCVVSV

EVAP Closed Canister Valve Vacuum Switching Valve

EVAP-CDCV

EVAP Canister Drain Cut Valve

EVAP-CKV

EVAP Check Valve

EVAP-CPCS

EVAP Canister Purge Control Solenoid

EVAP-CPCSV

EVAP Canister Purge Control Solenoid Valve

EVAP-CPCV

EVAP Canister Purge Control Valve

EVAP-CPRV

EVAP Canister Purge Regulator Valve

EVAP-CPSV

EVAP Canister Vent Shut Valve

EVAP-CPT

EVAP Canister Purge Timer

EVAP-CPTVS

EVAP Canister Purge Thermal Vacuum Switch

EVAP-CPV

EVAP Canister Vent Valve

EVAP-CPVCSV

EVAP Canister Purge Volume Control

EVAP-CPVCV

EVAP Canister Purge Volume Control Valve

EVAP-CPVDV

EVAP Canister Purge Vacuum Delay Valve

EVAP-CPVR

EVAP Canister Purge Valve Resonator

EVAP-CS

EVAP Control Solenoid

EVAP-CSPS

EVAP Control System Pressure Sensor

EVAP-CSPV

EVAP Canister Purge Valve

EVAP-CST

EVAP Canister Surge Tank

EVAP-CSV

EVAP Control Solenoid Valve

EVAP-CT

EVAP Catch Tank

EVAP-CV

EVAP Control Solenoid Valve

EVAP-CVCS

EVAP Canister Vent Control Solenoid

EVAP-CVCSV

EVAP Canister Vent Control Solenoid Valve

EVAP-CVCV

EVAP Canister Vent Control Valve

EVAP-CVS

EVAP Canister Vent Solenoid

EVAP-CVSV

EVAP Carburetor Vent Switching Valve

EVAP-CVV

EVAP Canister Vent Valve

EVAP-DCTO

EVAP Dual Coolant Temperature Override

EVAP-DF

EVAP Drain Filter

EVAP-DPS

EVAP Differential Pressure Sensor

EVAP-DV

EVAP-Drain Valve

EVAP-ESIM

Evaporative System Integrity Monitor

EVAP-EV

EVAP Emission Valve

EVAP-FBVV

EVAP Fuel Bowl Vent Valve

EVAP-FBVS

EVAP Fuel Bowl Vent Solenoid

EVAP-FCV

EVAP Fuel Cut Valve

EVAP-FLS

EVAP Fuel Level Sensor

EVAP-FOLV

EVAP Fuel Overflow Limiter Valve

EVAP-FR/FTPS

EVAP Rollover Valve/Fuel Tank

EVAP-FS

EVAP Flow Switch

EVAP-FSV

EVAP Flow Switchover Valve

EVAP-FTCV

EVAP Tank Pressure Control Valve

EVAP-FTEV

EVAP Fuel Tank EVAP Valve

EVAP-FTPCSV

EVAP Fuel Tank Pressure Control Solenoid Valve

EVAP-FTPS

EVAP Fuel Tank Pressure Sensor

EVAP-FTS

EVAP Fuel Temperature Sensor

EVAP-FVCV

EVAP Fuel Vapor Control Valve

EVAP-FVS

EVAP Fuel Vapor Separator

EVAP-FVTS

EVAP Fuel Vapor Temperature Sensor

EVAP-FVV

EVAP Fuel Vent Valve

EVAP-FVVV

EVAP Fuel Vapor Vent Valve

EVAP-FWV

EVAP Fuel Vent Valve

EVAP-IVS

EVAP Inner Vent Solenoid

EVAP-LDAF

EVAP Leak Detection Pump Air Filter

EVAP-LDP

EVAP Leak Detection Pump

EVAP-LDPAF

EVAP Leak Detection Pump Air Filter

EVAP-LDPF

EVAP Leak Detection Pump Filter

EVAP-LDPVV

EVAP Leak Detection Pump Vent Valve

EVAP-LSEP

EVAP Liquid Separator

EVAP-NVLD

EVAP Natural Vacuum Leak Detection

EVAP-ORVR

Evaporative On-Board Refueling Vapor Recovery System

EVAP-ORVRCV

Evaporative On-Board Refueling Vapor Recovery Check Valve

EVAP-ORVRFTVRV

EVAP-ORVR Fuel Tank Vapor Recirculation

EVAP-OVCV

EVAP Outer Vent Control Valve

EVAP-OWV

EVAP One-Way Valve

EVAP-PCDV

EVAP Purge Control Diaphram Valve

EVAP-PCS

EVAP Purge Control Solenoid Valve

EVAP-PCSV

EVAP Purge Cut-Off Solenoid Valve

EVAP-PFS

EVAP Purge Flow Sensor

EVAP-PFSVVSV

EVAP Purge Flow Switching Valve Vacuum Switching Valve

EVAP-PPS

EVAP Proportional Purge Solenoid

EVAP-PR

EVAP Purge Resonator

EVAP-PRRV

EVAP Pressure Relief Rollover Valve

EVAP-PRV

EVAP Pressure Relief Valve

EVAP-PS

EVAP Purge Solenoid

EVAP-PSOL

EVAP Purge Solenoid

EVAP-PSSV

EVAP Pressure Switching Solenoid

EVAP-PSVVSV

EVAP Pressure Switching Valve Vacuum Switching Valve

EVAP-PV

EVAP Purge (Frequency) Valve

EVAP-PVS

EVAP Ported Vacuum Switch

EVAP-RV

EVAP Rollover Valve

EVAP-RV/FTPS

EVAP Rollover Valve/Fuel Tank

EVAP-RVSV

EVAP Rollover Vapor Separator Valve

EVAP-SNR

EVAP Canister Sensor

EVAP-SOL

EVAP Solenoid

EVAP-SOV

EVAP Shutoff Valve

EVAP-SSV

EVAP Shut-Off Solenoid Valve

EVAP-SV

EVAP Solenoid Valve

EVAP-TC

EVAP Trap Canister

EVAP-TS

EVAP Temperature Switch

EVAP-TPBPV

EVAP Tank Pressure By-Pass Valve

EVAP-TPCS

EVAP Tank Pressure Control Solenoid

EVAP-TPCV

EVAP Tank Pressure Control Valve

EVAP-TRWV

EVAP Tree-Way Valve

EVAP-TV

EVAP Thermal Valve

EVAP-TVS

EVAP Thermal Vacuum Switch

EVAP-TVV

EVAP Thermal Vacuum Valve

EVAP-TWV

EVAP Two-Way Valve

EVAP-VC

EVAP Vapor Canister

EVAP-VCAT

EVAP Vapor Canister Air Tank

EVAP-VCF

EVAP Vapor Canister Filter

EVAP-VCSV

EVAP Vapor Canister Shut-off Valve

EVAP-VCTV

EVAP Vacuum Control Valve

EVAP-VCV

EVAP Vacuum Canister Valve

EVAP-VCVS

EVAP Vapor Canister Vent Solenoid

EVAP-VLFR

EVAP Vent Line Flow Restrictor

EVAP-VM

EVAP Vacuum Motor

EVAP-VMV

EVAP Vapor Management Valve

EVAP-VPS

EVAP Vapor Pressure Sensor

EVAP-VPSVSV

EVAP Vapor Pressure Sensor Vacuum Switching Valve

EVAP-VS

EVAP Vacuum Sensor

EVAP-VSOL

EVAP Ventilation Solenoid

EVAP-VSOL/LDP

EVAP Ventilation Solenoid/Leak Detection Pump

EVAP-VST

EVAP Vacuum Surge Tank

EVAP-VSV

EVAP Vacuum Switching Valve

EVAP-VV

EVAP Ventilation Valve

EVRS

EGR Vacuum Regulator Solenoid

"F"

FBC

Feedback Carburetor

FCOV

Fuel Change Over Valve

FF

Flex Fuel

FF-CKV

Fuel Fill Check Valve

FF-FCV

Fuel Tank Fuel Cut-Off Valve

FF-FLVV

Fuel Tank Fill Limit Vent Valve

FFC-PVRV

Fuel Fill Cap Pressure Vacuum Relief Valve

FGOV

Fuel Gravity/Overflow Valve

FGVV

Fuel Gravity Vent Valve

FI

Fuel Injected

FICD

Fast Idle Control Device

FISR

Fast Idle Solenoid Relay

FLV

Fill Limit Valve

FLVV

Fill Limiting Vent Valve

FP-CKV

Fill Pipe Check Valve

FP-RV

Fill Pipe Rollover Valve

FR

Fill Pipe Restrictor

FT-FLVV

Fuel Tank Fill Limit Vent Valve

FT-GVV

Fuel Tank Grade Vent Valve

FT-OPRV

Fuel Tank Over Pressure Vent Valve

FT-PCV

Fuel Tank Pressure Control Valve

FT-VCV

Fuel Tank Vapor Control Valve

FT-VRV

Fuel Tank Vapor Recirculation Valve

FTCV

Fuel Tank Check Valve

FTDPS

Fuel Tank Differential Pressure Sensor

FTEV

Fuel Tank EVAP Valve

FTPS

Fuel Tank Pressure Sensor

FTT

Fuel Tank Temperature Sensor

FTTS

Fuel Tank Temperature Sensor

FTV/LSV

Fuel Tank Vapor/Liquid Seperation Valve

FTVCV

Fuel Tank Vapor Control Valve

FTVPRV

Fuel Tank Ventilation Pressure Retention Valve

FVPS

Fuel Vapor Pressure Sensor

FTVV

Fuel Tank Vent Valve

FVV

Fuel Vapor Valve

"G"

GVWR

Gross Vehicle Weight Rating

"H"

HAC

High Altitude Compensator

HAFS

Heated Air Fuel Ratio Sensor

HAI

Hot Air Intake

HAS

High Altitude System

HC

Hydrocarbons

HCAC-VSV

Hydrocarbon Absorber Catalyst Vacuum Switching Valve

HDC

Heavy Duty Cooling

HDC-CTO

HDC Coolant Temperature Override

HFM-SFI

Hot Film Engine Management SFI

HIC

Hot Idle Compensator

HIM

Heated Intake Manifold

HO

High Output

HO2S

Heated Oxygen Sensor

HP

High Performance

HP

Horsepower

HPCA

Housing Pressure Cold Advance

HSC

High Swirl Combustion

"I"

IAC

Idle Air Control Valve

IACV-SW

IACV Switch

ICOM

Idle Compensator

IDI

Indirect Diesel Injection

IES

Idle Enrichment System

IMCO

Improved Combustion System

"K"

KS

Knock Sensor

"L"

LH-SFI

Hot Wire Sequential Multiport Fuel Injection

LVFD

Liquid/Vapor Fuel Discriminator

LVW

Loaded Vehicle Weight

"M"

MD-TICS

Timing & Injection rate Control System

MDP

Manifold Differential Pressure sensor

ME-SFI

Motor Electronics Sequential Fuel Injection

MFI

Multiport Fuel Injection

MFI-MAF

MFI Mass Airflow Sensor

MFLS

Main Fuel Level Sensor

MI

Mechanical Fuel Injection

MIL

Malfunction Indicator Light

M/T

Manual Transmission

"N"

NAC

Nitrogen Oxides (NOx) Adsorbing Catalyst

NLV

Non-Linear Valve

NOS

NOx Sensor

NOx

NOx Emission Control

NOxATWC

NOx Adsorptive TWC

NOxC

Nitrogen Oxide Catalyst

NOxS

Nitrogen Oxide Sensor

NOxTWC

NOx Adsorptive TWC

NSC

Nitrogen Oxides (NOx) Storage Catalyst

"O"

OBD

On-Board Diagnostic System

PBD (F)/(P)

Full/Partial On-Board Diagnostic

OC

Oxidation Catalytic Converter

OHC

Overhead Cam

ORVR

On-Board Refueling Vapor Recovery

ORVR-COV

ORVR Cut-Off Valve

ORVR-CV

ORVR Control Valve

ORVR-FAV

ORVR Fresh Air Valve

ORVR-FMV

ORVR Flow Management Valve

ORVR-FTVCV

ORVR Fuel Tank Vapor Control Valve

ORVR-FTVRV

ORVR Fuel Tank Vapor Recirculation Valve

ORVR-FVRS

ORVR Fuel Vapor Recovery System

ORVR-FVV

ORVR Fuel Vent Valve

ORVR-LV

ORVR Leveling Valve

ORVR-OCKV

ORVR Overfill Check Valve

ORVR-RCV

ORVR Refueling Control Valve

ORVR-VCV

ORVR Vapor Cut Valve

ORVR-VRV

ORVR Vapor Recirculating Valve

ORVR-VSV

ORVR Vent Shut Valve

ORVR-VV

ORVR Vent Valve

OVCV

Outer Vent Control Valve

O2S

Oxygen Sensor

"P"

PAIR

Pulsed Secondary Air Injection

PAIR-ABV

PAIR Anti-Backfire Valve

PAIR-ACOV

PAIR Air Cut-Off Valve

PAIR-ACS

PAIR Air Control Solenoid

PAIR-ACV

PAIR Air Control Valve

PAIR-AIV

PAIR Air Injection Valve

PAIR-ASCS

PAIR Air Suction Control Solenoid

PAIR-ASOV

PAIR Air Shutoff Valve

PAIR-ASS

PAIR Air Switching Solenoid

PAIR-ASV

PAIR Air Switching Valve

PAIR-ASVL

PAIR Air Suction Valve

PAIR-AVCS

PAIR Air Valve Control Solenoid

PAIR-CSV

PAIR Control Solenoid Valve

PAIR-CKV

PAIR Check Valve

PAIR-DV

PAIR Diverter Valve

PAIR-PAF

PAIR Pulse Air Feeder

PAIR-PAV

PAIR Pulse Air Valve

PAIR-RES

PAIR Resonator

PAIR-RV

PAIR Reed Valve

PAIR-SCSV

PAIR Swirl Control Solenoid Valve

PAIR-SCV

PAIR Swirl Control Valve

PAIR-SOL

PAIR Solenoid

PAIR-VSV

PAIR Vacuum Switching Valve

PCM

Powertrain Control Module

PCV

Positive Crankcase Ventilation

PCV-DOV

PCV Dual Orifice Valve

PCV-HCB

PCV Heated Crankcase Breather

PCV-HE

PCV Heating Element

PCV-PRV

PCV Pressure Regulator Valve

PCV-SOL

PCV Solenoid

PEVR

Power Enrichment Vacuum Regulator

PPM

Parts Per Million

PTOX

Periodic Trap Oxidizer

PURCV

Purge Crankcase Ventilation

PVCS

Ported Valve Control System

PVCS-A

PVCS Actuator

PVCS-CS

PVCS Control Solenoid

PVLCS

Power Valve Control System

"R"

RC

NOx Reduction Catalyst

ROV

Rollover Valve

"S"

SAI-SV

Secondary Air Injection Shutoff Valve

SAIR-CV

Secondary Air Injection Control Valve

SC

Supercharged or Super Charger

SC MFI

Supercharged Multiport Fuel Injection

SCR

Selective Catalytic Reduction

SCSV

Swirl Control Solenoid Valve

SCV

Swirl Control Valve

SCV-A

SCV Actuator

SFI

Sequential Multiport Fuel Injection

SFI-MAF

SFI Mass Airflow Sensor

SFLS

Sub-Fuel Level Sensor

SOHC

Single Overhead Cam

SPK

Spark Controls

SPK-AVM

SPK Advance Vacuum Modulator

SPK-BVSV

SPK Bimetal Vacuum Switching Valve

SPK-CC

SPK Computer Controlled

SPK-CKV

SPK Check Valve

SPK-CSSA

SPK Cold Start Spark Advance System

SPK-CSSH

SPK Cold Start Spark Hold System

SPK-CTO

SPK Coolant Temperature Override

SPK-DAVS

SPK Distributor Vacuum Advance Solenoid

SPK-DCKV

SPK Distributor Check Valve

SPK-DCTO

SPK Dual Coolant Temperature Override

SPK-DDD

SPK Dual Diaphragm Distributor

SPK-DMV

SPK Distributor Modulator Valve

SPK-DPD

SPK Dual Point Distributor

SPK-DPVS

SPK Distributor Ported Vacuum Switch

SPK-DRCV

SPK Distributor Retard Control Valve

SPK-DRS

SPK Distributor Retard Solenoid

SPK-DSVMV

SPK Distributor Spark Vacuum Modulator Valve

SPK-DTVS

SPK Distributor Thermal Vacuum Switch

SPK-DTVV

SPK Distributor Thermal Vacuum Valve

SPK-DV

SPK Delay Valve

SPK-DVA

SPK Distributor Vacuum Advance

SPK-DVAS

SPK Distributor Vacuum Advance Solenoid

SPK-DVCS

SPK Distributor Vacuum Control Solenoid

SPK-DVCSW

SPK Distributor Vacuum Controlled Switch

SPK-DVCV

SPK Distributor Vacuum Control Valve

SPK-DVDV

SPK Distributor Vacuum Delay Valve

SPK-DVRS

SPK Distributor Vacuum Retard Switch

SPK-DVRV

SPK Distributor Vacuum Regulating Valve

SPK-DVVV

SPK Distributor Vacuum Vent Valve

SPK-EAVS

SPK Electronically Actuated Vacuum Switch

SPK-EDM

SPK Electronic Distributor Modulator

SPK-EI

SPK Electronic Ignition

SPK-ESA

SPK Electronic Spark Advance

SPK-ESC

SPK Electronic Spark Control (Retard)

SPK-ESS

SPK Electronic Spark Selection

SPK-EST

SPK Electronic Spark Timing

SPK-FDV

SPK Forward Delay Valve

SPK-HPCA

SPK Housing Pressure Cold Advance

SPK-ITCS

SPK Ignition Timing Control System

SPK-ITVS

SPK Ignition Timing Vacuum Switch

SPK-NLVR

SPK Non-Linear Vacuum Regulator

SPK-OSAC

SPK Orifice Spark Advance Control

SPK-PVA

SPK Ported Vacuum Advance

SPK-PVS

SPK Ported Vacuum Switch

SPK-RDO

SPK Retard Delay Orifice

SPK-RDV

SPK Reverse Delay Valve

SPK-RDVD

SPK Reverse Delay Valve (Dual)

SPK-RDVLV

SPK Retard Delay Valve

SPK-RDVS

SPK Reverse Delay Valve (Single)

SPK-RETS

SPK Retard Switch

SPK-SC

SPK Speed Controlled

SPK-SDV

SPK Spark Delay Valve

SPK-SOL

SPK Solenoid

SPK-SRRV

SPK Spark Relay Regulator Valve

SPK-TAVIA

SPK Temperature Activated Vacuum Ignition Advance

SPK-TCS

SPK Transmission Controlled Spark

SPK-TCSYS

SPK Timing Control System

SPK-TIDC

SPK Thermostatic Ignition Distributor Control

SPK-TV

SPK Thermal Valve

SPK-TVS

SPK Thermal Vacuum Switch

SPK-VACTO

SPK Vacuum Advance Coolant Temperature Override

SPK-VAS

SPK Vacuum Advance Solenoid

SPK-VAV

SPK Vacuum Advance Valve

SPK-VR

SPK Vacuum Retard

SPK-VRSW

SPK Vacuum Retard Switch

SPK-VSV

SPK Vacuum Switching Valve

SPK-VTCS

SPK Vacuum Timing Control System

SPL

Smoke Puff Limiter

SRI

Service Reminder Indicator

SSCA

Stepped Speed Control Actuator

SSCS

Stepped Speed Control Solenoid

STS

Service Throttle Soon Light

STVS

Secondary Throttle Valve System

SUB-HO2S

Sub-Heated Oxygen Sensor (after CAT)

SUB-O2S

Sub-Oxygen Sensor

SUB-TWC

Sub Three-Way Catalytic Converter

"T"

TAA

Turbo Air-To-Air

TAA

Throttle Actuator Assembly

TAB

Thermactor Air By-Pass

TAD

Thermactor Air Diverter

TAC

Thermostatic Air Cleaner

TBI

Throttle Body Injection

TBPCS

Throttle By-Pass Control System

TC

Turbo Charger

TCC

Torque Converter Clutch

TCCL

Torque Converter Control

TCD

Throttle Closing Dashpot

TC-DV

TC Delay Valve

TC-TVC

TC Thermal Vacuum Switch

TC-VS

TC Vacuum Switch

TD

Thermactor Diverter

TFT

Tank Fuel Temperature Sensor

THOS2

Third Heated Oxygen Sensor

TICV

Thermal Ignition Control Valve

TIV

Thermal Idle Valve

TK

Throttle Kicker

TLUC

Transmission Lock-Up Converter

TLUC-TVS

TLUC Thermal Vacuum Switch

TLUC-VS

TLUC Vacuum Switch

TM

Throttle Modulator

TOS

Throttle Opener System

TP

Throttle Positioner

TPI

Tuned Port Fuel Injection

TPV

Throttle Poppet Valve

TR

Thermal Reactor

TRC

Throttle Return Control

TRCS

Throttle Return Control Solenoid

TRCTL

Throttle Return Control Throttle Lever Actuator

TRSCV

Throttle Return Solenoid Control Valve

TRTVV

Temperature Regulator Thermal Vacuum Valve

TRVV

Transmission Vacuum Valve

TSOL

Throttle Solenoid

TVISD

Throttle Vacuum Idle Speed Diaphragm

TVM

Transmission Vacuum Modulator

TVS

Thermal Vacuum Switch

TWC

Three-Way Catalytic Converter

TWC+OC

Three-Way + Oxidation Catalytic Converter

"V"

VA

Vacuum Advance Unit

VAC-AMP

Vacuum Amplifier

VA-CTO

VA Coolant Temperature Override

VC

Vapor Canister

VCV

Vacuum Cut Valve

VCV-BV

VCV By-Pass Valve

VLFR

Vent Line Flow Restrictor/Anti-Trickle Fill Valve

"W"

WU

Warm-Up Catalyst

WU-OC

Warm-Up Oxidation Converter

WU-TWC

Warm-Up Three-Way Catalytic Converter

GENERAL INFORMATION

Commonly Used Abbreviations

* PLEASE READ THIS FIRST *

NOTE: **This article is intended for general information purposes only. This information may not apply to all makes and models. Not all abbreviations are covered as manufacturers add new ones every day.**

"A"

A

Amperes

ABS

Anti-Lock Brakes

ABRS

Air Bag Restraint System

AC

Alternating Current

A/C

Air Conditioning

ACCS

A/C Cycling Switch

ACCUM

Accumulator

ACCY

Accessory

ACT

Air Charge Temperature Sensor

ADJ

Adjust or Adjustable

ADV

Advance

AFS

Airflow Sensor

AI

Air Injection

AIR or A.I.R.

Air Injection Reactor

AIS

Air Injection System

Alt.

Alternator or Altitude

Amp./amp/amps

Ampere

ASCS

Air Suction Control Solenoid

ASD

Auto Shutdown

ASDM

Air Bag System Diagnostic Module

ASV

Air Suction Valve

A/T

Automatic Transmission/Transaxle

ATC

Automatic Temperature Control

ATDC

After Top Dead Center

ATF

Automatic Transmission Fluid

ATS

Air Temperature Sensor

Aux.

Auxiliary

Avg.

Average

AXOD

Automatic Transaxle Overdrive (Ford Models Only)

"B"

BAC

By-Pass Air Control

BAP

Barometric Absolute Pressure Sensor

BARO

Barometric

Batt.

Battery

Bbl.

Barrel (Example: 4-Bbl.)

BCM

Body Control Module

BHP

Brake Horsepower

BMAP

Barometric and Manifold Absolute Pressure Sensor

BOO

Brake On-Off Switch

B/P

Backpressure

BPS

Barometric Pressure Sensor

BPT

Backpressure Transducer

BTDC

Before Top Dead Center

BTSI

Brake Transmission Shift Interlock

BTU

British Thermal Unit

BVSV

Bimetallic Vacuum Switching Valve

"C"

Â° C

Celsius (Degrees)

Calif.

California

CANP

Canister Purge

CARB

California Air Resources Board

CAT

Catalytic Converter

CB

Circuit Breaker

CBD

Closed Bowl Distributor

cc

cubic centimeter

CCC

Close Coupled Catalyst

CCC

Computer Command Control

CCD

Computer Controlled Dwell

CCOT

Cycling Clutch Orifice Tube

CCW

Counterclockwise

CDI

Capacitor Discharge Ignition

CEC

Computerized Engine Control

CID

Cubic Inch Displacement

cm

Centimeter

CMP

Camshaft Position Sensor

CO

Carbon Monoxide

CO_2

Carbon Dioxide

Cont.

Continued

CONV

Convertible

CP

Canister Purge

CKP

Crankshaft Position Sensor

CTS

Coolant Temperature Sensor

Cu. In.

Cubic Inch

CVC

Constant Vacuum Control

CV

Check Valve or Constant Velocity

CW

Clockwise

CYL or Cyl.

Cylinder

C^3 I

Computer Controlled Coil Ignition

C^4

Computer Controlled Catalytic Converter

"D"

"D"

Drive

DC

Direct Current Or Discharge

DDD

Dual Diaphragm Distributor

Def.

Defrost

Defog.

Defogger

DERM

Diagnostic Energy Reserve Module

DFI

Digital Fuel Injection

Diag.

Diagnostic

DTC

Diagnostic Trouble Code

DIC

Driver Information Center

DIS

Distributorless Ignition System

DIST

Distribution

DLC

Data Link Connector

DOC

Diesel Oxidation Catalyst

DOHC

Double Overhead Cam

DOT

Department of Transportation

DPF

Diesel Particulate Filter

DRB-II

Diagnostic Readout Box

DVOM

Digital Volt-Ohmmeter

"E"

EACV

Electric Air Control Valve

EATX

Electronic Automatic Transaxle

EBCM

Electronic Brake Control Module

EBL

Electronic Back Light

ECM

Engine Control Module

ECT

Engine Coolant Temperature Sensor

EDIS

Electronic Distributorless Ignition System

EEC

Electronic Engine Control

EECS

Evaporative Emission Control System

EEPROM

Electronically Erasable PROM

EFE

Early Fuel Evaporation

EGO

Exhaust Gas Oxygen Sensor

EGR

Exhaust Gas Recirculation

EOT

Engine Oil Temperature

ESA

Electronic Spark Advance

ESC

Electronic Spark Control

EST

Electronic Spark Timing

EVAP

Fuel Evaporative System

EVIC

Electronic Vehicle Information Center

EVP

EGR Valve Position Sensor

EWMA

Exponentially Weighted Moving Average (MODE 6)

Exc.

Except

"F"

Â° F

Fahrenheit (Degrees)

F/B

Fuse Block

Fed.

Federal

FI

Fuel Injection

FICU

Fuel Injection Control Unit

FIPL

Fuel Injector Pump Lever

FLI

Fuel Level Indicator

FPR-VSV

Fuel Pressure Regulator Vacuum Switching Valve

Ft. Lbs.

Foot Pounds

FWD

Front Wheel Drive

"G"

g

grams

Gals.

gallons

GND or GRND

Ground

"H"

HAC

High Altitude Compensation

HC

Hydrocarbons

H/D

Heavy Duty

HO2S

Heated Exhaust Gas Oxygen Sensor

Hg

Mercury

Hgt.

Height

HLDT

Headlight

HO

High Output

HO2S

Heated Oxygen Sensor

HP

High Performance

HSC

High Swirl Combustion

HSO

High Specific Output

HTR

Heater

Hz

Hertz (Cycles Per Second)

"I"

IAC

Idle Air Control

IACV

Idle Air Control Valve

IAT

Intake Air Temperature

IC

Integrated Circuit

ID

Identification

I.D.

Inside Diameter

IFS

Independant Front Suspension

IFS

Inertia Fuel Shutoff (Ford)

Ign.

Ignition

IMRC

Intake Manifold Runner Control

In.

Inches

INCH Lbs.

Inch Pounds

in. Hg

Inches of Mercury

Inj.

Injector

IP

Instrument Panel

IRS

Independant Rear Suspension

ISC

Idle Speed Control

IVD

Interactive Vehicle Dynamics (Ford)

IVSV

Idle Vacuum Switching Valve

"J"

J/B

Junction Block

"K"

KAPWR

Keep Alive Power

k/ohms

kilo-ohms (1000 ohms)

kg

Kilograms (weight)

kg/cm^2

Kilograms Per Square Centimeter

KM/H

Kilometers Per Hour

KOEO

Key On, Engine Off

KOER

Key On, Engine Running

KS

Knock Sensor

kW

Kilowatt

kV

Kilovolt

"L"

L

Liter

lbs. (Lbs. when used in table)

Pounds

LCD

Liquid Crystal Display

L/D

Light Duty

LDP

Leak Detection Pump (Part of EVAP system.)

LED

Light Emitting Diode

LH

Left Hand

"M"

mA

Milliamps

MA or MAF

Mass Airflow

MAFS

Mass Airflow Sensor

MAP

Manifold Absolute Pressure

MAT

Manifold Air Temperature

Mem.

Memory

MEM-CAL

Memory Calibration Chip

mfd.

Microfarads

MFI

Multiport Fuel Injection

MICU

Multiplex Integrated Control Unit (Acura/Honda)

MIL

Malfunction Indicator Light

MPI

Multi-Point (Fuel) Injection

mm

Millimeters

MPH

Miles Per Hour

mV

Millivolts

"N"

NA

Not Available

NAC

NOx Adsorber Catalyst

NCA

No Color Available (Wiring Diagrams)

NGS

New Generation Star

N.m

Newton Meter

No.

Number

Nos.

Numbers

NOx

Oxides of Nitrogen

"O"

O_2

Oxygen

OBD

On-Board Diagnostics

OC

Oxidation Catalyst

OD

Overdrive

O.D.

Outside Diameter

OHC

Overhead Camshaft

OSS

Output Speed Sensor

O/S

Oversize

oz.

Ounce

ozs.

Ounces

"P"

"P"

Park

P/C

Printed Circuit

PCM

Powertrain Control Module

PCS

Purge Control Solenoid

PC-SOL

Purge Control Solenoid

PCV

Positive Crankcase Ventilation

PFI

Port Fuel Injection

PGM-FI

Programmed Fuel Injection

PID

Parameter Identification

PIP

Profile Ignition Pick-up

PNP

Park Neutral Position Switch

P/N

Park/Neutral

PRNDL

Park Reverse Neutral Drive Low

PROM

Programmable Read-Only Memory

psi

Pounds Per Square Inch

P/S

Power Steering

PSPS

Power Steering Pressure Switch

PTC

Positive Temperature Coefficient

PTO

Power Take-Off

Pts.

Pints

Pwr.

Power

"Q"

Qts.

Quarts

"R"

RABS

Rear Anti-Lock Brake System

RECIRC

Recirculation

RH

Right Hand

RPM

Revolutions Per Minute

RWAL

Rear Wheel Anti-Lock Brake

RWD

Rear Wheel Drive

"S"

SAS

Steering Angle Sensor

SBC

Single Bed Converter

SBEC

Single Board Engine Controller

SDARS

Satellite Digital Audio Radio Service

SES

Service Engine Soon

SFI

Sequential (Port) Fuel Injection

SIL

Shift Indicator Light

SIR

Supplemental Inflatable Restraint

SOHC

Single Overhead Cam

SOL or Sol.

Solenoid

SPFI

Sequential Port Fuel Injection

SPK

Spark Control

SPOUT

Spark Output

SRI

Service Reminder Indicator

SRS

Supplemental Restraint System (Air Bag)

STAR

Self-Test Automatic Readout

STO

Self-Test Output

SUB-O_2

Sub Oxygen Sensor

Sw.

Switch

Sys.

System

"T"

TAB

Thermactor Air By-Pass

TAC

Throttle Actuator Module

TAD

Thermactor Air Diverter

TBC

Body Control Module (General Motors)

TBI

Throttle Body Injection

TCC

Torque Converter Clutch

TDC

Top Dead Center

Temp.

Temperature

TFI

Thick Film Ignition

THERMAC

Thermostatic Air Cleaner

TPM

Tire Pressure Monitor

TPMS

Tire Pressure Monitor System

TPS

Throttle Position Sensor/Switch

TS

Temperature Sensor

TV

Thermovalve

TWC

Three-Way Catalyst

"V"

V

Valve

Vac.

Vacuum

VAF

Vane Airflow

VAPS

Variable Assist Power Steering

VCC

Viscous Converter Clutch

VCRM

Variable Control Relay Module

VIN

Vehicle Identification Number

VM

Vacuum Modulator

Volt.

Voltage

VOM

Volt-Ohmmeter (Analog)

VRV

Vacuum Regulator Valve

VSS

Vehicle Speed Sensor

VSV

Vacuum Switching Valve

"W"

W/

With

W/O

Without

WAC

Wide Open Throttle A/C Switch

WOT

Wide Open Throttle

Article GUID: A00002370

COMMON SPECS & PROCEDURES

Escalade, Suburban, Tahoe & Yukon

COMMON SPECS & PROCEDURES INDEX

ESCALADE, SUBURBAN, TAHOE & YUKON COMMON SPECS & PROCEDURES

System	Specification/Procedure
Air Conditioning	
Service	APPROXIMATE FLUID CAPACITIES
Torque	Automatic - FASTENER SPECIFICATIONS
Axle Nut/Hub Nut	
Front	255 N.m (188 lb ft)
Battery	N/A
Brakes	
Bleeding Sequence	RIGHT REAR, LEFT REAR, RIGHT FRONT, LEFT FRONT HYDRAULIC BRAKE SYSTEM BLEEDING (MANUAL) HYDRAULIC BRAKE SYSTEM BLEEDING (PRESSURE)
Disc Brakes	
Service Specifications	DISC BRAKE COMPONENT SPECIFICATIONS
Torque	FASTENER SPECIFICATIONS
Charging	
Generator	N/A
Torque	FASTENER SPECIFICATIONS
Drive Belts	
Adjustment	Non-Adjustable Serpentine Belt
Drive Belt Routing	Please see figure under drive belt DRIVE BELT REPLACEMENT - ACCESSORY for 5.3L, 6.2L or DRIVE BELT REPLACEMENT - ACCESSORY for 6.0L
Engine Cooling	
General Service Specifications	N/A
Radiator Cap Pressure	Pressure Stamped On Cap
Thermostat R & I	

System		Specification/Procedure
	5.3L, 6.0L, 6.2L	ENGINE COOLANT THERMOSTAT REPLACEMENT (L96) or ENGINE COOLANT THERMOSTAT HOUSING REPLACEMENT (L83, L86)
	Water Pump R & I	
	5.3L, 6.0L, 6.2L	WATER PUMP REPLACEMENT (L83, L86) or WATER PUMP REPLACEMENT (L96)
Engine Mechanical		
5.3L, 6.2L		
	Compression	ENGINE COMPRESSION TEST
	Oil Pressure	Minimum - Hot - @ 1,000 RPM - 152 kPa (22 psig) @ 2,000 RPM - 207 kPa (30 psig) @ 3,000 RPM - 228 kPa (33 psig)
	Overhaul	ENGINE MECHANICAL SPECIFICATIONS (L83) ENGINE MECHANICAL SPECIFICATIONS (L86)
	Torque	FASTENER SPECIFICATIONS
6.0L		
	Compression	ENGINE COMPRESSION TEST
	Oil Pressure	Minimum - Hot - @ 1,000 RPM - 152 kPa (22 psig) @ 2,000 RPM - 207 kPa (30 psig) @ 3,000 RPM - 228 kPa (33 psig)
	Overhaul	ENGINE MECHANICAL SPECIFICATIONS (RPO L96 VIN G)
	Torque	FASTENER SPECIFICATIONS
Fluid Specifications		See FLUIDS under MAINTENANCE/FLUIDS tab. From within Manager or Service Writer, click the "30/60/90 Interval" or "Maint." button.
Flywheel/Flex Plate/Drive Plate Torque		5.3L, 6.2L Automatic - First Pass - 15 N.m (11 lb ft) Second Pass - 30 N.m (22 lb ft) Final Pass - 45 Degrees 6.0L Automatic - First Pass - 20 N.m (15 lb ft) Second Pass - 50 N.m (37 lb ft) Final Pass - 100 N.m (74 lb ft)
Fuel System		
Pressure Specification		5.3L, 6.2L (FPCM) - Ignition ON, engine OFF, 320-580 kPa (46-84 psi) 6.0L - 345-414 kPa (50-60 psi)

System	Specification/Procedure
Fuel Pressure Test Procedure	5.3L, 6,2L - **CIRCUIT/SYSTEM VERIFICATION** 6.0L - **CIRCUIT/SYSTEM VERIFICATION**
Fuel Filter Location	Fuel Filter Is Part of the Fuel Tank Fuel Pump Module
Fuel Filter R & I	5.3L, 6.2L - **FUEL TANK FUEL PUMP MODULE REPLACEMENT (SWB)** or **FUEL TANK FUEL PUMP MODULE REPLACEMENT (LWB)** 6.0L - **FUEL TANK FUEL PUMP MODULE REPLACEMENT (FRONT TANK)** or **FUEL TANK FUEL PUMP MODULE REPLACEMENT (REAR TANK)**
Ignition	
Firing Order & Cylinder Identification	**FIRING ORDER & CYLINDER IDENTIFICATION**
Ignition Wires (Resistance)	5.3, 6.2L Individual Ignition Coil/Module Assemblies 6.0L - 170-220 Ω per 25.4 mm (1.0 in)
Ignition Wires (Routing)	
5.3L, 6.2L 6.0L	Coil on Plug Straight down to spark plug
Spark Plug	
5.3L, 6.0L, 6.2L - Type - See parts catalog	
Gap	5.3L, 6.2L - 0.95-1.10 mm (0.037-0.043 in) 6.0L - 0.95-1.10 mm (0.037-0.043 in)
Torque	5.3L, 6.2L - 20 N.m (15 lb ft) 6.0L - 11 N.m (15 lb ft)
Starting	
Starter	N/A
Torque	**FASTENER SPECIFICATIONS**
Wheel Alignment	
Adjustment Specifications	**WHEEL ALIGNMENT SPECIFICATIONS**
Torque	**FASTENER SPECIFICATIONS**
Wheel & Tire	
Wheel Lug Nut Torque	190 N.m (140 lb ft) For lug nut Tightening Sequence, please see figure under **TIRE AND WHEEL REMOVAL AND INSTALLATION (6-LUG WHEEL)** or **TIRE AND WHEEL REMOVAL AND INSTALLATION (8-LUG WHEEL)**

n, T...

2015 DTC INDEX

Escalade, Suburban, Tahoe, Yukon

ACTIVE NOISE CANCELLATION SYSTEM - DIAGNOSTIC TROUBLE CODES

ACTIVE NOISE CANCELLATION SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Engine RPM Input Circuit Signal Invalid
Â	Microphone Input Signal Circuit

ADJUSTABLE PEDAL SYSTEM - DIAGNOSTIC TROUBLE CODES

ADJUSTABLE PEDAL SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Adjustable Pedal Rearward Switch (Z75)
Â	Adjustable Pedal Rearward Switch (X88 or Z88)
Â	Adjustable Pedal Position Sensor
Â	Adjustable Foot Pedal Inhibit Circuit

ANTILOCK BRAKE SYSTEM - DIAGNOSTIC TROUBLE CODES

ANTILOCK BRAKE SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Traction Control Switch Circuit Short to Ground
Â	Hill Descent Control Switch Short to Ground
Â	Wheel Speed Sensor
Â	Pump Motor
Â	Traction Control System
Â	Antilock Braking System Brake Switch Circuit
Â	Acceleration Sensor (Without UGN)
Â	Acceleration Sensor (With UGN)

DTC	Description
Â	Multi-Axis Acceleration Sensor Module - Incorrect Component Installed
Â	Engine Control Module Indicated Traction Control Malfunction
Â	Wheel Speed Sensor Frequency Malfunction
Â	Valve High Temperature/Stability System Active Too Long
Â	Calibration Data Configuration Not Programmed
Â	Steering Position Signal
Â	Lateral Acceleration Sensor
Â	Longitudinal Acceleration Sensor
Â	Traction Control Torque Request Circuit
Â	Automatic Braking Engine Torque Request Signal Message Counter Incorrect

AUTOMATIC TRANSMISSION - 6L80 - DIAGNOSTIC TROUBLE CODES

AUTOMATIC TRANSMISSION - 6L80 - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Control Module
Â	Control Module Overtemperature
Â	Actuator High Control Circuit Group 1
Â	Control Module Temperature Sensor
Â	Control Module Power Up Temperature Sensor
Â	Transmission Fluid Temperature Sensor
Â	Input Speed Sensor
Â	Transmission Tow Mode Switch Circuit
Â	Output Speed Sensor
Â	Torque Converter Clutch (TCC) System
Â	Shift Solenoid Valve 1 Performance
Â	Shift Solenoid Valve 2 Performance
Â	Pressure Control Solenoid Valve 2
Â	Pressure Control Solenoid Valve 3

DTC	Description
Â	Switch Circuit
Â	Transmission Fluid Pressure Switch 1
Â	Park/Neutral Position Switch Circuit
Â	Transmission Fluid Pressure Switch 3
Â	Transmission Fluid Pressure Switch 4
Â	Line Pressure Control Solenoid Valve
Â	Pressure Control Solenoid Valve 2
Â	Pressure Control Solenoid Valve 3
Â	Shift Solenoid Valve 1
Â	Shift Solenoid Valve 2
Â	Transmission Fluid Pressure Switch 5
Â	Up and Down Shift Switch Signal Message Counter Incorrect
Â	Transmission Mode Switch Signal Message Counter Incorrect
Â	Internal Mode Switch
Â	Pressure Control Solenoid Valve 4
Â	Pressure Control Solenoid 4
Â	Pressure Control Solenoid Valve 5
Â	Pressure Control (PC) Solenoid Valve 5
Â	Torque Converter Clutch (TCC) Pressure Control Solenoid Valve
Â	Four Wheel Drive (4WD) Switch Circuit (NQF OR NQH)

AUTOMATIC TRANSMISSION - 8L90 (M5U) - DIAGNOSTIC TROUBLE CODES

AUTOMATIC TRANSMISSION - 8L90 (M5U) - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Control Module
Â	Actuator High Control Circuit Group 1
Â	Transmission Fluid Temperature Sensor
Â	Input Speed Sensor
Â	Transmission Tow Mode Switch Circuit
Â	Output Speed Sensor

DTC	Description
Â	Transmission Control Solenoid Valve 1
Â	Transmission Control Solenoid Valve 2
Â	Transmission Control Solenoid Valve 3
Â	Switch Circuit
Â	Park/Neutral Position Switch Circuit Low Voltage
Â	Transmission Control Solenoid Valve 1
Â	Transmission Control Solenoid Valve 2
Â	Transmission Control Solenoid Valve 3
Â	Acceleration Sensor Signal Message Counter Incorrect
Â	Up and Down Shift Switch Signal Message Counter Incorrect
Â	Intermediate Speed Sensor
Â	Internal Mode Switch P
Â	Internal Mode Switch A
Â	Internal Mode Switch B
Â	Internal Mode Switch
Â	Internal Mode Switch C
Â	Internal Mode Switch S
Â	Actuator High Control
Â	Transmission Control Solenoid Valve 4
Â	Transmission Control Solenoid Valve 4
Â	Transmission Control Solenoid Valve 5
Â	Transmission Control Solenoid Valve 5
Â	Transmission Control Solenoid Valve 6
Â	Transmission Control Solenoid Valve
Â	Torque Converter Clutch (TCC) System
Â	Transmission Control Solenoid Valve 7
Â	Transmission Control Solenoid Valve 8
Â	Transmission Control Solenoid Valve 8
Â	Transmission Control Solenoid Valve 9

BATTERY, CHARGING SYSTEM AND STARTING SYSTEM - DIAGNOSTIC TROUBLE CODES

BATTERY, CHARGING SYSTEM AND STARTING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Device Power Circuit/Device Voltage Circuit/Control Module Power Circuit/ Battery Voltage/System Voltage
Â	Battery Current Sensor
Â	Low Battery Capacity Detected
Â	Parasitic Load
Â	Starter Relay Control Circuit
Â	Generator L-Terminal Circuit
Â	Generator F-Terminal Circuit

BOLTED EXTERIOR BODY PANELS AND CLOSURES - DIAGNOSTIC TROUBLE CODES

BOLTED EXTERIOR BODY PANELS AND CLOSURES - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Hood Ajar Circuit Plausibility Failure
Â	Engine Hood Switch Circuit

BUMPERS AND FASCIAS - DIAGNOSTIC TROUBLE CODES

BUMPERS AND FASCIAS - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Active Grille Air Shutter
Â	Active Grille Air Shutter

CELLULAR SYSTEM, ENTERTAINMENT SYSTEM, AND NAVIGATION SYSTEM - DIAGNOSTIC TROUBLE CODES

CELLULAR SYSTEM, ENTERTAINMENT SYSTEM, AND NAVIGATION SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Auxiliary Electronic Control Unit Performance

DTC	Description
Â	Circuit Board Temperature Sensor Above Maximum Threshold (Audio Amplifier)
Â	Circuit Board Temperature Sensor Above Maximum Threshold (Human Machine Interface Control Module)
Â	Audio Output (UQ3)
Â	Audio Output (UQA with Front Bench Seat)
Â	Audio Output (UQA with Front Bucket Seats)
Â	Audio Output (UQS)
Â	Audio Output(UQH)
Â	Universal Serial Bus (USB) Programming
Â	USB 1 Circuit (IO5/IO6)
Â	USB 1 Circuit (IO3)
Â	USB 2 Circuit
Â	Antenna Signal Circuit
Â	Satellite Antenna Circuit
Â	Theft Protection Active
Â	Microphone 1 Input Signal Circuit
Â	Auxiliary Video Input Signal Circuit Open Circuit
Â	Front Video Display Output Signal (X88/Z88 without U42 and IO3)
Â	Front Video Display Output Signal (X88/Z88 with U42)
Â	Front Video Display Output Signal (X88/Z88 with IO3)
Â	Front Video Display Output Signal (Z75)
Â	Rear Seat Entertainment Input Signal Circuit Signal Amplitude < Minimum (without DNU)
Â	Rear Seat Entertainment Input Signal Circuit Signal Amplitude < Minimum (with DNU)
Â	Infotainment Faceplate Control Module
Â	Info Display Module Internal Malfunction
Â	Optical Media Drive
Â	Optical Media Drive Theft Locked
Â	Cellular Phone Microphone Circuit

DTC	Description
Â	Global Positioning System Signal (IO6 without UE1)
Â	Global Positioning System Signal (OnStar Gen 9.xx - IO6 with UE1 without CV3)
Â	Global Positioning System Signal (OnStar Gen 9.xx - UE1 with IO6 with CV3)
Â	Global Positioning System (OnStar Gen 10)
Â	Cellular Phone Antenna Circuit Malfunction (OnStar Gen 9.xx - UE1 without CV3)
Â	Cellular Phone Antenna Circuit Malfunction (OnStar Gen 9.xx - UE1 with CV3)
Â	Cellular Phone Antenna Circuit Malfunction (OnStar Gen 10)
Â	Cellular Phone Select Service Switch

CRUISE CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

CRUISE CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Steering Wheel Controls Distance Sensing Cruise Control Gap Up/Down Signal Circuit
Â	Steering Wheel Angle Sensor Module - Incorrect Component Installed (Distance Sensing Cruise Control)
Â	Driven Wheel Speed - Non Driven Wheel Speed Not Plausible
Â	Vehicle Identification Number Malfunction
Â	Electronic Control Unit Software - Calibration Not Learned (Distance Sensing Cruise Control Module)
Â	Distance Sensing Cruise Control Module Performance
Â	Cruise Control Brake Switch Circuit
Â	Brake Switch Circuit
Â	Cruise Control Switch Signal Message Counter Incorrect
Â	Brake Switch Signal Message Counter Incorrect
Â	Distance Sensing Cruise Control Signal Message Counter Incorrect

DTC	Description
Â	Front Object Detection Control Module Torque Request Signal Message Counter Incorrect (Distance Sensing Cruise Control Module)
Â	Cruise Control/Vehicle Speed Limiting/Warning Switch

DATA COMMUNICATION SYSTEM - DIAGNOSTIC TROUBLE CODES

DATA COMMUNICATION SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Electronic Control Unit
Â	Option Configuration
Â	Electronic Control Unit Hardware
Â	Electronic Control Unit Software
Â	Electronic Control Unit Hardware
Â	Electronic Control Unit Software
Â	Control Module
Â	Low Speed CAN Bus
Â	MOST Bus
Â	MOST Bus Performance
Â	Control Module Communication Bus A Off/CAN Bus Communication
Â	Control Module Communication Bus B Off (Chassis Expansion Bus)
Â	Control Module Communication Powertrain Expansion CAN Bus Off Malfunction (Powertrain Expansion Bus)
Â	Control Module Communication Object Detection CAN Bus Off
Â	Control Module Communication Chassis Expansion CAN Bus Off
Â	Control Module Communication Low Speed CAN Bus Off
Â	Control Module U Code List
Â	Control Module U Code List
Â	Control Module U Code List
Â	Control Module U Code List
Â	Powertrain Wake-Up Communication Circuit

DTC	Description
Â	Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus
Â	Lost Communication with Body Control Module on Low Speed CAN Bus
Â	Lost Communication with Fuel Pump Driver Control Module
Â	Lost Communication with Right Object Detection Control Module on Dedicated Bus 1
Â	Primary/Secondary High Speed CAN Bus Subnet Configuration List
Â	MOST Communication Enable Circuit
Â	High Speed Communication Enable Circuit
Â	Object Detection Control Module High Speed Communication Enable Circuit 1
Â	Object Detection Control Module High Speed Communication Enable Circuit 2
Â	Fuel Pump Driver Control Module Lost Communication with ECM
Â	Control Module U Code List

ENGINE CONTROLS/FUEL - 5.3L, 6.2L - DIAGNOSTIC TROUBLE CODES

ENGINE CONTROLS/FUEL - 5.3L, 6.2L - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Camshaft Position Actuator Solenoid Valve Control Circuit
Â	Intake Camshaft Position System Performance
Â	Crankshaft Position - Camshaft Position Not Plausible
Â	HO2S Heater
Â	Throttle Body Air Flow Performance/Intake Air Flow System Performance
Â	Fuel Pressure Regulator Performance
Â	Fuel Pressure Regulator
Â	Intake Air Temperature (IAT) Sensor
Â	Intake Air Temperature (IAT) Sensor

DTC	Description
Â	Fuel Rail Pressure Low During Engine Cranking
Â	Intake Air Humidity Sensor
Â	Mass Air Flow (MAF) Sensor Performance
Â	Mass Air Flow (MAF) Sensor
Â	Manifold Absolute Pressure (MAP) Sensor Performance
Â	Manifold Absolute Pressure (MAP) Sensor
Â	Intake Air Temperature (IAT) Sensor 1
Â	Engine Coolant Temperature (ECT) Sensor Performance
Â	Engine Coolant Temperature (ECT) Sensor
Â	Throttle Position Sensor/Sensor Communication
Â	Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature
Â	HO2S Circuit High Voltage Bank
Â	HO2S Slow Response
Â	Fuel Trim System
Â	Fuel Composition Sensor
Â	Fuel Pressure Sensor Performance
Â	Fuel Rail Pressure Sensor Performance
Â	Fuel Rail Pressure Sensor
Â	Cylinder Injector Control Circuit
Â	Fuel Pump Control Circuit
Â	Engine Misfire Detected/Cylinder 8 Misfire
Â	Crankshaft Position System Variation Not Learned
Â	Knock Sensor/Control Module Knock Sensor Processor
Â	Knock Sensor
Â	Crankshaft Position Sensor
Â	Camshaft Position Sensor
Â	Ignition Coil
Â	Catalyst System Low Efficiency Bank
Â	Evaporative Emission (EVAP) System Small Leak Detected

DTC	Description
Â	Evaporative Emission (EVAP) Purge Solenoid Valve Control Circuit
Â	Evaporative Emission (EVAP) Vent System Performance
Â	Evaporative Emission (EVAP) Vent Solenoid Valve Control Circuit
Â	Fuel Tank Pressure Sensor
Â	Evaporative Emission (EVAP) System Large Leak Detected
Â	Evaporative Emission (EVAP) System Flow During Non-Purge
Â	Idle Speed
Â	Cold Start Rough Idle
Â	Cold Start Intake Camshaft Position System Performance
Â	Brake Pedal Position Sensor
Â	Control Module/VIN Not Programmed or Mismatched (ECM)
Â	Fuel Pump Enable Circuit Low Voltage
Â	5V Reference (ECM)
Â	Malfunction Indicator Lamp (MIL) Control Circuit
Â	Engine Controls Ignition Relay/Ignition 1 Switch Circuit 2
Â	Transmission Control Module Requested MIL Illumination
Â	Cylinder Injector High Control Circuit Shorted to Control Circuit
Â	Fuel Pump Control Module Driver High Temperature
Â	Fuel Rail Pressure Sensor
Â	Fuel Pump Driver Control Module System
Â	Fuel Pump Driver Control Module Ignition On/Start Switch Circuit Low Voltage
Â	Fuel Pump
Â	Fuel Pump Driver Control Module Enable Circuit Performance
Â	Ignition Coil Supply Voltage Circuit Bank
Â	Cold Start Emission Reduction Control System
Â	Throttle Actuator
Â	Control Module Fuel Pressure Regulator 1 Control System Circuitry Performance
Â	Post Catalyst Fuel Trim System

DTC	Description
Â	Accelerator Pedal Position (APP) Sensor
Â	Cylinder Injector High Control Circuit
Â	Intake Air Temperature (IAT) Sensors 1-2 Not Plausible
Â	Fuel Trim Cylinder Balance Bank
Â	Barometric Pressure (BARO) Sensor
Â	Water in Fuel
Â	Crankshaft Position Signal Output Circuit
Â	Fuel Pump Flow Performance
Â	Chassis Control Module Requested MIL Illumination
Â	Cylinder Deactivation System
Â	Cylinder Deactivation Solenoid Valve Control Circuit

ENGINE COOLING SYSTEM - DIAGNOSTIC TROUBLE CODES

ENGINE COOLING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Cooling Fan Speed Output
Â	Engine Coolant Over temperature - Protection Mode Active

ENGINE MECHANICAL - 5.3L (L83) OR 6.2L (L86) - DIAGNOSTIC TROUBLE CODES

ENGINE MECHANICAL - 5.3L (L83) OR 6.2L (L86) - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Engine Oil Pressure Control Solenoid Valve
Â	Engine Oil Pressure Control Solenoid Valve Stuck Off

FIXED AND MOVEABLE WINDOWS - DIAGNOSTIC TROUBLE CODES

FIXED AND MOVEABLE WINDOWS - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Rear Defrost Circuit
Â	Window Switch

DTC	Description
Â	Window Motor

FRAME AND UNDERBODY - DIAGNOSTIC TROUBLE CODES

FRAME AND UNDERBODY - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Left/Right Side Assist Step Motor Control Circuit
Â	Left/Right Assist Step Position Sensor Circuit
Â	Assist Step Disable Switch Circuit Short to Ground
Â	Assist Step Position Sensor Supply Circuit

HORN SYSTEM - DIAGNOSTIC TROUBLE CODES

HORN SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Horn Relay Secondary Circuit

HVAC SYSTEM - AUTOMATIC - DIAGNOSTIC TROUBLE CODES

HVAC SYSTEM - AUTOMATIC - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Passenger Compartment Temperature Sensor/Solar Load Sensor/ Control Module Voltage Reference Output 2
Â	Duct Air Temperature Sensor
Â	Front Blower Motor Speed Circuit
Â	Front Blower Motor Speed Circuit
Â	Recirculation Control/Temperature Control /Main Temperature Control/Air Flow Control Circuit
Â	Auxiliary Electronic Control Unit (ECU) Internal Malfunction
Â	Air Conditioning Compressor Valve Control Circuit
Â	Air Conditioning (A/C) Refrigerant Pressure Sensor
Â	Air Conditioning (A/C) Compressor Clutch Relay

HYDRAULIC BRAKE SYSTEM - DIAGNOSTIC TROUBLE CODES

HYDRAULIC BRAKE SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Low Brake Fluid Indicated
Â	Brake Fluid Level Switch Circuit
Â	Brake Booster Large Vacuum Leak Detected
Â	Brake Booster Vacuum Sensor Circuit

IMMOBILIZER SYSTEM - DIAGNOSTIC TROUBLE CODES

IMMOBILIZER SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Security Sensor Data Circuit (with BTM)
Â	Security Sensor Data Circuit (without BTM)
Â	Mobile Telephone Communications Interface Requested Immobilization
Â	Security Controller In Learn Mode (without BTM)
Â	Security Controller In Learn Mode (with BTM)
Â	No Transponder Modulation or No Transponder
Â	Immobilizer Transponder of Wrong Type Programmed
Â	Environment Identification
Â	Incorrect Immobilizer Identifier Received
Â	Incorrect Environmental Identifier
Â	Transponder Authentication
Â	Unconfigured Transponder
Â	Incorrect Environmental Identifier
Â	Device 1 Environment Identifier Not Programmable
Â	Immobilizer Key Incorrect
Â	Immobilizer Key Not Programmed
Â	Remote Vehicle Speed Limiting Signal Message Counter Incorrect
Â	Immobilizer Fuel Enable Signal Not Correct

DTC	Description
Â	Immobilizer Security Code Not Programmed

INSTRUMENT PANEL SYSTEM DISPLAYS AND GAUGES - DIAGNOSTIC TROUBLE CODES

INSTRUMENT PANEL SYSTEM DISPLAYS AND GAUGES - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Ambient Air Temperature Sensor
Â	Odometer Circuit General Memory Malfunction
Â	Universal Serial Bus (USB) Programming
Â	Head-Up Display Module
Â	Head-Up Display Switch
Â	Ambient Air Temperature Sensor
Â	Fuel Level Sensor
Â	Engine Oil Pressure Sensor
Â	Engine Oil Level Switch Circuit

INSTRUMENT PANEL TRIM AND CONSOLE TRIM - DIAGNOSTIC TROUBLE CODES

INSTRUMENT PANEL TRIM AND CONSOLE TRIM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Instrument Panel Compartment Door Latch Actuator Circuit

KEYLESS ENTRY SYSTEM AND REMOTE FUNCTIONS - DIAGNOSTIC TROUBLE CODES

KEYLESS ENTRY SYSTEM AND REMOTE FUNCTIONS - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Challenge Active Circuit
Â	Keyless Entry Data Link Circuit
Â	Keyless Entry Transmitters
Â	Keyless Entry Data Link
Â	Keyless Entry Transmitter
Â	Keyless Entry Transmitter

DTC	Description
Â	Keyless Entry Antenna 1
Â	Keyless Entry Antenna 2 High Voltage/Open
Â	Keyless Entry Antenna 3
Â	Keyless Entry Antenna 4
Â	Keyless Entry Antenna 5
Â	Keyless Entry Antenna 6

LIGHTING SYSTEM - DIAGNOSTIC TROUBLE CODES

LIGHTING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Stop Lamp Switch Circuit Not Plausible
Â	Control Module Voltage Reference Output 1
Â	Battery Rundown Protection Circuit Short to Ground
Â	Front Fog Lamps
Â	Backup Lamps
Â	Passenger Compartment Lamp
Â	Interior Door Handle Backlight
Â	Headlamps Control Circuit
Â	Headlamp Switch Input Signals Correlation Malfunction
Â	High Beam Control
Â	Low Beam Control Circuit
Â	Left/Right Cornering Lamp
Â	Left/Right Daytime Running Lamps
Â	Daytime Running Lamps Control
Â	Passenger Compartment Dimming 1
Â	Passenger Compartment Dimming 2
Â	Display Dimming Pulse Width Modulation Output
Â	Exterior Illumination Lamp
Â	Ambient Light Sensor
Â	Front Fog Lamp Switch Circuit Malfunction

