SCHEMATIC AND ROUTING DIAGRAMS

TIRE PRESSURE MONITORING SYSTEM SCHEMATICS

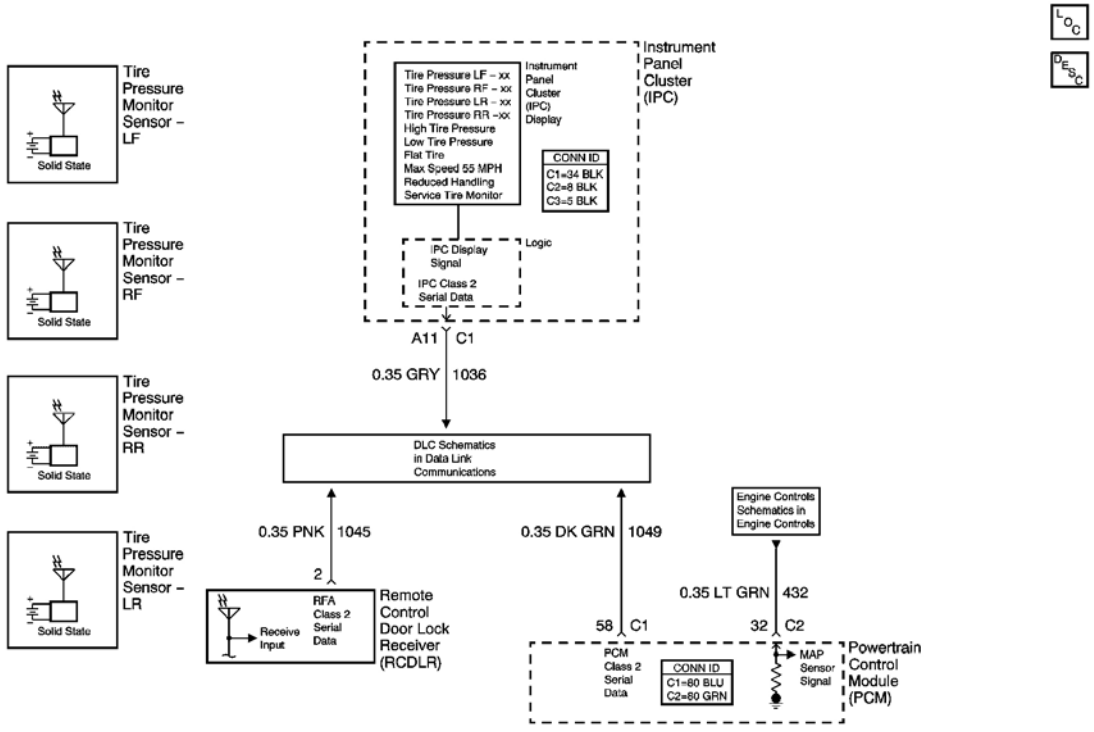


Fig. 1: Tire Pressure Monitoring System Schematics
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

