



# Technical Service Bulletin

SUBJECT:		No: <b>TSB-12-31-001</b>	
<b>GENERAL SERVICE INFORMATION FOR THE TIRE PRESSURE MONITORING SYSTEM – REVISED</b>		DATE: <b>May, 2012</b>	
		MODEL: <b>See below</b>	
CIRCULATE TO:	<input type="checkbox"/> GENERAL MANAGER	<input checked="" type="checkbox"/> PARTS MANAGER	<input checked="" type="checkbox"/> TECHNICIAN
<input checked="" type="checkbox"/> SERVICE ADVISOR	<input checked="" type="checkbox"/> SERVICE MANAGER	<input type="checkbox"/> WARRANTY PROCESSOR	<input type="checkbox"/> SALES MANAGER

*This bulletin supercedes TSB-11-31-001, issued April, 2011, to add affected vehicles (2012 models, inc. iMiEV), identify a new sensor (4250C193) and provide updated instructions, diagnosis and charts. Changes in the body of the bulletin are italicized and indicated by ◀. Changes in the charts (pages 8-11) are italicized in red and indicated by ◀.*

## PURPOSE

This TSB provides a single source to answer questions and provide information regarding the tire pressure monitoring system (TPMS), its construction and servicing.

Reference charts covering sensor application and other information are provided at the end of the bulletin.

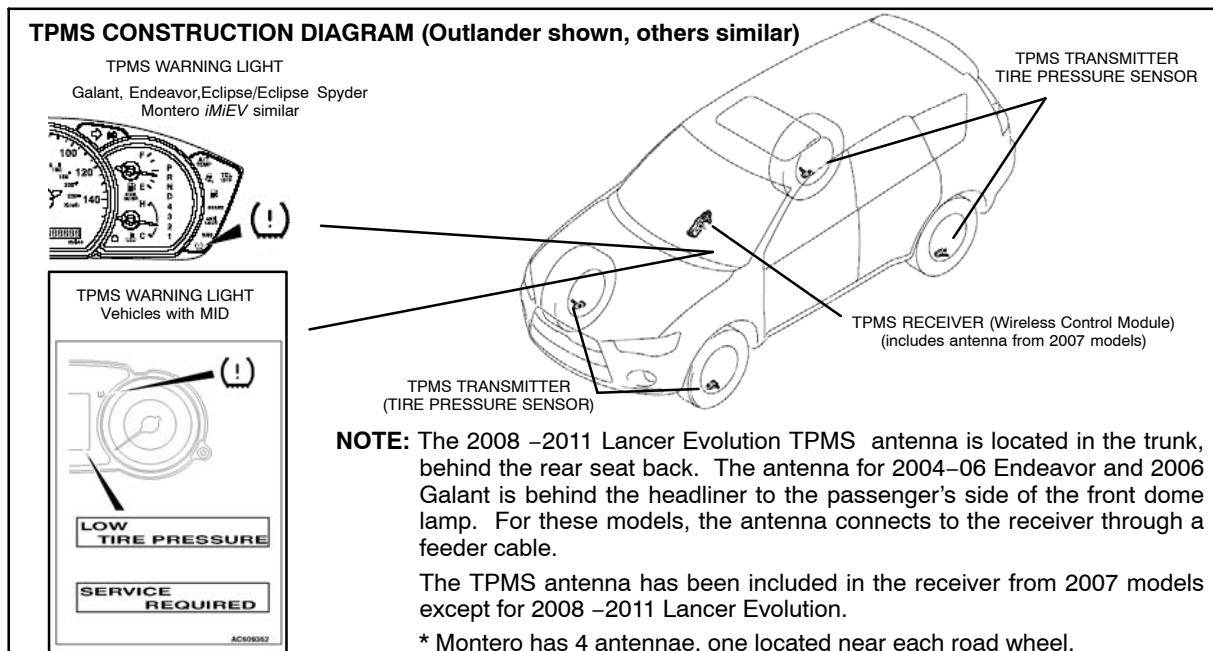
## AFFECTED VEHICLES

- 2004–2011 Endeavor
- 2006–2012 Galant
- 2008–2012 Eclipse
- 2008–2012 Eclipse Spyder
- 2012 i-MiEV
- 2008–2012 Lancer
- 2009–2012 Lancer Sportback
- 2008–2012 Lancer Evolution
- 2007–2012 Outlander
- 2011–2012 Outlander Sport
- 2004–2006 Montero
- 2008–2009 Raider

