

Tire-pressure Monitoring Systems (TPMS) for Dummies

Tech Session – Richard Waters

The objective of this session is to describe how TPMS can be a way to avoid catastrophic tire failures and expensive to repair damage,

a description of the different types of TPMS systems and how they work, plus an overview of currently available systems suitable for GMC motorhomes.

I do not sell TPMS systems, I just researched it because I was afraid of blowouts.



GMCMI Fall 2013 Convention – Deadline for Reservations is August 16th!



2013 GMCMI Fall Convention!

Friday, September 20 to Thursday, September 26 KOA Campground & Convention Center Branson, Missouri

Before we proceed a word of warning.

DISCLAIMER:

Information presented by *GMC Motorhomes International* is intended only to communicate thoughts, ideas, opinions and procedures to and from *GMC Motorhome* owners; there is no attempt to replace or supersede recommendations from *General Motors Corporation* or any other component manufacturer or local and national codes relating to these modifications.







DISCLAIMER (continued)

2013 GMCMI Fall Convention! Friday, September 20 to Thursday, September 26 KOA Campground & Convention Center | Branson, Missouri

All opinions expressed here are those of the author and not **GMCMI**.

Mention of any product does not constitute endorsement by the author or *GMCMI*.

I'm not at expert at any of this.

I'm just someone who likes to fool with his GMC, just like most everyone else here.





A bit of history

• Why I'm going to be talking about monitoring tire pressure.



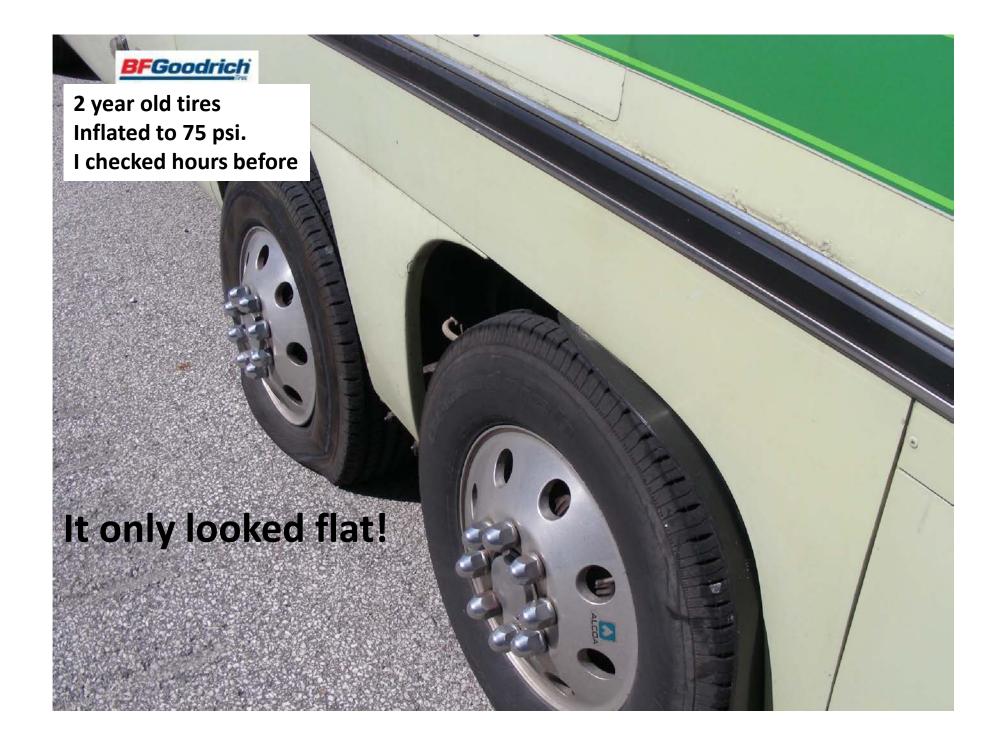
Problems on the way to DuQuoin

- While heading to the 2010 Fall GMCMI convention, with a new motor and transmission I had just finished installing the day before, I heard a very loud bang.
- First thought, was it the new motor?
- I pulled over, not really knowing what happened.











BFGoodrich

2 year old tires Inflated to 75 psi. I checked hours before

No fixing this tire. Lucky it didn't fly apart.

