

## 2010 SUSPENSION

### Tire Pressure Monitoring - Equinox & Terrain

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DIAGNOSTIC CODE INDEX

### DIAGNOSTIC CODE INDEX

| DTC                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>DTC C0569</u>                         | C0569 00: System Configuration Malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <u>DTC C0750, C0755, C0760, or C0765</u> | C0750 03: Left Front Tire Pressure Sensor Low Voltage<br>C0750 29: Left Front Tire Pressure Sensor Too Few Pulses<br>C0750 39: Left Front Tire Pressure Sensor Internal Malfunction<br>C0755 03: Right Front Tire Pressure Sensor Low Voltage<br>C0755 29: Right Front Tire Pressure Sensor Too Few Pulses<br>C0755 39: Right Front Tire Pressure Sensor Internal Malfunction<br>C0760 03: Left Rear Tire Pressure Sensor Low Voltage<br>C0760 29: Left Rear Tire Pressure Sensor Too Few Pulses<br>C0760 39: Left Rear Tire Pressure Sensor Internal Malfunction<br>C0765 03: Right Rear Tire Pressure Sensor Low Voltage<br>C0765 29: Right Rear Tire Pressure Sensor Too Few Pulses<br>C0765 39: Right Rear Tire Pressure Sensor Internal Malfunction |
| <u>DTC C0775</u>                         | C0775 00: Low Tire Pressure System Sensors Malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### DTC C0569

#### Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

#### DTC Descriptor

### DTC C0569 00

System Configuration Malfunction

#### Circuit/System Description

If the tire type and pressure selection information is not entered with the scan tool during the body control module (BCM) setup, the tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete. If equipped, the driver information center (DIC) will also display a service tire monitor type message. Under these circumstances, DTC C0569 will be set and the tire type and pressure information will need to be entered

for the system to function correctly.

### **Conditions for Running the DTC**

The ignition is ON.

### **Conditions for Setting the DTC**

The BCM has not undergone the tire type and pressure selection setup procedure.

### **Action Taken When the DTC Sets**

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays a service tire monitor type warning message.

### **Conditions for Clearing the DTC**

A current DTC will clear when the BCM has undergone the tire type and pressure selection setup procedure and 1 ignition cycle has occurred.

### **Diagnostic Aids**

A newly replaced BCM will set DTC C0569 on its initial ignition ON cycle if the module setup information has not been entered. The Tire Type and Tire Pressure Selection setup must be performed with the scan tool.

### **Reference Information**

### **Description and Operation**

#### **Tire Pressure Monitor Description and Operation**

### **Scan Tool Reference**

**Control Module References** for scan tool information

### **Special Tools**

**J-46079** Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

### **Circuit/System Verification**

Verify that the DTC C0569 is not set.

- If the DTC is set, perform the BCM tire type and pressure selection setup with the scan tool and cycle the ignition. If the DTC resets, replace the K9 BCM.