## BACKGROUND

Mitsubishi products were first equipped with TPMS in 2004, and all current models are factory equipped with TPMS. The system consists of the following major components:

- Transmitters (sensors)
- Warning light
- Antenna \*
- Receiver (ECU)



continued

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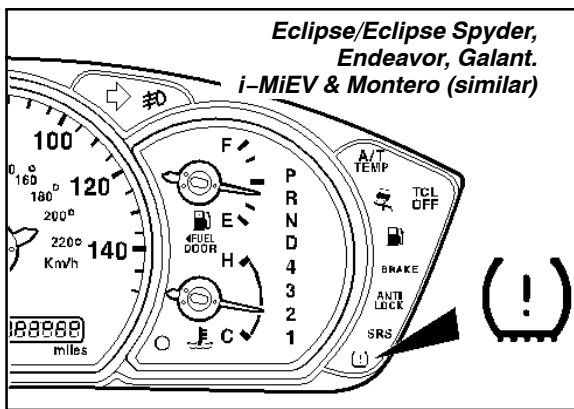
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## TPMS Operation

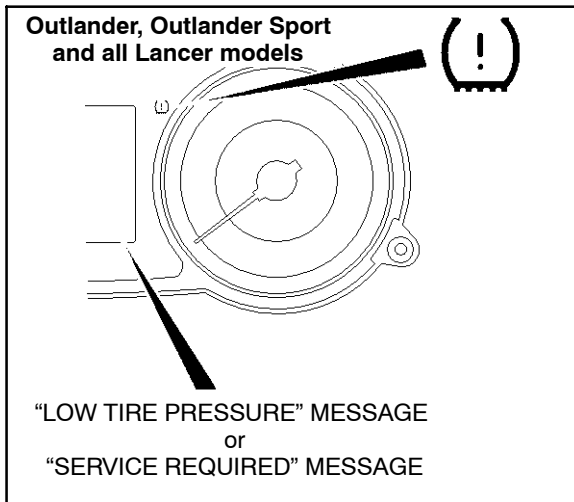
There are typically 4 wheel speed sensors per vehicle (one per wheel), except for 2004–06 Montero and some Endeavors equipped with full size spare tires mounted on alloy wheels, which have 5 sensors. Sensors are battery powered and transmit a wireless signal that is received by the antenna and recorded by the TPMS ECU. When the sensor transmits a signal that tire pressure is below the minimum pressure stored in the vehicle's TPMS ECU (25% below the tire pressure listed on the Tire Pressure and Loading Label), a steady warning light is illuminated in the instrument panel and a DTC is set for low tire pressure. If a system fault is detected, for Lancer models, Outlander, Outlander Sport, Eclipse models and 2008 & later Galant and Endeavor, and 2012 iMiEV, the warning light flashes for about one minute when the vehicle is first started, then changes to steady illumination and a DTC is set in memory. For Montero, and pre-2008 Galant and Endeavor, the light flashes continuously.

## TPMS warning light operation



Vehicles equipped with TPMS have a warning light in the instrument panel to notify drivers when low air pressure or a system fault is detected.

