

# COMBINED TYRE PRESSURE/IR SENSOR



The system consists of a powered pressure and temperature sensor with transmitter fitted to a wheel rim, this sends pressure and temperature data over an RF link to a compact receiver on the car. Sampling rates increase automatically when a change in pressure is detected and the system shuts down below a threshold pressure to preserve battery life. The receiver sends data to the car control via CAN.

## Electrical

- Supply voltage 2.5-3.6V (Internal Lithium Thionyl Chloride battery)
- Life >175,000 transmissions when transmitting at 4Hz at a temperature range of +50°C to +130°C
- Transmission rate included in transmitted data
- Battery voltage measured on full load
- Transmission rate: governed by rate of change of pressure and rotation of the wheel. Structured to preserve battery life.

### Tyre Pressure

- Pressure range 4.4 to 30psi gauge (0.3 to 2.068 Bar)
- Pressure accuracy  $\pm 0.15$ psi ( $\pm 10$ mBar) typical,  $\pm 0.3$ psi ( $\pm 20$ mBar) max
- Pressure resolution 0.01 psi/bit (0.69mBar/bit)

### Tyre Temperature (IR Sensor)

- Calibrated temperature range 0°C to +150°C
- Compensated temperature range +40°C to +130°C
- Temperature resolution 0.05°C/bit
- Temperature accuracy  $\pm 3^\circ\text{C}$
- Repeatability  $\pm 1^\circ\text{C}$
- Target distance 300mm max (calibrated at 240mm)

### Board Temperature

- On board KTY13-5 temperature sensor
- Temperature sensor range -50°C to +150°C
- Temperature resolution 0.17°C/bit

Each sensor transmits a unique encrypted serial number. A data disc is supplied for each sensor containing the 16bit ID serial number and temperature and pressure calibration points.

## RF Specification

- Compatible with MESL CAN receiver
- Modulation FM (FSK) encoded serial data
- Nominal frequency 433.920MHz
- Transmission range 15m (typ)

## Message Type 1 (20.4ms duration)

<Serial No>  
<Board Temp>  
<Pressure>  
<TX count>

## Message Type 2 (20.4ms duration)

<Serial No>  
<Vbatt> (measured on full load)  
<Tyre temp (IR sensor)>  
<TX count>

## Message Type 3 (20.4ms duration)

<Serial No>  
<TX Life count>  
<Tyre temp (IR sensor)>  
<TX count>

| Rate | Inertial switch | Pressure | Nominal Threshold dp/dt (mBar/s) | dp required (mBar) | Nominal Transmission rate, Hz(s) | Message type                 |
|------|-----------------|----------|----------------------------------|--------------------|----------------------------------|------------------------------|
| 0    | X               | <0.3Bar  | --                               | --                 | 0                                | No TX                        |
| 1    | LOW             | >0.3Bar  |                                  |                    | 0.39(2.56)                       | 1, 2, 1, 3 cyclically        |
| 2    | HIGH            | >0.3Bar  |                                  |                    | 4.0(0.25)                        | 1, 2, 3, 2, 3, 2, 3, 2, 3, 2 |
| 3    | HIGH            | >0.3Bar  | 1.5                              | 3.8                | 4.0(0.25)                        | 1, 2, 3, 1, 2, 3, 1, 2, 3, 1 |

Rate 0 applies when the pressure is <0.3 Bar gauge. Sensor does not transmit but continues to sample the pressure.

Rates 1-3 apply when the pressure is >0.3Bar (0.58psi) gauge.

Rates quoted are for  $V_{\text{supply}} = 3.6\text{V}$  and  $25^\circ\text{C}$ . Rates slow down linearly with increasing temperature and reducing  $V_{\text{supply}}$ . Rates are  $\approx 0.63$  quoted values under combined worst case condition of  $V_{\text{supply}} = 2.5\text{V}$  and temperature  $135^\circ\text{C}$ .

