



Photo courtesy of Preston Systems

The Tire Sentry™ tire monitoring system is available in two versions: one that can monitor up to six tires and one that can monitor up to 14 tires.

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The Tire Sentry Tire Monitor

This device can provide motorhome owners peace of mind by informing them about a low pressure situation in the tires on a towed vehicle or the coach itself.

Having had two flat tires on our towed vehicle, we had become a bit anxious regarding our tires. At every stop, one of us would go inspect the towed car. The first flat occurred during the day, and another motorist alerted us via the CB radio when there was still some rubber and steel belts around the wheel. The second incident took place at night, and no one warned us until they saw sparks. This time the wheel was just a few revolutions from being worn down to the brake drum. We were not able to feel, hear, or detect the flat in any way during either

incident. Consequently, when we were offered a chance to test a new device for monitoring tires, we eagerly accepted.

This past summer at the FMCA convention in Blacksburg, Virginia, FMC technical editor C. Jay Haynor, F13585, introduced us to Carl Fiorletta. In 1989 Fiorletta had the same experience of not being able to detect a flat tire on his towed car, and the resultant damage involved not only the tire but also the fender of the car. Carl became just as anxious as we did. The difference was that he knew what to do about solving the problem!

After examining considerable technology and talking with a large number of recreational vehicle owners, Carl defined his goal. He wanted a system that was affordable and reliable but required little maintenance. While studying patents that already existed for ideas to solve this problem, he noted that they either required batteries at each wheel to power a sensing/transmitting device or they necessitated a modification to the vehicle's

wheels. Clearly, having to modify a vehicle's wheels is a disadvantage, and systems that utilize radio frequency transmissions require one or more batteries at each wheel. This presents several disadvantages.

For one, sufficient power is available only for transmitting information regarding a low-pressure condition; consequently, such a system is unable to include a constant display to indicate system performance, status, and diagnostics. And, if the battery has an insufficient charge, it may not even be able to transmit a low-pressure warning. This type of system may be relatively inexpensive and easy to install, but it is also vulnerable to theft or vandalism, and the owner would have an ongoing annual expense to replace the batteries. Also, without the constant diagnostics display, you cannot tell whether the equipment is missing, either as a result of theft or road hazard damage, or whether the system is actually working. The challenge was to develop a system that required neither batteries nor wheel modification.

In his previous business, Fiorletta manufactured automation systems for semiconductor clean rooms, wherein employees wore enclosed "space suits" so they wouldn't contaminate the work environment. From this venture, he recruited the best mechanical and electrical engineers to help him bring the tire monitor through development to production. Morgan Dunn, his lead mechanical engineer, has an interesting background in mechanical design with nearly 15 years of experience in robotics/automation, electro-mechanical systems, missile guidance systems, and airborne radar. Mike Nurre, his lead electrical engineer, has 20 years of experience in the development and design of machine control systems; ink-jet printers; robotic material handling systems; laser-linked automatic guided weapons systems; and, more recently, high speed-automated mail processing systems used by the U.S. Postal Service.

Headed by Fiorletta, Preston Systems Inc. began development of the Tire Sentry™ in 1989, and a pat-

ent was issued in 1993. Prior to our test, the Tire Sentry™ had been installed on automobiles and trucks, but ours was to be the first installation on a bus conversion. On our first visit to Preston Systems, measurements were taken for mounting brackets, and we returned a week later for the actual installation of the product. On our second visit, the pressure monitors were fitted to each wheel of the bus, and the solid-state sensors were attached to the underside of the coach to provide constant pressure and systems status readings from each wheel. The pressure monitors are calibrated to specific required pressures, and the clearance distance between the monitors and their sensors is measured in fractions of an inch.

Wires from the sensing units on the six rear wheels were pulled through the center conduit to the front compartment, while the wires from the front wheels came through the first bulkhead within a pre-existing aperture. All the wires were attached to a junction block in the front compartment. The control panel was installed in the dash area with a single cable running down to the junction block.