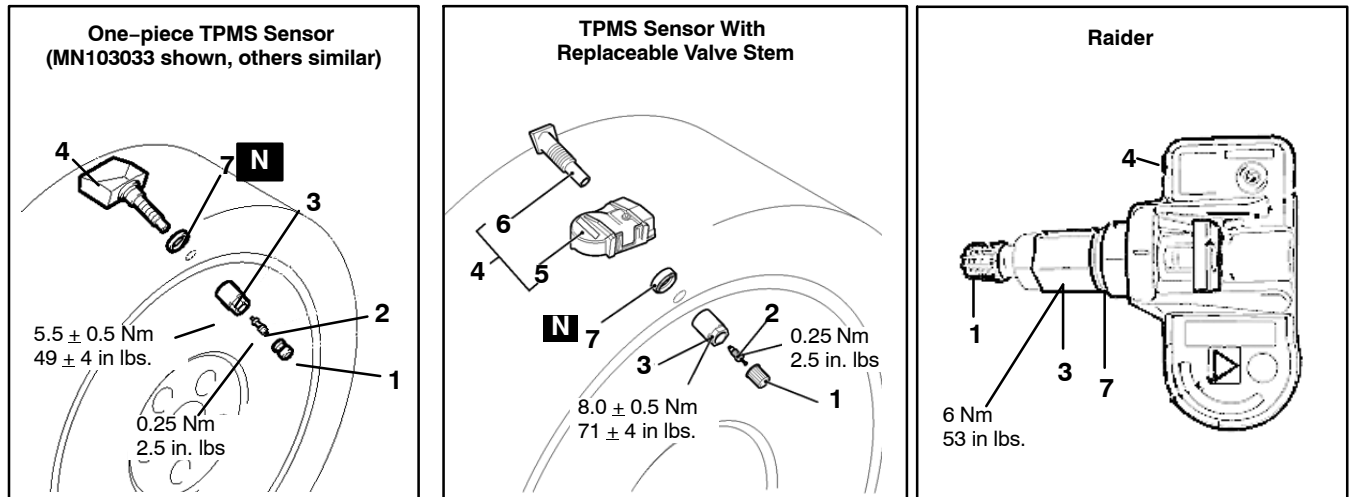
The TPMS warning light illuminates when air pressure in a monitored tire drops below a pre-programmed minimum value.



- The TPMS warning light comes on when the vehicle is first started as part of the system self check. If tire pressure is correct and there are no system faults (DTCs), the light turns off after a short period.
- If the TPMS warning light comes on and stays illuminated, low tire pressure in one or more tires is indicated. Outlander, Outlander Sport, and all Lancer models also display a "Low Tire Pressure" message in the MID. A DTC is set for each sensor registering low pressure.
- If the TPMS warning light flashes when the vehicle is first started, then stays illuminated, a system fault (with accompanying DTC) is indicated. Outlander, Outlander Sport, and all Lancer models also display a "Service Required" message in the MID.
- Under certain conditions, the TPMS light may illuminate, then turn off after a short period of driving. This may be due to tire pressure being slightly below the minimum value. As the car is driven, friction causes the tire to heat up and tire pressure increases above the "warning off" value, the light is turned off.

- Cold tire pressure should be adjusted to the proper levels as indicated by the "Tire Pressure and Loading" label located on the driver's side B pillar (not to the MAX PRESSURE indicated on the tire's sidewall).
- In some cases the TPMS light may remain "ON" after air pressure adjustment is completed. In that case, you may have to drive the vehicle for a few minutes to reset the light.
- After installing the spare due to a flat tire, the TPMS warning light will flash for about 20 minutes of driving. The deflated tire, now stored as the spare, will not be monitored until it is re-installed as a usable tire.

## TPMS Sensor Parts Identification



1. Valve stem cap - Valve stem caps designed for TPMS use an internal o-ring to increase sealing, reduce air loss, and prevent moisture and dirt from contaminating the sensor.

Use the following part numbers to insure the sensor is protected :

- 4250A165 – Black cap fitted to steel wheels.
- 4250A686 – Silver cap fitted to alloy wheels.

The only difference in these caps is color.