TIRE PRESSURE MONITORING SYSTEM COMPONENT VIEWS

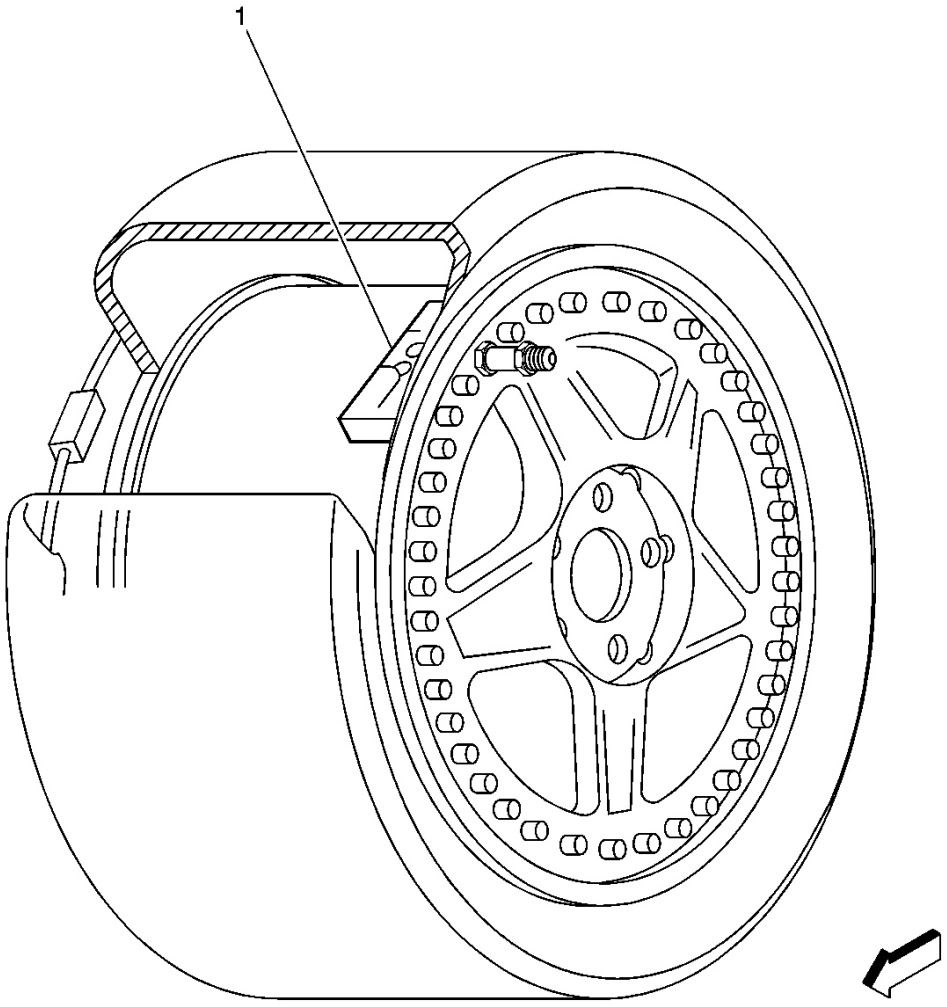


Fig. 2: Wheel With Tire Pressure Monitor Sensor Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Tire Pressure Monitor Sensor