What to Do

- I did have a ten year old spare and I could change it.
- Did not like the idea of changing tires with my butt inches away from trucks going over 70!
- Remembered I had road service.

Good thing I have Road Service

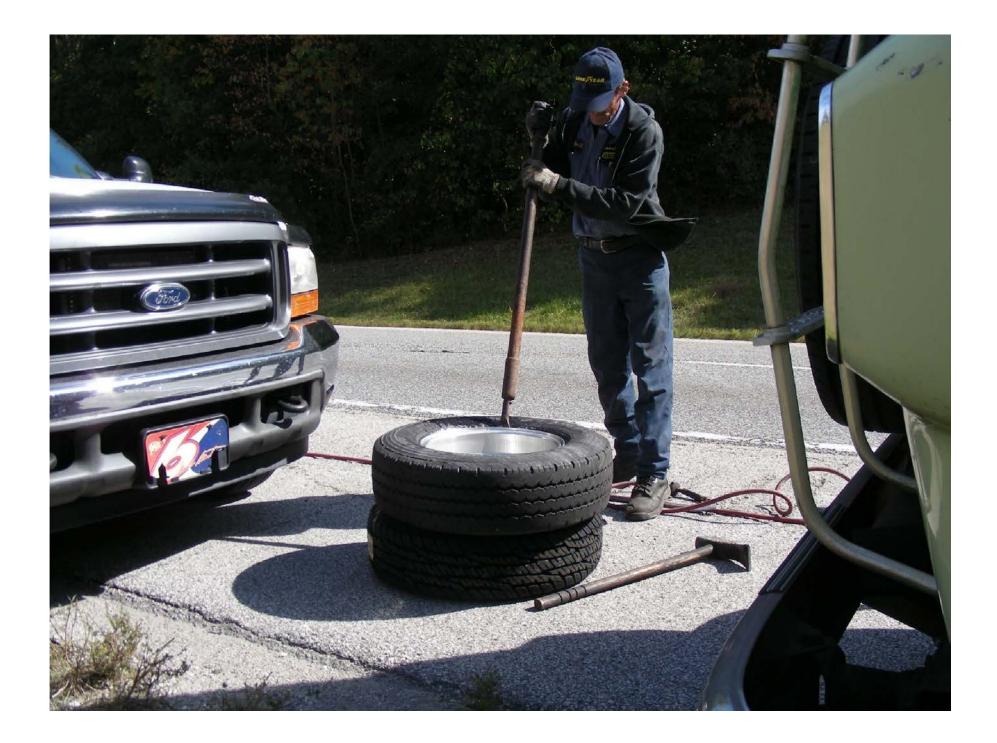
• Called Coach-Net and they had a guy out to me in about an hour.