2. Valve stem core\* – A Schrader-type valve that seals the valve stem. Genuine Mitsubishi parts have nickel plated cores to prevent corrosion. **Do not over tighten.**
3. Valve stem nut\* - Holds the TPMS sensor to the wheel. **Do not over tighten.**



**\*Proper torque of the valve stem core and valve stem nut is extremely important. Over tightening of either component can damage the aluminum valve stem (damaged threads, cracked valve stem) and cause an air leak.**

4. Transmitter (one piece sensor) - Houses electronics, transmitter and battery. Transmits tire pressure information to the receiver.
5. Sensor body (sensors with replaceable stems) – Houses electronics, transmitter and battery. Transmits tire pressure information to the receiver.
6. Valve stem (sensors with replaceable stems) – Replaceable on some sensors
7. Seal – Provides a seal between the sensor & wheel. Must be replaced every time sensor is removed.

### Tire Pressure Basics

- *Tire pressure should be adjusted when the tire is cold and the vehicle hasn't been driven for several hours. If adjusted hot, tire pressure may be low after the vehicle is parked for a while and the tire cools.* ◀
- *Always reinstall the correct valve stem cap. Genuine Mitsubishi valve stem caps for TPMS sensors have an internal o-ring to help protect the sensor from moisture and dirt. Not installing the correct cap can lead to corrosion and possible sensor damage.* ◀

### Affect of Environmental Factors on Tire Pressure (Altitude and Ambient Temperature)

Air pressure in the tire will vary according to the vehicle’s operating environment. These factors should be taken into consideration when diagnosing or servicing TPMS.

- Tire pressure should be checked and adjusted according to instructions in the owner’s manual . Slight air loss may occur over time under normal conditions. Expect a 1 PSI drop over a 1 month time period.
- Tire pressure is affected by ambient temperature. Colder ambient temperatures will decrease tire pressure. Expect a 1 psi drop for every 10 degree drop in temperature. Tire pressure should be adjusted to compensate for seasonable temperature changes.
- Adjusting tire pressure when the tire is warm will cause a lower reading when the tire is cold.

Example:

If tire pressure is set at sea level to 32 psi at 70° F (21° C), and the temperature falls to freezing (32° F, 0° C), air pressure in the tire will drop by approximately 4 psi to 28 psi. This is very close to the minimum value to turn the TPMS warning light on.

- Increased altitude decreases tire pressure. A decrease of 0.5 PSI will occur for each 1,000 ft of altitude change. However, TPMS systems in 2007 Outlander and all 2008 and later models (*except i-MiEV*) automatically compensate for altitude changes. *It is not necessary to adjust tire pressure when driving to high altitude for a short time. However, tire pressure should be adjusted while at high altitude for longer periods( e. g. week long vacations). Adjust pressure as listed in the following chart, by altitude, as “Tire Pressure (PSI).” Adjusting pressure to the sea level reading while at higher altitude can lead to over inflation (and a possible rough ride) when the vehicle is returned to lower altitude.*

Affect of Temperature Change on Tire Pressure (Pressure set at 70° F)			Affect of Altitude on Tire Pressure (when adjusting pressure at listed altitude)		
			Altitude	Tire Pressure (PSI)	PSI Change
Temperature	Tire Pressure (PSI)	Change from Cold Placard Inflation Pressure	6,000 ft	29	-3.0
120°F (49°C)	37	+5	5,000 ft	29.5	-2.5
110°F (43°C)	36	+4			
100°F (38°C)	35	+3			
90°F (32°C)	34	+2			
80°F (27°C)	33	+1	4,000 ft	30	-2.0
70°F (21°C)	32	0	3,000 ft	30.5	-1.5
60°F (16°C)	31	-1			
50°F (10°C)	30	-2			
40°F (4°C)	29	-3			
30°F (-1°C)	28	-4	2,000 ft	31	-1.0
20°F (-7°C)	27	-5	1,000 ft	31.5	-0.5
10°F (-12°C)	26	-6			
0°F (-18°C)	25	-7			
-10°F (-23°C)	24	-8			
-20°F (-29°C)	23	-9	Sea Level	32	0

