

Model TFS2000

Thermal Gas Flow Modules for Inline Gas Measurement



Description

The model TFS2000 thermal gas flow modules are specially developed for inline gas measurement which requires the module directly connected to the pipeline.

Aimed at the smart gas meter application, both a temperature sensor and a gas-recognition sensor are integrated in this module. The temperature sensor signal can be used for temperature compensation on flow data, while the gas-recognition sensor can be used to identify whether the flow medium is air or natural gas.

The module contains a thermal mass flow sensor which is made by MEMS process. Thanks to MEMS process, this model has advantages of low power consumption and wide measuring range with high accuracy, and are benefit a compact design. As there is no moving part in the TFS2000, the module forms a solid state sensor system with excellent stability and reliability.

To prevent any possible influence due to metal particles contained in gas flow, the flow channel is specially designed and a protective layer is applied to the surface of the flow sensor.

In case of high-volume orders, the housing of TFS2000 modules can be customized for the best integration into customer gas meters.



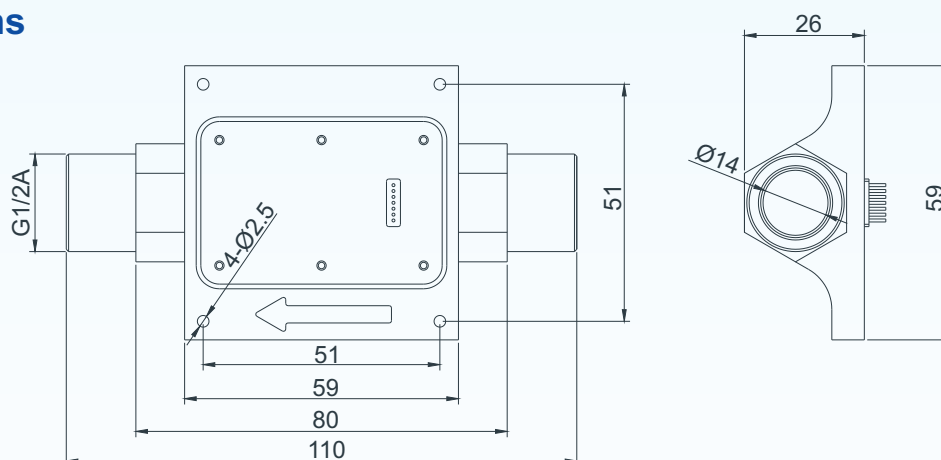
Features

- inline gas measurement
- integrated temperature and gas-recognition sensors
- low power consumption
- high accuracy: up to $\pm 1.5\%$ rdg
- wide range: 0~6m³/h

Applications

- smart gas metering which requires inline integration
- industrial gas flow control

Dimensions



Note: All dimensions are in mm.

BCM SENSOR TECHNOLOGIES BVBA

Model TFS2000

Thermal Gas Flow Modules for Inline Gas Measurement



Technical Data

| Parameters | | Units | Specifications | Notes |
|--|--------------------------|-------------------|--|-------|
| flow medium | | | natural gas, air | 1 |
| measuring range | | m ³ /h | 0~6 | 2 & 3 |
| ultimate flow rate | | m ³ /h | 12 | |
| ultimate pressure of flow medium | | bar | 3 | |
| pressure drop | | mbar | 1 max. at 6m ³ /h | |
| diagnosis signal of no-flow | | Vdc | 0.5±0.25 | |
| output signal | | Vdc | 0.05~2.95 | |
| digital output option | | | SPI, I ² C | |
| accuracy | | %rdg | ±3 (for flow rate < 0.6m ³ /h), ±1.5 (for flow rate ≥ 0.6m ³ /h) | 4 |
| temperature sensor | temperature range | °C | -20 ~ +60 | |
| | sensitivity | mV/°C | 0.5 | |
| | output reference @20°C | V | 0.2 | |
| | accuracy of temp. sensor | °C | ±0.5 | |
| gas-recognition sensor output | | Vdc | 1.2 in case of air, 1.5 in case of CH ₄ | |
| supply voltage (Vs) | | Vdc | 3.3 (typical), or any voltage in range of 3.1, ..., 5.5Vdc | |
| power consumption in continuous mode | | mA | 5.5 | |
| power consumption in sleep mode | | µA | 10 max. | |
| response time | | ms | 40 typical, 100 max. | 5 |
| voltage to control flow and temp sensor | | Vdc | switch on: 0.9, ..., Vs; switch off: 0, ..., 0.4 | |
| voltage to control gas sensor | | Vdc | switch on: 0.9, ..., Vs; switch off: 0, ..., 0.4 | |
| storage temperature range | | °C | -25 ~ +70 | |
| operating temperature range | | °C | -20 ~ +60 | |
| temp. coeff. of span of flow measurement | | %rdg/°C | -0.19 (at 0.6m ³ /h), -0.13 (at 6m ³ /h) | |
| mechanical interface | | | G1/2A, other thread types available on request | |
| electrical interface | | | 9-pin plug-in connector (standard), flying wires of 200mm length | |
| housing material | | | aluminum alloy | |

General test conditions:

- flow medium: standard air of pressure 760mm of mercury column;
- temperature: 20°C;
- humidity: 50%RH;
- excitation voltage: 3.3Vdc.

Notes: 1. For other media, consult BCM SENSOR.

2. Minimum measuring flow rate: 0.016m³/h.

3. Customized ranges available on request. Consult BCM SENSOR.

4. "rdg" refers to "reading".

5. The response time is measured from the wake-up moment in the sleep mode to the moment when the output rises to 90% of maximum value. 40ms is the typical response time when the sleep time is less than 2 seconds. This typical response time may increase to 70ms in case of longer sleep time.

The listed specifications and dimensions are subject to change without prior notice.

BCM SENSOR TECHNOLOGIES BVBA

Model TFS2000

Thermal Gas Flow Modules for Inline Gas Measurement



Ordering Information

| | | | | | | |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
| position (pos.) 1: model | | | | | | |
| TFS2000 | | | | | | |
| pos. 2: measuring range | | | | | | |
| 0/6m ³ /h | | | | | | |
| pos. 3: output signal | | | | | | |
| 0.05/2.95V (standard) SPI I ² C | | | | | | |
| pos. 4: accuracy | | | | | | |
| 3%rdg 1.5%rdg | | | | | | |
| pos. 5: mechanical interface | | | | | | |
| G1/2A other thread types available on request | | | | | | |
| pos. 6: electrical interface | | | | | | |
| 9P: 9-pin plug-in connector (standard) FW: 200mm flying wires | | | | | | |
| pos. 7: customized specifications | | | | | | |
| “(*)” is necessary only if any customized parameter is required, otherwise it is neglectable. | | | | | | |
| pos.1 | pos. 2 | pos. 3 | pos. 4 | pos. 5 | pos. 6 | pos. 7 |

Examples of Ordering Code

- standard sensor:

TFS2000-0/6m³/h-0.05/2.95V-1.5%rdg-G1/2A-9P