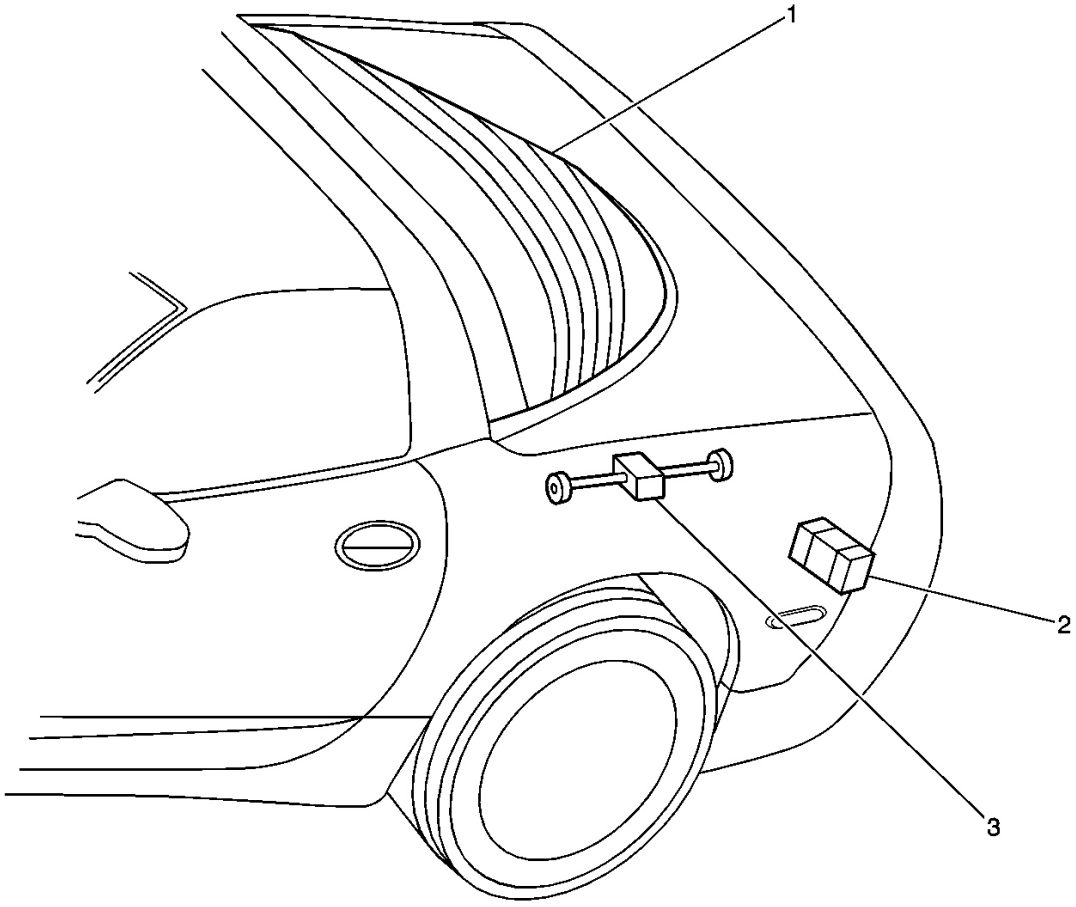


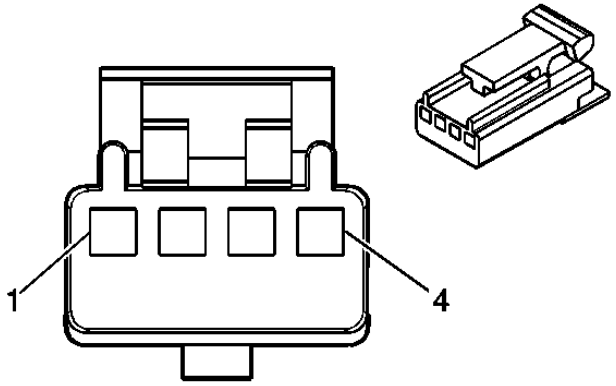
Fig. 3: Rear Of Vehicle Component View - Left
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Defogger Grid
2	Electronic Suspension Control (ESC) Module
3	Remote Control Door Lock Receiver (RCDLR)

TIRE PRESSURE MONITORING SYSTEM CONNECTOR END VIEWS

Remote Control Door Lock Receiver Terminal Identification



Connector Part Information		• 12059162 • 4 Way F Micro-Pack 100 Series (BLK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
1	ORN	540	Battery Positive Voltage
2	PNK	1045	RFA Class 2 Serial Data
3	-	-	Not Used
4	BLK	851	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - TIRE PRESSURE MONITORING

Begin the system diagnosis with **Diagnostic System Check - Tire Pressure Monitoring** . The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system.
- The ability of the control module(s) to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - TIRE PRESSURE MONITORING

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Tests if the Remote Control Door Lock Receiver (RCDLR), which is part of the Remote Keyless Entry

(RKE) system, is able to communicate with the scan tool. Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

3: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all available information before tests are performed.

4: Tests if a malfunction exists in the RKE system, which controls the Tire Pressure Monitor (TPM) system.

5: Tests if a malfunction exists in the TPM system.

Diagnostic System Check - Tire Pressure Monitoring

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to establish communication with the RCDLR. Does the scan tool communicate with the RCDLR?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with Class 2 Device** in Data Link Communications
3	Select the RKE Diagnostic Trouble Codes (DTC) function on the scan tool. Does the scan tool display any DTCs that begin with a "U"?	Go to **Diagnostic Trouble Code (DTC) List** in Data Link Communications.	Go to **Step 4**
4	Does the scan tool display any RKE DTCs?	Go to **Diagnostic Trouble Code (DTC) List** in Keyless Entry	Go to **Step 5**
5	Does the scan tool display any TPM DTCs?	Go to **Diagnostic Trouble Code (DTC) List**	System OK

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
Tire Pressure Monitor (TPM) option	Set Options/Tire Pressure Monitor	The scan tool can be used to enable, or disable the TPM option in the RCDLR.
TPM DTC display	Set Options/Tire Pressure Monitor DTC	The scan tool can be used to enable or disable the TPM DTC displaying option on the DIC.

SCAN TOOL DATA LIST

Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/ Engine OFF/ Tire pressures set to specification			
LF Tire Pressure	Tire Pressure Data	psi	30
LF Tire Status	Tire Information	Data Pending/OK	OK
LR Tire Pressure	Tire Pressure Data	psi	30
LR Tire Status	Tire Information	Data Pending/OK	OK
Manual Tire Programing	Tire Information	Active/Inactive	Inactive
RF Tire Pressure	Tire Pressure Data	psi	30
RF Tire Status	Tire Information	Data Pending/OK	OK
RR Tire Pressure	Tire Pressure Data	psi	30
RR Tire Status	Tire Information	Data Pending/OK	OK
Tire Pressure Sensor ID	Tire Information	Valid/Invalid	Valid

SCAN TOOL DATA DEFINITIONS

LF Tire Pressure

The scan tool displays 0-42 psi. The actual pressure of the left front tire.

LF Tire Status

The scan tool displays Data Pending or OK. Data Pending indicates that the left front tire pressure sensor is in stationary mode. OK indicates that the sensor is in drive mode.

LR Tire Pressure

The scan tool displays 0-42 psi. The actual pressure of the left rear tire.

LR Tire Status

The scan tool displays Data Pending or OK. Data Pending indicates that the left rear tire pressure sensor is in stationary mode. OK indicates that the sensor is in drive mode.

Manual Tire Programming

The scan tool displays Active or Inactive. Active indicates the Tire Pressure Monitor (TPM) system is in sensor programming mode. Inactive indicates the TPM system is not in the sensor programing mode.

RF Tire Pressure

The scan tool displays 0-42 psi. The actual pressure of the right front tire.

RF Tire Status

The scan tool displays Data Pending or OK. Data Pending indicates that the right front tire pressure sensor is in stationary mode. OK indicates that the sensor is in drive mode.

