Tyre Pressure Monitoring System

Installation
User Guide
Specification

for TMS10 and TMS11

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Issue5

Contents

1 Important Notices

It is your responsibility to fully consider the implications of installing TMS sensors, and take adequate precautions to ensure the installation does not compromise the integrity of the wheel. In addition you must accept responsibility for carrying out inspection and testing of the sensors to ensure they remain suitable for use. TMS is not a safety device, but acts only as an aid to the user detecting pressure changes, and does not replace the need for regular tyre maintenance.

Please do not remove any labels or identification marks on the products you have purchased, as these will help us to identify them if you should need to contact us or return them.

We recommend that you do not do anything that would change, modify or alter the products supplied, except for the appropriate work necessary for assembly of the TMS. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

2 What's in the box

Sensor Transmitters

Up to 16 per Receiver

Sensors TMS10

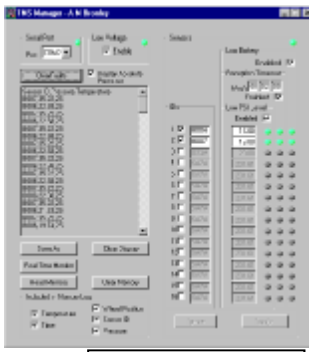
FCC ID: SUYTMS10

AND

Receiver

Receiver TMS11

Up to 4 BNC Antenna (2m)



TMS Manager PC Software

3 Introduction

Features

- Sensors are calibrated
- All transmissions are encrypted to eliminate false readings and interference with other RF equipment.
- Based on FM 433.92MHz.
- A temperature compensated system.
- Reliable transmit and receive strategy. Software protocol that recovers signal from noisy environments making the TMS more tolerant to interference.

T MS Sensor Transmitters. The system is based on small battery powered *sensors* that can be mounted inside our customers enclosure for mounting to the wheel. The sensors monitor tyre pressure and temperature and transmit this data via a radio link to a *receiver unit* mounted inside the vehicle. The sensors transmit data even while the vehicle is stationary.

Every sensor has its own unique identity (ID) code and every customer is assigned a unique code. This means that other users of T MS are unable to eavesdrop on your data.

T MS Receiver is for use on large vehicles and other applications that require multiple tyre pressures to be monitored. It is possible to assign up to 16 sensor ID codes to the *receiver unit,* and set a low-pressure level for each assigned sensor. The unit can be connected to the vehicle network via the RS232 port. The unit also has the option of a switched output to drive an external alarm, the alarm can be software configured to activate on certain conditions.

4 Installation

4a Sensor TMS10

- **Sensor Battery Maintenance and Replacement**

The battery life is dependant on the number of times the sensor transmits. We have designed the sensors such that they transmit on change of pressure and so that you know that the system is operating there is a default transmission approximately every 5 minutes.

The sensors transmit an energy value that gives an indication of the battery life. After a period of use, the battery fitted to the sensors will fail. When this happens the control unit will alarm. It will then be necessary to return the sensors for a battery change and calibration check. Changing of the battery should be left to the manufacturer, as permanent damage can be caused if the correct procedures are not taken.

- **Fitting The Sensor**

The sensor is supplied as a printed circuit complete with antenna and battery. It is the responsibility of each customer to ensure that the sensor is installed in the enclosure. Attention must be made not to block the input to the pressure sensor component on the PCB.

4b Receiver TMS11

- **Antenna Position**

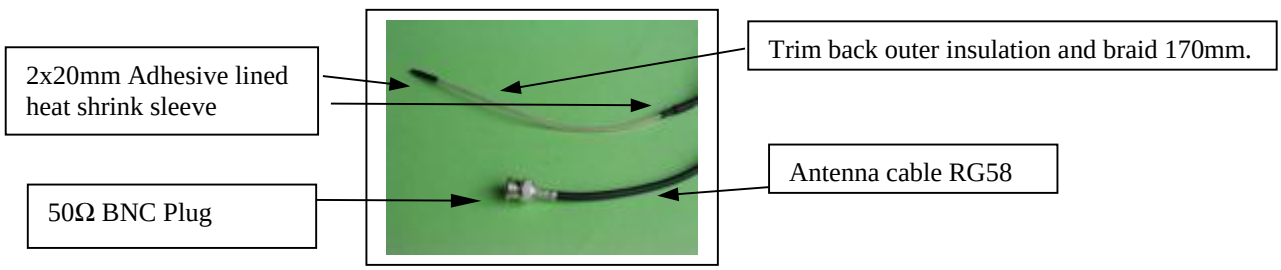
The Receiver can accept up to four BNC terminated antenna. These are supplied separately. The antenna should ideally be mounted within line of sight of the wheels. Mounting it within the loom is not recommended.