**TPMS sensor service procedures and common concerns**

- Valve stem corrosion or breakage may occur due to improper maintenance procedures.
- Valve stem caps should be installed onto the stem at all times to prevent moisture entry. Corrosion from moisture can also cause valve stem damage during service.
- Moisture inside the valve stem and valve core will cause corrosion. Corrosion can cause valve core damage during service.
- To prevent the valve stem cap from corroding to the valve stem, always use OEM valve stem caps. Using an incorrect valve stem cap can lead to corrosion.
- To prevent corrosion, use only the correct valve core type. Genuine Mitsubishi valve core replacements are available from MMNA. Refer to ASA CAPS for the correct part number for your vehicle.
- When installing a TPMS transmitter, always torque the retaining nut to spec. Then retorque it after the tire is inflated to the proper pressure.



**VALVE STEM RETAINING NUT AND VALVE STEM CORE TORQUE SPECS**

MODEL	RETAINING NUT	VALVE STEM CORE	MODEL	RETAINING NUT	VALVE STEM CORE
<i>i-MiEV</i>	71 ± in lb (8.0 ± 0.5 Nm)	2.5 in. lb (0.25 Nm)	Galant	49 ± 4 in lb (5.5 ± 0.5 Nm)	2.5 in. lb (0.25 Nm)
Lancer/ Lancer Sportback			Eclipse/ Eclipse Spyder		
Lancer Evolution			Endeavor		
Outlander			Montero		
Outlander Sport			Raider		

- Over-tightening the valve stem core may cause the valve stem to crack. Valve core tightening tools (some with pre-set torque) are available through independent sources. They allow you to tighten the valve core without risk of over tightening.
- Sensor seal shapes are different between alloy and steel wheels. Always use the correct seal when re-installing a sensor to prevent air pressure leaks (refer to page 11).
- To prevent air leaks, do not reuse TPMS sensor seals. A new sensor seal should be used when installing any tire pressure sensor.
- Valve stems are replaceable on new-style TPMS sensors (P/N 4250B975) installed on 2009 & later Lancer based vehicles, Outlander, Outlander Sport and *i-MiEV*. New style sensors can be retrofitted to earlier vehicles (refer to the chart later in this bulletin for exceptions).
- To deflate a tire, completely loosen (but do not remove) the valve stem nut and press on the sensor to relieve tire pressure. Then remove the nut completely and CAREFULLY let the sensor drop into the tire prior to tire removal. Do not remove the valve core unless necessary. Refer to Removal Service Points in the service manual for details.
- Improper tire removal can damage sensors. Some customers may state the TPMS indicator light came on just after they got new tires. Diagnose proper sensor operation using procedures in the service manual.



- OEM TPMS sensors may not be compatible with certain aftermarket wheels. Air leaks around the seal are just one issue that can occur if OEM sensors are used on non-OEM wheels.
- Tire inflator and tire sealant products can damage TPMS sensors.
- Moisture in the assembled rim and tire can damage TPMS sensors.

### TPMS Sensor battery life expectancy

- Expected battery life is between five and ten years, depending on the sensor.
- The battery is sealed inside the sensor and not serviceable.
- DTCs C1910, C1920, C1930, & C1940 indicate low sensor battery voltage in individual tires.

### Sensor Registration

- A MUT 3 is required to register TPMS sensors to a vehicle (except Raider).
- Use the correct sensor for the specific vehicle. Refer to the sensor chart later in this TSB.
- Before starting the registration procedure, MUT-III will ask you to select either 4 or 5 sensors (per vehicle). Full size spares may have a TPMS sensor, but temporary spare tires do not.
- All sensors must be registered at the same time. Not completing all steps of sensor registration will cancel the entire registration procedure and you will have to start over. *All registrations are erased and "DTC C1900: No Registration" is set.*
- There are two sensor registration methods: magnet (special tool MIT46716 – circular-shaped magnet) or air pressure drop. Refer to the sensor chart for the correct procedure for each sensor.