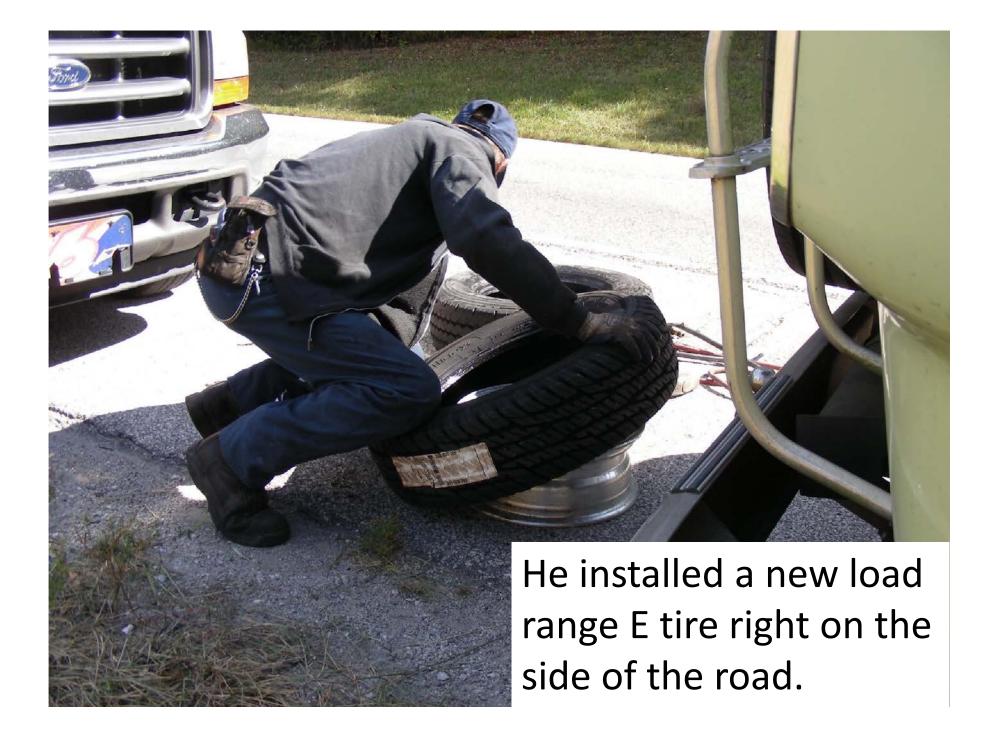






His rear end was not very far away from the trucks.









I don't know what caused the failure. The guys at Discount Tire didn't know either.



Tire Warranty?

- I called my local Discount Tire, thinking I had a road hazard warranty.
- "Well no" they said, "you didn't buy one."
- We would have refunded what you paid for that tire if you had one of our "CERTS".



When I got home.

- I took the tire back to my local Discount Tire.
- The guy there sold me "*CERTS*" for 6 tires.
- He told me about "Why incur an additional cost for the replacement of a tire damaged as a result of a road hazard or manufacturer defect when you can get it replaced at no additional cost to you?"
- So I thought I was all set for the next time.



Fast Forward 2 ½ years

- In the spring of 2013 my wife, cat and I were on our first long trip (4 weeks) ever in our GMC.
- Near Savannah, GA
 the engine quit and I
 had to park on the side
 of the expressway.
- Loose distributor +12 volt wire (easy fix).



About a week later

• I had a flat in a campground!!!





While checking the tire pressures in preparation to leave, I wiggled the valve stem on the front passenger side tire and it started to leak and went flat!



In my GMC I had an AC powered Air Compressor & Torque Wrench.

- Since I didn't know why the tire was leaking,
 I put the spare on.
- I used my never used Harbor Freight impact wrench to change the tire and my seldom used Sears air compressor to bring the tire up to 70 PSI.





Loose Valve Stem

- Discovered the problem was caused by a loose valve stem.
- Got the valve stem nut tight, aired it up and put that tire on the spare tire carrier.

Less than 20 miles later the tire I had just changed went flat on the highway!!!



My seldom used tools are getting used.

- Had to start the Onan to run the compressor.
- Pumped the tire back up so I could get someplace safe where I could decide what to.



Found this abandoned grocery store and changed the tire again



My seldom used tools are getting used.

- Had to start the Onan. again to run the compressor.
- Got my seldom used air compressor and Harbor Freight impact wrench back out.
- Jacked the front end up and put the original tire back on since I knew why it went flat.





- I drove all the way home, worrying about tire pressure.
- Checked my tires hourly when driving.
- Has to be a better way!



Got a little nervous on this bridge.



When I got home I went to Discount Tire

- I bought my tires from Discount Tire and was talked into buying their warranty that they call
 Certificate for Repair, Refund or Replacement
 I figured, "You know the "CERTS".
- Found out that they don't not cover RVs!





Conditions and Exclusions

Non-commercial service includes use by the owner in his/her regular trade or business but excludes commercial truck, racing, off-the-highway, taxi, limousine, or similar service.
 Passenger, SUV or light truck tire road hazard warranty (if applicable) *does not apply to tires used on commercial trucks, recreational vehicles* or off-the-highway service.



- So much for Discount Tire!!
- Next time COSTCO or someplace that doesn't exclude RVs.



There must be a better way

- I have 2 of these in my coach
- It's a hassle to keep checking my tires.



Started to get Paranoid

• What causes tire failures?



Under Inflation and **Overloaded** tires are the main reasons for failures.

Why RV tires fail

https://www.youtube.com/watch?v=1ThwsyjLXcM



Under Inflation and **Overloaded** tires are the main reasons for failures.