RR Tire Pressure

The scan tool displays 0-42 psi. The actual pressure of the right rear tire.

RR Tire Status

The scan tool displays Data Pending or OK. Data pending indicates that the right rear tire pressure sensor is in stationary mode. OK indicates that the sensor is in drive mode.

Tire Pressure Sensor ID

The scan tool displays Valid or Invalid. Valid indicates all of the TPM sensors are transmitting a valid identification code. Invalid indicates one or more of the sensors are transmitting an invalid, or no identification code.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module(s)
C0750, C0755, C0760, C0765	**DTC C0750, C0755, C0760, or C0765**	Remote Control Door Lock Receiver (RCDLR)

DTC C0750, C0755, C0760, OR C0765

Circuit 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 sensors into drive mode. The remote control door lock receiver (RCDLR) receives and translates the data contained in each sensor's RF transmission into sensor presence, sensor mode, and tire pressure. Once vehicle speed is 32 km/h (20 mph), or greater, the RCDLR waits for the first sensor to go into drive mode then checks if all sensors have gone into drive mode.

Conditions for Running the DTC

Vehicle speed is 32 km/h (20 mph), or greater.

Conditions for Setting the DTC

Any given sensor does not go into drive mode, or does not transmit at all for 15 minutes.

Action Taken When the DTC Sets

- A DTC is stored in memory
- The DIC displays the SERVICE TPM SYSTEM message.
- The DIC displays the suspect tire pressure as dashes.

Conditions for Clearing the DTC

- A current DTC will clear when the malfunction is no longer present.
- A history DTC will clear after 100 consecutive malfunction free ignition cycles.
- Use a scan tool.

Diagnostic Aids

- The sensor scan procedure using the **J-46079** TPM diagnostic tool with the**J 41760** sensor activating tool, may have to be repeated up to 3 times before determining a sensor is malfunctioning. See **Special Tools and Equipment** .
- Loss of, or low system battery voltage will cause all of the sensor Id codes to be erased from the RCDLR's memory and set all 4 sensor DTCs. If this condition is suspected, refer to **Tire Pressure Sensor Learn** .
- Occasionally sensor transmission are not received by the RCDLR due to vehicle level RF interference.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Tests if the sensors will transmit valid data with good signal strength in response to a magnetic activation. During this step it is important to observe the signal strength graph on the TPM tool's display screen when the sensor transmits. Any more than 1/4 graph displayed can be considered good signal strength.

3: Tests if the RCDLR can receive and translate data from simulated sensor transmissions

5: Tests if the sensors internal roll switch is functioning properly.

DTC C0750, C0755, C0760, or C0765

Step	Action	Values	Yes	No
Schematic Reference:Tire Pressure Monitoring System Schematics				
1	Did you perform the Tire Pressure Monitor Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Tire Pressure Monitoring**
	1. Using the **J-46079** TPM tool, press and release the scan button. See **Special Tools and Equipment** . 2. Using the **J 41760** sensor	8 digit ID number, accurate tire pressure +/- 2 psi, Learn Mode, Good Signal Strength		

2	activating tool, activate the suspect sensor. See **Special Tools and Equipment** . Does the TPM tool display the suspect sensor's transmission data as specified?		Go to **Step 3**	Go to **Step 6**
3	1. Enable the TPM learn mode. Refer to **Tire Pressure Sensor Learn** . 2. Using the TPM tool in simulate mode, learn 4 simulated sensor transmissions into the RCDLR's memory. 3. With the scan tool observe all 4 tire pressures. Does the scan tool display all 4 tire pressures as specified?	LF Tire Pressere-10 psi, RF Tire Pressure-20 psi, RR Tire Pressure-30 psi, LR Tire Pressure-40 psi, +/- 4 psi	Go to **Step 4**	Go to **Step 7**
4	Learn the tire pressure sensors. Refer to **Tire Pressure Sensor Learn** . Did you complete the procedure?	-	Go to **Step 5**	-
5	Operate the vehicle within the conditions for running and setting the DTC. Does the DTC reset?	-	Go to **Step 6**	System OK
6	Replace the suspect sensor. Refer to **Tire Pressure Sensor Replacement** . Did you complete the replacement?	-	Go to **Step 8**	-
7	Replace the RCDLR. Refer to **Remote Control Door Lock Receiver Replacement** In Keyless Entry. Did you complete the replacement?	-	Go to **Step 8**	-
8	1. Use the scan tool in order to clear the DTC. 2. Operate the vehicle within the conditions for running and setting the DTC. Does the DTC reset?	-	Go to **Step 2**	System OK