*Some vehicles may be equipped with sensors requiring different registration methods due to sensor replacement. If you have difficulty performing TPMS sensor registration on some wheels, use the magnet to register the sensors first. Then use the air pressure drop method to register sensors that did not register. Restore tire pressure to the specification listed on the "Tire Pressure and Loading Label" located at the driver's door jamb when registration is completed.*

- The MIT46716 special tool (magnet) works only on 2003–2006 Montero, 2004–2006 Endeavor and 2006 Galant TPMS sensors mounted to OEM alloy wheels. It will not work on steel wheels.
- The air pressure drop method must be used on TPMS equipped vehicles with steel wheels. Refer to the chart for preferred registration methods.
- Air pressure drop method – reduce air pressure below 25 PSI. Then reduce air pressure by an additional 3 PSI to cause the sensor to transmit information.
- During sensor registration, start at the front left tire then proceed in a clockwise rotation, left front, right front, right rear, full size spare (if equipped), left rear.
- During sensor registration, mark the inside of the tire or wheel (e.g. "TPMS 1," etc.) for ease of identification during TPMS diagnosis. If the vehicle ever comes to you for diagnosis, you can relate a DTC to the specific wheel/tire, even after a tire rotation. Any markings you make should be durable, but removable without excessive effort.
- Several aftermarket TPMS tools are available to speed the registration process. These tools may eliminate the need to deflate and re-inflate the tire during sensor registration.

### Troubleshooting / Diagnosis.

- The tire location and sensor I.D. number displayed on the MUT-III relates to the order in which the tire was originally registered to the vehicle. It does not relate to a specific tire location (e.g. tire 1 is left front). Tire rotation and replacement changes the location of each sensor.
- DTCs C1915, C1925, C1935, C1945 (Transmitter Off DTC) indicate TPMS sensors that were not activated. Call Techline for possible remedies.

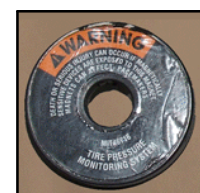
- TPMS DTCs 22, 26, 31, 35, 39, C1911, C1921, C1931, C1941 (Reception abnormality DTC) may set if the receiver does not receive TPMS sensor data normally. External electronic devices (mobile phone chargers, GPS devices, iPod accessories, etc.) may transmit RF signals when connected to the 12 volt power outlet and interrupt the TPMS sensor signal. A wireless transmission facility or device using the same frequency as the transmitter may also cause signal interruption. Under these conditions, a DTC may be set and illuminate the TPMS light. Do not replace sensors unless TSB-11-31-004 has been completed. If DTCs return, conduct normal diagnosis

### Commonly Available TPMS diagnostic tools

If you search the Internet, you will find a number of TPMS diagnostic and service tools for sale. In many cases, you can find complete kits to handle all of your TPMS needs. MMNA does not endorse these tools, but if you are doing regular TPMS service, they may be of interest to you.



- The circular magnet (p/n 46716, photo right) is an “essential” tool for TPMS sensor registration and is the only tool required by MMNA. It can only be used with TPMS sensors p/n MN103033 (2006 Galant & 2004-06 Endeavor) and MN103081 (when used on Montero only).
- Aftermarket electronic TPMS tools may provide both sensor registration and activation functions. The following TPMS sensor tools are compatible with all MMNA TPMS equipped products.



OTC TPR                      BARTEC Wheelrite Tech 300+

While these tools are compatible with all current MMNA TPMS equipped vehicles, they are not essential tools. They are NOT available through the Mitsubishi Special Tools website. MMNA does not endorse their use. Other tools may be compatible with MMNA products. Contact the individual vendor for tool capabilities, prices and availability.