### **Repair Procedures**

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

**Control Module References** for BCM replacement, setup and programming.

## **DTC C0750, C0755, C0760, OR C0765**

### **Diagnostic Instructions**

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

### **DTC Descriptor**

#### **DTC C0750 03**

Left Front Tire Pressure Sensor Low Voltage

#### **DTC C0750 29**

Left Front Tire Pressure Sensor Too Few Pulses

#### **DTC C0750 39**

Left Front Tire Pressure Sensor Internal Malfunction

#### **DTC C0755 03**

Right Front Tire Pressure Sensor Low Voltage

#### **DTC C0755 29**

Right Front Tire Pressure Sensor Too Few Pulses

#### **DTC C0755 39**

Right Front Tire Pressure Sensor Internal Malfunction

#### **DTC C0760 03**

Left Rear Tire Pressure Sensor Low Voltage

#### **DTC C0760 29**

Left Rear Tire Pressure Sensor Too Few Pulses

#### **DTC C0760 39**

## Left Rear Tire Pressure Sensor Internal Malfunction

### **DTC C0765 03**

Right Rear Tire Pressure Sensor Low Voltage

### **DTC C0765 29**

Right Rear Tire Pressure Sensor Too Few Pulses

### **DTC C0765 39**

Right Rear Tire Pressure Sensor Internal Malfunction

#### **Circuit/System Description**

The tire pressure monitor (TPM) system has a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly. As vehicle speed increases, centrifugal force closes the sensors internal roll switch, which puts the sensor into Rolling mode. The body control module (BCM) receives and translates the data contained in the tire pressure sensor RF transmissions into sensor presence, sensor mode, and tire pressure. Once vehicle speed is greater than 40km/h (25 mph), the BCM waits for the first sensor to go into Rolling mode, then checks if all sensors have gone into Rolling mode. If one or more sensors do not go into these modes, or do not transmit at all, the BCM will set DTC C0750, C0755, C0760, or C0765 respectively.

#### **Conditions for Running the DTC**

Vehicle speed is greater than 40 km/h (25 mph).

#### **Conditions for Setting the DTC**

- A sensor does not transmit for 18 minutes.
- A sensor low battery condition.

#### **Action Taken When the DTC Sets**

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) flashes for 1 minute and then remains illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays the suspect tire pressure as dashes.
- If equipped, the DIC displays a service tire monitor type message.

#### **Conditions for Clearing the DTC**

- A current DTC will clear when the malfunction is no longer present and 1 ignition cycle occurs.
- The BCM automatically clears the history DTC when a current DTC is not detected in 100 consecutive drive cycles.

#### **Diagnostic Aids**

- Some aftermarket wheel valve stem holes are located further from the wheel rim than original equipment wheels. When using the TPM special tool to activate a sensor, ensure the tool antenna is no further than 15 cm (6 in) from the sensor and is aiming upward.
- Aftermarket wheel valve stem locations can cause a sensor to not function correctly.
- A sensor may have been damaged due to a previous wheel/tire service or flat tire event.
- The use of other than GM approved tire sealants can obstruct the sensor pressure sensing port and cause inaccurate tire pressure readings. If this condition is verified, remove the sealer from the tire and replace the sensor. Refer to **Tire Pressure Indicator Sensor Replacement**.
- Occasionally sensor transmissions are not received by the BCM due to vehicle level RF interference from items such as but not limited to aftermarket ignition systems, DVD players, CB radios, or metallic type window tinting.
- The sensor activation procedure may have to be repeated up to 3 times before determining a sensor is malfunctioning. In the event a particular sensor information is displayed on the special tool upon activation but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the RF signal is being blocked by another component.
- Occasionally sensors can become mislocated due to previous tire rotations where the sensor learn procedure was not performed or stray sensor transmissions have been received from other vehicles. Always learn the sensors to ensure the DTC set is for that actual physical corner of the vehicle. Refer to **Tire Pressure Indicator Sensor Learn**.
- A sensor low battery condition will set a sensor DTC but will not illuminate the low tire pressure indicator or display a message on the DIC, if equipped. The sensor battery condition can be verified in the scan tool BCM data list. If a sensor low battery condition is indicated on the scan tool, the sensor will need to be replaced. Refer to **Tire Pressure Indicator Sensor Replacement**.

## Reference Information

## Description and Operation

### **Tire Pressure Monitor Description and Operation**

## Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

## Scan Tool Reference

**Control Module References** for scan tool information

## Special Tools

**J-46079** Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

## Circuit/System Verification

1. Using the **J-46079**, activate each tire pressure sensor and record each sensors transmission data and physical location. See **Special Tools**. Verify **J-46079** displays the 8-digit ID number, accurate tire pressure +/- 27. See **Special Tools**. 6 kPa (4 psi), Learn Mode, and at least a 1/4 graph signal strength displayed.
  - If any of the parameters listed above are not displayed, replace the suspect tire pressure sensor.
2. With the scan tool, verify tire pressure sensors ID and locations displayed on the scan tool match the IDs and locations recorded from the special tool.
  - If the IDs and locations do not match, perform the **Tire Pressure Indicator Sensor Learn**.
3. Enable the TPM learn mode. Use the **J-46079** in simulate mode to learn 4 simulated sensor transmissions into the BCM. See **Special Tools**. Verify that all 4 simulated sensor locations, IDs, and tire pressures displayed on the TPM special tool match the corresponding scan tool parameters displayed.
  - If the scan tool does not match, replace the K9 BCM.
4. Test drive the vehicle above 40 km/h (25 mph) for greater than 2 minutes. With the scan tool, observe the suspect Pressure Sensor Mode data parameter. Verify the sensor mode changes to Rolling.
  - If the Pressure Sensor Mode does not change, replace the suspect tire pressure sensor.

## Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Replacement**
- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for BCM replacement, setup and programming.

## DTC C0775

### Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

### DTC Descriptor

### DTC C0775 00

Low Tire Pressure System Sensors Malfunction

### Circuit/System Description

If the tire pressure sensor learn procedure has not been performed, the tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete. If equipped, the driver information center (DIC) will also

display a service tire monitor type message. Under these circumstances, DTC C0775 will be set and the tire pressure sensor learn procedure will need to be performed for the system to function correctly.

#### **Conditions for Running the DTC**

The ignition is ON.

#### **Conditions for Setting the DTC**

The body control module (BCM) has not undergone the tire pressure sensor learn procedure.

#### **Action Taken When the DTC Sets**

- The tire pressure monitor indicator icon on the instrument panel cluster (IPC) will flash for 1 minute and then remain illuminated after the ignition switch is cycled ON and the IPC bulb check is complete.
- If equipped, the driver information center (DIC) displays a service tire monitor type warning message.

#### **Conditions for Clearing the DTC**

A current DTC will clear when the BCM has undergone the tire pressure sensor learn procedure and 1 ignition cycle has occurred.

#### **Reference Information**

#### **Description and Operation**

#### **Tire Pressure Monitor Description and Operation**

#### **Electrical Information Reference**

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

#### **Scan Tool Reference**

**Control Module References** for scan tool information

#### **Special Tools**

**J-46079** Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

#### **Circuit/System Verification**

Verify that the DTC C0775 is not set.

- If the DTC is set, perform the tire pressure sensor learn procedure. Cycle the ignition. If the DTC resets, replace the K9 BCM.

## Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for BCM replacement, setup and programming.

## SYMPTOMS - TIRE PRESSURE MONITORING

1. Perform the **Diagnostic System Check - Vehicle** , before using the Symptom Tables in order to verify that all of the following are true:
  - There are no DTCs set.
  - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Tire Pressure Monitor Description and Operation**.

### Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Tire Pressure Monitoring (TPM) System. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

### Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

### Symptom List

Refer to **Low Tire Pressure Indicator Malfunction** in order to diagnose the symptom.

## LOW TIRE PRESSURE INDICATOR MALFUNCTION

### Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

### Circuit/System Description

The body control module (BCM) receives a radio frequency (RF) transmission from each tire pressure sensor.

Each sensor has its own unique identification (ID) code, which it transmits as part of each RF message, that must be learned into the BCM memory. Once all 4 IDs have been learned and vehicle speed is greater than 40 km/h (25 mph), the BCM continuously compares IDs in received transmission to its learned IDs to determine if all 4 sensors are present. If the BCM detects a low tire pressure condition or a malfunction in the system, it will send a serial data message to the instrument panel cluster (IPC) requesting the appropriate tire pressure monitor indicator illumination and also to display the appropriate data message on the driver information center (DIC), if equipped.

