

# bf1systems TPMS Installation Guide

## 1 Modifications

| Date       | Modifications               | Author | Version | Modified Sheets | Approved |            |        |
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### 3 Introduction

bf1systems produce a range of TPMS solutions for use on different cars in various formulae of motorsport.

Whilst the systems are different, the installation requirements for the components are generally common, and this document is intended to provide additional information on how to mount the components on the car to ensure the best possible performance from the TPMS.

Separate documentation is available which provides information on how to mount the valve and wheel sensors, the CAN protocol for the DigiTyre TPMS and the system's User Manual. If you have not received copies of this, then please contact us and we will send these documents to you.

## 4 TPMS Components

Within your TPMS, you will have the following components:

- For a “positioned” system (i.e. a non-learning TPMS):
    - Between 1 and 4 receiving antennas
    - 1 TPMS ECU
    - Wheel sensors and valves
  - For a “learning “ system either:
    - 4 LF Triggers
    - 2 Antennas
    - 1 TPMS ECU
    - Wheel sensors and valves
- Or
- 4 Trigger Antennas
  - 1 TPMS ECU
  - Wheel sensors and valves

### 4.1 Wiring

If you are not purchasing the TPMS wiring harness from bf1systems, and are planning on building the TPMS wiring harness for your car and have not received a TPMS wiring schematic then please contact us and we will provide you with the required information.

Please note that if you are manufacturing the wiring harness, some basic rules should be observed. These are:

- All CAN wiring must be a twisted pair
- It is recommended that the +12V and GND wiring to the TPMS ECU should be a twisted pair
- All wiring going from the TPMS ECU to the antennas and triggers should be a three core twist

If you have any questions, then please do not hesitate to contact us.

### 4.2 TPMS ECU

Every TPMS must have a TPMS ECU. This is the brains behind the entire TPMS, and connects the system to the car’s data logger and dash, as well as connecting to all the chassis mounted TPMS components.

If you have purchased a DigiTyre Lite variant of TPMS ECU (as shown in Figure 1), then it is important to note that the ECU is not waterproof, and therefore should be mounted in an appropriate location where it will not get wet. If possible, it is recommended that you mount the ECU flat, if it is to be mounted on its side please do so with the connector facing downwards, to prevent water accumulating in the connector. There is no need to AV mount the ECU, and the recommended tightening torque for nuts or bolts to retain the ECU via its mounting lugs is  $2.5\pm 0.5\text{Nm}$ .



Figure 1

If you have purchased a DigiTyre MDE v2 or Kompact ECU (as shown in Figure 2), then these components are waterproof (once the connectors are mated) and can be mounted in environments where they will come into contact with moisture. It is important however to ensure that they will not become completely submerged.



Figure 2

### 4.3 TPMS Antenna

With your TPMS kit you will have received either Size 6 or Size 2 antennas. The antenna is the component which receives the RF datagrams transmitted from the TPMS wheel sensors, and therefore its positioning is important.

The number of antennas you are using with your TPMS will have a large influence on where the antennas are located on a car.

With a learning TPMS, one or two antennas can be supported. It is therefore preferable to mount one antenna at the front of the car, and one antenna at the rear.

The antennas receive best through their long side edges, so the antenna should be orientated as shown in Figure 3. If possible, the antenna should be mounted on the axle line, and as close to the centre of the car as possible, to ensure even reception from the wheel sensors.

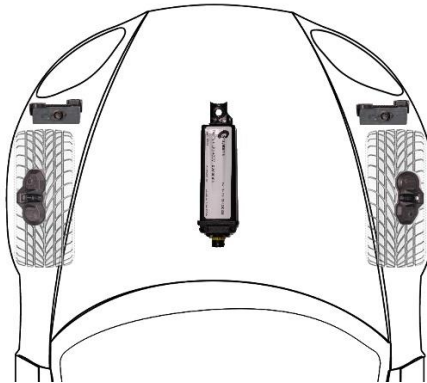


Figure 3

The antennas should not be surrounded or encased within either metal or carbon fibre, as both of these materials will attenuate the signals from the wheel sensors, leading to poor reception.