RV 101[®] Tire Tips by RV Education 101[®]

https://www.youtube.com/watch?v=isgLhpWUpSs



Under Inflation and **Overloaded** tires are the main reasons for failures.

RV Tire Maintenance

https://www.youtube.com/watch?v=OllidoINHj4



- Number One Cause of Tire Failures
 - Under inflated tire
 - Recommend to check the inflation pressure every day if possible
 - In my opinion that's not often enough according to my experience.

Started to think about what to do.

• Tire Pressure Monitoring Systems (TPMS)



There's a reason why this happened

- Since 2008, the NHTSA has required automotive manufacturers (though not RV manufacturers) to install such systems in vehicles with a gross weight of up to 10,000lbs.
- Not sure why RVs or big truck are exempt.



Remember the problems Ford had



- As of October 1, 2007, all new vehicles manufactured in the United States must have a tire pressure monitoring system (TPMS).
- Low tire pressure-related crashes cause 660 fatalities and 33,000 injuries each year, according to the National Highway Traffic Safety Administration (NHTSA).

- Some think that blowouts are caused by pressure bursting a weak spot in the tire, the main reason for them is just the opposite.
- Most blowouts are caused by too little air pressure allowing the tire to flex beyond its elastic limits until it overheats to the point where the rubber loses its bond to the internal fabric and steel cord reinforcement.

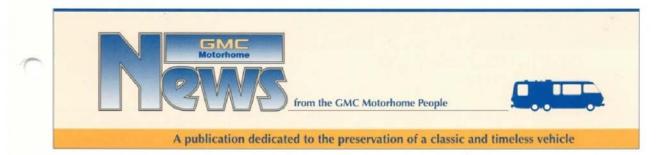
- Over/under inflated tires are one of the biggest risk factor facing drivers today. In fact, under inflated situation is a lot more common, and it can lead to tire blowout especially in hot summer days.
- One study found that vehicles under inflated by more than 25% or more were three times as likely to be involved in the crash. That's because it's not only the tire blowout that affect safe driving.
- Under inflated tires stability of the vehicle, steering response and bad traction on the road.
- It also contribute to bad gas mileage significantly.

l get it!

• Low tire pressure is a problem.



I remembered an article in Cinnabar's magazine about a way to monitor tire pressure. That was March 2000



March 2000 Number 23 **INSIDE:** LETTERS **COACH TALK** CLUBS, RALLIES AND SEMINARS GREAT NORTH AMERICAN **RV RALLY** JULY 17 TO 21 BATTERY EQUALIZATION DOWN-UNDER QUESTIONS . FRONT-END VIBRATION • TIRE PRESSURE SENSORS HOT WATER TEMPERATURE **ON-THE-ROAD** OFF-THE-ROAD • WHEEL BEARING LUBRICATION

REAR WHEEL BEARINGS

Macauta Da

SMARTIRE - A TIRE MONITORING SYSTEM by Doug Marion

The SmarTire system monitors tire inflation pressures and temperatures at the push of a button.

The old adage, "Out of sight, out of mind," often applies to GMC Motorhome tires. Of course, tires are not out of sight, but the inflation pressure they carry often is out of mind, which can be costly and dangerous. When inflation pressure drops even a few pounds below the correct level, heat buildup causes damage that may extend over many miles, leading to tire failure. When underinflation is dramatic, a blowout is not far away. Most failures don't cause accidents, but the potential is there.

The SmarTire RV Wireless Tire Pressure Monitoring System is designed to prevent tire failures and ensure maximum tread wear by positioning a visual reminder in front of the driver. The dashmounted display module electronically monitors not only the individual pressures inside as many as for all types of motorhomes. The RV-433 sixwheel Wireless Monitor System features six electronic sensors, one attached to the wheel rim inside each tire. Each sensor continuously sends a pressure and temperature signal via 433MHz radio frequency to a dash-mounted interactive display module. If air pressure or temperature vary from preset limits — 5 psi or 10 degrees F, for example — a red warning light atop the module is activated. If the deviation is not corrected, a buzzer sounds. The manufacturer is developing systems that will cover eight or 10 wheels, which will allow monitoring of motorhome and dinghy-vehicle tire pressures simultaneously.

System installation involves placing sensors in each wheel and mounting the display module.

