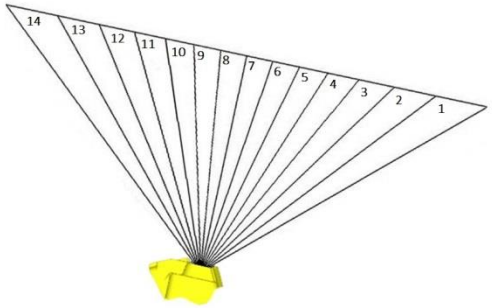
bf1systems 5 Pixel V2 IRTPTMS Wheel Sensor

The bf1systems 5 Pixel V2 InfraRed Tyre Pressure & Temperature Monitoring System (IRTPTMS) wheel sensor is a smaller, lighter evolution of bf1systems previous 5 Pixel IRTPTMS wheel sensor technology

The 5 pixel V2 IRTPTMS sensor provides the ability to measure the inner tyre carcass temperature at 5 points over a 96° Field of View (FoV), with the customer able to select these five points prior to the build of the sensors.

The inner tyre carcass measurement is a measure of the tyre's bulk temperature, which provides information on the mechanical grip available from the tyre, which relates to the long term behaviour of the tyre.



The infrared element has a total Field of View of 96° which can be angled to cover the maximum area of the inner tyre carcass. This FoV is sub-divided into 14 pixels (each of which has a 6.9° FoV), which the customer is able to select 5 of, prior to the build of the sensors, to have their measured temperatures transmitted as part of the sensor's datagram.

The temperatures are then transmitted along with the internal air temperature, tyre pressure, sensor serial number, remaining battery life and other diagnostic data on a 433MHz RF link to antennas that are mounted on the vehicle, or to a handheld tool such as the Mini Analyser.

The wheel sensor also contains a 125kHz Low Frequency (LF) receiver, meaning that on closed wheel race cars a learning system can be fitted which automatically detects where a sensor is fitted on the car. The LF receiver is also used by the handheld Mini Analyser which uses this feature to request data on demand from the wheel sensor.

When the wheel assembly does not have a tyre fitted, the wheel sensor enters a quiet mode in which it does not transmit, to preserve battery life. When a tyre is fitted and pressurised, the sensor typically transmits a datagram once every four minutes, allowing the sensor to be monitored by the Garage Monitoring System. If the wheel sensor detects a pressure change greater than or equal to 200mbar/minute at any time it will enter a fast transmit mode in which it transmits 255 datagrams at a rate of 1Hz.

When the wheel sensor detects that it is rotating at a speed greater than approximately 40kph it enters its moving mode and starts transmitting datagrams at a faster rate. The sensor remains in this mode until it stops rotating. After which It enters stationary mode

Each wheel sensor is identified by a unique serial number, and customers are supplied with a permit list containing all of their wheel sensors. This permit list is loaded into their ECUs and handheld devices to ensure that customers can only receive their own wheel sensors.

Specification

Electrical

- Supply Voltage – Internal 3V
- Lifetime (typical) – 1 season

Pressure

12.5mbar/bit Sensor

- Pressure Range – 0 – 3.1625bar gauge
- Pressure Resolution – 12.5mbar/bit
- Accuracy - ±25.0mbar

25mbar/bit Sensor

- Pressure Range – 0 – 5.375bar gauge
- Pressure Resolution – 25mbar/bit
- Accuracy - ±25.0mbar

Tyre Carcass Temperature

- Temperature Range – -40°C – +215°C
- Temperature Resolution – 0.25°C/bit
- Accuracy – ± 2.5°C*

Internal Air Temperature

- Temperature Range – -2°C – 150°C
- Temperature Resolution – 0.125°C/bit
- Accuracy – ±0.5°C

General

- Operating Temperature Range – 0°C – +140°C
- Mass – 33±1g
- RF Transmit Frequency – 433.92MHz

Transmission Information

- Moving transmit rate – 1Hz
- Stationary transmit rate – Every 255 seconds
- Transmit time after going stationary – 60 seconds
- IR temperatures are disabled in stationary mode below 45°C ambient temperature

*This accuracy is calculated under assumed operating conditions with the ambient temperature at 95°C and the tyre carcass temperature at 125°C

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