On front engine cars, it is usual for the rear antenna to be mounted inside what would normally be the boot compartment, point front to back, and this location tends to work quite well.

If you have any questions regarding the installation of the antennas, please do not hesitate to contact us.

On cars where more than two antennas are utilised within the TPMS (e.g. Le Mans prototypes), it is standard for one antenna to be mounted near to each wheel, generally within the vicinity of the wheel arch. This is because these cars tend to utilise carbon fibre extensively in their construction which attenuates the signal from the wheel sensors, so the antennas must be mounted closer to the wheel sensors.

All TPMS antennas are rated to operate at up to 105°C, and locations where this temperature may be exceeded (e.g. engine bays) should be avoided.

## 4.4 TPMS LF Trigger

If you have purchased a learning TPMS, you will have either received four LF Triggers or four Trigger Antennas for fitment to the car. If you are using a system with LF Triggers, then one LF trigger must be mounted in each wheel arch. The LF triggers are used to activate the wheel sensors when the car is stationary, and allow the TPMS to recognise on which corner each wheel sensor is fitted.

To ensure reliable triggering of the wheel sensors, which means the TPMS can learn the wheels as quickly as possible, the LF Triggers must be mounted so that the laser marked side (shown in Figure 4) is facing the centre of the wheel and parallel with the tyre surface. If the car has wheel arch liners, then it is usual for the LF trigger to be mounted to the back of the arch liner. However, if the arch liner is manufactured from carbon fibre then it is necessary to create a trigger-sized window of either Kevlar or glass-fibre to prevent the signal from the LF trigger being reduced.

The LF trigger must also be mounted as far outboard as possible on the car, so it sits in-line with the wheel sensor when viewed from above or in front/behind. An illustration of a good trigger position is shown in Figure 5.



Figure 4

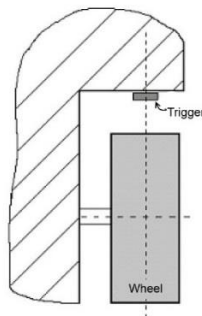


Figure 5

## 4.5 Trigger Antenna

If you have purchased a learning TPMS with four Trigger Antennas for fitment to the car, then one LF trigger must be mounted in each wheel arch. The Trigger Antenna is used both to activate the wheel sensors when the car is stationary, allow the TPMS to recognise on which corner each wheel sensor is fitted, and also to receive the datagrams that the wheel sensors transmit.

To ensure reliable triggering of the wheel sensors, which means the TPMS can learn the wheels as quickly as possible, the Trigger Antenna must be mounted so that the laser marked side (shown in Figure 6) is facing the centre of the wheel and parallel with the tyre surface. If the car has wheel arch liners, then it is usual for the Trigger Antenna to be mounted to the back of the arch liner. However, if the arch liner is manufactured from carbon fibre then it is necessary to create a window of either Kevlar or glass-fibre to prevent the signal from the Trigger Antenna being reduced.

The LF trigger must also be mounted as far outboard as possible on the car, so it sits in-line with the wheel sensor when viewed from above or in front/behind. An illustration of a good position for the Trigger Antenna is shown in Figure 7.



Figure 6

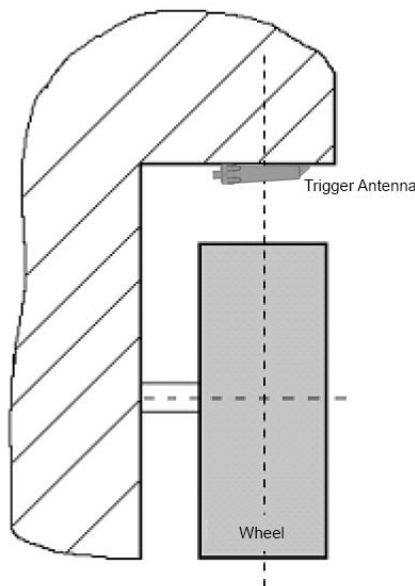


Figure 7