DTC	Description
Â	Hazard Lamps Request Circuit Malfunction
Â	Passenger Compartment Dimming Request Signal
Â	High Beam Request Signal Circuit Performance - Signal Invalid
Â	High Beam and Headlamp Flash Select Circuit Malfunction
Â	Tail Lamp Circuit Short to Ground
Â	License Plate Lamp
Â	Center High Mounted Stop Lamp
Â	Trailer Left Tail Lamp/Trailer Right Tail Lamp
Â	Trailer Left Turn Signal /Trailer Right Turn Signal
Â	Trailer Brake Lamps
Â	Trailer Lamps Number of Intermittent Short Circuit Detections Exceeded Signal Cross Coupled
Â	Trailer Backup Lamps
Â	Trailer Fog Lamps
Â	Left/Right Front Turn Signal
Â	Left/Right Rear Turn Signal
Â	Brake Pedal Position Sensor/Control Module Voltage Reference Output 3
Â	Brake Applied Output

MIRROR SYSTEM - DIAGNOSTIC TROUBLE CODES

MIRROR SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Driver/Passenger Mirror Internal Malfunction

OBJECT DETECTION SYSTEM - PARK ASSIST SYSTEM - DIAGNOSTIC TROUBLE CODES

OBJECT DETECTION SYSTEM - PARK ASSIST SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Right Side Object Detection Control Module

DTC	Description
Â	Parking Assist Front Sensor
Â	Parking Assist Rear Sensor
Â	Parking Assist On/Off Switch Circuit
Â	Parking Assist On/Off Switch Indicator Circuit (Chevrolet, GMC)
Â	Parking Assist On/Off Switch Indicator Circuit (Cadillac, without UGN)
Â	Parking Assist On/Off Switch Indicator Circuit (Cadillac, with UGN)
Â	Vehicle Direction Camera Indicator Circuit (Chevrolet, GMC)
Â	Vehicle Direction Camera Indicator Circuit (Cadillac, without UGN)
Â	Vehicle Direction Camera Indicator Circuit (Cadillac, with UGN)
Â	Calibration Data Not Programmed
Â	System Disabled Information Stored Malfunction
Â	Vehicle Identification Number Information
Â	Rearview Camera Input Signal Circuit Missing Reference (UVC)
Â	Rearview Camera Input Signal Circuit (UVH)
Â	Control Module Voltage Reference Output 2 Circuit (with UD5)
Â	Control Module Voltage Reference Output 2 Circuit (with UD7)
Â	Driver Seat Cushion
Â	Vehicle Direction Warning Switch Circuit
Â	Short Range Object Sensor Performance
Â	Long Range Radar Sensor Module
Â	Frontview Camera Module
Â	Frontview Camera
Â	Rearview Camera
Â	Sideview Camera
Â	Sideview Camera
Â	Frontview Camera Supply Circuit
Â	Rearview Camera Supply Circuit
Â	Sideview Camera
Â	Sideview Camera

DTC	Description
Â	Front Object Detection Control Module Torque Request Signal Message Counter Incorrect

PARKING BRAKE - DIAGNOSTIC TROUBLE CODES

PARKING BRAKE - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Park Brake
Â	Park Brake Slip Detected
Â	Park Brake Solenoid Actuator Current Sensor
Â	Park Brake Switch
Â	Park Brake Unlatch Switch
Â	Calibration Data
Â	System Disabled Information Stored Invalid Data
Â	Electronic Control Unit
Â	Electronic Control Unit
Â	Printed Circuit Board

POWER DOOR LOCK SYSTEM AND RELEASE SYSTEMS - DIAGNOSTIC TROUBLE CODES

POWER DOOR LOCK SYSTEM AND RELEASE SYSTEMS - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Passenger/Driver Exterior Door Handle Switch
Â	Left/Right Rear Door Handle Switch
Â	Liftgate Position Sensor Signal Circuit Performance
Â	Liftgate Latch Control Circuit/Power Liftgate Latch Release Motor Circuit
Â	Child Security Lock Switch Circuit
Â	Child Security Lock Switch Indicator Circuit
Â	Driver Door Open Switch Circuit Not Plausible
Â	All Doors Unlock/Lock (With UTT)

DTC	Description
Â	All Doors Unlock/ Lock (Without UTT)
Â	Driver Door Unlock/Lock Switch - Passenger Door Unlock/Lock Switch
Â	Hands Free Sensor Signal/Hands Free Liftgate Sensor Module
Â	Rear Cargo Door Unlock /Lock
Â	Trunk Lid Unlatch Output Circuit
Â	Exterior Liftgate Unlatch Switch Circuit Malfunction
Â	All Door Dead Lock Circuit
Â	Keyless Entry Output Signal Circuit
Â	Child Security Lock Motors Circuit
Â	Liftgate Close Switch Malfunction
Â	Liftgate Control Module
Â	Liftgate Handle Switch Malfunction (Without TB5)
Â	Liftgate Handle Switch Malfunction (With TB5)
Â	Liftgate Interior Release Open/Close Switch Malfunction
Â	Liftgate Latch Switches Malfunction
Â	Liftgate Object Sensor Malfunction
Â	Liftgate Motor Power Open/Close Malfunction

POWER SEAT SYSTEM - DIAGNOSTIC TROUBLE CODES

POWER SEAT SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Control Module Voltage Reference/Driver Seat Position Sensor
Â	Driver Seat Switch
Â	Seat Adjuster Switch Internal Malfunction
Â	Driver Memory Select Switch
Â	Driver Seat Motors Group 1 Common Circuit
Â	Seat Lumbar/Bolster Pump
Â	Seat Bolster Memory Control Module Internal Malfunction

POWER STEERING SYSTEM - DIAGNOSTIC TROUBLE CODES

POWER STEERING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Control Module Temperature Sensor High Temperature
Â	Steering Assist Smooth Road Shake Compensation Disabled Too Many Transitions
Â	Electric Steering Motor
Â	Steering Wheel Angle Sensor Signal Not Plausible
Â	Steering Wheel Torque Sensor
Â	Electronic Control Unit Hardware (Power Steering Control Module)

SEAT HEATING SYSTEM AND SEAT COOLING SYSTEM - DIAGNOSTIC TROUBLE CODES

SEAT HEATING SYSTEM AND SEAT COOLING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Front/Right Heated Seat Module
Â	Driver/Passenger Seat Temperature Request Circuit
Â	Left/Right Front Seat Heating Switch

SECONDARY AND CONFIGURABLE CUSTOMER CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

SECONDARY AND CONFIGURABLE CUSTOMER CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Steering Wheel Controls Signal Circuit Protection Time-Out (With Z75)
Â	Steering Wheel Controls Signal Circuit (Without Z75)

SHIFT LOCK CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

SHIFT LOCK CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description

DTC	Description
Â	Park Lock Solenoid Control

STEERING WHEEL AND STEERING COLUMN - DIAGNOSTIC TROUBLE CODES

STEERING WHEEL AND STEERING COLUMN - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Integral Switch Malfunction
Â	Inverted Run/Start Power Relay Circuit
Â	Steering Column Lock Motor Feedback Circuit Not Plausible
Â	Steering Column Position Module
Â	Steering Column Lock Motor Lock Circuit
Â	Steering Column Lock Password Incorrect
Â	No Response From Steering Column Lock Received
Â	Steering Column Lock Solenoid Actuator Unlocked Signal Circuit

SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM - DIAGNOSTIC TROUBLE CODES

SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Driver Steering Wheel Air Bag Deployment Loop Stage
Â	Driver Seat
Â	Driver/Passenger Seat Belt
Â	Left/Right Roof Rail Air Bag Deployment Loop
Â	Passenger Instrument Panel Air Bag Deployment Loop Stage 1/ 2
Â	Deployment Commanded
Â	Passenger Seat Belt Tension Sensor
Â	Passenger Seat Position Sensor
Â	Passenger Presence Module(Inflatable Restraint Sensing and Diagnostic Module)
Â	Passenger Presence Module(Passenger Presence Module)
Â	Impact Sensor

DTC	Description
Â	Center Front Impact Sensor
Â	Rollover Protection Disable Switch Circuit
Â	Rollover Protection OFF Indicator Circuit/Passenger Air Bag On Indicator Circuit
Â	Option Configuration Error(Passenger Presence System)
Â	SDM Option Configuration Error(Inflatable Restraint Sensing and Diagnostic Module)
Â	System Configuration Error

SUSPENSION CONTROL SYSTEM - SUSPENSION DAMPING - DIAGNOSTIC TROUBLE CODES

SUSPENSION CONTROL SYSTEM - SUSPENSION DAMPING - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Printed Circuit Board Temperature Sensor
Â	Shock Absorber Actuator Circuit
Â	Position Sensor Circuit
Â	Position Sensor 5V Supply

SUSPENSION CONTROL SYSTEM - SUSPENSION LEVELING SYSTEM - DIAGNOSTIC TROUBLE CODES

SUSPENSION CONTROL SYSTEM - SUSPENSION LEVELING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Left/Right Rear Position Sensor Circuit (With Z85)
Â	Level Control Exhaust Solenoid Valve Circuit (With Z95)
Â	Level Control Exhaust Solenoid Valve Circuit (With Z85)
Â	Level Control Air Pressure Sensor (With Z85)
Â	Level Control Air Pressure Sensor Malfunction Signal Invalid(With Z95)
Â	Vehicle Level Control Compressor Relay (With Z95)
Â	Vehicle Level Control Compressor Relay (With Z85)

THEFT DETERRENT SYSTEM - DIAGNOSTIC TROUBLE CODES

THEFT DETERRENT SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Content Theft Deterrent Assembly
Â	Content Theft Deterrent Sensor

TIRE PRESSURE MONITORING SYSTEM - DIAGNOSTIC TROUBLE CODES

TIRE PRESSURE MONITORING SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	System Configuration Malfunction
Â	Tire Pressure Sensor
Â	Tire Pressure Monitoring System Sensors Malfunction

TRAILER BRAKE CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

TRAILER BRAKE CONTROL SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Manual Trailer Brake/Device Voltage Reference Output 2
Â	Trailer Brake Power Control Module
Â	Trailer Brake Power Control Module

TRANSFER CASE - MP 3010-NP0 - DIAGNOSTIC TROUBLE CODES

TRANSFER CASE - MP 3010-NP0 - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	AWD Indicator Circuit
Â	4WD HI Indicator Circuit
Â	2WD HI Indicator Circuit
Â	Transfer Case Range Selection Switch
Â	Range Actuator System Performance/Range Actuator Control Circuit
Â	Range Actuator Lock Control System

DTC	Description
Â	Front Axle System
Â	General System Performance Temperature High
Â	Unable to Complete Shift
Â	Range Actuator - Position Not Learned
Â	Transfer Case Range Position Sensor/5V Reference 1
Â	Range Actuator Position Sensor/5V Reference 2
Â	Transfer Case Clutch
Â	Range Actuator Position - Range Position Correlation
Â	Electronic Control Unit (ECU)
Â	System Configuration Error Calibration Not Learned
Â	Device Voltage Range
Â	Control Module
Â	Vehicle Speed Sensor (VSS) 2
Â	Transfer Case/Four Wheel Drive (4WD) Neutral Range Performance
Â	Transfer Case/Four Wheel Drive (4WD) Neutral Range Performance (L83)

TRANSFER CASE - MP 3023/3024-NQH - DIAGNOSTIC TROUBLE CODES

TRANSFER CASE - MP 3023/3024-NQH - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	AWD Indicator Circuit
Â	4WD HI Indicator Circuit
Â	4WD LO Indicator Circuit
Â	2WD HI Indicator Circuit
Â	Neutral Indicator Circuit
Â	Transfer Case Range Selection Switch/5V Reference 3 Circuit
Â	Range Actuator Control
Â	Range Actuator Lock Control
Â	Front Axle System
Â	General System Performance Temperature High

DTC	Description
Â	Unable to Complete Shift
Â	Range Actuator - Position Not Learned
Â	Transfer Case Range Position Sensor/5V Reference 1
Â	Range Actuator Position Sensor/5V Reference 2
Â	Transfer Case
Â	Range Actuator Position
Â	Electronic Control Unit
Â	System Configuration Error Calibration Not Learned
Â	Control Module
Â	Device Voltage Range
Â	Vehicle Speed Sensor (VSS) 2
Â	Four Wheel Drive (4WD) High Range Performance
Â	Transfer Case/Four Wheel Drive (4WD) Neutral Range Performance
Â	Transfer Case/Four Wheel Drive (4WD) (L83)
Â	Four Wheel Drive (4WD) Low Range Performance
Â	Four Wheel Drive (4WD) Neutral Range Performance

WIPER SYSTEM AND WASHER SYSTEM - DIAGNOSTIC TROUBLE CODES

WIPER SYSTEM AND WASHER SYSTEM - DIAGNOSTIC TROUBLE CODES

DTC	Description
Â	Rain Sensor
Â	Rear Wiper Switch
Â	Windshield Wiper
Â	Rear Washer Relay Circuit
Â	Front Washer Relay Circuit

WIRING SYSTEMS AND POWER MANAGEMENT - DIAGNOSTIC TROUBLE CODES

WIRING SYSTEMS AND POWER MANAGEMENT - DIAGNOSTIC TROUBLE CODES

DTC	Description

DTC	Description
Â	In Park Switch Circuit
Â	Power Mode Start Switch Circuit
Â	Power Mode Run/Start Indicator Circuit
Â	Control Module Ignition On and Start Circuit (Instrument Cluster)
Â	Control Module Ignition
Â	Control Module Voltage Output Circuit
Â	Run Power Relay Circuit
Â	Run/Crank Power Relay Circuit
Â	Accessory Power Circuit
Â	Interruptible RAP Relay Circuit
Â	Ignition On/Start Switch
Â	Ignition Accessory Switch Circuit Low Voltage

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GENERAL INFORMATION

General Information - Escalade, Suburban, Tahoe, Yukon

INTRODUCTION

ARROWS AND SYMBOLS

This service manual uses various symbols in order to describe different service operations.

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Fig. 1: Service Operations Symbols
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Front of Vehicle
2	View Detail
2	View Detail
3	Ambient Air Mixed with Another Gas or Indicate Temperature Change
4	Motion or Direction
5	View Angle
6	Dimension (1:2)
7	Ambient/Clean Air Flow or Cool Air Flow
8	Lubrication Point- Oil or Fluid
9	Task Related
10	Sectioning (1:3)
11	Gas Other Than Ambient Air or Hot Air Flow
12	Lubrication Point- Grease or Jelly
13	Multidirectional Arrow

ACRONYMS AND UNITS

Acronyms

Acronym	Meaning	Definition
2WD	Two-Wheel Drive	Indicates that a vehicle has 2 driven wheels OR that a 4WD vehicle uses only 2 wheels for propulsion. So it can be the description of a vehicle configuration OR the operational mode of the drivetrain.
4WD	Four-Wheel Drive	Four-wheeled vehicle with a drivetrain that allows all four wheels to receive power from the engine simultaneously which provides better control on various surfaces. Can be used to describe the configuration of the vehicle OR as the operational mode of the drivetrain. 4WD vehicles usually can turn 2 wheels off to be in a 2WD mode. See also AWD.
A/C	Air Conditioning	The cooling and dehumidification of indoor air for thermal comfort.
A/D	Analog to Digital	Used in context of converting electrical analog signals to digital signals.

Acronym	Meaning	Definition
ABS	Antilock Braking System	System on motor vehicles which prevents the wheels from locking while braking which helps the driver maintain control in heavy braking conditions.
AC	Alternating Current	An electrical current whose magnitude and direction vary cyclically.
AM	Amplitude Modulation	Method of impressing data onto an alternating-current (AC) carrier waveform.
APP	Accelerator Pedal Position	A pedal that controls the throttle valve.
AWD	All-Wheel Drive	All-wheel-drive systems are designed to function on all types of surfaces, both on- and off-road, and most of them cannot be switched off. This can also be called full-time four wheel drive. See also 4WD.
AWG	American Wire Gauge	American wire gauge is a standardized wire gauge system used since 1857 predominantly in the United States for the diameters of round, solid, nonferrous, electrically conducting wire. E.g. a wire of AWG10 has a diameter of 2.588mm, AWG20 corresponds to a diameter of 0.812mm.
B+	Battery Positive Voltage	The electrical potential on the positive terminal of the battery.
BARO	Barometric Pressure	Atmospheric pressure as measured by a barometer.
BCM	Body Control Module	This module supplies vehicle occupants with visual and audible information and controls various vehicle functions,
BECM	Battery Energy Control Module	Control module used to regulate the battery voltage.
BPP	Brake Pedal Position	Position of the foot pedal that moves a piston in the master brake cylinder.
CAN	Controller Area Network	Serial data connection between control modules by Bosch
CCM	Chassis Control Module	The module that controls various vehicle functions on the Chassis, like Engine/Trans Mount, Active Grille Air Shutter, Load Leveling, etc•••
CD	Compact Disc	A small optical disk on which data such as music, text, or graphic images is digitally encoded.
CNG	Compressed Natural Gas	This a substitute for gasoline or diesel fuel. It is made by compressing natural gas (which is mainly composed by methane (CH4), in a percentage range of 70% to 98%)
CO	Carbon Monoxide	This is a product of the incomplete combustion of carbon-containing compounds, at room temperature this is a gas. It consists of one carbon atom covalently bonded to one oxygen atom.

Acronym	Meaning	Definition
CO2	Carbon Dioxide	Chemical compound composed of two oxygen atoms covalently bonded to a single carbon atom.
CPA	Connector Position Assurance	Part of an electrical connector that prevents the connector from moving out of its socket. Usually needs to be pressed to unlock the connector when disconnecting it.
CPP	Clutch Pedal Position	A lever operated with the foot that controls the coupling that connects or disconnects driving and driven parts of a driving mechanism.
CV	Constant Velocity	Used in conjunction with CV joints, which connect two shafts at an angle while both shafts always have the same rotational speed without variations.
CVT	Continuously Variable Transmission	A transmission in which the ratio of the rotational speeds of two shafts, as the input shaft and output shaft of a vehicle or other machine, can be varied continuously within a given range, providing an infinite number of possible ratios which improves fuel economy.
D	Drive	D on the transmission gear selector lever.
DAB	Digital Audio Broadcast	Technology for broadcasting of audio using digital radio (carries information via digital signal) transmission.
DC	Direct Current	Continuous current, constant flow of electric charge.
DLC	Data Link Connector	This is an electronic connector typically located underneath the driver's side dashboard, just above the pedals. The connector has 16 pins.
DMM	Digital Multimeter	Electronic measuring instrument that combines several functions in one unit. The most basic instruments include an ammeter, voltmeter, and ohmmeter.
DOHC	Dual Overhead Camshaft	Dual overhead camshafts (DOHC) are higher performance engines, they produce more power, and can run at higher speeds because they allow an engine to have four valves per cylinder. Each camshaft operates two of the valves, one camshaft handles the intake valves, and one handles the exhaust valves
DPF	Diesel Particulate Filter	Device designed to remove diesel particulate matter or soot from the exhaust gas of a diesel engine.
DRL	Daytime Running Lamps	White lights mounted on the front of an automobile that automatically switch on when the key is turned and are intended for daytime use, to increase the visibility of the automobile.

Acronym	Meaning	Definition
DSCC	Distance Sensing Cruise Control	A type of cruise control that automatically maintains the distance between vehicles.
DSP	Digital Signal Processor	A specialized microprocessor designed specifically for digital signal processing, generally in real-time computing.
DTC	Diagnostic Trouble Code	An electronic signal stored in an automotive computer, indicating the presence of a fault detected by that computer.
DVD	DVD	A popular optical disc storage media format the size of a CD. Used mainly for movies but also for data. DVD has no spelled out version (officially it does not mean Digital Video Disc or Digital Versatile Disc, it just means DVD).
EBCM	Electronic Brake Control Module	This module contains a microprocessor and software for antilock braking system operation.
ECM	Engine Control Module	This electronic module works with a vehicle's sensors and engine control devices to insure that the engine operates at maximum efficiency and performance. It performs three vital functions. Receives electronic signals from engine sensors. Analyzes the data and makes an engine performance decision (based on the pre-set parameters within the unit). Sends an "output command" to an actuator that adjusts engine performance.
ECT	Engine Coolant Temperature	A measure of how hot or cold the fluid which flows through the engine in order to prevent its overheating, transferring the heat produced by the device to other devices that utilize or dissipate it.
EEPROM	Electrically Erasable Programmable Read-Only Memory	A non-volatile storage chip used in computers and other devices to store small amounts of volatile data, e.g. calibration tables or device configuration.
EGR	Exhaust Gas Recirculation	Is an NOx (nitrogen oxide and nitrogen dioxide) reduction technique used in most gasoline and diesel engines. EGR works by recirculating a portion of an engine's exhaust gas back to the engine cylinders.
EMI	Electromagnetic Interference	Electromagnetic interference (also called radio frequency interference) is a disturbance that affects an electrical circuit due to either electromagnetic conduction or electromagnetic radiation emitted from an external source.
ESD	Electrostatic Discharge	The sudden and momentary electric current that flows between two objects at different electrical potentials.
EV	Electric Vehicle	A category of vehicles that only have an electric drive system.

Acronym	Meaning	Definition
EVAP	Evaporative Emission	A system that controls the fuel fumes in the fuel tank.
FM	Frequency Modulation	In telecommunication this is a way to convey information over a carrier wave by varying its frequency.
FWD	Front-Wheel Drive	A form of engine/transmission layout used in motor vehicles, where the engine drives the front wheels only.
GMLAN	General Motors Local Area Network	A local-area network is a computer network covering a small geographic area, like a home or vehicle. This specific type of LAN connects several controllers inside the vehicle and was developed by General Motors.
GPS	Global Positioning System	Satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense.
GSM	Global System for Mobile Communications	Globally accepted standard for digital cellular communication.
GVW	Gross Vehicle Weight	Maximum total weight of a road vehicle or trailer that is loaded, including the weight of the vehicle itself plus fuel, passengers, cargo, and trailer tongue weight.
HD	Heavy Duty	Robust design to accommodate large work loads.
HID	High Intensity Discharge	A type of light that produces a bright light by using gas filled bulbs. (gas is usually mercury, metal halide, and high-pressure sodium) Uses very little battery power and is a very "cool" light.
HO2S	Heated Oxygen Sensor	Heated oxygen sensors have an internal heater circuit that brings the sensor up to operating temperature more quickly than an unheated sensor. An oxygen sensor must be hot (about 600-650Â°F) before it will generate a voltage signal. The hot exhaust from the engine will provide enough heat to bring an O2 sensor up to operating temperature.
HVAC	Heating Ventilation Air Conditioning	This system is sometimes referred to as climate control. Ventilation air ducts installed throughout a vehicle that supply conditioned air to a room through rectangular or round outlet vents.
I^2C	Inter-Integrated Circuit	Serial data connection between Integrated Circuits (microchips) inside a control module invented by Phillips
IAT	Intake Air Temperature	Temperature of the air entering intake air flow system of the engine.
ICE	Internal Combustion Engine	An engine in which the combustion of fuel and an oxidizer (typically air) occurs in a confined space called a combustion chamber.

Acronym	Meaning	Definition
ID	Identification	Number or Code that identifies a component or control module. Can be written on the part or be transmitted on a bus or via radio.
ISP	Internet Service Provider	A company that furnishes corporations and individual consumers with various services, mainly access to the Internet.
ISS	Input Shaft Speed	Rotational speed of the input shaft of a transmission.
LAN	Local Area Network	Standard network connection PC's.
LCD	Liquid Crystal Display	A thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector.
LED	Light Emitting Diode	Small light bulbs that fit easily into an electrical circuit they do not have a filament that will burn out, and they do not get especially hot. They are illuminated solely by the movement of electrons in a semiconductor material.
LIN	Local Interconnect Network	Computer networking bus system used within automotive network architectures. Similar to CAN, but cheaper and less powerful.
LPG	Liquefied Petroleum Gas	A mixture of mainly propane and butane, produced commercially and stored under pressure to keep it in a liquid state.
MAF	Mass Air Flow	The amount of air drawn into the engine
MAP	Manifold Absolute Pressure	Pressure in the engine intake system after the throttle valve referenced to a perfect vacuum.
MDI	Multiple Diagnostics Interface	A device used by GM dealers that enables a PC to communicate with the control modules in a vehicle.
MIL	Malfunction Indicator Lamp	An indicator of the internal status of a car engine.
MOST	Media Oriented Systems Transport	Serial communication bus to transmit audio and video information.
N	Neutral	A state of the transmission in which it is not engaged.
NiMH	Nickel Metal Hydride	A type of rechargeable battery that uses a hydrogen absorbing alloy for the negative electrode.
NOx	Nitrogen Oxides	Refers to any of the following oxygen compounds of nitrogen or a mixture of them. Nitric Oxide, Nitrogen dioxide, Nitrous Oxide, Dinitrogen trioxide, Dinitrogen tetroxide, Dinitrogen pentoxide.
O2	Oxygen	A colorless, odorless, tasteless, gaseous chemical element with the chemical symbol O and atomic number 8.

Acronym	Meaning	Definition
O2S	Oxygen Sensor	An electronic device that measures the proportion of oxygen (O2) in the gas or liquid being analyzed.
OBD	On-Board Diagnostic	A generic term referring to a vehicle's self-diagnostic and reporting capability.
OEM	Original Equipment Manufacturer	A producer that provides a product to its customers, who proceed to modify or bundle it before distributing it to their customers.
OSS	Output Shaft Speed	Rotational speed of the output shaft of a transmission.
P	Park	A state in which the transmission is set so one can leave the vehicle.
PCB	Printed Circuit Board	A thin plate on which chips and other electronic components are placed.
PCM	Powertrain Control Module	A control module that features the functions of both, the engine and the transmission control module.
PCMCIA	Personal Computer Memory Card Industry Association	An international standards body and trade association with over 100 member companies that was founded in 1989 to establish standards for Integrated Circuit cards and to promote interchangeability among mobile computers where ruggedness, low power, and small size were critical.
PIN	Personal Identification Number	A secret numeric password shared between a user and a system that can be used to authenticate the user to the system.
PPE	Personal Protective Equipment	Protective clothing, helmets, goggles, or other garment designed to protect the wearer's body from injury.
PRNDL	Park, Reverse, Neutral, Drive, Low	Park, Reverse, Neutral, Drive, Low (automatic transmission positions).
PTC	Positive Temperature Coefficient	Refers to materials that experience an increase in electrical resistance when their temperature is raised.
PTO	Power Take-Off	A splined driveshaft, usually on a tractor or truck that can be used to provide power to an attachment or separate machine. This mechanism allows implements to draw energy from the tractor's engine.
PVC	Polyvinyl Chloride	A thermoplastic copolymer.
PWM	Pulse Width Modulation	Square shaped type of signal that carries the information in the ratio between on and off times.
R	Reverse	Rearward: directed or moving toward the rear;
RAM	Random Access Memory	A type of computer data storage. It today takes the form of integrated circuits that allow the stored data to be accessed in any order.

Acronym	Meaning	Definition
RCT	Radiator Coolant Temperature	This is the heat intensity of the radiator coolant measured in degrees. The radiator is a part of the cooling system that removes the engine heat. Coolant is a mixture of water and antifreeze (ethylene glycol) which lowers the freezing point of the water in the coolant system, this fluid also picks up heat from the engine and transfers it to the air.
RDS	Radio Data System	A standard from the European Broadcasting Union for sending small amounts of digital information using conventional FM radio broadcasts.
RF	Radio Frequency	A frequency or rate of oscillation within the range of about 3 Hz and 300 GHz. This range corresponds to frequency of alternating current electrical signals used to produce and detect radio waves.
ROM	Read-Only Memory	A class of storage media used in computers and other electronic devices. Data stored in ROM cannot be modified.
RPO	Regular Production Option	A three digit/letter code given to parts, assemblies, and systems originally installed on the vehicle. These RPO codes designate options and are assigned by General Motors.
RSA	Rear Seat Audio	An auxiliary set of controls that operate the main audio system from the rear seat. Rear passengers can also operate a different media source than the front passengers.
RWD	Rear-Wheel Drive	A common engine/transmission layout in which the engine is in the front of the vehicle, but the front mid-engine, rear mid-engine and rear engine layouts are also used.
SCV	Speed Controlled Volume	The volume control is set for a desired sound level in the vehicle as the vehicle increases its speed, the sound level is adjusted.
SDM	Sensing and Diagnostic Module	The name given to air bag modules used in General Motors vehicles.
SIM	Subscriber Identity Module	Part of a removable smart card Integrated Circuit Card. This is used for mobile cellular telephone devices such as mobile computers and mobile phones. SIM cards securely store the service-subscriber key used to identify a subscriber. The SIM card allows users to change phones by simply removing the SIM card from one mobile phone and inserting it into another mobile phone or broadband telephony device.
SIR	Supplemental Inflatable Restraint	Technical term for the air bag. Air bag is a stretchable membrane, which inflates during an automobile accident to provide cushioning to the passenger's head and torso to prevent injury to the passengers.

Acronym	Meaning	Definition
SPI	Serial Peripheral Interface	This is an interface that enables the serial (one bit at a time) exchange of data between two devices. An SPI operates in full duplex mode. This means that data can be transferred in both directions at the same time. It is a standard bus technology like CAN or I2C.
SPS	Service Programming System	System that enables repair facilities to update the software in control modules.
SUV	Sport Utility Vehicle	A passenger vehicle which combines the towing capacity of a pickup truck with the passenger-carrying space of a minivan.
SVS	Service Vehicle Soon	Indicator lamp or symbol for a malfunction related to a vehicle component or system.
TA	Traffic Announcement	Message spoken on radio regarding the movement of vehicles or pedestrians through an area or along a route. The buttons on radios that enable this announcements are also often labeled TA.
TAC	Throttle Actuator Control	A motor which moves the engine throttle plate or valve, controlled by the engine control module. A throttle plate limits the amount of air entering a internal combustion gasoline engine.
TAP	Transmission Adaptive Pressure	The transmission control module learns each component's characteristics and adjusts fluid pressure accordingly.
TCC	Torque Converter Clutch	Resides in a torque converter to connect an engine to an automatic transmission. The clutch is applied when conditions are correct to achieve a 1:1 ratio of engine crankshaft to transmission input shaft.
TCM	Transmission Control Module	A module that controls electronic automatic transmissions. It uses sensors from the vehicle as well as data provided by the Engine Control Module to calculate how and when to change gears in the vehicle for optimum performance, fuel economy and shift quality.
TDC	Top Dead Center	The piston is in its highest position relative to the combustion chamber.
TIS	Techline Information System	The PC-based global dealership diagnostic software that provides the technician the ability to reference the most recent service information via the service department's computer.
TPA	Terminal Position Assurance	An additional locking mechanism inside an electric connector that holds the pins in place.
TV	Television	A telecommunication system for broadcasting and receiving moving pictures and sound over a distance.

Acronym	Meaning	Definition
USB	Universal Serial Bus	A type of communication bus connection between a computer and a peripheral device.
VCI	Vehicle Communications Interface	A diagnostic tool that communicates to modules of multiple communication protocols in a vehicle by converting vehicle serial data into PC serial data communication.
VIN	Vehicle Identification Number	Used by manufacturers to uniquely identify motor vehicles using 17 characters.
VSCM	Vehicle Stability Control Module	This module uses information from several sensors to detect a loss of vehicle traction, then works with the antilock brake system to apply individual brakes to help keep the vehicle on its intended path.
VSS	Vehicle Speed Sensor	Sends data regarding how fast the car is traveling at the moment of driving. It is designed to be able to record the rate at which the vehicle's crankshaft is spinning.
WOT	Wide Open Throttle	When the throttle blade or valve is at its maximum open position, allowing maximum air to enter an internal combustion gasoline engine.
WLAN	Wireless Local Area Network	Standard to transmit digital data via radio frequency.
XM	XM (Satellite Radio)	XM Satellite Radio Holdings (XM) is one of two satellite radio services in the United States and Canada. XM provides pay-for-service radio, analogous to cable television. Its service includes 73 different music channels, 39 news, sports, talk, and entertainment channels, 21 regional traffic and weather channels and 23 play-by-play sports channels (2008).
XML	Extensible Markup Language	A markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

Units

Unit	Meaning	Definition
m^2	Square Meter	Area
A	Ampere	Electrical
Ah	Ampere Hour	Electrical
C	Coulomb	Electrical
dBm	Decibel Meter	Electrical
dBmV	Decibel Millivolt	Electrical

Unit	Meaning	Definition
mV/DIV	Millivolts per Division	Electrical
mV/s	Millivolts per Second	Electrical
Ω	Ohm	Electrical
V	Volt	Electrical
V/DIV	Volts per Division	Electrical
V/ms	Volts per Millisecond	Electrical
W	Watt	Electrical
mm^3 /stroke	Cubic Millimeters per Stroke	Flow
gal/h	Gallons per Hour	Flow
g/s	grams per second	Flow
g/stroke	Grams per Stroke	Flow
kg/100km	Kilograms per 100 Kilometer	Flow
kg/h	Kilograms per Hour	Flow
km/L	kilometer/liter	Flow
L/100km	Liters per 100 Kilometers	Flow
L/h	Liters per Hour	Flow
L/min	Liters per Minute	Flow
MPG	Miles per Gallon	Flow
mg/s	Milligrams per Second	Flow
mg/stroke	Milligrams per stroke	Flow
ft	feet	Length
in	Inch	Length
m	Meter	Length
mi	Mile	Length
bar	Bar	Mechanical
bar/min	Bars per Minute	Mechanical
in. H2O	Inches of Water	Mechanical
in. H2O/s	Inches of Water per second	Mechanical
kPa/s	Kilopascals per Second	Mechanical
N	Newton	Mechanical

Unit	Meaning	Definition
Â	Newton Meter	Mechanical
Pa	Pascal	Mechanical
Pa/s	Pascals per Second	Mechanical
lb ft	Pound Foot	Mechanical
PSI	Pound-Force per Square Inch	Mechanical
Counts	Counts	Misc.
Cycles	Cycles	Misc.
dB	Decibel	Misc.
Â°	Degree	Misc.
Â°C	Degree Centigrade	Misc.
Â°CA	Degree Crankshaft Angle	Misc.
Â°F	Degree Fahrenheit	Misc.
Â°/s	Degree per Second	Misc.
Hz	Hertz	Misc.
kbit/s	Kilobit per second	Misc.
lx	Lux	Misc.
ppm	Parts per Million	Misc.
%	Percent	Misc.
%/min	Percents per Minute	Misc.
%/sec	Percents per Second	Misc.
Pulses	Pulses	Misc.
:1	Ratio	Misc.
RPM	Revolutions per Minute	Misc.
Steps	Steps	Misc.
W/m^2	Watts per Square Meter	Misc.
g	g (Acceleration)	Movement
km/h	Kilometers per Hour	Movement
m/s	Meters per Second	Movement
m/s^3	Meters per Second Cubed	Movement
m/s^2	Meters per Second Squared	Movement

Unit	Meaning	Definition
MPH	Miles per Hour	Movement
mm/s	Millimeters per Second	Movement
d	Day	Time
h	Hour	Time
hh:mm:ss	Hour:Minute:Second	Time
ms/DIV	Milliseconds per Division	Time
min	Minute	Time
s	Second	Time
s/DIV	Seconds per Division	Time
yy-mm-dd	Year-Month-Day (2 digits)	Time
yyyy-mm-dd	Year-Month-Day (4 digits, preferred)	Time
m^3	Cubic Meter	Volume
gal	Gallon	Volume
L	Liter	Volume
mL	milliliters	Volume
US gal	US Gallon	Volume
US pt	US Pint	Volume
US qt	US Quart	Volume
kg	Kilogram	Weight

TEXT FORMATS AND SYMBOLS

Service Information Text Strings

Text strings have been introduced in the Service Information procedures in an effort to increase consistent and common global phrases. Text strings are common, predefined, fixed phrases used in service information.

Text Strings - Sentence Format

Text string sentences are used when frequently used procedure steps require additional explanation. They are complete sentences that contain the necessary elements to describe an action or a fact.

Text Strings - Chain Format

Text string chains contain a component name and an action verb. Text string chains are used when little explanation is required to complete a procedure step.

Text String Chain Symbols

Symbol	Description
Â»	This symbol is used to separate the object from the task or nominal value.
:	Used to separate tool and secondary qualifier statements from the details (operational, scan tool, or circuit information).
&	Separates two electrical test points.
@	Used to separate any location information (replaces "from the", "to the" or "at").
()	Used for illustration callout references.
[ ]	Used for quantity references.
{ }	Used to identify decisional information (RPOs, AWD, If equipped, etc.).
-	Dashes are used to separate additional information. Additional information goes at the end of the subject matter.

CUSTOMER CONCERN VERIFICATION SHEETS

The GM Customer Concern Verification Sheets have been designed to improve communications between the service customer and the technician. The more clearly the technician understands the concern and its symptoms, the more likely the concern will be fixed right the first time.

The GM-wide Customer Concern Verification Sheets are available in GM GlobalConnect. The Customer Concern Verification Sheets may be printed and reproduced locally.

TRAINING

Dealers

All U.S. GM Dealers participating in the Center of Learning / GM Service Technical College (STC) Programs can enroll through the Center of Learning website at https://www.centerlearning.com. Within the website, there are individual training paths that are designed to assist in planning the training needs for each individual and their job role. Dealers who have questions about Center of Learning Training should contact the Center of Learning help desk at 1-888-748-2687. The help desk is available Monday through Friday, 8:00 am - 9:00 pm Eastern Standard Time, excluding holidays. For GM Access support, contact the GM Access Help Desk at 1-888-337-1010.

Fleets

GM Fleet customers with GM Warranty In-Shop agreements are able to participate in service technical training through the Center of Learning/GM Service Technical College (STC).

Assistance for GM fleet registered customers using GM STC training is provided by the Center of Learning help desk at 1-888-748-2687. The help desk is available Monday through Friday, 8:00 am-9:00 pm Eastern Standard Time, excluding holidays. For GM Access support, contact the GM Access Help Desk at 1-888-337-1010.

Most GM STC course materials have associated charges.

To purchase authentic GM STC Training Materials, contact the GM Training Materials Headquarters at 1-800-393-4831.

Non-GM Dealer Technicians

Technician training for non-GM dealers is available through ACDelco. This training is for ACDelco PSC and Fleet program members employed in the automotive or truck service industry.

ACDelco courses are available at approved GM STC Training Centers. Availability and schedules can be obtained by calling 1-800-825-5886 (prompt 1) or contact us via the web at www.acdelcotechconnect.com and select the Training tab. Seminars are also offered through the ACDelco Warehouse Distribution channel. Contact your Local ACDelco representative or distributor directly for more information.

VEHICLE, ENGINE AND TRANSMISSION ID AND VIN LOCATION, DERIVATIVE AND USAGE (CADILLAC)

Fig. 2: Locating Vehicle Identification Number (VIN) Plate
Courtesy of GENERAL MOTORS COMPANY

The vehicle identification number (VIN) plate is the legal identifier of the vehicle. The VIN plate is located on the upper left corner of the instrument panel (I/P). The VIN number can be seen through the windshield from the outside of the vehicle:

Vehicle Identification Number (VIN) System

Position	Definition	Character	Description
1	Country of Origin	1	United States
2	Manufacturer	G	General Motors
3	Make	Y	Cadillac MPV
4	GVWR/Brake System/Body Style	S	7, 001-8, 000 lbs Hydraulic
5	Line Chassis	3	4x2
		4	4x4
6	Series	A	Escalade Standard
		B	Escalade Luxury Collection
		C	Escalade Premium Collection
		D	Escalade Platinum Collection
		G	Escalade ESV Standard
		H	Escalade ESV Luxury Collection
		J	Escalade ESV Premium Collection
		K	Escalade ESV Platinum Collection
		7	Escalade Export (Non US, Non Canada)
		8	Escalade ESV Export (Non US, Non Canada)
7	Restraint System	K	Active Manual Belts, Airbag - Driver and Passenger - Front (1st row), Front Seat Side (1st row), Front Inboard Seat Side (1st) row), Roof Side (All seating rows)
8	Engine Type	J	RPO L86, Engine - Gas, 8 CYL, 6.2L, SIDI VVT, AFM, E85 MAX, Aluminum
9	Check Digit	-	Check Digit
10	Model Year	G	
11	Plant Location	R	Arlington, TX
12-17	Plant Sequence Number	100, 001	Plant Sequence Number

6.2L L86 Engine ID and VIN Derivative Location

Refer to **Engine Identification** .

6L80 MYC Transmission ID and VIN Derivative Location

Refer to **Transmission Identification Information** .

VEHICLE, ENGINE AND TRANSMISSION ID AND VIN LOCATION, DERIVATIVE AND USAGE (CHEVROLET)

Fig. 3: Locating Vehicle Identification Number (VIN) Plate
Courtesy of GENERAL MOTORS COMPANY

The vehicle identification number (VIN) plate is the legal identifier of the vehicle. The VIN plate is located on the upper left corner of the instrument panel (I/P). The VIN number can be seen through the windshield from the outside of the vehicle:

Vehicle Identification Number (VIN) System

Position	Definition	Character	Description
1	Country of Origin	1	United States
2	Manufacturer	G	General Motors
3	Make	N	Chevrolet MPV
4	GVWR/Brake System/Body Style	L	6, 001-7, 000 lbs Hydraulic
		S	7, 001-8, 000 lbs Hydraulic
5	Line Chassis	C	4x2
		K	4x4
6	Series	A	1/2 ton Tahoe LS
		B	1/2 ton Tahoe LT
		C	1/2 ton Tahoe LTZ
		D	1/2 ton Tahoe Police Vehicle
		G	1/2 ton Suburban LS
		H	1/2 ton Suburban LT
		J	1/2 ton Suburban LTZ
		K	1/2 ton Suburban FL
		3	1/2 ton Tahoe Special Services Vehicle
		4	1/2 ton Tahoe FL
		6	1/2 ton Tahoe Export (Non US, Non Canada)
		8	Suburban Export (Non US, Non Canada)
7	Restraint System	E	Active Manual Belts, Airbags - Driver and Passenger - Front (1st row), Front Seat Side (1st row), Roof Side (All seating rows)
		K	Active Manual Belts, Airbag - Driver and Passenger - Front (1st row), Front Seat Side (1st row), Front Inboard Seat Side (1st) row), Roof Side (All seating rows)
8	Engine Type	C	RPO L83, Engine - Gas, 8 CYL, 5.3L, SIDI VVT, AFM, E85 MAX, Aluminum

Position	Definition	Character	Description
		J	RPO L86, Engine - Gas, 8 CYL, 6.2L, SIDI VVT, AFM, E85 MAX, Aluminum
9	Check Digit	-	Check Digit
10	Model Year	G	
11	Plant Location	R	Arlington, TX
12-17	Plant Sequence Number	100, 001	Plant Sequence Number

5.3L L83, 6.2L L86 Engine ID and VIN Derivative Location

Refer to **Engine Identification** .

6L80 MYC Transmission ID and VIN Derivative Location

Refer to **Transmission Identification Information** .

VEHICLE, ENGINE AND TRANSMISSION ID AND VIN LOCATION, DERIVATIVE AND USAGE (GMC)

Fig. 4: Locating Vehicle Identification Number (VIN) Plate
Courtesy of GENERAL MOTORS COMPANY

The vehicle identification number (VIN) plate is the legal identifier of the vehicle. The VIN plate is located on the upper left corner of the instrument panel (I/P). The VIN number can be seen through the windshield from the outside of the vehicle:

Vehicle Identification Number (VIN) System

Position	Definition	Character	Description
1	Country of Origin	1	United States
2	Manufacturer	G	General Motors
3	Make	K	GMC MPV
4	GVWR/Brake System/Body Style	S	7, 001-8, 000 lbs Hydraulic
5	Line Chassis	1	4x2
		2	4x4
6	Series	A	1/2 ton Yukon SLE
		B	1/2 ton Yukon SLT
		C	1/2 ton Yukon Denali
		F	1/2 ton Yukon XL SLE
		G	1/2 ton Yukon XL SLT
		H	1/2 ton Yukon XL Denali
		7	Yukon Export (Non US, Non Canada)
		8	Yukon XL Export (Non US, Non Canada)
7	Restraint System	E	Active Manual Belts, Airbags - Driver and Passenger - Front (1st row), Front Seat Side (1st row), Roof Side (All seating rows)
		K	Active Manual Belts, Airbag - Driver and Passenger - Front (1st row), Front Seat Side (1st row), Front Inboard Seat Side (1st) row), Roof Side (All seating rows)
8	Engine Type	C	RPO L83, Engine - Gas, 8 CYL, 5.3L, SIDI VVT, AFM, E85 MAX, Aluminum
		J	RPO L86, Engine - Gas, 8 CYL, 6.2L, SIDI VVT, AFM, E85 MAX, Aluminum
9	Check Digit	-	Check Digit
10	Model Year	G	2017
11	Plant Location	R	Arlington, TX
12-17	Plant Sequence Number	100, 001	Plant Sequence Number

5.3L L83, 6.2L L86 Engine ID and VIN Derivative Location

Refer to **Engine Identification** .

6L80 MYC Transmission ID and VIN Derivative Location

Refer to **Transmission Identification Information** .

VEHICLE CERTIFICATION, TIRE PLACARD, ANTI-THEFT, AND SERVICE PARTS ID LABEL

Fig. 5: Identifying Vehicle Certification, Tire Place Card, Anti-Theft & Service Parts ID Labels
Courtesy of GENERAL MOTORS COMPANY

Callout	Description

Vehicle Certification Label
The vehicle certification label is located on the driver side B-pillar and displays the following assessments:
• Gross Vehicle Weight Rating (GVWR)
• Gross Axle Weight Rating (GAWR), front and rear
• The gross vehicle weight (GVW) is the weight of the vehicle and everything it carries. The gross vehicle weight must not exceed the GVWR. Include the following items when figuring the GVW:
  • The base vehicle weight (factory weight)
  • The weight of all vehicle accessories
  • The weight of the driver and the passengers
  • The weight of the cargo	

1	Name of Manufacturer
2	Gross Vehicle Weight Rating
3	Gross Axle Weight Rating (Front, Rear)
4	Canadian Safety Mark (w/RPO Z49)
5	Certification Statement
6	Vehicle Class Type (Pass Car, etc.)
7	Vehicle Identification Number
8	Date of Manufacture (Mo/Yr)
Tire Placard The tire placard label is located on the driver side B-pillar and displays the following assessments:	
9	Specified Occupant Seating Positions
10	Maximum Vehicle Capacity Weight
11	Tire Pressure, Front, Rear, and Spare (Cold)
12	Original Equipment Tire Size
Service Parts ID Label The vehicle service parts identification label is located in the instrument panel (I/P) compartment. The label is use to help identify the vehicle original parts and options.	
13	Vehicle Identification Number
14	Engineering Model Number (Vehicle Division, Line and Body Style)

Callout	Description
15	Interior Trim Level and Decor
16	Exterior (Paint Color) WA Number
17	Paint Technology
18	Special Order Paint Colors and Numbers
19	Vehicle Option Content
Anti-Theft Label	
20	The Federal law requires that General Motors label certain body parts on this vehicle with the VIN. The purpose of the law is to reduce the number of motor vehicle thefts by helping in the tracing and recovery of parts from stolen vehicles. Labels are permanently affixed to an interior surface of the part. The label on the replacement part contains the letter R, the manufacturer's logo, and the DOT symbol. The anti-theft label must be covered before any painting, and rustproofing procedures, and uncovered after the procedures. Failure to follow the precautionary steps may result in liability for violation of the Federal Vehicle Theft Prevention Standard and possible suspicion to the owner that the part was stolen.

RPO CODE LIST

RPO Table

RPO	Description
The production/process codes provide the description of the Regular Production Options (RPOs). The RPO list is printed on the Service Parts Identification Label.	
1LR	MODIFICATION-BRAKE SYSTEM, OPTIONAL LININGS
4AA	INTERIOR TRIM-JET BLACK
4B8	INTERIOR TRIM-COCOA / SHALE
4D7	INTERIOR TRIM-JET BLACK/DK ASH
4DP	INTERIOR TRIM-COCOA / DUNE
4ER	INTERIOR TRIM-JET BLACK / VECCHIO
4EY	INTERIOR TRIM-COCOA / PILLION BROWN SAUVAGE
4EZ	INTERIOR TRIM-COCOA / DARK ATMOSPHERE
4FP	INTERIOR TRIM-PLATINUM JET BLACK
4FQ	INTERIOR TRIM-CHOOCCACHINO
5AZ	ACCESSORY-SAFETY KIT - UNIVERSAL
5JL	ACCESSORY-BRAKE UPGRADE PKG 1 - COMPLETE

RPO	Description
5W4	SALES PACKAGE-SPECIAL SERVICE, MUNICIPAL
5Y3	ACCESSORY-TOW BALL - TRAILER HITCH
9C1	SALES PACKAGE-POLICE VEHICLE
9G3	SALES PACKAGE-"OFF ROAD"
A31	WINDOW-POWER OPERATED, ALL DOORS (DO NOT USE ON NEW/MAJOR PROGRAMS)
A45	MEMORY-SEAT ADJUSTER, MIRROR, POWER, DRIVER, PERSONALIZATION
A4M	SALES PROCESSING OPT-#3
A95	SEAT-FRT BKT, HIGH BACK, DRIVER & PASS RECL
ACO	IDENTIFICATION-ACCESSORY CATALOG OFFERING
AG1	ADJUSTER FRT ST-POWER, MULTI-DIRECTIONAL, DRIVER
AG2	ADJUSTER PASS ST-POWER, MULTI-DIRECTIONAL
AKJ	WINDSHIELD STYLE-SHADE BAND
AKK	WINDSHIELD STYLE-ACOUSTIC PVB
AKO	WINDOW TYPE-PRIVACY
AKP	WINDOW TYPE-SOLAR ABSORBING
AKX	WINDSHIELD TYPE-SOLAR ABSORBING
AL0	SENSOR INDICATOR-INFLATABLE RESTRAINT, FRT PASS/CHILD PRESENCE DETECTOR
AMF	LOCK CONTROL-ADDITIONAL, PROGRAMMABLE, REMOTE ENTRY, MULTIPLE UNITS
AN3	SEAT-FRT, INDIVIDUAL (NON BKT)
AP9	NET-CONVENIENCE
AQQ	LOCK CONTROL, ENTRY-REMOTE ENTRY, EXTENDED RANGE (MY 09 AND FUTURE)
ARL	PLANT CODE-ARLINGTON, TX, USA
ARN	SEAT THIRD ROW-60/40 BENCH, MAN FOLD
AS8	SEAT THIRD ROW-60/40 BENCH, POWER FOLD
AT6	SEAT RR-BENCH, 60/40 MANUAL CONFIGURABLE
ATD	SEAT THIRD ROW-NONE
ATH	LOCK CONTROL, ENTRY-REMOTE ENTRY, EXTENDED RANGE, PASSIVE ENTRY, ALL DOORS
ATN	SEAT RR-BUCKET, POWER CONFIGURABLE
ATT	SEAT RR-BENCH, 60/40 POWER CONFIGURABLE
ATV	SEAT RR-BUCKET, MANUAL CONFIGURABLE

RPO	Description
AU3	LOCK CONTROL-SIDE DR, ELEC
AX4	RESTRAINT CONVERSION-SEAT, MAN, EUROPEAN
AX7	RESTRAINT PROVISIONS-AUTOMATIC BELTS, PRE-CRASH, PRE-TIGHTENING
AXP	VEHICLE TYPE-MULTI-PURPOSE PASSENGER VEHICLE
AXX	VEHICLE TYPE-VEHICLE TYPE - NOT REQUIRED DO NOT USE
AY0	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER & PASS FRT, SEAT SIDE, ROOF SIDE
AYE	RESTRAINT-HEAD, RR SEAT, ANILINE LEATHER (WITH DVD) (DO NOT USE AFTER M.Y. 2017)
AYQ	RESTRAINT SYSTEM-SEAT, INFLATABLE, DRIVER & PASS FRT, FRT SEAT SIDE, FRT INBOARD SEAT SIDE, ROOF SIDE
AZ3	SEAT-FRT SPLIT, DRIVER, PASS, FULL FEATURE CENTER
B30	COVERING FLOOR-CARPET
B3V	TEST-EXTENDED WATER
B58	COVERING-FLOOR MAT, FRT & RR, CARPETED INSERT
B5N	COVERING-FLOOR MAT, FRT & RR, RUBBER
B85	MOLDING B/S-EXTERIOR, BRIGHT
B86	MOLDING B/S-BODY COLOR
BAG	PARTS PKG-EXPORT
BG9	COVERING FLOOR-RUBBER
BPH	APPEARANCE PACKAGE-CHEVROLET "OFF ROAD"
BRS	STEPS, RUNNINGBOARD-SIDE, RETRACTABLE, POWER
BTM	SWITCH-ENGINE START, KEYLESS
BTV	REMOTE START-ENGINE
BVE	STEPS, RUNNINGBOARD-SIDE
C25	WIPER SYS RR WINDOW-INTERMITTENT
C49	DEFOGGER-RR WINDOW, ELECTRIC
C9I	SWITCH-ROLL OVER SENSING
CE1	WIPER SYS WINDSHIELD-PULSE, MOISTURE SENSITIVE
CF5	ROOF-SUN, GLASS, SLIDING, ELEC
CJ4	HVAC SYSTEM-AIR CONDITIONING, FRT & RR ELECTRONIC CONTROLS
CK4	COUNTRY-GREECE

RPO	Description
CL5	COUNTRY-PERU
CL6	COUNTRY-BOLIVIA
CT1	COUNTRY-BELGIUM
CT2	COUNTRY-AUSTRIA
CT3	COUNTRY-GERMANY
CT5	COUNTRY-NETHERLANDS
CT6	COUNTRY-ITALY
CT7	COUNTRY-DENMARK
CT9	COUNTRY-SPAIN
CU1	COUNTRY-NORWAY
CU2	COUNTRY-FINLAND
CU3	COUNTRY-FRANCE
CU4	COUNTRY-SWEDEN
CU5	COUNTRY-SWITZERLAND
CU7	COUNTRY-KUWAIT
CU8	COUNTRY-SAUDI ARABIA
CV3	COUNTRY-MEXICO
CV5	COUNTRY-JAPAN
CV6	COUNTRY-CHILE
CW2	COUNTRY-GULF AREAS (BAHRAIN, KUWAIT, OMAN, QATAR, SAUDI ARABIA, UAE)
CW9	COUNTRY-MISCELLANEOUS
CX2	COUNTRY-COLOMBIA
CX3	COUNTRY-ECUADOR
CX9	COUNTRY-LEBANON
CY2	COUNTRY-JORDAN
CZ3	COUNTRY-RUSSIA
D07	CONSOLE-FRT COMPT, FLOOR, CUSTOM
D2D	COUNTRY-PHILIPPINES
D2Y	COUNTRY-ANTIGUA
D3B	COUNTRY-BERMUDA

RPO	Description
D3D	COUNTRY-REPUBLIC OF TRINIDAD AND TOBAGO
D3I	COUNTRY-BARBADOS
D3J	COUNTRY-CAYMAN ISLANDS
D3K	COUNTRY-DOMINICAN REPUBLIC
D3L	COUNTRY-EL SALVADOR
D3M	COUNTRY-GUATEMALA
D3P	COUNTRY-HAITI
D3Q	COUNTRY-HONDURAS
D3U	COUNTRY-ST MAARTEN
D4G	COUNTRY-BAHAMAS
D4N	COUNTRY-COSTA RICA
D5D	COUNTRY-NICARAGUA
DCK	CONSOLE-FRT COMPT, FLOOR, CUSTOM, W/COOLER
DD8	MIRROR I/S R/V-LT SENSITIVE
DL3	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, POWER FOLDING, TURN SIG IND, LT SENSITIVE, COLOR
DL8	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED
DNS	EQUIPMENT-SUPPLIER INSTALLED
DNU	EQUIPMENT-ADDITIONAL VIDEO SCREEN
DR4	MIRROR O/S-LH & RH, REMOTE CONTROL, ELECTRIC, HEATED, LT SENSITIVE, POWER FOLDING, COLOR
DT4	ASHTRAY-CIGARETTE LIGHTER
E01	STEPS-ASSIST
EF5	COUNTRY-PANAMA
EF7	COUNTRY-UNITED STATES OF AMERICA (USA)
EXP	EXPORT-
FE9	CERTIFICATION-EMISSION, FEDERAL
FHO	VEHICLE FUEL-GASOLINE E10
FHS	VEHICLE FUEL-GASOLINE E85
G1C	PRIMARY COLOR-EXTERIOR, OVERCAST MET(402Y)

RPO	Description
G1E	PRIMARY COLOR-EXTERIOR, LIMITED ADDICTION RED TINT (405Y)
G1W	PRIMARY COLOR-EXTERIOR, ABALONE WHITE TRICOAT(140X)
G7U	PRIMARY COLOR-EXTERIOR, PLUM BERRY MET (143X)
G80	AXLE POSITRACTION-LIMITED SLIP
GAN	PRIMARY COLOR-EXTERIOR, SWITCHBLADE SILVER MET (G) 636R
GAZ	PRIMARY COLOR-EXTERIOR, SUMMIT WHITE (G) 8624
GBA	PRIMARY COLOR-EXTERIOR, BLACK (G) 8555
GT5	AXLE REAR-4.10 RATIO
GU4	AXLE REAR-3.08 RATIO
GU5	AXLE REAR-3.23 RATIO
GU6	AXLE REAR-3.42 RATIO
GWT	PRIMARY COLOR-EXTERIOR, CHAMPAGNE SILVER MET (102V)
GWX	PRIMARY COLOR-EXTERIOR, SUBTERRANEAN MET (105V)
GXG	PRIMARY COLOR-EXTERIOR, IRIDIUM MET (121V)
H0K	INTERIOR TRIM CONFIG-LEATHER, LEVEL 3, COCOA / DUNE
H0U	INTERIOR TRIM CONFIG-CLOTH, LEVEL 2, JET BLACK
H2G	INTERIOR TRIM CONFIG-VINYL, LEVEL 1, JET BLACK
H2T	INTERIOR TRIM CONFIG-CLOTH, LEVEL 2, COCOA / DUNE
H2U	INTERIOR TRIM CONFIG-LEATHER, LEVEL 3, JET BLACK
H2V	INTERIOR TRIM CONFIG-LEATHER, LEVEL 3, JET BLACK / DK ASH
H2X	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, JET BLACK
H2Y	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, COCOA / DUNE
H4W	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, COCOA / DARK ATMOSPHERE
H4X	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, COCOA / PILLION BROWN SAUVAGE
H4Y	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, COCOA / SHALE
HD7	HANDLE-O/S, DR, ILLUMINATED
HEW	INTERIOR TRIM CONFIG-CLOTH, LEVEL 3, JET BLACK
HEY	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, JET BLACK / VECCHIO
HHZ	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, CHOCCACHINO
HJU	INTERIOR TRIM CONFIG-LEATHER, LEVEL 4, PLATINUM JET BLACK

