



## TIRE PRESSURE MONITORING SYSTEM: What you need to know...

### How does it work?

A sensor is embedded in a housing that is molded on the back of an aluminum tire valve. The sensor runs on a battery that lasts 5-10 years, depending on the model. The sensor is used to measure the tire pressure and the temperature of the electronic wheel systems. A tire pressure monitoring system has to carry out two main functions: The recognition of a pressure loss and the measurement of the absolute pressure. The sensor sends a signal to a detector, usually found in the wheel well. The detector signals a central receiving which collects the information and displays it on the dash. Some systems display the variable tire pressure, while others simply show a warning light when the pressure is 25% above or below the placard pressure.

### Why monitor tire pressure?

Most people ignore their tires. Tires are certainly the most critical safety component on a vehicle. Tire failure is the most common cause of breakdowns and accidents. Inadequate air pressure leads to increased flexing work and premature tire wear. In turn, at high speeds this can lead to tires no longer being able to withstand the loads and bursting.

The numbers tell the story:

- Nearly **250,000** accidents per year occur in the United States alone due to low tire pressure
- Approx. **80%** of roadside flats are caused by inadequate tire pressure
- Surveys conducted in the UK found that **80% of motorists** fail to regularly check their tires
- Monitoring pressure can **double the service life of tires** — and **reduce fuel consumption by up to 4%**, saving consumers at the pump!

The best tread designs and the most expensive tires are nothing without the air that carries them along. Checking tire air pressures is such a small investment in time compared to the costs related

to replacing tires put out of service because of improper inflation.

NHTSA estimates that the installation of tire pressure monitoring systems, which would warn drivers of an underinflated tire, could prevent as many as 79 deaths and 10,000 injuries each year in the US alone.

### How do I handle valves with TPMS sensors?

With various valve designs, each manufacturer recommends different techniques to dismount the tire. One European design recommends that you deflate the tire by removing the valve core, and keep the valve in the rim, being careful to not damage it with your tire tools. Other manufacturers recommend that the valve be pushed into the rim prior to removing the tire. Damaging a sensor is costly. Tire shops that currently damage a sensor are forced to seek a replacement from a local dealer at a cost of over 100USD in many cases!

Dill Air Controls Products, a leading valve manufacturer, has created a kit that contains replacement components to fit most of the sensors on the road. Anytime a TPMS valve is removed from the rim, it is recommended that its components be replaced. That is, a new sealing grommet, new specialty valve core (electroless nickel plated), anodized aluminum hex nut, and plastic sealing valve cap. Some designs require additional components, such as a washer inside the rim. It is critical that the correct components are used for each vehicle model. For example, using a brass valve core will cause galvanic corrosion that will cease the core in place making it irremovable. Since the valve and sensor are one piece, a new sensor will need to be purchased! Also, be aware of the various torque specifications depending on the manufacturer. Tightening a nut at too low a torque will result in a potentially dangerous leak and an unhappy customer.

Different units also require various calibration procedures. Newer models are designed to automatically inform the system of their new position when they are rotated to a new position. Older models, however, require a step-by-step calibration procedure that can be quite timely. There are handheld devices available for this procedure.

### US Department of Transportation Final Ruling:

The National Highway Traffic Safety Administration published their final ruling establishing a new federal motor vehicle safety standard requiring the installation of a tire pressure monitoring system (TPMS) capable of detecting when one or more of a vehicle's tires is significantly under-inflated. This rule is part of the TREAD Act, and requires a unit that is capable of detecting when one or more tires is 25% above or below the manufacturer's recommended inflation pressure (placard pressure). The phase-in process is as follows: 20% of a vehicle manufacturer's light vehicles are required to comply with the standard during the 1st year (September 1, 2005 to August 31, 2006); 70% during the 2nd year (September 1, 2006 to August 31, 2007), and 100% of light vehicles thereafter.

### Summary

Knowledge is the key to understanding tire pressure monitoring systems. There exists much uncertainty in servicing vehicles with these units since it is such a drastic change for the tire industry. However, as we gain experience in working with TPMS we will be making vehicles safer and preventing accidents on a daily basis!