Did not like the idea that sensors were installed inside the rim.

in any convenient and visible location with double-sided tape.

As the wheel rotates on the road, centrifugal force causes a motion switch inside the sensor to connect a radio transmitter to a lithium battery, producing the signals that are read on the dash monitor. When the vehicle stops, the switch disconnects the battery. The sensors are coded so the display module identifies each tire correctly. The sensors' pressure-sensing range



The counterweight plate and the sensor are mounted using a large stainless-steel clamp. Excess strap is cut off.



The sensor is mounted 180 degrees from the valve stem and counterweight plate.



Six sensor transmitters, their counterweight plates and their stainless steel mounting straps go inside the tires and are mounted on the rims.

is 0 to 127 psi. Storage and operating temperature range is minus 40 degrees F to 185 degrees F and accuracy is described by the manufacturer as plus or minus 1 psi and 1 degree E Battery life is projected at seven years or approximately 90,000 miles. Inflation pressures are monitored every 30 seconds and air temperature every 60 seconds while the vehicle is moving at speeds of 5 mph and faster. When tires are rotated, the display module is easily reprogrammed to reflect different wheel positions for each sensor.

The SmarTire system's purpose is to help eliminate tire failures that are caused by low air pressures, and it appears quite capable of doing that, thereby increasing safety and extending tire life. Maintaining proper inflation pressure is necessary for best tread wear, as well as optimum fuel efficiency and vehicle handling. The system may also alert the driver to possible disc-brake drag, bad wheel bearings or other problems that can raise the air temperature inside a tire.

The six-wheel system is list priced at \$499; installation averages \$150. SmarTire offers a \$120 installation coupon for use at select stores, including Sears, National Tire & Battery, America's Tire, Discount Tire and American Car Care Centers. If you are buying tires, this is a perfect time to have SmarTire installed because most of the installation cost is absorbed in the price of the tire mounting.

The system carries a three-year/50,000mile warranty and a comprehensive owner's manual that gives very detailed programming instructions is provided.

SmarTire Systems, Inc. is located at 13151 Vanier Place, Suite 150, Richmond, B.C; telephone toll-free (888) 982-3001. The company's Internet web site features the monitoring system interactively at http://www.smartire.com. A

Doug Marion is the former Technical Editor of MotorHome magazine.

TPMS has come a long way since then

• Just Google "TPMS for RVs"



RV Tire Pressure Monitoring Systems

TPMS is used to monitor the pressure

- in the tires via sensors located in the tires
- or the use of wheel speed and other vehicle sensors
- a warning light and/or chime is used to warn the driver of a potentially unsafe condition
 - like a loss of tire pressure
 - or increase in tire temperature.

RV Tire Pressure Monitoring Systems

- Given the repair costs associated with a blowout -- where damage to the RV can often extend well beyond the wheel well -- installing a TPMS system should be a high priority for motorhome and travel trailer owners.
- A number of competing tire pressure monitoring systems are available including the Hawkshead Talon and the TireMinder TPMS system.



7 reasons for using a TPMS on your motorhome and towed vehicle tires.

1. Most Tire Pressure Monitoring Systems I researched were easy to install and easy to use.

2. It's a quick and easy way to check the tire pressure in every tire before traveling each day. The TPMS I use is accurate to within 2.7 percent. That's as accurate as many tire gauges.

3. You can monitor both the motorhome and the towed vehicle tires as you travel. That's what I call piece of mind!



7 reasons for using a TPMS on your motorhome and towed vehicle tires.

4. A TPMS has some type of alarm/warning system to notify you of a potential problem. Knowing when there is a potential problem with a tire can limit damage to the motorhome and quite possibly save lives.

5. My TPMS monitors tires for a loss in air pressure and for possible overheating.

6. A TPMS can be cost-effective. The cost of a decent TPMS can be about the same as the price of a new tire, not to mention the damage a blowout can cause to the motorhome and/or the towed vehicle.



7 reasons for using a TPMS on your motorhome and towed vehicle tires.

7. I don't think I was ever as relaxed traveling in the motorhome as I was with the TPMS onboard. Driving is much more enjoyable when you know what the tire pressure is at any given time, and the fact that you will be warned if a problem with the tires exists.



I Decided I had to get TPMS

 I Had some trips coming up and didn't want to worry about tires.



