

TPMS system overview

This new TPMS kit has been launched to offer a previously unavailable solution for motorsport applications that is not only affordable but has innovative new TPMS features for managing sensor data on multiple wheel sets.

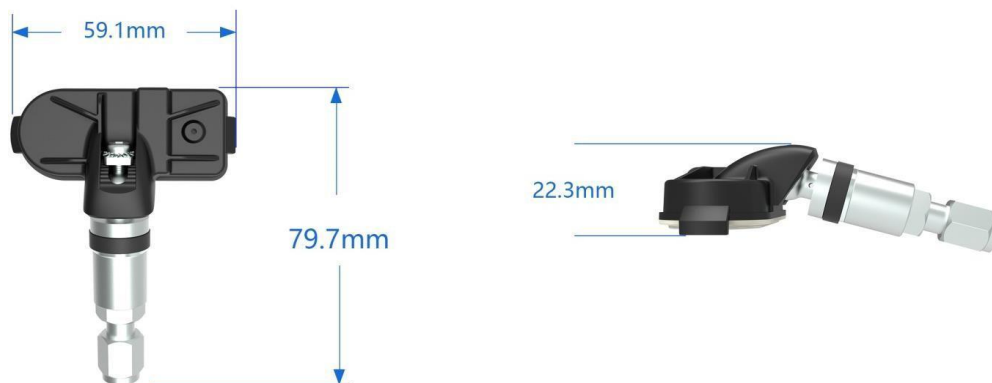
- Lightweight sensors (20g)
- Automatic learning functions for sensor serial numbers and wheel location
- CE & FCC Compliant
- Connection output for
CAN 2.0A up to 1Mbit/s (default)
- Pressure resolution 15.7mbar
- Pressure accuracy +/- 20mbar
- Sensors and receiver protection IP67
- Any number of sensors can be added to the system
- 1 Receiver required for all 4 sensors
- Sensor update frequency 2Hz

The kit is compatible with competition and race car applications that utilise 1Mbps CAN. (Other baud rates are available.) This is the established industry standard for professional suppliers of ECUs, dashboards and data loggers within the motorsport and other automotive sectors.

TPMS system overview

Each of the sensors supplied with the TPMS kits have unique serial number that identify the corner location on the car and also a unique team code. The sensors have been paired to the receiver team code and the correct wheel position on the car.

Sensor



Sensor features

- Spare sensors can be programmed with any of the serial numbers that have been allocated to a receiver.
- Sensor IDs of two unmounted wheels can be swapped.
- Sensor supplied with an 11mm valve stem.
- 8mm and alternative valves designs are available on request.
- Automatic Assignment of Sensor Location (AASL)
When sensors are relocated to a different position on the car, you can automatically reassign them to their new position using the TPMS handset 'Read' function. For example, if the front wheels are swapped this operation enables you to reallocate the sensor data in the receiver so that the values for the front left sensor are now transmitted on the CAN ID for the front right. Consequently, the sensor data that is viewed on the dashboard and logged is correct and will appear as the front right. Any sensor can be allocated to any of the 4 corner locations, they must have different serial numbers.

TPMS system overview

Pressure transmission modes

1. Sensor not fitted or tyre is not inflated - No transmission
2. Tyre inflated but the wheel is not rotating – Pressure is measured every 60 seconds. Any pressure changes the sensor will transmit data.
3. Tyre inflated and sensor accelerating (typical speed over 35mph.) – Pressure is measured every 0.5 second (2Hz). Any pressure changes the sensor will transmit data.
4. When the wheel stops rotating, for example during a pit stop, the sensor will continue to measure the pressure every 0.5 second (2Hz) for a further 5 minutes before the measured and transmit time reverts back to 60 seconds.

Measured sensor parameters

MEASUREMENT PARAMETER	NOTES
Location	0x01-FL,0x02-FR,0x03-RL,0x04-RR
Pressure	0x0100=256kPa
Temperature	0x20=32°C
Sensor Voltage	0x21=3.3V (1 decimal place)
Alarm: Puncture	0x01=Tyre deflating
Alarm: Sensor Failure	0x20=Sensor failure or out of reception

TPMS system overview

Sensor specifications

Sensor pressure measurement range	0-8000 mbar
High frequency modulation mode	FSK
Sensor temperature measurement range	-40° C to 125°C
Sensor temperature resolution	1°C
Sealing	IP67
Battery lifespan	Min 2 race seasons
RF frequency	433.92MHz
High frequency emission power	<8dBm (50ohms)

Sensor battery

Type-Manganese dioxide-Li/Organic Electrolyte (350mAh)

Acceleration resistance – 2000g (Equivalent to 300km/h on a 17-inch wheel)

TPMS system overview

Receiver



Individual receivers are allocated unique identification serial numbers ensuring that only sensors with these serial numbers can be read.