RPO	Description
HJV	INTERIOR TRIM CONFIG-CLOTH, LEVEL 3, COCOA / DUNE
I16	ENGINEERING YEAR-2017
IO3	RADIO-INFOTAINMENT SYSTEM - BASE HMI
IO5	RADIO-INFOTAINMENT SYSTEM - UPLEVEL HMI, ENHANCED CONNECTIVITY
IO6	RADIO-INFOTAINMENT SYSTEM - UPLEVEL HMI, ENHANCED CONNECTIVITY, EMBEDDED NAVIGATION
J71	BRAKE PARKING-POWER OPERATED
J95	BRAKE-HYD POWER, SINGLE REAR WHEEL, 4 WHL DISC
JB1	BRAKE-VAC POWER, 17" DISC/DISC, W/ESS, 7700 LBS
JD9	BRAKE-VAC POWER, 17" DISC/DISC, W/VSES, 7700 LBS
JF4	PEDALS-ADJUSTABLE, POWER
JHD	CONTROL-HILL DESCENT, GEAR HOLD
JL1	CONTROL-INTEGRATED TRAILER BRAKE
K05	HEATER ENG-BLOCK
K34	CRUISE CONTROL-AUTOMATIC, ELECTRONIC
K47	AIR CLEANER-HIGH CAPACITY
K4B	BATTERY-LN3, FLA, 12V, 70AH, 730 SAE CCA, AUX
K4C	CHARGER-INDUCTIVE PORTABLE WIRELESS DEVICE
K59	CRUISE CONTROL-AUTOMATIC, ADAPTIVE
KA6	HEATER SEAT-REAR
KB6	HEATER-SEAT, COOLING, FRT
KC4	COOLING SYSTEM-ENG OIL
KG4	GENERATOR-150 AMP
KI4	RECEPTACLE-ELECTRICAL, ACCESSORY 110 VOLT
KI5	RECEPTACLE-ELECTRICAL, ACCESSORY 230 VOLT
KNP	COOLING SYSTEM-TRANS, HD
KRV	REFRIGERANT-LOW GWP
KSG	CRUISE CONTROL-AUTOMATIC, ADAPTIVE, WITH STOP/GO
KW5	GENERATOR-220 AMP
KW7	GENERATOR-170 AMP

RPO	Description
L83	ENGINE-GAS, 8 CYL, 5.3L, SIDI VVT, AFM, E85 MAX, ALUM, GM
L86	ENGINE-GAS, 8 CYL, 6.2L, SIDI VVT, AFM, E85 MAX, ALUM, GM
L96	ENGINE-GAS, 8 CYL, 6.0L, SFI, E85 MAX, IRON, GM
M5U	TRANSMISSION-AUTO 8 SPD, 8L90
MAA	MARKETING AREA-AFRICA
MAF	MARKETING AREA-SOUTHEAST ASIA
MAH	MARKETING AREA-US, PUERTO RICO/USVI
MAM	MARKETING AREA-MIDDLE EAST
MAY	MARKETING AREA-ANDEAN (SOUTH AMERICA 2)
MBC	MARKETING AREA-CANADA
MBD	MARKETING AREA-CENTRAL AMERICA/CARIBBEAN
MBM	MARKETING AREA-EUROPE GROUP
MBR	MARKETING AREA-RUSSIA GROUP
MCX	MARKETING AREA-MEXICO
MYC	TRANSMISSION-AUTO 6 SPD, HMD, 6L80
MYD	TRANSMISSION-AUTO 6 SPD, HMD, 6L90
N08	LOCK CONTROL-FUEL FILLER DR, REM CONT
N12	EXHAUST SYSTEM-REAR EXIT
N30	STEERING WHEEL-DELUXE
N33	STEERING COLUMN-TILT TYPE
N37	STEERING COLUMN-TILT, TELESCOPING
N38	STEERING COLUMN-TILT, TELESCOPING, POWER
NE1	CERTIFICATION-EMISSION, GEOGRAPHICALLY RESTRICTED REGISTRATION FOR VEHICLES UP TO 14, 000 LBS GVW (USE 2003 MDL YR
NE4	EMISSION SYSTEM-EEC 14
NE9	EMISSION SYSTEM-EEC 09
NHT	PERFORMANCE PACKAGE-ENHANCED TOWING
NK5	STEERING WHEEL-STANDARD
NKC	NOISE CONTROL-SYSTEM, ACTIVE NOISE CANCELLATION
NP0	TRANSFER CASE-ACTIVE, SINGLE SPEED, SWITCH ACTIVATED, ALUM

RPO	Description
NP5	STEERING WHEEL-LEATHER WRAPPED
NQH	TRANSFER CASE-ACTIVE, TWO SPEED, SWITCH ACTIVATED, ALUM
NT7	EMISSION SYSTEM-FEDERAL, TIER 2
NTB	EMISSION SYSTEM-FEDERAL, TIER 3
NU5	EMISSION SYSTEM-CALIFORNIA, BIN 4
NUF	EMISSION SYSTEM-CALIFORNIA, ULEV125
NUM	EMISSION SYSTEM-CALIFORNIA, LEV3 MDV 10-14K GVW
NZ4	WHEEL SPARE-17 X 7.5, J, STEEL, DESIGN 2
NZD	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 6
NZG	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 7
NZT	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 18
NZZ	SALES PACKAGE-SKID PLATE, "OFF ROAD" SPORT
PB4	LOCK CONTROL-WHEEL
PYQ	WHEEL-17 X 7.5, J, ALUMINUM, DESIGN 7
PZX	WHEEL-18 X 8.5, J, ALUMINUM, DESIGN 2
Q5U	WHEEL-17 X 8.0, J, ALUMINUM, DESIGN 2
Q7L	WHEEL-22 X 9.0, J, ALUMINUM, DESIGN 2
Q7M	WHEEL-22 X 9.0, J, ALUMINUM, DESIGN 3
QAR	TIRE ALL-P265/60R17 SL 108V BW AL3
QBL	TIRE ALL-P265/70R17 SL 113H BW OOR
QHX	TIRE ALL-P285/50R20 SL 111H BW AL3
QSS	TIRE ALL-P275/55R20 SL 111S BW AL2
QST	TIRE ALL-P285/45R22 SL 110H BW AL3
QXO	TIRE ALL-P265/65R18 SL 112H BW AL3
QXT	TIRE ALL-LT265/70R17 E 121/118 Q BW AT
QXU	TIRE ALL-LT265/70R17 E 121/118 Q BW AT
RAP	WHEEL-17 X 8.0, J, STEEL, DESIGN 1
RBR	WHEEL-22 X 9.0, J, STEEL, DESIGN 1
RBX	TIRE ALL-P265/65R18 SL 112T BW AT
RBZ	TIRE ALL-P255/70R17 SL 110S BW ALS

RPO	Description
RC3	TIRE ALL-P265/70R17 SL 113S BW AT
RC4	TIRE SPARE-P265/70R17 SL 113S BW
RC7	TIRE ALL-P275/55R20 SL 111S BW AT
RCV	WHEEL-18 X 8.5, J, ALUMINUM, DESIGN 4
RCW	WHEEL-18 X 8.5, J, ALUMINUM, DESIGN 5
RD2	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 2
RD4	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 4
RD5	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 5
RD6	WHEEL-17 X 8.0, J, STEEL, DESIGN 2
RHO	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 19
RI8	TIRE ALL-265/65R18 SL 114S BW MT
RIA	ACCESSORY-FLOOR LINER - CONTOURED
RIB	ACCESSORY-FLOOR LINER - CONTOURED - 3RD ROW
RKX	TIRE ALL-P265/65R18 SL 112T BW ALS
RM7	WHEEL SPARE-17 X 8.0, J, STEEL, DESIGN 1
RTL	WHEEL-20 X 9.0, J, ALUMINUM, DESIGN 1
RUF	WHEEL SPARE-17 X 7.5, J, STEEL, DESIGN 1
RVA	WHEEL-22 X 9.0, J, ALUMINUM, DESIGN 1
RVG	ACCESSORY-ADAPTER - TRAILER HARNESS
RVQ	ACCESSORY-ASSIST STEPS - TUBULAR - OVAL - BLACK
RVX	ACCESSORY-BALL MOUNT - TRAILER HITCH
RWI	ACCESSORY-BODY SIDE MOLDINGS - CHROME
RWK	ACCESSORY-BODY SIDE MOLDINGS - PAINTED
RWS	ACCESSORY-FLOOR MATS - CARPET
RWU	ACCESSORY-CARGO AREA ORGANIZER - COLLAPSIBLE
RX1	ACCESSORY-WHEEL, WITH INSERTS - DESIGN 1
RXH	ACCESSORY-CENTER CAP - WHEEL - DESIGN 1
RXJ	ACCESSORY-CENTER CAP - WHEEL - DESIGN 2
RXN	ACCESSORY-WHEEL, WITH INSERTS - DESIGN 2
RYK	ACCESSORY-REAR SEAT INFOTAINMENT SYSTEM 1

RPO	Description
RYT	ACCESSORY-FIRST AID KIT
RZ9	ACCESSORY-GRILLES/GRILLE INSERT - ALTERNATE DESIGN 1
RZO	ACCESSORY-WHEEL - 20" - ALUMINUM - DESIGN 9
S0M	ACCESSORY-ILLUMINATED DOOR SILLS
S0P	ACCESSORY-INSERT - FLOOR CONSOLE
S1V	ACCESSORY-HEADPHONES - RSE
S2B	WHEEL SPARE-17 X 7.0, J, ALUMINUM, DESIGN 1
S44	ACCESSORY-LOCKING PIN - TRAILER HITCH
S47	ACCESSORY-LUG NUTS
S6D	ACCESSORY-PORTABLE REFRIGERATOR
S6N	ACCESSORY-RECEIVER COVER - TRAILER HITCH
S6Q	ACCESSORY-ROADSIDE ASSISTANCE PACKAGE
SAF	LOCK-SPARE TIRE, HOIST SHAFT
SAM	ACCESSORY-SKID PLATES
SAO	ACCESSORY-SMOKERS PACKAGE
SD5	ACCESSORY-TIRE PRESSURE MONITOR
SDA	ACCESSORY-TOW HOOKS
SDI	ACCESSORY-TRIANGLE - REFLECTIVE
SES	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 1
SEU	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 2
SEV	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 3
SEW	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 4
SEY	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 5
SEZ	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 6
SF0	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 7
SF1	ACCESSORY-WHEEL - 22 X 9.0 - J - ALUMINUM - DESIGN 8
SFE	ACCESSORY-WHEEL LOCKS
SFJ	ACCESSORY-WINDOW SHADES - REFLECTIVE
SFV	ACCESSORY-WIRELESS NETWORK INTERFACE MODULE
SFZ	ACCESSORY-EMBLEM - EXTERIOR - DESIGN 1

RPO	Description
SGF	WHEEL-22 X 9.0, J, ALUMINUM, DESIGN 4
SGG	WHEEL-22 X 9.0, J, ALUMINUM, DESIGN 5
SJA	ACCESSORY-GRILLE / GRILLE INSERTS - ALTERNATE FINISH 2
SLT	EQUIPMENT-LT' SALES PKG
T3U	LAMP FRT FOG-FRT FOG
T4F	HEADLAMPS-HIGH INTENSITY DISCHARGE
T79	LAMP-FOG, RR
T89	LAMP-TAIL & STOP, EXPORT
TB4	BODY EQUIPMENT-LIFT GATE (MANUAL)
TB5	BODY EQUIPMENT-LIFT GATE (POWER)
TB8	CONTROL, HEADLAMPS-RH RULE OF THE ROAD
TBD	COMMUNICATION SYSTEM-VEHICLE HEALTH MANAGEMENT
TC2	BODY EQUIPMENT-LIFT GATE, POWER, HANDS FREE
TG5	PLAYER-COMPACT DISC AND MP3
TGG	LANGUAGE CONTROL-ENGLISH, ARABIC, FRENCH
TQ5	HEADLAMP HIGH BEAM-AUTO CONTROL
TR2	LAMP-TURN SIGNAL, ENLARGED
TRW	PROVISIONS-LAMP, ROOF MOUNTED
TUF	ORNAMENTATION-EMBLEM, "TEXAS EDITION"
U19	SPEEDOMETER-INST, KILO & MILES, KILO ODOMETER
U2J	DIGITAL AUDIO SYSTEM-S-BAND - NONE
U2K	DIGITAL AUDIO SYSTEM-S-BAND
U2L	RECEPTION-HD
U42	ENTERTAINMENT PKG-RR SEAT, SINGLE DISP, REM CONTROL, RR CONSUMER PORT, 2-WIRELESS 2-CHANNEL HEADPHONES, OPTICAL DRIVE
U77	ANTENNA-RR WINDOW, RADIO
UD5	PARK ASSIST-FRONT AND REAR
UD7	PARK ASSIST-REAR
UDC	DISPLAY INSTRUMENT-DRIVER INFO ENHANCED (ONE COLOR GRAPHIC)
UDD	DISPLAY INSTRUMENT-DRIVER INFO ENHANCED (MULTI COLOR STANDARD GRAPHIC)

RPO	Description
UDV	DISPLAY INSTRUMENT-DRIVER INFO ENHANCED, FULL CLUSTER (MULTI COLOR GRAPHIC)
UE0	COMMUNICATION SYSTEM-VEHICLE - NONE
UE1	COMMUNICATION SYSTEM-VEHICLE, ONSTAR
UEU	SENSOR INDICATOR-FORWARD COLLISION ALERT
UFG	SENSOR INDICATOR-REAR CROSS TRAFFIC ALERT
UFL	LANE ACTIVE SAFETY-DEPARTURE WARNING
UG1	OPENER-GARAGE DOOR, UNIVERSAL
UGN	COLL IMMINENT BRK-ALL SPEED, VEH FWD MOVEMENT, BRAKE PREFILL, INTEGRATED BRAKE ASSIST
UHN	WHEEL-18 X 8.5, J, ALUMINUM, DESIGN 3
UHS	DISPLAY INSTRUMENT-DRIVER INFO ENHANCED (MULTI COLOR ENHANCED GRAPHIC)
UHX	LANE ACTIVE SAFETY-KEEP ASSIST
UHY	COLL IMMINENT BRK-LOW SPEED, VEH FWD MOVEMENT, BRAKE PREFILL, INTEGRATED BRAKE ASSIST
UJM	TIRE PRESS INDICATOR-MANUAL LEARN
UK3	CONTROL-STEERING WHEEL, ACCESSORY
UKC	SIDE ACTIVE SAFETY-OBSTACLE DETECTION ENHANCED
UL2	FREQUENCIES-EUROPEAN
UL8	FREQUENCIES-SAUDI ARABIAN
ULT	APPEARANCE PACKAGE-CADILLAC ESCALADE, PLATINUM
UMN	SPEEDOMETER-INST, MILES & KILO, MILES ODOMETER
UPF	WIRELESS INTERFACE-SHORT RANGE, VOICE REC
UQ3	SPEAKER SYSTEM-ENHANCED AUDIO
UQA	SPEAKER SYSTEM-PREMIUM AUDIO BRANDED WITH AMPLIFIER
UQG	SPEAKER SYSTEM-ENHANCED AUDIO WITH AMPLIFIER
UQH	SPEAKER SYSTEM-PREMIUM AUDIO BRANDED WITH SURROUND AMPLIFIER, AUDIOPHILE
UQS	SPEAKER SYSTEM-PREMIUM AUDIO BRANDED WITH SURROUND AMPLIFIER
UTJ	THEFT DETERENT-ELECTRICAL, UNAUTHORIZED ENTRY
UTR	ALARM, HORN-CONTENT THEFT DETERENT, SELF POWERED
UTT	THEFT DETERENT-BODY SECURITY CONTENT

RPO	Description
UTU	SENSOR, VEHICLE-INCLINATION
UTV	SENSOR, VEHICLE-INTERIOR MOVEMENT
UV6	DISPLAY-HEAD UP
UVC	VISION-REAR VIEW, MONO, ANALOG
UVD	STEERING WHEEL HEAT-MANUAL
UVH	VISION-360 VIEW, MONO, ANALOG
UVZ	SENSOR-COLLISION AVOIDANCE & MITIGATION, VEHICLE REVERSE MOVEMENT
V54	LUGGAGE CARRIER-ROOF, PAINTED
V76	HOOK-TOW
VAS	ACCESSORY-GRILLE / GRILLE INSERTS - ALTERNATE FINISH - BODY COLOR
VAT	ACCESSORY-GRILLE / GRILLE INSERTS - ALTERNATE FINISH - CHROME
VAV	ACCESSORY-FLOOR MATS - ALL WEATHER
VBX	LANGUAGE LABEL-ARABIC
VC5	LABEL-SHIPPING, EXCEPT US, US POSSESSIONS, OR JAPAN (DO NOT USE MY18 AND BEYOND)
VFF	VIDEO FORMAT-REGION 1, NTSC
VFJ	VIDEO FORMAT-REGION 2, PAL
VFK	VIDEO FORMAT-REGION 3, NTSC
VFM	VIDEO FORMAT-REGION 4, NTSC
VFP	VIDEO FORMAT-REGION 5, PAL
VGC	PROTECTOR-FILM, PAINT ETCH PREVENTIVE
VH9	ENVELOPE-OWNER INFO MAN
VK3	LICENSE PLATE FRONT-FRT MOUNTING PKG
VKU	ACCESSORY-MIRROR CAPS - CHROME
VKW	ACCESSORY-ORGANIZER - FRONT CONSOLE
VKY	ACCESSORY-DOOR HANDLES - ALTERNATE FINISH - CHROME
VL4	LICENSE PLATE FRONT-FRT MOUNTING PKG, EEC
VL5	LICENSE PLATE-RR MOUNTING PKG, EXPORT
VLG	ACCESSORY-CLOSEOUT - REAR FASCIA
VLI	ACCESSORY-MAT - TRUNK / CARGO AREA

RPO	Description
VPH	VEHICLE PREPARATION-OVERSEAS DELIVERY
VPV	HANDLING CHARGE-ARLINGTON ASM TO KERR INDUSTRIES, ARLINGTON, TX AND RETURN TO ARLINGTON ASM
VQK	ACCESSORY-SPLASH GUARDS - CUSTOM MOLDED
VQQ	ACCESSORY-CROSS RAILS - ROOF RACK - INTEGRATED - BLACK
VQY	ACCESSORY-TOW HOOKS - CHROME
VQZ	ACCESSORY-EXHAUST TIP - DESIGN 1
VRS	ACCESSORY-CARGO SECURITY SHADE
VRV	ACCESSORY-SPLASH GUARDS - CUSTOM MOLDED - PAINTED
VT7	OWNERS MANUAL-ENGLISH LANGUAGE
VV4	COMMUNICATION EQUIP-MOBILE INTERNET CONNECTIVITY
VVJ	CALIBRATION-SPEEDOMETER (180 KPH/112 MPH)
VXH	ACCESSORY-ASSIST STEPS - TUBULAR - CHROME - OVAL
VZ3	LABEL-MERCURY DISPOSAL NOTIFICATION
W2D	ACCESSORY-CARGO NET
WH9	ACCESSORY-CARGO AREA DIVIDER - VERTICAL
WJI	SALES PACKAGE-MARY KAY
WMG	VIN MODEL YEAR-
WV9	MERCHANDISED PKG-VALUE LEADER
X88	MARKET BRAND-CHEVROLET
XAA	ACCESSORY-TIRE ALL-P275/55R20 SL 111S BW AL2 VAR 1
XAB	ACCESSORY-TIRE ALL-215/45ZR18 XL 93Y BW AL3 VAR 1
XAV	ACCESSORY-TIRE ALL - P285/45R22 SL 110H BW AL3 -VAR 1
XL7	FREQUENCIES RATING-315 MHZ, LONG DISTANCE
XL8	FREQUENCIES RATING-433 MHZ
Y65	SALES PACKAGE-ESS 1
Y66	SALES PACKAGE-ESS 2
Y86	SALES PACKAGE-ESS 1B
Y91	MERCHANDISED PKG-LUXURY EDITION
YF5	CERTIFICATION-EMISSION, CALIFORNIA

RPO	Description
YM8	IDENTIFICATION-LIMITED PERSONALIZATION OPTION (LPO)
Z49	COUNTRY-CANADA
Z56	CHASSIS PACKAGE-POLICE CONVERSION
Z5X	MIRROR PROVISIONS-ARABIC LANGUAGE
Z71	CHASSIS PACKAGE-"OFF ROAD"
Z75	MARKET BRAND-CADILLAC
Z82	TRAILER PROVISIONS-SPECIAL EQUIPMENT, H.D.
Z85	CHASSIS PACKAGE-INCREASED CAPACITY
Z88	MARKET BRAND-GMC
Z95	CHASSIS PACKAGE-MAGNERIDE
ZAK	TIRE SPARE-P265/60R17 SL 108V BW AL3
ZBL	TIRE SPARE-P265/70R17 SL 113 H BW OOR
ZBZ	TIRE SPARE-P255/70R17 SL 110H BW ALS
ZW7	CHASSIS PACKAGE-PREMIUM SMOOTH RIDE
ZXT	TIRE SPARE-LT265/70R17/E BW TL
ZXU	TIRE SPARE-LT265/70R17 E 121/118 S BW AT
ZY1	COLOR COMBINATION-SOLID

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 PosidriveÂ® or Type 1A cross-recess identifies a metric cross-recess screw. For best results, use a Type 1A cross-recess screwdriver, or equivalent, in PosidriveÂ® 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

Fig. 6: Identifying Fastener Strength Marks
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
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.

Fig. 7: Identifying Adhesive Coated Fasteners
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Prevailing Torque Nut, Center Lock Type

Callout	Component Name
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

Application	Specification	
	Metric	English
• 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

Application	Specification	
	Metric	English
• 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	62 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

THREAD INSERTS

General Purpose Thread Repair Kits.

These kits are available commercially.

Repair Procedure

Fig. 8: Drilling & Tapping Damaged Threads

Courtesy of GENERAL MOTORS COMPANY

WARNING: **Refer to Safety Glasses Warning .**

NOTE: **Refer to the thread repair kit manufacturer's instructions regarding the size of the drill and tap to use.**

Avoid any buildup of chips. Back out the tap every few turns and remove the chips.

1. Determine the size, the pitch, and the depth of the damaged thread. If necessary, adjust the stop collars on the cutting tool and tap to the required depth.
2. Drill out the damaged threads. Clean out any chips.
3. Lubricate the tap with light engine oil. Tap the hole. Clean the threads.

Fig. 9: View Of Thread Insert
Courtesy of GENERAL MOTORS COMPANY

4. Thread the thread insert onto the mandrel of the installer. Engage the tang of the insert onto the end of the mandrel.

NOTE: **The insert should be flush to one turn below the surface.**

5. Lubricate the insert with light engine oil, except when installing in aluminum and install the insert.
6. If the tang of the insert does not break off when backing out the installer, break the tang off with a drift.

REGISTERED AND NON-REGISTERED TRADEMARKS

Listed below are Registered Trademarks (Â®) or Non-Registered Trademarks (™) which may appear in this service manual.

A
ACÂ®
ACCUTURNÂ®
ACDelcoÂ®
Active Fuel Management™
AcuzincÂ®
AirbankÂ®
AllisonÂ®
AMMCOÂ®
AUTOFUSEÂ®
AUTOTRACÂ®
B
BendixÂ®
BluetoothÂ®
BON-AMIÂ®
BoschÂ®
BoseÂ®
C
CaterpillarÂ®
CATÂ®
C-QuamÂ®
D
DelcoÂ®
Delco BoseÂ®
Delco ElectronicsÂ®

Delco FreedomÂ®
Delco LOC IIÂ®
Delco MoraineÂ®
Delco RemyÂ®
Delco SoundÂ®
Delco SupremeÂ®
Delco TechÂ®
DELCOREÂ®
DelphiÂ®
DEX-COOLÂ®
DEXOILÂ®
DEXRONÂ®
DEXSTEER™
DNRÂ®
DolbyÂ®
DRÂ®
DuracellÂ®
DuraguardÂ®
DurastopÂ®
Duramax™
E
Eaton CorporationÂ®
EMDÂ®
ETRÂ®
F
FLO-LITEÂ®
G
General MotorsÂ®
GMÂ®
GM Goodwrench ServiceÂ®
GM OptikleenÂ®

GM Parts™
GM PassÂ®
GM UltraliteÂ®
GMACÂ®
GoodwrenchÂ®
GTPÂ®
H
Homelink™
HYDRA-MATICÂ®
I
IlluminationÂ®
INSTA-TRACÂ®
IntuneÂ®
L
LOCTITE™
Lord Fusor™
M
MAGNASTEERÂ®
MaxifuseÂ®
MetripackÂ®
MicropackÂ®
MinifuseÂ®
Mr GoodwrenchÂ®
N
NorthstarÂ®
O
OnStarÂ®
OptikleenÂ®
P
PASS-KEYÂ®
PASS-KEYIIÂ®

PASSLOCK™
PK3Â®
PozidrivÂ®
ProÂ®
Q
Quad 4Â®
R
RAINSENSE™
Rapid FireÂ®
S
ScotchBrite™
Scotchguard™
SignalsÂ®
Sikkens™
Soft-RayÂ®
Solar-RayÂ®
StabilitrakÂ®
SunrayceÂ®
SuperlubeÂ®
SycloneÂ®
T
Tech 2Â®
TechlineÂ®
TeflonÂ®
TefzelÂ®
Theft-IÂ®
TheftlockÂ®
TiltmasterÂ®
TORXÂ®
TransjelÂ®
TransguideÂ®

Twilight SentinelÂ®
U
UltraliteÂ®
V
VelcroÂ®
W
Weatherpack™

DOOR LOCK AND IGNITION LOCK FOLDING KEY BLADE REMOVAL AND INSTALLATION

Special Tools

BO-51098 Flip Key Blade Fixture

For equivalent region tools, refer to **Special Tools**.

Fig. 10: Remote Keyless Entry (RKE) Transmitter Assembly
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Failure to properly support the Remote Keyless Entry (RKE) transmitter assembly while replacing the key blade may cause internal damage to the transmitter assembly.

1. Insert the RKE transmitter in the fixture as shown.

Fig. 11: Flip Key Blade Fixture & Transmitter Assembly
Courtesy of GENERAL MOTORS COMPANY

NOTE: **It may be necessary to dress the pin drift on a grinder to maintain the diameter in order to drive the pin through the housing.**

2. Using the **BO-51098** fixture, drive the retention pin from the transmitter assembly as shown.

Fig. 12: Transmitter Assembly & Key Blade
Courtesy of GENERAL MOTORS COMPANY

3. Remove the key blade from the transmitter assembly.
4. Install the coded blank into the transmitter assembly, insure the indentation on the key blade faces the retention pin.

Fig. 13: Inserting Transmitter Pin
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Use caution not to damage the surface, chrome plating, in the following steps.**

5. Using needle nose pliers, insert the pin half way into the transmitter assembly.

Fig. 14: Flip Key Blade Fixture
Courtesy of GENERAL MOTORS COMPANY

6. Using the **BO-51098** fixture, drive the roll pin flush to the surface.

INSTRUMENT PANEL COMPARTMENT DOOR LOCK CYLINDER CODING

3
2
1

Fig. 15: View Of Lock Cylinder Tumblers
Courtesy of GENERAL MOTORS COMPANY

The internal lock cylinder only uses 4 of the ten cut positions, 7 through 10. The tumbler positions are on one side and self-retaining.

1. Rotate the cylinder (1) so the side with tumbler spring wells faces up.
2. Insert the tumbler springs (2) into the 4 spring wells.
3. Install the first tumbler (3) for key cut position 7 in the slot nearest to the front of the lock cylinder. Install the remaining tumblers following the key code.
4. Press the tumblers in place until they are secure.
5. Check for correct loading of the tumblers by inserting the key into the cylinder. All tumblers should be flush with the lock cylinder body.

FRONT SIDE DOOR LOCK CYLINDER CODING

Fig. 16: Exploded View Of Lock Cylinder
Courtesy of GENERAL MOTORS COMPANY

The door lock cylinder only uses 7 of the 10 cut positions, 3 through 9. The tumbler positions are staggered from side to side, 4 on one side and 3 on the other side, are self-retaining. The left and right door lock cylinders are identical. The lever assembly determines which side of the vehicle the lock cylinder is for. After removing the current lock, record which lever is used and the orientation of rod clip.

NOTE: **All lock cylinders for side milled keys have right and left tumblers. The location of the tooth of the tumbler**

determines whether it is right of left. Illustrations in this procedure show the right tumblers on the top and the left tumblers on the bottom. All tumblers are marked 1R, 1L, 2R, or 2L. The number being cut depth and the letter meaning right or left.

1. Rotate the cylinder (1) so the side with the 4 tumbler spring wells faces up.
2. Insert the tumbler springs (2) into the 4 spring wells.
3. Install the tumbler (3) for key cut position 3 in the slot closest to the cylinder. Install the remaining tumblers, key cut positions 5, 7 and 9, following the key code and same process. Press the tumblers in place until they are secure.
4. Check the correct loading of the tumblers by inserting the key into the cylinder. All tumblers should be flush with the lock cylinder body.
5. Turn the cylinder so the side with the 3 tumbler spring wells faces up.
6. Insert the tumbler springs into the 3 spring wells.
7. The first tumbler closest to the front of the lock cylinder to be loaded will be the fourth key cut position. Install the remaining tumblers for key cut positions 6 and 8. Press the tumblers in place until they are secure.
8. Check the correct loading of the tumblers by inserting the key into the cylinder. All of the tumblers should be flush with the lock cylinder body.
9. Apply lubricant to the cylinder body and tumbler surfaces along with a small amount in the head of the cylinder using the supplied grease.
10. Install 2 springs (4) into the spring wells in the head of the lock cylinder.
11. Snap the shutter assembly (5) into the cylinder.
12. Assemble the cylinder into the case (6).
13. Align dimples of the cylinder cap (7) with the 4 recesses in the cap. Secure by pressing the cap into place with light hand pressure.
14. If required, assemble the rod clip (9) to the lever (8) using the recorded lever information.
15. Assemble the lever to the lock. Use E-clip (10) to retain the lever assembly.
16. If supplied, assemble the gasket to the lock.
17. Insert the key into the lock and function the lock to check for proper assembly and smooth operation.

LOCK CYLINDER CODING - IGNITION

3
1
2

Fig. 17: Ignition Lock Cylinder
Courtesy of GENERAL MOTORS COMPANY

The ignition lock cylinder uses only 7 of the 10 cut positions, 3 through 9. The ignition cylinder tumblers are all located on alternate sides of the cylinder (1). They are snap-in and self-retaining. It follows the key code with the first tumbler being the first depth of the key code, closest to the head of the key.

1. Hold the ignition cylinder assembly (1) so the side with the 4 tumblers spring pocket of the cylinder is facing up.
2. Insert the tumbler springs (2) into each of the spring pockets of the cylinder assembly.
3. The first tumbler (3) to be loaded will be the first key cut position, the first number in the key code. Install the first tumbler in the slot nearest the head of the lock cylinder. Install the remaining tumblers for cuts 5, 7 and 9 following the key code and same process. Press the tumblers in place until they are secure.
4. Rotate cylinder assembly so the 3 tumblers springs pocket of the cylinder is facing up. Insert tumbler springs (2) into each of the spring pockets of the cylinder assembly.
5. The first tumbler (3) to be loaded will be the fourth key cut position, the fourth number in the key code. Install the first tumbler in the slot nearest the head of the lock cylinder. Install the remaining tumblers for cuts 6 and 8 following the key code and same process. Press the tumblers in place until they are secure.
6. Inspect for correct loading of the tumblers by inserting the key into cylinder. The side bar should drop flush with the lock cylinder body diameter.
7. Lightly lubricate the outside surfaces in the tumbler area of the lock body and down the key slot using the provided grease. Insert and extract the key 5 times to lubricate the keyway.
8. Line-up the lock to the run position. Insert lock in steering column. Rotate lock to key out position and remove key. Insert key and rotate lock 3 times to distribute the grease from the lock to column housing inside diameter.

SPARE WHEEL HOIST LOCK CYLINDER CODING

Fig. 18: Exploded View Of Spare Wheel Hoist Lock Cylinder
Courtesy of GENERAL MOTORS COMPANY

The internal lock cylinder only uses 5 of the 10 cut positions, 6 through 10. The tumbler positions are on one side and self-retaining.

NOTE: **All lock cylinders for side milled keys have right and left tumblers. The location of the tooth of the tumbler determines whether it is right of left. Illustrations in this procedure show the right tumblers on the top and the left tumblers on the bottom. All tumblers are marked 1R, 1L, 2R, or 2L. The number being cut depth**

and the letter meaning right or left.

1. Rotate the cylinder (1) so the side with the 5 tumbler spring wells faces up.
2. Insert the tumbler springs (2) into the 4 spring wells.
3. Install the tumbler (3) for key cut position 6 in the slot closest to the cylinder head. Install the remaining tumblers, key cut positions 8 and 10, following the key code and the same process. Press the tumblers in place until they are secure.
4. Check for correct loading of the tumblers by inserting the key into the cylinder. All of the tumblers should be flush with the lock cylinder body.
5. Turn the cylinder so the side with the 3 tumbler spring wells faces up.
6. Insert tumbler springs into the 2 spring wells.
7. The first tumbler closest to the front of the lock cylinder to be loaded will be the seventh key cut position. Install the remaining tumblers for key cut position 9, following the key code and same process. Press the tumblers in place until they are secure.
8. Check for correct loading of the tumblers by inserting the key into the cylinder. All of the tumblers should be flush with the lock cylinder body.
9. Apply lubricant to the cylinder body and tumbler surfaces along with a small amount in the head of the cylinder using the supplied grease.
10. Install 2 springs (4) into the 2 spring wells in the head of the cylinder.
11. Snap the shutter assembly (5) into the cylinder.
12. Insert the retainer spring (10) in the retainer pocket making sure it is positioned on the spring post.
13. Place the retainer bolt (11) in the pocket with the angle facing the back of the case. Depress the retainer bolt and hold.
14. With the key still in the cylinder, insert into case (6) 90 degrees to the right of the drain slot/retainer.
15. Rotate back 90 degrees to the key out position. Hold lock in case and remove the key. The cylinder should secure bolt in case.
16. Place the lock cylinder cap (7) on top of the lock assembly. Bend tabs on cap to underside of case making sure they are secure and pulled tight to case.
17. Insert key and rotate to verify the lock was assembled properly. The key should not be able to be removed when bolt is down. The lock should only rotate clockwise 90 degrees.
18. Assembly gaskets (9), if supplied in the groove located at the end of the case and gasket (8) in the grove at the front of the case.

LIFTING AND JACKING THE VEHICLE

WARNING: To avoid any vehicle damage, serious personal injury or death, always use the jackstands to support the vehicle when lifting the vehicle with a jack.

WARNING: To avoid any vehicle damage, serious personal injury or death when major components are removed from the

vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

CAUTION: **Perform the following steps before beginning any vehicle lifting or jacking procedure:**

- **Remove or secure all of the vehicle contents in order to avoid any shifting or any movement that may occur during the vehicle lifting or jacking procedure.**
- **The lifting equipment or the jacking equipment weight rating must meet or exceed the weight of the vehicle and any vehicle contents.**
- **The lifting equipment or the jacking equipment must meet the operational standards of the lifting equipment or jacking equipment manufacturer.**
- **Perform the vehicle lifting or jacking procedure on a clean, hard, dry, level surface.**
- **Perform the vehicle lifting or jacking procedure only at the identified lift points. DO NOT allow the lifting equipment or jacking equipment to contact any other vehicle components.**

Failure to perform the previous steps could result in damage to the lifting equipment or the jacking equipment, the vehicle, and/or the vehicle contents.

For lifting the vehicle, various lift points are recommended. Before you begin any lifting procedure, place the vehicle on a clean, hard, level surface. Verify that all the lifting equipment meets weight standards and is in good working order. Verify that all of the vehicle loads are equally distributed and secure. If you are only supporting the vehicle at the frame side rails, verify that the lifting equipment does not put too much stress on, or weaken, the frame side rails.

During hoisting, do NOT damage the fuel tanks, the exhaust system, or the underbody.

Fig. 19: Lifting and Jacking Vehicle
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Lower Control Arm Contact Points
2	Front Frame Contact Points
3	Rear Frame Contact Points
4	Rear Axle Contact Points
5	Differential Contact Points

Frame Contact Hoist

Front Hoist Pads

Fig. 20: Front Hoist Pads And Body Mount Bracket
Courtesy of GENERAL MOTORS COMPANY

NOTE: **The front hoist pads must not contact the rocker panels, the front fenders, or the floor pan.**

Position the front hoist pads under the front frame for all pickup and all utilities just after the rear edge of the number 1 body mount bracket (1).

Rear Hoist Pads

Fig. 21: Rear Hoist Pads And Frame Rail
Courtesy of GENERAL MOTORS COMPANY

NOTE: **The rear hoist pads must not contact the body rocker panels or the floor pan.**

Position the rear hoist pads under the flat portion of the frame rail (1), just in front of the rear spring.

Suspension Contact Hoist

Front Lift

Fig. 22: Front Suspension Lower Control Arms
Courtesy of GENERAL MOTORS COMPANY

Position the front lift under the outer edge of the front suspension lower control arms (1).

Rear Lift

Fig. 23: Rear Lift Under Axle Housing Tubes
Courtesy of GENERAL MOTORS COMPANY

Position the rear lift under the axle housing tubes (1) on each side of the differential.

Do not damage the stabilizer bar.

Jacking

When you are lifting a vehicle with a vehicle jack or a floor jack, block the wheels at the opposite end from which you are lifting. Use jack stands to provide additional support.

Under the Frame Rails (Front)

Fig. 24: Frame Rail Pad
Courtesy of GENERAL MOTORS COMPANY

NOTE: **The floor jack pad must not contact rocker panel or the floor pan.**

Position the floor jack pad under the frame rail pad (1).

Under the Rear Differential

Fig. 25: Center Of Rear Axle Differential
Courtesy of GENERAL MOTORS COMPANY

Position the floor jack pad under the center of the rear axle differential (1).

Do not damage the establisher bar.

Under the Frame Rail (Rear)

Fig. 26: Flat Part Of Frame
Courtesy of GENERAL MOTORS COMPANY

Position the jack under the flat part of the frame (1), just in front of the rear spring hanger.

Jack Stands

When you support the vehicle with jack stands, place the jack stands under the frame or the rear axle.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description

Illustration	Tool Number/ Description
	BO-51098 Flip Key Blade Fixture

.

REMINDER INDICATOR (RESET PROCEDURES)

GM: Buick / Cadillac / Chevrolet / GMC / Olds / Pontiac - 1980-17

ENGINE OIL REPLACEMENT REMINDER

NOTE: **Most 1981-88 General Motors vehicles do not use a Service Reminder Indicator (SRI).**

NOTE: **To determine the appropriate reset procedure, refer to ENGINE OIL REPLACEMENT REMINDER RESET INDEX. Only vehicles listed in this index have an oil change reminder reset.**

ENGINE OIL REPLACEMENT REMINDER RESET INDEX

Model & Year	Reset Procedure
Alero	
1999-03	Engine Oil Replacement Reminder Reset - Procedure 1
2004	Engine Oil Replacement Reminder Reset - Procedure 3
Acadia	
2007-10	Engine Oil Replacement Reminder Reset - Procedure 16
2011-17	Engine Oil Replacement Reminder Reset - Procedure 6
Allante	
1989-93	Engine Oil Replacement Reminder Reset - Procedure 23
ATS	
2013-17	Engine Oil Replacement Reminder Reset - Procedure 33
Aurora	
1995-99	Engine Oil Replacement Reminder Reset - Procedure 27
2001-03	Engine Oil Replacement Reminder Reset - Procedure 6
Avalanche	
2002-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-13	Engine Oil Replacement Reminder Reset - Procedure 6
Aveo	
2009-11	Engine Oil Replacement Reminder Reset - Procedure 3
Aztek	

Model & Year	Reset Procedure
2001-05	Engine Oil Replacement Reminder Reset - Procedure 3
Bravada	
2002-04	Engine Oil Replacement Reminder Reset - Procedure 11
Bonneville	
2003-05	Engine Oil Replacement Reminder Reset - Procedure 6
Brougham	
1992	Engine Oil Replacement Reminder Reset - Procedure 3
Cascada	
-17	Engine Oil Replacement Reminder Reset - Procedure 18
Camaro	
1998-02	Engine Oil Replacement Reminder Reset - Procedure 1
2010-15	Engine Oil Replacement Reminder Reset - Procedure 18
-17	Engine Oil Replacement Reminder Reset - Procedure 33
Canyon	
2004-12	Engine Oil Replacement Reminder Reset - Procedure 10
2015-17	Engine Oil Replacement Reminder Reset - Procedure 18
Caprice	
1994	Engine Oil Replacement Reminder Reset - Procedure 2
1995-96	Engine Oil Replacement Reminder Reset - Procedure 3
2011-17	Engine Oil Replacement Reminder Reset - Procedure 18
Captiva Sport	
2012-15	Engine Oil Replacement Reminder Reset - Procedure 6
Century	
1997-04	Engine Oil Replacement Reminder Reset - Procedure 6
City Express	
2015-17	Engine Oil Replacement Reminder Reset - Procedure 3
Classic	
2005	Engine Oil Replacement Reminder Reset - Procedure 4
Cobalt & G5 Pursuit (Canadian)	
2005-09	Engine Oil Replacement Reminder Reset - Procedure 4

Model & Year	Reset Procedure
Colorado	
2004-12	Engine Oil Replacement Reminder Reset - Procedure 10
2015-17	Engine Oil Replacement Reminder Reset - Procedure 18
Corvette	
1990-96	Engine Oil Replacement Reminder Reset - Procedure 5
1997-13	Engine Oil Replacement Reminder Reset - Procedure 6
2014-17	Engine Oil Replacement Reminder Reset - Procedure 33
Cruze	
2011-17	Engine Oil Replacement Reminder Reset - Procedure 18
Cruze Limited	
	Engine Oil Replacement Reminder Reset - Procedure 18
CT6	
-17	Engine Oil Replacement Reminder Reset - Procedure 33
CTS	
2003-04	Engine Oil Replacement Reminder Reset - Procedure 20
2005-08	Engine Oil Replacement Reminder Reset - Procedure 22
2009	Engine Oil Replacement Reminder Reset - Procedure 6
2010-11	Engine Oil Replacement Reminder Reset - Procedure 3 or Engine Oil Replacement Reminder Reset - Procedure 19
2012-15	Engine Oil Replacement Reminder Reset - Procedure 6
2016-17	Engine Oil Replacement Reminder Reset - Procedure 33
Cutlass Calais, Cutlass Supreme, Cutlass Ciera, Cutlass Cruiser	
1990-91	Engine Oil Replacement Reminder Reset - Procedure 28
DeVille	
1991-93	Engine Oil Replacement Reminder Reset - Procedure 25
1994-99	Engine Oil Replacement Reminder Reset - Procedure 19
2000-05	Engine Oil Replacement Reminder Reset - Procedure 16
DeVille Concours	
1994-96	Engine Oil Replacement Reminder Reset - Procedure 19

Model & Year	Reset Procedure
1997-99	Engine Oil Replacement Reminder Reset - Procedure 6
DTS	
2006-11	Engine Oil Replacement Reminder Reset - Procedure 6
Eighty Eight & Ninety Eight	
1990-91	Engine Oil Replacement Reminder Reset - Procedure 28
1992-94	Engine Oil Replacement Reminder Reset - Procedure 29
1995-97	Engine Oil Replacement Reminder Reset - Procedure 30
Eldorado	
1989-91	Engine Oil Replacement Reminder Reset - Procedure 24
1992-93	Engine Oil Replacement Reminder Reset - Procedure 26
1994-97	Engine Oil Replacement Reminder Reset - Procedure 19
1997-02	Engine Oil Replacement Reminder Reset - Procedure 6
ELR	
2014-16	Engine Oil Replacement Reminder Reset - Procedure 33
Enclave	
2008-17	Engine Oil Replacement Reminder Reset - Procedure 16
Encore	
2013-17	Engine Oil Replacement Reminder Reset - Procedure 18
Envision	
2016-17	Engine Oil Replacement Reminder Reset - Procedure 33
Envoy Series	
2002-06	Engine Oil Replacement Reminder Reset - Procedure 6
2007-09	Engine Oil Replacement Reminder Reset - Procedure 4
Equinox	
2005-09	Engine Oil Replacement Reminder Reset - Procedure 3
2011-14	Engine Oil Replacement Reminder Reset - Procedure 6
2015-17	Engine Oil Replacement Reminder Reset - Procedure 34
Escalade Series	
2002-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-14	Engine Oil Replacement Reminder Reset - Procedure 6

Model & Year	Reset Procedure
2015-17	Engine Oil Replacement Reminder Reset - Procedure 33
Express/ Chevy Express/ Cutaway/ RV	
2003-17	Engine Oil Replacement Reminder Reset - Procedure 3
Firebird	
1998-02	Engine Oil Replacement Reminder Reset - Procedure 6
Fleetwood	
1991-92	Engine Oil Replacement Reminder Reset - Procedure 25
1993-96	Engine Oil Replacement Reminder Reset - Procedure 3
Grand Am	
1999-02	Engine Oil Replacement Reminder Reset - Procedure 2
2003-05	Engine Oil Replacement Reminder Reset - Procedure 3
Grand Prix	
1998-03	Engine Oil Replacement Reminder Reset - Procedure 3
2004-08	Engine Oil Replacement Reminder Reset - Procedure 6
GTO	
2004-06	Engine Oil Replacement Reminder Reset - Procedure 3
G5	
2007-09	Engine Oil Replacement Reminder Reset - Procedure 4
G6	
2005-10	Engine Oil Replacement Reminder Reset - Procedure 32
G8	
2008-09	Engine Oil Replacement Reminder Reset - Procedure 9
HHR	
2006-11	Engine Oil Replacement Reminder Reset - Procedure 4
Impala	
2000-06	Engine Oil Replacement Reminder Reset - Procedure 8
2007-13	Engine Oil Replacement Reminder Reset - Procedure 6
2014-17	Engine Oil Replacement Reminder Reset - Procedure 33
Impala Limited	
2014-16	Engine Oil Replacement Reminder Reset - Procedure 16

Model & Year	Reset Procedure
Intrigue	
1998-02	Engine Oil Replacement Reminder Reset - Procedure 3
LaCrosse & Allure	
2005-13	Engine Oil Replacement Reminder Reset - Procedure 18
2014-17	Engine Oil Replacement Reminder Reset - Procedure 33
LeSabre	
1994-99	Engine Oil Replacement Reminder Reset - Procedure 12
2000-05	Engine Oil Replacement Reminder Reset - Procedure 14
Lucerne	
2006-10	Engine Oil Replacement Reminder Reset - Procedure 6
2011	Engine Oil Replacement Reminder Reset - Procedure 18
Lumina	
1997-01	Engine Oil Replacement Reminder Reset - Procedure 6
Malibu	
2004-07	Engine Oil Replacement Reminder Reset - Procedure 13
2008-12	Engine Oil Replacement Reminder Reset - Procedure 4
2013-17	Engine Oil Replacement Reminder Reset - Procedure 18
Malibu Limited	
2016	Engine Oil Replacement Reminder Reset - Procedure 18
Montana	
2000-05	Engine Oil Replacement Reminder Reset - Procedure 3
Monte Carlo	
1997-99	Engine Oil Replacement Reminder Reset - Procedure 6
2000-06	Engine Oil Replacement Reminder Reset - Procedure 8
2007	Engine Oil Replacement Reminder Reset - Procedure 6
Park Avenue	
1991-94	Engine Oil Replacement Reminder Reset - Procedure 15
1995-96	Engine Oil Replacement Reminder Reset - Procedure 12
1997-05	Engine Oil Replacement Reminder Reset - Procedure 14
Pickup/ C3500/ Cab & Chassis (C/K)	

Model & Year	Reset Procedure
1996-00	Engine Oil Replacement Reminder Reset - Procedure 3
Rainier	
2004-07	Engine Oil Replacement Reminder Reset - Procedure 17
Regal	
1997-04	Engine Oil Replacement Reminder Reset - Procedure 6
2011-13	Engine Oil Replacement Reminder Reset - Procedure 18
2014-17	Engine Oil Replacement Reminder Reset - Procedure 33
Rendezvous	
2002-07	Engine Oil Replacement Reminder Reset - Procedure 17
Roadmaster	
1994	Engine Oil Replacement Reminder Reset - Procedure 15 or Engine Oil Replacement Reminder Reset - Procedure 2
1995-96	Engine Oil Replacement Reminder Reset - Procedure 3
Savana Series/ Cutaway/ RV	
2003-17	Engine Oil Replacement Reminder Reset - Procedure 3
Seville	
1989-91	Engine Oil Replacement Reminder Reset - Procedure 24
1992-93	Engine Oil Replacement Reminder Reset - Procedure 26
1994-97	Engine Oil Replacement Reminder Reset - Procedure 19
1998-04	Engine Oil Replacement Reminder Reset - Procedure 16
Sierra Series	
1999-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-17	Engine Oil Replacement Reminder Reset - Procedure 6
Silhouette	
2000-01	Engine Oil Replacement Reminder Reset - Procedure 3
2002-04	Engine Oil Replacement Reminder Reset - Procedure 6
Silverado Series	
2001-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-15	Engine Oil Replacement Reminder Reset - Procedure 6

Model & Year	Reset Procedure
2016-17	Engine Oil Replacement Reminder Reset - Procedure 33
Solstice	
2006-10	Engine Oil Replacement Reminder Reset - Procedure 4
Sonic	
2012-17	Engine Oil Replacement Reminder Reset - Procedure 18
Spark	
2013-16	Engine Oil Replacement Reminder Reset - Procedure 35
2017	Engine Oil Replacement Reminder Reset - Procedure 18
SRX	
2004	Engine Oil Replacement Reminder Reset - Procedure 20
2005-06	Engine Oil Replacement Reminder Reset - Procedure 22
2007-09	Engine Oil Replacement Reminder Reset - Procedure 6
2010-12	Engine Oil Replacement Reminder Reset - Procedure 18
2013-16	Engine Oil Replacement Reminder Reset - Procedure 33
SS	
2014-17	Engine Oil Replacement Reminder Reset - Procedure 18
SSR	
2004	Engine Oil Replacement Reminder Reset - Procedure 3
2005-06	Engine Oil Replacement Reminder Reset - Procedure 6
STS	
2005-11	Engine Oil Replacement Reminder Reset - Procedure 7
Suburban	
2000-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-17	Engine Oil Replacement Reminder Reset - Procedure 6
Tahoe	
2000-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-17	Engine Oil Replacement Reminder Reset - Procedure 6
Terrain	
2011-17	Engine Oil Replacement Reminder Reset - Procedure 34
Toronado	

Model & Year	Reset Procedure
1989-92	Engine Oil Replacement Reminder Reset - Procedure 31
Torrent	
2006-09	Engine Oil Replacement Reminder Reset - Procedure 3
Trailblazer	
2002-09	Engine Oil Replacement Reminder Reset - Procedure 11
Traverse	
2009-17	Engine Oil Replacement Reminder Reset - Procedure 6
Trax	
2015-17	Engine Oil Replacement Reminder Reset - Procedure 18
Uplander, Montana SV6 (Canadian)	
2005-08	Engine Oil Replacement Reminder Reset - Procedure 6
Venture	
2000-04	Engine Oil Replacement Reminder Reset - Procedure 3
2005	Engine Oil Replacement Reminder Reset - Procedure 6
Verano	
2012-17	Engine Oil Replacement Reminder Reset - Procedure 18
Volt	
2011-15	Engine Oil Replacement Reminder Reset - Procedure 21
2016-17	Engine Oil Replacement Reminder Reset - Procedure 33
XLR	
2004	Engine Oil Replacement Reminder Reset - Procedure 6
2005-09	Engine Oil Replacement Reminder Reset - Procedure 19
XT5	
2017	Engine Oil Replacement Reminder Reset - Procedure 33
XTS	
2013-17	Engine Oil Replacement Reminder Reset - Procedure 33
Yukon Series	
2000-06	Engine Oil Replacement Reminder Reset - Procedure 3
2007-17	Engine Oil Replacement Reminder Reset - Procedure 6

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 1

1. The CHANGE OIL (or CHANGE ENGINE OIL) message is displayed when its time to change engine oil, usually between 3000 and 7500 miles since last oil change.
2. To reset the oil life monitor, turn the ignition switch to RUN position, with engine off. Press the TRIP/OIL RESET button on the instrument panel for 12 seconds. The OIL CHANGE light will start to flash to confirm that system is reset (on some models a chime will also sound). Reset is complete when OIL CHANGE light goes out.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 2

Engine oil life monitor calculates engine oil temperature and RPM. It indicates when the engine oil is nearly worn out. A CHANGE OIL light on the instrument cluster is illuminated when it is time to change the engine oil. To reset CHANGE OIL light:

1. Remove IP fuse block cover (cover can be seen when driver's door is open).
2. Turn ignition ON, engine OFF.
3. Press OIL RESET button and hold for 5 seconds.
4. If Oil Life light does not reset, repeat procedure with ignition OFF.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 3

Engine oil life monitor calculates engine oil temperature and RPM. It indicates when the engine oil is nearly worn out. A CHANGE OIL light on the instrument cluster is illuminated when it is time to change the engine oil.

1. To reset oil life monitor and turn off CHANGE OIL light (or message), turn ignition to ON position with engine off.
2. Depress accelerator pedal to wide open throttle 3 times within 5 seconds.
3. Turn ignition to LOCK/OFF
4. If light (or message) does not turn off, turn ignition OFF and repeat procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 4

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A CHANGE ENGINE OIL SOON message will come on. Change the engine oil as soon as possible within the next 600 miles (1, 000 km). It is possible that, if driving under the best conditions, the oil life system may not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset.

Reset Procedure

1. Turn the ignition key to RUN with the engine OFF.

2. Press the INFO and RESET buttons on the Driver Information Center (DIC) at the same time to enter the personalization menu.
3. Press the INFO button to scroll through the available personalization menu modes until the DIC display shows OIL-LIFE RESET.
4. Press the INFO and RESET buttons at the same time for one second and release.
5. Press and hold the reset button until the DIC display shows ACKNOWLEDGED. This will tell you the system has been reset.
6. Turn the key to LOCK/OFF.

Alternate Method (Some Models)

1. Turn the ignition key to RUN with the engine off.
2. Fully press the release the accelerator pedal 3 times within 5 seconds. Several beeps sound. This confirms the oil life system has been reset.
3. If the CHANGE/OIL message comes back on when you start the engine, the engine oil life system has not been reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 5

Engine oil life monitor calculates engine oil temperature and RPM. It indicates when the oil is nearly worn out. A CHANGE OIL light on left side of instrument cluster is illuminated when it is time to change oil. To reset oil life monitor:

1. Turn ignition on.
2. Depress ENG MET button on trip monitor and release.
3. Within 5 seconds, depress and release ENG MET button again.
4. Within 5 seconds, depress and hold the ENG MET or GAUGES button again. The CHANGE OIL light should flash.
5. Depress and hold the RANGE or GAUGES button until the CHANGE OIL light stops flashing and goes out. When the light goes out, the engine oil life monitor is reset. This should take about 10 seconds.

NOTE: **If the light does not reset, turn ignition off and repeat the procedure.**

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 6

The Driver Information Center (DIC) will display a CHANGE OIL message when an oil change is due. The instrument cluster may also have a CHANGE OIL light. To reset the oil life monitor:

Reset Procedure

1. Turn ignition switch to RUN position, with engine off.
2. Press the TRIP (on some models SELECT or SET/RESET) button, located on the DIC, until the OIL LIFE display appears. Message will

display percentage of oil life remaining.

NOTE: **On models without DIC buttons, use the TRIP/ODOMETER reset stem.**

3. Press and hold SET/RESET button (on some models, the check-symbol button) on DIC for at least 5 seconds. The message will change to indicate that the Oil Life has been reset. On some models, 3 chimes will also sound.
4. Turn ignition off.
5. Turn the key to OFF. If the light or message comes back on when you start your vehicle, the oil life system has not reset. Repeat the procedure.

NOTE: **On some models, if oil life system does not reset, try turning ignition OFF after displaying oil life message. Then press and hold reset button.**

Alternate Method (Some Models)

1. Turn the ignition key to RUN with the engine off.
2. Fully press the release the accelerator pedal 3 times within 5 seconds. Several beeps sound. This confirms the oil life system has been reset.
3. If the CHANGE/OIL message comes back on when you start the engine, the engine oil life system has not been reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 7

When the system has calculated that oil life has been diminished, it indicates that an oil change is necessary. A CHANGE ENGINE OIL SOON message in the DIC comes on. Reset the system whenever the engine oil is changed so that the system can calculate the next engine oil change. To reset the system:

1. Press the up or down arrow to scroll the DIC to show OIL LIFE.
2. Once the XXX% ENGINE OIL LIFE menu item is highlighted, press and hold the RESET button until the percentage shows 100%

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 8

The CHANGE ENGINE OIL message is displayed when its time to change engine oil, usually between 3000 and 7500 miles since last oil change. The oil change interval is not based on mileage, but on engine revolutions and engine operating temperature.

1. There are 2 ways to reset the engine oil life monitor. To reset the engine oil life monitor using the accelerator pedal, go to step 4. To reset the engine oil life monitor using the radio, turn the radio off. Turn ignition to ACC or ON, with the engine off. Press and hold the DISP (on some models, TUNE DISP) button (or knob) on the radio for at least 5 seconds until SETTINGS is displayed.
2. Press the SEEK (on some models, SEEK PTYPE or SEEK PSCAN) up or down arrow to scroll through the main menu. Scroll until OIL LIFE

appears on the display. Press the PREV or NEXT button to enter the sub-menu. RESET will be displayed.

3. Press the DISP/TUNE DISP button to reset. A chime will sound to verify the new setting and DONE will be displayed for one second. Once the message indicator has been reset, scroll through the menu until EXIT appears on the display. Press the DISP/TUNE DISP button to exit the program. A chime will sound to verify the exit.
4. To reset the engine oil life monitor using the accelerator pedal, turn ignition on with engine off. Fully depress and release the accelerator pedal slowly 3 times within 5 seconds. If CHANGE ENGINE OIL light flashes, oil life monitor is reset. If the CHANGE ENGINE OIL light comes back on and stays on, oil life monitor has not reset. Repeat reset procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 9

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A CHANGE message will come on. Change the engine oil as soon as possible within the next 600 miles (1000 km). It is possible that, if driving under the best conditions, the oil life may not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset.

To reset the Engine Oil Life System, do the following:

1. Press and hold the TRIP button on the steering wheel while turning on the ignition. Do not start the engine.
2. The instrument panel cluster will prompt to clear the service code.
3. Release the button.
4. Press and hold ENTER Switch on the left side of the steering wheel for approximately one second.
5. Turn off the ignition.

If the CHANGE ENGINE OIL SOON message comes back on when you start the vehicle, the engine oil life system has not reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 10

1. Turn ignition ON, with engine off.
2. Press and release reset stem on instrument panel while OIL LIFE message is displayed.
3. Once the alternating OIL LIFE and RESET messages appear, press and hold stem in until several beeps will sound. This confirms that oil life system has been reset. Turn ignition off or full LOCK position. If CHANGE OIL messages comes back after starting engine, repeat reset procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 11

Reset Procedure

If vehicle is equipped with a Driver Information Center (DIC), reset oil life monitor by pressing the Driver Information Center SELECT button for 5 seconds while ENGINE OIL LIFE is displayed.