- Some aftermarket electronic TPMS tools are capable of activating TPMS sensors for registration without tire deflation and inflation.
- Some aftermarket electronic TPMS tools can check for correct sensor frequency to verify the correct sensor is installed. This function is available on the OTC and BARTEC TPMS tools.
- Certain aftermarket electronic TPMS tools can provide sensor ID, temperature and tire pressure.
- Valve core tightening tools, some with pre-set torque, are available through independent sources. They allow you to tighten the valve core without risk of over tightening.



### WARRANTY INFORMATION

This TSB provides technical information only. Standard warranty procedures apply.

#### Warranty Requirement

When available, dealers must use a valve stem repair kit (see chart, page 11) for a TPMS sensor leak due to a cracked stem. Warranty replacement of a TPMS sensor assembly repairable with a valve stem repair kit is subject to chargeback. See page 11 for repair kit details.

#### Warranty Coverage Reminder

Air leaking from TPMS sensors related to tire changes and/or tire repairs is not covered under MMNA warranty. Dealers encountering air leaks where a tire has been recently replaced must not submit a warranty claim for repairs or seal replacement.

### Galant, Eclipse/Eclipse Spyder, Endeavor TPMS Sensor Information

Model	Wheel Type	Model Year(s)	Original Sensor P/N	Original Sensor Color	Service (Replacement) P/N	Service Sensor Color	MFG	Signal Frequency	Registration Method
Galant	Alloy	2006	MN103033	Black	<b>4250C196</b>	<b>Beige</b>	Schradler ↓	433 MHz	Original=Magnet Replacement=Air Pressure Drop ↓
		2007-2010	MN103081	Yellow	<b>4250C193</b>	<b>Gray</b>		315 MHz ↓	
		2010-2012	4250B877	Brown	4250B875	Green			
Eclipse/Spyder	Steel	2008-2010	4250A030	Blue					
		2010-2012	4250B875	Green					
		2008-2010	MN103081	Yellow	<b>4250C193</b>	<b>Gray</b>			
Endeavor	Alloy ↓	2004-2006	MN103033	Black	<b>4250C196</b>	<b>Beige</b>		433 MHz	Original=Magnet Replacement=Air Pressure Drop ↓
		2007-2010	MN103081	Yellow	<b>4250C193</b>	<b>Gray</b>		315 MHz ↓	
		2010-2011	4250B877	Brown					

**For Steel Wheels - Galant**

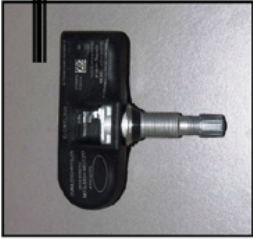
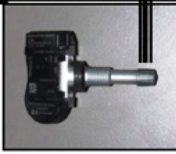
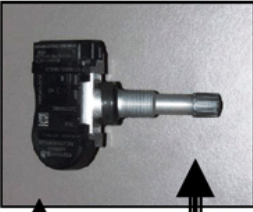

Blue	Green
4250A030	4250B875
Original sensor	Service Part
Replaces Blue sensor	
Use green sensor as replacement for blue .	

Black	Beige	Yellow	Brown	Gray
MN103033	<b>4250C196</b>	MN103081	4250B877	<b>4250C193</b>
04-06 Endeavor		Original Sensor		
06 Galant		Service Part		
07-12 Galant, Eclipse, Spyder & Endeavor with TPMS				
Use 4250C196 beige sensor as replacement				
Use 4250C193 light gray sensor as replacement for yellow & brown				




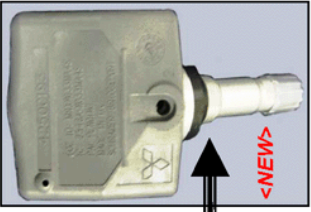

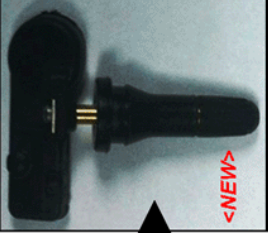
Lancer, Lancer Sportback, Lancer Evolution, Outlander, Outlander Sport, **i-MiEV** TPMS Sensor Info