REPAIR INSTRUCTIONS

TIRE PRESSURE SENSOR REPLACEMENT

Removal Procedure

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

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

- **Place the cap and the 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 using the tire machine to separate the tire bead from the wheel, position the bead breaking fixture 90 degrees from the valve stem.**
- **When removing the tire from the wheel, ensure a tolerance is maintained between the tire machine fixture, or irons, tire bead, and the sensor.**

3. Remove the tire from the wheel. Refer to **Tire Mounting and Dismounting** in Tires and Wheels.

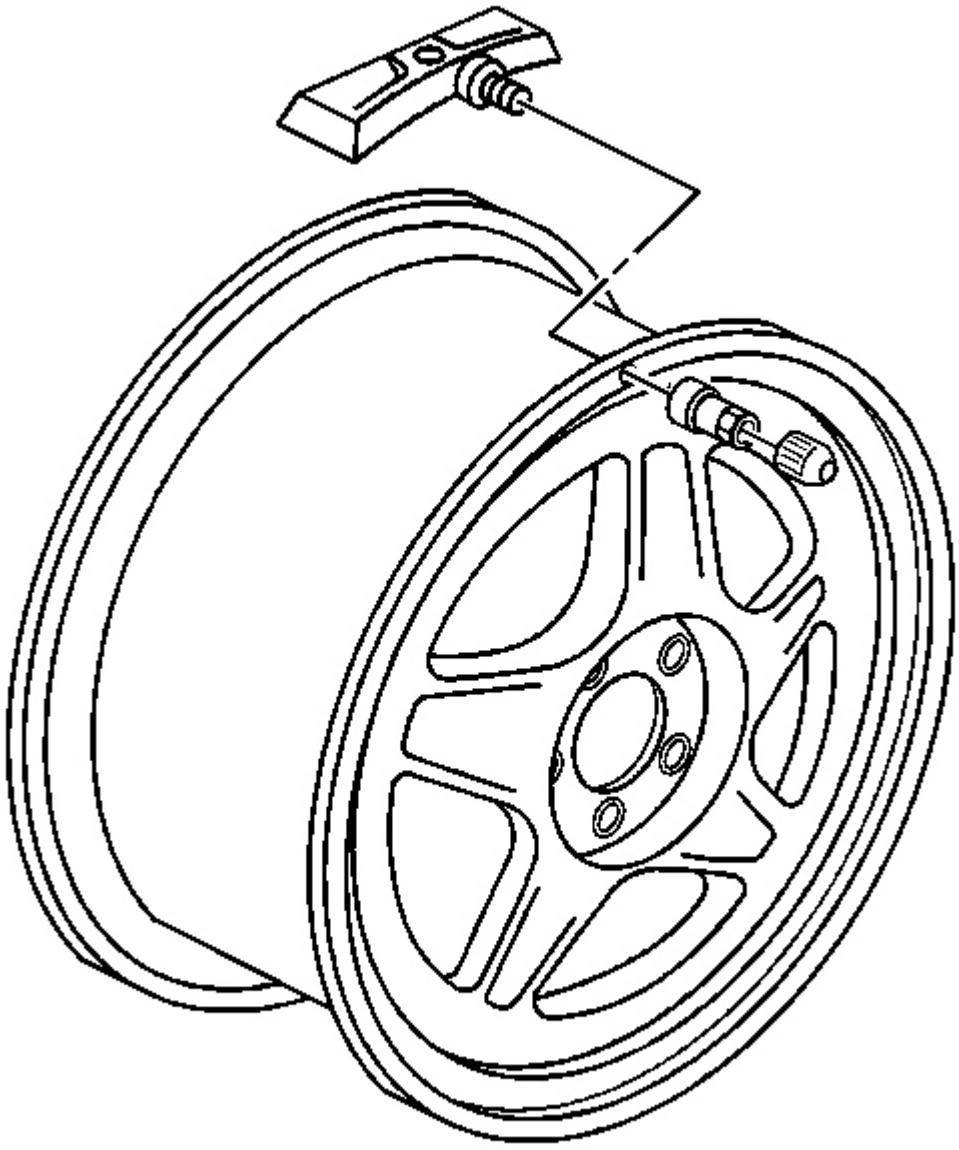


Fig. 4: Identifying Air Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: 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 sensor's grommet sealing area of the wheel.