Alternate Method

To reset the oil life monitor, turn ignition switch to ON or RUN position with engine off. Depress accelerator pedal slowly to wide open throttle 3 times within 5 seconds. If CHANGE ENG OIL light flashes for 5 seconds, oil life monitor is reset. If the CHANGE ENG OIL light does not flash, oil life monitor has not reset. Repeat this step.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 12

1. CHANGE OIL SOON light will come on when engine oil has broken down enough to require changing. After changing oil, reset oil life display.
2. To reset light, turn ignition on. Open glove box to access oil reset button. Press and hold oil reset button in glove box for at least 5 seconds, but not longer than 60 seconds. The CHANGE OIL SOON light will flash 4 times to indicate light has been reset.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 13

GM Oil Life System calculates when to change your engine oil and filter based on vehicle use. Anytime oil is changed, reset the system so it can calculate when the next oil change is required. If a situation occurs where you change your oil prior to a Change Oil Soon message being turned on, reset the system. After changing the engine oil, reset the system.

1. Display OIL LIFE RESET on the DIC.
2. Press and hold ENTER button for at least one second. An ACKNOWLEDGED display message will appear for 3 seconds or until the next button is pressed. This will tell you the system has been reset.
3. Turn key to OFF.
4. If Change Oil Soon message comes back on when you start your vehicle, engine oil life system has not reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 14

1. To display this light, press the GAGE INFO or GAGES button on the Driver Information Center (DIC). When oil life index is less than 10 percent, display will show OIL LIFE INDEX CHANGE OIL. After changing oil, reset system.
2. To reset light, display OIL LIFE INDEX. Hold RESET button for more than 5 seconds. After reset, oil life will change to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 15

1. CHANGE OIL SOON light will come on when engine oil has broken down enough to require changing. After changing oil, reset oil life display.
2. To reset light, locate reset button hole under the dash near passenger door. Use a pencil or similar object to push and hold button (inside hole) for 5 seconds. The CHANGE OIL SOON light will flash 4 times to indicate light has been reset.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 16

Vehicles WITHOUT Driver Information Center (DIC) Buttons

1. Turn the ignition to ON/RUN, with the engine off. The vehicle must be in P (Park) to access this display. Press the trip odometer reset stem until OIL LIFE REMAINING displays.
2. Press and hold the trip odometer reset stem until OIL LIFE REMAINING shows "100%." Three chimes sound and the CHANGE ENGINE OIL SOON message goes off.
3. Turn the key to LOCK/OFF. If the CHANGE ENGINE OIL SOON message comes back on when the vehicle is started, the engine oil life system has not been reset. Repeat the procedure.

Vehicles WITH Driver Information Center (DIC) Buttons

1. Turn the ignition to ON/RUN position, with the engine off.
2. Press the VEHICLE INFORMATION BUTTON (i) until OIL LIFE REMAINING displays.
3. Press and hold the SET/RESET button (check-mark symbol) until "100%" is displayed. Three chimes sound (on some models) and the CHANGE ENGINE OIL SOON message goes off.
4. Turn ignition to LOCK/OFF position. If the CHANGE ENGINE OIL SOON message comes back on when engine is started, repeat reset procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 17

Reset Procedure

1. Turn the ignition to ON, with the engine off.
2. Press the MODE button until the Driver Information Center (DIC) reads OIL LIFE LEFT/HOLD SET TO RESET.
3. Press and hold the SET button until 100% is displayed. You will hear three chimes and the CHANGE ENGINE OIL message will go off. Turn the key to OFF.
4. If the CHANGE ENGINE OIL message comes back on when engine is started, the engine oil life system has not reset. Repeat the procedure.

Alternate Method (Some Models)

1. Turn the ignition key to RUN with the engine off.
2. Fully press the release the accelerator pedal 3 times within 5 seconds. Several beeps sound. This confirms the oil life system has been reset.
3. If the CHANGE/OIL message comes back on when you start the engine, the engine oil life system has not been reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 18

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A CHANGE ENGINE OIL message or light will come on. Change the engine oil as soon as possible within the next 600 miles (1 000 km). It is possible that, if driving under the best conditions, the oil life system may not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset.

NOTE: **Be careful not to reset the oil life display accidentally at any time other than after the oil is changed. It cannot be reset accurately until the next oil change.**

Vehicles with DIC (& Steering Wheel Controls)

1. Using the DIC controls on the right side of the steering wheel (see **Fig. 1**), display REMAINING OIL LIFE on the driver information center (DIC).
2. Press SEL or SET/CLR (check mark icon on some systems) on the DIC controls and hold down for a few seconds to clear the CHANGE ENGINE OIL SOON message and reset the oil life at 100%.

NOTE: **Be careful not to reset the oil life display accidentally at any time other than after the oil is changed. It cannot be reset accurately until the next oil change.**

NOTE: **If the CHANGE OIL message comes back on when the vehicle is started, the engine oil life system has not been reset. Repeat the procedure.**

Fig. 1: Identifying DIC Controls (Steering Wheel - Typical)
Courtesy of GENERAL MOTORS COMPANY

Vehicles with DIC (& Turn Signal Lever Controls)

1. Turn the ignition to ON/RUN with the engine off.
2. Press the DIC MENU button on the turn signal lever to enter the Vehicle Information Menu. Use the thumbwheel to scroll through the menu items until you reach REMAINING OIL LIFE. See **Fig. 2**.

NOTE: **On vehicles with an Uplevel DIC, the controls are at the right-hand side of the steering wheel.**

3. Press the SET/CLR button (on some models, the check-symbol button) while the oil life display is active. After a few seconds, there will be a single chime (on some models) and the oil life will be reset to 100%
4. Turn the ignition to LOCK/OFF.

The system is reset when the CHANGE OIL message is off and the REMAINING OIL LIFE 100% message is displayed.

NOTE: **If the CHANGE OIL message comes back on or Code 82 DIC message comes on when the vehicle is started, the engine oil life system has not been reset. Repeat the procedure.**

Fig. 2: Identifying DIC Controls (Turn Signal Lever)
Courtesy of GENERAL MOTORS COMPANY

Vehicles without DIC (Some Models)

1. With the engine OFF, turn the ignition key to RUN.
2. Fully press and release the accelerator pedal slowly three times within five seconds.
3. Turn the key to OFF, than start the vehicle.

Reset Using Diagnostic Scan Tool (Some Models)

1. Turn on ignition.
2. Connect scan tool.
3. Select Module Diagnosis.

4. Select Engine Control Module.
5. Select Configuration/Reset function.
6. Select Engine Oil System Reset.
7. Push Enter button to run function.
8. Confirm Executed successfully.
9. Turn ignition of and confirm.
10. Turn ignition on and confirm.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 19

1. The Driver Information Center (DIC) will display remaining oil life as a percentage estimate of the useful life of oil.
2. When remaining oil life is 10 percent or less, the system will display CHANGE OIL SOON. When oil life expires, display will show CHANGE ENGINE OIL. After changing oil, reset oil life display.
3. To reset oil life display, press INFORMATION (or INFORMATION SKIP) button to display OIL LIFE LEFT. Press and hold RESET (or RESET NO) button until 100 OIL LIFE LEFT (0.0 OIL LIFE LEFT on some early models) is displayed.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 20

With Base Audio System

Press up or down arrow on the INFO button located to right of Driver Information Center (DIC) display to access DIC menu. Once 100 percent ENGINE OIL LIFE menu item is highlighted, press and hold the CLR button. Percentage will return to 100 and oil life indicator will be reset. Repeat procedure if the percentage does not return to 100.

With Navigation System

Turn the system on by pressing PWR/VOL knob once. PWR/VOL knob is located to lower left of DIC display. Press INFO button located to left of the display to access Vehicle Information menu. Turn TUNE/SEL knob located to lower right of the display until ENGINE OIL LIFE is highlighted. Press TUNE/SEL knob once to select it. When 100 percent Engine Oil Life is displayed, press multifunction button next to reset prompt in upper right corner of the display. Percentage will return to 100 and the oil life indicator will be reset. Repeat procedure if the percentage does not return to 100.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 21

1. Use the SELECT knob to select OIL LIFE on the DIC menu.
2. Press SELECT to start the OIL LIFE reset procedure.

3. The DIC menu will display "Are you sure that you want to reset?" Use SELECT to choose YES to reset oil life or NO to exit and return to the previous menu.
4. If YES is selected, the DIC menu will display RESET OIL LIFE for a short time and then 100% OIL LIFE will be display when OIL LIFE is successfully reset.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 22

With Base Audio System

1. Press the CLR button located to the right of the driver information center (DIC) display to acknowledge the Change Engine Oil message. This will clear the message from the display and reset it.
2. Press the up or down arrow on the INFO button located to the right of the Driver Information Center (DIC) display to access the DIC menu.
3. Once 100% ENGINE OIL LIFE menu item is highlighted, press and hold the CLR button. The percentage will return to 100 and the oil life indicator will be reset. Repeat the steps if the percentage does not return to 100.
4. Turn OFF the key. If the Change Engine Oil message comes back on when you start the vehicle, the engine oil life system has not reset. Repeat the procedure.

Without DIC

1. With the engine OFF, turn the ignition key to RUN.
2. Fully press and release the accelerator pedal slowly three times within five seconds.
3. Turn the key to OFF, then start the vehicle.

With Navigation System

1. Press the multifunction button, next to the OK prompt in the upper right of the display to acknowledge the Change Engine Oil message. This will clear the message from the display and reset it.
2. Turn the system on by pressing the PWR/VOL knob once. The PWR/VOL knob is located to the lower left of the driver information center (DIC) display.
3. Press the INFO button located to the left of the display to access the Vehicle Information menu.
4. Turn the TUNE/SEL knob located to the lower right of the display until Engine Oil Life is highlighted. Press the knob once to select it.
5. Once the 100% Engine Oil Life is displayed, press the multifunction button next to the Reset prompt in the upper right corner of the display. The percentage will return to 100 and the oil life indicator will be reset. Repeat the steps if the percentage does not return to 100.
6. Turn OFF the key. If the Change Engine Oil message comes back on when you start the vehicle, the engine oil life system has not reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 23

1. An OIL LIFE INDEX is one of the displays on Driver Information Center (DIC). It will display remaining oil life as a percentage estimate of the useful life of oil.
2. It will show 100 percent when the system is reset. When the oil life is 0 percent, the display will show CHANGE ENGINE OIL. After changing oil, reset oil life display.
3. To reset service reminder on 1989 models, press RANGE button until OIL LIFE INDEX appears on display. Depress and hold in AVG ECON and RANGE buttons for more than 5 seconds or until 100 is displayed. This will reset remaining oil life to 100 percent.
4. On 1990-93 models, press RANGE button until OIL LIFE INDEX appears on DIC display. Depress and hold in AVG SPEED and RANGE buttons for more than 5 seconds or until 100 is displayed. This will reset remaining oil life to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 24

1. An OIL LIFE INDEX is one of 4 displays on Driver Information Center (DIC). It will display remaining oil life as a percentage estimate of the useful life of oil.
2. Display will show 100 percent when the system is reset. When remaining oil life is 10 percent or less, the system will display CHANGE OIL SOON. When the oil life expires, the display will show CHANGE ENGINE OIL. After changing oil, reset oil life display.
3. To reset oil life display, press ENG DATA button until OIL LIFE INDEX appears on DIC display. Depress and hold in ENG DATA and RANGE buttons until 100 is displayed. This will reset remaining oil life to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 25

1. An OIL LIFE INDEX is one of the displays on Driver Information Center (DIC). It will display remaining oil life as a estimated percentage of the useful life of oil.
2. It will show 100 percent when the system is reset. When the oil life is 0 percent, the display will show CHANGE ENGINE OIL. After performing necessary services, reset service reminder.
3. To reset service reminder, turn ignition to on position. Do not start engine. Depress and hold RANGE and FUEL USED buttons until OIL LIFE INDEX appears on DIC display. Depress and hold RANGE and RESET buttons for 5-60 seconds.
4. When CHANGE OIL SOON light flashes 4 times, remaining oil life index is reset to 100 percent. If CHANGE OIL SOON comes on and stays on for 5 seconds, display did not reset. Repeat step 3.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 26

1. Oil change reminder display on the Driver Information Center (DIC) is similar to 1990-91 models, but reset procedures are different. After changing oil, reset oil life display.

2. To reset, press INFORMATION button to display OIL LIFE INDEX. Press and hold STORE/RECALL button until 100 is displayed. This will reset oil life display to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 27

1. The Driver Information Center (DIC) displays estimated percentage of the remaining useful life of engine oil or transaxle fluid. When remaining oil or fluid life is 0 percent, the display will show CHANGE OIL NOW or CHANGE TRNS FLUID NOW. After changing engine oil or transaxle fluid, reset oil life display.
2. To reset the display, turn ignition on with engine off. Press ENG button to select the OIL LIFE or TRNS FLUID LIFE percentage display. Then, press and hold in RESET for at least 5 seconds.
3. The word RESET will appear. Then, OIL LIFE 100 or TRNS FLUID 100 will be displayed.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 28

1. An oil change reminder displays estimated percentage of the remaining useful life of the oil. When engine is started, a tone will sound and approximate distance to next oil change will be displayed.
2. When remaining oil life is 10 percent or less, the system will calculate distance to next oil change. When the oil life is 0 percent, the display will show CHANGE OIL NOW. After changing oil, reset oil life display.
3. To reset the display, press and hold in OIL button to select the oil life display. Then, press and hold in RESET and OIL buttons for at least 5 seconds. This will reset oil life display to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 29

1. To reset the display, press and release the TEST button.
2. Press and release the OIL button.
3. Press and hold the RESET button for at least 7 seconds. This will reset oil life display to 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 30

1. To reset the display, press and release RESET button on Driver Information Center (DIC).
2. Press SEL button (with down arrow) to select OIL.
3. Press SEL button (with left and right arrows) to display oil life.
4. Press and hold RESET button for about 5 seconds.
5. A reset message will display, then oil life will display 100 percent.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 31

With Information Center Display

OIL LIFE INDEX is one of 4 engine data displays used on models with Information Center display. It will display remaining oil life as estimated percentage of the useful life of oil. It will show 100 percent when the system is reset. After changing oil, reset oil life display.

1. To reset the display, press ENG DATA button (1989-90) or OPTIONS button (1991-92) until oil life index is displayed.
2. Then, press and hold in ENG DATA and GAGE buttons (1989) or RESET/ENTER button (1990-92) for at least 5 seconds. This will reset remaining oil life to 100 percent.

With Visual Information Center

OIL LIFE is one of the displays used on models with a Visual Information Center (VIC). It will display data regarding previous oil change. A bar graph display shows full when oil is changed. Bar graph will go down as vehicle is driven and oil ages. When bar graph reaches CHANGE OIL mark, oil should be changed. After changing oil, reset oil life display.

1. To reset the display, press INFO hard key and then OIL LIFE soft key to display oil life index.
2. Press RESET soft key.
3. A reset confirmation page will appear and ask if oil has been changed. Press YES soft key to reset bar graph, and update last oil change date and mileage information.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 32

When the system has calculated that oil life has been diminished, it will indicate that an oil change is necessary. A CHANGE ENGINE OIL SOON message will come on. Change the engine oil as soon as possible within the next 600 miles (1000 km). It is possible that, if driving under the best conditions, the oil life system may not indicate that an oil change is necessary for over a year. However, the engine oil and filter must be changed at least once a year and at this time the system must be reset.

To reset the Engine Oil Life System, do the following:

1. With the CHANGE OIL SOON message displayed, press any of the three driver information center (DIC) buttons to clear the CHANGE OIL SOON message.
2. Display OIL LIFE RESET on the DIC.
3. Press and hold the ENTER button for at least one second. An ACKNOWLEDGED display message will appear for three seconds or until the next button is pressed. This will tell you the system has reset.

4. Turn the ignition to OFF.

If the CHANGE ENGINE OIL message comes back on when you start the vehicle the Engine Oil Life System has not reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 33

This vehicle has a computer system that indicates when to change the engine oil and filter. This is based on a combination of factors which include engine revolutions, engine temperature, and miles driven. Based on driving conditions, the mileage at which an oil change is indicated can vary considerably. For the oil life system to work properly, the system must be reset every time the oil is changed. To reset the system:

Reset Procedure

1. Using the DIC controls on the right side of the steering wheel, display REMAINING OIL LIFE on the driver information center (DIC).
2. Press SEL (check mark icon on some systems) on the DIC controls and hold down for a few seconds to clear the CHANGE ENGINE OIL SOON message and reset the oil life at 100%.

NOTE: **Be careful not to reset the oil life display accidentally at any time other than after the oil is changed. It cannot be reset accurately until the next oil change.**

Alternate Method (Some Models)

1. Turn the ignition key to RUN with the engine off.
2. Fully press the release the accelerator pedal 3 times within 5 seconds. Several beeps sound. This confirms the oil life system has been reset.
3. If the CHANGE/OIL message comes back on when you start the engine, the engine oil life system has not been reset. Repeat the procedure.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 34

Vehicles with Driver Information Center (DIC)

1. Turn the ignition to ON/RUN with the engine off.
2. Press the DIC MENU button on the center console to enter the Vehicle Information Menu.
3. Press either the up or down arrows to view REMAINING OIL LIFE.
4. Press the SET/CLR button until 100% is displayed.
5. Turn the ignition to LOCK/OFF.

The system is reset when the CHANGE ENGINE OIL SOON message goes off.

NOTE: **If the CHANGE OIL message comes back on when the vehicle is started, the engine oil life system has not been reset. Repeat the procedure.**

Alternate Method

1. With the engine OFF, turn the ignition key to RUN.
2. Fully press and release the accelerator pedal slowly three times within five seconds.
3. Turn the key to OFF, than start the vehicle.

ENGINE OIL REPLACEMENT REMINDER RESET - PROCEDURE 35

Reset the system whenever the engine oil is changed so that the system can calculate the next engine oil change. Always reset the engine oil life to 100% after every oil change. It will not reset itself. Use the DIC controls at the right side of the instrument cluster to reset the system.

1. Display remaining oil life (oil can w/ %) on the DIC
2. Press and hold SET/CLR on the DIC for more than five seconds. The oil life will change to 100%.

If the OIL CHANGE DIC message comes back on when the vehicle is started, the engine oil life system has not reset. Repeat the procedure.

EMISSIONS MAINTENANCE REMINDER (REMINDER FLAG)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET. Only vehicles listed in this index have an Oxygen Sensor Reminder Flag reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Some Models	
1980	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET- PROCEDURE 1

1. Every 30, 000 miles, a reminder flag appears in speedometer face, indicating service of oxygen sensor is necessary. See **Fig. 3**. Inspect and service oxygen sensor as necessary and reset flag.
2. To reset flag, remove instrument panel trim plate. Remove instrument cluster lens. Using pointed tool, apply light downward pressure on notches of flag until it is reset. An alignment mark will appear in left center of odometer window when flag is fully reset.

Fig. 3: Resetting Reminder Flag
Courtesy of GENERAL MOTORS CORP.

EMISSIONS MAINTENANCE REMINDER (WARNING LIGHT)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have an oxygen sensor warning light reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Sprint	
1985-86	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

At 30, 000 mile intervals, a SENSOR light in dash will start flashing, indicating oxygen sensor needs replacement. To reset mileage counter (after sensor replacement), locate SENSOR light cancel switch on right side of fuse box. Return cancel switch to OFF position. Start engine to ensure light remains off.

EMISSIONS MAINTENANCE REMINDER (CHECK ENGINE LIGHT)

NOTE: **To determine the appropriate reset procedure, refer to EMISSIONS MAINTENANCE REMINDER RESET INDEX. Only vehicles listed in this index have a check engine light reset.**

EMISSIONS MAINTENANCE REMINDER RESET INDEX

Model & Year	Reset Procedure
Geo Tracker	
1989-94	Emissions Maintenance Reminder Reset - Procedure 1

EMISSIONS MAINTENANCE REMINDER RESET - PROCEDURE 1

Federal Emissions

1. CHECK ENGINE light functions as a service reminder indicator and emission system service. CHECK ENGINE light will come on each 50, 000 miles (PCV and EGR), each 80, 000 miles (oxygen sensor) and each 100, 000 miles (charcoal canister) to indicate needed emission system service.
2. After servicing and/or replacing components, reset CHECK ENGINE light by sliding cancel switch to its opposite position. See **CHECK ENGINE LIGHT RESET SWITCH LOCATION (GEO TRACKER)**for switch location.

CHECK ENGINE LIGHT RESET SWITCH LOCATION (GEO TRACKER)

Application	Location
1989-91	Behind Access Panel, Directly Below Steering Column
1992-94	(1) Behind Instrument Panel, Next To Left Speaker
(1) See **Fig. 4**.	

Fig. 4: Check Engine Light Reset Switch Location (1992-94 Geo Tracker - Federal Emissions)
Courtesy of GENERAL MOTORS CORP.

California Emissions

CHECK ENGINE light indicates when it is necessary to have emission system serviced, regardless of mileage. CHECK ENGINE light comes on briefly when starting as a bulb check. If light does not come on or stays on constantly, repair as necessary.

FUEL FILTER REPLACEMENT REMINDER

NOTE: **To determine the appropriate reset procedure, refer to Fuel Filter Life Reset Index. Only vehicles listed in this index have a fuel filter life reset.**

FUEL FILTER REPLACEMENT REMINDER RESET INDEX

Application	Reset Procedure
Some Models	Fuel Filter Replacement Reminder Reset - Procedure 1

FUEL FILTER REPLACEMENT REMINDER RESET - PROCEDURE 1

NOTE: **This procedure does not apply to all models. Manufacturer does not specify which vehicles are equipped with a Fuel Filter Replacement Reminder.**

NOTE: **ALWAYS reset the FUEL FILTER LIFE system (if equipped) after a fuel filter change.**

"FUEL FILTER LIFE" message will appear when a reset is performed either by using the steering wheel controls or performing manual reset procedure.

1. On vehicles with steering wheel controls, press and hold the select button for 5 seconds while the FUEL FILTER LIFE message is displayed. This message will appear on the Driver Information Center (DIC) for 10 seconds.
2. On vehicles without steering wheel controls, go to next step.
3. Without pressing the pedals, turn the ignition key to the ON position, engine off. Wait 5 seconds.
4. Completely depress the brake and accelerator pedals simultaneously and hold for 10 seconds. The system is now reset. Turn ignition key OFF.
5. On all vehicles, the next time engine is started, the message will no longer be displayed.

MAINTENANCE SERVICE REMINDER

NOTE: **To determine the appropriate reset procedure, refer to MAINTENANCE SERVICE REMINDER RESET INDEX. Only vehicles listed in this index have a Service Reminder reset.**

MAINTENANCE SERVICE REMINDER RESET INDEX

Model & Year	Reset Procedure
6000 STE	
1987-89	Maintenance Service Reminder Reset - Procedure 1
Bonneville	
1988-91	Maintenance Service Reminder Reset - Procedure 1
Caprice	
2011	Maintenance Service Reminder Reset - Procedure 2

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 1

The SERVICE REMINDER message light is used on models with a Driver Information Center (DIC). After performing necessary services, reset service reminder light.

1. To reset service reminder, push DIC button until desired service item is displayed.
2. Press and hold down the DIC button. With button pressed, the distance display will decrease in increments of 500 miles.
3. Release button when desired distance is displayed on the DIC.

MAINTENANCE SERVICE REMINDER RESET - PROCEDURE 2

The displayed service reminder is reset using a scan tool or by the following procedure:

1. Turn the ignition to the OFF position.
2. Press and hold the TRIP button.
3. Turn the ignition to the ON position.
4. Release the TRIP button.
5. Once in the Service Reset screen, press and hold the ENTER switch for 3-5 seconds. A confirmation beep will sound upon reset.
6. Turn the ignition to the OFF position.

NOTE: **If the service reminder comes back on when you start the vehicle, the Service Reminder Display has not reset. Repeat the procedure.**

TIMING BELT REPLACEMENT REMINDER

NOTE: **To determine the appropriate reset procedure, refer to TIMING BELT REPLACEMENT REMINDER INDEX. Only the vehicles listed in this index have a Timing Belt Replacement Reminder Reset.**

CHANGE TIMING BELT MESSAGE INDEX

Model & Year	Reset Procedure
Chevrolet Cruze - LUW and LWE Engines (2011-16)	Timing Belt Replacement Reminder Reset - Procedure 1
Chevrolet Sonic - LUW and LWE Engines (2012-16)	Timing Belt Replacement Reminder Reset - Procedure 1

TIMING BELT REPLACEMENT REMINDER RESET - PROCEDURE 1

NOTE: **Applies to LUW and LWE engines.**

Description

On LUW and LWE engines, the Instrument Cluster monitors the odometer mileage to determine when a timing belt (if equipped) replacement may be necessary. After the vehicle has accumulated approximately 100, 000 miles (160, 000 kilometers), the Instrument Cluster may display the CHANGE TIMING BELT message.

Message Reset

After the engine timing belt has been replaced, reset the CHANGE TIMING BELT message by locating and removing the fuses that supply power to the Instrument Cluster, for two minutes.

- **2011-16 Cruze** : Fuse #21 (F21DA) Underhood (**Fig. 5**)
- **2012-16 Sonic** : Fuse #F26 (F26DA) Under Dash (lower-left of dash - **Fig. 6**)

Fig. 5: Underhood Fuses (Cruze)
Courtesy of GENERAL MOTORS CORP.

Fig. 6: Instrument Panel Fuses (Sonic)
Courtesy of GENERAL MOTORS CORP.

TRANSMISSION FLUID REPLACEMENT REMINDER

NOTE: **To determine the appropriate reset procedure, refer to TRANSMISSION FLUID REPLACEMENT REMINDER RESET INDEX. Only the vehicles listed in this index have a CHANGE TRANS FLUID MESSAGE reset.**

TRANSMISSION FLUID REPLACEMENT REMINDER RESET INDEX

Model & Year	Reset Procedure
Aurora	
1995-99	Transmission Fluid Replacement Reminder Reset - Procedure 4
Concours	
1994-98	Transmission Fluid Replacement Reminder Reset - Procedure 1
1999	Transmission Fluid Replacement Reminder Reset - Procedure 2
CTS	
2003	Transmission Fluid Replacement Reminder Reset - Procedure 3
2004	Transmission Fluid Replacement Reminder Reset - Procedure 2
DeVille	
1992-97	Transmission Fluid Replacement Reminder Reset - Procedure 1
1998-04	Transmission Fluid Replacement Reminder Reset - Procedure 2
Eldorado	
1992-98	Transmission Fluid Replacement Reminder Reset - Procedure 1
1999-00	Transmission Fluid Replacement Reminder Reset - Procedure 2
2001-02	Transmission Fluid Replacement Reminder Reset - Procedure 1
Seville	
1992-97	Transmission Fluid Replacement Reminder Reset - Procedure 1
1998-04	Transmission Fluid Replacement Reminder Reset - Procedure 2
SRX	
2004	Transmission Fluid Replacement Reminder Reset - Procedure 2

TRANSMISSION FLUID REPLACEMENT REMINDER RESET - PROCEDURE 1

The CHANGE TRANS FLUID message will appear on the Driver Information Center (DIC) when trans fluid change is due. Change fluid in both the oil pan and side cover.

1. To reset display, turn ignition ON with engine OFF.
2. On the climate control panel, press and hold OFF and REAR DEFOG buttons until TRANS FLUID RESET message appears in DIC (about 5-20 seconds).

TRANSMISSION FLUID REPLACEMENT REMINDER RESET - PROCEDURE 2

The CHANGE TRANS FLUID message will appear on the Driver Information Center (DIC) when trans fluid change is due. Percentage of transaxle fluid life remaining may be checked at any time by pressing INFO button several times until TRANS FLUID LIFE message appears.

1. To reset display, turn ignition key ON with engine OFF.
2. Press the INFO button until TRANS FLUID LIFE message appears.
3. Press and hold INFO RESET button until display shows 100 percent TRANS FLUID LIFE. Transaxle fluid life index is now reset.

TRANSMISSION FLUID REPLACEMENT REMINDER RESET - PROCEDURE 3

NOTE: **The CHANGE TRANS FLUID message will appear on the Driver Information Center (DIC) when trans fluid change is due.**

Resetting With Base Audio System

Press CLR button located to the right of the DIC display to acknowledge the CHANGE TRANS FLUID message. This will clear the message from the display and reset it. To reset transmission fluid life indicator, press up or down arrow on INFO button located to the right of the DIC display to access the DIC menu. Once percentage TRANS FLUID LIFE menu item is highlighted, press and hold CLR button. Percentage will return to 100, and transmission fluid life indicator will be reset. Repeat if percentage does not return to 100.

Resetting With Navigation System

Press multifunction button located to the right of the DIC display, next to the OK prompt to acknowledge the CHANGE TRANS FLUID message. This will clear the message form the display and reset it. To reset transmission fluid life indicator, turn system on by pressing PWR/VOL knob once. PWR/VOL knob is located to the lower left of the DIC display. Press INFO button located to the left of the DIC display to access the VEHICLE INFO menu. Turn TUNE/SEL knob located to the lower right of the DIC display until TRANS FLUID LIFE is highlighted. Press knob once to select it. Once percentage TRANS FLUID LIFE is displayed, press multifunction button next to the RESET prompt in the upper right corner of the display. Percentage will return to 100, and transmission fluid life indicator will be reset. Repeat if percentage does not return to 100.

TRANSMISSION FLUID REPLACEMENT REMINDER RESET - PROCEDURE 4

1. The Driver Information Center (DIC) displays estimated percentage of the remaining useful life of transaxle fluid. When remaining fluid life is 0 percent, the display will show CHANGE TRNS FLUID NOW. After changing transaxle fluid, reset oil life display.
2. To reset the display, turn ignition on with engine off. Press ENG button to select the TRNS FLUID LIFE percentage display. Then, press and hold in RESET for at least 5 seconds.
3. The word RESET will appear. Then, TRNS FLUID 100 will be displayed.

TIRE PRESSURE MONITOR SYSTEM REMINDER

NOTE: **To determine the appropriate reset procedure, refer to TPMS REMINDER RESET INDEX. Only vehicles listed in this index have a TPMS Reminder Reset.**

TPMS REMINDER RESET INDEX

Model	Application	Procedure
Buick		
Allure	2007	TPMS Reminder Reset - Procedure 1
Â	2008-09	TPMS Reminder Reset - Procedure 2
Cascada	2016-17	TPMS Reminder Reset - Procedure 25
Century	1999-05	(1) TPMS Reminder Reset - Procedure 21
Enclave	2008-12	TPMS Reminder Reset - Procedure 2
Â	2013-17	TPMS Reminder Reset - Procedure 9
Encore	2013-17	TPMS Reminder Reset - Procedure 25
Envision	2016-17	TPMS Reminder Reset - Procedure 26
LaCrosse	2006-09	TPMS Reminder Reset - Procedure 2
Â	2010-12	TPMS Reminder Reset - Procedure 11
Â	2013-17	TPMS Reminder Reset - Procedure 26
LaSabre	2002-05	(1) TPMS Reminder Reset - Procedure 20
Lucerne	2006	(1) TPMS Reminder Reset - Procedure 22
Â	2007-11	TPMS Reminder Reset - Procedure 2
Park Avenue	1998-05	(1) TPMS Reminder Reset - Procedure 20
Rainier	2006-07	TPMS Reminder Reset - Procedure 1
Regal	1999-04	(1) TPMS Reminder Reset - Procedure 21
Â	2011-12	TPMS Reminder Reset - Procedure 11
Â	2013-17	TPMS Reminder Reset - Procedure 26
Rendezvous	2003-07	(1) TPMS Reminder Reset - Procedure 24
Verano	2012	TPMS Reminder Reset - Procedure 11
Â	2013-17	TPMS Reminder Reset - Procedure 25
Cadillac		

Model	Application	Procedure
ATS	2013-17	TPMS Reminder Reset - Procedure 11
CT6	2016-17	TPMS Reminder Reset - Procedure 11
CTS	2004-12	With RPO UH3: TPMS Reminder Reset - Procedure 9 W/O RPO UH3: TPMS Reminder Reset - Procedure 10
Â	2013-14	TPMS Reminder Reset - Procedure 9
Â	2015-17	TPMS Reminder Reset - Procedure 11
Deville	2001-05	TPMS Reminder Reset - Procedure 4
DTS	2006-11	TPMS Reminder Reset - Procedure 2
ELR	2014-16	TPMS Reminder Reset - Procedure 11
Escalade Series	2004-06	TPMS Reminder Reset - Procedure 1
Â	2008-12	TPMS Reminder Reset - Procedure 2
Â	2013-14	TPMS Reminder Reset - Procedure 9
Â	2015-17	TPMS Reminder Reset - Procedure 11
Seville	2001-04	TPMS Reminder Reset - Procedure 4
SRX	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012-16	TPMS Reminder Reset - Procedure 11
STS	2005-11	TPMS Reminder Reset - Procedure 3
XLR	2008	TPMS Reminder Reset - Procedure 2
XT5	2017	TPMS Reminder Reset - Procedure 11
XTS	2013-17	TPMS Reminder Reset - Procedure 11
Chevrolet		
Avalanche	2004-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 3
Â	2013	TPMS Reminder Reset - Procedure 9
Aveo	2008-11	(2) TPMS Reminder Reset - Procedure 7
Bolt EV	2017	TPMS Reminder Reset - Procedure 28
Camaro	2010-11	TPMS Reminder Reset - Procedure 2

Model	Application	Procedure
Â	2012	TPMS Reminder Reset - Procedure 11
Â	2013-15	TPMS Reminder Reset - Procedure 25
Â	2016-17	TPMS Reminder Reset - Procedure 11
Caprice	2011-13	TPMS Reminder Reset - Procedure 31
Â	2014-17	TPMS Reminder Reset - Procedure 25
Captiva Sport	2012-15	TPMS Reminder Reset - Procedure 2
City Express	2015-17	TPMS Reminder Reset - Procedure 32
Cobalt	2008-10	TPMS Reminder Reset - Procedure 3
Colorado	2006-12	TPMS Reminder Reset - Procedure 1
Â	2015-17	Base DIC TPMS Reminder Reset - Procedure 25 Uplevel DIC TPMS Reminder Reset - Procedure 11
Corvette	1987-96	(1) TPMS Reminder Reset - Procedure 20
Â	1997-04	TPMS Reminder Reset - Procedure 6
Â	2005-06	TPMS Reminder Reset - Procedure 3
Â	2007-13	TPMS Reminder Reset - Procedure 9
Â	2014-17	TPMS Reminder Reset - Procedure 8
Cruze	2011-12	TPMS Reminder Reset - Procedure 11
Â	2013-17	Base DIC TPMS Reminder Reset - Procedure 25 Uplevel DIC TPMS Reminder Reset - Procedure 11
Cruze Limited	2016	TPMS Reminder Reset - Procedure 25
Equinox	2007	TPMS Reminder Reset - Procedure 5
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 11
Â	2013-14	TPMS Reminder Reset - Procedure 25
Â	2015-17	TPMS Reminder Reset - Procedure 33
Express Van	2008-12	TPMS Reminder Reset - Procedure 2
Â	2013-17	TPMS Reminder Reset - Procedure 27

Model	Application	Procedure
HHR	2008-11	TPMS Reminder Reset - Procedure 3
Impala	2000-02	(1) TPMS Reminder Reset - Procedure 13
Â	2003-05	(1) TPMS Reminder Reset - Procedure 14
Â	2006-07	TPMS Reminder Reset - Procedure 5
Â	2008-12	TPMS Reminder Reset - Procedure 2
Â	2013	TPMS Reminder Reset - Procedure 9
Â	2014-17	TPMS Reminder Reset - Procedure 28
Impala Limited	2014-16	TPMS Reminder Reset - Procedure 9
Malibu / Classic	2008-11	TPMS Reminder Reset - Procedure 3
Â	2012	TPMS Reminder Reset - Procedure 2
Â	2013-14	TPMS Reminder Reset - Procedure 25
Â	2015-17	TPMS Reminder Reset - Procedure 28
Malibu Limited	2016	TPMS Reminder Reset - Procedure 25
Monte Carlo	2000-02	(1) TPMS Reminder Reset - Procedure 13
Â	2003-05	(1) TPMS Reminder Reset - Procedure 14
Â	2006-07	TPMS Reminder Reset - Procedure 5
Orlando (Canada)	2012	TPMS Reminder Reset - Procedure 11
Silverado Series	2006-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 3
Â	2013	TPMS Reminder Reset - Procedure 27
Â	2014-17	TPMS Reminder Reset - Procedure 26
Sonic	2012	TPMS Reminder Reset - Procedure 11
Â	2013-17	TPMS Reminder Reset - Procedure 25
Spark	2013-15	TPMS Reminder Reset - Procedure 29
Â	2016-17	TPMS Reminder Reset - Procedure 25
Spark EV	2014-16	TPMS Reminder Reset - Procedure 30
SS	2014-17	TPMS Reminder Reset - Procedure 25
Suburban	2004-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2

Model	Application	Procedure
Â	2012	TPMS Reminder Reset - Procedure 3
Â	2013-14	TPMS Reminder Reset - Procedure 9
Â	2015-17	TPMS Reminder Reset - Procedure 26
Tahoe	2004-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 3
Â	2013-14	TPMS Reminder Reset - Procedure 9
Â	2015-17	TPMS Reminder Reset - Procedure 26
TrailBlazer	2006-07	TPMS Reminder Reset - Procedure 1
Traverse	2009-12	TPMS Reminder Reset - Procedure 2
Â	2013-17	TPMS Reminder Reset - Procedure 9
Trax	2015-17	TPMS Reminder Reset - Procedure 25
Uplander	2008	TPMS Reminder Reset - Procedure 3
Volt	2011-12	TPMS Reminder Reset - Procedure 11
Â	2013-15	TPMS Reminder Reset - Procedure 30
Â	2016-17	TPMS Reminder Reset - Procedure 11
GMC		
Acadia	2007-11	TPMS Reminder Reset - Procedure 3
Â	2012	TPMS Reminder Reset - Procedure 2
Â	2013-16	TPMS Reminder Reset - Procedure 9
Â	2017	TPMS Reminder Reset - Procedure 11
Acadia Limited	2017	TPMS Reminder Reset - Procedure 9
Canyon	2006-12	TPMS Reminder Reset - Procedure 1
Â	2015-17	TPMS Reminder Reset - Procedure 34
Envoy	2006-09	TPMS Reminder Reset - Procedure 1
Savana Series	2008-12	TPMS Reminder Reset - Procedure 2
Â	2013-17	TPMS Reminder Reset - Procedure 27
Sierra Series	2006-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 3

Model	Application	Procedure
Â	2013	TPMS Reminder Reset - Procedure 9
Â	2014-17	TPMS Reminder Reset - Procedure 26
Terrain	2010-11	TPMS Reminder Reset - Procedure 2
Â	2012-17	TPMS Reminder Reset - Procedure 12
Yukon Series	2004-07	TPMS Reminder Reset - Procedure 1
Â	2008-11	TPMS Reminder Reset - Procedure 2
Â	2012	TPMS Reminder Reset - Procedure 3
Â	2013-14	TPMS Reminder Reset - Procedure 9
Â	2015-17	TPMS Reminder Reset - Procedure 26
Oldsmobile		
Alero	1999-00	(1) TPMS Reminder Reset - Procedure 16
Aurora	2001-03	(1) TPMS Reminder Reset - Procedure 17
Pontiac		
Aztek	2003-05	(1) TPMS Reminder Reset - Procedure 23
Bonneville	2000-05	(1) TPMS Reminder Reset - Procedure 15
G3	2009	TPMS Reminder Reset - Procedure 2
G5	2008-09	TPMS Reminder Reset - Procedure 2
G6	2008-10	TPMS Reminder Reset - Procedure 2
G8	2008-09	TPMS Reminder Reset - Procedure 2
Grand Am	1999-05	(1) TPMS Reminder Reset - Procedure 18
Grand Prix	2008	TPMS Reminder Reset - Procedure 2
Solstice	2008-10	TPMS Reminder Reset - Procedure 2
Torrent	2008-09	TPMS Reminder Reset - Procedure 2
Wave	2008	TPMS Reminder Reset - Procedure 2
Vibe	2005-07	(1) TPMS Reminder Reset - Procedure 19

(1) This is an Indirect TPM System. A tire sensor activation tool is not required for this procedure.

(2) A tire sensor activation tool cannot be used for this procedure.

TPMS REMINDER RESET - PROCEDURE 1

NOTE: **When the wheels have been rotated, or a tire pressure sensor or EGM/LGM has been replaced, retrain tire pressure sensors.**

NOTE: **The DIC will display the "SERVICE TIRE MONITOR" message if one or more of the tire pressure sensors has malfunctioned or if all of the sensors have not been programmed successfully. If, after the relearn procedure, the warning indicators are still on, there is a problem in the TPM system.**

NOTE: **If this procedure is performed following replacement and reprogramming of the Liftgate Module (LGM), DIC may display a low tire pressure fault and all tire pressures read 0 psi. If this problem occurs, see appropriate manufacturer service information.**

NOTE: **The TPM system will cancel the learn mode if more than 2 minutes have passed and no sensors have been learned, or if the system has been in learn mode for more than 5 minutes. If the learn mode is canceled before any sensor has been learned, the EGM/LGM will remember all current sensor IDs and their locations. As soon as the first sensor ID code is learned, all other IDs are erased from the EGM/LGM's memory. On models that display the individual tire pressure on DIC, updated tire pressures will not be displayed until EGM/LGM receives 2 more valid transmissions from each sensor.**

NOTE: **Before proceeding with the steps below, ensure that no other sensor learn procedure is being performed simultaneously, or that tire pressures are not being adjusted on a TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition ON with engine OFF. Apply parking brake.

   NOTE: **If Learn Mode cannot be enabled, TPM system is not enabled in EGM/LGM. See appropriate manufacturer service information.**

3. To enable Learn Mode, turn headlight switch from OFF to parking lamps 4 times within 4 seconds. A double horn chirp will sound and the low tire pressure indicator will begin to flash to indicate the learn mode has been enabled.
4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After horn chirp has sounded, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
6. After left rear sensor has been learned, turn ignition switch to OFF position to exit Learn Mode.
7. Test drive the vehicle above 25 mph for at least 2 minutes before viewing tire pressures on DIC.

TPMS REMINDER RESET - PROCEDURE 2

NOTE: **If a tire pressure sensor or the Remote Control Door Lock Receiver (RCDLR) is replaced, or if wheels have been rotated, tire pressure sensor must be retrained.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on or display shows dashes instead of a value, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **Under the following conditions, the TPM system may not function properly:**

- **If one or more of the tire pressure sensors are missing or inoperable.**
- **A compact spare tire is used.**

NOTE: **If a tire pressure sensor or the Remote Control Door Lock Receiver (RCDLR) is replaced, or if wheels have been rotated, tire pressure sensor must be retrained.**

NOTE: **The relearn procedure must be completed within 15 minutes from when the vehicle is stationary after being driven at 20 mph (32 km/h), or greater, for 10 seconds.**

NOTE: **The learn mode will cancel if the ignition is cycled to OFF or if more than 2 minutes has elapsed for any sensor that has not been learned. If the learn mode is cancelled before the first sensor is learned, the original sensor IDs will be maintained. If the learn mode is canceled after the first sensor is learned, the following will occur:**

- **All stored sensor IDs will be invalidated in the RCDLR memory.**
- **If equipped, the DIC will display dashes instead of tire pressures.**
- **DTC C0775 will be set.**

These conditions will now require the learn procedure to be repeated for the system to function properly.

IMPORTANT: Ensure that no other learn procedure is being performed simultaneously or that tire pressures are not being adjusted on another TPM equipped vehicle within close proximity. Stray signals from other TPM equipped vehicles just driving by can be inadvertently learned. If any random horn chirps are heard from the vehicle while performing the learn procedure, most likely a stray sensor has

been learned and the procedure will need to be cancelled and repeated. Under these circumstances, performing the TPM Learn Procedure away from other vehicles would be highly recommended. In the event a particular sensor activation does not cause the horn to chirp, it may be necessary to rotate the wheel valve stem to a different position due to the sensor signal is being blocked by another component.

1. Turn ignition switch to ACC position. Apply parking brake.
2. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
3. To enable Learn Mode:
   - On vehicles equipped with keyless entry, simultaneously press the keyless entry transmitters lock and unlock buttons until a double horn chirp sounds indicating the Learn Mode has been enabled. On vehicles with DIC, a TIRE LEARN message may be displayed. The left front turn signal will also be illuminated.
   - On vehicles not equipped with keyless entry, press and release the driver information center (DIC) INFO button until the TIRE LEARN message appears on the DIC display. Press and hold the SET/RESET button until a double horn chirp sounds indicating the Learn Mode has been enabled. The left front turn signal will also be illuminated.
4. Ignition ON.
5. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
6. After horn chirp has sounded, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
7. After left rear sensor has been learned, turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 3

NOTE: **If a tire pressure sensor or the Remote Control Door Lock Receiver (RCDLR) is replaced, or if wheels have been rotated, tire pressure sensor must be relearned.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on or display shows dashes instead of a value, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **In vehicles without the "UH3" option, each turn signal will illuminate one at a time indicating which location is to be learn.**

NOTE: **The TPM system will cancel the learn mode if more then 2 minutes have passed and no sensors have been**

learned, or if the ignition switch is turn to the OFF position. If the learn mode is canceled before the first ID is learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory. If the learn mode is canceled after the first ID is learned, the RCDLR will store the IDs as invalid and the DIC will display dashes instead of tire pressures.

NOTE: **Before proceeding with the registration procedure, ensure that no other sensor learn procedure is being performed simultaneously, or that no tire pressures are being adjusted on another TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition switch to ACC position. Apply parking brake.
3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a double horn chirp sounds, indicating the Learn Mode has been enabled.

   NOTE: **The left front turn signal will also illuminate to indicate the learn mode has been enabled.**

4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
6. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 4

NOTE: **If the wheels have been rotated, or tire pressure sensor or Remote Control Door Lock Receiver (RCDLR) is replaced, the TPM system needs to relearn tire pressure sensor IDs.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **The TPM system will cancel Learn Mode if ignition is turned off, if more than 1 or 2 minutes has passed and no sensors have been learned, vehicle battery voltage is less than 8 volts, all 4 sensors have been learned, or if the RCDLR has been in Learn Mode for more than 5 minutes. If Learn Mode is cancelled before any IDs are**

learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory.

NOTE: **Before proceeding with the registration procedure, ensure that no other sensor learn procedure is being performed simultaneously, or that no tire pressures are being adjusted on another TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition ON with engine OFF.

   NOTE: **If the TPM Learn Mode cannot be enabled, ensure the TPM option is enabled in the RCDLR. See appropriate manufacturer service information.**

3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a horn chirp sounds, indicating Learn Mode has been enabled.

   NOTE: **If a horn chirp does not sound after 15 seconds, remove, then re-apply TPM sensor relearn magnet.**

4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After the horn chirp sounds, proceed to the next 3 sensors in the following order: right front, right rear, then left rear.
6. After the left rear sensor ID is learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn the ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 5

NOTE: **If the wheels have been rotated, or tire pressure sensor or Remote Control Door Lock Receiver (RCDLR) is replaced, the TPM system needs to relearn tire pressure sensor IDs.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **The TPM system will cancel Learn Mode if ignition is turned off, if more than 1 or 2 minutes has passed and no sensors have been learned, vehicle battery voltage is less than 8 volts, all 4 sensors have been learned, or if**

the RCDLR has been in Learn Mode for more than 5 minutes. If Learn Mode is cancelled before any IDs are learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory.

NOTE: **Before proceeding with the registration procedure, ensure that no other sensor learn procedure is being performed simultaneously, or that no tire pressures are being adjusted on another TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition ON with engine OFF.
3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a horn chirp sounds, indicating Learn Mode has been enabled.
4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After the horn chirp sounds, proceed to the next 3 sensors in the following order: right front, right rear, then left rear.
6. After the left rear sensor ID is learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn the ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 6

NOTE: **If the wheels have been rotated, or tire pressure sensor or Remote Control Door Lock Receiver (RCDLR) is replaced, the TPM system needs to relearn tire pressure sensor IDs.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **The TPM system will cancel Learn Mode if ignition is turned off, if more than 1 or 2 minutes has passed and no sensors have been learned, vehicle battery voltage is less than 8 volts, all 4 sensors have been learned, or if the RCDLR has been in Learn Mode for more than 5 minutes. If Learn Mode is cancelled before any IDs are learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.

2. Turn ignition ON with engine OFF.
3. Press RESET button on DIC in order to clear any warning messages.
4. Press and release OPTIONS button until display is blank.
5. Press and hold RESET button for 3 seconds.

NOTE: **If the DIC does not display "TIRE TRAINING" message, ensure TPM option is enabled in the RCDLR. See appropriate manufacturer service information.**

6. Press and release OPTIONS button until "TIRE TRAINING" is displayed.
7. Press and release RESET button. The DIC should display "LEARN L FRONT TIRE", verifying Learn Mode has been enabled.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After the horn chirp sounds, proceed to the next 3 sensors in the following order: right front, right rear, then left rear.
10. Turn the ignition switch to OFF position to exit the learn mode.

TPMS REMINDER RESET - PROCEDURE 7

NOTE: **An OEM scan tool or Pressure Increase/Decrease Method is used to perform this procedure.**

NOTE: **Before proceeding with this process, ensure that no other learn procedure is being performed simultaneously or that tire pressures are not being adjusted on another TPM equipped vehicle within close proximity. Stray signals from other TPM equipped vehicles just driving by can be inadvertently learned. If any random horn chirps are heard from the vehicle while performing the learn procedure, most likely a stray sensor has been learned and the procedure will need to be cancelled and repeated. Under these circumstances, performing the TPM Learn Procedure away from other vehicles would be highly recommended. In the event a particular sensor activation does not cause the horn to chirp, it may be necessary to rotate the wheel valve stem to a different position due to the sensor signal is being blocked by another component.**

1. Ignition ON with engine OFF, apply the parking brake.
2. Using a scan tool, initiate the TPM Learn Mode.
3. Perform the procedure by following the menu selections. A double horn chirp will sound and the IPC tire pressure monitor indicator warning lamp icon will flash indicating Learn Mode is enabled.
4. Starting with the left front tire, active the sensors by one of the following methods:

- Hold the antenna of the scan tool, aimed upward, against the tire sidewall close to the wheel rim at the valve stem location. Press and release the activate button and wait for a horn chirp. Once the horn chirp has sounded, the sensor information is learned.
- Increase/decrease the tire pressure for 8-10 seconds then wait for a horn chirp. The horn chirp may occur before or up to 30 seconds after the 8-10 second pressure increase/decrease time period has been reached. Once the horn chirp has sounded, the sensor information has been learned.

5. After the horn chirp has sounded, repeat step 4 for the remaining 3 sensors in the following order: Right front, Right rear, Left rear.
6. After the left rear sensor is learned, a double horn chirp will sound indicating all sensor IDs have been learned and the tire pressure module will exit the Learn mode turning OFF the IPC tire pressure monitor warning indicator lamp icon.
7. Ignition OFF, adjust all tires to the recommended pressures. Refer to the tire placard label.

TPMS REMINDER RESET - PROCEDURE 8

Automatic Sensor Learn Process

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. When a tire is installed, the vehicle must be stationary for about 20 minutes before the system recalculates. The following relearn process takes up to 10 minutes, driving at a minimum speed of 12 mph (19 km/h). A dash (-) or pressure value will display in the DIC. A warning message displays in the DIC if a problem occurs during the relearn process.

TPMS REMINDER RESET - PROCEDURE 9

NOTE: **If a tire pressure sensor or the Remote Control Door Lock Receiver (RCDLR) is replaced, or if wheels have been rotated, tire pressure sensor must be relearned.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on or display shows dashes instead of a value, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **The TPM system will cancel the learn mode if more then 2 minutes have passed and no sensors have been learned, or if the ignition switch is turn to the OFF position. If the learn mode is canceled before the first ID is learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory. If the learn mode is canceled after the first ID is learned, the RCDLR will store the IDs as invalid and the DIC will display dashes instead of tire pressures.**

NOTE: **Before proceeding with the registration procedure, ensure that no other sensor learn procedure is being performed simultaneously, or that no tire pressures are being adjusted on another TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition switch to RUN position. Apply parking brake.
3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a double horn chirp sounds, indicating the Learn Mode has been enabled. On some models, a TIRE LEARNING ACTIVE message may also be displayed on the DIC screen.
4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
6. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 10

NOTE: **If a tire pressure sensor or the Remote Control Door Lock Receiver (RCDLR) is replaced, or if wheels have been rotated, tire pressure sensor must be relearned.**

NOTE: **When the tire pressure warning light illuminates and warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning indicators are still on or display shows dashes instead of a value, there is a problem in the TPM system. See appropriate manufacturer service information.**

NOTE: **The TPM system will cancel the learn mode if more then 2 minutes have passed and no sensors have been learned, or if the ignition switch is turn to the OFF position. If the learn mode is canceled before the first ID is learned, the RCDLR will remember all previously stored IDs and their locations. As soon as the first sensor ID is learned, all other IDs are erased from the RCDLR's memory. If the learn mode is canceled after the first ID is learned, the RCDLR will store the IDs as invalid and the DIC will display dashes instead of tire pressures.**

NOTE: **Before proceeding with the registration procedure, ensure that no other sensor learn procedure is being performed simultaneously, or that no tire pressures are being adjusted on another TPM equipped vehicle within close proximity.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Depending on ignition type:
    - With standard ignition switch, place the switch in the RUN position.
    - With electronic keyless ignition, place the switch in the ACC position.
3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a double horn chirp sounds, indicating the Learn Mode has been enabled.
4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
6. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 11

NOTE: **This procedure is for vehicles with an Uplevel DIC.**

When a low tire pressure condition is detected, the TPMS illuminates the low tire pressure warning light on the instrument cluster. A message to check the pressure in a specific tire displays in the Driver Information Center (DIC). The low tire pressure warning light and the DIC warning message come on at each ignition cycle until the tires are inflated to the correct inflation pressure. Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Place the vehicle power mode in ON/RUN/START.
4. Make sure the Tire Pressure info display option is turned on. The info displays on the DIC can be turned on and off through the Settings menu.
5. Use the five-way DIC control on the right side of the steering wheel to scroll to the Tire Pressure screen under the DIC info page.
6. Press and hold the SEL button located in the center of the five-way DIC control. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen
7. Start with the driver side front tire. Place a tire sensor activation tool against the tire sidewall, near the valve stem. Then press the button to

activate the TPMS sensor. A horn chirp confirms that the sensor identification code has been matched to this tire and wheel position.

8. After horn chirp has sounded, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
9. After left rear sensor has been learned, the horn sounds two times to indicate the sensor identification code has been matched to the driver side rear tire, and the TPMS sensor matching process is no longer active. The TIRE LEARNING ACTIVE message on the DIC display screen goes off.
10. Press STOP to turn the ignition off.

TPMS REMINDER RESET - PROCEDURE 12

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/ wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/RUN with the engine off.
4. Use the MENU button (center console) to select the Vehicle Information Menu in the Driver Information Center (DIC). Use the arrow keys to scroll to the Tire Pressure screen
5. Press the SET/CLR button to begin the sensor matching process. A message requesting acceptance of the process should display.
6. Press the SET/CLR button again to confirm the selection. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
7. Start with the driver side front tire. Place a tire sensor activation tool against the tire sidewall, near the valve stem. Then press the button to activate the TPMS sensor. A horn chirp confirms that the sensor identification code has been matched to this tire and wheel position.
8. After horn chirp has sounded, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
9. After left rear sensor has been learned, the horn sounds two times to indicate the sensor identification code has been matched to the driver side rear tire, and the TPMS sensor matching process is no longer active. The TIRE LEARNING ACTIVE message on the DIC display screen goes off.
10. Turn the ignition to LOCK/OFF.

TPMS REMINDER RESET - PROCEDURE 13

LOW TIRE PRESSURE light comes on if air pressure in one tire drops to 12 psi (kPa) less than the other 3 tires, if tires are rotated, if tire(s) are repaired or replaced, if air pressure is adjusted or when vehicle battery is disconnected. Light will stay on until ignition is turned off or RESET button is pressed. Check and adjust air pressure in all 4 tires before resetting system.

1. There are 2 ways to reset the tire inflation monitor. To reset the tire inflation monitor using the exterior or interior lamp controls, go to step 4. To reset tire inflation monitor using the radio, turn the radio off. Turn ignition to ACC or ON, with the engine OFF. Press and hold the TUNE DISP button on the radio for at least 5 seconds until settings is displayed.
2. To scroll through the main menu:
   - On Impala, press the SEEK PTYPE up or down arrow.
   - On Monte Carlo, press the SEEK PSCAN up or down arrow.

   On all models, scroll until TIRE MON appears on the display. Press the 1 PREV or 2 NEXT button to enter the sub-menu. RESET will be displayed.
3. Press the TUNE DISP button to reset. A chime will sound to verify the new setting and DONE will be displayed for one second. Once the message has been reset, scroll through the menu until EXIT appears on the display. Press the TUNE DISP button to exit the program. A chime will sound to verify the exit.
4. Reset the tire inflation monitor:
   - On Impala, using the interior lighting controls, turn the switch from OFF to ON position 3 times with ignition switch in ON position.
   - On Monte Carlo, using the exterior lighting controls, turn the switch from OFF to parking lamps 3 times with ignition switch in ON position.

TPMS REMINDER RESET - PROCEDURE 14

NOTE: **There are 3 different ways to reset the Tire Pressure Monitor (TPM) system. After resetting, the TPM system requires up to 30 minutes of straight line driving in each of the 3 speed ranges to complete the calibration process.**

Using Exterior Lamp Switch

1. Adjust all tire pressures to the recommended kPa/psi.
2. Turn ignition ON with engine OFF.
3. Cycle the exterior lamp switch from OFF to parking lamps 3 times within 5 seconds.
4. Use the scan tool in order to clear the TPM DTC.

Using RDS Radio, If Equipped

1. Adjust all tire pressures to the recommended kPa/psi.
2. Turn the ignition to ACC or ON, with the engine OFF.
3. Turn the radio OFF.
4. Press and hold the DISP button until SETTINGS is displayed.
5. Press the SEEK up or down arrows until TIRE MON is displayed.
6. Press the PREV or NEXT button to enter the sub-menu. RESET will be displayed.
7. Press the DISP button, A chime will sound and DONE will be displayed.
8. Scroll until EXIT is displayed.
9. Press the DISP button to exit the TPM reset mode. A chime will sound to verify exit.
10. Use the scan tool in order to clear the TPM DTC.

Using Scan Tool

1. Adjust all tire pressures to the recommended kPa/psi.
2. Install the scan tool.
3. Turn ignition ON with engine OFF.
4. With the scan tool select Special Functions.
5. Select TIM Reset.
6. Press the Reset soft key.
7. Use the scan tool in order to clear the TPM DTC.