The following day, our towed car was fitted with the Tire Sentry™. The wires from each tire sensor were routed to the front end of the car and then followed the existing wiring harness for the tow lights. A connector plug was installed at the rear of the bus adjacent to the receptacle for the lights. It is quite convenient to plug in both connectors when attaching the towed vehicle. The control panel consists of a green and red light-emitting diode (LED) for each wheel. The green LED flashes with each tire revolution; however, at running speeds the green LEDs appear to be lit continuously. Whenever the sensor detects low tire pressure, the red LED is illuminated and a loud audio alarm sounds. Because the system is hard-wired, it can also monitor itself and sound the alarm if a component failure or loss of equipment occurs. A reset button allows the user to silence the alarm. With the installation completed, we

went for a test run. After going only a short way, the audio alarm and two red LEDs representing the left side tires of the tow car were activated. It was discovered that the two tires on the tow car had not been fully re-inflated after installation. The Tire Sentry™ was right; we really had a low-pressure situation! After inflating the low tires, we went back out for another check. As a test, one of the engineers intentionally created a leak in one of the bus tires by unscrewing the core in the valve stem. It didn't take the Tire Sentry™ long to identify the problem. The engineers made some final checks, and soon we were ready to roll down the highway again. Until we had the Tire Sentry™ installed, we're not sure we fully realized how much we worried about the towed car. The engineers at Preston Systems were concerned that the multiple green LEDs would be distracting and were considering the use of a single green light to indicate full operational status, but we get an indescribable feeling of relief and relaxation whenever we look at those flashing green lights. Anyone who has ever experienced a flat tire on either their motorhome or towed car will immediately enjoy such peace of mind when they install a Tire Sentry™ that they will bless the day that Carl Fiorletta had a flat tire. We have had the Tire Sentry™ monitoring the tires on our coach and towed vehicle for more than 5,000 miles and remain impressed by its performance. The Tire Sentry™ is designed to conduct systems and performance checks continuously. This feature allows the system to provide an early warning of tire failure, and to monitor component function. It activates an alarm when the tire pressure falls below 90 percent of the appropriate pressure for a particular tire. This gives the owner time to reach a service station (or at least leave the highway before the tire and vehicle are damaged.) Additionally, if any part of the system were to be damaged by road hazards or vandalism, an alarm condition would

be activated. As Fiorletta pointed



The Tire Sentry includes a sensor for each tire (left) that provides a warning in the event of a low pressure situation, thereby preventing serious damage, such as that experienced by the authors after a blow-out (far left).

out, the most comprehensive instrument panel on the most expensive motor coach says nothing about your last or ultimate safety device — your tires. Tires give you payload, stability, traction, and steering control. The Tire Sentry™ provides you with vital information about these very important components in your vehicle's safety system.

Preston Systems Inc. has spent the past two years performing final revisions and testing the Tire Sentry™. It will be introduced to the RV industry at the FMCA winter convention this month in Baton Rouge, Louisiana. The customer will have the choice of buying a Tire Sentry™ to monitor up to six or 14 tires. If you start with the six-tire system and wish to add

another vehicle, you will be able to return the control panel to Preston Systems for an upgrade. Also, if you replace your motorhome or towed vehicle, you can take the system with you and purchase just an installation kit to mount the product on the new vehicle. These features protect the value of the original purchase. The six-tire system is expected to retail for under \$500, and the 14-tire system for under \$1,000. Considering the cost of tires and the potential damage to a vehicle, as well as the safety of the occupants, either is a minimal investment.

In addition, the customer will be able to install a complete system with ordinary tools. Unlike any other tire monitoring device currently on

the market, the Tire Sentry™ can be installed without modifying any of the wheels; without having to dismantle a wheel/tire assembly; and without using batteries at each wheel.

Fiorletta pointed out that you should still check your tires each morning, and then let the Tire Sentry™ monitor them for the rest of the day.

As an aside, if the four green LEDs for the towed car stop flashing, better go look. The car is probably missing!

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