Selecting the best position for the antenna varies from vehicle to vehicle and we suggest that you select the site that gives good reception from all wheel positions. From experience, the following have proven to be helpful.

- On the underside of the vehicle in line of sight with all wheels
- Using up to four antenna placed at front and rear of vehicle

When you have installed the sensors it is useful to check that the receiver is picking up the ID codes. If not move the antenna active end within close proximity to the wheel and in line of sight. If reception occurs and the ID code is received then antenna position needs to be reconsidered.

Antenna Preparation



Antenna Connector Termination.
NOTE: If an antenna is not connected in any application then the connector must be terminated using a 50 Ohm resistor.

- **Assign Sensors To The Receiver**

Use T MS Manager to assign the sensor IDs.

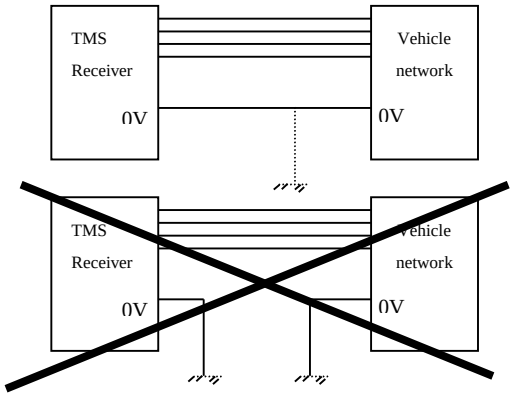
- **Install Receiver**

The receiver is suitable for installation where temperatures will not exceed 55°C. The units should not be mounted in a position of direct water spray or near exhaust pipe work or radiator airflow.

Mount the unit on the vehicle and connect the antenna(s) and the vehicle and PC interface connector.

Your TMS system is now ready for use.

Receiver Wiring Good Practice:



5 User Guide

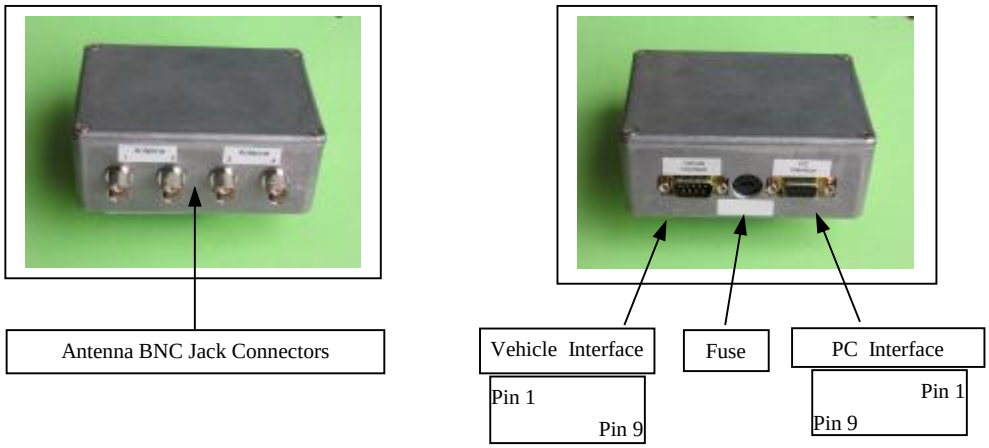
5a Sensor TMS10

See specifications in section 7 for more information.

- Transmit on change of pressure. Default transmit every 5 minutes.

5b Receiver TMS11

A small, lightweight, robust control unit that receives transmissions from the sensors.