• Most for cars, but lots for Trucks and RVs





• Most are for automobiles



• Most are for automobiles





What I looked for in a TPMS

- Cost Effective
- Warranty
- Ease of installation
- Monitor the motorhome and towed tires
- Good alarm/alert
- High pressure
- Low tire pressure
- Overheating alarm
- Battery replaceable
- Flow through sensors



- As of October 1, 2007, all new vehicles manufactured in the United States must have a tire pressure monitoring system (TPMS).
- Low tire pressure-related crashes cause 660 fatalities and 33,000 injuries each year, according to the National Highway Traffic Safety Administration (NHTSA).
- Or, this estimate that **41 fatalities (414 x .2 x .5) and 1,028 injuries are caused annually** by flat tires/blowouts, where under-inflation is the cause of the flat tire/blowout.
- Some think that blowouts are caused by pressure bursting a weak spot in the tire, the main reason for them is just the opposite. *Most blowouts are caused by too little air pressure allowing the tire to flex beyond its elastic limits until it overheats to the point where the rubber loses its bond to the internal fabric and steel cord reinforcement*.
- Over/under inflated tires are one of the biggest risk factor facing drivers today. In fact, under inflated situation is a lot more common, and it can lead to tire blowout especially in hot summer days. One study found that vehicles under inflated by more than 25% or more were three times as likely to be involved in the crash. That's because it's not only the tire blowout that affect safe driving. Under inflated tires stability of the vehicle, steering response and bad traction on the road. It also contribute to bad gas mileage significantly.

Polk's Top 7 Reasons for Using a Tire Pressure Monitoring System

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- **3.** You can monitor both the motorhome and the towed vehicle tires as you travel. That's what I call piece of mind!
- **4.** A TPMS has some type of alarm/warning system to notify you of a potential problem. Knowing when there is a potential problem with a tire can limit damage to the motorhome and quite possibly save lives.
- **5.** My TPMS monitors tires for a *loss in air pressure* and for *possible overheating*.
- 6. A TPMS can be cost-effective. *The cost of a decent TPMS can be about the same as the price of a new tire*, not to mention the damage a blowout can cause to the motorhome and/or the towed vehicle.
- 7. I don't think I was ever as relaxed traveling in the motorhome as I was with the TPMS onboard. Driving is much more enjoyable when you know what the tire pressure is at any given time, and the fact that you will be warned if a problem with the tires exists.



By Mark Polk <u>RV Education 101</u> http://www.fmca.com



TPMS for RVs Come in Different Configurations

- Flow-Through and non Flow-Through tire sensors
 - easier to add air with Flow-Through
 - Some say the added length of Flow-Through sensors is a potential problem at car washes
 - Some say to use no Flow-Through sensors on towed cars.
 - I prefer Flow-Through (hassle to remove sensor to add air)
- Replaceable or non replaceable batteries
 - Some say "We intentionally avoided the option to offer replaceable batteries due to the multiple types of problems that we found with ensuring a consistent seal that will keep the sensor air tight and keep water and debris away from the electronics in the sensor".
 - I'd rather change my batteries myself and not have to send the sensors back to the factory when they go dead.

Flow-Through tire sensors



non Flow-Through tire sensors



Replaceable Battery



Replaceable Battery



Internal Sensors



Display

• Graphic vs Non Graphic



Doran 360RV

- Doran 360RV
- non Flow-Through
- non replaceable batteries
- Graphic Display
- ONE YEAR LIMITED WARRANTY
- \$399.99 for 6 wheels
- The sensors are waterproof, weatherproof and spin-welded to prevent corrosion and provide long-life
- We intentionally avoided the option to offer replaceable batteries due to the multiple types of problems that we found with ensuring a consistent seal that will keep the sensor air tight and keep water and debris away from the electronics in the sensor







PressurePro TPMS

- PressurePro TPMS
- not Flow-Through
- Display is not graphic
- from \$515.00
- Amazon
- seen in FMCA Mag
- Old Technology?