TPMS REMINDER RESET - PROCEDURE 15

CHECK TIRE PRESSURE or TIRE PRESS message will come on if air pressure in one tire is lower than the other 3 tires, if tires are rotated, if tire(s) are repaired or replaced, or if air pressure is adjusted. Message will stay on until system is recalibrated. Check and adjust air pressure in all 4 tires before recalibrating system.

NOTE: **If vehicle is equipped with Systems Monitor, go to step 2.**

1. To recalibrate vehicle equipped with Driver Information Center (DIC), turn ignition ON with engine OFF. Using the MODE and SELECT button on DIC, change display until TIRE PRESSURE appears. Press and hold RESET button for 5 seconds. TIRE PRESSURE RESET should now appear on display. If TIRE PRESSURE RESET does not appear on display after 5 seconds, repair system as necessary. Using a scan tool, clear TPM DTC.

2. To recalibrate vehicle equipped with Systems Monitor, turn ignition ON with engine OFF. Press and hold TIRE PRESS RESET button for 5 seconds. TIRE PRESS light on the Systems Monitor should begin to flash. Release the TIRE PRESS RESET button. TIRE PRESS light should go out and system is now reset. If TIRE PRESS light does not begin to flash after 5 seconds, repair system as necessary. Using a scan tool, clear TPM DTC.

TPMS REMINDER RESET - PROCEDURE 16

CHECK TIRE PRESSURE light comes on if air pressure in one tire drops to 12 psi (kPa) less than the other 3 tires, if tires are rotated, if tire(s) are repaired or replaced, or if air pressure is adjusted. Light will stay on until ignition is turned off or RESET button is pressed. Check and adjust air pressure in all 4 tires before resetting system.

1. To reset tire inflation monitor, turn ignition ON with engine OFF. Press and release the RESET button. RESET button is located inside of driver's side instrument panel fuse block (left end of instrument panel). The CHANGE OIL indicator light will begin to flash.
2. Press and release the RESET button again. The CHANGE OIL indicator light will turn off, and the CHECK TIRE PRESSURE indicator light will begin to flash. While the CHECK TIRE PRESSURE indicator light is flashing, press and hold the RESET button until the chime sounds indicating system is reset. If CHECK TIRE PRESSURE light does not go out, repeat reset procedure. If system still will not reset, repair system as necessary.

TPMS REMINDER RESET - PROCEDURE 17

NOTE: **When a spare tire is mounted, a wheel is replaced or rotated, or tire pressure has been adjusted, TPM system will need to be recalibrated.**

NOTE: **When the low tire pressure warning messages appear, immediately check air pressure of all tires and adjust to the specified pressure. If warning messages are still displayed, there is a malfunction in the TPM system. See appropriate manufacturer service information.**

NOTE: **Under the following conditions, the system may not function properly:**

- **More than one tire is low.**
- **Only one tire is replaced with a new tire during service.**
- **Vehicle is moving faster than 65 mph (105 km/h).**
- **The system is not yet calibrated.**
- **Tire treadwear is uneven.**
- **Compact spare tire is installed.**

- **Tire chains are being used.**
- **Vehicle is being driven on a rough or frozen road.**
- **If ABS warning light is on.**

CAUTION: **DO NOT recalibrate TPM system until all problems are fixed and tire pressure in all 4 tires has been adjusted. If recalibration is done when tire pressures are incorrect, TPM system will not work properly and may not set an alert when a tire pressure is low or high.**

NOTE: **There are 2 ways to recalibrate the Tire Pressure Monitor (TPM) system:**

- ***Using DIC Reset Button*** **(if no scan tool is available)**
- ***Using Scan Tool*** **(if an OBD-II compatible scan tool is available).**

Using DIC Reset Button

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Turn ignition ON with engine OFF.
4. Press SELECT right arrow button until "GAGE" is displayed.
5. Press SELECT down arrow button until "TIRE PRESSURE" is displayed.
6. Press and hold RESET button until "TIRE PRESSURE RESET" is displayed.
7. Release RESET button. DIC should display "TIRE PRESSURE NORMAL".
8. After resetting, the TPM system requires up to 30 minutes of straight line driving in each of the following speed ranges to complete calibration process:
   - 15-40 mph (24-64 km/h).
   - 40-70 mph (64-113 km/h).
   - 70-90 mph (113-145 km/h).

NOTE: **The EBCM learns tire pressure calibration for each speed range independently. In Monitor Mode 1, EBCM has only partially learned tire pressure calibration for speed range and has limited detection capability for a tire pressure condition. In Monitor Mode 2, EBCM has fully learned tire pressure calibration for speed**

range and has full detection capability for a tire pressure condition.

NOTE: **Learning process does not need to be completed during a single trip.**

Using Scan Tool

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Connect scan tool. Turn ignition ON with engine OFF.
4. Using scan tool, select "SPECIAL FUNCTIONS".
5. Select "TIRE PRESSURE RESET".
6. Press RESET soft key. A "TIRE PRESSURE NORMAL" message should appear on display.
7. If necessary, use scan tool to clear any TPM Diagnostic Trouble Codes (DTCs).
8. After resetting, the TPM system requires up to 30 minutes of straight line driving in each of the following speed ranges to complete calibration process:
   - 15-40 mph (24-64 km/h).
   - 40-70 mph (64-113 km/h).
   - 70-90 mph (113-145 km/h).

NOTE: **The EBCM learns tire pressure calibration for each speed range independently. In Monitor Mode 1, EBCM has only partially learned tire pressure calibration for speed range and has limited detection capability for a tire pressure condition. In Monitor Mode 2, EBCM has fully learned tire pressure calibration for speed range and has full detection capability for a tire pressure condition.**

NOTE: **Learning process does not need to be completed during a single trip.**

TPMS REMINDER RESET - PROCEDURE 18

The Tire Pressure Monitor (TPM) system alerts the driver when a large change in the pressure of one tire exists, while the vehicle is being driven. The TPM system uses the Electronic Brake Control Module (EBCM), ABS wheel speed sensor inputs, class 2 serial data circuit, and the Driver Information Center (DIC) to perform the system functions. The EBCM contains software to calculate relative tire pressure differences. The software requires approximately 30 minutes of straight line driving in 3 different speed ranges to complete the calibration process to have full capability for detecting a tire pressure condition. The speed ranges are 15-40 mph, 40-70 mph and 70-90 mph.

1. LOW TIRE PRESSURE light comes on if air pressure in one tire drops to 12 psi less than the other 3 tires, if tires are rotated, if tire(s) are repaired or replaced, if air pressure is adjusted or if vehicle battery is disconnected. Light will stay on until ignition is turned off or RESET button is pressed. Check and adjust air pressure in all 4 tires before resetting system.
2. To reset tire inflation monitor, turn ignition ON with engine OFF. Press and release the RESET button. RESET button is located inside of driver's side instrument panel fuse block (left end of instrument panel). The CHANGE OIL indicator light will begin to flash.
3. Press and release the RESET button again. The CHANGE OIL indicator light will turn off, and the LOW TIRE PRESSURE indicator light will begin to flash. While the LOW TIRE PRESSURE indicator light is flashing, press and hold the RESET button until the chime sounds indicating system is reset. If the LOW TIRE PRESSURE indicator light does not go out, repeat reset procedure. If system still will not reset, repair system as necessary.

TPMS REMINDER RESET - PROCEDURE 19

NOTE: **After resetting, the tire pressure monitoring (TPM) system requires 60 minutes or more of driving at a speed of 30 km/h (19 mph) or above to complete the calibration process to have full capability for detecting a tire pressure condition.**

1. Adjust all tire pressures to the recommended kPa/psi.
2. Turn ignition ON with engine OFF.
3. Press and hold the tire pressure warning reset switch until the tire pressure warning indicator blinks 3 times at one second intervals.
4. If the tire pressure warning indicator does not blink, repeat the procedure starting at step 2.
5. Drive the vehicle for 60 minutes or more at a speed of 30 km/h (19 mph).
6. Verify the system has initialized. Turn ignition ON with engine OFF and observe the tire pressure warning indicator.
   - System Initialized: light on for 3 seconds.
   - System not initialized: light on for 4 seconds.

TPMS REMINDER RESET - PROCEDURE 20

NOTE: **When a spare tire is mounted, a wheel is replaced or rotated, or tire pressure has been adjusted, TPM system will need to be recalibrated.**

CAUTION: **DO NOT recalibrate TPM system until all problems are fixed and tire pressure in all 4 tires has been adjusted. If recalibration is done when tire pressures are incorrect, TPM system will not work properly and may not set an alert when a tire pressure is low or high.**

NOTE: **When the tire pressure warning message appears on DIC, immediately check air pressure of all tires and adjust to the specified pressure. If warning message is still displayed, there is a malfunction in the TPM system. See appropriate manufacturer service information.**

NOTE: **Under the following conditions, the system may not function properly:**

- **More than one tire is low.**
- **Vehicle is moving faster than 65 mph (105 km/h).**
- **The system is not yet calibrated.**
- **Tire treadwear is uneven.**
- **Compact spare tire is installed.**
- **Tire chains are being used.**
- **Vehicle is being driven on a rough or frozen road.**
- **If ABS warning light is on.**

NOTE: **There are 2 ways to recalibrate the Tire Pressure Monitor (TPM) system:**

- ***Using DIC Reset Button*** **(if no scan tool is available)**
- ***Using Scan Tool*** **(if an OBD-II compatible scan tool is available).**

Using DIC Reset Button

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Turn ignition ON with engine OFF.
4. Press and hold appropriate button (located on left side of steering column) until "TIRE PRESSURE" message appears on display:
    - 1997-99 models: Press and hold GAGES button
    - 2000-05 models: Press and hold GAGES INFO button
5. Press and hold RESET button for 5 seconds. After 5 seconds, "TIRE PRESSURE RESET" message should appear on display.
6. Release RESET button. A "TIRE PRESSURE NORMAL" message should appear on display.
7. After resetting, the TPM system requires up to 30 minutes of straight line driving in each of the following speed ranges to complete calibration

process:

- 15-40 mph (24-64 km/h).
- 40-70 mph (64-113 km/h).
- 70-90 mph (113-145 km/h).

NOTE: **The EBCM learns tire pressure calibration for each speed range independently. In Monitor Mode 1, EBCM has only partially learned tire pressure calibration for speed range and has limited detection capability for a tire pressure condition. In Monitor Mode 2, EBCM has fully learned tire pressure calibration for speed range and has full detection capability for a tire pressure condition.**

NOTE: **Learning process does not need to be completed during a single trip.**

Using Scan Tool

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Connect scan tool. Turn ignition ON with engine OFF.
4. Using scan tool, select SPECIAL FUNCTIONS.
5. Select TIM RESET.
6. Press RESET soft key. A "TIRE PRESSURE NORMAL" message should appear on display.
7. If necessary, use scan tool to clear any TPM Diagnostic Trouble Codes (DTCs).
8. After resetting, the TPM system requires up to 30 minutes of straight line driving in each of the following speed ranges to complete calibration process:
   - 15-40 mph (24-64 km/h).
   - 40-70 mph (64-113 km/h).
   - 70-90 mph (113-145 km/h).

NOTE: **The EBCM learns tire pressure calibration for each speed range independently. In Monitor Mode 1, EBCM has only partially learned tire pressure calibration for speed range and has limited detection capability for a tire pressure condition. In Monitor Mode 2, EBCM has fully learned tire pressure calibration for speed range and has full detection capability for a tire pressure condition.**

NOTE: **Learning process does not need to be completed during a single trip.**

TPMS REMINDER RESET - PROCEDURE 21

Using Reset Button (1999-05 Models)

1. Adjust all tire pressures to the recommended Psi (kPa). See vehicle's Loading Information Label for recommended tire pressure. Turn ignition ON with engine OFF.
2. Press and hold the red RESET button located in the passenger side instrument panel fuse block.
3. The LOW TIRE indicator will flash 3 times, then turn off.
4. Use scan tool to clear the TPM DTC.

Using Scan Tool (2003-05 Models)

1. Adjust all tire pressures to the recommended Psi (kPa). See vehicle's Loading Information Label for recommended tire pressure. Turn ignition ON with engine OFF.
2. Install scan tool. Turn ignition ON with engine OFF.
3. With scan tool, select Special Functions.
4. Select TIM Reset.
5. Press Reset soft key.
6. LOW TIRE indicator will flash 3 times, then turn OFF.
7. Clear the TPM DTC.

TPMS REMINDER RESET - PROCEDURE 22

NOTE: **When a spare tire is mounted, a wheel is replaced or rotated, or tire pressure has been adjusted, TPM system will need to be recalibrated.**

CAUTION: **DO NOT recalibrate TPM system until all problems are fixed and tire pressure in all 4 tires has been adjusted. If recalibration is done when tire pressures are incorrect, TPM system will not work properly and may not set an alert when a tire pressure is low or high.**

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Turn ignition ON with engine OFF.
4. Press and hold the MODE button until DIC display reads "LOW TIRE PRESSURE HOLD SET TO RESET".

5. Press and hold SET button chime sounds and "TIRE PRESSURE RESET" is displayed and a chime sounds 3 times.
6. Release SET button and DIC will display "TIRE PRESSURE NORMAL".

NOTE: **If low tire pressure warning message is still set, TPM system has not reset. Repeat procedure. If it does not work after two tries, refer to appropriate service information.**

7. After resetting, the TPM system requires up to 5 miles of driving in each of the following speed ranges to complete the calibration process:
   - 25-40 mph (40-64 km/h).
   - 40-60 mph (65-96 km/h).
   - 60-85 mph (96-136 km/h).

NOTE: **Learning process does not need to be completed during a single trip.**

TPMS REMINDER RESET - PROCEDURE 23

1. Check and adjust air pressure in all 4 tires before resetting system. Refer to tire placard located on the inside edge of the driver's door. Turn ignition ON, with engine OFF.
2. Press the MODE button on the Driver Information System until LOW TIRE PRESSURE HOLD SET TO RESET is displayed.
3. Press and hold the SET button until a chime sounds and TIRE PRESSURE RESET is displayed and a chime sounds 3 times.
4. Release the SET button and TIRE PRESSURE NORMAL will be displayed.

TPMS REMINDER RESET - PROCEDURE 24

NOTE: **When a spare tire is mounted, a wheel is replaced or rotated, or tire pressure has been adjusted, TPM system will need to be recalibrated.**

CAUTION: **DO NOT recalibrate TPM system until all problems are fixed and tire pressure in all 4 tires has been adjusted. If recalibration is done when tire pressures are incorrect, TPM system will not work properly and may not set an alert when a tire pressure is low or high.**

1. Turn ignition switch to OFF position.
2. Ensure all tire pressures are adjusted to the pressure recommended on tire pressure label.
3. Turn ignition ON with engine OFF.
4. Press and hold the MODE button until DIC display reads "LOW TIRE PRESSURE HOLD SET TO RESET".

5. Press and hold SET button until a chime sounds and "TIRE PRESSURE RESET" is displayed.
6. System will now sound a chime 3 times, and DIC will display "TIRE PRESSURE NORMAL".

NOTE: **If low tire pressure warning message is still set, TPM system has not reset. Repeat procedure.**

7. After resetting, the TPM system requires up to 5 miles (8 km) of flat, smooth road, straight line driving in each of the 4 speed ranges (about 10-20 minutes in each range) to complete the calibration process:
   - 19-40 mph (31-65 km/h).
   - 40-59 mph (65-95 km/h).
   - 59-74.5 mph (95-120 km/h).
   - 74.5-90 mph (120-145 km/h).

NOTE: **The EBCM learns tire pressure calibration for each speed range independently. In Calibration Mode, EBCM has only partially learned tire pressure calibration for speed range and has limited detection capability for a tire pressure condition. In Detection Mode, EBCM has fully learned tire pressure calibration for speed range and has full detection capability for a tire pressure condition.**

NOTE: **Learning process does not need to be completed during a single trip.**

TPMS REMINDER RESET - PROCEDURE 25

NOTE: **This procedure is for vehicles with a Base DIC.**

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions using a TPMS relearn tool. There are two minutes to match the first tire/wheel position, and five minutes overall to match all four tire/wheel positions. If it takes longer, the matching process stops and must be restarted.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/ RUN with the engine OFF or place the vehicle power mode in ON/ RUN/ START. See **Fig. 7**.

4. Use the MENU button to select the VEHICLE INFORMATION MENU in the Driver Information Center (DIC). See **Fig. 8**.
5. Use the thumbwheel (or up and down arrows) to scroll to the TIRE PRESSURE MENU item screen.
6. Press the SET/CLR button to begin the sensor matching process. A message requesting acceptance of the process should display.
7. Press the SET/CLR button again to confirm the selection. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
10. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

Fig. 7: Ignition Positions (Key & Keyless)
Courtesy of GENERAL MOTORS CORP.

Fig. 8: Identifying DIC Controls (Turn Signal Lever)
Courtesy of GENERAL MOTORS CORP.

TPMS REMINDER RESET - PROCEDURE 26

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/ wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/RUN with the engine OFF.
4. Up-level Driver Information Center (DIC) Only: Make sure the TIRE PRESSURE INFO page option is turned on. The info pages on the DIC can be turned on and off through the SETTINGS menu.

5.
   - **Up-Level DIC** : Use the DIC controls (arrow buttons) on the right side of the steering wheel to scroll to the TIRE PRESSURE screen under the DIC info page.
   - **Base-Level DIC** : Use the TRIP ODOMETER RESET stem to scroll to the TIRE PRESSURE screen.

6. - **Up-Level DIC** : Press and hold the SET/RESET button (check-mark symbol) located in the center of the DIC controls.
   - **Base-Level DIC** : Press and hold the TRIP ODOMETER RESET stem for about five seconds. A message asking if the process should begin should appear. Select YES and press the TRIP ODOMETER RESET stem to confirm the selection.
7. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
10. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 27

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/ wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn ignition switch to ON/RUN position, with engine OFF.
3. Simultaneously press the keyless entry transmitter's lock and unlock buttons until a horn chirp sounds, indicating Learn Mode has been enabled. The TIRE LEARNING ACTIVE message displays on the DIC screen.

NOTE: **If the vehicle does not have RKE, press the Driver Information Center (DIC) vehicle information button until the PRESS (check mark symbol) TO RELEARN TIRE POSITIONS message displays. The horn sounds twice to signal the receiver is in relearn mode and TIRE LEARNING ACTIVE message displays on the DIC screen. If the vehicle does not have RKE or DIC buttons, press the trip odometer reset stem on the instrument cluster until the PRESS (check mark symbol) TO RELEARN TIRE POSITIONS message displays. The horn sounds twice to signal the receiver is in relearn mode and TIRE LEARNING ACTIVE message displays on the DIC screen.**

4. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
5. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
6. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 28

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

TPMS sensors are mounted onto each tire and wheel assembly, excluding the spare tire and wheel assembly. Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/ RUN with the engine OFF or place the vehicle power mode in ON/ RUN/ START. See **Fig. 7**.
4. Make sure the Tire Pressure info page option is turned on. The info pages on the Driver Information Center (DIC) can be turned on and off through the Settings menu.
5. Use the DIC controls on the right side of the steering wheel to scroll to the Tire Pressure screen under the DIC info page.
6. Press and hold the SET/RESET button (check mark symbol) located in the center of the DIC controls.
7. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
10. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 29

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

TPMS sensors are mounted onto each tire and wheel assembly, excluding the spare tire and wheel assembly. Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/RUN with the engine OFF.
4. Press the MENU button (right-hand side of instrument cluster) once on the Driver Information Center (DIC).
5. Press the up or down arrow button until the Tire Learn screen is displayed.
6. Press and hold the SET/CLR button to begin the sensor matching process.
7. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
10. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 30

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

TPMS sensors are mounted onto each tire and wheel assembly, excluding the spare tire and wheel assembly. Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the vehicle's tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Put the vehicle in ON/ RUN and place the vehicle in P (Park).
4. If the Driver Information Center (DIC) display is minimized, press the SELECT knob to maximize it. See **Fig. 9**.
5. Use the SELECT knob to scroll to the Tire Pressure display screen.
6. Press and hold the SELECT knob for five seconds to begin the sensor matching process. A message displays confirming to begin the process.
7. Use the SELECT knob to select YES with the highlighted selection, and press the SELECT knob again to confirm the selection.
8. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
9. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
10. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
11. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

Fig. 9: Identifying DIC Controls (Spark EV)

Courtesy of GENERAL MOTORS CORP.

TPMS REMINDER RESET - PROCEDURE 31

NOTE: **You have two minutes to match the first tire/wheel position, and five minutes overall to match all four tire/wheel positions. If it takes longer, the matching process stops and must be restarted.**

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/RUN with the engine off.
4. Enter the learn sequence from the TPM Learn screen, located under the Customization Menu in the instrument panel cluster. Press SRCE button until you see Customize Options and then press ENTER (left pointing arrow). Move the thumbwheel up or down to scroll through the available options. Press ENTER to select an item. To exit the current menu, or go back, use the thumbwheel to select BACK (left arrow) at the top of the screen and then press ENTER.
5. Start with the driver side front tire. The driver side front indicator lamp also comes on to indicate that corner's sensor is ready to be learned. Place a tire sensor activation tool against the tire sidewall, near the valve stem. Then press the button to activate the TPMS sensor. A horn chirp confirms that the sensor identification code has been matched to this tire and wheel position
6. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
7. After the driver side rear TPMS sensor has been learned the horn chirps two times. The driver side rear indicator lamp turns off and the TPMS sensor matching process is done. Turn the ignition switch to LOCK/OFF.

Fig. 10: Identifying DIC Controls
Courtesy of GENERAL MOTORS CORP.

TPMS REMINDER RESET - PROCEDURE 32

NOTE: **An OEM scan tool is used to perform this procedure.**

NOTE: **The sensor learn procedure must be performed after every tire rotation, tire pressure indicator module replacement, or sensor replacement. Make sure the TPM tool battery is sufficient to complete TPM learn process. Do not place the TPM tool directly on the valve stem. The TPM tool should be placed against the tire sidewall near the valve stem. The TPM sensor learn activation procedure may have to be repeated up to 3 times**

before determining a sensor is malfunctioning. The low tire pressure warning light will start to flash to indicate the learn mode has been enabled. The front and back turn signals will flash twice when a sensor has been learned.

1. Ignition ON with engine OFF, apply the parking brake.
2. Using a scan tool, initiate the TPM Learn Mode.
3. Starting with the left front tire, active the sensor by holding the antenna of the tire pressure monitor special tool aimed upward against the tire sidewall close to the wheel rim at the valve stem location. Press and release the activate button. Ensure that the transmit indicator on the special tool indicates that the sensor activation signal is being transmitted. Wait for the front and back turn signals to flash twice. If the front and back turn signals do not flash, repeat the sensor activation sequence with the tool. Once the front and back turn signals have flashed twice, the sensor information is learned.

NOTE: **Follow the sensor order listed here since there is no visual indicator on the vehicle for the sensor learn order.**

4. After the front and back turn signals have flashed twice, repeat step 2 for the remaining 3 sensors in the following order: Right front, Right rear, Left rear.
5. When the left rear sensor has been learned, the front and back turn signals will flash twice, the learn process is complete and the tire pressure indicator module exits the Learn mode.

TPMS REMINDER RESET - PROCEDURE 33

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/ wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Set the parking brake.
3. Turn the ignition to ON/RUN with the engine OFF.
4. Press the MENU button (center console) to select the Vehicle Information Menu in the Driver Information Center (DIC).
5. Use the arrow keys to scroll to the Tire Pressure screen.

6. Press the SET/CLR button to begin the sensor matching process. A message should display requesting acceptance of the process.
7. Press the SET/CLR button again to confirm the selection. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.
8. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
9. After horn chirp has sounded, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
10. After left rear sensor has been learned, a double horn chirp will sound, indicating all 4 sensor IDs have been learned. Turn ignition switch to OFF position to exit Learn Mode.

TPMS REMINDER RESET - PROCEDURE 34

If refilling a low tire, no specific reset procedure is required. All warnings are extinguished once the TPMS receives a signal that all tires are properly inflated.

Each TPMS sensor has a unique identification code. The identification code needs to be matched to a new tire/wheel position after rotating the tires or replacing one or more of the TPMS sensors. The TPMS sensor matching process should also be performed after replacing a spare tire with a road tire containing the TPMS sensor. The malfunction light and the DIC message should go off at the next ignition cycle. The sensors are matched to the tire/ wheel positions, using a TPMS relearn tool.

1. Set the tire pressure of all wheels to pressure specified on the tire and loading information label.
2. Turn the ignition to ON/RUN with the engine OFF. Set the parking brake.
3. Up-level Driver Information Center (DIC) Only: Make sure the TIRE PRESSURE INFO page option is turned on. The info pages on the DIC can be turned on and off through the SETTINGS menu.

4.
   - **Up-Level DIC** : Use the DIC controls (arrow buttons) on the right side of the steering wheel to scroll to the TIRE PRESSURE screen under the DIC info page.
   - **Base-Level DIC** : Use the MENU button to select the Vehicle Information menu in the DIC. Use the thumbwheel to scroll to the Tire Pressure Menu item screen. See **Fig. 8**.

5.
   - **Up-Level DIC** : Press and hold the SET/RESET button (check-mark symbol) located in the center of the DIC controls.
   - **Base-Level DIC** : Press the SET/CLR button to begin the sensor matching process. A message asking if the process should begin should appear. Press the SET/CLR button again to confirm the selection.
6. The horn sounds twice to signal the receiver is in relearn mode and the TIRE LEARNING ACTIVE message displays on the DIC screen.

7. Starting with left front tire, hold a tire sensor activation tool against the side wall of the tire, within 3 inches of the valve stem. Activate tool until a horn chirp sounds.
8. After horn chirp has sounded and the right turn signal has illuminated, proceed to the next 3 sensors in the following order: right front, right rear and left rear.
9. After left rear sensor has been learned, the horn sounds two times to indicate the sensor identification code has been matched to the driver side rear tire, and the TPMS sensor matching process is no longer active. The TIRE LEARNING ACTIVE message on the DIC display screen goes off.
10. Turn the ignition switch to LOCK/OFF.
11. Set all four tires to the recommended air pressure level as indicated on the Tire and Loading Information label.

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GENERAL INFORMATION

Squeaks and Rattles - Escalade, Suburban, Tahoe, Yukon

DIAGNOSTIC INFORMATION AND PROCEDURES

SQUEAKS AND RATTLES

Special Tools

- **CH-39570** Chassis Ear
- **GE-41416** Ultrasonic Leak Detector

For equivalent regional tools, refer to **Special Tools**.

NOTE: **Squeaks and rattles are caused by improperly controlled relative motion between vehicle components. There are 4 ways to prevent squeaks and rattles.**

To aid in diagnosing, use CH-39570 ear or GE-41416 detector.

- Attach the component that squeaks or rattles securely.
- Separate the components that squeak or rattle to prevent contact.
- Insulate the components that squeak or rattle.
- Insulate low uniform friction surfaces to eliminate stickslip motion.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description

Illustration	Tool Number/ Description
	CH-39570 J 39570 Chassis Ear

Illustration	Tool Number/ Description
	GE-41416 J 41416 Ultrasonic Leak Detector

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GENERAL INFORMATION

Trouble Shooting - Basic Procedures

* PLEASE READ THIS FIRST *

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

ACCESSORIES & ELECTRICAL

CHARGING SYSTEM TROUBLE SHOOTING

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NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC CHARGING SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Vehicle Will Not Start	
Dead battery	Check battery cells, alternator belt tension and alternator output
Loose or corroded battery connections	Check all charging system connections
Ignition circuit or switch malfunction	Check and replace as necessary
Alternator Light Stays On With Engine Running	
Loose or worn alternator drive belt	Check alternator drive tension and condition, See Belt Adjustment in TUNE-UP article in the TUNE-UP section

CONDITION & POSSIBLE CAUSE	CORRECTION
Loose alternator wiring connections	Check all charging system connections
Short in alternator light wiring	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Defective alternator stator or diodes	See Bench Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Alternator Light Stays Off With Ignition Switch ON	
Blown fuse	See WIRING DIAGRAMS
Defective alternator	See Testing in ALTERNATOR article
Defective indicator light bulb or socket	See Indicator Warning Lights in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Alternator Light Stays OFF With Ignition Switch ON	
Short in alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective rectifier bridge	See Bench Tests in ALTERNATOR article
Lights or Fuses Burn Out Frequently	
Defective alternator wiring	See On-Vehicle Tests in ALTERNATOR article
Defective regulator	See Regulator Check in ALTERNATOR article
Defective battery	Check and replace as necessary
Ammeter Gauge Shows Discharge	
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in TUNE-UP article in the TUNE-UP section
Defective wiring	Check all wires and wire connections
Defective alternator or regulator	See Bench Tests and On-Vehicle Tests in ALTERNATOR article
Defective ammeter, or improper ammeter wiring connection	See Testing in STANDARD INSTRUMENTS in the ACCESSORIES & EQUIPMENT section
Noisy Alternator	
Loose drive pulley	Tighten drive pulley attaching nut
Loose mounting bolts	Tighten all alternator mounting bolts
Worn or dirty bearings	See Bearing Replacement ALTERNATOR article
Defective diodes or stator	See Bench Test in ALTERNATOR article
Battery Does Stay Charged	

CONDITION & POSSIBLE CAUSE	CORRECTION
Loose or worn drive belt	Check alternator drive belt tension and condition. See Belt Adjustment in appropriate TUNE-UP article in the TUNE-UP section
Loose or corroded battery connections	Check all charging system connections
Loose alternator connections	Check all charging system connections
Defective alternator or battery	See On-Vehicle Tests and Bench Tests in ALTERNATOR article
Add-on electrical accessories exceeding alternator capacity	Install larger alternator
Battery Overcharged-Uses Too Much Water	
Defective battery	Check alternator output and repair as necessary
Defective alternator	See On-Vehicle Test and Bench Tests in ALTERNATOR article
Excessive alternator voltage	Check alternator output and repair as necessary

IGNITION SYSTEM TROUBLE SHOOTING

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Fig. 1: Ignition Secondary Trouble Shooting Chart

Ignition Primary Trouble Shooting Chart

Fig. 2: Ignition Primary Trouble Shooting Chart

STARTER TROUBLE SHOOTING

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BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole	See STARTER article shoes
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article
Broken clutch housing	See STARTER article

CONDITION & POSSIBLE CAUSE	CORRECTION
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearing	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article
Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter relay faulty	Replace starter relay
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch	Replace ignition switch contacts sticking
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	
Weak battery	Charge or replace battery as necessary
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid
Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	solenoid
Low Current Draw	
Worn brushes or weak brush springs	Replace brushes or brush springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

AIR CONDITIONING & HEAT

AIR CONDITIONING TROUBLE SHOOTING

WARNING: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC AIR CONDITIONING TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Compressor Not Working	Compressor clutch circuit open.
.....	Compressor clutch coil inoperative.
.....	Poor clutch ground connection.
.....	Fan belts loose.
.....	Thermostatic switch inoperative.
.....	Thermostatic switch not adjusted.
.....	Ambient temperature switch open.
.....	Superheat fuse blown.
Excessive Noise or Vibration	Missing or loose mounting bolts.
.....	Bad idler pulley bearings.
.....	Fan belts not tightened correctly.
.....	Compressor clutch contacting body.
.....	Excessive system pressure.
.....	Compressor oil level low.
.....	Damaged clutch bearings.
.....	Damaged reed valves.
.....	Damaged compressor.
Insufficient or No Cooling; Compressor Working	Expansion valve inoperative.
.....	Heater control valve stuck open.
.....	Low system pressure.
.....	Blocked condenser fins.
.....	Blocked evaporator fins.

CONDITION	POSSIBLE CAUSE
.....	Vacuum system leak.
.....	Vacuum motors inoperative.
.....	Control cables improperly adjusted.
.....	Restricted air inlet.
.....	Mode doors binding.
.....	Blower motor inoperative.
.....	Temperature above system capacity.

HEATER SYSTEM TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC HEATER SYSTEM TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Insufficient, Erratic, or No Heat	Low Coolant Level
.....	Incorrect thermostat.
.....	Restricted coolant flow through core.
.....	Heater hoses plugged.
.....	Misadjusted control cable.
.....	Sticking heater control valve.
.....	Vacuum hose leaking.
.....	Vacuum hose blocked.
.....	Vacuum motors inoperative.
.....	Blocked air inlet.
.....	Inoperative heater blower motor.
.....	Oil residue on heater core fins.
.....	Dirt on heater core fins.
Too Much Heat	Improperly adjusted cables.

CONDITION	POSSIBLE CAUSE
.....	Sticking heater control valve.
.....	No vacuum to heater control valve.
.....	Temperature door stuck open.
Air Flow Changes During Acceleration	Vacuum system leak.
.....	Bad check valve or reservoir.
Air From Defroster At All Times	Vacuum system leak.
.....	Improperly adjusted control cables.
.....	Inoperative vacuum motor.
Blower Does Not Operate Correctly	Blown fuse.
.....	Blower motor windings open.
.....	Resistors burned out.
.....	Motor ground connection loose.
.....	Wiring harness connections loose.
.....	Blower motor switch inoperative.
.....	Blower relay inoperative.
.....	Fan binding or foreign object in housing.
.....	Fan blades broken or bent.

BRAKES

BRAKE SYSTEM TROUBLE SHOOTING

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BRAKE SYSTEM TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Brakes Pull Left or Right	
Incorrect tire pressure	Inflate tires to proper pressure
Front end out of alignment	See WHEEL ALIGNMENT

CONDITION & POSSIBLE CAUSE	CORRECTION
Mismatched tires	Check tires sizes
Restricted brake lines or hoses	Check hose routing
Loose or malfunctioning caliper	See DISC BRAKES or BRAKE SYSTEM
Bent shoe or oily linings	See DRUM BRAKES or BRAKE SYSTEM
Malfunctioning rear brakes	See DRUM, DISC BRAKES or BRAKE SYSTEM
Loose suspension parts	See SUSPENSION
Noises Without Brakes Applied	
Front linings worn out	Replace linings
Dust or oil on drums or rotors	See DRUM, DISC BRAKES or BRAKE SYSTEM
Noises With Brakes Applied	
Insulator on outboard shoe damaged	See DISC BRAKES or BRAKE SYSTEM
Incorrect pads or linings	Replace pads or linings
Brake Rough, Chatters or Pulsates	
Excessive lateral runout	Check rotor runout
Parallelism not to specifications	Reface or replace rotor
Wheel bearings not adjusted	See SUSPENSION
Rear drums out-of-round	Reface or replace drums
Disc pad reversed, steel against rotor	Remove and reinstall pad
Excessive Pedal Effort	
Malfunctioning power unit	See POWER BRAKES or BRAKE SYSTEM
Partial system failure	Check fluid and pipes
Worn disc pad or lining	Replace pad or lining
Caliper piston stuck or sluggish	See DISC BRAKES or BRAKE SYSTEM
Master cylinder piston stuck	See MASTER CYLINDERS or BRAKE SYSTEM
Brake fade due to incorrect pads for linings	Replace pads or linings
Linings or pads glazed	Replace pads or linings
Worn drums	Reface or replace drums
Excessive Pedal Travel	
Partial brake system failure	Check fluid and pipes
Insufficient fluid in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM

CONDITION & POSSIBLE CAUSE	CORRECTION
Air trapped in system	See BRAKE BLEEDING or BRAKE SYSTEM
Rear brakes not adjusted	See Adjustments in DRUM BRAKES or BRAKE SYSTEM
Bent shoe or lining	See DRUM BRAKES or BRAKE SYSTEM
Plugged master cylinder cap	See MASTER CYLINDERS or BRAKE SYSTEM
Improper brake fluid	Replace brake fluid
Pedal Travel Decreasing	
Compensating port plugged	See MASTER CYLINDERS or BRAKE SYSTEM
Swollen cup in master cylinder	See MASTER CYLINDERS or BRAKE SYSTEM
Master cylinder piston not returning	See MASTER CYLINDERS or BRAKE SYSTEM
Weak shoe retracting springs	See DRUM BRAKES BRAKE SYSTEM
Wheel cylinder piston sticking	See DRUM BRAKES or BRAKE SYSTEM
Dragging Brakes	
Master cylinder pistons not returning	See MASTER CYLINDERS BRAKE SYSTEM
Restricted brake lines or hoses	Check line routing
Incorrect parking brake adjustment	See DRUM BRAKES BRAKE SYSTEM
Parking Brake cables frozen	See DRUM BRAKES BRAKE SYSTEM
Incorrect installation of inboard disc pad	Remove and replace correctly
Power booster output rod too long	See POWER BRAKE UNITS BRAKE SYSTEM
Brake pedal not returning freely	See DISC, DRUM BRAKES BRAKE SYSTEM
Brakes Grab or Uneven Braking Action	
Malfunction of combination valve	See CONTROL VALVE or BRAKE SYSTEM
Malfunction of power brake unit	See POWER BRAKE UNITS or BRAKE SYSTEM
Binding brake pedal	See DISC, DRUM BRAKES or BRAKE SYSTEM
Pulsation or Roughness	
Uneven pad wear caused by caliper	See DISC BRAKES or BRAKE SYSTEM
Uneven rotor wear	See DISC BRAKES or BRAKE SYSTEM
Drums out-of-round	Reface or replace drums

ENGINE MECHANICAL

COOLING SYSTEM TROUBLE SHOOTING

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COOLING SYSTEM TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Overheating	
Coolant Leak	Fill/Pressure Test System
A/C Condenser Fins Clogged	Remove/Clean Condenser
Radiator Fins Clogged	Remove/Clean Radiator
Thermostat Stuck Closed	Replace Thermostat
Clogged Cooling System Passages	Clean/Flush Cooling System
Water Pump Malfunction	Replace Water Pump
Fan Clutch Malfunction	Replace Fan Clutch
Retarded Ignition Timing	Reset Ignition Timing
Cooling Fan Malfunction	Test Cooling Fan/Circuit
Cooling Fan Motor Malfunction	Test Fan Motor
Cooling Fan Relay Malfunction	Test Fan Relay
Faulty Radiator Cap	Replace Radiator Cap
Broken/Slipping Fan Belt	Replace Fan Belt
Restricted Exhaust	Repair Exhaust System
Corrosion	
Impurities In Coolant	Clean/Flush System
Coolant Leakage	
Damaged hose	Replace Hose
Leaky Water Pump	Replace Water Pump
Damaged Radiator Seam	Replace/Repair Radiator
Leaky Thermostat Cover	Replace Thermostat Cover
Cylinder Head Problem	Check Head/Head Gasket
Leaky Freeze Plugs	Replace Freeze Plugs
Recovery System Inoperative	

CONDITION & POSSIBLE CAUSE	CORRECTION
Loose and/or Defective Radiator Cap	Replace Radiator Cap
Overflow Tube Clogged and/or Leaking	Repair Tube
Recovery Bottle Vent Restricted	Clean Vent
No Heater Core Flow	
Collapsed Heater Hose	Replace Heater Hose
Plugged Heater Core	Clean/Replace Heater Core
Faulty Heater Valve	Replace Heater Valve

GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING

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BASIC GASOLINE ENGINE - MECHANICAL TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Lopes At Idle	
Intake manifold-to-head leaks	Replace manifold gasket, See ENGINES
Blown head gasket	Replace head gasket, See ENGINES
Worn timing gears, chain or sprocket	Replace gears, chain or sprocket
Worn camshaft lobes	Replace camshaft, See ENGINES
Overheated engine	Check cooling system, See COOLING
Blocked crankcase vent valve	Remove restriction
Leaking EGR valve	Repair leak and/or replace valve
Faulty fuel pump	Replace fuel pump
Engine Has Low Power	
Leaking fuel pump	Repair leak and/or replace fuel pump
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Sticking valves or weak valve springs	Check valve train components, See ENGINES
Incorrect valve timing	Reset valve timing, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Worn camshaft lobes	Replace camshaft, See ENGINES
Blown head gasket	Replace head gasket. See ENGINES.
Clutch slipping	Adjust pedal and/or replace components, See ENGINES
Engine overheating	Check cooling system, See COOLING
Auto. Trans. pressure regulator valve faulty	Replace pressure regulator valve
Auto. Trans. fluid level too low	Add fluid as necessary
Improper vacuum diverter valve operation	Replace vacuum diverter valve
Vacuum leaks	Inspect vacuum system and repair as required
Leaking piston rings	Replace piston rings, See ENGINES
Faulty High Speed Operation	
Low fuel pump volume	Replace fuel pump
Leaking valves or worn	Replace valves and/or springs, See ENGINES
Incorrect valve timing	Reset valve timing,See ENGINES
Intake manifold restricted	Remove restriction
Worn distributor shaft	Replace distributor
Faulty Acceleration	
Improper fuel pump stroke	Remove pump and reset pump stroke
Incorrect ignition timing	Reset ignition timing, See TUNE-UP
Leaking valves	Replace valves, See ENGINES
Worn fuel pump diaphragm or piston	Replace diaphragm or piston
Intake Backfire	
Improper ignition timing	Reset ignition timing, See TUNE-UP
Faulty accelerator pump discharge	Replace accelerator pump
Improper choke operation	Check choke and adjust as required
Defective EGR valve	Replace EGR valve
Fuel mixture too lean	Reset air/fuel mixture, See TUNE-UP
Choke valve initial clearance too large	Reset choke valve initial clearance
Exhaust Backfire	
Vacuum leak	Inspect and repair vacuum system
Faulty vacuum diverter valve	Replace vacuum diverter valve

CONDITION & POSSIBLE CAUSE	CORRECTION
Faulty choke operation	Check choke and adjust as required
Exhaust system leak	repair exhaust system leak
Engine Detonation	
Ignition timing too far advanced	Reset ignition timing, See TUNE-UP
Faulty ignition system	Check ignition timing, See TUNE-UP
Spark plugs loose or faulty	Retighten or replace plugs
Fuel delivery system clogged	Inspect lines, pump and filter for clog
EGR valve inoperative	Replace EGR valve
PCV system inoperative	Inspect and/or replace hoses or valve
Vacuum leaks	Check vacuum system and repair leaks
Excessive combustion chamber deposits	Remove built-up deposits
Leaking, sticking or broken valves	Inspect and/or replace valves
External Oil Leakage	
Fuel pump improperly seated or worn gasket	Remove pump, replace gasket and seat properly
Oil pan gasket broken or pan bent	Straighten pan and replace gasket
Timing chain cover gasket broken	Replace timing chain cover gasket
Rear main oil seal worn	Replace rear main oil seal
Oil pan drain plug not seated properly	Remove and reinstall drain plug
Camshaft bearing drain hole blocked	Remove restriction
Oil pressure sending switch leaking	Remove and reinstall sending switch
Excessive Oil Consumption	
Worn valve stems or guides	Replace stems or guides, See ENGINES
Valve "O" ring seals damaged	Replace "O" ring seals, See ENGINES
Plugged oil drain back holes	Remove restrictions
Improper PCV valve operation	Replace PCV valve
Engine oil level too high	Remove excess oil
Engine oil too thin	Replace thicker oil
Valve stem oil deflectors damaged	Replace oil deflectors
Incorrect piston rings	Replace piston rings, See ENGINES
Piston ring gaps not staggered	Reinstall piston rings, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Insufficient piston ring tension	Replace rings, See ENGINES
Piston ring grooves or oil return	slots clogged Replace piston rings, See ENGINES
Piston rings sticking in grooves	Replace piston rings, See ENGINES
Piston ring grooves excessively worn	Replace piston and rings, See ENGINES
Compression rings installed upside down	Replace compression rings correctly, See ENGINES
Worn or scored cylinder walls	Rebore cylinders or replace block
Mismatched oil ring expander and rail	Replace oil ring expander and rail, See ENGINES
Intake gasket dowels too long	Replace intake gasket dowels
Excessive main or connecting rod bearing clearance	Replace main or connecting rod bearings, See ENGINES
No Oil Pressure	
Low oil level	Add oil to proper level
Oil pressure sender or gauge broken	Replace sender or gauge
Oil pump malfunction	Remove and overhaul oil pump, See ENGINES
Oil pressure relief valve sticking	Remove and reinstall valve
Oil pump passages blocked	Overhaul oil pump, See ENGINES
Oil pickup screen or tube blocked	Remove restriction
Loose oil inlet tube	Tighten oil inlet tube
Loose camshaft bearings	Replace camshaft bearings, See ENGINES
Internal leakage at oil passages	Replace block or cylinder head
Low Oil Pressure	
Low engine oil level	Add oil to proper level
Engine oil too thin	Remove and replace with thicker oil
Excessive oil pump clearance	Reduce oil pump clearance, See ENGINES
Oil pickup tube or screen blocked	Remove restrictions
Main, rod or cam bearing clearance excessive	Replace bearing to reduce clearance, See ENGINES
High Oil Pressure	
Improper grade of oil	Replace with proper oil
Oil pressure relief valve stuck closed	Eliminate binding
Oil pressure sender or gauge faulty	Replace sender or gauge
Noisy Main Bearings	

CONDITION & POSSIBLE CAUSE	CORRECTION
Inadequate oil supply	Check oil delivery to main bearings
Excessive main bearing clearance	Replace main bearings, See ENGINES
Excessive crankshaft end play	Replace crankshaft, See ENGINES
Loose flywheel or torque converter	Tighten attaching bolts
Loose or damaged vibration damper	Tighten or replace vibration damper
Crankshaft journals out-of-round	Re-grind crankshaft journals
Excessive belt tension	Loosen belt tension
Noisy Connecting Rods	
Excessive bearing clearance or missing bearing	Replace bearing, See ENGINES
Crankshaft rod journal out-of-round	Re-grind crankshaft journal
Misaligned connecting rod or cap	Remove rod or cap and realign
Incorrectly tightened rod bolts	Remove and re-tighten rod bolts
Noisy Pistons and Rings	
Excessive piston-to-bore clearance	Install larger pistons, See ENGINES
Bore tapered or out-of-round	Rebore block
Piston ring broken	Replace piston rings, See ENGINES
Piston pin loose or seized	Replace piston pin, See ENGINES
Connecting rods misaligned	Realign connecting rods
Ring side clearance too loose or tight	Replace with larger or smaller rings
Carbon build-up on piston	Remove carbon
Noisy Valve Train	
Worn or bent push rods	Replace push rods, See ENGINES
Worn rocker arms or bridged pivots	Replace push rods, See ENGINES
Dirt or chips in valve lifters	Remove lifters and remove dirt/chips
Excessive valve lifter leak-down	Replace valve lifters, See ENGINES
Valve lifter face worn	Replace valve lifters, See ENGINES
Broken or cocked valve springs	Replace or reposition springs
Too much valve stem-to-guide clearance	Replace valve guides, See ENGINES
Valve bent	Replace valve, See ENGINES
Loose rocker arms	Retighten rocker arms, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive valve seat run-out	Reface valve seats, See ENGINES
Missing valve lock	Install new valve lock
Excessively worn camshaft lobes	Replace camshaft, See ENGINES
Plugged valve lifter oil holes	Eliminate restriction or replace lifter
Faulty valve lifter check ball	Replace lifter check ball, See ENGINES
Rocker arm nut installed upside down	Remove and reinstall correctly
Valve lifter incorrect for engine	Remove and replace valve lifters
Faulty push rod seat or lifter plunger	Replace plunger or push rod
Noisy Valves	
Improper valve lash	Re-adjust valve lash, See ENGINES
Worn or dirty valve lifters	Clean and/or replace lifters
Worn valve guides	Replace valve guides, See ENGINES
Excessive valve seat or face run-out	Reface seats or valve face
Worn camshaft lobes	Replace camshaft, See ENGINES
Loose rocker arm studs	Re-tighten rocker arm studs, See ENGINES
Bent push rods	Replace push rods, See ENGINES
Broken valve springs	Replace valve springs, See ENGINES
Burned,Sticking or Broken Valves	
Weak valve springs or warped valves	Replace valves and/or springs, See ENGINES
Improper lifter clearance	Re-adjust clearance or replace lifters
Worn guides or improper guide clearance	Replace valve guides, See ENGINES
Out-of-round valve seats or improper seat width	Re-grind valve seats
Gum deposits on valve stems, seats or guide	Remove deposits
Improper spark timing	Re-adjust spark timing
Broken Pistons/Rings	
Undersize pistons	Replace with larger pistons, See ENGINES
Wrong piston rings	Replace with correct rings, See ENGINES
Out-of-round cylinder bore	Re-bore cylinder bore
Improper connecting rod alignment	Remove and realign connecting rods
Excessively worn ring grooves	Replace pistons, See ENGINES

CONDITION & POSSIBLE CAUSE	CORRECTION
Improperly assembled piston pins	Re-assemble pin-to-piston, See ENGINES
Insufficient ring gap clearance	Install new rings, See ENGINES
Engine overheating	Check cooling system
Incorrect ignition timing	Re-adjust ignition timing, See TUNE-UP
Excessive Exhaust Noise	
Leaks at manifold to head, or to pipe	Replace manifold or pipe gasket
Exhaust manifold cracked or broken	Replace exhaust manifold, See ENGINES

ENGINE PERFORMANCE

CARBURETOR TROUBLE SHOOTING:

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BASIC COLD START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Choke not closing	Check choke operation, see FUEL SYSTEMS
Choke linkage bent	Check linkage, see FUEL SYSTEM
Engine Starts, Then Dies	
Choke vacuum kick setting too wide	Check setting and adjust see, FUEL SYSTEMS
Fast idle RPM too low	Reset RPM to specification, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Vacuum leak	Inspect vacuum system for leaks
Low fuel pump outlet	Repair or replace pump, see FUEL SYSTEMS
Low carburetor fuel level	Check float setting see FUEL SYSTEM
Engine Quits Under Load	
Choke vacuum kick setting incorrect	Reset vacuum kick setting,see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEM

CONDITION & POSSIBLE CAUSE	CORRECTION
Incorrect hot fast idle speed RPM	Reset fast idle RPM, see TUNE-UP
Engine Starts, Runs Up, Then Idles, Slowly With Black Smoke	
Choke vacuum kick set too narrow	Reset vacuum kick, see FUEL SYSTEMS
Fast idle cam index incorrect	Reset fast idle cam index, see FUEL SYSTEMS
Hot fast idle RPM too low	Reset fast idle RPM, see TUNE-UP

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Engine flooded	Allow fuel to evaporate

BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Stalls in Gear	
Choke vacuum kick setting incorrect	Reset choke vacuum kick, see FUEL SYSTEMS
Fast idle RPM incorrect	Reset fast idle RPM, see TUNE-UP
Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS
Acceleration Sag or Stall	
Defective choke control switch	Replace choke control switch
Choke vacuum kick setting incorrect	Reset choke vacuum kick see, FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, FUEL SYSTEMS
Accelerator pump defective	Repair or replace pump see FUEL SYSTEMS
Secondary throttles not closed	Inspect lockout adjustment, see FUEL SYSTEMS
Sag or Stall After Warmup	
Defective choke control switch	Replace choke control switch, see FUEL SYSTEMS
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Float level incorrect (too low)	Adjust float level, see FUEL SYSTEMS
Backfiring & Black Smoke	
Plugged heat crossover system	Remove restriction

BASIC WARM ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Hesitation With Small Amount of Gas Pedal Movement	
Vacuum leak	Inspect vacuum lines
Accelerator pump weak or inoperable	Replace pump, see FUEL SYSTEMS
Float level setting too low	Reset float level, see,FUEL SYSTEMS
Metering rods sticking or binding	Inspect and/or replace rods, see FUEL SYSTEMS
Carburetor idle or transfer system plugged	Inspect system and remove restriction
Frozen or binding heated air inlet	Inspect heated air door for binding
Hesitation With Heavy Gas Pedal Movement	
Defective accelerator pump	Replace pump, see FUEL SYSTEMS
Metering rod carrier sticking or binding	Remove restriction
Large vacuum leak	Inspect vacuum system and repair leak
Float level setting too low	Reset float level, see FUEL SYSTEMS
Defective fuel pump, lines or filter	Inspect pump, lines and filter
Air door setting incorrect	Adjust air door setting, see FUEL

DIESEL ENGINE TROUBLE SHOOTING

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NOTE: **Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.**

BASIC DIESEL ENGINE TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Crank	
Bad battery connections or dead batteries	Check connections and/or replace batteries
Bad starter connections or bad starter	Check connections and/or replace starter
Engine Cranks Slowly, Won't Start	
Bad battery connections or dead batteries	Check connections and/or replace batteries

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine oil too heavy	Replace engine oil
Engine Cranks Normally, But Will Not Start	
Glow plugs not functioning	Check glow plug system, see FUEL SYSTEMS
Glow plug control not functioning	Check controller, see FUEL SYSTEMS
Fuel not injected into cylinders	Check fuel injectors, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Fuel filter blocked	Replace fuel filter
Fuel tank filter blocked	Replace fuel tank filter
Fuel pump not operating	Check pump operation and/or replace pump
Fuel return system blocked	Inspect system and remove restriction
No voltage to fuel solenoid	Check solenoid and connections
Incorrect or contaminated fuel	Replace fuel
Incorrect injection pump timing	Re-adjust pump timing, see FUEL SYSTEMS
Low compression	Check valves, pistons, rings, see ENGINES
Injection pump malfunction	Inspect and/or replace injection pump
Engine Starts, Won't Idle	
Incorrect slow idle adjustment	Reset idle adjustment, see TUNE-UP
Fast idle solenoid malfunctioning	Check solenoid and connections
Fuel return system blocked	Check system and remove restrictions
Glow plugs go off too soon	See glow plug diagnosis in FUEL SYSTEMS
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
No fuel to injection pump	Check fuel delivery system
Incorrect or contaminated fuel	Replace fuel
Low compression	Check valves, piston, rings, see ENGINES
Injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Fuel solenoid closes in RUN position	Check solenoid and connections
Engines Starts/Idles Rough W/out Smoke or Noise	
Incorrect slow idle adjustment	Reset slow idle, see TUNE-UP
Injection line fuel leaks	Check lines and connections
Fuel return system blocked	Check lines and connections

CONDITION & POSSIBLE CAUSE	CORRECTION
Air in fuel system	Bleed air from system
Incorrect or contaminated fuel	Replace fuel
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engines Starts and Idles Rough W/out Smoke or Noise, But Clears After Warm-Up	
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Engine not fully broken in	Put more miles on engine
Air in system	Bleed air from system
Injector nozzle malfunction	Check nozzles, see FUEL SYSTEMS
Engine Idles Correctly, Misfires Above Idle	
Blocked fuel filter	Replace fuel filter
Injection pump timing incorrect	Reset pump timing, see FUEL SYSTEMS
Incorrect or contaminated fuel	Replace fuel
Engine Won't Return To Idle	
Fast idle adjustment incorrect	Reset fast idle, see TUNE-UP
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
External linkage binding	Check linkage and remove binding
Fuel Leaks On Ground	
Loose or broken fuel line	Check lines and connections
Internal injection pump seal leak	Replace injection pump, see FUEL SYSTEMS
Cylinder Knocking Noise	
Injector nozzles sticking open	Test injectors, see FUEL SYSTEMS
Very low nozzle opening pressure	Test injectors and/or replace
Loss of Engine Power	
Restricted air intake	Remove restriction
EGR valve malfunction	Replace EGR valve
Blocked or damaged exhaust system	Remove restriction and/or replace components
Blocked fuel tank filter	Replace filter
Restricted fuel filter	Remove restriction and/or replace filter
Block vent in gas cap	Remove restriction and/or replace cap
Tank-to-injection pump fuel supply blocked	Check fuel lines and connections

CONDITION & POSSIBLE CAUSE	CORRECTION
Blocked fuel return system	Remove restriction
Incorrect or contaminated fuel	Replace fuel
Blocked injector nozzles	Check nozzle for blockage, see FUEL SYSTEMS
Low compression	Check valves, rings, pistons, see ENGINES
Loud Engine Noise With Black Smoke	
Basic timing incorrect	Reset timing, see FUEL SYSTEMS
EGR valve malfunction	Replace EGR valve
Internal injection pump malfunction	Replace injection pump, see FUEL SYSTEMS
Incorrect injector pump housing pressure	Check pressure, see FUEL SYSTEMS
Engine Overheating	
Cooling system leaks	Check cooling system and repair leaks
Belt slipping or damaged	Check tension and/or replace belt
Thermostat stuck closed	Remove and replace thermostat, see ENGINE COOLING
Head gasket leaking	Replace head gasket
Oil Light on at Idle	
Low oil pump pressure	Check oil pump operation, see ENGINES
Oil cooler or line restricted	Remove restriction and/or replace cooler
Engine Won't Shut Off	
Injector pump fuel solenoid does not return fuel valve to OFF position	Remove and check solenoid and replace if needed

VACUUM PUMP DIAGNOSIS

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

FUEL INJECTION TROUBLE SHOOTING

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BASIC FUEL INJECTION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start (Cranks Normally)	
Cold start valve inoperative	Test valve and circuit
Poor connection;vacuum or wiring	Check vacuum and electrical connections
Contaminated fuel	Test fuel for water or alcohol
Defective fuel pump relay or circuit	Test relay and wiring
Battery too low	Charge and test battery
Low fuel pressure	Test pressure regulator and fuel pump, check for restricted lines and filters
No distributor reference pulses	Repair ignition system as necessary
Open coolant temperature sensor circuit	Test sensor and wiring
Shorted W.O.T. switch in T.P.S.	Disconnect W.O.T. switch, engine should start
Defective ECM	Replace ECM
Fuel tank residual pressure valve leaks	Test for fuel pressure drop after shut down
Hard Starting	
Disconnected hot air tube to air cleaner	Reconnect tube and test control valve
Defective Idle Air Control (IAC) valve	Test valve operation and circuit
Shorted, open or misadjusted T.P.S.	Test and adjust or replace T.P.S.
EGR valve open	Test EGR valve and control circuit
Poor Oxygen sensor signal	Test for shorted or circuit
Incorrect mixture from PCV system	Test PCV for flow, check sealing of oil filter cap
Poor High Speed Operation	
Low fuel pump volume	Faulty pump or restricted fuel lines or filters
Poor MAP sensor signal	Test MAP sensor, vacuum hose and wiring

CONDITION & POSSIBLE CAUSE	CORRECTION
Poor Oxygen sensor signal	Test for shorted or open sensor or circuit
Open coolant temperature sensor circuit	Test sensor and wiring
Faulty ignition operation	Check wires for cracks or poor con- nections, test secondary voltage with oscilloscope
Contaminated fuel	Test fuel for water or alcohol
Intermittent ECM ground	Test ECM ground connection for resistance
Restricted air cleaner	Replace air cleaner
Restricted exhaust system	Test for exhaust manifold back pressure
Poor MAF sensor signal	Check leakage between sensor and manifold
Poor VSS signal	If tester for ALCL hook-up is available check that VSS reading matches speedometer
Ping or Knock on Acceleration	
Poor Knock sensor signal	Test for shorted or open sensor or circuit
Poor Baro sensor signal	Test for shorted or open sensor or circuit
Improper ignition timing	See VEHICLE EMISSION CONTROL LABEL (where applicable)
Check for engine overheating problems	Low coolant, loose belts or electric cooling fan inoperative

NOTE: **For additional electronic fuel injection trouble shooting information, see the appropriate article in the ENGINE PERFORMANCE section (not all vehicles have Computer Engine Control articles). Information is provided there for diagnosing fuel system problems on vehicles with electronic fuel injection.**

IGNITION SYSTEM TROUBLE SHOOTING

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Fig. 3: Ignition Secondary Trouble Shooting Chart

Ignition Primary Trouble Shooting Chart

Fig. 4: Ignition Primary Trouble Shooting Chart

STARTER TROUBLE SHOOTING

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BASIC STARTER TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Fails to Operate	
Dead battery or bad connections between starter and battery	Check battery charge and all wires and connections to starter
Ignition switch faulty or misadjusted	Adjust or replace ignition switch
Open circuit between starter switch ignition terminal on starter relay	Check and repair wires and connections as necessary
Starter relay or starter defective	See Testing in STARTER article
Open solenoid pull-in wire	See Testing in STARTER article
Starter Does Not Operate and Headlights Dim	
Weak battery or dead cell	Charge or replace battery as necessary
Loose or corroded battery connections	Check that battery connections are clean and tight
Internal ground in starter windings	See Testing in STARTER article
Grounded starter fields	See Testing in STARTERS
Armature rubbing on pole shoes	See STARTER article
Starter Turns but Engine Does Not Rotate	
Starter clutch slipping	See STARTER article
Broken clutch housing	See STARTER article
Pinion shaft rusted or dry	See STARTER article
Engine basic timing incorrect	See Ignition Timing in TUNE-UP article
Broken teeth on engine flywheel	Replace flywheel and check for starter pinion gear damage
Starter Will Not Crank Engine	
Faulty overrunning clutch	See STARTER article
Broken clutch housing	See STARTER article
Broken flywheel teeth	Replace flywheel and check for starter pinion gear damage

CONDITION & POSSIBLE CAUSE	CORRECTION
Armature shaft sheared or reduction gear teeth stripped	See STARTER article
Weak battery	Charge or replace battery as necessary
Faulty solenoid	See On-Vehicle Tests in STARTER article
Poor grounds	Check all ground connections for tight and clean connections
Ignition switch faulty or misadjusted	Adjust or replace ignition switch as necessary
Starter Cranks Engine Slowly	
Battery weak or defective	Charge or replace battery as necessary
Engine overheated	See ENGINE COOLING SYSTEM article
Engine oil too heavy	Check that proper viscosity oil is used
Poor battery-to-starter connections	Check that all between battery and starter are clean and tight
Current draw too low or too high	See Bench Tests in STARTER article
Bent armature, loose pole shoes screws or worn bearings	See STARTER article
Burned solenoid contacts	Replace solenoid
Faulty starter	Replace starter
Starter Engages Engine Only Momentarily	
Engine timing too far advanced	See Ignition Timing in TUNE-UP article
Overrunning clutch not engaging properly	Replace overrunning clutch. See STARTER article
Broken starter clutch	See STARTER article
Broken teeth on engine flywheel	Replace flywheel and check starter pinion gear for damage
Weak drive assembly thrust spring	See STARTER article
Weak hold-in coil	See Bench Tests in STARTER article
Starter Drive Will Not Engage	
Defective point assembly	See Testing in STARTER article
Poor point assembly ground	See Testing in STARTER article
Defective pull-in coil	Replace starter solenoid
Starter Relay Does Not Close	
Dead battery	Charge or replace battery as necessary
Faulty wiring	Check all wiring and connections leading to relay
Neutral safety switch faulty	Replace neutral safety switch
Starter relay faulty	Replace starter relay

CONDITION & POSSIBLE CAUSE	CORRECTION
Starter Drive Will Not Disengage	
Starter motor loose on mountings	Tighten starter attach bolts
Worn drive end bushing	See STARTER article
Damaged engine flywheel teeth	Replace flywheel and starter pinion gear for damage
Drive yolk return spring broken or missing	Replace return spring
Faulty ignition switch	Replace ignition switch
Insufficient clearance between winding leads to solenoid terminal and main contact in solenoid	Replace starter solenoid
Starter clutch not disengaging	Replace starter clutch
Ignition starter switch contacts sticking	Replace ignition switch
Starter Relay Operates but Solenoid Does Not	
Faulty solenoid switch, switch connections or relay	Check all wiring between relay and solenoid or replace relay or solenoid as necessary
Broken lead or loose soldered connections	Repair wire or wire connections as necessary
Solenoid Plunger Vibrates When Switch is Engaged	
Weak battery	Charge or replace battery as necessary
Solenoid contacts corroded	Clean contacts or replace solenoid
Faulty wiring	Check all wiring leading to solenoid
Broken connections inside switch cover	Repair connections or replace solenoid
Open hold-in wire	Replace solenoid
Low Current Draw	
Worn brushes or weak	Replace brushes or brush springs as necessary
High Pitched Whine During Cranking Before Engine Fires but Engine Fires and Cranks Normally	
Distance too great between starter pinion and flywheel	Align starter or check that correct starter and flywheel are being used
High Pitched Whine After Engine Fires With Key released. Engine Fires and Cranks Normally	
Distance too small between starter pinion and flywheel	Flywheel runout contributes to the intermittent nature

TUNE-UP TROUBLE SHOOTING - GAS ENGINE VEHICLES

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vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.