- **Vehicle Interface:**
  Pin 1 - +ve supply (see section 7)
  Pin 4 – RESET
  Pin 5 – Supply 0V
  Pin 6 – RESET common (0V)
  Pin 7 – FAULT

PC Interface (RS232):
Pin 2 - Serial Tx
Pin 3 – Serial Rx
Pin 5 – Gnd

FAULT – In normal operating conditions this is supply voltage. In an alarm condition this goes to 0V. 0.2 Amp maximum source current. FAULT conditions are enabled via T MS Manager. The 4 parameters being monitored that cause a FAULT condition are listed below and can be enabled/disabled using TMS Manager.

- Low Voltage - Voltage level set at manufacture.
- Low Battery - Indicates when Sensor batteries need replacing
- Reception Timeout - type in hrs/mins/secs and click ‘Apply’
- Low PSI Level - type in PSI for each sensor ID and ‘Apply)

RESET – connect to 0v to reset/clear alarm condition and set FAULT output to supply voltage.

The PC application “T MS Manager” is used to configure the receiver and download data.

- **Check System Operation**

- Check that sensors are installed
- Supply power to the receiver
- The receiver should output data for each sensor as it is received

Note: If the system does not work refer to the troubleshooting section.

6 Troubleshooting

No data output from your vehicle network

- Check antenna position
- Check sensor installation
- Check pressure in tyre. Increase/decrease pressure and check
- Check that the senor ID assignment is correct
- Check for external radio interference that may be swamping TMS
- Check wiring
- Check for any ground loops
- Check connection

No receiver output

- Check wiring
- Check for any ground loops
- Check power supply
- Check that the senor ID assignment is correct

Receiver is working but no data from sensors

- Check antenna position
- Check sensor installation
- Check pressure in tyre. Increase/decrease pressure and check
- Check for external radio interference that may be swamping TMS
- Check that the senor ID assignment is correct

Sensor ID code not detected

- Check antenna position
- Check sensor installation
- Check pressure in tyre. Increase/decrease pressure and check
- Check that the senor ID assignment is correct
- Check for external radio interference that may be swamping TMS
- Check wiring

Intermittent receptions

- Check antenna position
- Check sensor installation
- Check for external radio interference that may be swamping TMS

7 Reference

7a System Specification

Pressure Sensor

	TMS10 -0/150
Pressure range (gauge**)	0 - 150 psi
Pressure resolution (Typically)	1.0 psi
Pressure accuracy (Typically over temperature range)	+/- 2 psi

** - Pressure measured relative to atmospheric pressure, taken to be 14.7 psi.

7b Sensor Specification

Size 23 x 70 x 25mm.
Weight Sensor PCB, batteries and antenna weigh approx.12.6 grams.
Aerial 174mm length in 24mm diameter.
***Road* sensors** transmit on change of pressure and have a default transmit every 5 minutes.
Data Frame output ID code, Pressure, Temperature, energy

Temperature Sensors

Temperature range: -25°C to +85°C (+125°C for short periods)
Temperature resolution: 1 °C (-19 °C to 79 °C), 2 °C (80 °C to 85 °C)
Temperature accuracy: +/-2 °C @ 25 °C

Radio Frequency Transmitter

Emission category: Tested and complies to FCC Part15.231
Modulation type: FSK
Centre frequency: 433.92MHz
Transmission duration: 60mS max
Transmission range: 60 metres typical (free space)

General Specification

Sensor sample rate (typically): Every 2.5 seconds
Event response time (typically): 1.5 seconds typically
Identification code: Unique
Operating temperature range: -25°C to +85°C (+125°C for short periods)
Survival temperature range: -55 °C to 125 °C
Power source: 3.0V @ 20 °C lithium battery
Typical battery life: 5 years

Additional note

All transmissions are encrypted to eliminate false readings and interference with other RADIO equipment.
All sensors are calibrated during manufacture and no periodic calibration is required.
Default transmit interval is stated as approximate. Resolution of 3 seconds, due to the effect of temperature, etc