Pacific Dualies 80008

- Pacific Dualies 80008 PressurePlus FM Series
- 6-Sensor Tire Pressure and Temperature Monitoring
- non-Flow-Through
- replaceable battery
- Price: \$325 Amazon



TireMinder

- TireMinder Tire Pressure Monitoring System
- Replaceable long-life CR 1362 lithium batteries
- non Flow-Through

Also Marketed as:

- HawksHead PRESSURE TRACK HD
- InnoTechRV
- TireTraker

Camping World for 6 wheels \$356.30 **Amazon** for 6 wheels \$323.63 *Image*





TireMinder



Camping World for 6 wheels \$356.30 **Amazon** for 6 wheels \$323.63 *Image*

TireStat



TIRE PRESSURE MONITOR SYSTEM - 6 TIRES...Regularly \$704.09 On Sale for Only **\$509.99**

http://www.pplmotorhomes.com

- All configurations include:
- Rechargeable Handheld Monitor
- Flow-ThroughTire Sensor
- Universal Transceiver Signal Booster (not included with 4-tire system)

The system is programmed to detect low pressure, high pressure, high temperature and rapid leaks using an exclusive rechargeable, Handheld Monitor which also functions as a portable tire gauge.

Tire-Safe Guard

- Sensors have Replaceable Battery
- Flow-Throughor nonFlow-Through
- LOW PRESSURE, HIGH TEMPERATURE, SLOW LEAK, HIGH PRESSURE, NO SIGNAL & LOW BATTERY
- \$279.00 + Shipping \$479.00 w/towed
- seen in FMCA Mag
- www.tiresafeguard.com
- Sales and Technical Support Hotline: 1.818.400.9976
- The flow-through sensors can be secured to prevent loss or theft
- Portable monitor has rechargeable battery and monitors tire pressure 0-199 PSI & temperature
- Sensor batteries are replaceable
- Monitor tires 24/7: low/high pressure, high temperature, and slow leaks.
- Monitor warning thresholds are user adjustable; low pressure alert level is per axle adjustable.
- Tire sensor signals have excellent range and not require signal booster for most vehicles





TALON & TALON X-TREME

by HawksHead

- Standard Monitor up to 22 wheel capability
- Lithium rechargeable battery
- 2 versatile Monitor mounts.
- Monitor power cord.
- Hard wire cord
- 4 Wheel Sensors for up to 188 PSI pressures.
- 4 Sensor locking screws, wrench and batteries.
- Choose Cap or Feed Through. We do not recommend feed through sensors for travel trailers, 5th wheels as the sensors are longer than Cap style and tend to stick out further.
- <u>http://www.tpms.ca</u> \$454.00
 Comes with 1 year Manufacturers
 Warranty. 30 Day Money Back Less S/H







TireMinder

- TireMinder Tire Pressure Monitoring System
- Replaceable long-life CR 1362 lithium batteries
- non Flow-Through

Also Marketed as:

- HawksHead PRESSURE TRACK HD
- InnoTechRV
- TireTraker



Camping World for 6 wheels \$356.30 **Amazon** for 6 wheels \$323.63 *Imagentary*

TST Truck Systems Technologies

- TST Truck Systems Technologies
- new Flow-Throughsensor system!!
- FIRST TO INTRODUCE THE USER REPLACEABLE BATTERY
- Monitor and six tire sensor system \$299
- (770) 889-9102
- http://www.tsttruck.com/Product_List.html
- I ORDERED for 6 wheels 7/1/2013 \$299
- Both sensors barely fit in Alcoa wheels –something to think about with other brands.

From their website:

- The 507RV system, as with our 510RV system, is accurate within 1.5 +/- PSI and our systems are accurate within +/-1 degree Fahrenheit of the actual air temperature within your tires.
- two year warranty
- This system remains backed and supported by the same personal service standards that have made TST the only name you ever need to know in the world of tire safety and pressure monitoring.
- This system will monitor up to 22 different tires with axle specific PSI settings.
- Our new system was designed by RVers for Rvers. Our new technology allows the user the ability to assign sensors to their perspective tire positions by literally touching a button.