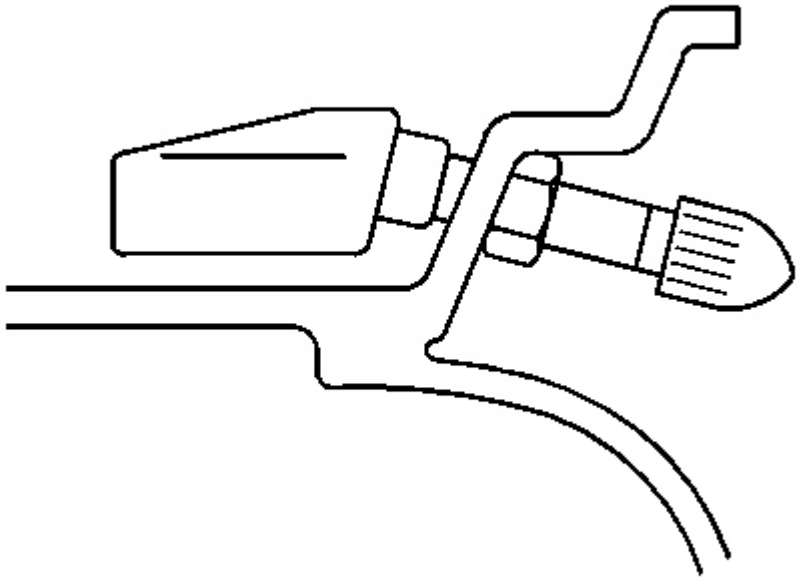


Fig. 5: Installed View Of Tire Pressure Monitor Sensor
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

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

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

IMPORTANT: To avoid tire pressure sensor damage when mounting the tire back on the wheel, ensure a tolerance is maintained between the tire machine, or irons, tire bead, and the sensor.

4. Install the tire on the wheel. Refer to **Tire Mounting and Dismounting** in Tires and Wheels.
5. Install the tire/wheel assembly on the vehicle. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
6. Lower the vehicle.
7. Learn the tire pressure sensors. Refer to **Tire Pressure Sensor Learn** .

TIRE PRESSURE SENSOR GROMMET REPLACEMENT

Removal Procedure

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

IMPORTANT: Before the tire is removed from the wheel, care must be given with the following items to avoid the tire pressure sensor damage upon tire dismounting.

- **Place the sensors 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 materiel.**
- **When using the tire machine to separate the tire bead from the wheel, position the bead breaking fixture 90 degrees from the valve stem.**
- **When removing the tire from the wheel, maintain a tolerance between the tire machine fixture, or irons, tire bead and the sensor.**

