

Tire pressure monitoring system



TIRESS

OPERATING INSTRUCTIONS

Thank you for choosing our product-

Please check the contents of the box, which should be as follows:

- A. One electronic control box.
- B. One 2-coloured LED with its bracket.
- C. One feed wire.
- D. Four pressure sensors for the tyres.
- E. One instruction booklet.
- F. One fitting booklet.
- G. One guarantee certificate.

The "TIRESS" pressure monitoring system is designed to be as fool proof as possible to both the installer and user.

In order to make the system as uncomplicated as possible, when the vehicle has a low tire pressure the driver is simply given a message on the dashboard display that alerts him/her to check the vehicle's tire pressures.

Choosing the trigger point for the alarm

You can choose one of the two alarm trigger points available according to the pressure of your tyres.

1. Option 1 is the standard version, as supplied by the factory, for tyres inflated to between 1.9 and 2.6 bar.

2. Option 2 can be chosen by making a small adjustment to the electronic control box. This is recommended for tyres inflated to between 2.4 and 3.1 bar. To select this option, please proceed as follows:

- A. open the control box, taking care not to touch or disturb the components within the box.
- B. identify the rectangular blue jumper.
- C. remove the jumper and re-fit it one position nearer to the connectors.
- D. re-close the electronic control box.

Functioning of the system:

When the ignition is switched on, the monitoring LED illuminates GREEN for two seconds. An audible alarm is also sounded for 1/2 sec. This acts as a bulb and buzzer check. Once pressure data is received from all four wheel-sensors, after driving has commenced, the monitoring LED is permanently illuminated GREEN.



During normal driving, with no low tire pressures, the monitoring LED is permanently illuminated GREEN. However if a tire begins to deflate and the pressure drops below 1.6/2,1 bars then the LED is illuminated blinking ORANGE accompanied by an audible warning,



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intermittent for 5 seconds, to alert the driver that at least one of the tires on the vehicle needs to be checked. Both the blinking and the intermittency of the buzzer follow a duty cycle of 1/2 second on and 1/2 a second off.



The warning will be extinguished when the vehicle has stopped and the system stops monitoring pressure. However, if the under inflated tire/s are not re-inflated then the warning shall be reinitialised when the system begins to monitor pressure again after the vehicle moves off.

If the pressure in the deflating tire drops below 1.2/1,7 bar then the warning message flashes continuously **RED** at a rate of one second on and one second off. An audible alarm shall also be sounded at a rate of one second on and one second off for 10 seconds.



System Installation.

The wheel sensors are installed in the same way as any clamp in valve stem (please refer to sensor mounting annex 1). The receiver can be placed in various locations were it is visible to the driver. After the receiver has been mounted it must be self learn with the unique identity codes of the four wheel sensors already installed. When the receiver is first installed and powered on it will automatically default to 'autolearn mode'. The flashing of the monitoring LED in **GREEN** indicates Autolearn activation. The system installer must then drive the vehicle above 35km/h for approx 10mins until the monitoring LED illuminates permanently **GREEN**. This time may vary due to driving conditions such as being stuck in traffic jams and driving below 35 km/h. During this learning period the receiver will 'buzz' periodically. This is done to inform the user that the receiver is receiving data from the wheel sensors. When the monitoring LED illuminate permanently **GREEN** this indicates to the installer that the receiver now knows the identity codes of the four wheel sensors and Autolearn is completed.

System Diagnostics.

Whilst monitoring tire pressure the system also performs self diagnostics. If one or more wheel sensors fail, the monitoring LED will illuminate **ORANGE** continuously, to indicate to the driver that a malfunction has occurred and he needs to proceed with servicing. The audio alarm will remain silent.

THIS FAIL WILL ONLY BE CLEARED WHEN THE EITHER THE WHEEL SENSOR HAS REPORTED IN AGAIN OR IT HAS BEEN REPLACED WITH A NEW SENSOR AND THE SYSTEM REPROGRAMMED.