Model	Wheel Type	Model Year(s)	Original Sensor P/N	Original Sensor Color	Service (Replacement) P/N	Service Sensor Color	MFG	Signal Frequency	Registration Method
Lancer, Lancer Sportback, Lancer Evolution	Steel	2008-2009	4250A225 *	Black ↓	4250A225 * 4250B975 ↓ 4250A225 * 4250B975 ↓	Black ↓	Siemens / Continental ↓	315 MHz ↓	Air Pressure Drop ↓
		2010	4250B668						
		2011 - up	4250B975						
	Alloy	2008 - 2009	4250A225						
		2010	4250B668						
		2011 - up	4250B975						
Outlander	Steel	2007 - 2009	4250A225 *						
		2010	4250B668						
	Alloy	2011 - up	4250B975						
		2007 - 2009	4250A225						
Outlander Sport	Steel	2010	4250B668						
	Alloy	2011 - up	4250B975						
	<b>Steel/Alloy</b>	<b>2012 - up</b>	<b>4250B975</b>						

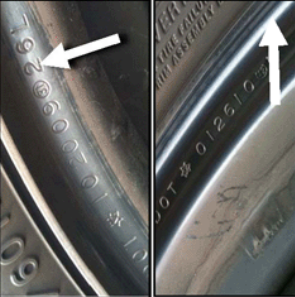

FOR ALLOY WHEELS		FOR STEEL WHEELS	
			
Black 4250A225	Black 4250A668	Black 4250B975	Black 4250A225 *
Original sensor - '08-'09	Original sensor - '10	<b>Original sensor - '11-up</b> Service Part - '08-'10	Replace only with the same sensor
Use P/N 4250B975 to replace 4250A225 or 4250B668 on alloy wheels.		Used on steel wheels without L of 26L stamping on side of rim, see photo on page 11.	
Refer to chart above for part number application by model			


### Montero, Raider TPMS Sensor Information



Model	Wheel Type	Model Year(s)	Original Sensor P/N	Original Sensor Color	Service (Replacement) P/N	Service Sensor Color	MFG	Signal Frequency	Registration Method
Montero	Alloy	2004-2006	MN103081	Yellow	4250C193	Gray	Schrader	315 MHz	Original=Magnet Replacement=Air Pressure Drop Drive Vehicle over 15 MPH for 10 Minutes.
Raider	All	2008-2009	56029319AA	Green	56029479AB	Black	Schrader		

			
<b>Montero 2004-2006</b> Yellow MN103081 Use 4250C193 light gray sensor as replacement for yellow	<b>Montero 2004-2006</b> Gray 4250C193	<b>Raider 2008-2009</b> Green 56029479AB 56029479AB (Black) replaces all previous Raider TPMS sensors	<b>Raider 2008-2009</b> Black 56029479AB

Other TPMS Sensor Information and Service Parts

<p><b>Steel Wheel Differences - Lancer, Outlander</b></p> 	<p>Stamped 26L or L          sensor P/N = 4250B975</p>
<p>Non stamped          sensor p/h = 4250A225</p> 	<p><b>Sensors are not interchangeable due to rim profile differences.</b></p>

<p><b>Valve Stem Repair Kit</b></p> 	<p>Valve stems are replaceable on TPMS sensor P/N 4250B668 or 4250B975. Remove seal with care to prevent sensor damage. P/N 4250B978.</p>
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<p><b>Valve stem seal types on Schrader sensors</b></p>	
<p>Steel Wheels</p> 	<p>Alloy Wheels</p> 
<p>Galant - P/N 4250A164</p>	<p>Endeavor, Eclipse/          Spyder, Galant, Montero          P/N MN103035</p>
<p>Replace seal when TPMS sensor is removed or serviced to prevent air leaks.</p>	

<p><b>Valve stem core and plastic cap</b></p> 	<p>OEM Valve core and caps must be used to prevent corrosion, air leaks or moisture intrusion.</p>
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