BASIC SPARK PLUG TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Normal Spark Plug Condition	
Light Tan or Gray deposits	No Action
Electrode not burned or fouled	No Action
Gap tolerance not changed	No Action
Cold Fouling or Carbon Deposits	
Overrich air/fuel mixture	Adjust air/fuel mixture, see ENGINE PERFORMANCE section
Faulty choke	Replace choke assembly, see ENGINE PERFORMANCE section
Clogged air filter	Clean and/or replace air filter
Incorrect idle speed or dirty carburetor	Reset idle speed and/ or clean carburetor
Faulty ignition wires	Replace ignition wiring
Prolonged operation at idle	Shut engine off during long idle
Sticking valves or worn valve guide seals	Check valve train
Wet Fouling or Oil Deposits	
Worn rings and pistons	Install new rings and pistons
Excessive cylinder wear	Rebore or replace block
Excessive valve guide clearance	Worn or loose bearing
Gap Bridged	
Deposits in combustion chamber becoming fused to electrode	Clean combustion chamber of deposits
Blistered Electrode	
Engine overheating	Check cooling system
Wrong type of fuel	Replace with correct fuel
Loose spark plugs	Retighten spark plugs
Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Pre-Ignition or Melted Electrodes	
Incorrect type of fuel	Replace with correct fuel
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE

CONDITION & POSSIBLE CAUSE	CORRECTION
Burned valves	Replace valves
Engine Overheating	Check cooling system
Wrong type of spark plug, too hot	Replace with correct spark plug, see ENGINE PERFORMANCE
Chipped Insulators	
Severe detonation	Check for over-advanced timing or combustion
Improper gapping procedure	Re-gap spark plugs
Rust Colored Deposits	
Additives in unleaded fuel	Try different fuel brand
Water In Combustion Chamber	
Blown head gasket or cracked head	Repair or replace head or head gasket

NOTE: **Before diagnosing an electronic ignition system, ensure that all wiring is connected properly between distributor, wiring connector and spark plugs. Ignition problem will show up either as: Engine Will Not Start or Engine Runs Rough.**

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS

CONDITION & POSSIBLE CAUSE	CORRECTION
Engine Won't Start	
Open circuit between distributor and bulkhead connector	Repair circuit
Open circuit between bulkhead connector and ignition switch	Repair circuit
Open circuit between ignition switch and starter solenoid	Repair circuit
Engine Runs Rough	
Fuel lines leaking or clogged	Tighten fitting, remove restriction
Initial timing incorrect	Reset ignition timing see ENGINE PERFORMANCE
Centrifugal advance malfunction	Repair distributor advance
Defective spark plugs or wiring	Replace plugs or plug wiring
Component Failure	
Spark arc-over on cap, rotor or coil	Replace cap, rotor or or coil
Defective pick-up coil	Replace pick-up coil
Defective ignition coil	Replace ignition coil
Defective vacuum unit	Replace vacuum unit

CONDITION & POSSIBLE CAUSE	CORRECTION
Defective control module	Replace control module

BASIC ELECTRONIC IGNITION TROUBLE SHOOTING CHARTS - USING OSCILLOSCOPE PATTERNS

CONDITION & POSSIBLE CAUSE	CORRECTION
Firing Voltage Lines are the Same, but Abnormally High	
Retarded ignition timing	Reset ignition timing, see ENGINE PERFORMANCE section
Fuel mixture too lean	Readjust carburetor, see ENGINE PERFORMANCE
High resistance in coil wire	Replace coil wire
Corrosion in coil tower terminal	Clean and/or replace coil
Corrosion in distributor coil terminal	Clean and/or replace distributor cap
Firing Voltage Lines are the Same but Abnormally Low	
Fuel mixture too rich	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in coil wire causing arcing	Replace coil wire
Cracked coil tower causing arcing	Replace coil
Low coil output	Replace coil
Low engine compression	Determine cause and repair
One or More, But Not All Firing Voltage Lines are Higher Than Others	
Carburetor idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
EGR valve stuck open	Clean and/or replace valve
High resistance in spark plug wires	Replace spark plug wires
Cracked or broken spark plug insulator	Replace spark plugs
Intake vacuum leak	Repair leak
Defective spark plugs	Replace spark plugs
Corroded spark plug terminals	Replace spark plugs
One or More, But Not All Firing Voltage Lines Are Lower Than Others	
Curb idle mixture not balanced	Readjust carburetor, see ENGINE PERFORMANCE
Breaks in plug wires	Replace plug wires causing arcing
Cracked coil tower causing arcing	Replace coil
Low compression	Determine cause and repair
Defective spark plugs	Replace spark plugs

CONDITION & POSSIBLE CAUSE	CORRECTION
Corroded spark plugs	Replace spark plugs
Cylinders Not Firing	
Cracked distributor cap terminals	Replace distributor cap
Shorted spark plug wire	Determine cause and repair
Mechanical problem in engine	Determine cause and repair
Defective spark plugs	Replace spark plugs
Spark plugs fouled	Replace spark plugs

BASIC DRIVEABILITY PROBLEMS TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Hard Starting	
Binding carburetor linkage	Eliminate binding
Binding choke linkage	Eliminate binding
Binding choke piston	Eliminate binding
Restricted choke vacuum	Check vacuum lines for blockage
Worn or dirty needle valve and seat	Clean carburetor, see ENGINE PERFORMANCE
Float sticking	Readjust or replace float see the ENGINE PERFORMANCE section
Incorrect choke adjustment	Reset choke adjustment see ENGINE PERFORMANCE
Defective coil	Replace coil
Improper spark plug gap	Regap spark plugs
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Detonation	
Over-advanced ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective spark plugs	Replace spark plugs
Fuel lines clogged	Clean fuel lines
EGR system malfunction	Check and repair EGR system
PCV system malfunction	Repair PCV system
Vacuum leaks	Check and repair vacuum system
Loose fan belts	Tighten or replace fan belts, see ENGINE PERFORMANCE
Restricted airflow	Remove restriction

CONDITION & POSSIBLE CAUSE	CORRECTION
Vacuum advance malfunction	Check distributor operation
Dieseling	
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate blinding
Binding choke linkage or fast idle cam	Eliminate binding
Defective idle solenoid	Replace idle solenoid see ENGINE PERFORMANCE
Improper base idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Incorrect idle mixture setting	Reset idle mixture, see ENGINE PERFORMANCE
Faulty Acceleration	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Engine cold and choke too lean	Adjust choke and allow engine to warm-up
Defective spark plugs	Replace spark plugs
Defective coil	Replace coil
Faulty Low Speed Operation	
Clogged idle transfer slots	Clean idle transfer slots, see FUEL
Restricted idle air bleeds and passages	Disassemble and clean carburetor, see FUEL
Clogged air cleaner	Replace air filter
Defective spark plugs	Replace spark plugs
Defective ignition wires	Replace ignition wire see ENGINE PERFORMANCE
Defective distributor cap	Replace distributor cap
Faulty High Speed Operation	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Defective distributor centrifugal advance	Replace advance mechanism
Defective distributor vacuum advance	Replace advance unit
Incorrect spark plugs or plug gap	Check gap and/or replace spark plugs
Faulty choke operation	Check choke and repair as required
Clogged vacuum passages	Remove restrictions
Improper size or clogged main jet	Check jet size and clean, see FUEL
Restricted air cleaner	Check filter and replace as necessary

CONDITION & POSSIBLE CAUSE	CORRECTION
Defective distributor cap, rotor or coil	Replace cap, rotor or coil
Misfire at All Speeds	
Defective spark plugs	Replace spark plugs
Defective spark plug wires	Replace spark plug wires
Defective distributor cap, rotor, or coil	Replace cap, rotor, or coil
Cracked or broken vacuum hoses	Replace vacuum hoses
Vacuum leaks	Repair vacuum leaks
Fuel lines clogged	Remove restriction
Hesitation	
Cracked or broken vacuum	Replace vacuum hoses hoses
Vacuum leaks	Repair Vacuum leaks
Binding carburetor linkage	Eliminate binding
Binding throttle linkage	Eliminate binding
Binding choke linkage or fast idle cam	Eliminate binding
Improper float setting	Readjust float setting, see FUEL
Cracked or broken ignition wires	Replace ignition wires
Rough Idle, Missing or Stalling	
Incorrect curb idle or fast idle speed	Reset idle speed, see see ENGINE PERFORMANCE
Incorrect basic timing	Reset ignition timing see ENGINE PERFORMANCE
Improper idle mixture adjustment	Reset idle mixture, see ENGINE PERFORMANCE
Improper feedback system operation	Check feedback system see ENGINE PERFORMANCE
Incorrect spark plug gap	Reset spark plug gap, see ENGINE PERFORMANCE
Moisture in ignition components	Dry components
Loose or broken ignition wires	Replace ignition wires
Damaged distributor cap or or rotor	Replace distributor cap or rotor
Faulty ignition coil	Replace ignition coil
Fuel filter clogged or worn	Replace fuel filter
Damaged idle mixture screw	Replace idle mixture screw, see FUEL
Improper fast idle cam adjustment	Reset fast idle cam adjustment, see TUNE- see ENGINE PERFORMANCE

CONDITION & POSSIBLE CAUSE	CORRECTION
Improper EGR valve operation	Replace EGR valve
Faulty PCV valve air flow	Replace PCV valve
Choke binding or improper choke setting	Reset choke or eliminate binding
Vacuum leak	Repair vacuum leak
Improper float bowl fuel level	Reset float adjustment, see FUEL
Clogged air bleed or idle passages	Clean carburetor passages, see FUEL
Clogged or worn air cleaner filter	Replace air filter
Faulty choke vacuum diaphragm	Replace diaphragm, see ENGINE PERFORMANCE
Exhaust manifold heat valve inoperative	Replace heat valve
Improper distributor spark advance	Check distributor operation
Leaking valves or valve components	Check and repair valvetrain
Improper carburetor mounting	Remove and remount carburetor
Excessive play in distributor shaft	Replace distributor
Loose or corroded wiring connections	Repair or replace as required
Engine Surges	
Improper PCV valve airflow	Replace PCV valve
Vacuum leaks	Repair vacuum leaks
Clogged air bleeds	Remove restriction
EGR valve malfunction	Replace EGR valve
Restricted air cleaner filter	Replace air filter
Cracked or broken vacuum hoses	Replace vacuum hoses
Cracked or broken ignition wires	Replace ignition wires
Vacuum advance malfunction	Check unit and replace as necessary
Defective or fouled spark plugs	Replace spark plugs
Ping or Spark Knock	
Incorrect ignition timing	Reset ignition timing see ENGINE PERFORMANCE
Distributor centrifugal or vacuum advance malfunction	Check operation and replace as necessary
Carburetor setting too lean	Readjust mixture setting, see ENGINE PERFORMANCE
Vacuum leak	Eliminate vacuum leak
EGR valve malfunction	Replace EGR valve

CONDITION & POSSIBLE CAUSE	CORRECTION
Poor Gasoline Mileage	
Cracked or broken vacuum	Replace vacuum hoses hoses
Vacuum leaks	Repair vacuum leaks
Defective ignition wires	Replace wires
Incorrect choke setting	Readjust setting, see ENGINE PERFORMANCE
Defective vacuum advance	Replace vacuum advance
Defective spark plugs	Replace spark plugs
Binding carburetor power piston	Eliminate binding
Dirt in carburetor jets	Clean and/or replace jets
Incorrect float adjustment	Readjust float setting, see FUEL
Defective power valve	Replace power valve, see ENGINE PERFORMANCE
Incorrect idle speed	Readjust idle speed
Engine Stalls	
Improper float level	Readjust float level
Leaking needle valve and seat	Replace needle valve and seat
Vacuum leaks	Eliminate vacuum leaks

VACUUM PUMP - DIESEL TROUBLE SHOOTING

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NOTE: **Diesel engines mechanical diagnosis is the same as gasoline engines for items such as noisy valves, bearings, pistons, etc. The following trouble shooting covers only items pertaining to diesel engines.**

VACUUM PUMP (DIESEL) TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Excessive Noise	
Loose pump-to-drive assembly screws	Tighten screws
Loose tube on pump assembly	Tighten tube

CONDITION & POSSIBLE CAUSE	CORRECTION
Valves not functioning properly	Replace valves
Oil Leakage	
Loose end plug	Tighten end plug
Bad seal crimp	Remove and re-crimp seal

MANUAL TRANSMISSION

MANUAL TRANSMISSION TROUBLE SHOOTING

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MANUAL TRANSMISSION/TRANSAXLE TROUBLE SHOOTING

Condition	Possible Cause
Noisy In Forward Gears	Low gear oil level, Loose bell housing bolts, Worn bearings or gears
Clunk On Deceleration (FWD Only)	Loose engine mounts, Worn inboard CV joints, Worn differential pinion shaft, Side gear hub counterbore in case worn oversize
Gear Clash When Shifting Forward Gears	Clutch Out Of Adjustment, Shift linkage damaged or out of adjustment, Gears or synchronizers damaged, Low gear oil level
Transmission Noisy When Moving (RWD Only) Quiet In Neutral With Clutch Engaged	Worn rear outputshaft bearing
Gear Rattle	Worn bearings, Wrong gear oil, Low gear oil, Worn gears
Steady Ticking At Idle (Increases With RPM)	Broken tooth on gear
Gear Clash When Shifting Forward Gears	Worn or broken synchronizers
Loud Whine In Reverse	Normal condition (1)
Noise When Stepping On Clutch	Bad release bearing, Worn pilot bearing
Ticking Or Screeching As Clutch Is Engaged	Faulty release bearing, Uneven pressure plate fingers
Click Or Snap When Clutch Is Engaged	Worn clutch fork, Worn or broken front bearing retainer
Transmission Shifts Hard	Clutch not releasing, Shift mechanism binding, Clutch installed backwards

Condition	Possible Cause
Will Not Shift Into One Gear, Shifts Into All Others	Bent shift fork, Worn detent balls
Locked Into Gear, Cannot Shift	Clutch adjustment, Worn detent balls
Transmission Jumps Out Of Gear	Pilot bearing worn, Bent shift fork, Worn gear teeth or face, Excessive gear train end play, Worn synchronizers, Missing detent ball spring, Shift mechanism worn or out of adjustment, Engine or transmission mount bolts loose or out of adjustment, Transmission not aligned
Shift Lever Rattle	Worn shift lever or detents, Worn shift forks, Worn synchronizers sleeve
Shift Lever Hops Under Acceleration	Worn engine or transmission mounts
(1) Most units use spur cut gears in reverse and are noisy	

POWERTRAIN

CLUTCH TROUBLE SHOOTING

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BASIC CLUTCH TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Chattering or Grabbing	
Incorrect clutch adjustment	Adjust clutch
Oil, grease or glaze on facings	Disassemble and clean or replace
Loose "U" joint flange	See DRIVE AXLES article
Worn input shaft spline	Replace input shaft
Binding pressure plate	Replace pressure plate
Binding release lever	See CLUTCH article
Binding clutch disc hub	Replace clutch disc
Unequal pressure plate contact	Replace worn/misaligned components
Loose/bent clutch disc	Replace clutch disc

CONDITION & POSSIBLE CAUSE	CORRECTION
Incorrect transmission alignment	Realign transmission
Worn pressure plate, disc or flywheel	Replace damaged components
Broken or weak pressure springs	Replace pressure plate
Sticking clutch pedal	Lubricate clutch pedal & linkage
Incorrect clutch disc facing	Replace clutch disc
Engine loose in chassis	Tighten all mounting bolts
Failure to Release	
Oil or grease on clutch facings	Clean or replace clutch clutch disc
Incorrect release lever or pedal adjustment	See CLUTCH article
Worn or broken clutch facings	Replace clutch disc
Bent clutch disc or pressure plate	Replace damaged components
Clutch disc hub binding on input shaft	Clean or replace clutch disc and/or input shaft
Binding pilot bearing	Replace pilot bearing
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Binding clutch cable	See CLUTCH article
Defective clutch master	Replace master cylinder
Defective clutch slave	Replace slave cylinder
Air in hydraulic system	Bleed hydraulic system
Rattling	
Weak or broken release lever spring	Replace spring and check alignment
Damaged pressure plate	Replace pressure plate
Broken clutch return spring	Replace return spring
Worn splines on clutch disc or input shaft	Replace clutch disc and/or input shaft
Worn clutch release bearing	Replace release bearing
Dry or worn pilot bearing	Lubricate or replace pilot bearing
Unequal release lever contact	Align or replace release lever
Incorrect pedal free play	Adjust free play
Warped or damaged clutch disc	Replace damaged components
Slipping	
Pressure springs worn or	Release pressure plate

CONDITION & POSSIBLE CAUSE	CORRECTION
Oily, greasy or worn facings	Clean or replace clutch disc
Incorrect clutch alignment	Realign clutch assembly
Warped clutch disc or pressure plate	Replace damaged components
Binding release levers or clutch pedal	Lubricate and/or replace release components
Squeaking	
Worn or damaged release	Replace release bearing
Dry or worn pilot or release bearing	Lubricate or replace assembly
Pilot bearing turning in crankshaft	Replace pilot bearing and/or crankshaft
Worn input shaft bearing	Replace bearing and seal
Incorrect transmission alignment	Realign transmission
Dry release fork between pivot	Lubricate release fork and pivot
Heavy and/or Stiff Pedal	
Sticking release bearing sleeve	Replace release bearing and/or sleeve
Dry or binding clutch pedal hub	Lubricate and align components
Floor mat interference with pedal	Lay mat flat in proper area
Dry or binding ball/fork pivots	Lubricate and align components
Faulty clutch cable	Replace clutch cable
Noisy Clutch Pedal	
Faulty interlock switch	Replace interlock switch
Self-adjuster ratchet noise	Lubricate or replace self-adjuster
Speed control interlock switch	Lubricate or replace interlock switch
Clutch Pedal Sticks Down	
Binding clutch cable	See CLUTCH article
Springs weak in pressure plate	Replace pressure plate
Binding in clutch linkage	Lubricate and free linkage
Noisy	
Dry release bearing	Lubricate or replace release bearing
Dry or worn pilot bearing	Lubricate or replace bearing
Worn input shaft bearing	Replace bearing
Transmission Click	

CONDITION & POSSIBLE CAUSE	CORRECTION
Weak springs in pressure	Replace pressure plate plate
Release fork loose on ball stud	Replace release fork and/or ball stud
Oil on clutch disc damper	Replace clutch disc
Broken spring in slave cylinder	Replace slave cylinder

DRIVE AXLE - NOISE DIAGNOSIS

Unrelated Noises

Some driveline trouble symptoms are also common to the engine, transmission, wheel bearings, tires, and other parts of the vehicle. Ensure cause of trouble actually is in the drive axle before adjusting, repairing, or replacing any of its parts.

Non-Drive Axle Noises

A few conditions can sound just like drive axle noise and have to be considered in pre-diagnosis. The 4 most common noises are exhaust, tires, CV/universal joints and wheel trim rings.

In certain conditions, the pitch of the exhaust gases may e gear whine. At other times, it may be mistaken for a wheel bearing rumble.

Tires, especially radial and snow, can have a high-pitched tread whine or roar, similar to gear noise. Also, some non-standard tires with an unusual tread construction may emit a roar or whine.

Defective CV/universal joints may cause clicking noises or excessive driveline play that can be improperly diagnosed as drive axle problems.

Trim and moldings also can cause a whistling or whining noise. Ensure none of these components are causing the noise before disassembling the drive axle.

Gear Noise

A "howling" or "whining" noise from the ring and pinion gear can be caused by an improper gear pattern, gear damage, or improper bearing preload. It can occur at various speeds and driving conditions, or it can be continuous.

Before disassembling axle to diagnose and correct gear ke sure that tires, exhaust, and vehicle trim have been checked as possible causes.

Chuckle

This is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from 40 MPH

and usually can be heard until vehicle comes to a complete stop. The frequency varies with the speed of the vehicle.

A chuckle that occurs on the driving phase is usually caused ive clearance due to differential gear wear, or by a damaged tooth on the coast side of the pinion or ring gear. Even a very small tooth nick or a ridge on the edge of a gear tooth is enough the cause the noise.

This condition can be corrected simply by cleaning the gear tooth nick or ridge with a small grinding wheel. If either gear is damaged or scored badly, the gear set must be replaced. If metal has broken loose, the carrier and housing must be cleaned to remove particles that could cause damage.

Knock

This is very similar to a chuckle, though it may be louder, and occur on acceleration or deceleration. Knock can be caused by a gear tooth that is damaged on the drive side of the ring and pinion gears. Ring gear bolts that are hitting the carrier casting can cause knock. Knock can also be due to excessive end play in the axle shafts.

Clunk

Clunk is a metallic noise heard when an automatic transmission is engaged in Reverse or Drive, or when throttle is applied or released. It is caused by backlash somewhere in the driveline, but not necessarily in the axle. To determine whether driveline clunk is caused by the axle, check the total axle backlash as follows:

1. Raise vehicle on a frame or twinpost hoist so that drive wheels are free. Clamp a bar between axle companion flange and a part of the frame or body so that flange cannot move.
2. On conventional drive axles, lock the left wheel to keep it from turning. On all models, turn the right wheel slowly until it is felt to be in Drive condition. Hold a chalk marker on side of tire about 12" from center of wheel. Turn wheel in the opposite direction until it is again felt to be in Drive condition.
3. Measure the length of the chalk mark, which is the total axle backlash. If backlash is one inch or less, drive axle is not the source of clunk noise.

Bearing Whine

Bearing whine is a high-pitched sound similar to a whistle. It is usually caused by malfunctioning pinion bearings. Pinion bearings operate at drive shaft speed. Roller wheel bearings may whine in a similar manner if they run completely dry of lubricant. Bearing noise will occur at all driving speeds. This distinguishes it from gear whine, which usually comes and goes as speed changes.

Bearing Rumble

Bearing rumble sounds like marbles being tumbled. It is usually caused by a malfunctioning wheel bearing. The lower pitch is because the wheel bearing turns at only about 1/3 of drive shaft speed.

Chatter On Turns

This is a condition where the entire front or rear of vehicle vibrates when vehicle is moving. The vibration is plainly felt as well as heard. Extra differential thrust washers installed during axle repair can cause a condition of partial lock-up that creates this chatter.

Axle Shaft Noise

Axle shaft noise is similar to gear noise and pinion bearing whine. Axle shaft bearing noise will normally distinguish itself from gear noise by occurring in all driving modes (Drive, cruise, coast and float), and will persist with transmission in Neutral while vehicle is moving at problem speed.

If vehicle displays this noise condition, remove suspect parts, replace wheel seals and install a new set of bearings. Re-evaluate vehicle for noise before removing any internal components.

Vibration

Vibration is a high-frequency trembling, shaking or grinding condition (felt or heard) that may be constant or variable in level and can occur during the total operating speed range of the vehicle.

The types of vibrations that can be felt in the vehicle can d into 3 main groups:

- Vibrations of various unbalanced rotating parts of the vehicle.
- Resonance vibrations of the body and frame structures caused by rotating of unbalanced parts.
- Tip-in moans of resonance vibrations from stressed engine or exhaust system mounts or driveline flexing modes.

DRIVE AXLE - RWD TROUBLE SHOOTING

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DRIVE AXLE (RWD) TROUBLE SHOOTING

CONDITION & POSSIBLE CAUSE	CORRECTION
Knocking or Clunking	
Differential Side Gear Clearance	Check Clearance
Worn Pinion Shaft	Replace Pinion Shaft

CONDITION & POSSIBLE CAUSE	CORRECTION
Axle Shaft End Play	Check End Play
Missing Gear Teeth	Check Differential/Replace Gear
Wrong Axle Backlash	Check Backlash
Misaligned Driveline	Realign Driveline
Clinking During Engagement	
Side Gear Clearance	Check Clearance
Ring and Pinion Backlash	Check Backlash
Worn/Loose Pinion Shaft	Replace Shaft/Bearing
Bad "U" Joint	Replace "U" Joint
Sticking Slip Yoke	Lube Slip Yoke
Broken Rear Axle Mount	Replace Mount
Loose Drive Shaft Flange	Check Flange
Click/Chatter On Turns	
Differential Side Gear Clearance	Check Clearance
Wrong Turn On Plates (1)	Replace Clutch Plates
Wrong Differential Lubricant (1)	Change Lubricant
Knock Or Click	
Flat Spot on Rear Wheel Bearing	Replace Wheel Bearing
Low Vibration At All Speeds	
Faulty Wheel Bearing	Replace Wheel Bearing
Faulty "U" Joint	Replace "U" Joint
Faulty Drive Shaft	Balance Drive Shaft
Faulty Companion Flange	Replace Flange
Faulty Slip Yoke Flange	Replace Flange
(1) Limited slip differential only.	

FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING

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articles available in the section(s) you are accessing.

BASIC FWD AXLE SHAFTS & CV JOINTS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE
Grease Leaks	CV boot torn or cracked
Clicking Noise on Cornering	Damaged outer CV
Clunk Noise on Acceleration	Damaged inner CV
Vibration or Shudder on Acceleration	Sticking, damaged or worn CV Misalignment or spring height

STEERING & SUSPENSION

MANUAL STEERING GEAR TROUBLE SHOOTING

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BASIC MANUAL STEERING GEAR TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise in Rack and Pinion	
Rack and pinion mounting bracket loose	Tighten all mounting bolts
Lack of/or incorrect lubricant	Correct as necessary
Steering gear mounting bolts loose	Tighten all mounting bolts
Excessive Play	
Front wheel bearing improperly adjusted	See FRONT SUSPENSION article
Loose or worn steering linkage	See STEERING LINKAGE article
Loose or worn steering gear shift	See MANUAL STEERING GEAR article
Steering arm loose on gear shaft	See MANUAL STEERING GEAR article
Steering gear housing bolts loose	Tighten all mounting bolts
Steering gear adjustment too loose	See MANUAL STEERING GEAR article
Steering arms loose on knuckles	Tighten and check steering linkage
Rack and pinion mounting loose	Tighten all mounting bolts

CONDITION & POSSIBLE CAUSE	CORRECTION
Rack and pinion out of adjustment	See adjustment in STEERING article
Tie rod end loose	Tighten and check steering linkage
Excessive Pitman shaft-to-ball nut lash	Repair as necessary
Poor Returnability	
Lack of lubricant in ball joint or linkage	Lubricate and service systems
Binding in linkage or ball joints	See STEERING LINKAGE and SUSPENSION article
Improper front end alignment	See WHEEL ALIGNMENT article
Improper tire pressure	Inflate to proper pressure
Tie rod binding	Inflate to proper pressure
Shaft seal rubbing shaft	See STEERING COLUMN article
Excessive Vertical Motion	
Improper tire pressure	Inflate to proper pressure
Tires, wheels or rotors out of balance	Balance tires then check wheels and rotors
Worn or faulty shock absorbers	Check and replace if necessary
Loose tie rod ends or steering	Tighten or replace if necessary
Loose or worn wheel bearings	See SUSPENSION article
Steering Pulls to One Side	
Improper tire pressure	Inflate to proper pressure
Front tires are different sizes	Rotate or replace if necessary
Wheel bearings not adjusted properly	See FRONT SUSPENSION article
Bent or broken suspension components	See FRONT SUSPENSION article
Improper wheel alignment	See WHEEL ALIGNMENT article
Brakes dragging	See BRAKES article
Instability	
Low or uneven tire pressure	Inflate to proper pressure
Loose or worn wheel bearings	See FRONT SUSPENSION article
Loose or worn idler arm bushing	See FRONT SUSPENSION article
Loose or worn strut bushings	See FRONT SUSPENSION article
Incorrect front wheel alignment	See WHEEL ALIGNMENT article
Steering gear not centered	See MANUAL STEERING GEARS article

CONDITION & POSSIBLE CAUSE	CORRECTION
Springs or shock	Check and replace if necessary
Improper cross shaft	See MANUAL STEERING GEARS article

POWER STEERING TROUBLE SHOOTING

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BASIC POWER STEERING TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Rattle or Chucking Noise	
Pressure hoses touching engine parts	Adjust to proper clearance
Loose Pitman shaft	Adjust or replace if necessary
Tie rods ends or Pitman arm loose	Tighten and check system
Rack and pinion mounts loose	Tighten all mounting bolts
Free play in worm gear	See POWER STEERING GEAR article
Loose sector shaft or thrust bearing adjustment	See POWER STEERING GEAR
Free play in pot coupling	See STEERING COLUMN article
Worn shaft serrations	See STEERING COLUMN article
Growl in Steering Pump	
Excessive pressure in hoses	Restricted hoses, see POWER STEERING GEAR article
Scored pressure plates	See POWER STEERING GEAR article
Scored thrust plates or rotor	See POWER STEERING GEAR article
Extreme wear of cam ring	See POWER STEERING GEAR article
Rattle in Steering Pump	
Vanes not installed	See POWER STEERING PUMP article
Vanes sticking in rotor	See POWER STEERING PUMP article
Swish noise in Pump	
Defective flow control valve	See POWER STEERING PUMP article

CONDITION & POSSIBLE CAUSE	CORRECTION
Groan in Steering Pump	
Air in fluid	See POWER STEERING PUMP article
Poor pressure hose connection	Tighten and check, replace if necessary
Squawk When Turning	
Damper "O" ring on valve spool cut	See POWER STEERING PUMP article
Moan or Whine in Pump	
Pump shaft bearing scored	Replace bearing and fluid
Air in fluid or fluid level low	See POWER STEERING PUMP article
Hose or column grounded	Check and replace if necessary
Cover "O" ring missing or damaged	See POWER STEERING PUMP article
Valve cover baffle missing or damaged	See POWER STEERING PUMP article
Interference of components in pump	See POWER STEERING PUMP article
Loose or poor bracket alignment	Correct or replace if necessary
Hissing When Parking	
Internal leakage in steering gear	Check valved assembly first
Chirp in Steering Pump	
Loose or worn power steering belt	Adjust or replace if necessary
Buzzing When Not Steering	
Noisy pump	See POWER STEERING PUMP article
Free play in steering shaft bearing	See STEERING COLUMN article
Bearing loose on shaft serrations	See STEERING COLUMN article
Clicking Noise in Pump	
Pump slippers too long	See POWER STEERING PUMP article
Broken slipper springs	See POWER STEERING PUMP article
Excessive wear or nicked rotors	See POWER STEERING PUMP article
Damaged cam contour	See POWER STEERING PUMP article
Poor Return of Wheel	
Wheel rubbing against turn signal	See STEERING COLUMN SWITCHES article
Flange rubbing steering gear adjuster	See STEERING COLUMN article
Tight or frozen steering shaft bearing	See STEERING COLUMN article

CONDITION & POSSIBLE CAUSE	CORRECTION
Steering gear out of adjustment	See POWER STEERING GEAR article
Sticking or plugged spool valve	See POWER STEERING PUMP article
Improper front end alignment	See WHEEL ALIGNMENT article
Wheel bearings worn or loose	See FRONT SUSPENSION article
Ties rods or ball joints binding	Check and replace if necessary
Intermediate shaft joints binding	See STEERING COLUMN article
Kinked pressure hoses	Correct or replace if necessary
Loose housing head spanner nut	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Sector shaft adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article
Worm thrust bearing adjusted too tight	See ADJUSTMENTS in POWER STEERING GEAR article
Reaction ring sticking in cylinder	See POWER STEERING GEAR article
Reaction ring sticking in housing head	See POWER STEERING GEAR article
Steering pump internal leakage	See POWER STEERING PUMP article
Steering gear-to-column misalignment	See STEERING COLUMN article
Lack of lubrication in linkage	Service front suspension
Lack of lubrication in ball joints	Service front suspension
Increased Effort When Turning Wheel Fast Foaming, Milky Power Steering Fluid, Low Fluid Level or Low Pressure	
High internal pump leakage	See POWER STEERING PUMP article
Power steering pump belt slipping	Adjust or replace if necessary
Low fluid level	Check and fill to proper level
Engine idle speed to low	Adjust to correct setting
Air in pump fluid system	See POWER STEERING PUMP article
Pump output low	See POWER STEERING PUMP article
Steering gear malfunctioning	See POWER STEERING GEAR article
Wheel Surges or Jerks	
Low fluid level	Check and fill to proper level
Loose fan belt	Adjust or replace if necessary
Insufficient pump pressure	See POWER STEERING PUMP article
Sticky flow control valve	See POWER STEERING PUMP article

CONDITION & POSSIBLE CAUSE	CORRECTION
Linkage hitting oil pan at full turn	Replace bent components
Kick Back or Free Play	
Air in pump fluid system	See POWER STEERING PUMP article
Worn poppet valve in steering gear	See POWER STEERING PUMP article
Excessive over center lash	See POWER STEERING GEAR article
Thrust bearing out of adjustment	See POWER STEERING GEAR article
Free play in pot coupling	See POWER STEERING PUMP article
Steering gear coupling loose on shaft	See POWER STEERING PUMP article
Steering disc mounting bolts loose	Tighten or replace if necessary
Coupling loose on worm shaft	Tighten or replace if necessary
Improper sector shaft adjustment	See POWER STEERING GEAR article
Excessive worm piston side play	See POWER STEERING GEAR article
Damaged valve lever	See POWER STEERING GEAR article
Universal joint loose	Tighten or replace if necessary
Defective rotary valve	See POWER STEERING GEAR article
No Power When Parking	
Sticking flow control valve	See POWER STEERING PUMP article
Insufficient pump pressure output	See POWER STEERING PUMP article
Excessive internal pump leakage	See POWER STEERING PUMP article
Excessive internal gear leakage	See POWER STEERING PUMP article
Flange rubs against gear adjust plug	See STEERING COLUMN article
Loose pump belt	Adjust or replace if necessary
Low fluid level	Check and add proper amount of fluid
Engine idle too low	Adjust to correct setting
Steering gear-to-column misaligned	See STEERING COLUMN article
No Power, Left Turn	
Left turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Left turn reaction seal damaged/missing	See POWER STEERING GEAR article
Cylinder head "O" ring damaged	See POWER STEERING PUMP article
No Power, Right Turns	

CONDITION & POSSIBLE CAUSE	CORRECTION
Column pot coupling bottomed	See STEERING COLUMN article
Right turn reaction seal "O" ring worn	See POWER STEERING GEAR article
Right turn reaction seal damaged	See POWER STEERING GEAR article
Internal leakage through piston end plug	See POWER STEERING GEAR article
Internal leakage through side plugs	See POWER STEERING GEAR article
Lack of Effort in Turning	
Left and/or right reaction seal sticking in cylinder head	Replace, see POWER STEERING GEAR article
Wanders to One Side	
Front end alignment incorrect	See WHEEL ALIGNMENT article
Unbalanced steering gear valve	See POWER STEERING GEAR article
Low Pressure Due to Steering Pump	
Flow control valve stuck or inoperative	See POWER STEERING PUMP article
Pressure plate not flat against cam ring	See POWER STEERING PUMP article
Extreme wear of cam ring	Replace and check adjustments
Scored plate, thrust plate or rotor	See POWER STEERING PUMP article
Vanes not installed properly	See POWER STEERING PUMP article
Vanes sticking in rotor slots	See POWER STEERING PUMP article
Cracked/broken thrust or pressure plate	See POWER STEERING PUMP article

STEERING COLUMN TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC STEERING COLUMN TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Noise in Steering	
Coupling pulled apart	See STEERING COLUMNS article
Column not correctly aligned	See STEERING COLUMNS article

CONDITION & POSSIBLE CAUSE	CORRECTION
Broken lower joint	Replace joint
Horn contact ring not	See STEERING COLUMN article
Bearing not lubricated	See STEERING COLUMN article
Shaft snap ring not properly seated	Reseat or replace snap ring
Plastic spherical joint not lubricated	See STEERING COLUMN article
Shroud or housing loose	Tighten holding screws
Lock plate retaining ring not seated	See STEERING COLUMN article
Loose sight shield	Tighten holding screws
High Steering Shaft Effort	
Column assembly misaligned	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Tight steering universal joint	See STEERING COLUMN article
High Shift Effort	
Column is out of alignment	See STEERING COLUMN article
Improperly installed dust shield	Adjust or replace
Seals or bearings not lubricated	See STEERING COLUMNS article
Mounting bracket screws too long	Replace with new shorter screws
Burrs on shift tube	Remove burrs or replace tube
Lower bowl bearing assembled wrong	See STEERING COLUMN article
Shift tube bent or broken	Replace as necessary
Improper adjustment of shift levers	See STEERING COLUMN article
Improper Trans. Shifting	
Sheared shift tube joint	Replace as necessary
Sheared lower shaft lever	Replace as necessary
Improper shift lever adjustment	See STEERING COLUMN article
Improper gate plate adjustment	See STEERING COLUMN article
Excess Play in Column	
Instrument panel bracket bolts loose	Tighten bolts and check bracket
Broken weld nut on jacket	See STEERING COLUMN article
Instrument bracket capsule sheared	See STEERING COLUMN article

CONDITION & POSSIBLE CAUSE	CORRECTION
Column bracket/jacket bolts loose	Tighten bolts and check bracket
Steering Locks in Gear	
Release lever mechanism	See STEERING COLUMN article

SUSPENSION TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC SUSPENSION TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Front End Noise	
Loose or worn wheel	See Wheel Bearing Adjustment in SUSPENSION
Worn shocks or shock mountings	Replace struts or strut mountings
Worn struts or strut mountings	Replace struts or strut mountings
Loose or worn lower control arm	See SUSPENSION
Loose steering gear-to-frame bolts	See STEERING
Worn control arm bushings	See SUSPENSION
Ball joints not lubricated	Lubricate ball joints & see Ball Joint Checking in SUSPENSION
Front Wheel Shake, Shimmy, or Vibration	
Tires or wheels out of balance	Check tire balance
Incorrect wheel alignment	See WHEEL ALIGNMENT
Drive shaft unbalanced	Check drive shaft balance
Loose or worn wheel bearings	See WHEEL ALIGNMENT
Loose or worn tie rod ends	See SUSPENSION
Worn upper ball joints	See Ball Joint Checking in SUSPENSION
Worn shock absorbers	Replace shock absorbers
Worn strut bushings	Replace strut bushings
Car Pulls to One Side	

CONDITION & POSSIBLE CAUSE	CORRECTION
Mismatched or uneven tires	Check tire condition
Broken or sagging springs	See SUSPENSION
Loose or worn strut bushings	See SUSPENSION
Improper wheel alignment	See WHEEL ALIGNMENT
Improper rear axle alignment	Check rear axle alignment
Power steering gear unbalanced	See STEERING
Front brakes dragging	See BRAKES
Abnormal Tire Wear	
Unbalanced tires	Check tire balance & rotation
Sagging or broken springs	See SUSPENSION
Incorrect front end alignment	See WHEEL ALIGNMENT
Faulty shock absorbers	Replace chock absorbers
Scuffed Tires	
Toe-In incorrect	See WHEEL ALIGNMENT
Suspension arm bent or twisted	See appropriate SUSPENSION article
Springs Bottom or Sag	
Bent or broken springs	See SUSPENSION
Leaking or worn shock absorbers	Replace shock absorbers
Frame misalignment	Check frame for damage
Spring Noises	
Loose "U" Bolts	See SUSPENSION
Loose or worn bushings	See SUSPENSION
Worn or missing interliners	See SUSPENSION
Shock Absorber Noise	
Loose shock mountings	Check & tighten mountings
Worn bushings	Replace bushings
Air in system	Bleed air from system
Undercoating on shocks	Remove undercoating
Car Leans or Sways on Corners	
Loose stabilizer bar	See SUSPENSION

CONDITION & POSSIBLE CAUSE	CORRECTION
Faulty shocks or mountings	Replace shocks or mountings
Broken or sagging springs	See SUSPENSION
Shock Absorbers Leaking	
Worn seals or reservoir tube crimped	See SUSPENSION
Broken Springs	
Loose "U" bolts	See SUSPENSION
Inoperative shock absorbers	Replace shock absorbers

WHEEL ALIGNMENT TROUBLE SHOOTING

NOTE: **This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to problem symptoms. For model-specific Trouble Shooting, refer to SUBJECT, DIAGNOSTIC, or TESTING articles available in the section(s) you are accessing.**

BASIC WHEEL ALIGNMENT TROUBLE SHOOTING CHART

CONDITION & POSSIBLE CAUSE	CORRECTION
Premature Tire Wear	
Improper tire inflation	Check tire pressure
Front alignment out of tolerance	See ALIGNMENT SPECS in WHEEL ALIGNMENT section
Suspension components worn	See SUSPENSION section
Steering system components worn	See STEERING section
Improper standing height	See WHEEL ALIGNMENT
Uneven or sagging springs	See SUSPENSION section
Bent wheel	See WHEEL ALIGNMENT
Improper torsion bar adjustment	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARING ADJ. in SUSPENSION section
Worn or defective shock	Replace shock absorbers
Tires out of balance	Check tire balance
Pulls to One Side	
Improper tire inflation	Check tire pressure

CONDITION & POSSIBLE CAUSE	CORRECTION
Brake dragging	See BRAKE section
Mismatched tires	See WHEEL ALIGNMENT
Broken or sagging spring	See SUSPENSION section
Broken torsion bar	See SUSPENSION section
Power steering valve not centered	See STEERING section
Front alignment out of tolerance	See WHEEL ALIGNMENT section
Defective wheel bearing	See WHEEL BEARINGS in SUSPENSION section
Uneven sway bar links	See SUSPENSION section
Frame bent	Check for frame damage
Steering system bushing worn	See STEERING section
Hard Steering	
Idler arm bushing too tight	See STEERING LINKAGE in STEERING section
Ball joint tight or seized	See SUSPENSION section
Steering linkage too tight	See STEERING LINKAGE in STEERING section
Power steering fluid low	Add proper amount of fluid
Power steering drive belt loose	See STEERING section
Power steering pump defective	See STEERING section
Steering gear out of adjustment	See STEERING section
Incorrect wheel alignment	See WHEEL ALIGNMENT
Damaged steering gear	See STEERING section
Damaged suspension	See SUSPENSION section
Bent steering knuckle or supports	See SUSPENSION section
Vehicle "Wanders"	
Strut rod or control arm bushing worn	See SUSPENSION section
Loose or worn wheel bearings	See WHEEL BEARINGS in SUSPENSION section
Improper tire inflation	Check tire pressure
Stabilizer bar missing or defective	See SUSPENSION section
Wheel alignment out of tolerance	See Adjustment in WHEEL ALIGNMENT section
Broken spring	See SUSPENSION section
Defective shock absorber	Replace shock absorbers

CONDITION & POSSIBLE CAUSE	CORRECTION
Worn steering & suspension components	See SUSPENSION section
Front End Shimmy	
Tire out of balance/round	Check tire balance
Excessive wheel runout	See WHEEL ALIGNMENT
Insufficient or improper caster	See WHEEL ALIGNMENT section
Worn suspension or steering components	See SUSPENSION section
Defective shock absorbers	Replace shock absorber
Wheel bearings worn or loose	See WHEEL BEARING ADJ. in SUSPENSION section
Power steering reaction Bracket loose	See STEERING section
Steering gear box (rack) mounting loose	See STEERING section
Steering gear adjustment loose	See STEERING section
Worn spherical joints	See SUSPENSION section
Toe-In Not Adjustable	
Lower control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Camber Not Adjustable	
Control arm bent	See SUSPENSION section
Frame bent	Check frame for damage
Hub & bearing not seated properly	See SUSPENSION section

GENERAL INFORMATION

Vehicle Diagnostic Information - Diagnostic Information and Procedures - Escalade, Suburban, Tahoe, Yukon

DIAGNOSTIC INFORMATION AND PROCEDURES

STRATEGY BASED DIAGNOSIS

The goal of Strategy Based Diagnosis is to provide guidance when you create a plan of action for each specific diagnostic situation. Following a similar plan for each diagnostic situation, you will achieve maximum efficiency when you diagnose and repair vehicles. Although each of the Strategy Based Diagnosis steps are numbered, you are not required to complete every step in order to successfully diagnose a customer concern. The first step of your diagnostic process should always be Understand and Verify the Customer's Concern. The final step of your diagnostic process should be to Repair and verify the Fix. Refer to the steps listed below for the correct Strategy Based Diagnosis.

NOTE: **For additional information on the following steps refer to the corresponding numbered paragraphs listed below.**

1. Understand and verify the customers concern.
2. Verify the vehicle is not operating as designed:
   - **If the vehicle is operating as designed review the suggestions listed below:**
   - Check Identical Vehicle
   - Customer Misunderstanding of System - Explain operation to customer or refer to owners or service manual
   - Customer dissatisfaction - Submit a Field Product Report
   - **If the vehicle is not operating as designed**
3. Perform preliminary checks - Visual inspections and operational
   - **If the customers concern is found, refer to step 7**
   - **If the customers concern is not found**
4. Perform the Diagnostic System Check - Vehicle, determine the diagnostic service category to perform.
   - **If the customers concern is found, refer to step 7**
   - **If the customers concern is not found**
5. Check for related Bulletins, Recalls and Preliminary Information.
   - **If the customers concern is found, refer to step 7**
   - **If the customers concern is not found**

6. Follow the diagnostic path listed below:
    1. Current DTC - Follow DTC Diagnostics
    2. Symptom no DTC - Follow Symptom Diagnostics
    3. No published diagnostic - Analyze and develop diagnostics or call Technical Assistance
    4. Intermittent/History DTC - See diagnostic detail below
7. Isolate the root cause then repair and verify the fix.
8. Re-examine the concern.
    - **If the vehicle is not repaired, refer to step 1**
    - **If the vehicle is repaired**
9. All OK.

Additional Information

1. Understand and Verify the Customer's Concern: The first part of this step is to obtain as much information as possible from the customer. Are there aftermarket accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed.
2. Vehicle Operating as Designed: This condition exists when the vehicle is found to operate normally. The condition described by the customer may be normal. Compare with another like vehicle that is operating normally under the same conditions described by the customer. Explain your findings and the operation of the system to the customer. If the customer is dissatisfied submit a Field Product Report.
3. Preliminary Checks: Conduct a thorough visual inspection. Review the service history. Detect unusual sounds or odors. Gather diagnostic trouble code (DTC) information in order to achieve an effective repair.
4. Perform Published Diagnostic System Check - Vehicle: The **Diagnostic System Check - Vehicle** verifies the proper operation of the system. This will lead the technician in an organized approach to diagnostics and identify what category of diagnostic to perform.
5. Check for related Bulletins, Recalls and Preliminary Information (PI).
6. Diagnostic categories:
    1. Current DTC: Follow the designated DTC diagnostic in order to make an effective repair. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.
    2. Symptom - No DTC: Select the appropriate symptom diagnostic. Follow the diagnostic steps or suggestions in order to complete the repair. Refer to **Symptoms - Vehicle**.
    3. No Published Diagnostics: Analyze the Concern. Develop a plan for the diagnostics. The service manual schematics will help you to see system power, ground, input, and output circuits. You can also identify splices and other areas where multiple circuits are tied together.

Look at component locations to see if components, connectors or harnesses may be exposed to extreme temperature, moisture, or corrosives (road salt, battery acid, oil or other fluids). Utilize the wiring diagrams, system description and operation, and system circuit description.

4. Intermittent/History DTC: An intermittent condition is one that does not occur continuously, may be difficult to duplicate, and will only occur when certain conditions are met. Generally, an intermittent is caused by faulty electrical connections and wiring, malfunctioning components, electromagnetic/radio frequency interference, driving conditions, or aftermarket equipment. The following approaches/tools may prove to be beneficial in locating and repairing an intermittent condition or history DTC.
   - Combining technicians knowledge with the available service information.
   - Evaluate the symptoms and conditions described by the customer.

     North America - The GM Customer Concern Verification Sheets have been designed to improve communications between the service customer and the technician. The more clearly the technician understands the concern and its symptoms, the more likely the concern will be fixed right the first time. The blank CCVS can be found in GM Global Connect under Service, Service Forms.

   - Follow the suggestions on **Testing for Intermittent Conditions and Poor Connections** .
   - Use a tool with data capturing capabilities like scan tool, digital multi-meter, or (if available) a vehicle data recorder.
7. Isolate the Root Cause then Repair and Verify Fix: After isolating the root cause, make the repairs and validate for the correct operation by performing the **Diagnostic Repair Verification**. Verifying that the DTC or symptom has been corrected may involve road testing the vehicle.
8. Re-examine the Concern: If a technician cannot successfully find or isolate the concern, a re-evaluation is necessary. Re-verify the concern. The concern could be an intermittent or normal condition.

DIAGNOSTIC PROCEDURE INSTRUCTIONS

The following is an instructional overview of all categories which may be included in a diagnostic procedure.

Diagnostic Instructions

- A link to the **Diagnostic System Check - Vehicle** is provided here. This procedure should be performed prior to performing other diagnostic procedures, as this prevents misdiagnosis where there are integrated system dependencies.
- A link to the **Strategy Based Diagnosis** is provided here. This provides an overview on how a technician should diagnose a vehicle.
- A link to the **Diagnostic Procedure Instructions** is provided here. This information is an instructional overview of all categories which may be included in a diagnostic procedure.

DTC Descriptor

Lists all DTCs and descriptors that are diagnosed within the procedure.

If the DTC supports symptom bytes they will either be listed with the DTC or there will be a link to the symptom byte list.

Diagnostic Fault Information

The Diagnostic Fault Information table identifies each circuit that makes up an electrical subsystem and the associated circuit faults. DTCs and symptoms are listed in the table for all circuit fault modes. This information can be used to diagnose an electrical fault, or as a quick visual aid showing how the different DTCs and symptoms apply for the subsystem being diagnosed.

All DTCs and symptoms shown in this table are not necessarily diagnosed during this procedure.

An example table from an engine coolant temperature (ECT) procedure:

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	P0117	P0118, P0119	P0118*, P0119	P0128, P111E
Low Reference	-	P0118, P0119	-	P0128
* Internal control module or component damage may occur if the circuit shorts to B+.				

Typical Scan Tool Data

The Typical Scan Tool Data table identifies a scan tool data parameter and its value in reference to potential circuit faults.

An example table from an ECT procedure:

ECT Sensor

Circuit	Short to Ground	Open	Short to Voltage
Operating Conditions: Engine = Idling - At normal operating temperature. **Parameter Normal Range:** 88 to 105Â°C (190 to 221Â°F)			
Signal	140Â°C (248Â°F)	-40Â°C (-40Â°F)	-40Â°C (-40Â°F)
Low Reference	-	-40Â°C (-40Â°F)	-

Circuit/System Description

Circuit/System Description identifies circuits, components, and describes how the circuit/system normally functions.

Conditions for Running the DTC

Conditions for Running the DTC, identifies what conditions must be present to allow the diagnostic to run.

Conditions for Setting the DTC

Conditions for Setting the DTC, identifies the conditions that must be present in order to fail the diagnostic and when to set the DTC.

Actions Taken When the DTC Sets

Actions Taken When the DTC sets, identifies the default actions taken when a control module sets a DTC.

Conditions for Clearing the DTC

Conditions for Clearing the DTC, identifies the conditions that must be met in order to clear the DTC.

Diagnostic Aids

Diagnostic Aids are suggestions which explain other methods to diagnose the condition. It also provides unique information about the system to assist the technician in finding and repairing a vehicle condition.

Reference Information

Reference Information includes links providing additional information to be used with the diagnostic procedure.

For example:

- Schematic Reference
- Connector End View Reference
- Component View Reference
- Description and Operation
- Electrical Information Reference
- DTC Type Reference
- Scan Tool Reference
- Special Tools

Circuit/System Verification

The Circuit/System Verification, when supported, needs to be performed prior to the Circuit/System Testing. It will determine the following conditions:

- If a higher priority concern needs to be addressed first (E.g. other DTCs)
- If other conditions are present (E.g. low fluid level)
- If the condition is current
- If the condition is intermittent
- If the system is all Ok

NOTE: **Any diagnostic step that asks if a DTC is "set" refers to a Set, Current, Present, Active DTC status. This does not include any other DTC status. For example History, Not Run, Passed and Failed.**

Circuit/System Verification is a non-intrusive procedure outlining how to verify that a system or a portion of a system is functioning correctly. During the verification process, the vehicle is kept intact and tested as a complete system. The verification is used to assist the technician in determining whether a condition is current, intermittent, or not present (All Ok). When a condition is determined to be intermittent a technician can use the **Testing for Intermittent Conditions and Poor Connections** link in Electrical Information Reference for additional testing information.

The technician should be able to identify if the fault is occurring on the input (signal) circuit or on the output (control) circuit when applicable.

Component Codes

The component codes are a language independent method of identifying a common component between different areas in the service information. The component codes work regardless on how the actual component name was translated.

The component codes used on the schematics will have the base code with an extension to identify location or quantity. For example the ABS wheel speed sensors are identified on the schematic with a base code (B5) and a location extension (LF, RF, LR, and RR) as seen below:

- B5LF Wheel Speed Sensor - Left Front
- B5RF Wheel Speed Sensor - Right Front
- B5LR Wheel Speed Sensor - Left Rear
- B5LR Wheel Speed Sensor - Left Rear

The diagnostic procedures will use the base code (B5) for a wheel speed sensor but may or may not use the extension identifying location (LF, RF, LR, and RR).

Example:

Disconnect the harness connector at the appropriate B5 Wheel Speed Sensor.

Or

Disconnect the appropriate electrical connector: B5 Wheel Speed Sensor

This is done so the diagnostic procedure can be common for all four wheel speed sensors and not have to take into account part location or quantity.

When the diagnostic states "the appropriate" it is up to the technician to identify which component is being diagnosed either by the symptom (Driver's door lock is inoperative) or the DTC descriptor (DTC C0585 04: Left Rear Door Latch Circuit Open).

Circuit/System Testing

NOTE: **Performing the Circuit/System Verification category first will aid in determining if a vehicle condition currently exists.**

Circuit/System Testing is a step by step, positive-flow, testing sequence which allows the technician to perform each test step, in sequence, until a fault is detected. If the result of a numbered test step is NOT achieved, the Right Repair Arrow below the failed test will identify what actions need to take place. If the result of a numbered test step is achieved, the normal flow is to proceed to the next numbered test step, as indicated by the Down Pass Arrow.

Intrusive diagnostics are performed to locate the system fault. System harness connections are disconnected from the component or control module to test individual circuit functions. The component or control module will be used to assist in verifying the circuit function. When a test does not pass, the repair steps (Right Repair Arrow) will indicate what circuit faults to test. For example a short to voltage, short to ground, or open/high resistance.

When testing for individual circuit faults, the technician is expected to perform terminal inspections such as connection surfaces and terminal tension at both the harness and the component or control module. When a condition is determined to be intermittent a technician can use the **Testing for Intermittent Conditions and Poor Connections** , or **Circuit Testing** link in Electrical Information Reference for additional information.