3. Remove the tire from the wheel. Refer to **Tire Mounting and Dismounting** in Tires and Wheels.

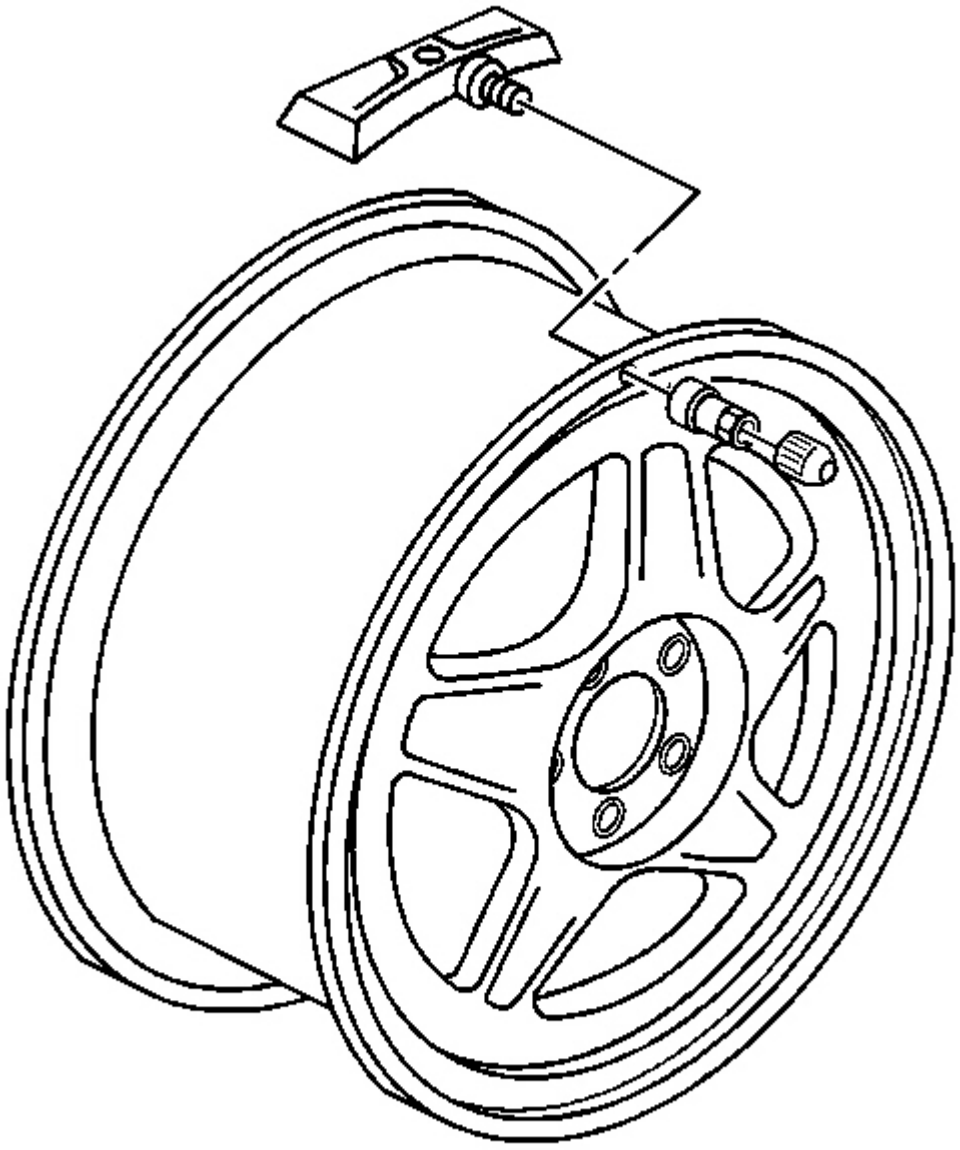


Fig. 6: Identifying Air Pressure Sensor
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If any tire sealant is noted upon tire dismounting, replace the sensor. Refer to Tire Pressure Sensor Replacement . Also remove all residual liquid sealant from the inside of the tire and wheel surfaces.

4. Remove the tire pressure sensor nut.
5. Remove the sensor from the wheel.
6. Remove the grommet from the sensors valve stem.

Installation Procedure

1. Clean any dirt or debris from the grommet sealing areas.
2. Install the grommet on the sensors valve stem.

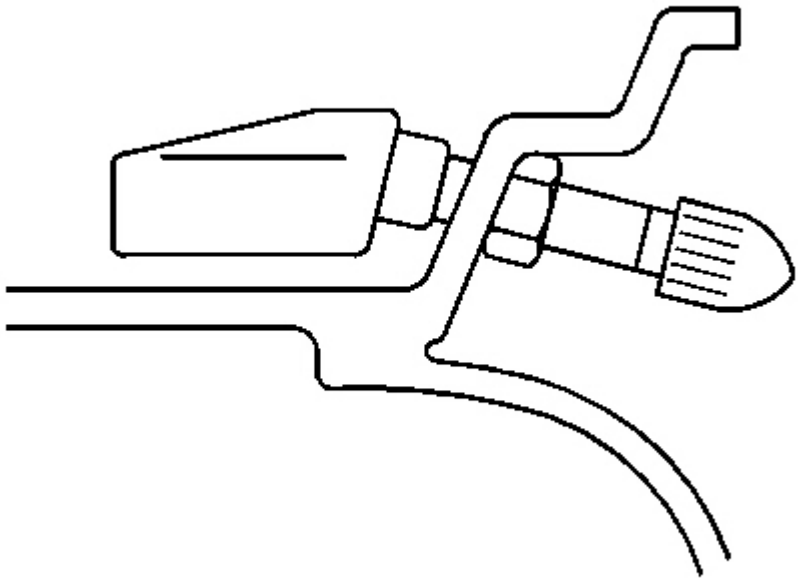


Fig. 7: Installed View Of Tire Pressure Monitor Sensor
Courtesy of GENERAL MOTORS CORP.

3. Insert the sensor through the wheel hole with the air passage facing away from the wheel.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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

Tighten:

- For domestic vehicles tighten the sensor nut to 7 N.m (62 lb in).

- For export vehicles tighten the sensor nut to 12 N.m (106 lb in).

IMPORTANT: To avoid tire pressure sensor damage when mounting the tire back on the wheel maintain a tolerance between the tire machine, or irons, tire bead and the sensor.

5. Install the tire on the wheel. Refer to **Tire Mounting and Dismounting** in Tires and Wheels.
6. Install the tire/wheel assembly on the vehicle. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
7. Lower the vehicle.

TIRE PRESSURE SENSOR LEARN

Tools Required

J 41760 Tire Pressure Sensor Activating Tool. See **Special Tools and Equipment** .

TPM Learn Mode Description

The Tire Pressure Monitor (TPM) system uses the remote control door lock receiver (RCDLR), body control module (BCM), driver information center (DIC), 4 radio frequency transmitting pressure sensors, and the serial data circuit to perform the TPM learn mode functions. The sensor learn procedure must be performed after a tire pressure sensor, or RCDLR replacement. Once the learn mode has been enabled, each of the sensors unique identification (Id) codes can be learned into the RCDLR's memory. After the RCDLR has received a sensor transmission, it sends a serial data message to the BCM to sound a horn chirp. This verifies the sensor has transmitted its Id and the RCDLR has received and learned it. The RCDLR must learn each sensor's Id in the proper order to determine sensor location. The first learned Id is assigned to the left front location, the second to right front, the third to right rear, and forth to left rear.