7c Receiver Specification

Case	*Dimensions*	111x82x40 mm	
	Mass	321 grams (approx)	
	Material	Aluminium	
	Operating Temp	-10°C to 55°C	
Power Supply		18V to 36V dc at 30mA (reverse polarity protected).	
Vehicle Interface Connector		Amplimite ‘2000’ “D” 9-way plug with threaded inserts	
PC Interface Connector		Amplimite ‘2000’ “D” 9-way socket with threaded inserts	
Antenna Connector		B6351B1-ND3G-50Amphenol BNC jacks bulkhead mounting 50 Ohm	
Fuse		20x5mm 250mA Anti-surge	
Serial RS232 output/input		Type	RS-232
		Baud rate	9600 bps
		Format	8 bit, 1 stop, non-parity

Unit tested and complies to FCC Part15.109

7d T MS Manager

T MS Manager is a software application that is used to configure the T MS receiver, enable data to be downloaded, and display data received from the sensors real time.

STEP1

- Connect the power supply to the TMS1101 receiver.

This is done via the Vehicle Interface connector. See section 5b.

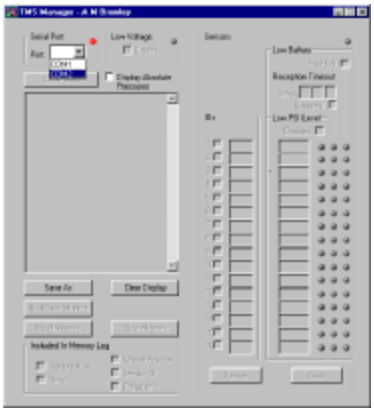
STEP 2

- Connect the computer to the 'PC Interface' connector on the TMS1101 receiver.

Using a 9-way serial cable connect one end to the computer COM1 or COM2 port.
Plug the other end into the 'PC Interface' 9-way socket on the TMS1101 Receiver.

STEP 3

- Run the Windows program "TMS Manager.exe"



→Select the COM port being used. TMS Manager is now ready to configure

STEP 4

- Assign Sensor IDs

You can assign up to 16 TMS pressure sensors.
Click on the box next to the first wheel position that you want to assign a sensor ID.
Next, type in the sensor ID code. This can be found on the label attached to each sensor.
Click 'Apply'.