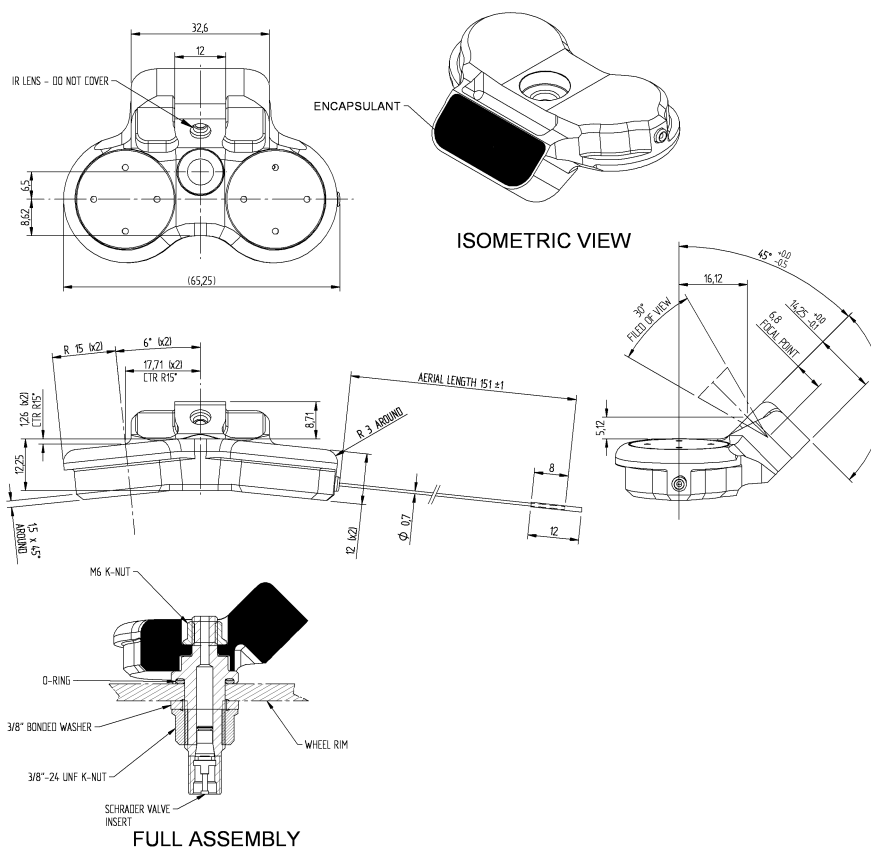
# COMBINED TYRE PRESSURE/IR SENSOR

## Mechanical

- Sensor incorporates Schrader valve in separate valve stem for tyre inflation
- Sensor weight <60g
- Valve stem 6AL4V Titanium (Ti Nitride coating)
- Sensor housing HE15 aluminium alloy (un-anodised)
- Sensor lids 6AL4V Titanium (Ti Nitride coating)
- 3/8UNF nut max torque 25Nm (18.4lbf.ft)
- M6 nut max torque 8Nm (5.9lbf.ft)

## Environmental

- Resistant to standard Motorsport fluids
- Operating temperature +10 to +135°C
- Vibration 50 to 2500Hz @ 40g 8hrs per axis
- Shock 50g(max), 1/2sine for 11ms, 5 times per axis



## Description

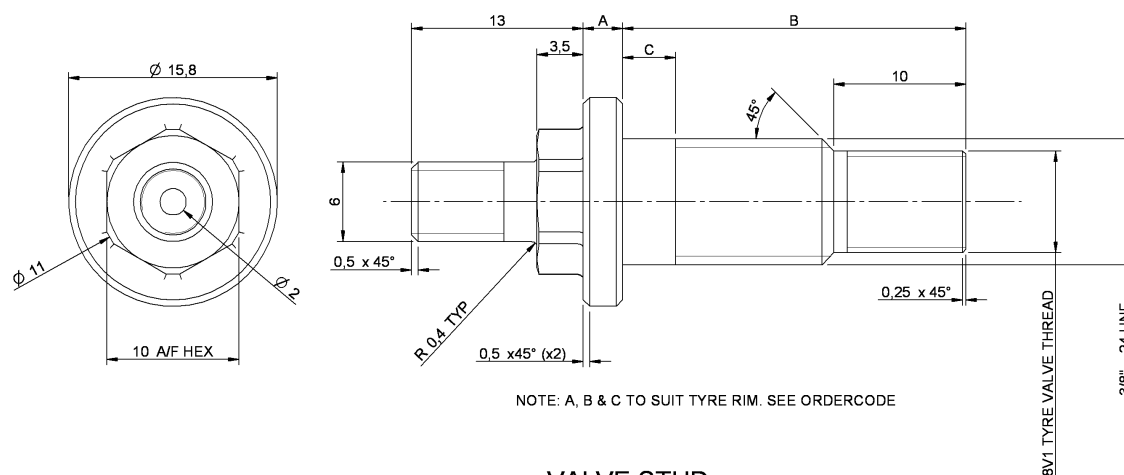
Combined Tyre Pressure and Infra Red Sensor

## Order Code

O 030 330 046 051

05/05/10

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| Description | Dimension A | Dimension B | Dimension C | Order Code        |
|-------------|-------------|-------------|-------------|-------------------|
| Valve stud  | 3mm         | 26mm        | 4mm         | O 030 330 990 018 |