In order to check which wheel sensor has failed, the tire mechanic must follow the following procedure:

- Step 1. Identify faulty sensor:
- Step 2. Inflate Front Left tyre to reach 3.2 Bars

Tire pressure monitoring system Mounting Instructions and Dismounting Instructions



It is recommended to relieve tyre pressure by removing the 12mm valve retaining nut rather than by removing the valve core. If the valve core has been removed from the stem, it must be replaced with the original nickel-plated core, or with a fresh nickel-plated core. Nickel-plated valve cores must be used with the aluminium valve stem. Failure to use nickel-plated cores will result in galvanic corrosion and eventual loss of tyre pressure. Tighten core with an approved core tool to 2.5 inch pounds (25 cNm).

IF THE CAR HAS ALREADY BEEN DRIVEN, AND A SENSOR NEEDS TO BE FITTED OR REPLACED, A NEW RUBBER VALVE-SEALING GROMMET MUST BE FITTED BEFORE THE SENSOR IS REPLACED.

Smart Valve, Tyre Pressure Monitoring Transmitter with Small Grommet Seal 14mm OD

Mounting Instructions

- 1) Slide inner tyre bead over rim face. Use lubricant, in accordance with normal procedure.
- 2) Mount transmitter valve through rim hole as shown in Figure 1. Both holes in the sensor case should face towards the inside of the tyre. Hand start and then slowly torque the 12mm valve retaining nut to 38 inch pounds (7.25 Nm +/-18%).

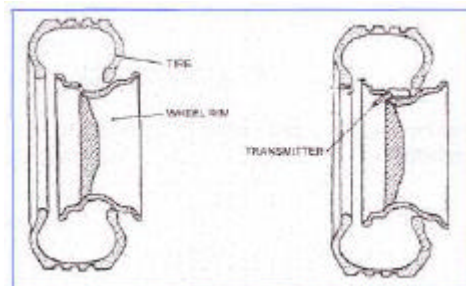


Figure 1 - Tyre, rim and transmitter orientation

3. Place wheel & tyre on turntable of tyre mounting machine. Ensure that transmitter is 270° (9 o'clock position) from mounting head when the outer tyre bead is mounted as shown in Figure 2.

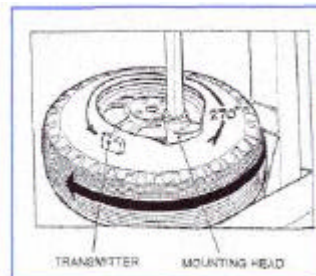


Figure 2 - Tyre mounting procedure

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4. Lubricate tyre well and mount second tyre bead as normal. Ensure that tyre does not rotate relative to rim.

5. Inflate tyre to required pressure, replace aluminium valve cap and fit wheel to appropriate position on vehicle.

Dismounting Instructions

1. Rotate tyre so that valve stem is in the 6 o'clock position. Unscrew 12mm valve retaining nut and allow tyre pressure to be relieved. Once tyre pressure is relieved, remove nut and allow transmitter to fall into tyre.

2. Place on tyre changing machine (see Figure 1) and break both tyre beads ensuring that the transmitter remains in the bottom of the tyre.

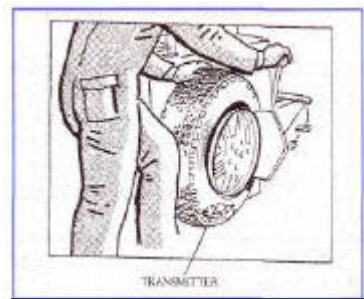


Figure 1 - Bead breaking procedure

3. Turn tyre so that valve hole is at 6 o'clock position. Carefully lift tyre onto turntable and position valve hole (and transmitter) at 270° (9 o'clock position) from bead mounting/dismounting head as in Figure 2.

