MAP USER MANUAL

Part numbers 1004, 1005 and 1006

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1. GENERAL

MAP-pressure sensor (part numbers 1004, 1005 and 1006) is intended for Manifold Absolute Pressure sensing. There are three versions available; 1 bar, 2.5 bar and 3 bar. Nominal operating voltage is 5.1V and output voltage is approximately 0-5V. Sensor elements used are Freescale (former Motorola) high quality temperature compensated models. Due to high quality parts and mechanics these sensors can also be used in aggressive environment.

1.1. SPECIFICATION

- **Operating voltage 1 bar: 4.75-5.25Vdc (5.1Vdc nominal)**
- **Operating voltage 2.5 and 3 bar: 4.74-5.46Vdc (5.1Vdc nominal)**
- **Overvoltage protection: Min 6.4Vdc**
- **Operating temperature: -40 - +125°C (-40 - +257°F)**
- **Measuring accuracy: ±1.5% of full scale (0- +85°C, 32- +185°F)**
- **Measuring range (absolute): 15-115kPa (2.2-16.7 psi) (1 bar), 20-250kPa (3-36 psi) (2.5 bar), 20-304 kPa (3-42 psi) (3 bar)**
- **Maximum pressure: 400 kPa (1 bar), 1000 kPa (2.5 bar), 1200 kPa (3 bar)**
- **Output voltage (Vs = 5.1Vdc): 0.2-4.8V (1 bar), 0.3-4.9V (2.5 and 3 bar)**
- **Response time (10-90%): < 5 ms**
- **Dimensions, case (WxDxH): 68 x 40 x 14mm (2.68 x 1.57 x 0.55 “)**
- **Ingress protection: IP68**
- **Weight: 80g (2.82 oz)**
- **Mating connector, body: TYCO 282087-1**
- **Mating connector, socket: TYCO 183025-1**
- **Mating connector, wire seal: TYCO 281934-2**

2. ASSEMBLY

2.1. MECHANICAL ASSEMBLY

Due to high quality parts used in MAP-sensor it can be assembled in many different conditions; wet, dry, cold or hot. Naturally best possible accuracy and reliability can only be achieved in dry, room temperature atmosphere.

Mechanical fixing is easiest to be done via three (3) ready-made vibration dampened fixing points. Maximum fixing screw diameter is 4mm, M4 bolt or 3.9mm thin sheet screws are suitable. Head of the screw must be at least 9mm (11/32") in diameter; otherwise the screw may slide thru rubber grommet. In some cases suitable washers should be used.

MAP-sensor is designed for 4-6mm (5/32-1/4") internal diameter pressure hose. Hose must be suitable for partial vacuum, non-reinforced hose may collapse and cause measuring errors.

For a best possible measuring result pressure hose must be connected to inlet manifold where there are the most stable and non-pulsating pressure present. Preferable location is a big volume chamber far away from cylinder head inlet tracts.

NOTE! Assembly of the MAP-sensor must be so the pressure hose is leaving the sensor downwards. This prevents accumulation of fluids inside the sensor and operational errors caused by this. Sensor response will be slower and in the long run there might be some reliability issues if fluids are allowed to collect inside the sensor.

2.2. ELECTRICAL ASSEMBLY

MAP-sensor should be connected to ECU according to Table 1 below.

Pin number	Signal	Cable color
1	+5,1V	Red
2	Output signal	Black
3	- / Ground / GND	Blue

Table 1 Pinning of the MAP-sensor

MAP-sensor output is designed to control high-impedance circuits, overload of the output may degrade accuracy and in worst case it may harm the sensor permanently. Maximum loading of the output is ±0,5mA.

Proper grounding of the MAP-sensor has major effect on the accuracy of the measurement. Preferable connection point of the grounding wire is directly to the ECU's grounding pin. If direct connection is not possible then the grounding point of the ECU grounding wire is recommended.

3. INSTRUCTIONS FOR USE

3.1. ELECTRICAL OPERATION

MAP-sensor output voltage is directly related to the pressure and to the operating voltage of the sensor according to the following formula.

1 bar:	**Vout = Vs* (.009*P-.095)**
2.5 bar:	**Vout = Vs*(0.0040*P-0.040)**
3 bar:	**Vout = Vs*(.00318*P-.00353)**

Where: Vout = output voltage
Vs = power supply voltage (4.75-5.45Vdc, 5.1Vdc nominal)
P = Absolute pressure in kilopascals (1 bar = 100 kPa)
Normal atmosphere is 100 kPa in absolute pressure
Ideal vacuum is 0 kPa in absolute pressure

Nominal output voltage at 1 bar absolute pressure and with 5.1V operating voltage:

1 bar:	**4.1055V**
2.5 bar:	**1.8360V**
3 bar:	**1.6038V**

4. WARRANTY

MAP-sensor has a full one (1) year warranty from the date of the purchase. Warranty includes component failures and workmanship. Not included are natural wear, usage against specification and Force Majeure -type failures. Warranty does not include failures in other systems connected to MAP-sensor, it is assumed that the end-user of MAP-sensor has skills necessary to assemble and analyze the product so it causes no risk to any other systems even in cases of malfunction and failure. Warranty is valid also in competition use.