

TIREUM LPM-420

LOW PRESSURE MONITORING SYSTEM

TECHNICAL DESCRIPTION

The TireUm LPM-420 consists of the following components:

- Four Tire Pressure Monitoring Sensors
- Two Wiring Harnesses (each with two Receivers)
- One Display

A tire pressure monitoring sensor is mounted on the rim (inside the tire) of each wheel on the vehicle. A receiver is mounted in each wheel well and all the receivers are wired (through the harness) to the display, which is located on the dash. A low pressure signal created by one of the sensors is transmitted, using an oscillating magnetic field, to the nearest receiver. The receiver converts the signal into a 12Vdc level and sends it to the display via the wiring harness. A warning signal is created by the display alerting the driver that one of the tires is losing air pressure.

Each sensor has a mechanical pressure switch set to activate when the tire pressure is below a predetermined level and a motion switch set to activate when the vehicle speed is greater than 20 km/hr. Thereby a signal is created only when the vehicle is moving and a low pressure exists in one, or more, of the tires. When the vehicle is stationary or when all tire pressures are correct, all sensors are turned off.

1) TIRE PRESSURE MONITORING SENSOR

Power is applied to the sensor printed circuit board (PCB) from the two 3Vdc, lithium, coin cell batteries on the PCB. The quartz oscillator, QZ1, oscillates at 32,768 Hz. A 25-30Hz pulse stream is created by IC1A, IC1B, R1 and C1, R4 and C4 modify this pulse stream so that the pulses are 5ms duration and 33-40ms apart (25-30Hz). The pulse stream and the 32.768Hz signal are combined to provide a 32,768Hz signal in 5ms pulses that are repeated every 33-40ms. This signal switches transistor T1 on and off causing current to flow through the coil creating a magnetic field that oscillates in the same manner. The coil is a 100 turn, 28AWG, copper wire coil approximately 45mm long by 25mm wide.

2) RECEIVER

Power is applied to the receiver from the vehicle battery. The receiver creates a weak, static magnetic field in one of its coils. When the oscillating magnetic field from the sensor is present, it interacts with this field creating an AC signal in the receiver. Other magnetic fields (AC or static) may also interact with the receiver's magnetic field creating a signal, therefore the signal is filtered to remove false signals. The AC signal is converted to a 12Vdc level.

3) DISPLAY

Power is applied to the display from the vehicle battery. Whenever the display receives a signal (12Vdc) from a receiver, the red light is illuminated until the signal stops. The buzzer sounds for 5 seconds after the start of the signal.

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OWNER'S MANUAL AND INSTALLER INFORMATION

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

GENERAL DESCRIPTION

The TireUm LPM-420 alerts the driver when the pressure is low in one or more of the vehicle's tires. The system activates itself when the vehicle is in motion (speeds above 20km/hr) and turns itself off when the vehicle is stopped.

The TireUm LPM-420 consists of four small sensors, two wiring harnesses and a display. One sensor is mounted in each wheel and the display is mounted on, or under, the dash. The wiring harnesses transmit the signal from the sensors to the display.

The display is connected to the vehicle power. There are two types of vehicle power: keyed and non-keyed. The display will turn on and off with the key if it is connected to the keyed power. If the display is connected to the non-keyed power, it will stay on all the time. TireUm recommends that the display is connected to the keyed power to avoid draining the vehicle battery when leaving the vehicle parked for long periods of time.

The display has two indicator lights (a green power light and red alarm light) and a buzzer. The green light indicates that the system is working and is on whenever there is power to the display. The red light illuminates whenever a low tire pressure is detected in any of the four wheels and the vehicle is moving at speeds above 20km/hr. The buzzer will sound for the first 5 seconds after a low pressure condition has been detected. The red light will stay on until the offending tire is re-inflated. During stop-start driving, the buzzer will sound each time the vehicle accelerates past 20km/hr.

The red light should stay off. If it comes on, check the pressure in all of the vehicle's tires. The green light should be on all the time that you are driving. If it does not come on, there is a problem with the system.

INSTALLATION

1) SENSOR

- a) Remove the tire from the rim.
- b) Clean an area of the rim approximately 3" long in the drop center opposite the valve. To clean the rim, remove any loose, flaking paint or coating, then clean with a 50/50 isopropyl; alcohol rubbing alcohol)/water mixture or heptane. Follow the solvent manufacturer's precautionary warnings and suggested handling procedures when using solvents.
- c) Remove the backing film from the adhesive tape on the sensor.

- d) Position the sensor over the cleaned area of the rim in the middle of the drop center. Press the sensor firmly onto the rim.
- e) Install the tire and balance the wheel using normal installation and balancing methods. To minimize the risk that the sensor will be damaged or knocked off the rim during installation, position the tire so that as you rotate the tire and rim, the bead drops over the rim at the sensor last. i.e. start the bead guide approximately 90 degrees past the sensor.

2) WIRING HARNESES

- a) There are two wiring harnesses: one for the two front wheels and one for the rear wheels. The longest harness is typically used for the rear wheels. Each harness has two “pucks” or receivers on it. These pucks pick up the signal from the sensors in the tire and must be located in the wheel well. They are mounted using adhesive tape the same way that the sensors were mounted.
- b) Determine the location for each puck in each wheel well and how the wire harness will be routed from one side of the vehicle to the other so that one puck is located at the left wheel and one at the right. Also determine how the remaining wire will be routed to the dash.
- c) Route the wire harnesses before permanently attaching the pucks.
- d) Clean an area of the wheel well approximately 3” square. Remove any dirt or road grime and then clean with a 50/50 isopropyl alcohol (rubbing alcohol)/water mixture or heptane. Follow the solvent manufacturer’s precautionary warnings and suggested handling procedures when using solvents.
- e) Remove the backing film from the adhesive tape on the puck.
- f) Position the puck over the cleaned area and press firmly onto the surface.
- g) Fix the wire onto the vehicle to ensure that it is held securely in place.

3) DISPLAY

- a) Select the location on the dash for the display.
- b) Route the ends of the wiring harnesses to this location and connect to the display.
- c) Connect the green wire of the display to vehicle ground.
- d) Locate a vehicle 12V wire (i.e. cigarette lighter or radio) and connect the red wire of the display to it using the splice.