## Diagnostic Aids

- If unsure about the condition, cycle the ignition and observe the tire pressure monitor indicator icon. If the tire pressure monitor indicator icon is continuously illuminated after the IPC bulb check is completed, a low tire pressure condition is present. Check the tires for damage or leaks and inflate to the tire placard specifications. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label**. If the tire pressure monitor indicator icon flashes for 1 minute after the IPC bulb check is completed and then remains illuminated, a tire pressure monitor system DTC is set. Perform the **Diagnostic System Check - Vehicle** to proceed with the proper diagnosis.
- Temperature can greatly effect tire pressures. Low tire pressure on a cold morning may cause the tire pressure monitor indicator icon to turn ON. The air pressure in the tire increases as the ambient temperature rises or as the tire warms up while the vehicle is driven. The pressure may increase enough to exceed the predetermined low pressure threshold which will turn OFF the tire pressure monitor indicator icon.
- Some aftermarket wheel valve stem holes are located further from the wheel rim than original equipment wheels. When using the TPM special tool to activate a sensor, ensure the tool antenna is no further than 15 cm (6 in) from the sensor and is aiming upward.
- Aftermarket wheel valve stem locations can cause a sensor to not function correctly.
- A sensor may have been damaged due to a previous wheel/tire service or flat tire event.
- The use of other than GM approved tire sealants can obstruct the sensor pressure sensing port and cause inaccurate tire pressure readings. If this condition is verified, remove the sealer from the tire and replace the sensor. Refer to **Tire Pressure Indicator Sensor Replacement**.
- Occasionally sensor transmissions are not received by the BCM due to vehicle level RF interference from items such as but not limited to aftermarket ignition systems, DVD players, CB radios, or metallic type window tinting.
- The sensor activation procedure may have to be repeated up to 3 times before determining a sensor is malfunctioning. In the event a particular sensor's information is displayed on the special tool upon activation but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the RF signal is being blocked by another component.
- Occasionally sensors can become mislocated due to previous tire rotations where the sensor learn procedure was not performed or stray sensor transmissions have been received from other vehicles. Always learn the sensors to ensure the DTC set is for that actual physical corner of the vehicle. Refer to **Tire Pressure Indicator Sensor Learn**.

## Reference Information

## Description and Operation

## Tire Pressure Monitor Description and Operation

### Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

### Scan Tool Reference

Control Module References for scan tool information

### Special Tools

**J-46079** Tire Pressure Monitor Diagnostic Tool. See Special Tools.

### Circuit/System Verification

**NOTE:** Low tire pressure in one or more tires is indicated by a continuously illuminated tire pressure monitor indicator icon after the IPC bulb check is completed. If equipped with a DIC, a check tire pressure type message will also be displayed. It is not necessary to perform the Learn procedure for a low tire condition. When a TPM DTC is set, the tire pressure monitor indicator icon will flash for 1 minute after the IPC bulb check is completed and then remains illuminated. If equipped with a DIC, a service tire monitor type message will also be displayed.

1. Verify all tires are inflated to the proper pressure  $\pm 10\%$ . Refer to Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label.
  - If not within the specified range, adjust all tire pressures to specification and drive the vehicle over 40 km/h (25 mph) for greater than 2 minutes. Verify the tire pressure monitor indicator icon is OFF.
2. Using the **J-46079**, activate each tire pressure sensor and record each sensor tire pressure reading. See Special Tools. Check the tire pressures with a known accurate hand held tire pressure gauge. Verify that the pressure readings from the special tool do not differ more than 27.6 kPa (4 psi) from the actual tire pressure readings.
  - If not within the specified range, replace the appropriate tire pressure sensor.
3. Using a scan tool, enable the TPM learn mode. Use the **J-46079** in simulate mode to learn 4 simulated sensor transmissions into the BCM. See Special Tools. Observe tire pressures in the scan tool data display. Verify the simulated tire pressures do not differ more than  $\pm 27.6$  kPa (4 psi) of the scan tool reading.
  - If not within the specified range, replace the K9 BCM.
4. Using a scan tool, perform the instrument panel special functions Lamp Test. Command the instrument panel warning lamps ON and OFF. Verify the tire pressure monitor indicator icon turns ON and OFF.
  - If the tire pressure monitor icon does not turn ON and OFF, replace the P16 IPC.

5. Ignition ON, use the scan tool to setup the Tire Type/Pressure Selection in the BCM Module Setup menu. Refer to the **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** . Drive the vehicle over 40 km/h (25 mph) for greater than 2 minutes. Verify the tire pressure monitor indicator icon is OFF.
  - If the tire pressure monitor indicator icon is ON, replace the K9 BCM.

## Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Tire Pressure Indicator Sensor Replacement**
- **Tire Pressure Indicator Sensor Learn**
- **Control Module References** for IPC or BCM replacement, setup, and programming

## REPAIR INSTRUCTIONS

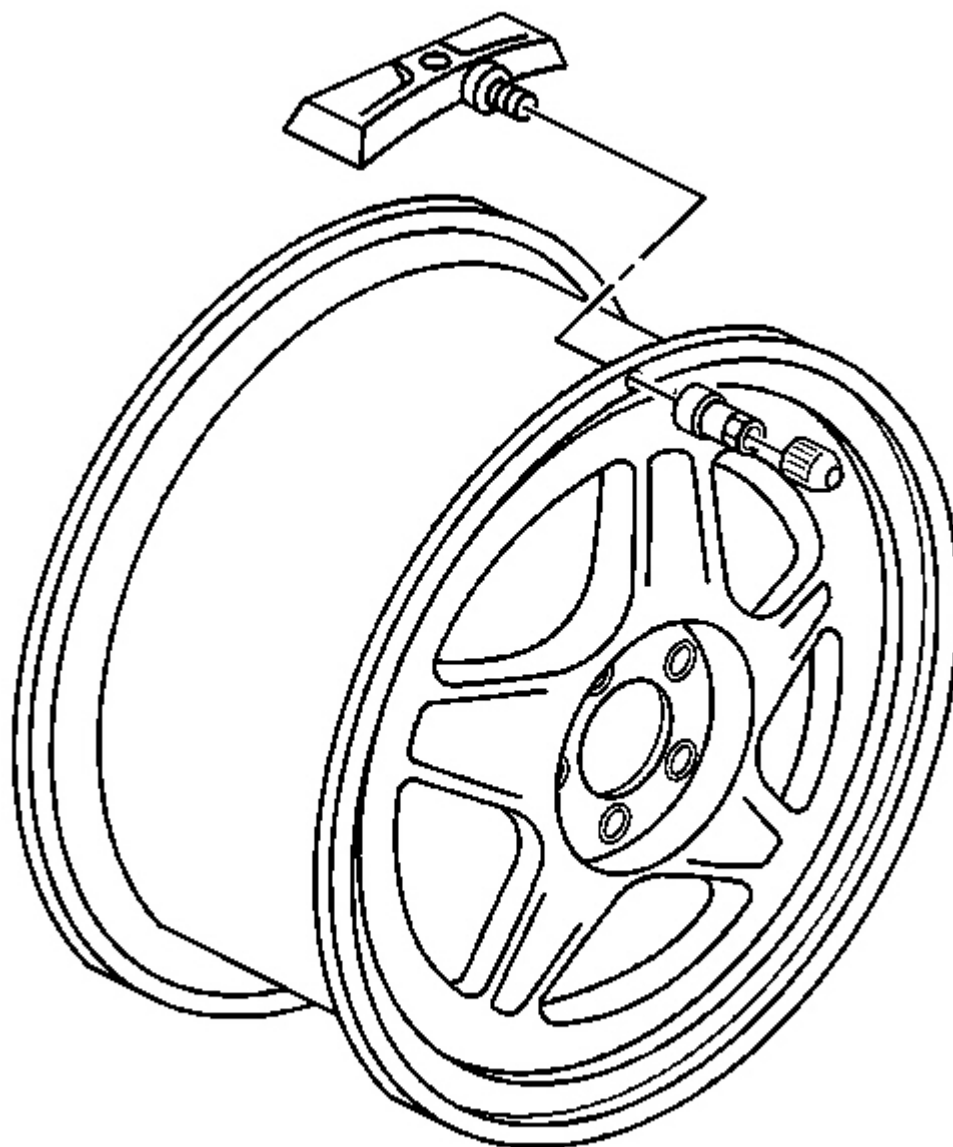
### TIRE PRESSURE INDICATOR SENSOR REPLACEMENT

#### Removal Procedure

1. Raise the vehicle on a suitable support. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire/wheel assembly from the vehicle. Refer to **Tire and Wheel Removal and Installation** .

**NOTE:** Before the tire is removed from the wheel, note the following items to avoid tire pressure sensor damage upon tire dismounting.