Any number of additional sensors can be programmed with serial numbers to make them compatible with a specific receiver.

A second receiver can be setup with the same sensor serial numbers and used on the same car if it not possible to locate a single receiver in a location that is in range of all 4 sensors. Both receivers can use the same CAN IDs for each sensor.

AASL function is enabled as follows:

- Press and hold the receiver button until it flashes twice then release. This puts the receiver into learn mode where the 4 sensor locations are waiting for sensors to be assigned.
- Using the TPMS handset 'Read' function activate all 4 sensors in the correct order (FL,FR,RL then RR.) The receiver LED will flash a number of times in quick succession as each sensor is allocated correctly. A display of the sensor serial number on the TPMS handset does not guarantee it has also been allocated a position within the receiver.
- Once a sensor serial number has been allocated to the first position (FL) the receiver is now ready to accept the next sensor to be assigned as a (FR) then the (RL) and the (RR) As the receiver learns each sensor serial number it will not allow it to be repeated in the next position.
- Finally press and hold the receiver button until it flashes 4 times to indicate the AASL is completed.

TPMS system overview

NOTES:

- The AASL operation does not change the sensor serial number only the revised allocation in the receiver.
- The receiver will not function correctly if you exit from the AASL without allocating sensors to all 4 positions. When in normal operating mode any sensor that is read will activate the LED.
- In the event the TPMS handset is not available, the sensor allocation can also be achieved by changing the tyre pressures. (the AASL function must be enabled.) You must avoid changing tyre pressures on wheels that contain sensors and are within the reception range of the receiver.
- During the sensor allocation phase you can 'Read' each sensor more than once if you are uncertain if the receiver has acknowledged the reception.

Default CAN IDs

Default IDs are defined below.

CAN ID	Location (forward facing)
0x05A0	Front Right Sensor
0x05A1	Front Left Sensor
0x05A2	Rear Right Sensor
0x05A3	Rear Left Sensor

TPMS system overview

Pinout for receiver

Connector	AMP Superseal
PIN 1 Red	Supply 9-16V
PIN 2 White	Screen
PIN 3 Black	GND
PIN 4 Green	CAN -
PIN 5 Yellow	CAN +
PIN 6 N/C	

Receiver wiring

The TPMS receivers are supplied with a wiring harness to connect the receiver to the car wiring. You can also connect the receiver directly to your car wiring. The 6 way AMP Superseal connector on the redundant harness can be removed and reused on the car wiring (spare contacts are supplied.)

Wire	0.35mm/12/0.20
Cable length	300mm
Connector	AMP Superseal 6 way socket
Mating connector	AMP Superseal 6 way plug (282108-1)

NOTE: The receiver is supplied without a CAN termination. If your installation requires it to be closed, a 120ohm resistor can be installed in the wiring using the spare contacts supplied with the wiring harness.

Wiring Pinout

Connector to receiver	Connectors to car wiring
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TPMS system overview

PIN 1 AMP Superseal 6 Way Plug	PIN 1 AMP Superseal 2 way socket (282104-1)
PIN 2 AMP Superseal 6 Way Plug	PIN 2 AMP Superseal 2 way socket (282104-1)
PIN 3 AMP Superseal 6 Way Plug	PIN 1 AMP Superseal 3 way socket (282087-1)
PIN 4 AMP Superseal 6 Way Plug	PIN 2 AMP Superseal 3 way socket (282087-1)
PIN 5 AMP Superseal 6 Way Plug	PIN 3 AMP Superseal 3 way socket (282087-1)
PIN 6 AMP Superseal 6 Way Plug	N/C

TPMS handset

TPMS system overview

The TPMS handset is used for direct reading of sensor parameters such as pressure, temperature and battery voltage. It can also be used to program or modify the sensor parameters such as the team code and wheel location including the AASL functions.



TPMS system overview

Ordering information

Order code	Description
BW_EXT_CABLE	TPMS receiver cable
BW_HHT	TPMS handset
BW_RX	TPMS receiver
BW_SEN_01	TPMS sensor
BW_TPMS_KIT	TPMS receiver + 4 x sensors + 1 x cable

Any additional sensors which are to be added to a kit will need to be programmed with your own TPMS handset. Alternatively, if you require Brightwater Technologies to supply sensors with your own sensor serial numbers please contact us prior to ordering.