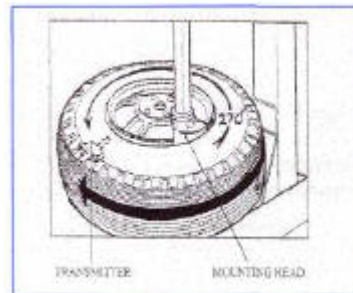
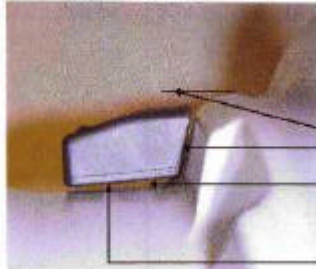


Figure 2 - Tyre dismounting procedure

4. Lubricate tyre well and remove outer side of the tyre. Reach inside the tyre and remove the transmitter. Remove tyre from rim using proper tyre changing equipment procedures.

Typical Mounted Transmitter in Rim.



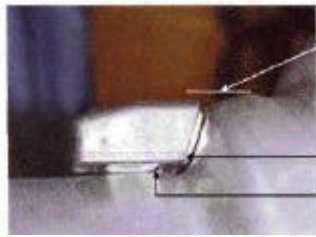
N.B! Transmitter must be torqued into rim to our recommendations, 7.5 Nm.

Ideally the top of transmitter is to be below Bead Hump. If not Possible, then take extra care when mounting tyre.

Front face must not touch rim face.

Must be a gap under centre line of transmitter and rim face.

NB! It is ok for one edge or corner of transmitter to touch the drop centre area as the torquing process tilts transmitter, (not shown in photo)

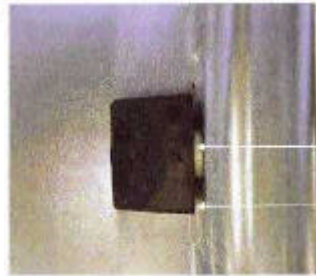


Transmitter - Typical mounting position - Twisted

Photo shows one side or one edge touching rim drop centre. This is ok **Ideally** the top edge of transmitter should be lower than the bead hump

This corner must not touch the rim face

The lower edge or lower corner of case touches the rim simply due to the torque applied during installation



Transmitter- Typical mounting position

Photo shows top view of the transmitter. This is OK.

N.B! Transmitter must be torqued into rim to our recommendations.

The moulded front face of the transmitter must not touch the rim surface.

Ideally, if possible, a gap of 0.5mm is recommended.

It is ok if ONE lower corner touches the rim due to the torquing process tipping the transmitter but NOT two corners (see other photos for more details).

The installation must be conformed to the above mentioned specifications: in the opposite case. SPAL srl will not be responsible for any kind of problems.

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Equipment Required - Tire Mounting

- Torque Wrench or Gun. Fully Programmable units are best suited (high final torquing speeds are not advised)
- (Optional) Automatic and hand-held reader tools to verify that transmitter has been successfully mounted and allows actual tire inflated pressure to be measured and either recorded or relayed to Plant Operations.

Central processor unit install:

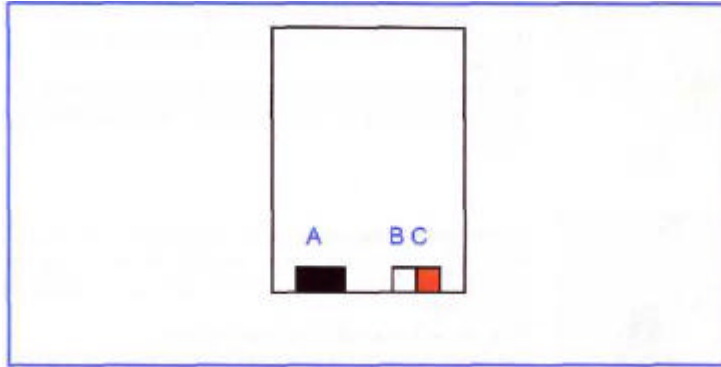


Figure 1 - Central unit

1. Supply wire (with the red connector): connect the brown wire to a +15V (IGNITION) and the blue wire to a negative; on the opposite side (where there is the red connector) connect the red connector to the red connector of the CPU (C);
2. LED wire: connect the LED wire with the black connector to the black connector (A) of the CPU;
3. Buzzer: connect the white connector of the buzzer to the white connector of the CPU (B);