EezTire

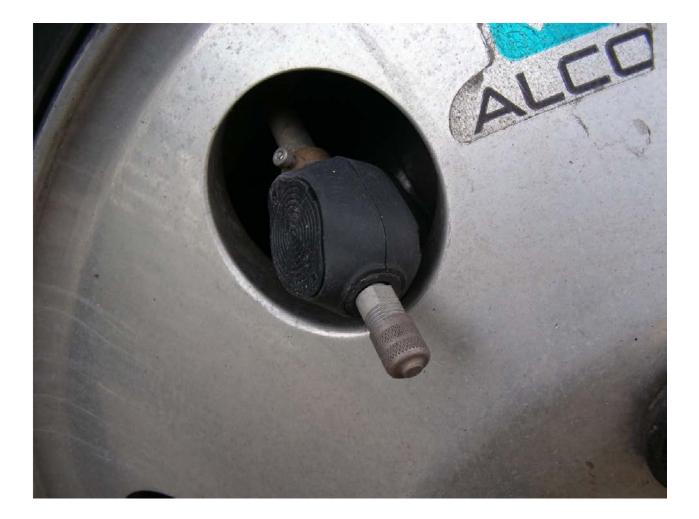
- Another one I just heard about Sept 23, 2013
- About \$325 Ebay
- Sensors are used on other brands TST etc.



What I bought

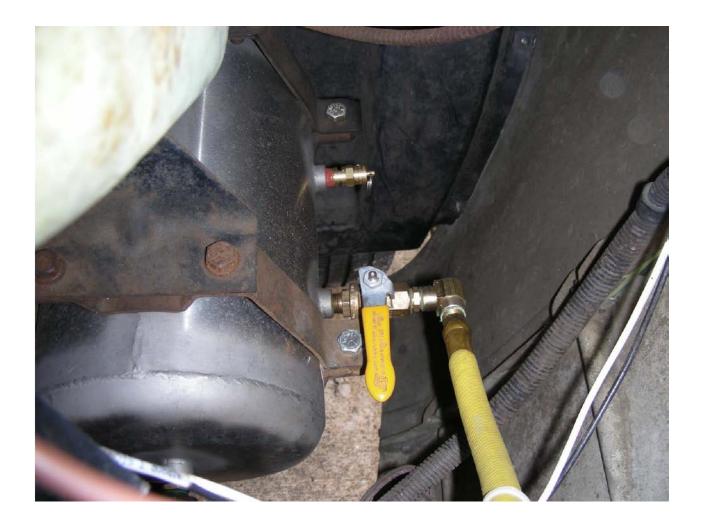
- TST Truck Systems Technologies
 - I called them and talked to a person within minutes
 - They promised tech support 24-7
 - I was in a hurry, fast free shipping
- Installation drawbacks
 - Sensors are real tight
 - Close fit of sensors
- Service Air System
- Comments on what I have experienced
 - Temp variations
 - Don't check the air anymore



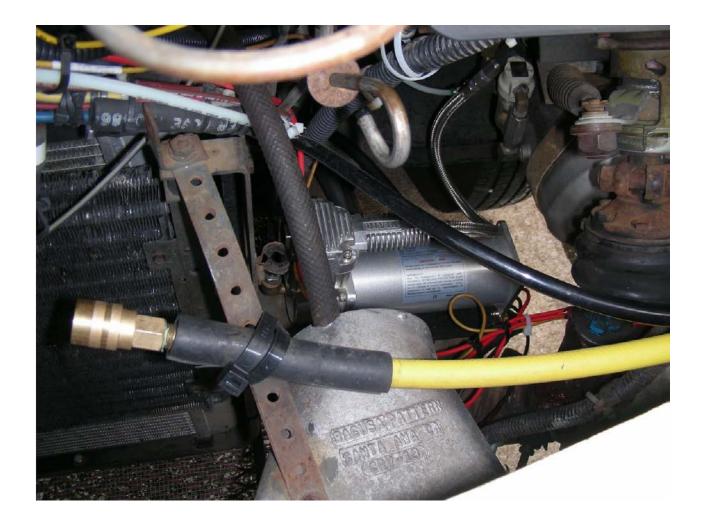




Service Air Shut Off



Quick Disconnect



25' of a good rubber hose Flexible when its cold outside



Installed an air pressure gage



Back Pages of FMCA Magazine



Back Pages of FMCA Magazine



Back Pages of FMCA Magazine



How to handle a blowout in your RV

How to Handle a Tire Blowout in Your RV

https://www.youtube.com/watch?v=lkwOE1yKY5c