Sensor Functions

Each sensor has am internal magnetic reed switch. When the **J 41760** sensor activating tool is held close to the sensor, the reed switch closes, activating the sensor. See **Special Tools and Equipment** . The sensor responds to a magnetic activation by transmitting in learn mode. When the RCDLR receives a learn mode transmission while in TPM learn mode, it will assign that sensor Id to the location on the vehicle relative to the order in which it was learned.

TPM Learn Mode Cancellation

The RCDLR will cancel the TPM learn mode if the ignition is turned OFF, more than 1 minute has passed and no sensor Ids have been learned, or if more than 5 minutes have passed for the entire procedure. If the learn mode is cancelled before any sensor Ids are learned, the RCDLR will remember all previously stored Ids and their locations. As soon as the RCDLR learns the first sensor Id, all previously stored Ids are erased from the RCDLR's memory.

1. Turn ON the ignition, with the engine OFF.

2. Press the DIC RESET button in order to clear any warning messages.
3. Press and release the OPTIONS button until the display is blank.
4. Press and hold the RESET button for 3 seconds.

IMPORTANT: If the DIC does not display the TIRE TRAINING message, ensure the TPM option is enabled in the RCDLR. Refer to Scan Tool Output Controls .

5. Press and release the OPTIONS button until TIRE TRAINING is displayed.
6. Press and release the RESET button and LEARN L FRONT TIRE is displayed, verifying the mode has been enabled.

IMPORTANT: If a horn chirp does not sound after 15 seconds, remove then reinstall the sensor activating tool.

7. Starting at the left front sensor, hold the **J 41760** over the valve stem until a horn chirp sounds. See **Special Tools and Equipment** .
8. After the horn chirp sounds, proceed as in step 7 for the next 3 sensors in the following order:
    1. Right front
    2. Right rear
    3. Left rear
9. Turn the ignition OFF to exit the learn mode.

DESCRIPTION AND OPERATION

TIRE PRESSURE MONITOR DESCRIPTION AND OPERATION

The Tire Pressure Monitor (TPM) System warns the driver when a significant increase, or decrease 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 powertrain control module (PCM), body control module (BCM), Instrument Panel Cluster (IPC), DIC, Remote Control Door Lock Receiver (RCDLR), a radio frequency (RF) transmitting pressure sensor in each wheel/tire assembly, and the serial data circuit to perform the system functions.

When the vehicle is stationary the sensors internal roll switches are open, which puts the sensors into stationary mode. In this mode the sensors transmit once every 60 minutes. As vehicle speed increases, centrifugal force closes the sensors internal roll switches, which puts the sensors to go into drive mode. In this mode the sensors transmit once every 60 seconds. The RCDLR receives and translates the data contained in each sensors RF transmission into sensor presence, sensor mode, and tire pressure. The RCDLR sends the tire pressure and tire location data to the DIC via the serial data circuit where they are displayed as follows:

- FRONT L XX R XX PSI
- REAR L XX R XX PSI

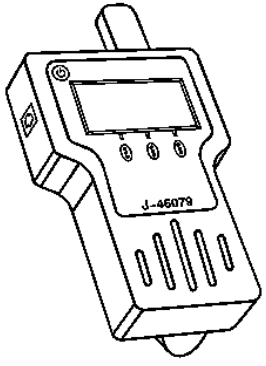
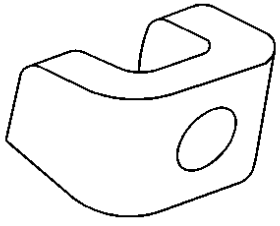
When the TPM system detects a significant decrease of tire pressure, the LOW TIRE PRESS XX, or XX TIRE FLAT - MAXIMUM SPEED 55 MPH - REDUCED HANDLING messages are displayed on the DIC and the low tire pressure indicator is displayed on the IPC. When the system detects a significant increase of tire pressure the HIGH TIRE PRESS XX message is displayed on the DIC. Both the messages and indicator can be cleared by adjusting the tire pressures to the recommended kpa/psi. Refer to **Tire Placard** in General Information, or to **Tire Inflation Pressure Specifications (1)** in Maintenance and lubrication. The sensors pressure accuracy from -10 to +70 degrees C is +/- 7 kPa (1 psi). The system also compensates for changes in barometric pressure using the PCMs map sensor via the serial data circuit.

The RCDLR has the ability to detect malfunctions within the TPM System. Any malfunction detected will cause the DIC to display the SERVICE TIRE MONITOR message. For more information on other functions of the RCDLR, refer to **Keyless Entry System Description and Operation** in Keyless Entry.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/ Description
	J-46079 Tire Pressure Monitor Diagnostic Tool
	J-41760 Tire Pressure Sensor Activating Tool