The component and control module will also be diagnosed during the test steps. A retest of a component or control module should always be performed before replacement. For example, reconnect all components and control modules and retest the system to verify the condition still exists before replacing components or control modules.

Component Testing

Component Testing may offer a static and/or dynamic component tests. These tests can be used to verify if a component is operating correctly to avoid unnecessary replacement.

Testing control modules in this category will not be offered. In most cases, the control module is used to verify the harness circuits in the Circuit/System Testing category and a retest of the control module should always be performed before replacement.

Repair Instructions

Repair Instructions provides a link to **Diagnostic Repair Verification**. This link describes how to verify the vehicle is repaired.

All links to repair, replacement, or programming procedures are located here.

Repair Verification

Repair Verification describes how to verify the vehicle is repaired when additional instructions are needed beyond what is in the Diagnostic Repair Verification.

DIAGNOSTIC SYSTEM CHECK INSTRUCTIONS

The following is an overview of instructions for the general information and 13 step System Verification included in the Diagnostic System Check - Vehicle procedure.

Diagnostic Instructions

A link to **Strategy Based Diagnosis** is provided as an overview on how a technician should diagnose a vehicle.

A link to the Diagnostic System Check Instructions is provided. This provides an overview of instructions and examples for the general information and 13 step System Verification included in the Diagnostic System Check - Vehicle procedure. The examples in this document are intended to give the technician a general idea of what the test step is referring to. They are not intended to list every possible condition or situation.

Diagnostic Systems Check steps are listed by priority to guide the technician to the appropriate diagnostic procedure to correct the customer concern. There are many ways to determine the priority of diagnosing a vehicle concern. Some faults can cause customer perceived symptoms in areas unrelated to the fault. Using an example from the System Check, after reading DTCs, the technician is asked to verify there are no Electronic Control Unit Internal Performance Faults present. It is important that any internal performance issues are addressed prior to continuing through the System Check. There is no benefit addressing other DTCs that could be set due to an internal fault to a control module. If the fault is present, performing the diagnostic procedure for that fault will likely correct the customer perceived concern and possibly eliminate other DTCs that may be set.

Not all steps of the Diagnostic System Check have to be performed. The Diagnostic System Check tries to prioritize the test steps with the highest priority faults first. The technician is then lead to another document to do the actual diagnosis or repair. The strategy is to repair higher level faults that may be the cause of other system or component level symptoms. Additionally, the Diagnostic System Check can only be used for a single fault at a time. If additional faults are present, the technician must perform the diagnostic system check for each concern until all customer concerns are

corrected.

Once a repair has been completed, General Motors diagnostic strategy is to always have the technician verify that the customer concern has been corrected. This is to prevent comebacks and to ensure customer satisfaction with their dealership experience. Therefore a link has been provided to **Diagnostic Repair Verification** procedure for the technician to verify the customer concern has been corrected.

There are some assumptions made when General Motors prepares service information. They include the following areas which are presumed to function as designed:

- The 12-volt battery is fully charged. General Motors assumes the majority of vehicles brought in for repair will be able to start and be driven into the service stall. If the vehicle has a dead battery, it is slow cranking or for any other reason the technician feels the customer concern may be battery related, a link is provided to **Battery Inspection/Test** . This procedure will guide the technician through inspecting and verifying the battery functions properly.
- Fuses should not be open. General Motors does not call out in diagnostic procedures to verify a fuse. The technician is expected to find an open fuse when the diagnostic test step states to check for an open circuit condition. Therefore a link has been provided to **Power Distribution Schematics** , and **Electrical Center Identification Views** **Electrical Center Identification Views** for technicians to reference power sources and fuse locations if they feel there may be loss of power due to an open fuse condition.
- Ground circuits are clean, tight, and in the correct location. General Motors assumes that the original ground circuits have not been compromised. The technician is expected to find a poor ground connection when the diagnostic test step states to test the ground circuit for an open/high resistance. Therefore a link has been provided to **Ground Distribution Schematics** , and **Harness Routing Views** for technicians to reference ground locations and which ground circuits may be related to the customer concern.
- All connectors/terminals fully seated in the area of concern. General Motors assumes that all connections are properly installed. The technician is expected to find an open or poor connection when the diagnostic test step asks to test the circuit for an open/high resistance. Therefore a link has been provided to **COMPONENT CONNECTOR END VIEWS - INDEX** for technicians to reference which connections may be related to the customer concern.
- There are no aftermarket devices that affect the operation of the system. General Motors can only author diagnostic and repair information for vehicle systems and components that are original equipment or genuine GM Accessories. Aftermarket equipment can negatively affect original equipment operation and lead a technician's diagnosis of a concern in the wrong direction. Therefore a link has been provided to **Checking Aftermarket Accessories** that guides a technician through the possible causes of vehicle problems related to aftermarket accessories.
- The scan tool powers up. General Motors assumes that power is available at the Data Link Connector and the scan tool will power on. Therefore a link has been provided to **Scan Tool Does Not Power Up** if the technician finds that the scan tool does not power on.

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN - This step is to obtain as much information as possible from the customer. Are there aftermarket

accessories on the vehicle? When does the condition occur? Where does the condition occur? How long does the condition last? How often does the condition occur? Review the service history of the vehicle for previous repairs that could help diagnose the current concern.

Now that the technician understands the customer concern, they should validate the concern on the vehicle. In order to verify the concern, the technician should be familiar with the normal operation of the system and refer to the owner or service manual for any information needed. Inspect the visible system components for obvious damage or conditions that could cause the concern. Conduct a thorough visual inspection. Detect unusual sounds or odors.

The condition described by the customer may be normal. If the technician finds the vehicle to operate normally, compare with another like vehicle that is operating normally, under the same conditions described by the customer. If this is the case, explain your findings and the operation of the system to the customer. If the customer is dissatisfied, submit a Field Product Report.

2. BULLETIN SEARCH - By searching for related bulletins, recall/field actions and preliminary information documents, a procedure for a known field issue may resolve the customer concern with little or no diagnosis necessary saving the technician diagnostic time.
3. MECHANICAL CONCERNS - This step is designed to take the technician directly to a list of symptom diagnostic procedures. The technician is asked to verify the symptoms exhibited by the system are mechanical in nature and not related to an electrical system, see some examples below. If the technician feels the concern could be related to an electrical system, they should continue through the Diagnostic System Check to verify the electrical functionality of vehicle. If the technician feels the concern is exclusively related to a mechanical system, a link to **Symptoms - Vehicle** is provided to select the appropriate symptom diagnostic procedure for the customer concern.

   Examples:

   - Brake noise or diagnosing irregular pad wear
   - Water leak diagnosis
   - Engine or transmission fluid leak diagnosis
   - Manual window or door lock diagnosis
   - Vehicle vibration diagnosis
   - Exhaust noise or leak diagnosis
4. VEHICLE POWER UP VERIFICATION - The technician is asked in this step to turn the ignition key ON and verify that the vehicle powers up. The technician should look for clues that multiple vehicle systems are receiving vehicle power mode messages, such as the cluster waking up, the radio powers on, the HVAC blower is operational, windshield wipers turn on, etc, with the key ON. This would be a rare condition as both the power mode master and back-up power mode master would have to be inoperable, however, if the vehicle does not power up, a link to **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)** is provided.
5. CONTROL MODULE COMMUNICATION and DTC CHECK - The technician is asked in this step to record the following three pieces of data on the Repair Order; any control module that the scan tool determined is not communicating, any DTC and symptom byte set current or

history, and the control module that has set the DTC.

This is considered a setup step for the rest of the Diagnostic System Check. The technician is not expected to do anything other than record the three pieces of data provided by the scan tool on the Repair Order. This provides the information needed to complete the rest of the diagnostic system check.

To complete this step, the technician is asked to utilize the scan tool Vehicle DTC Information function. This function will query every possible control module on the vehicle requesting all DTCs. During the DTC query, the scan tool will try to establish communication with each control module. If the scan tool can communicate with the control module during the DTC request, it will display PRESENT and provide the number of DTCs set in the control module. If the scan tool cannot communicate with a control module, it will only display NOT COMMUNICATING. Since the scan tool cannot determine if a given control module should be present or not, the technician is asked in a future step to verify that the vehicle was not built with control modules listed as NOT COMMUNICATING.

If the scan tool cannot establish communications with ALL of the vehicles control modules, a link to **Data Link References** is provided. A faulty control module or fault with the serial data circuit can cause no communication with all of the control modules on the vehicle. If any control module communicates on the serial data circuit, continue through the Diagnostic System check, as a future step will address any specific non communicating or group of non communicating control modules.

Once the scan tool has completed the routine, the technician should review each control module that has set a DTC and document them on the Repair Order. When reviewing the DTCs, the technician should take notice if any DTCs are powertrain related, and if so, navigate in the scan tool to the Powertrain area and utilize the Capture Info function. This will upload any Freeze Frame/Failure Records stored in the control module to the scan tool in case the data is lost from the control module. As an example, if the technician commands a Clear DTCs function on a powertrain controller, all diagnostic information stored in the controller is erased. This includes Freeze Frame/Failure Records and Inspection/Maintenance System Status indicators, if required for your region.

6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS - The technician is asked to review the DTCs recorded in step 5 and verify there are no control module internal performance faults set current. This type of fault may be the cause of other symptoms or DTCs displayed by the vehicle. By addressing this fault first, the technician may find the other concerns are resolved. The technician should always follow the diagnostic procedure for these types of faults prior to replacing any control module. If the technician finds a control module has an internal performance fault, a link is provided to **Diagnostic Trouble Code (DTC) List - Vehicle** to select the appropriate DTC diagnostic procedure.

   Examples:

   - B1000 Electronic Control Unit Performance
   - B101D ECU Hardware Performance
   - C0550 Electronic Control Unit Performance

- C056D ECU Hardware Performance
- C0570 Auxiliary Electronic Control Unit Performance
- P0606 Control Module Internal Performance
- P0607 Control Module Performance

7. CONTROL MODULE COMMUNICATION VERIFICATION - This step is used to ensure the control modules that are NOT COMMUNICATING were not built on the vehicle. To understand if the vehicle was built with that option, we provide a link to the **Data Link References** , document where Regular Production Options (RPOs) are listed next to the names of optional ECU's and can be compared to those the vehicle was built with. If the technician determines that a control that is NOT COMMUNICATING should be present, the technician is asked to follow the appropriate diagnostic procedure listed in the **Data Link References** document.
8. COMMUNICATION and POWER MODE FAULTS - This step is asking the technician to look for communication DTCs or DTCs related to control modules powering up based on power mode, communication enable or wake-up circuits. See in the below table some examples of the DTCs the technician should diagnose prior to continuing through the Diagnostic System Check. The technician should review the list of DTCs recorded in step 4 and verify that none of these type of DTCs are present. If so, the technician is referred to the **Diagnostic Trouble Code (DTC) List - Vehicle** to select the appropriate DTC diagnostic procedure.

   Examples:

   - U0140 Lost Communication With Body Control Module
   - U0164 Lost Communication With HVAC Control Module
   - U0170 Lost Communication With Passenger Presence Detection Module
   - U0402 Invalid Data Received From Transmission Control Module
   - U0452 Invalid Data Received From Inflatable Restraint Sensing and Diagnostic Module
   - U1814 Powertrain High Speed Communication Enable Circuit
   - B1428 Ignition Switched Power Run/Crank Relay Circuit
   - B137B Accessory Power Module Wake Up Circuit
   - C0897 Control Module Power Moding
   - P2536 Ignition Accessory Switch Circuit
9. POWER MODE VERIFICATION - This step verifies the Power Mode Master is receiving the proper output state of the ignition switch. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician is asked to perform the test with the driver door open. This ensures the retained accessory power mode is inactive during this test which could result in different scan tool readings. The technician is only asked to verify the current Power Mode parameter in the

power mode data display list. If the parameter does not match the actual ignition switch position, a link is provided to perform the **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)** diagnostic procedure.

10. ENGINE CRANK and RUN VERIFICATION - Here the technician is asked to verify that the engine cranks and runs. The technician should use the main power mode input, this being either the ignition key or, on vehicles equipped with Passive Entry Passive Start, the push button switch, to complete this step. The test should not be performed using a key fob, if the MIL is illuminated the powertrain controller may disable this input. The technician should know at this point whether the engine cranks and runs without having to actually performing this test step. One of the follow has probably already occurred and this step can be skipped: The technician drove the vehicle into the stall or verified when checking the Crank and Run parameter in step 8. If the technician has not already somehow verified the engine cranks in previous steps, the technician should perform this test step. Regardless of how this step was performed, if the engine does not crank, a link is provided to **Engine Does Not Crank**, or if the engine cranks but does not run, a link is provided to **Engine Cranks But Does Not Run** for the technician to choose the correct diagnostic procedure for the actual engine application being used.
11. REMAINING DTC REVIEW - Here the technician is asked to review any remaining DTCs that were not addressed in previous steps. The technician is asked first to verify there are no control module supply voltage, system voltage or 5V circuit DTCs present. Control modules, systems or components with insufficient or zero voltage can cause one or multiple symptoms to exist on the vehicle. Control module voltage issues could also be the cause of failures during a programming event. The technician should correct voltage issues prior to addressing any programming or configuration DTCs. The technician should then check for any ECU programming, setup or configuration DTCs. By programming software or configuring a control module, the technician could correct the customer concern unobtrusively. The remaining DTCs, which are usually specific system or component faults, are diagnosed last. They can include ECU input and output circuit DTCs or individual circuit faults that usually cause single symptoms or failure modes on the vehicle and can be fixed following the proper DTC diagnostic procedure. In general, the technician should think about what DTCs or faults could be caused by another DTC or fault. A failed sensor may set a component DTC and then the system may set a DTC indicating the system cannot operate properly. By correcting the sensor fault, the system may now operate properly and the system level DTC will transition to history. Refer to the examples within each category below to understand the differences between these DTCs. If DTCs of these type are current, the technician is referred to **Diagnostic Trouble Code (DTC) List - Vehicle** to choose the correct DTC diagnostic procedure.
    1. Voltage DTCs
        - B1325 Device Power 1 Circuit
        - C0875 Device Voltage Reference Input 2 Circuit
        - C1001 Adaptive Cruise Control Indicators Supply Voltage Circuit
        - P0641 5-Volt Reference Circuit
        - P0787 Downshift Timing Solenoid Control Circuit Low Voltage
    2. Programming, Setup, Configuration or Software Performance DTCs
        - B3943 Steering Column Lock has Not Learned Column Integration Module
        - B101E ECU Software Performance

- B1019 System Configuration Error
- C0558 Calibration Data Not Programmed
- P0630 VIN Not Programmed or Mismatched - Powertrain Control Module (PCM)

3. Component related DTCs
    - B0013 Driver Frontal Deployment Loop Stage 2
    - B0163 Passenger Compartment Temp Sensor Circuit
    - C0045 Left Rear Wheel Speed Sensor Circuit
    - P0565 Cruise Control Switch Circuit
    - P0751 1-2 Shift Solenoid (SS) Valve Performance
4. System related DTCs
    - B1010 System Sensors Data Mismatch
    - C0176 System Thermal Error
    - C0561 System Disabled Information Stored
    - P1564 Vehicle Acceleration Too High - Cruise Control Disabled
    - P1625 Transmission Control Module (TCM) System Reset
5. Any other remaining DTCs - The technician should diagnose and correct any other DTCs that are left that were not from the categories above.

12. EMISSION RELATED INSPECTION/MAINTENANCE TESTING CONCERNS - Several regions require that a vehicle pass on-board diagnostic system tests and the inspection/maintenance emission tests in order to renew license plates or vehicle registration. This is accomplished by viewing the Inspection/Maintenance System Status display on a scan tool. Using a scan tool, the technician can observe the Inspection/Maintenance System Status in order to verify that the vehicle meets the criteria that comply with the local area requirements. If inspection and maintenance checks are required in your region, and the customer concern is related to not passing an Inspection/Maintenance test, a link is provided to **Inspection/Maintenance System Check** where the technician can choose the appropriate Inspection/Maintenance System Check for the actual engine application being used.
13. SYMPTOM DIAGNOSIS - At this step, the diagnostics are assuming that the only information the technician has available to diagnose the customer concern are symptoms of a problem. There are no DTCs set current or history. There may be a Driver Information Center display message or a system indicator to aid in identifying the root cause. The technician should evaluate the symptoms and conditions described by the customer and perform the symptoms diagnostics for the area of customer concern. A link is provided to **Symptoms - Vehicle** which contains a list of all symptoms related to this service manual publication.

DIAGNOSTIC STARTING POINT - VEHICLE

Begin the system diagnosis with **Diagnostic System Check - Vehicle**. The Diagnostic System Check - Vehicle will provide a complete strategy to locate and repair a mechanical or electrical vehicle fault. Not following this strategy may cause additional diagnostic time and/or misdiagnosis.

The Diagnostic System Check - Vehicle will provide the following strategy:

- When to verify the customer concern and identify related bulletins, recalls and preliminary information
- When to identify a control module that is not communicating, a control module that has set a DTC, and the DTC diagnostic priority
- When to address power mode concerns
- When to verify the engine cranks and runs
- When to diagnose symptom related concerns

DIAGNOSTIC SYSTEM CHECK - VEHICLE

Diagnostic Instructions

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic System Check Instructions** to provide an overview of each diagnostic step.
- Continue through the Diagnostic System Check until you are directed to follow a particular diagnostic or repair procedure. Once a repair has been completed, perform the **Diagnostic Repair Verification** and verify the customer concern has been corrected.

The diagnostic procedures within this manual are developed on the assumption that the following areas function as designed:

- The 12 V battery is fully charged and cables are clean and tight. Refer to **Battery Inspection/Test** .
- Fuses are not open. Refer to **Power Distribution Schematics** , and **Electrical Center Identification Views** **Electrical Center Identification Views** .
- Ground circuits for the area of customer concern are clean, tight, and in the correct location. Refer to **Ground Distribution Schematics** , and **Harness Routing Views** .
- All connectors/terminals fully seated in the area of concern. Refer to **COMPONENT CONNECTOR END VIEWS - INDEX** .
- There are no aftermarket devices that affect the operation of the system. Refer to **Checking Aftermarket Accessories** .
- The scan tool powers up. Refer to **Scan Tool Does Not Power Up** .

Diagnostic System Check

1. VERIFY CUSTOMER CONCERN - Understand and validate the customer concern. Inspect the visible system components for obvious damage or conditions that may cause the concern.

2. BULLETIN SEARCH - Check for related bulletins, recall/field actions and preliminary information.
3. MECHANICAL CONCERNS - Verify the symptom is not exclusively a mechanical concern.
   - **If the symptom is exclusively a mechanical concern**

     Refer to **Symptoms - Vehicle**.

   - **If the symptom is not a mechanical concern**

NOTE: **Do not clear any DTCs unless instructed to do so by a diagnostic procedure. If any DTC is Powertrain related, select Capture Info to store DTC and Freeze Frame/Failure Records to the scan tool.**

4. VEHICLE POWER UP VERIFICATION - Ignition ON, verify the vehicle powers up.
   - **If the vehicle does not power up**

     Refer to **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)** .

   - **If the vehicle powers up**
5. CONTROL MODULE COMMUNICATION and DTC CHECK - Using a scan tool, perform the Vehicle DTC Information function and verify at least one control module communicates with the scan tool. Record on the Repair Order the following information:
   - Any control module that is not communicating.
   - Any DTC, including symptom byte, and the control module that has set the DTC.
   - **If the scan tool does not communicate with any control module on the vehicle**

     Refer to **Data Link References** .

   - **If the scan tool communicates with any control module**
6. CONTROL MODULE INTERNAL PERFORMANCE FAULTS - Verify there are no current control module Internal Hardware Performance DTCs set.
   - **If any DTC of this type is set**

     Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.

   - **If no DTC of this type is set**
7. CONTROL MODULE COMMUNICATION VERIFICATION - Verify the vehicle is not built with any control module listed as not communicating with the scan tool, refer to **Data Link References** .

- **If the vehicle is built with a control module that is not communicating**

  Refer to **Data Link References** .

- **If all control modules the vehicle is built with are communicating**

8. COMMUNICATION and POWERMODE FAULTS - Verify there are no current control module Power Mode or Communication DTCs set.
   - **If any DTC of this type is set**

     Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.

   - **If no DTC of this type is set**

NOTE: **The engine may start during this test. Ensure the vehicle is out of gear and the parking brake is applied. Turn the engine OFF as soon as the crank power mode parameter has been observed.**

9. POWER MODE VERIFICATION - Driver door open, observe each scan tool Power Mode data parameter while cycling through all power modes. Verify all Power Mode data parameters match the actual ignition switch/push button switch selection.
   - **If any Power Mode data parameter does not match**

     Refer to **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)** .

   - **If all Power Mode data parameters match**

10. ENGINE CRANK and RUN VERIFICATION - Verify that the engine cranks and runs.
    - **If the engine does not crank**

      Refer to **Engine Does Not Crank**.

    - **If the engine does not run**

      Refer to **Engine Cranks But Does Not Run**.

    - **If the engine cranks and runs**

11. REMAINING DTC REVIEW - Verify there are no other DTCs set.
    - **If other DTCs are set**

      Diagnose them in the order listed below. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.

1. Voltage DTCs
2. Programming, Setup, Configuration or Software Performance DTCs
3. Component related DTCs
4. System related DTCs
5. Any remaining DTCs

- **If no other DTCs are set**

12. EMISSION RELATED INSPECTION/MAINTENANCE TESTING CONCERNS-If inspection and maintenance checks are required in your region, verify the customer concern is not related to inspection/maintenance testing.
    - **If the customer concern is related to inspection/maintenance testing**

      Refer to **Inspection/Maintenance System Check**.

    - **If the customer concern is not related to inspection/maintenance testing**
13. SYMPTOM DIAGNOSIS - Diagnose any remaining customer concern. Refer to **Symptoms - Vehicle**.

POWERTRAIN DIAGNOSTIC TROUBLE CODE (DTC) TYPE DEFINITIONS

Emissions Related DTCs

Action Taken When the DTC Sets - Type A

- The control module illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Freeze Frame/Failure Records.

Action Taken When the DTC Sets - Type B

- The control module illuminates the MIL on the second consecutive ignition cycle that the diagnostic runs and fails.
- The control module records the operating conditions at the time the diagnostic fails. The first time the diagnostic fails, the control module stores this information in the Failure Records. If the diagnostic reports a failure on the second consecutive ignition cycle, the control module records the operating conditions at the time of the failure. The control module writes the operating conditions to the Freeze Frame and updates the Failure Records.

- The following applies to misfire DTCs:
    - If the control module detects a low level or an emission level misfire condition during 2 consecutive trips, the control module illuminates

the MIL.

- If the control module detects a high level or catalyst damaging misfire, the control module flashes the MIL at a rate of once per second.
- If the control module detects a misfire during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
  - The engine load is within 20 percent of the previous test that failed.
  - The engine speed is within 375 RPM of the previous test that failed.
  - The engine coolant temperature is in the same range of the previous test that failed.

- The following applies to fuel trim DTCs:
  - If the control module detects a fuel trim condition during 2 consecutive trips, the control module illuminates the MIL.
  - If the control module detects a fuel trim condition during 2 non-consecutive trips, the stored conditions are compared with the current conditions. The control module illuminates the MIL when the following conditions occur:
    - The engine load is within 20 percent of the previous test that failed.
    - The engine speed is within 375 RPM of the previous test that failed.
    - The engine coolant temperature is in the same range of the previous test that failed.

Conditions for Clearing the MIL/DTC - Type A or Type B

- The control module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- A current DTC, Last Test Failed, clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other emission related diagnostic.
- Clear the MIL and the DTC with a scan tool.

Non-Emissions Related DTCs

Action Taken When the DTC Sets - Type C

- The control module stores the DTC information into memory when the diagnostic runs and fails.
- The MIL will not illuminate.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Failure Records.
- The driver information center, if equipped, may display a message.

Conditions for Clearing the DTC - Type C

- A current DTC Last Test Failed clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Clear the DTC with a scan tool.

DIAGNOSTIC TROUBLE CODE (DTC) LIST - VEHICLE

This master DTC list includes all applicable DTCs in alphanumeric order.

DTC	Diagnostic Procedure
B0005	Wiring Systems and Power Management - **DTC B0005**
B0012	Supplemental Inflatable Restraints - **DTC B0012 or B0013**
B0013	Supplemental Inflatable Restraints - **DTC B0012 or B0013**
B0014	Supplemental Inflatable Restraints - **DTC B001E, B0014, B0021, B0031, or B0038**
B0015	Supplemental Inflatable Restraints - **DTC B0015, B001A, B001B, or B0022**
B0016	Supplemental Inflatable Restraints - **DTC B0016, B0018, B0023, or B0025**
B0018	Supplemental Inflatable Restraints - **DTC B0016, B0018, B0023, or B0025**
B0019	Supplemental Inflatable Restraints - **DTC B0019 or B0020**
B001A	Supplemental Inflatable Restraints - **DTC B0015, B001A, B001B, or B0022**
B001B	Supplemental Inflatable Restraints - **DTC B0015, B001A, B001B, or B0022**
B001E	Supplemental Inflatable Restraints - **DTC B001E, B0014, B0021, B0031, or B0038**
B0020	Supplemental Inflatable Restraints - **DTC B0019 or B0020**
B0021	Supplemental Inflatable Restraints - **DTC B001E, B0014, B0021, B0031, or B0038**
B0022	Supplemental Inflatable Restraints - **DTC B0015, B001A, B001B, or B0022**
B0023	Supplemental Inflatable Restraints - **DTC B0016, B0018, B0023, or B0025**
B0025	Supplemental Inflatable Restraints - **DTC B0016, B0018, B0023, or B0025**
B0031	Supplemental Inflatable Restraints - **DTC B001E, B0014, B0021, B0031, or B0038**
B0038	Supplemental Inflatable Restraints - **DTC B001E, B0014, B0021, B0031, or B0038**
B0052	Supplemental Inflatable Restraints - **DTC B0052**
B0071	Supplemental Inflatable Restraints - **DTC B0071**
B0079	Supplemental Inflatable Restraints - **DTC B0079 or B0080**
B0080	Supplemental Inflatable Restraints - **DTC B0079 or B0080**

DTC	Diagnostic Procedure
B0081	Supplemental Inflatable Restraints - **DTC B0081 (Inflatable Restraint Sensing and Diagnostic Module)** **DTC B0081 (Passenger Presence Module)**
B0083	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B0084	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B0085	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B0086	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B0087	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B0088	Supplemental Inflatable Restraints - **DTC B0083-B0088**
B008F	Supplemental Inflatable Restraints - **DTC B008F**
B0091	Supplemental Inflatable Restraints - **DTC B0091**
B0158	Displays and Gauges - **DTC B0158**
B0163	HVAC - Automatic - **DTC B0163, B0183, or B1405**
B0173	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B0178	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B0183	HVAC - Automatic - **DTC B0163, B0183, or B1405**
B0193	HVAC - Automatic - **DTC B0193**
B0208	HVAC - Automatic - **DTC B0208**
B0223	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0228	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0233	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0283	Fixed and Moveable Windows - **DTC B0283**
B0408	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0413	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0418	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**

DTC	Diagnostic Procedure
B0423	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0428	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0433	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B0509	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B0514	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B0519	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B051A	Frame and Underbody - **DTC B051A or B051B**
B051B	Frame and Underbody - **DTC B051A or B051B**
B051C	Frame and Underbody - **DTC B051C or B051D**
B051D	Frame and Underbody - **DTC B051C or B051D**
B051E	Frame and Underbody - **DTC B051E**
B052B	Frame and Underbody - **DTC B052B**
B0550	Displays and Gauges - **DTC B0550**
B0560	Active Noise Cancellation - **DTC B0560**
B0655	Lighting - **DTC B0655**
B067A	Supplemental Inflatable Restraints - **DTC B067A, B067F, or B0680**
B067F	Supplemental Inflatable Restraints - **DTC B067A, B067F, or B0680**
B0680	Supplemental Inflatable Restraints - **DTC B067A, B067F, or B0680**
B0770	Transfer Case - MP 3010 (NP0) - **DTC B0770**
B0770	Transfer Case - MP 3023/3024 (NQH) - **DTC B0770**
B0775	Transfer Case - MP 3010 (NP0) - **DTC B0775**
B0775	Transfer Case - MP 3023/3024 (NQH) - **DTC B0775**
B0780	Transfer Case - MP 3023/3024 (NQH) - **DTC B0780**
B0785	Transfer Case - MP 3010 (NP0) - **DTC B0785**
B0785	Transfer Case - MP 3023/3024 (NQH) - **DTC B0785**
B0790	Transfer Case - MP 3023/3024 (NQH) - **DTC B0790**
B094C	Object Detection and Pedestrian Protection - **DTC B094C**
B0954	Object Detection and Pedestrian Protection - **DTC B0954, B0955, B0956, or B0957**

DTC	Diagnostic Procedure
B0955	Object Detection and Pedestrian Protection - **DTC B0954, B0955, B0956, or B0957**
B0956	Object Detection and Pedestrian Protection - **DTC B0954, B0955, B0956, or B0957**
B0957	Object Detection and Pedestrian Protection - **DTC B0954, B0955, B0956, or B0957**
B0958	Object Detection and Pedestrian Protection - **DTC B0958, B0959, B0960, or B0961**
B0959	Object Detection and Pedestrian Protection - **DTC B0958, B0959, B0960, or B0961**
B0960	Object Detection and Pedestrian Protection - **DTC B0958, B0959, B0960, or B0961**
B0961	Object Detection and Pedestrian Protection - **DTC B0958, B0959, B0960, or B0961**
B0967	Object Detection and Pedestrian Protection - **DTC B0967**
B0968	Object Detection and Pedestrian Protection - **DTC B0968 (Chevrolet, GMC)** **DTC B0968 (Cadillac, without UGN)** **DTC B0968 (Cadillac, with UGN)**
B097B	Wiring Systems and Power Management - **DTC B097B**
B097C	Wiring Systems and Power Management - **DTC B097C**
B0987	Object Detection and Pedestrian Protection - **DTC B0987 (Chevrolet, GMC)** **DTC B0987 (Cadillac, without UGN)** **DTC B0987 (Cadillac, with UGN)**
B0997	Cellular, Entertainment, and Navigation - **DTC B0997**
B1000	Data Communications - **DTC B1000**
B1001	Data Communications - **DTC B1001**
B1001	Supplemental Inflatable Restraints - **DTC B1001 (Passenger Presence System)** **DTC B1001 (Inflatable Restraint Sensing and Diagnostic Module)**
B1008	Object Detection and Pedestrian Protection - **DTC B1008**
B1011	Object Detection and Pedestrian Protection - **DTC B1011**
B1015	Object Detection and Pedestrian Protection - **DTC B1015**
B1019	Vehicle Access - **Liftgate Control Module - DTC B1019**
B1019	Supplemental Inflatable Restraints - **DTC B1019**
B101D	Data Communications - **DTC B101D**
B101E	Data Communications - **DTC B101E**
B1020	HVAC - Automatic - **DTC B1020**
B1023	Steering Wheel and Column - **DTC B1023**
B1024	Cellular, Entertainment, and Navigation - **DTC B1024 (Audio Amplifier)** **DTC B1024 (Human Machine Interface Control Module)**

DTC	Diagnostic Procedure
B1025	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1026	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1027	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1028	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1029	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1030	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1031	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1032	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1033	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1034	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1035	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1036	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1037	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1038	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1039	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1040	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**

DTC	Diagnostic Procedure
B1041	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1042	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1043	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1044	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1045	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1046	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1047	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1048	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1049	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1050	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1051	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1052	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1053	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1054	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1055	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1056	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**

DTC	Diagnostic Procedure
B1057	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1058	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1059	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1060	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1061	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1062	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1063	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1064	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1065	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1066	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1067	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1068	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1069	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1070	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1071	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1072	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**

DTC	Diagnostic Procedure
B1073	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1074	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1075	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1085	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1095	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1105	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1115	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1125	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B1135	Cellular, Entertainment, and Navigation - **DTC B1025-B1135 (UQ3)** **DTC B1025-B1135 (UQA with Front Bench Seat)** **DTC B1025-B1135 (UQA with Front Bucket Seats)** **DTC B1025-B1135 (UQS)** **DTC B1025-B1135 (UQH)**
B124B	Cellular, Entertainment, and Navigation - **DTC B124B (IO3)** **DTC B124B (IO5/IO6)**
B124C	Cellular, Entertainment, and Navigation - **DTC B124C**
B124F	Cellular, Entertainment, and Navigation - **DTC B124F**
B124F	Displays and Gauges - **DTC B124F**
B125A	Cellular, Entertainment, and Navigation - **DTC B125A**
B125C	Cellular, Entertainment, and Navigation - **DTC B125C**
B1271	Cellular, Entertainment, and Navigation - **DTC B1271**
B1277	Active Noise Cancellation - **DTC B1277, B127C, or B127D**
B1277	Cellular, Entertainment, and Navigation - **DTC B1277**
B127A	Cellular, Entertainment, and Navigation - **DTC B127A**
B127B	Object Detection and Pedestrian Protection - **DTC B127B**
B127C	Active Noise Cancellation - **DTC B1277, B127C, or B127D**
B127D	Active Noise Cancellation - **DTC B1277, B127C, or B127D**

DTC	Diagnostic Procedure
B127E	Cellular, Entertainment, and Navigation - **DTC B127E (X88/Z88 without U42 and IO3)** **DTC B127E (X88/Z88 with U42)** **DTC B127E (X88/Z88 with IO3)** **DTC B127E (Z75)**
B1280	Cellular, Entertainment, and Navigation - **DTC B1280 (without DNU)** **DTC B1280 (with DNU)**
B12A4	Cellular, Entertainment, and Navigation - **DTC B12A4**
B12A6	Cellular, Entertainment, and Navigation - **DTC B12A6**
B12A7	Cellular, Entertainment, and Navigation - **DTC B12A7**
B12A8	Cellular, Entertainment, and Navigation - **DTC B12A8**
B1325	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1327	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1328	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1329	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1330	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1370	Wiring Systems and Power Management - Instrument Cluster - **DTC B1370 (Instrument Cluster)**
B1370	Wiring Systems and Power Management - **DTC B1370, B1380, or B1441**
B1380	Wiring Systems and Power Management - **DTC B1370, B1380, or B1441**
B1395	Lighting - **DTC B1395**
B1395	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1395	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B1405	Object Detection and Pedestrian Protection - **DTC B1405 (with UD5)** **DTC B1405 (with UD7)**
B1405	Power Seats - **DTC B1405, B1825, B2355, B2365, or B2375**
B1405	HVAC - Automatic - **DTC B0163, B0183, or B1405**
B1415	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**

DTC	Diagnostic Procedure
B1424	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1425	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1439	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B1441	Wiring Systems and Power Management - **DTC B1370, B1380, or B1441**
B1445	Wiring Systems and Power Management - **DTC B1445**
B144A	Wiring Systems and Power Management - **DTC B144A**
B144B	Wiring Systems and Power Management - **DTC B144B**
B144C	Steering Wheel and Column - **DTC B144C**
B1451	Wiring Systems and Power Management - **DTC B1451**
B1474	Vehicle Access - **DTC B1474 or B3849**
B1480	Lighting - **DTC B1480**
B1516	12 V Starting and Charging - **DTC B1516**
B1517	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
B151A	12 V Starting and Charging - **DTC B151A**
B1527	12 V Starting and Charging - **DTC B1527**
B1534	Vehicle Access - **DTC B1534 or B1535**
B1535	Vehicle Access - **DTC B1534 or B1535**
B153A	Vehicle Access - **Liftgate Latch Switches Malfunction - DTC B153A**
B153E	Vehicle Access - **DTC B153E**
B153F	Vehicle Access - **Liftgate Object Sensor Malfunction - DTC B153F**
B154A	Mirrors - **DTC B154A or B154B**
B154B	Mirrors - **DTC B154A or B154B**
B172E	Object Detection and Pedestrian Protection - **DTC B172E or B172F**
B172F	Object Detection and Pedestrian Protection - **DTC B172E or B172F**
B1735	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1740	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1745	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**

DTC	Diagnostic Procedure
B1750	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1755	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1760	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1815	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1820	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1825	Power Seats - **DTC B1405, B1825, B2355, B2365, or B2375**
B1830	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1835	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1840	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B1845	Power Seats - **DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820, B1830, B1835, B1840, or B1845**
B191A	Seat Heating and Cooling - **DTC B191A or B191B**
B191B	Seat Heating and Cooling - **DTC B191A or B191B**
B2355	Power Seats - **DTC B1405, B1825, B2355, B2365, or B2375**
B2365	Power Seats - **DTC B1405, B1825, B2355, B2365, or B2375**
B2375	Power Seats - **DTC B1405, B1825, B2355, B2365, or B2375**
B242C	Seat Heating and Cooling - **DTC B242C or B242D**
B242D	Seat Heating and Cooling - **DTC B242C or B242D**
B243A	Seat Heating and Cooling - **DTC B243A or B243B**
B243B	Seat Heating and Cooling - **DTC B243A or B243B**
B244A	Power Seats - **DTC B244A**
B2455	Cellular, Entertainment, and Navigation - **DTC B2455**
B2462	Cellular, Entertainment, and Navigation - **DTC B2462 (without UE1)** **DTC B2462 (UE1)**
B2470	Cellular, Entertainment, and Navigation - **DTC B2470**
B2476	Cellular, Entertainment, and Navigation - **DTC B2476 or B2482**
B2482	Cellular, Entertainment, and Navigation - **DTC B2476 or B2482**
B2494	Vehicle Access - **Liftgate Handle Switch Malfunction - DTC B2494 (Without TB5)** **Liftgate Handle Switch Malfunction - DTC B2494 (With TB5)**
B2495	Vehicle Access - **DTC B2495 or B24A0**
B24A0	Vehicle Access - **DTC B2495 or B24A0**
B2515	Steering Wheel and Column - **DTC B2515**

DTC	Diagnostic Procedure
B252C	Vehicle Access - **DTC B252C**
B252E	Vehicle Access - **DTC B252E**
B2530	Lighting - **DTC B2530**
B2545	Lighting - **DTC B2545**
B255D	Lighting - **DTC B255D**
B255F	Lighting - **DTC B255F**
B2575	Lighting - **DTC B2575 or B2699**
B257A	Lighting - **DTC B257A**
B2580	Lighting - **DTC B2580**
B258A	Lighting - **DTC B258A**
B2600	Lighting - **DTC B2600 or B2605**
B2605	Lighting - **DTC B2600 or B2605**
B260D	Lighting - **DTC B260D or B260E**
B260E	Lighting - **DTC B260D or B260E**
B2610	Lighting - **DTC B2610**
B2615	Lighting - **DTC B2615**
B2625	Lighting - **DTC B2625**
B263A	Lighting - **DTC B263A**
B2645	Lighting - **DTC B2645**
B2699	Lighting - **DTC B2575 or B2699**
B270A	Shift Lock Control - **DTC B270A**
B2725	Transfer Case - MP 3010 (NP0) - **DTC B2725, P0698, or P0699**
B2725	Transfer Case - MP 3023/3024 (NQH) - **DTC B2725, P0698, or P0699**
B273A	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC B273A**
B2740	Lighting - **DTC B2740**
B2745	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC B2745**
B2750	Horns - **DTC B2750**
B2755	Power Seats - **DTC B2755 or B2765**
B2765	Power Seats - **DTC B2755 or B2765**
B285A	Steering Wheel and Column - **DTC B285A**

DTC	Diagnostic Procedure
B2897	Steering Wheel and Column - **DTC B2897**
B2910	Steering Wheel and Column - **DTC B2910**
B291A	Theft Deterrent - **DTC B291A**
B291B	Theft Deterrent - **DTC B291B**
B2955	Immobilizer - **DTC B2955 (with BTM)** **DTC B2955 (without BTM)**
B297B	Vehicle Access - **DTC B297B or B297C**
B297C	Vehicle Access - **DTC B297B or B297C**
B3006	Bolted Exterior Body Panels and Closures - **DTC B3006**
B302A	Immobilizer - **DTC B302A**
B3031	Immobilizer - **DTC B3031 (without BTM)** **DTC B3031 (with BTM)**
B3055	Immobilizer - **DTC B3055**
B305A	Steering Wheel and Column - **DTC B305A**
B305C	Immobilizer - **DTC B305C**
B305D	Remote Functions - **DTC B305D**
B305E	Wiring Systems and Power Management - **DTC B305E**
B3101	Remote Functions - **DTC B3101**
B3105	Remote Functions - **DTC B3105**
B3106	Remote Functions - **DTC B3106**
B3109	Remote Functions - **DTC B3109-B3113**
B310D	Remote Functions - **DTC B310D-B310F**
B310E	Remote Functions - **DTC B310D-B310F**
B310F	Remote Functions - **DTC B310D-B310F**
B3110	Remote Functions - **DTC B3109-B3113**
B3111	Remote Functions - **DTC B3109-B3113**
B3112	Remote Functions - **DTC B3109-B3113**
B3113	Remote Functions - **DTC B3109-B3113**
B3119	Remote Functions - **DTC B3119**
B3120	Remote Functions - **DTC B3120**
B3121	Remote Functions - **DTC B3121**
B3122	Remote Functions - **DTC B3122**

DTC	Diagnostic Procedure
B3123	Remote Functions - **DTC B3123**
B3124	Remote Functions - **DTC B3124**
B3125	Vehicle Access - **DTC B3125, B3130, or B3135 (With UTT)** **DTC B3125, B3130, or B3135 (Without UTT)**
B3130	Vehicle Access - **DTC B3125, B3130, or B3135 (With UTT)** **DTC B3125, B3130, or B3135 (Without UTT)**
B3135	Vehicle Access - **DTC B3125, B3130, or B3135 (With UTT)** **DTC B3125, B3130, or B3135 (Without UTT)**
B3140	Vehicle Access - **DTC B3140, B3145, B3150, or B3155**
B3145	Vehicle Access - **DTC B3140, B3145, B3150, or B3155**
B3150	Vehicle Access - **DTC B3140, B3145, B3150, or B3155**
B3155	Vehicle Access - **DTC B3140, B3145, B3150, or B3155**
B316B	Fixed and Moveable Windows - **DTC B316B, B317A, B318A, or B319A**
B317A	Fixed and Moveable Windows - **DTC B316B, B317A, B318A, or B319A**
B318A	Fixed and Moveable Windows - **DTC B316B, B317A, B318A, or B319A**
B319A	Fixed and Moveable Windows - **DTC B316B, B317A, B318A, or B319A**
B3205	Fixed and Moveable Windows - **DTC B3205 or B3210**
B3210	Fixed and Moveable Windows - **DTC B3205 or B3210**
B323A	Vehicle Access - **DTC B323A-B323C**
B323B	Vehicle Access - **DTC B323A-B323C**
B323C	Vehicle Access - **DTC B323A-B323C**
B3245	Vehicle Access - **DTC B324A or B3245**
B324A	Vehicle Access - **DTC B324A or B3245**
B324D	Instrument Panel and Console Trim - **DTC B324D**
B3265	Vehicle Access - **DTC B3265**
B3531	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B356A	Object Detection and Pedestrian Protection - **DTC B356A**
B3583	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B3596	Lighting - **DTC B3596**
B3600	Lighting - **DTC B3600**
B3604	Adjustable Pedals - **DTC B3604 or B3605 (Z75)** **DTC B3604 or B3605 (X88 or Z88)**
B3605	Adjustable Pedals - **DTC B3604 or B3605 (Z75)** **DTC B3604 or B3605 (X88 or Z88)**

DTC	Diagnostic Procedure
B3606	Adjustable Pedals - **DTC B3606**
B3618	Vehicle Access - **DTC B3618**
B361A	Displays and Gauges - **DTC B361A**
B361B	Displays and Gauges - **DTC B361B**
B3622	Secondary and Configurable Customer Controls - **DTC B3622 (With Z75)** **DTC B3622 (Without Z75)**
B3623	Cruise Control - **DTC B3623**
B3631	Adjustable Pedals - **DTC B3631**
B3650	Lighting - **DTC B3650**
B370A	Wipers and Washers - **DTC B370A**
B3715	Wipers and Washers - **DTC B3715 or B3875**
B374A	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B3782	HVAC - Automatic - **DTC B0223, B0228, B0233, B0408, B0413, B0418, B0423, B0428, B0433, B1395, B3531, B374A, or B3782**
B3794	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
B3797	Vehicle Access - **DTC B3797**
B3806	Lighting - **DTC B3806**
B3811	Wipers and Washers - **DTC B3811**
B3849	Vehicle Access - **DTC B1474 or B3849**
B384C	Vehicle Access - **DTC B384C**
B3873	Wipers and Washers - **DTC B3873**
B3875	Wipers and Washers - **DTC B3715 or B3875**
B3881	Lighting - **DTC B3881 or B3882**
B3882	Lighting - **DTC B3881 or B3882**
B3883	Lighting - **DTC B3883**
B3884	Lighting - **DTC B3884**
B3885	Lighting - **DTC B3885 or B3886**
B3886	Lighting - **DTC B3885 or B3886**
B3887	Lighting - **DTC B3887 or B3888**
B3888	Lighting - **DTC B3887 or B3888**

DTC	Diagnostic Procedure
B3889	Lighting - **DTC B3889**
B388E	Lighting - **DTC B388E**
B3890	Lighting - **DTC B3890**
B3891	Lighting - **DTC B3891**
B389A	Immobilizer - **DTC B389A**
B3902	Immobilizer - **DTC B3902**
B390A	Object Detection and Pedestrian Protection - **DTC B390A**
B390C	Object Detection and Pedestrian Protection - **DTC B390C**
B390D	Object Detection and Pedestrian Protection - **DTC B390D**
B390F	Object Detection and Pedestrian Protection - **DTC B390F**
B3920	Power Seats - **DTC B3920**
B3924	Immobilizer - **DTC B3924-B3928**
B3925	Immobilizer - **DTC B3924-B3928**
B3926	Immobilizer - **DTC B3924-B3928**
B3927	Immobilizer - **DTC B3924-B3928**
B3928	Immobilizer - **DTC B3924-B3928**
B392B	Power Seats - **DTC B392B**
B392C	Power Seats - **DTC B392C**
B3930	Vehicle Access - **DTC B3930**
B3933	HVAC - Automatic - **DTC B0173, B0178, B0509, B0514, B0519, B3583, or B3933**
B3935	Immobilizer - **DTC B3935**
B393B	HVAC - Automatic - **DTC B393B**
B3948	Lighting - **DTC B3948 or B3949**
B3949	Lighting - **DTC B3948 or B3949**
B3950	Lighting - **DTC B3950 or B3951**
B3951	Lighting - **DTC B3950 or B3951**
B395A	Object Detection and Pedestrian Protection - **DTC B395A**
B395B	Object Detection and Pedestrian Protection - **DTC B395B**
B395C	Object Detection and Pedestrian Protection - **DTC B395C**
B396A	Vehicle Access - **Liftgate Motor Power Open/Close Malfunction - DTC B396A**

DTC	Diagnostic Procedure
B396C	Vehicle Access - **Liftgate Interior Release Open/Close Switch Malfunction - DTC B396C or B396D**
B396D	Vehicle Access - **Liftgate Interior Release Open/Close Switch Malfunction - DTC B396C or B396D**
B396E	Vehicle Access - **Liftgate Close Switch Malfunction - DTC B396E**
B3976	Immobilizer - **DTC B3976**
B3978	Immobilizer - **DTC B3978-B3982**
B3979	Immobilizer - **DTC B3978-B3982**
B3980	Immobilizer - **DTC B3978-B3982**
B3981	Immobilizer - **DTC B3978-B3982**
B3982	Immobilizer - **DTC B3978-B3982**
B3984	Immobilizer - **DTC B3984**
B399A	Object Detection and Pedestrian Protection - **DTC B399A**
B399B	Object Detection and Pedestrian Protection - **DTC B399B**
B399C	Object Detection and Pedestrian Protection - **DTC B399C**
B399D	Object Detection and Pedestrian Protection - **DTC B399D**
C0035	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0036	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0037	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0038	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0039	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0040	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0041	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0042	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0043	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0044	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0045	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0046	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0047	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0048	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0049	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**
C0050	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0035-C0050**

DTC	Diagnostic Procedure
C0110	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0110**
C0131	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0131**
C0161	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0161**
C0176	Power Steering - **DTC C0176**
C0186	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0186, C0187, C0196, or C0287 (Without UGN)** **DTC C0186, C0187, C0196, or C0287 (With UGN)**
C0187	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0186, C0187, C0196, or C0287 (Without UGN)** **DTC C0186, C0187, C0196, or C0287 (With UGN)**
C018C	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C018C**
C0196	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0186, C0187, C0196, or C0287 (Without UGN)** **DTC C0186, C0187, C0196, or C0287 (With UGN)**
C0242	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0242**
C0245	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0245**
C025E	Hydraulic Brakes - **DTC C025E**
C0267	Hydraulic Brakes - **DTC C0267**
C0273	Hydraulic Brakes - **DTC C0273**
C0274	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0274, C0275, or C0280**
C0275	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0274, C0275, or C0280**
C0277	Lighting - **DTC C0277 or C0890**
C027D	Park Brake - **DTC C027D**
C0280	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0274, C0275, or C0280**
C0287	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0186, C0187, C0196, or C0287 (Without UGN)** **DTC C0186, C0187, C0196, or C0287 (With UGN)**
C028A	Park Brake - **DTC C028A, C028B, or C028F**
C028B	Park Brake - **DTC C028A, C028B, or C028F**
C028E	Park Brake - **DTC C028E**
C028F	Park Brake - **DTC C028A, C028B, or C028F**
C0293	Park Brake - **DTC C0293**
C0297	Lighting - **DTC C0297**
C0298	Park Brake - **DTC C0298**
C0299	Hydraulic Brakes - **DTC C0299**

DTC	Diagnostic Procedure
C0306	Transfer Case - MP 3010 (NP0) - **DTC C0306 or C0381**
C0306	Transfer Case - MP 3023/3024 (NQH) - **DTC C0306 or C0381**
C0321	Transfer Case - MP 3010 (NP0) - **DTC C0321 or C0326**
C0321	Transfer Case - MP 3023/3024 (NQH) - **DTC C0321 or C0326**
C0326	Transfer Case - MP 3010 (NP0) - **DTC C0321 or C0326**
C0326	Transfer Case - MP 3023/3024 (NQH) - **DTC C0321 or C0326**
C0364	Transfer Case - MP 3010 (NP0) - **DTC C0364 or C0379**
C0364	Transfer Case - MP 3023/3024 (NQH) - **DTC C0364 or C0379**
C0374	Transfer Case - MP 3010 (NP0) - **DTC C0374**
C0374	Transfer Case - MP 3023/3024 (NQH) - **DTC C0374**
C0379	Transfer Case - MP 3010 (NP0) - **DTC C0364 or C0379**
C0379	Transfer Case - MP 3023/3024 (NQH) - **DTC C0364 or C0379**
C0381	Transfer Case - MP 3010 (NP0) - **DTC C0306 or C0381**
C0381	Transfer Case - MP 3023/3024 (NQH) - **DTC C0306 or C0381**
C0387	Transfer Case - MP 3010 (NP0) - **DTC C0387**
C0387	Transfer Case - MP 3023/3024 (NQH) - **DTC C0387**
C038D	Transfer Case - MP 3010 (NP0) - **DTC C038D**
C038D	Transfer Case - MP 3023/3024 (NQH) - **DTC C038D**
C0392	Transfer Case - MP 3010 (NP0) - **DTC C0392, P0642, or P0643**
C0392	Transfer Case - MP 3023/3024 (NQH) - **DTC C0392, P0642, or P0643**
C0396	Transfer Case - MP 3010 (NP0) - **DTC C0396, C039E, P0652, or P0653**
C0396	Transfer Case - MP 3023/3024 (NQH) - **DTC C0396, C039E, P0652, or P0653**
C0397	Transfer Case - MP 3010 (NP0) - **DTC C0397**
C0397	Transfer Case - MP 3023/3024 (NQH) - **DTC C0397**
C0398	Transfer Case - MP 3010 (NP0) - **DTC C0398**
C0398	Transfer Case - MP 3023/3024 (NQH) - **DTC C0398**
C039E	Transfer Case - MP 3010 (NP0) - **DTC C0396, C039E, P0652, or P0653**
C039E	Transfer Case - MP 3023/3024 (NQH) - **DTC C0396, C039E, P0652, or P0653**
C044B	Power Steering - **DTC C044B**
C0475	Power Steering - **DTC C0475**

DTC	Diagnostic Procedure
C0544	Power Steering - **DTC C0544**
C0545	Power Steering - **DTC C0545**
C0549	Steering Wheel and Column - **DTC C0549**
C0550	Transfer Case - MP 3010 (NP0) - **DTC C0550**
C0550	Transfer Case - MP 3023/3024 (NQH) - **DTC C0550**
C0558	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0558**
C0558	Park Brake - **DTC C0558**
C0561	Park Brake - **DTC C0561**
C0561	Cruise Control - **DTC C0561**
C0565	Cruise Control - **DTC C0565**
C0569	Tire Pressure Monitoring - **DTC C0569**
C0569	Transfer Case - MP 3010 (NP0) - **DTC C0569**
C0569	Transfer Case - MP 3023/3024 (NQH) - **DTC C0569**
C056D	Park Brake - **DTC C056D**
C056D	Data Communications - **DTC C056D**
C056D	Power Steering - **DTC C056D (Power Steering Control Module)**
C056E	Park Brake - **DTC C056E**
C056E	Cruise Control - **DTC C056E (Distance Sensing Cruise Control Module)**
C056E	Data Communications - **DTC C056E**
C0574	Park Brake - **DTC C0574**
C0574	Electronic Suspension Control - **DTC C0574**
C0575	Electronic Suspension Control - **DTC C0575, C0580, C0585, or C0590**
C0580	Electronic Suspension Control - **DTC C0575, C0580, C0585, or C0590**
C0585	Electronic Suspension Control - **DTC C0575, C0580, C0585, or C0590**
C0590	Electronic Suspension Control - **DTC C0575, C0580, C0585, or C0590**
C0615	Electronic Suspension Control - **DTC C0615, C0620, C0625, or C0630**
C0620	Electronic Suspension Control - **DTC C0615, C0620, C0625, or C0630**
C0625	Automatic Level Control - **DTC C0625 or C0630 (With Z85)**
C0625	Electronic Suspension Control - **DTC C0615, C0620, C0625, or C0630**
C0630	Automatic Level Control - **DTC C0625 or C0630 (With Z85)**

DTC	Diagnostic Procedure
C0630	Electronic Suspension Control - **DTC C0615, C0620, C0625, or C0630**
C0660	Automatic Level Control **DTC C0660 (With Z95)** **DTC C0660 (With Z85)**
C0696	Electronic Suspension Control - **DTC C0696**
C0710	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C0710**
C0711	Automatic Level Control - **DTC C0711 (With Z85)** **DTC C0711 (With Z95)**
C0712	Automatic Level Control - **DTC C0712 (With Z95)** **DTC C0712 (With Z85)**
C0750	Tire Pressure Monitoring - **DTC C0750, C0755, C0760, or C0765**
C0755	Tire Pressure Monitoring - **DTC C0750, C0755, C0760, or C0765**
C0760	Tire Pressure Monitoring - **DTC C0750, C0755, C0760, or C0765**
C0765	Tire Pressure Monitoring - **DTC C0750, C0755, C0760, or C0765**
C0775	Tire Pressure Monitoring - **DTC C0775**
C0800	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0805	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0870	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0880	Trailer Brake Controls - **DTC C0880 or C1115-C1118**
C0880	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0890	Lighting - **DTC C0277 or C0890**
C0895	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0896	Transfer Case - MP 3010 (NP0) - **DTC C0896**
C0896	Transfer Case - MP 3023/3024 (NQH) - **DTC C0896**
C0899	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C0900	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
C1002	Cruise Control - **DTC C1002**
C1112	Trailer Brake Controls - **DTC C111B or C1112-C1114**

DTC	Diagnostic Procedure
C1113	Trailer Brake Controls - **DTC C111B or C1112-C1114**
C1114	Trailer Brake Controls - **DTC C111B or C1112-C1114**
C1115	Trailer Brake Controls - **DTC C0880 or C1115-C1118**
C1116	Trailer Brake Controls - **DTC C0880 or C1115-C1118**
C1117	Trailer Brake Controls - **DTC C0880 or C1115-C1118**
C1118	Trailer Brake Controls - **DTC C0880 or C1115-C1118**
C111A	Trailer Brake Controls - **DTC C111A**
C111B	Trailer Brake Controls - **DTC C111B or C1112-C1114**
C124F	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C124F, C1250, or C1251**
C1250	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C124F, C1250, or C1251**
C1251	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C124F, C1250, or C1251**
C1252	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C1252-C1254**
C1253	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C1252-C1254**
C1254	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC C1252-C1254**
P0010	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0010, P2088, or P2089**
P0011	Engine Controls and Fuel - 6.0L (L96) - **DTC P0011**
P0011	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0011**
P0016	Engine Controls and Fuel - 6.0L (L96) - **DTC P0016**
P0016	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0016**
P0030	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0031	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0032	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0036	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0037	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0038	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**

DTC	Diagnostic Procedure
P0050	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0051	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0052	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0053	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0054	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0056	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0057	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0058	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0059	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0060	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0068	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0068 or P1101**
P0071	Displays and Gauges - **DTC P0071-P0074**
P0072	Displays and Gauges - **DTC P0071-P0074**
P0073	Displays and Gauges - **DTC P0071-P0074**
P0074	Displays and Gauges - **DTC P0071-P0074**
P0089	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0089, P228C, or P228D**
P0090	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P0091	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P0092	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P0096	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0096 or P0111**
P0097	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0097, P0098, or P0099**

DTC	Diagnostic Procedure
P0098	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0097, P0098, or P0099**
P0099	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0097, P0098, or P0099**
P00C6	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P00C6**
P00C7	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P00C7**
P00C8	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P00C9	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P00CA	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0090-P0092, P00C8, P00C9, or P00CA**
P00F4	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P00F4-P00F6**
P00F5	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P00F4-P00F6**
P00F6	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P00F4-P00F6**
P0101	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0101**
P0102	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0102 or P0103**
P0103	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0102 or P0103**
P0106	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0106**
P0107	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0107 or P0108**
P0108	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0107 or P0108**
P0111	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0096 or P0111**
P0112	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0112, P0113, or P0114**
P0113	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0112, P0113, or P0114**
P0114	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0112, P0113, or P0114**
P0116	Engine Controls and Fuel - 6.0L (L96) - **DTC P0116**
P0116	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0116**
P0117	Engine Controls and Fuel - 6.0L (L96) - **DTC P0117 or P0118**
P0117	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0117, P0118, or P0119**
P0118	Engine Controls and Fuel - 6.0L (L96) - **DTC P0117 or P0118**
P0118	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0117, P0118, or P0119**
P0119	Engine Controls and Fuel - 6.0L (L96) - **DTC P0119**
P0119	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0117, P0118, or P0119**
P0121	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P0122	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**

DTC	Diagnostic Procedure
P0123	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P0128	Engine Controls and Fuel - 6.0L (L96) - **DTC P0128**
P0128	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0128**
P0131	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0132	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0133	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P0135	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0137	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0138	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P013A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P013B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P013C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P013D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P013E	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P013F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P0141	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P014A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**