- Place the sensor's cap and valve on a dry clean surface after removal. The cap is aluminum and the valve is nickel plated to prevent corrosion and are not to be substituted with a cap or valve made of any other material.
  - When separating the tire bead from the wheel, position the bead breaking fixture 90 degrees from the valve stem.
  - Position the mounting/dismounting head so the tire iron, or pry bar can be inserted slightly clockwise of the sensor body when prying the tire bead up and over the mounting/dismounting head.
  - Using the tire machine, rotate the tire/wheel assembly clockwise when transferring the tire bead to the out side of the wheel rim.
  - Repeat items for inner bead.
3. Remove the tire from the wheel. Refer to **Tire Dismounting and Mounting** .



**Fig. 1: View Of Tire Pressure Sensor**  
Courtesy of GENERAL MOTORS CORP.

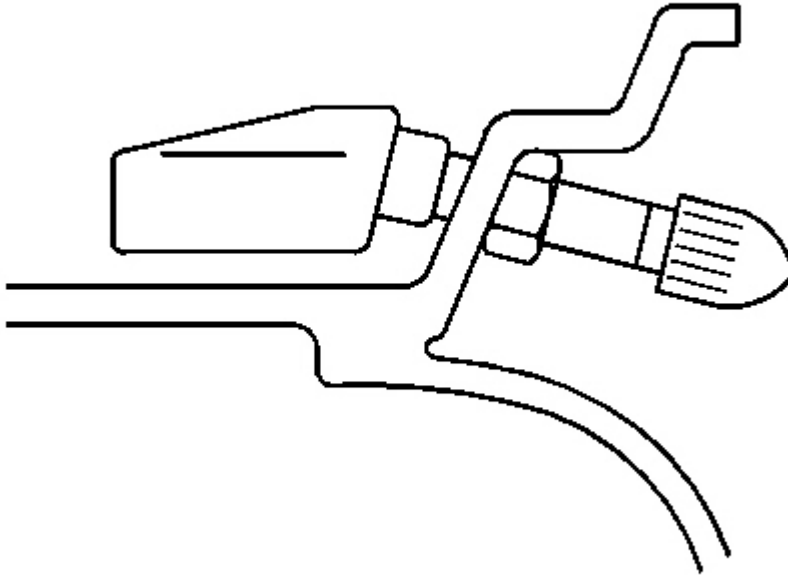
**NOTE:** If any tire sealant is noted upon tire dismounting, remove all residual liquid sealant from the inside of the tire and wheel surfaces.

4. Remove the tire pressure sensor nut.

5. Remove the tire pressure sensor.

#### **Installation Procedure**

1. Clean any dirt or debris from the grommet sealing area.



**Fig. 2: View Of Tire Pressure Monitor Sensor & Nut**  
**Courtesy of GENERAL MOTORS CORP.**

2. Insert the sensor in the wheel hole with the air passage facing away from the wheel.

**CAUTION: Refer to Fastener Caution .**

3. Install the sensor nut and position the sensor body parallel to the inside wheel surface while torquing.

Tighten the sensor nut to 7 N.m (62 lb in).

**NOTE:** Before reinstalling the tire on the wheel, note the following items to avoid tire pressure sensor damage upon tire mounting:

- Position the mounting/dismounting head 180 degrees from the valve

stem.

- Position the bead transition area 45 degrees counterclockwise of the valve stem.
- Using the tire machine, rotate the tire/wheel assembly clockwise when transferring the tire bead to the inside of the wheel rim.
- Repeat items for outer bead.

4. Install the tire on the wheel. Refer to **Tire Dismounting and Mounting** .

**NOTE:** A service replacement tire pressure sensor is shipped in OFF mode. In this mode the sensor's unique identification code cannot be learned into the liftgate module (LGM) memory. The sensor must be taken out of OFF mode by spinning the tire/wheel assembly above 32 km/h (20 mph) in order to close the sensor's internal roll switch for at least 10 seconds.

5. Install the tire/wheel assembly on the vehicle. Refer to **Tire and Wheel Removal and Installation** .
6. Lower the vehicle.
7. Learn the tire pressure sensors. Refer to **Tire Pressure Indicator Sensor Learn**.

