



# 2<sup>nd</sup> Air Inlet Temperature Sensor (as per TechReg section 3.6)

**2020-08-11** | This document contains information regarding the air inlet temperature sensor intended for scrutineering purposes and regarding the connection of the sensor to the scrutineering data logging systems.

## 1 Introduction

Since turbocharger boost pressure limits for TCR cars are subject to a correction which is a linear function of inlet air temperature, inlet air temperature must be monitored using a sensor of known and common quality. Thus TCR mandates a common air inlet temperature sensor which is either connected directly to the TCR ECU via the designated input pin or to the AiM Evo4/5 scrutineering data logger, depending which system is present.

**This document** serves as installation manual and contains information regarding the sensor and instructions how to mount and order it. For information on how to connect the sensor to the TCR ECU, please refer to the TCR ECU's pin out, provided by Marelli. Information for connecting the sensor to the AiM Evo4/5 is contained in this document including instructions how to mount and order it.

## 2 The Sensor

The chosen air inlet temperature sensor is the Marelli PT1000 M6. This sensor is capable of measuring fluids and gasses. It comes with a 3-Pin female connector, Deutsch ASU-603-03-PA. Table 2 shows the sensor's operating range.

- splash resistant to fluids encountered in motorsports
- miniature tip
- low weight (16 g)
- -20 °C to 200 °C, tolerance  $\pm 1$  °C

Pin 1	Signal
Pin 2	-
Pin 3	GND

Table 1: Pin out Deutsch ASU



°C	Ohm
-20	921.6
-10	960.9
0	1000.0
10	1039.0
20	1077.9
30	1116.7

°C	Ohm
40	1156.4
50	1194.0
60	1232.4
70	1270.8
80	1309.0
90	1347.1

°C	Ohm
100	1385.1
110	1422.9
120	1460.7
130	1498.3
140	1535.8
150	1573.3

°C	Ohm
160	1610.5
170	1647.7
180	1684.8
190	1721.7
200	1758.6
210	1795.3

Table 2: Temperature Resistance Table PT1000

### 3 Mounting

To ensure adequate sensor performance the sensor must be installed correctly. Figure 1 shows how the sensor must be mounted in an aluminium pipe. Consider the following instructions before suggesting a mounting position to WSC Technical Department for approval.

The 2<sup>nd</sup> air inlet temperature sensor should be mounted:

- close to the manufacturers own sensor,
- after the intercooler, preferably before the throttle valve, to ensure good circulation,
- not in a metal part such as an aluminium tube or the throttle body OR decoupled via plastic bushing.
- as deep as possible in the airflow, with the sensor tip protruding at least 5 mm into the airflow.

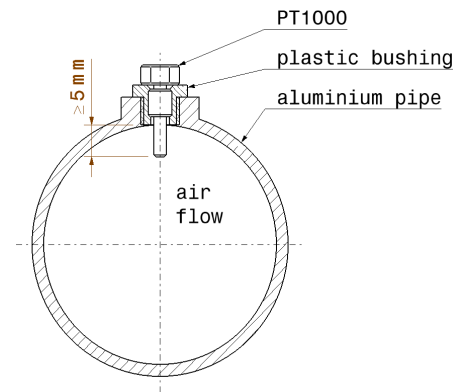


Figure 1: Mounting Instruction

Manufacturers are required to propose their intended mounting position to WSC Technical Department ([tcr-ecu@tcr-series.com](mailto:tcr-ecu@tcr-series.com)) for approval. In the proposal manufacturers are required to attach visual documentation suitable to let WSC staff understand the exact intended position in relation to intercooler, throttle and intake manifold.

### 4 Cabling

Cabling is required between the air inlet temperature sensor and the scrutineering data logging system, which is either part of the TCR ECU or the AiM Evo4 or Evo5 standalone system.

**Connection to TCR ECU** For connection between the air inlet temperature sensor and the TCR ECU, no additional mandatory cable is required. If there is an additional cable connecting the sensor to the loom, manufacturers are requested to provide specification and drawing for these cables to WSC technical department.

Pin 1	Signal
Pin 2	-
Pin 3	GND

Table 3: Pinout Deutsch ASU

Pin 1	Signal
Pin 2	GND
Pin 3	Uref (5V)
Pin 4	Ubat (12V)

Table 4: Pinout Binder

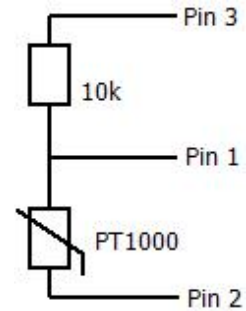


Figure 2: Wiring Schematic

**Connection to AiM Evo4/5** The cable between the air inlet temperature sensor and the AiM Evo4/5 scrutineering data logger is provided as a mandatory component through FRW Wires at standardized length of 3 m.

- 3-Pin male connector, Deutsch ASU-603-03-PA, pinout shown in table 3.
- 4-Pin male connector, Binder 712, pinout shown in table 4.
- 2 wires AWG24 with single sleeve
- 10 kΩ pull up resistor

The cable must be fitted without additional sleeves or covers and it must not be incorporated in any other part of the loom. This is necessary to enable visual examination of the entire cable by a technical scrutineer. Furthermore the cable should not pass close to heat sources. Where possible, the cable should follow the pressure pipe of the scrutineering intake manifold pressure sensor. Any manipulation, modification or disconnection of the sensor or the cable is prohibited.

## 5 Supplier

- *Sensor Marelli PT1000 M6, No: 083813295000 CA.0149916.A*  
Marelli Europe SpA  
Viale Aldo Borletti 61/63  
20011 Corbetta (Milano) Italy  
[Francesco Dimatera](mailto:francesco.dimatera@marelli.com) - francesco.dimatera@marelli.com
- *Connection wire, No: "TCR-AITSC-v20.1.0"*  
FRW SRL  
Via della Tecnica 26  
36100, Vicenza, Italia  
[Desirèe Falcomer](mailto:commercial@frw-wires.com) - commercial@frw-wires.com

## 6 Document Information

This decision is with immediate application and valid until further notice on the subject.

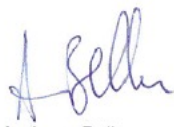
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