DTC	Diagnostic Procedure
P014B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P0151	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0152	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0153	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P0155	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0157	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P0158	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0131, P0132, P0137, P0138, P0151, P0152, P0157, or P0158**
P015A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P015B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P015C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P015D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P0161	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0030-P0032, P0036-P0038, P0050-P0054, P0056-P0060, P0135, P0141, P0155, or P0161**
P0171	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0171, P0172, P0174, or P0175**
P0172	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0171, P0172, P0174, or P0175**
P0174	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0171, P0172, P0174, or P0175**
P0175	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0171, P0172, P0174, or P0175**
P0178	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0178 or P0179**
P0179	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0178 or P0179**
P018B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P018B-P018D**
P018C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P018B-P018D**

DTC	Diagnostic Procedure
P018D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P018B-P018D**
P0191	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0191**
P0192	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0192 or P0193**
P0193	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0192 or P0193**
P0201	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0201	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0202	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0202	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0203	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0203	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0204	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0204	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0205	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0205	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0206	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0206	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0207	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0207	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**

DTC	Diagnostic Procedure
P0208	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0208	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0222	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P0223	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P0231	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0231, P0232, or P023F**
P0232	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0231, P0232, or P023F**
P023F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0231, P0232, or P023F**
P0261	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0261	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0262	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0262	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0264	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0264	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0265	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0265	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0267	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0267	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0268	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**

DTC	Diagnostic Procedure
P0268	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0270	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0270	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0271	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0271	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0273	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0273	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0274	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0274	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0276	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0276	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0277	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0277	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0279	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0279	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0280	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**

DTC	Diagnostic Procedure
P0280	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0282	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0282	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0283	Engine Controls and Fuel - 6.0L (L96) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0283	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0201-P0208, P0261, P0262, P0264, P0265, P0267, P0268, P0270, P0271, P0273, P0274, P0276, P0277, P0279, P0280, P0282, or P0283**
P0300	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0300	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0301	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0301	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0302	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0302	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0303	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0303	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0304	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0304	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0305	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0305	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0306	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0306	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0307	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0307	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0308	Engine Controls and Fuel - 6.0L (L96) - **DTC P0300-P0308**
P0308	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0300-P0308**
P0315	Engine Controls and Fuel - 6.0L (L96) - **DTC P0315**
P0315	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0315**
P0324	Engine Controls and Fuel - 6.0L (L96) - **DTC P0324, P0326, P0331, P06B6, or P06B7**

DTC	Diagnostic Procedure
P0324	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0325	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0325	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0326	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0326	Engine Controls and Fuel - 6.0L (L96) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0327	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0327	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0328	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0328	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0330	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0330	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0331	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0331	Engine Controls and Fuel - 6.0L (L96) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0332	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0332	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0333	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0333	Engine Controls and Fuel - 6.0L (L96) - **DTC P0325, P0327, P0328, P0330, P0332, or P0333**
P0335	Engine Controls and Fuel - 6.0L (L96) - **DTC P0335 or P0336**
P0335	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0335 or P0336**
P0336	Engine Controls and Fuel - 6.0L (L96) - **DTC P0335 or P0336**
P0336	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0335 or P0336**
P0340	Engine Controls and Fuel - 6.0L (L96) - **DTC P0340 or P0341**
P0340	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0340 or P0341**
P0341	Engine Controls and Fuel - 6.0L (L96) - **DTC P0340 or P0341**
P0341	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0340 or P0341**
P0351	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0351	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0352	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**

DTC	Diagnostic Procedure
P0352	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0353	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0353	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0354	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0354	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0355	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0355	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0356	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0356	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0357	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0357	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0358	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0358	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P0420	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0420 or P0430**
P0430	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0420 or P0430**
P0442	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0442**
P0443	Engine Controls and Fuel - 6.0L (L96) - **DTC P0443, P0458, or P0459**
P0443	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0443, P0458, or P0459**
P0446	Engine Controls and Fuel - 6.0L (L96) - **DTC P0446**

DTC	Diagnostic Procedure
P0446	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0446**
P0449	Engine Controls and Fuel - 6.0L (L96) - **DTC P0449, P0498, or P0499**
P0449	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0449, P0498, or P0499**
P0451	Engine Controls and Fuel - 6.0L (L96) - **DTC P0451-P0454**
P0451	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0451-P0454**
P0452	Engine Controls and Fuel - 6.0L (L96) - **DTC P0451-P0454**
P0452	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0451-P0454**
P0453	Engine Controls and Fuel - 6.0L (L96) - **DTC P0451-P0454**
P0453	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0451-P0454**
P0454	Engine Controls and Fuel - 6.0L (L96) - **DTC P0451-P0454**
P0454	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0451-P0454**
P0455	Engine Controls and Fuel - 6.0L (L96) - **DTC P0455**
P0455	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0455**
P0458	Engine Controls and Fuel - 6.0L (L96) - **DTC P0443, P0458, or P0459**
P0458	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0443, P0458, or P0459**
P0459	Engine Controls and Fuel - 6.0L (L96) - **DTC P0443, P0458, or P0459**
P0459	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0443, P0458, or P0459**
P0461	Displays and Gauges - **DTC P0461-P0464**
P0462	Displays and Gauges - **DTC P0461-P0464**
P0463	Displays and Gauges - **DTC P0461-P0464**
P0464	Displays and Gauges - **DTC P0461-P0464**
P0480	Engine Heating and Cooling - **DTC P0480, P0691, or P0692**
P0496	Engine Controls and Fuel - 6.0L (L96) - **DTC P0496**
P0496	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0496**
P0498	Engine Controls and Fuel - 6.0L (L96) - **DTC P0449, P0498, or P0499**
P0498	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0449, P0498, or P0499**
P0499	Engine Controls and Fuel - 6.0L (L96) - **DTC P0449, P0498, or P0499**
P0499	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0449, P0498, or P0499**
P0506	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0506 or P0507**
P0507	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0506 or P0507**

DTC	Diagnostic Procedure
P050D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P050D**
P0513	Immobilizer - **DTC P0513**
P0521	Displays and Gauges - **DTC P0521, P0522, or P0523**
P0522	Displays and Gauges - **DTC P0521, P0522, or P0523**
P0523	Displays and Gauges - **DTC P0521, P0522, or P0523**
P0532	HVAC - Automatic - **DTC P0532 or P0533**
P0533	HVAC - Automatic - **DTC P0532 or P0533**
P0560	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P0561	12 V Starting and Charging - **DTC P0561**
P0562	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P0563	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P0564	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P0565	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P0567	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P0568	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P056C	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P0571	Cruise Control - **DTC P0571**
P0572	Cruise Control - **DTC P0572 or P0573**
P0573	Cruise Control - **DTC P0572 or P0573**
P0575	Cruise Control - **DTC P0575**
P057B	Engine Controls and Fuel - 6.0L (L96) - **DTC P057B-P057D**
P057B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P057B-P057D**
P057C	Engine Controls and Fuel - 6.0L (L96) - **DTC P057B-P057D**

DTC	Diagnostic Procedure
P057C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P057B-P057D**
P057D	Engine Controls and Fuel - 6.0L (L96) - **DTC P057B-P057D**
P057D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P057B-P057D**
P0580	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P0581	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P059F	Bumpers and Fascias - **DTC P059F or P151E**
P05AE	Bumpers and Fascias - **DTC P05AE or P151F**
P05CC	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P05CC**
P0601	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0601	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0601	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0601	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P0601	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0601, P0603, P0604, or P062F**
P0601	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0601	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0602	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0602	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0602	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0602	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P0602	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0602	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0603	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0603	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0603	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0603	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P0603	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0601, P0603, P0604, or P062F**

DTC	Diagnostic Procedure
P0604	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0604	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0604	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0604	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P0604	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0601, P0603, P0604, or P062F**
P0604	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0604	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0605	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0606	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0606	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0606	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0606	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P0606	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0606	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0607	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P060A	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P060B	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P060C	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P0611	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P0615	12 V Starting and Charging - **DTC P0615, P0616, or P0617**
P0616	12 V Starting and Charging - **DTC P0615, P0616, or P0617**
P0617	12 V Starting and Charging - **DTC P0615, P0616, or P0617**
P0621	12 V Starting and Charging - **DTC P0621**
P0622	12 V Starting and Charging - **DTC P0622**
P0628	Engine Controls and Fuel - 6.0L (L96) - **DTC P0628 or P0629**
P0628	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0628**
P0629	Engine Controls and Fuel - 6.0L (L96) - **DTC P0628 or P0629**
P062B	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**

DTC	Diagnostic Procedure
P062B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P062F	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P062F	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P062F	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P062F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P062F	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0601, P0603, P0604, or P062F**
P062F	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P062F	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0630	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0630	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P0633	Immobilizer - **DTC P0633**
P0634	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0634**
P0641	Engine Controls and Fuel - 6.0L (L96) - **DTC P0641, P0651, P0697, or P06A3 (ECM)**
P0641	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0641, P0651, P0697, or P06A3**
P0642	Transfer Case - MP 3010 (NP0) - **DTC C0392, P0642, or P0643**
P0642	Transfer Case - MP 3023/3024 (NQH) - **DTC C0392, P0642, or P0643**
P0643	Transfer Case - MP 3010 (NP0) - **DTC C0392, P0642, or P0643**
P0643	Transfer Case - MP 3023/3024 (NQH) - **DTC C0392, P0642, or P0643**
P0645	HVAC - Automatic - **DTC P0645, P0646, or P0647**
P0646	HVAC - Automatic - **DTC P0645, P0646, or P0647**
P0647	HVAC - Automatic - **DTC P0645, P0646, or P0647**
P064F	Transfer Case - MP 3010 (NP0) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P064F	Transfer Case - MP 3023/3024 (NQH) - **DTC P0601, P0602, P0604, P0606, P062F, or P064F**
P0650	Engine Controls and Fuel - 6.0L (L96) - **DTC P0650, P263A, or P263B**
P0650	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0650, P263A, or P263B**
P0651	Engine Controls and Fuel - 6.0L (L96) - **DTC P0641, P0651, P0697, or P06A3 (ECM)**
P0651	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0641, P0651, P0697, or P06A3**
P0652	Transfer Case - MP 3010 (NP0) - **DTC C0396, C039E, P0652, or P0653**

DTC	Diagnostic Procedure
P0652	Transfer Case - MP 3023/3024 (NQH) - **DTC C0396, C039E, P0652, or P0653**
P0653	Transfer Case - MP 3010 (NP0) - **DTC C0396, C039E, P0652, or P0653**
P0653	Transfer Case - MP 3023/3024 (NQH) - **DTC C0396, C039E, P0652, or P0653**
P0658	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0658 or P0659**
P0658	Automatic Transmission - 8L90 (M5U) - **DTC P0658 or P0659**
P0659	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0658 or P0659**
P0659	Automatic Transmission - 8L90 (M5U) - **DTC P0658 or P0659**
P0667	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0667, P0668, or P0669**
P0668	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0667, P0668, or P0669**
P0669	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0667, P0668, or P0669**
P0685	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0685	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0686	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0686	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0687	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0687	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0689	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0689	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0690	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0690	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P0691	Engine Heating and Cooling - **DTC P0480, P0691, or P0692**
P0692	Engine Heating and Cooling - **DTC P0480, P0691, or P0692**
P0697	Engine Controls and Fuel - 6.0L (L96) - **DTC P0641, P0651, P0697, or P06A3 (ECM)**
P0697	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0641, P0651, P0697, or P06A3**
P0698	Transfer Case - MP 3010 (NP0) - **DTC B2725, P0698, or P0699**
P0698	Transfer Case - MP 3023/3024 (NQH) - **DTC B2725, P0698, or P0699**
P0699	Transfer Case - MP 3010 (NP0) - **DTC B2725, P0698, or P0699**
P0699	Transfer Case - MP 3023/3024 (NQH) - **DTC B2725, P0698, or P0699**
P06A3	Engine Controls and Fuel - 6.0L (L96) - **DTC P0641, P0651, P0697, or P06A3 (ECM)**
P06A3	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0641, P0651, P0697, or P06A3**

DTC	Diagnostic Procedure
P06AC	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P06AC, P06AD, or P06AE**
P06AD	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P06AC, P06AD, or P06AE**
P06AE	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P06AC, P06AD, or P06AE**
P06B6	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P06B6	Engine Controls and Fuel - 6.0L (L96) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P06B7	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P06B7	Engine Controls and Fuel - 6.0L (L96) - **DTC P0324, P0326, P0331, P06B6, or P06B7**
P0700	Engine Controls and Fuel - 6.0L (L96) - **DTC P0700**
P0700	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0700**
P0703	Cruise Control - **DTC P0703**
P0711	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0711-P0713**
P0711	Automatic Transmission - 8L90 (M5U) - **DTC P0711-P0713**
P0712	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0711-P0713**
P0712	Automatic Transmission - 8L90 (M5U) - **DTC P0711-P0713**
P0713	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0711-P0713**
P0713	Automatic Transmission - 8L90 (M5U) - **DTC P0711-P0713**
P0716	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0716 or P0717**
P0716	Automatic Transmission - 8L90 (M5U) - **DTC P0716, P0717, P07BF, or P07C0**
P0717	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0716 or P0717**
P0717	Automatic Transmission - 8L90 (M5U) - **DTC P0716, P0717, P07BF, or P07C0**
P071A	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P071A**
P071A	Automatic Transmission - 8L90 (M5U) - **DTC P071A**
P0722	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0722 or P0723**
P0722	Automatic Transmission - 8L90 (M5U) - **DTC P0722, P0723, P077C, or P077D**
P0723	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0722 or P0723**
P0723	Automatic Transmission - 8L90 (M5U) - **DTC P0722, P0723, P077C, or P077D**
P0741	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0741 or P0742**
P0742	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0741 or P0742**
P0746	Automatic Transmission - 8L90 (M5U) - **DTC P0746 or P0747**
P0747	Automatic Transmission - 8L90 (M5U) - **DTC P0746 or P0747**

DTC	Diagnostic Procedure
P0751	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0751 or P0752**
P0752	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0751 or P0752**
P0756	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0756**
P0776	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0776 or P0777**
P0776	Automatic Transmission - 8L90 (M5U) - **DTC P0776 or P0777**
P0777	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0776 or P0777**
P0777	Automatic Transmission - 8L90 (M5U) - **DTC P0776 or P0777**
P077C	Automatic Transmission - 8L90 (M5U) - **DTC P0722, P0723, P077C, or P077D**
P077D	Automatic Transmission - 8L90 (M5U) - **DTC P0722, P0723, P077C, or P077D**
P0796	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0796 or P0797**
P0796	Automatic Transmission - 8L90 (M5U) - **DTC P0796 or P0797**
P0797	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0796 or P0797**
P0797	Automatic Transmission - 8L90 (M5U) - **DTC P0796 or P0797**
P07BF	Automatic Transmission - 8L90 (M5U) - **DTC P0716, P0717, P07BF, or P07C0**
P07C0	Automatic Transmission - 8L90 (M5U) - **DTC P0716, P0717, P07BF, or P07C0**
P0815	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0815, P0816, P0826, or P1876**
P0815	Automatic Transmission - 8L90 (M5U) - **DTC P0815, P0816, or P0826**
P0816	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0815, P0816, P0826, or P1876**
P0816	Automatic Transmission - 8L90 (M5U) - **DTC P0815, P0816, or P0826**
P0826	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0815, P0816, P0826, or P1876**
P0826	Automatic Transmission - 8L90 (M5U) - **DTC P0815, P0816, or P0826**
P0842	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0842 or P0843**
P0843	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0842 or P0843**
P0850	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0850-P0852**
P0851	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0850-P0852**
P0851	Automatic Transmission - 8L90 (M5U) - **DTC P0851**
P0852	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0850-P0852**
P0856	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC P0856**
P0872	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0872 or P0873**
P0873	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0872 or P0873**

DTC	Diagnostic Procedure
P0877	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0877 or P0878**
P0878	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0877 or P0878**
P0960	Automatic Transmission - 8L90 (M5U) - **DTC P0960, P0962, or P0963**
P0961	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0961-P0963**
P0962	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0961-P0963**
P0962	Automatic Transmission - 8L90 (M5U) - **DTC P0960, P0962, or P0963**
P0963	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0961-P0963**
P0963	Automatic Transmission - 8L90 (M5U) - **DTC P0960, P0962, or P0963**
P0964	Automatic Transmission - 8L90 (M5U) - **DTC P0964, P0966, or P0967**
P0965	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0965-P0967**
P0966	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0965-P0967**
P0966	Automatic Transmission - 8L90 (M5U) - **DTC P0964, P0966, or P0967**
P0967	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0965-P0967**
P0967	Automatic Transmission - 8L90 (M5U) - **DTC P0964, P0966, or P0967**
P0968	Automatic Transmission - 8L90 (M5U) - **DTC P0968, P0970, or P0971**
P0969	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0969-P0971**
P0970	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0969-P0971**
P0970	Automatic Transmission - 8L90 (M5U) - **DTC P0968, P0970, or P0971**
P0971	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0969-P0971**
P0971	Automatic Transmission - 8L90 (M5U) - **DTC P0968, P0970, or P0971**
P0973	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0973 or P0974**
P0974	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0973 or P0974**
P0976	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0976 or P0977**
P0977	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0976 or P0977**
P0989	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0989 or P0990**
P0990	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0989 or P0990**
P1101	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0068 or P1101**
P1248	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P1249	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P124A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**

DTC	Diagnostic Procedure
P124B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P124C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P124D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P124E	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P124F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1248-P124F**
P1255	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1255**
P127C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P127C or P127D**
P127D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P127C or P127D**
P129B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P129B or P129C**
P129B	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P129C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P129B or P129C**
P129C	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P129D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P129D**
P129E	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P129E or P12A8**
P12A6	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P12A6**
P12A8	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P129E or P12A8**
P135A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P135A or P135B**
P135B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P135A or P135B**
P1400	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1400**
P150C	Engine Controls and Fuel - 6.0L (L96) - **DTC P150C**
P150C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P150C**
P1516	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1516, P2101, P2119, or P2176**
P151E	Bumpers and Fascias - **DTC P059F or P151E**
P151F	Bumpers and Fascias - **DTC P05AE or P151F**
P1553	Cruise Control - **DTC P1553**
P155A	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P155B	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**

DTC	Diagnostic Procedure
P155C	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P15AE	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P15AF	12 V Starting and Charging - **DTC B1325, B1327-B1330, B1395, B1415, B1424, B1425, B1439, B1517, C0800, C0805, C0870, C0880, C0895, C0899, C0900, P0560, P0562, P0563, P0611, P129B, P129C, P15AE, or P15AF**
P15F6	Cruise Control - **DTC P15F6 (Distance Sensing Cruise Control Module)**
P15F6	Object Detection and Pedestrian Protection - **DTC P15F6 (Active Safety Control Module (UGN+Z75))**
P15F8	Antilock Brake System - Non-Hybrid Less than 3900 kg (8600 lb) GVW - **DTC P15F8**
P162B	Immobilizer - **DTC P162B**
P162C	Cruise Control - **Cruise Control Malfunction - DTC B3794, P0564, P0565, P0567, P0568, P056C, P0580, P0581, P155A-P155C, or P162C**
P1631	Immobilizer - **DTC P1631**
P163A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P163A**
P1649	Immobilizer - **DTC P1649**
P1682	Engine Controls and Fuel - 6.0L (L96) - **DTC P0685-P0687, P0689, P0690, or P1682**
P1682	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0685-P0687, P0689, P0690, or P1682**
P16A0	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P16A1	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P16A2	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P16E9	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P16F0	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P16F3	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P16F3	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P16F3	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P16F4	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P16FB	Automatic Transmission - 8L90 (M5U) - **DTC P0601-P0604, P0606, P062F, P16F3, P16F4, or P16FB**
P175F	Automatic Transmission - 8L90 (M5U) - **DTC P175F**
P1761	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P1761**
P1761	Automatic Transmission - 8L90 (M5U) - **DTC P1761**

DTC	Diagnostic Procedure
P1762	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P1762**
P176B	Automatic Transmission - 8L90 (M5U) - **DTC P176B-P176D**
P176C	Automatic Transmission - 8L90 (M5U) - **DTC P176B-P176D**
P176D	Automatic Transmission - 8L90 (M5U) - **DTC P176B-P176D**
P1824	Automatic Transmission - 8L90 (M5U) - **DTC P1824, P182D, P18B8, P18BD, or P18C2**
P182A	Automatic Transmission - 8L90 (M5U) - **DTC P182A, P1838, P18B5, P18BA, or P18BF**
P182B	Automatic Transmission - 8L90 (M5U) - **DTC P182B, P182C, P18B6, P18BB, or P18C0**
P182C	Automatic Transmission - 8L90 (M5U) - **DTC P182B, P182C, P18B6, P18BB, or P18C0**
P182D	Automatic Transmission - 8L90 (M5U) - **DTC P1824, P182D, P18B8, P18BD, or P18C2**
P182E	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P182E or P1915**
P182E	Automatic Transmission - 8L90 (M5U) - **DTC P182E or P1915**
P182F	Automatic Transmission - 8L90 (M5U) - **DTC P182F, P1839, P18B7, P18BC, or P18C1**
P1838	Automatic Transmission - 8L90 (M5U) - **DTC P182A, P1838, P18B5, P18BA, or P18BF**
P1839	Automatic Transmission - 8L90 (M5U) - **DTC P182F, P1839, P18B7, P18BC, or P18C1**
P1840	Automatic Transmission - 8L90 (M5U) - **DTC P1840, P1841, P18B9, P18BE, or P18C3**
P1841	Automatic Transmission - 8L90 (M5U) - **DTC P1840, P1841, P18B9, P18BE, or P18C3**
P185F	Transfer Case - MP 3023/3024 (NQH) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P1876	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P0815, P0816, P0826, or P1876**
P18B5	Automatic Transmission - 8L90 (M5U) - **DTC P182A, P1838, P18B5, P18BA, or P18BF**
P18B6	Automatic Transmission - 8L90 (M5U) - **DTC P182B, P182C, P18B6, P18BB, or P18C0**
P18B7	Automatic Transmission - 8L90 (M5U) - **DTC P182F, P1839, P18B7, P18BC, or P18C1**
P18B8	Automatic Transmission - 8L90 (M5U) - **DTC P1824, P182D, P18B8, P18BD, or P18C2**
P18B9	Automatic Transmission - 8L90 (M5U) - **DTC P1840, P1841, P18B9, P18BE, or P18C3**
P18BA	Automatic Transmission - 8L90 (M5U) - **DTC P182A, P1838, P18B5, P18BA, or P18BF**
P18BB	Automatic Transmission - 8L90 (M5U) - **DTC P182B, P182C, P18B6, P18BB, or P18C0**
P18BC	Automatic Transmission - 8L90 (M5U) - **DTC P182F, P1839, P18B7, P18BC, or P18C1**
P18BD	Automatic Transmission - 8L90 (M5U) - **DTC P1824, P182D, P18B8, P18BD, or P18C2**
P18BE	Automatic Transmission - 8L90 (M5U) - **DTC P1840, P1841, P18B9, P18BE, or P18C3**
P18BF	Automatic Transmission - 8L90 (M5U) - **DTC P182A, P1838, P18B5, P18BA, or P18BF**
P18C0	Automatic Transmission - 8L90 (M5U) - **DTC P182B, P182C, P18B6, P18BB, or P18C0**

DTC	Diagnostic Procedure
P18C1	Automatic Transmission - 8L90 (M5U) - **DTC P182F, P1839, P18B7, P18BC, or P18C1**
P18C2	Automatic Transmission - 8L90 (M5U) - **DTC P1824, P182D, P18B8, P18BD, or P18C2**
P18C3	Automatic Transmission - 8L90 (M5U) - **DTC P1840, P1841, P18B9, P18BE, or P18C3**
P1915	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P182E or P1915**
P1915	Automatic Transmission - 8L90 (M5U) - **DTC P182E or P1915**
P2066	Displays and Gauges - **DTC P2066**
P2067	Displays and Gauges - **DTC P2067**
P2068	Displays and Gauges - **DTC P2068**
P2088	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0010, P2088, or P2089**
P2089	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0010, P2088, or P2089**
P2096	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2096-P2099**
P2097	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2096-P2099**
P2098	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2096-P2099**
P2099	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2096-P2099**
P2101	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1516, P2101, P2119, or P2176**
P2119	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1516, P2101, P2119, or P2176**
P2122	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2122, P2123, P2127, P2128, or P2138**
P2123	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2122, P2123, P2127, P2128, or P2138**
P2127	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2122, P2123, P2127, P2128, or P2138**
P2128	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2122, P2123, P2127, P2128, or P2138**
P2135	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0121-P0123, P0222, P0223, P16A0-P16A2, or P2135**
P2138	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2122, P2123, P2127, P2128, or P2138**
P2147	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2148	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2150	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2151	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**

DTC	Diagnostic Procedure
P2153	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2154	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2156	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2157	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2160	Transfer Case - MP 3010 (NP0) - **DTC P2160 or P2161 (2-Wire)**
P2160	Transfer Case - MP 3023/3024 (NQH) - **DTC P2160 or P2161 (2-Wire)**
P2161	Transfer Case - MP 3010 (NP0) - **DTC P2160 or P2161 (2-Wire)**
P2161	Transfer Case - MP 3023/3024 (NQH) - **DTC P2160 or P2161 (2-Wire)**
P216B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P216C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P216E	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P216F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2176	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P1516, P2101, P2119, or P2176**
P217B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P217C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P217E	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P217F	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2147, P2148, P2150, P2151, P2153, P2154, P2156, P2157, P216B, P216C, P216E, P216F, P217B, P217C, P217E, or P217F**
P2199	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2199**
P219A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P219A or P219B**
P219B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P219A or P219B**

DTC	Diagnostic Procedure
P2227	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2227-P2230**
P2228	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2227-P2230**
P2229	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2227-P2230**
P2230	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2227-P2230**
P2269	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2269**
P2270	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P2271	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P2272	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P2273	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0133, P013A-P013F, P014A, P014B, P0153, P015A-P015D, or P2270-P2273**
P228C	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0089, P228C, or P228D**
P228D	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0089, P228C, or P228D**
P2300	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2300	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2301	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2301	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2303	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2303	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2304	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2304	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**

DTC	Diagnostic Procedure
P2306	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2306	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2307	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2307	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2309	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2309	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2310	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2310	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2312	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2312	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2313	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2313	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2315	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2315	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2316	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2316	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**

DTC	Diagnostic Procedure
P2318	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2318	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2319	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2319	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2321	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2321	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2322	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2322	Engine Controls and Fuel - 6.0L (L96) - **DTC P0351-P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, or P2322**
P2534	Wiring Systems and Power Management - **DTC P2534 or P2535**
P2535	Wiring Systems and Power Management - **DTC P2534 or P2535**
P2537	Wiring Systems and Power Management - **DTC P2537**
P2544	Engine Controls and Fuel - 6.0L (L96) - **DTC P2544**
P2544	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2544**
P254F	Bolted Exterior Body Panels and Closures - **DTC P254F**
P2618	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2618 or P2619**
P2619	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2618 or P2619**
P262B	Data Communications - **DTC P0601-P0607, P060A-P060C, P062F, P16E9-P16F0, or P262B**
P262B	Engine Controls and Fuel - 6.0L (L96) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P262B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0601-P0604, P0606, P062B, P062F, P0630, P16F3, or P262B (ECM)**
P2632	Engine Controls and Fuel - 6.0L (L96) - **DTC P2632-P2634**
P2633	Engine Controls and Fuel - 6.0L (L96) - **DTC P2632-P2634**
P2634	Engine Controls and Fuel - 6.0L (L96) - **DTC P2632-P2634**

DTC	Diagnostic Procedure
P2635	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P2635**
P2636	Engine Controls and Fuel - 6.0L (L96) - **DTC P2636**
P263A	Engine Controls and Fuel - 6.0L (L96) - **DTC P0650, P263A, or P263B**
P263A	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0650, P263A, or P263B**
P263B	Engine Controls and Fuel - 6.0L (L96) - **DTC P0650, P263A, or P263B**
P263B	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P0650, P263A, or P263B**
P2670	Automatic Transmission - 8L90 (M5U) - **DTC P2670 or P2671**
P2671	Automatic Transmission - 8L90 (M5U) - **DTC P2670 or P2671**
P2714	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2714 or P2715**
P2714	Automatic Transmission - 8L90 (M5U) - **DTC P2714 or P2715**
P2715	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2714 or P2715**
P2715	Automatic Transmission - 8L90 (M5U) - **DTC P2714 or P2715**
P2718	Automatic Transmission - 8L90 (M5U) - **DTC P2718, P2720, or P2721**
P2719	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2719-P2721**
P2720	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2719-P2721**
P2720	Automatic Transmission - 8L90 (M5U) - **DTC P2718, P2720, or P2721**
P2721	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2719-P2721**
P2721	Automatic Transmission - 8L90 (M5U) - **DTC P2718, P2720, or P2721**
P2723	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2723 or P2724**
P2723	Automatic Transmission - 8L90 (M5U) - **DTC P2723 or P2724**
P2724	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2723 or P2724**
P2724	Automatic Transmission - 8L90 (M5U) - **DTC P2723 or P2724**
P2727	Automatic Transmission - 8L90 (M5U) - **DTC P2727, P2729, or P2730**
P2728	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2728-P2730**
P2729	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2728-P2730**
P2729	Automatic Transmission - 8L90 (M5U) - **DTC P2727, P2729, or P2730**
P2730	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2728-P2730**
P2730	Automatic Transmission - 8L90 (M5U) - **DTC P2727, P2729, or P2730**
P2736	Automatic Transmission - 8L90 (M5U) - **DTC P2736, P2738, or P2739**
P2738	Automatic Transmission - 8L90 (M5U) - **DTC P2736, P2738, or P2739**

DTC	Diagnostic Procedure
P2739	Automatic Transmission - 8L90 (M5U) - **DTC P2736, P2738, or P2739**
P2762	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2762, P2763, or P2764**
P2763	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2762, P2763, or P2764**
P2764	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2762, P2763, or P2764**
P2771	Automatic Transmission - 6L80 (MYC) or 6L90 (MYD) - **DTC P2771 (NQF, NQH)**
P279A	Transfer Case - MP 3010 (NP0) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P279A	Transfer Case - MP 3023/3024 (NQH) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P279B	Transfer Case - MP 3010 (NP0) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P279B	Transfer Case - MP 3023/3024 (NQH) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P279C	Transfer Case - MP 3010 (NP0) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P279C	Transfer Case - MP 3023/3024 (NQH) - **DTC P185F or P279A-P279C** **DTC P185F or P279A-P279C (L83)**
P27A7	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27A8	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27A9	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27AA	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27AB	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27AC	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P27AD	Automatic Transmission - 8L90 (M5U) - **DTC P27A7-P27AD**
P2808	Automatic Transmission - 8L90 (M5U) - **DTC P2808 or P2809**
P2809	Automatic Transmission - 8L90 (M5U) - **DTC P2808 or P2809**
P2812	Automatic Transmission - 8L90 (M5U) - **DTC P2812, P2814, or P2815**
P2814	Automatic Transmission - 8L90 (M5U) - **DTC P2812, P2814, or P2815**
P2815	Automatic Transmission - 8L90 (M5U) - **DTC P2812, P2814, or P2815**
P2817	Automatic Transmission - 8L90 (M5U) - **DTC P2817 or P2818**
P2818	Automatic Transmission - 8L90 (M5U) - **DTC P2817 or P2818**
P281D	Automatic Transmission - 8L90 (M5U) - **DTC P281D or P281E**
P281E	Automatic Transmission - 8L90 (M5U) - **DTC P281D or P281E**
P2824	Automatic Transmission - 8L90 (M5U) - **DTC P2824, P2826, or P2827**
P2826	Automatic Transmission - 8L90 (M5U) - **DTC P2824, P2826, or P2827**
P2827	Automatic Transmission - 8L90 (M5U) - **DTC P2824, P2826, or P2827**

DTC	Diagnostic Procedure
P3400	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3400**
P3401	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3403	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3404	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3425	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3427	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3428	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3441	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3443	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3444	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3449	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3451	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
P3452	Engine Controls and Fuel - 5.3L (L83) or 6.2L (L86) - **DTC P3401, P3403, P3404, P3425, P3427, P3428, P3441, P3443, P3444, P3449, P3451, or P3452**
U0020	Data Communications - **DTC U0020**
U0028	Data Communications - **DTC U0028**
U0029	Data Communications - **DTC U0029**
U0073	Data Communications - **DTC U0073 or U2100**
U0074	Data Communications - **DTC U0074**
U0075	Data Communications - **DTC U0075**
U0077	Data Communications - **DTC U0077**

DTC	Diagnostic Procedure
U0078	Data Communications - **DTC U0078**
U0100-U02FF	Data Communications - **DTC U0100-U02FF**
U0300-U0336	Data Communications - **DTC U0300-U0336**
U0400-U05FF	Data Communications - **DTC U0400-U05FF**
U1500-U15FF	Data Communications - **DTC U1500-U15FF**
U1814	Data Communications - **DTC U1814**
U1833	Data Communications - **DTC U1833**
U184A	Data Communications - **DTC U184A**
U18A2	Data Communications - **DTC U18A2**
U18A6	Data Communications - **DTC U18A6**
U18B9-U18BF	Data Communications - **DTC U18B9-U18BF**
U2098	Data Communications - **DTC U2098**
U2099	Data Communications - **DTC U2099**
U209E	Data Communications - **DTC U209E**
U209F	Data Communications - **DTC U209F**
U2100	Data Communications - **DTC U0073 or U2100**
U2500-U25FF	Data Communications - **DTC U2500-U25FF**
U2616	Data Communications - **DTC U2616**

SYMPTOM BYTE LIST

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
(00-0F) General Electrical Failures This category includes standard wiring failure modes (for example, shorts and opens), direct current (DC) quantities related by Ohm's Law and quantities related to amplitude, frequency or rate of change, and wave shape.		
00	-	This sub type is used for failures that cannot be assigned to a specific sub type. No additional information is available.
01	Short to Battery	This sub type is used for failures where the Electronic Control Unit measures vehicle system (battery positive) potential for greater than a specified time period or when some other value is expected.
02	Short to Ground	This sub type is used for failures where the Electronic Control Unit

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
		measures ground (battery negative) potential for greater than a specified time period or when some other value is expected.
03	Low Voltage	This sub type is used for failures where the Electronic Control Unit measures a voltage below a specified range but not necessarily a short to ground.
04	Open	This sub type is used for failures where the Electronic Control Unit determines an open circuit via lack of bias voltage, low current flow, no change in state of an input in response to an output, etc.
05	High Voltage/Open	This sub type is used for failures where the condition detected by the Electronic Control Unit is the same for either indicated failure mode.
06	Low Voltage/Open	This sub type is used for failures where the condition detected by the Electronic Control Unit is the same for either indicated failure mode.
07	High Voltage	This sub type is used for failures where the Electronic Control Unit measures a voltage above a specified range but not necessarily a short to battery.
08	Performance - Signal Invalid	This sub type is used for failures where the value of the signal is not plausible given the operating conditions.
09	Too Fast Transitions	This sub type is used for failures where the signal transitions more quickly than is reasonably allowed.
0A	Too Slow Transitions	This sub type is used for failures where the signal transitions more slowly than is reasonably allowed.
0B	High Current	This sub type is used for failures where the Electronic Control Unit measures current flow above a specified range.
0C	Low Current	This sub type is used for failures where the Electronic Control Unit measures current flow below a specified range.
0D	High Resistance	This sub type is used for failures where the Electronic Control Unit infers a circuit resistance above a specified range.
0E	Low Resistance	This sub type is used for failures where the Electronic Control Unit infers a circuit resistance below a specified range.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
0F	Signal Erratic	This sub type is used for failures where the signal is momentarily implausible (not long enough for Signal Invalid) or discontinuous.
(10-1F) Additional General Electrical Failures This category includes the overflow from category 0.		
10	-	Currently not used.
11	High Input	This sub type is used for failures where some circuit quantity is above a specified range.
12	Low Input	This sub type is used for failures where some circuit quantity is below a specified range.
13	Low Voltage/High Temperature	This sub type is used for failures where a temperature sensor with a negative temperature coefficient detects a voltage below a specified range.
14	High Voltage/Low Temperature	This sub type is used for failures where a temperature sensor with a negative temperature coefficient detects a voltage above a specified range.
15	Performance - Signal Rising Time Failure	This sub type is used for failures where the signal rise time is outside a specified range.
16	Performance - Signal Falling Time Failure	This sub type is used for failures where the signal fall time is outside a specified range.
17	Performance - Signal Shape/Waveform Failure	This sub type is used for failures where the shape of the signal (plot of the amplitude with respect to time) is not correct (for example, improper circuit impedance.)
18	Low Signal Amplitude	This sub type is used for failures where the Electronic Control Unit measures a signal voltage below a specified range but not necessarily a short to ground (for example, gain too low).
19	High Signal Amplitude	This sub type is used for failures where the Electronic Control Unit measures a signal voltage above a specified range but not necessarily a short to battery (for example, gain too high).
1A	Performance - Bias Level Out of Range	This sub type is used for failures where the Electronic Control Unit applies a bias voltage to a circuit upon which is superimposed a signal voltage (for example, Oxygen Sensor Circuit.)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
1B	Signal Cross Coupled	This sub type is used for failures where the Electronic Control Unit detects a circuit shorted to another circuit when both circuits are controlled by the Electronic Control Unit.
1C	-	Currently not used.
1D	-	Currently not used.
1E	-	Currently not used.
1F	Erratic	This sub type is used for failures where the Electronic Control Unit momentarily detects one of the conditions defined above but not long enough to set a specific sub type.
(20-2F) FM / PWM Failures This category includes faults related to Frequency Modulated (FM) and Pulse Width Modulated (PWM) inputs and outputs of the Electronic Control Unit and faults where position is determined by counts.		
20	-	Currently not used.
21	Incorrect Period	This sub type is used for failures where the Electronic Control Unit measures an incorrect duration for one cycle of the output.
22	Too Short Low-Time	This sub type is used for failures where the Electronic Control Unit detects the low pulse is too narrow with respect to time.
23	Too Long Low-Time	This sub type is used for failures where the Electronic Control Unit detects the low pulse is too wide with respect to time.
24	Too Short High-Time	This sub type is used for failures where the Electronic Control Unit detects the high pulse is too narrow with respect to time.
25	Too Long High-Time	This sub type is used for failures where the Electronic Control Unit detects the high pulse is too wide with respect to time.
26	Low Frequency	This sub type is used for failures where the Electronic Control Unit detects too few cycles in a given time period.
27	High Frequency	This sub type is used for failures where the Electronic Control Unit detects too many cycles in a given time period.
28	Incorrect Frequency	This sub type is used for failures where the Electronic Control Unit measures an incorrect number of cycles in a given time period.
29	Too Few Pulses	This sub type is used for failures where the Electronic Control Unit measures too few pulses (for example, position is calibrated in counts from one extreme to the other).

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
2A	Too Many Pulses	This sub type is used for failures where the Electronic Control Unit measures too many pulses (for example, position is calibrated in counts from one extreme to the other).
2B	Missing Reference	This sub type is used for failures where the Electronic Control Unit does not detect a reference for a signal circuit or a group of signal circuits.
2C	-	Currently not used.
2D	-	Currently not used.
2E	-	Currently not used.
2F	-	Currently not used.
(30-3F) Electronic Control Unit Internal Failures This category includes faults related to memory, software, and internal electrical circuitry; requiring component replacement.		
30	-	Currently not used.
31	Internal Checksum Error	This sub type is used by the Electronic Control Unit to indicate an incorrect checksum calculation where memory type is not specified.
32	General Memory Malfunction	This sub type is used by the Electronic Control Unit to indicate a memory failure where memory type is not specified.
33	Special Memory Malfunction	This sub type is used by the Electronic Control Unit to indicate a memory failure where the specific memory type is not defined in this category.
34	RAM Malfunction	This sub type is used by the Electronic Control Unit to indicate a Random Access Memory (RAM) failure.
35	ROM Malfunction	This sub type is used by the Electronic Control Unit to indicate a Read Only Memory (ROM) failure.
36	EEPROM Performance/Malfunction	This sub type is used by the Electronic Control Unit to indicate an Electrically Erasable Programmable Read Only Memory (EEPROM) failure.
37	Software Malfunction	This sub type is used by the Electronic Control Unit to indicate a failure in the execution of operational software
38	Supervision Software Malfunction	This sub type is used by the Electronic Control Unit to indicate a loop time error in the execution of the operational software.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
39	Internal Malfunction	This sub type is used by the Electronic Control Unit to indicate the detection of an internal circuit failure.
3A	Incorrect Component Installed	This sub type is used by the Electronic Control Unit to indicate a mismatch between the hardware connected to the Electronic Control Unit and the hardware expected by the Electronic Control Unit.
3B	Self-Test Malfunction	This sub type is used by the Electronic Control Unit to indicate a sensor self-test failure launched by an Electronic Control Unit command.
3C	Internal Communication Malfunction	This sub type is used by the Electronic Control Unit to indicate loss of an internal communication line, for example, between microprocessors in a dual microprocessor configuration.
3D	-	Currently not used.
3E	-	Currently not used.
3F	-	Currently not used.
(40-4F) Electronic Control Unit Programming Failures This category includes faults related to operational software, calibrations, and options; remedied by programming the Electronic Control Unit.		
40	-	Currently not used.
41	Not Programmed	This sub type is used to indicate that only boot software is present in the Electronic Control Unit.
42	Calibration Not Programmed	This sub type is used to indicate that operational software is present but calibration data is not.
43	EEPROM Incorrect Programming	This sub type is used to indicate an EEPROM error that may be remedied by reprogramming the module.
44	Security Access Not Activated	This sub type is used to indicate that programming was attempted without unlocking the Electronic Control Unit.
45	Variant Not Programmed	This sub type is used to indicate the need to enter (program) the sub system option content.
46	Configuration Not Programmed	This sub type is used to indicate the need to enter (program) the vehicle option content.
47	VIN Not Programmed	This sub type is used to indicate the need to enter (program) the vehicle identification number (VIN).

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
48	Security Code Not Programmed	This sub type is used to indicate the need to enter (program) the theft / security code.
49	RAM Incorrect Programming	This sub type is used by the Electronic Control Unit to indicate a Random Access Memory (RAM) error remedied by reprogramming.
4A	Programming Checksum Error	This sub type is used by the Electronic Control Unit to indicate an incorrect checksum calculation where memory type is not specified.
4B	Calibration Not Learned	This sub type is used by the Electronic Control Unit to indicate that a password, operational range, etc. for a sensor or actuator must be learned by the Electronic Control Unit.
4C	DTC Memory Full	This sub type is used by the Electronic Control Unit to indicate that more DTCs have been detected than can be accommodated by the memory allocated for DTC storage.
4D	Stack Overflow	This subtype is used by the Electronic Control Unit to indicate that more memory has been used in a stack than is allocated to a program.
4E	-	Currently not used.
4F	-	Currently not used.
(50-5F) Algorithm Based Failures This category includes faults based on comparing two or more input parameters for plausibility or comparing a single parameter to itself with respect to time.		
50	-	Currently not used.
51	-	Currently not used.
52	-	Currently not used.
53	Low Temperature	This sub type is used for failures where the Electronic Control Unit calculates a low temperature condition based upon the duration of certain operating parameters.
54	High Temperature	This sub type is used for failures where the Electronic Control Unit calculates a high temperature condition based upon the duration of certain operating parameters.
55	Too Few Transitions	This sub type is used for failures where the Electronic Control Unit monitors a parameter over time within specified limits and detects fewer than the expected number of transitions.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
56	Too Many Transitions	This sub type is used for failures where the Electronic Control Unit monitors a parameter over time within specified limits and detects more than the expected number of transitions.
57	-	Currently not used.
58	Performance	This sub type is used for failures where the Electronic Control Unit does not see the expected change to a parameter or group of parameters in response to a particular event.
59	Protection Time-Out	This sub type is used for failures where the Electronic Control Unit detects a function is active for greater than a specified time period.
5A	Not Plausible	This sub type is used for failures where the Electronic Control Unit compares two or more input parameters for plausibility.
5B	-	Currently not used.
5C	-	Currently not used.
5D	-	Currently not used.
5E	-	Currently not used.
5F	-	Currently not used.
(60-6F) Mechanical Failures This category includes faults detected by inappropriate motion in response to an Electronic Control Unit controlled output.		
60	-	Currently not used.
61	Stuck	This sub type is used for failures where the Electronic Control Unit does not detect any motion in response to energizing a motor, solenoid, relay, etc.
62	Stuck Open	This sub type is used for failures where the Electronic Control Unit does not detect any motion upon commanding the operation of a motor, solenoid, relay, etc., to close some piece of equipment.
63	Stuck Closed	This sub type is used for failures where the Electronic Control Unit does not detect any motion upon commanding the operation of a motor, solenoid, relay, etc., to open some piece of equipment.
64	Slip Detected	This sub type is used for failures where the Electronic Control Unit detects excessive duration to command a motor, solenoid, relay, etc., to move a piece of equipment to a desired position.

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
65	Emergency Position Not Achievable	This sub type is used for failures where the Electronic Control Unit is unable to command a motor, solenoid, relay, etc., to move a piece of equipment to the emergency position.
66	Incorrect Mounting	This sub type is used for failures where the server detects incorrectly mounted components, for example, acceleration sensor showing a position error of 90Â°.
67	Incorrect Assembly	This sub type is used for failures where the control module has detected that the component has been incorrectly installed (for example, hydraulic pipes crossed over, circuits cross wired) or polarity errors.
68	-	Currently not used.
69	-	Currently not used.
6A	-	Currently not used.
6B	-	Currently not used.
6C	-	Currently not used.
6D	-	Currently not used.
6E	-	Currently not used.
6F	-	Currently not used.
(70-7F) Bus Signal / Message Failures This category includes faults related to bus hardware and signal integrity. This category is also used when the physical input for a signal is located in one Electronic Control Unit and another Electronic Control Unit diagnoses the circuit.		
70	-	Currently not used.
71	Invalid Data	This sub type is used by the Electronic Control Unit to indicate a signal was received with the corresponding validity bit equal to Invalid or post processing of the signal determines it is invalid.
72	Message Counter Incorrect	This sub type is used by the Electronic Control Unit to indicate a signal was received without the corresponding rolling count value being properly updated.
73	Parity Error	This sub type is used by the Electronic Control Unit to indicate a message was processed with an incorrect parity calculation.
74	Bus Signal Checksum Error	This sub type is used by the Electronic Control Unit to indicate a message was processed with an incorrect protection (checksum)

Symptom Byte	Symptom Byte Description	Symptom Byte Definition
		calculation.
75	Serial Data Link High Input	This sub type is used for failures where some circuit quantity, reported via serial data, is above a specified range.
76	Serial Data Link Low Input	This sub type is used for failures where some circuit quantity, reported via serial data, is below a specified range.
77	-	Currently not used.
78	-	Currently not used.
79	-	Currently not used.
7A	-	Currently not used.
7B	-	Currently not used.
7C	-	Currently not used.
7D	-	Currently not used.
7E	-	Currently not used.
7F	Bus Signal Erratic	This sub type is used for failures where the signal, reported via serial data, is momentarily implausible or discontinuous.
(80-FF) Reserved Unique System Specific - See specific diagnostic procedures for symptom byte information if these symptom bytes are used.		

SYMPTOMS - VEHICLE

Body Hardware and Trim

Symptoms-Instrument Panel and Console Trim

Body Repair

- **Symptoms - Bolted Exterior Body Panels and Closures**
- **Symptoms - Active Grille Air Shutter**
- **Symptoms - Power Assist Steps**

Body Systems

- **Symptoms - Adjustable Pedals**
- **Symptoms - Fixed and Moveable Windows**

- **Symptoms - Horns**
- **Symptoms - Lighting**
- **Symptoms - Mirrors**
- **Symptoms - Vehicle Access**
- **Symptoms - Wiper/Washer Systems**

Brakes

- **Symptoms - Antilock Brake System**
- **Symptoms - Hydraulic Brakes**
- **Symptoms - Park Brake**

Driveline/Axle

- **Symptoms - Front Drive Axle**
- **Symptoms - Propeller Shaft**
- **Symptoms - Locking/Limited Slip Rear Axle**
- **Symptoms - Rear Drive Axle**
- **Symptoms - Wheel Drive Shafts**

Driver Information and Entertainment

- **Symptoms - Cellular Communication**
- **Symptoms - Entertainment**
- **Symptoms - Displays and Gauges**
- **Symptoms - Secondary and Configurable Customer Controls**

Engine

- **Symptoms - Engine Electrical**
- **Symptoms - Cruise Control**
- **Symptoms - Engine Controls** - 4.8L, 5.3L, 6.0L, 6.2L, or 7.0L
- **Symptoms - Engine Controls** - 5.3L (L83) or 6.2L (L86 LT1 LT4)
- **Symptoms - Engine Cooling**

- Symptoms - Engine Mechanical
- Symptoms - Engine Exhaust

General Information

Symptoms - Vibration Diagnosis and Correction

HVAC

Symptoms - HVAC Systems - Automatic

Power and Signal Distribution

- Symptoms - Data Communications
- Symptoms - Mobile Device Wireless Charger
- Symptoms - Power Outlets
- Symptoms - Wiring Systems

Roof

Symptoms - Roof

Safety and Security

- Symptoms - Immobilizer
- Symptoms - Object Detection
- Symptoms - Remote Functions
- Symptoms - Seat Belts
- Symptoms - SIR
- Symptoms - Theft Deterrent

Seats

- Symptoms - Power Seats
- Symptoms - Seat Heating and Cooling

Steering

- **Symptoms - Power Steering System**
- **Symptoms - Steering Wheel and Column**
- **Symptoms - Automatic Level Control**

Suspension

- **Symptoms - Suspension General Diagnosis**
- **Symptoms - Tire Pressure Monitoring**

Transmission/Transaxle

- **Symptoms - Automatic Transmission** - 6L45/6L50/6L80/6L90
- **Symptoms - Automatic Transmission** - 8L90 transmission
- **Symptoms - Automatic Transmission Shift Lock Control**
- **Symptoms - Transfer Case** - MP 3010-NP0
- **Symptoms - Transfer Case** - MP 3023/3024-NQH

ENGINE DOES NOT CRANK

Refer to the appropriate diagnostic procedure below for the symptom observed.

- **Starter Solenoid Does Not Click**
- **Starter Solenoid Clicks, Engine Does Not Crank**
- **Engine Cranks Slowly**

ENGINE CRANKS BUT DOES NOT RUN

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- **Engine Cranks But Does Not Run** - 4.8L, 5.3L, 6.0L, 6.2L, or 7.0L engine
- **Engine Cranks But Does Not Run** - 5.3L (L83) or 6.2L (L86 LT1 LT4) engine

INSPECTION/MAINTENANCE SYSTEM CHECK

Refer to the appropriate diagnostic procedure below for the vehicle being serviced.

- **Inspection/Maintenance System Check** - 4.8L, 5.3L, 6.0L, 6.2L, or 7.0L engine
- **Inspection/Maintenance System Check** - 5.3L (L83) or 6.2L (L86 LT1 LT4) engine

DIAGNOSTIC REPAIR VERIFICATION

NOTE: **After a repair has been made, some DTCs require the ignition to be turned Off and then back On before the scan tool function will clear the DTC.**

1. Ignition/Vehicle Off
2. Install any components or connectors that have been removed or replaced during diagnosis.
3. Perform any adjustment, programming or setup procedures that are required when a component or module is removed or replaced.
4. Ignition On/Vehicle In Service Mode
5. Clear the DTCs.
6. Ignition/Vehicle Off - For greater than 60 s
7. Perform the Circuit/System Verification and verify the result ends with an All OK. - If available

   or

   If the repair was related to a DTC, duplicate the Conditions for Running the DTC and use the Freeze Frame/Failure Records, if applicable, in order to verify the DTC does not set.If the DTC sets or another DTC is present, refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

   or

   If the repair was symptom related, duplicate the conditions under which the customer concern occurred to verify the repair. If the customer concern reoccurs or another symptom is present, refer to **Symptoms - Vehicle**

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GENERAL INFORMATION

Waterleaks - Escalade, Suburban, Tahoe, Yukon

DIAGNOSTIC INFORMATION AND PROCEDURES

WATERLEAK TEST PREPARATION

- GM vehicles are designed to operate under normal environmental conditions.
- The design criteria for sealing materials and components takes into consideration the sealing forces required to withstand the natural elements. These specifications cannot take into consideration any artificial conditions, i.e., high pressure car washes.
- The water leak test procedure has been correlated to the natural elements and will determine the ability of a vehicle to perform under normal operating conditions.
- The first step in diagnosing a leak is determining the conditions under which a leak occurs. If the general leak area can be found, the exact entry point can be isolated using a water hose or an air hose. Some trim panels or components may need to be removed in order to repair the leak.
- If leaks are found around a door, door window, rear compartment lid or liftgate area this does not necessarily indicate a bad weatherstrip. An adjustment to these areas may resolve the condition.

1. **Watertest Stand Assembly**

20
60°
1
19
2
18
3
17
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13
8

Fig. 1: View Of Watertest Stand Assembly
Courtesy of GENERAL MOTORS COMPANY

Assemble the water test stand as shown.

Callout	Component Name
1	Pipe (0.5 x 36 in)
2	Reducing Tee, Right Stand Only (0.5 x 0.5 x 0.25 in)
3	Coupling, Left Stand Only, (0.5 in)
4	Tee, Left Stand Only (0.5 in)
5	Cross, Right Stand Only (0.5 in)
6	Pipe to Hose Nipple, Right Stand Only (0.5 in)
7	Female Hose Coupling (5/8 in)
8	Input Hose, Right Stand Only (2.0 ft) (5/8 in diameter)
9	Close Nipple (0.5 in)
10	Cross (0.5 in) with Weld-On Cap (0.5 in)
11	Nipple (0.5 x 12 in)
12	Cap (0.5 in)
13	Female Hose Coupling (5/8 in)
14	Cross Hose (12 ft) (5/8 in diameter)
15	Hose Quick Connect
16	Pipe to Hose Nipple (0.5 in)
17	Pipe (0.5 x 60 in)
18	Water Pressure Gauge, Right Stand Only
19	Full Jet Spray Nozzle, No. 1/2GG-25 or Equivalent
20	Coupling (0.5 in)

Fig. 2: Illustrating How Water Spray From Stands Should Overlap Vehicle
Courtesy of GENERAL MOTORS COMPANY

2. Position the stands as shown.

   The water spray from the stands should overlap the vehicle as shown.

3. Have an assistant inside of the vehicle during the test in order to locate any leaks.
4. The water pressure at the nozzle should maintain a 155 kPa (22 psi), for at least 4 minutes.

Fig. 3: Proper Water Spray Angles
Courtesy of GENERAL MOTORS COMPANY

5. In order to check the windshield, aim the water spray 30 degrees down and 45 degrees toward the rear.

Aim the water towards the corner of the windshield.

6. In order to check the side windows for leaks, position the water stand towards the center of the rear quarter, aiming the water spray 30 degrees down and 45 degrees toward the rear.
7. In order to check the back window, aim the water spray 30 degrees down and 30 degrees toward the front.

DUST LEAKS

Dust may leak into the vehicle where water will not. This happens particularly in the lower portion of the interior.

Forward motion of the vehicle can create a slight vacuum which pulls air and dust into the vehicle.

In order to determine the location of dust leaks, perform the following steps:

1. Remove the mats from the floor.
2. Remove the mats from the kick panel.
3. Remove the insulation from the floor.
4. Remove the insulation from the kick panel.
5. Drive the vehicle on a dusty road.
6. Examine the interior.

   Dust in the shape of a small cone or slit will usually be found at the point of leakage.

7. Mark the points of leakage.

   NOTE: **Ensure that the interior is darkened when performing this step.**

8. Shine bright lamps on the underside of the floor and the cowl.
9. Have an assistant mark any points inside of the vehicle for any points where the light shines through.
   - Inspect the weld joints.
   - Inspect the body mounts.
10. Seal any leaks with an air-drying, body-sealing compound.

WATER HOSE TEST

Fig. 4: Performing Water Hose Test
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Use a water hose without the nozzle attached.**

1. Have an assistant inside of the vehicle in order to locate the leak.

2. Begin testing at the base of the window or the windshield.
3. Slowly move the hose upward and across the top of the vehicle.

AIR HOSE TEST

Fig. 5: Performing Air Hose Test
Courtesy of GENERAL MOTORS COMPANY

CAUTION: **The air hose test should only be used on fully cured urethane adhesive. Otherwise, damage to the urethane adhesive bead could result in additional leaks.**

1. Using a liquid detergent, diluted with water in a spray bottle, spray the window at the edges. Begin at the bottom and gradually move up and across the top.

NOTE: **The compressed air should not exceed 205 kPa (30 psi).**

2. Have an assistant inside of the vehicle with an air hose.
3. Have the assistant aim the compressed air at the suspected areas.

   Bubbles will form in the soap solution at the location of the leak.

REPAIR INSTRUCTIONS

BODY WATERLEAK REPAIR

Fig. 6: Cutting Out Adhesive Caulking (1 Of 2)
Courtesy of GENERAL MOTORS COMPANY

WARNING: If the vehicle interior is exposed to moisture and becomes soaked up to the level of the sensing and diagnostic module (SDM), the SDM and SDM harness connector must be replaced. The SDM could be activated when powered, which could cause airbag deployment and result in personal injury.

Depending on the location of the waterleak, you may have to remove certain interior components in order to repair the leak.

1. If the floor carpet is wet refer to **Floor Carpet Drying** .

Fig. 7: Cutting Out Adhesive Caulking (2 Of 2)
Courtesy of GENERAL MOTORS COMPANY

2. Cut out a portion of the adhesive caulking in the leak area from inside or outside of the vehicle.
3. Clean and remove all loose particles of the adhesive old caulking from the area.
4. Apply joint body and seam sealer where the old adhesive caulking was removed.

5. Allow the adhesive caulking to dry for several hours.
6. Test for leaks.
7. Install the trim, if removed.

STATIONARY WINDOW WATERLEAK REPAIR

WARNING: If any water enters the vehicle interior up to the level of the carpet or higher and soaks the carpet, the sensing and diagnostic module (SDM) and the SDM harness connector may need to be replaced. The SDM could be activated when powered, which could cause deployment of the air bag(s) and result in personal injury. Before attempting these procedures, the SIR system must be disabled. Refer to Disabling the SIR System.

With the ignition OFF, inspect the SDM mounting area, including the carpet. If any significant soaking or evidence of significant soaking is detected, you must perform the following tasks:

1. **Remove all water.**
2. **Repair the water damage.**
3. **Replace the SDM harness connector.**
4. **Replace the SDM.**

Failure to follow these tasks could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

1. If the floor carpet is wet refer to **Floor Carpet Drying** .
2. Remove the trim moldings or the headliner in order to repair the leak, if needed.
3. Determine the source of water entry.
4. If water is leaking at the edge of the windshield, reseal the windshield using Urethane Adhesive Systems which meet GM Specification GM 3651G.
5. If water leaks into the vehicle at the sides of the stationary windows, reseal the window using Urethane Adhesive Systems which meet GM Specification GM 3651G.

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