## **TIRE PRESSURE INDICATOR SENSOR LEARN**

### **Special Tools**

**J-46079** Tire Pressure Monitor Diagnostic Tool. See **Special Tools**.

### **Relearn Mode Description**

The tire pressure monitor (TPM) system uses the instrument panel cluster (IPC), body control module (BCM), 4 radio frequency transmitting pressure sensors, and the serial data circuit to perform the TPM Relearn mode functions. The sensor Relearn procedure must be performed after every tire rotation, BCM replacement, or sensor replacement. Once the relearn mode has been enabled, each of the sensors unique identification codes can be learned into the BCM memory. When a sensor ID has been learned, the BCM sends a serial data message to the BCM to sound a horn chirp. This verifies the sensor has transmitted its ID and the BCM has received and learned it. The BCM must learn the sensor IDs in the proper sequence to determine correct sensor location. The first learned ID is assigned to the left front location, the second to right front, the third to right rear and the fourth to left rear. The turn signals will individually illuminate indicating which location is to be learned in the proper sequence.

### **Sensor Functions Using J-46079 or EL-46079**

Each sensor has an internal low frequency coil. When the **J-46079** is used in activate mode, it produces a low frequency transmission that activates the sensor. See **Special Tools**. The sensor responds to a low frequency activation by transmitting in learn mode. When the BCM receives a learn mode transmission while in TPM learn mode, it will assign that sensors ID to the location on the vehicle relative to the order in which it was learned.

## Sensor Functions Using Pressure Increase/Decrease Method

Each sensor takes a pressure measurement sample once every 30 seconds while in stationary mode. If the tire pressure increases, or decreases by more than 8.3 kPa (1.2 psi) from the last pressure measurement, another measurement will occur immediately to verify the change in pressure. If a pressure change has indeed occurred, the sensor transmits in Learn mode. When the BCM receives a Learn mode transmission while in TPM learn mode, it will assign that sensor's ID to the location on the vehicle relative to the order in which it was learned.

### Relearn Mode Cancellation

The Relearn 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 relearn mode is cancelled before the first sensor is learned, the original sensor IDs will be maintained. If the relearn mode is canceled after the first sensor is learned, the following will occur:

- All stored sensor IDs will be invalidated in the BCM memory.
- If equipped, the DIC will display dashes instead of tire pressures.
- DTC C0775 will be set.

These conditions will now require the relearn procedure to be repeated for the system to function properly.

### TPM Relearn Procedure

#### NOTE:

If using the scan tool to enable the relearn mode, the J-46079 must be used to activate the sensors. See Special Tools. When this preferred method is used, any stray sensor signals will not affect the relearn procedure. In the event a particular sensor's information is displayed on the special tool upon activation but the horn does not 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.

If using the DIC buttons to enable the relearn mode, the J-46079 or Pressure Increase/Decrease Method may be used. See Special Tools. Before proceeding with this method, 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 Relearn 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.

### Preferred Scan Tool Relearn Enable Method

1. Apply park brake (manual transmission only).

2. Ignition ON, using a scan tool, initiate the Tire Pressure Sensors Learn mode. A double horn chirp will sound indicating the Relearn mode has been enabled. The left front turn signal will also be illuminated.
3. Starting with the left front tire, active the sensor by holding the antenna of the **J-46079** aimed upward against the tire sidewall close to the wheel rim at the valve stem location. See **Special Tools**. Press and release the Activate button and wait for a horn chirp. Once the horn chirp has sounded, the sensor information is learned and the turn signal in the next location to be learned will illuminate.
4. After the horn chirp has sounded and the right front turn signal is illuminated, repeat step 2 for the remaining 3 sensors in the following order:
  1. Right front
  2. Right rear
  3. Left rear
5. When the left rear sensor has been learned and a double horn chirp has sounded, the learn process is complete and the BCM exits the Relearn mode.
6. Ignition OFF, adjust all tires to the recommended pressures. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label**.

#### **Alternate DIC Relearn Enable Method**

1. Apply park brake (manual transmission only).
2. Ignition ON, activate the Relearn mode with the driver information center (DIC) display controls. A double horn chirp sounds indicating the Relearn mode has been enabled and the left front turn signal will also be illuminated.
3. Starting with the left front tire, activate the tire pressure sensor by using one of the following methods:
  - Hold the antenna of the **J-46079** aimed upward against the tire sidewall close to the wheel rim at the valve stem location. See **Special Tools**. Press and release the activate button and wait for a horn chirp. Once the horn chirp has sounded, the sensor information is learned and the turn signal in the next location to be learned will illuminate.