LED mounting instructions:



1=green wire
2=black wire
3=white wire

Figure 1 - LED installation

To install the LED on the dashboard:

1. Choose a suitable location on the dashboard,
2. make an 8mm. dia. hole,
3. insert the LED-holder supplied into the hole.
4. It may be easier to insert the LED into the LED-holder first (Figure 1).



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- Step 3. Drive test vehicle at a speed above 35km/h for one minute.
If the **ORANGE** LED signal starts to flash rapidly **ORANGE** it means that the faulty sensor must be situated in a different position. Return to base deflate Left Front to 2 bars and inflate Right Front to 3.2 bars.
- Step 4. Repeat step 3 by deflating the previously over inflated tyre and moving to the next tyre until the **ORANGE** LED signal does not start to flash after one minute. This indicates that you have identified the right wheel position of the faulty sensor.
- Step 5. Proceed with replacement of the identified sensor and drive off for 15 minutes at a speed above 35km/h
- Step 6. Verify that the initially **ORANGE** LED illuminates changes to permanently **GREEN** accompanied by a continuous 2 second buzzer alert. This indicates to the driver that the receiver knows the identity code of the new sensor and the service procedure is completed.

A wheel sensor failure is deemed to be a sensor from which pressure data has not been received in the last 32 total pressure transmissions from other wheel sensors. Since the pressure sensors transmit once every minute, the fail time equates to about 11 minutes of driving.

System Specification

*System:

Frequency of operation:	433.92 MHz
Data Rate:	4.096 KHz
Leak Pressure Threshold: 1.6 Bar	
Flat Tyre Pressure Threshold:	1.2 Bar
Threshold hysteresis:	± 50 mBar
Leak reaction time:	10 seconds after Pressure < 1.6 bars - 2,1 bars
Flat Tyre reaction time:	10 seconds after P<1.2 bars - 1,7bars

*Receiver:

Power Supply:	Ignition. (12V)
Receiver Current:	< 20 mA with LED GREEN < 30 mA with LED ORANGE some peaks < 50 mA with LED RED
Power Voltage:	9 to 16 Volts, 13.6 nominal
Operating Temperature	-20 to + 70 deg Celsius
Installation	Internal to vehicle cockpit free from metal shielding

*TPM Sensor:

Lifetime:	7 years or 150,000 kms
Weight:	< 40 g
Nut torque:	10 N/m
Installation:	See Annex 1
Operating temperature	-40 to +100 deg Celsius

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FUNCTIONS OF THE LED AND BUZZER

Standard option - alarm triggered at 1.6 and 1.2 bar - recommended for tyres inflated to pressures between 1.9 and 2.6 bar.

Option 2 - the alarm is triggered at 2.1 and 1.7 bar - recommended for tyres inflated to pressures between 2.4 and 3.1 bar.

Receiver Function	Monitoring LED	Value	Buzzer	Value
Power On	GREEN	(2 sec permanent)	ON	1/2 sec perm
Normal Pressure (driving)	GREEN	Permanently	OFF	
Low Tire P<2,1/<1.6+/- 0.5 bar	ORANGE	Perm (1/2 on 1/2 off)	ON	2 sec (1/2on1/2 off)
Flat Tire P<1,7/ <1.2 +/- 0.5 bar	RED	Perm (1 on 1 off)	ON	10 sec (1 on, 1 off)
Pressure Sensor Failure	ORANGE	Permanently	OFF	
Tyre Over inflated P>3,5/>3 bar	ORANGE	Perm (1/4on1/4 off)	OFF	
Autolearn	GREEN	Perm (1 on 1 off)	ON	1/4 sec when it detects tx