STEP 5

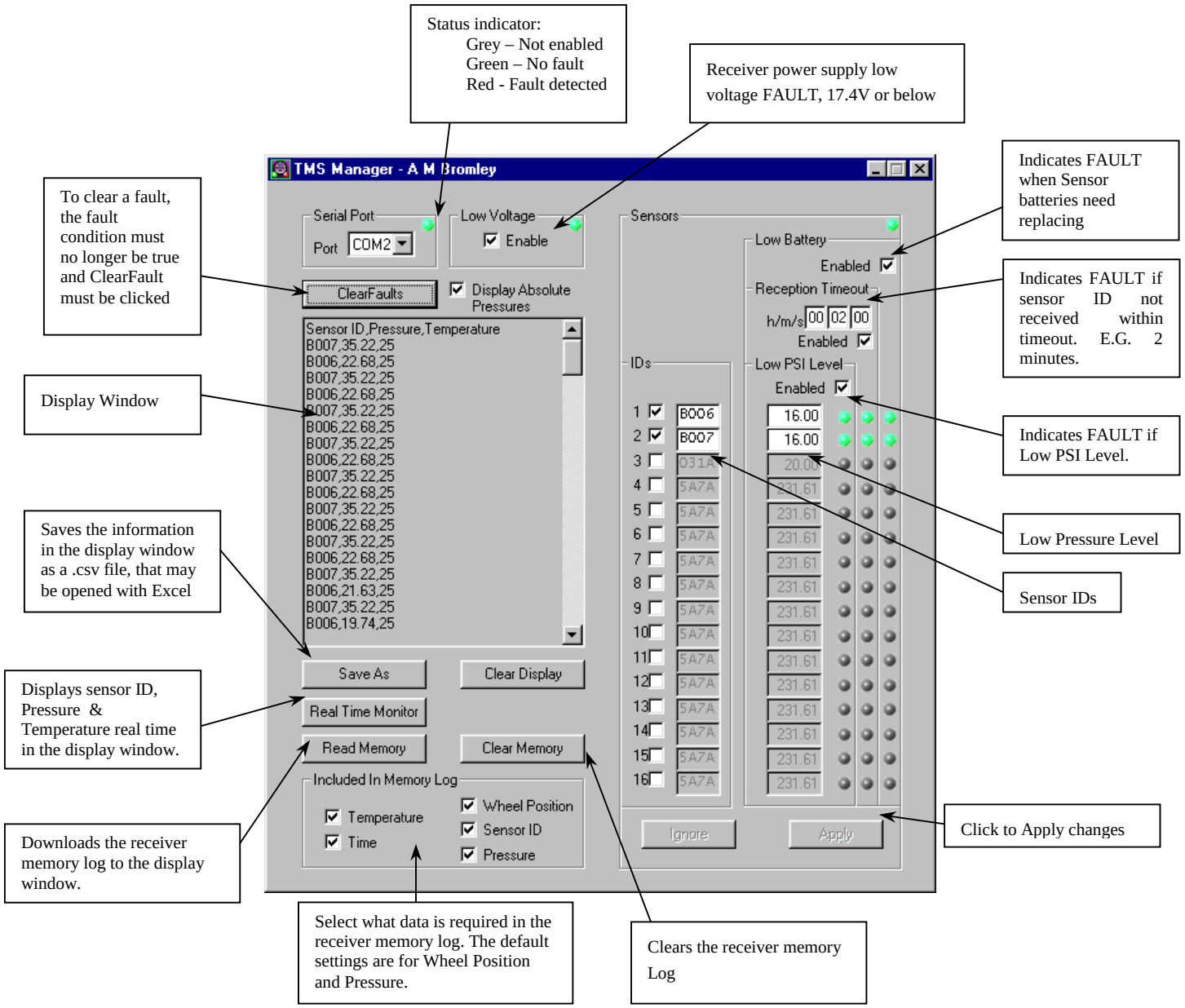
- Low Pressure Level

Ensure that the relevant wheel position is enabled.
Type in the Low Pressure Level in PSI.

Click 'Apply'.

STEP 6

The system is now ready to use.


Status indicator:
Grey – Not enabled
Green – No fault
Red - Fault detected
Receiver power supply low voltage FAULT, 17.4V or below
TMS Manager - A M Bromley
Serial Port
Port COM2
Low Voltage
Enable
Sensors
Low Battery
Enabled
Reception Timeout
h/m/s 00 02 00
Enabled
IDs
Low PSI Level
Enabled
ClearFaults
Display Absolute Pressures
Sensor ID,Pressure,Temperature
B007,35.22,25
B006,22.68,25
B007,35.22,25
B006,22.68,25
B007,35.22,25
B006,22.68,25
B007,35.22,25
B006,22.68,25
B007,35.22,25
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B007,35.22,25
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B007,35.22,25
B006,22.68,25
B007,35.22,25
B006,21.63,25
B007,35.22,25
B006,19.74,25
1 B006 16.00
2 B007 16.00
3 031A 20.00
4 5A7A 231.61
5 5A7A 231.61
6 5A7A 231.61
7 5A7A 231.61
8 5A7A 231.61
9 5A7A 231.61
10 5A7A 231.61
11 5A7A 231.61
12 5A7A 231.61
13 5A7A 231.61
14 5A7A 231.61
15 5A7A 231.61
16 5A7A 231.61
Save As
Clear Display
Real Time Monitor
Read Memory
Clear Memory
Included In Memory Log
Temperature
Time
Wheel Position
Sensor ID
Pressure
Ignore
Apply
To clear a fault, the fault condition must no longer be true and ClearFault must be clicked
Indicates FAULT when Sensor batteries need replacing
Indicates FAULT if sensor ID not received within timeout. E.G. 2 minutes.
Display Window
Indicates FAULT if Low PSI Level.
Saves the information in the display window as a .csv file, that may be opened with Excel
Low Pressure Level
Sensor IDs
Displays sensor ID, Pressure & Temperature real time in the display window.
Downloads the receiver memory log to the display window.
Click to Apply changes
Select what data is required in the receiver memory log. The default settings are for Wheel Position and Pressure.
Clears the receiver memory Log