**WARNING: Over inflating tires may cause personal injury or damage to the tires and wheels. When increasing tire pressure do not exceed the maximum inflation pressure as noted on the tire sidewall.**

- 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 is learned and the turn signal in the next location to be learned will illuminate.
4. After the horn chirp has sounded and the right front turn signal is illuminated, repeat step 2 for the remaining 3 sensors in the following order:
    1. Right front
    2. Right rear
    3. Left rear
  5. When the left rear sensor has been learned and a double horn chirp has sounded, the learn process is complete and the BCM exits the Relearn mode.

6. Ignition OFF, adjust all tires to the recommended pressures. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label**.

## DESCRIPTION AND OPERATION

### TIRE PRESSURE MONITOR DESCRIPTION AND OPERATION

The tire pressure monitor (TPM) system warns the driver when a significant loss, or gain of tire pressure occurs in any of the 4 tires and allows the driver to display the individual tire pressures and their locations on the driver information center (DIC).

The system uses the body control module (BCM), driver information center (DIC), instrument panel cluster (IPC), a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly, and the serial data circuit to perform the system functions. Each sensor has an internal power supply with a 10 year service life.

When the vehicle is stationary, the sensors internal accelerometer is inactive, which puts the sensors into a stationary state. In this state the sensors sample tire pressure once every 30 seconds and do not transmit at all if the tire pressure does not change. As vehicle speed increases, centrifugal force activates the sensors internal accelerometer causing the sensors to go into rolling mode. In this mode, the sensors sample tire pressure once every 30 seconds and transmit in rolling mode once every 60 seconds. The BCM receives and translates the data contained in each sensors RF transmission into sensor presence, sensor mode, and tire pressure. The BCM sends the tire pressure and tire location data to the DIC via the serial data circuit where they are displayed.

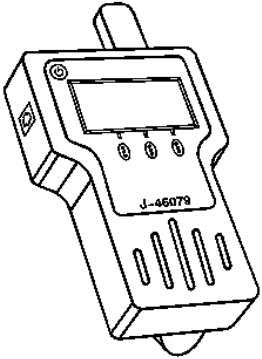
The sensors continuously compare their last pressure sample to their current pressure sample and will transmit in re-measure mode if a 8.3 kPa (1.2 psi) change in tire pressure has been detected in either a stationary or rolling state. When the TPM system detects a significant loss, or gain of tire pressure, the tire pressure monitor indicator icon is illuminated on the IPC and if equipped, a check tire pressure type message is displayed on the DIC. Both the indicator icon and DIC message can be cleared by adjusting the tire pressures to the recommended kPa/psi and driving the vehicle above 40 km/h (25 mph) for at least 2 minutes.

If power is disconnected from the BCM or if the vehicle battery is disconnected each TPM sensor ID is retained but all of the tire pressure information is lost. Under these circumstances the BCM cannot assume that the tire pressures were maintained over an unknown period of time. If equipped, the DIC will display all dashes and the scan tool will indicate a default tire pressure value of 1020 kPa (148 psi) for each tire. Driving the vehicle above 40 km/h (25 mph) for at least 2 minutes will activate the sensors causing the DIC to display the current tire pressures. The **J-46079** TPM special tool or the pressure increase/decrease method may also be used to activate the sensors as well. See **Special Tools**.

The BCM has the ability to detect malfunctions within the TPM system. In the event a DTC is set, the tire pressure monitor indicator icon on the IPC will flash for 1 minute and then remain illuminated after the ignition is turned ON and the IPC bulb check has been completed. Any malfunction detected will cause the DIC to display a service tire monitor system type message. For more information on other functions of the BCM, refer to **Keyless Entry System Description and Operation**.

## SPECIAL TOOLS AND EQUIPMENT

### SPECIAL TOOLS

| Illustration                                                                      | Tool Number/Description                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|  | <p>EL 46079<br/>J 46079<br/>Tire Pressure Monitor Diagnostic Tool</p> |