

Pressure sensors for CNG and LPG

Media-resistant, micromechanics

Input quantity: P

Output quantity: U

- Available both non-fitted and fitted in an extremely robust housing.
- EMC protection up to 100 Vm^{-1}
- With temperature compensation
- Ratiometric output signal
- All sensors and sensor cells are resistant to fuels (including diesel) and oils, e.g. engine oil.



Application

Monolithically integrated silicon pressure sensors are high-precision measuring elements for determining absolute pressure. They are particularly suitable for use under rough ambient conditions e.g. for measuring the absolute intake manifold pressure of internal combustion engines.

Design and operation

The sensor contains a silicon chip with an etched pressure diaphragm. A change in pressure produces elongation of the diaphragm, which is recorded by an evaluation circuit by way of changes in resistance. The circuit is integrated on the silicon chip together with electronic compensating elements. Manufacture of the silicon chip involves joining a silicon wafer carrying numerous sensor elements to a glass plate. Following a sawing process to divide this into individual chips, one such chip is soldered onto a metal base with a pressure connection. The pressure is routed by way of the connection and base to the back of the pressure diaphragm. A reference vacuum enclosed under the cap welded to the base permits measurement of the absolute pressure and at the same time protects the front of the pressure diaphragm. The programming logic on the chip permits adjustment of the output characteristic curve for increased accuracy. The fully calibrated and checked sensors are installed in a special housing for intake manifold attachment (refer to quotation).

Signal evaluation

The pressure sensor supplies an analog output signal with a ratiometric relationship to the supply voltage. An RC

low-pass filter with e.g. $t = 2 \text{ ms}$ is recommended in the input section of the downstream electronics to suppress any harmonic interference. On the version with integrated temperature sensor, this consists of an NTC thermistor (to be operated with a series resistor) for measuring the ambient temperature.

Installation instructions

On installation, the pressure connection should be facing downwards to prevent the accumulation of condensate in the pressure cell.

Version

Sensors with housing:

This version is provided with a robust housing. On the version with temperature sensor, the sensor is accommodated in the housing.

Sensors without housing:

Housing similar to TO, pressure supply through a central pressure connection.

The following soldering pins are required:

Pin 6 Output voltage UA,

Pin 7 Earth,

Pin 8 +5 V.

Note

1 connector housing, 3 contact pins and 3 individual seals are required for a 3-pin connector.

1 connector housing, 4 contact pins and 4 individual seals are required for a 4-pin connector.

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Part number

0 261 230 145

Technical data

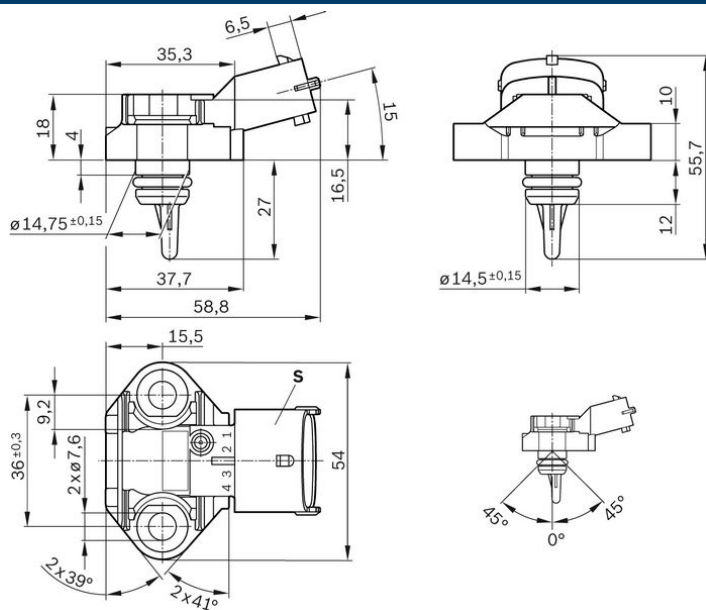
| Parameter | | min |
|------------------------------------|--------------------|------|
| typ | max | |
| Pressure range ($p_1 \dots p_2$) | kPa | 50 |
| 1000 | | |
| Load current I_L at output | mA | -1 |
| 0,5 | | |
| Load resistance to ground or U_V | k Ω | 5 |
| 10 | | |
| Lower limit at $U_V = 5\text{ V}$ | V | 0,25 |
| 0,3 | 0,35 | |
| Upper limit at $U_V = 5\text{ V}$ | V | 4,75 |
| 4,8 | 4,85 | |
| Response time $\tau_{10/90}$ | ms) | |
| 1 | | |
| Operating temperature | $^{\circ}\text{C}$ | -40 |
| 130 | | |

Limit data

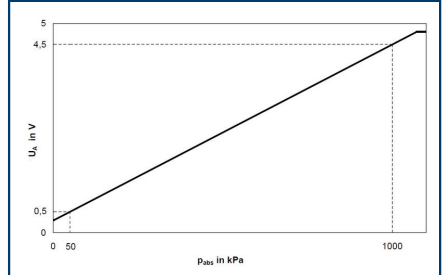
Recommendation for signal evaluation

Temperature sensor

Dimensional drawings

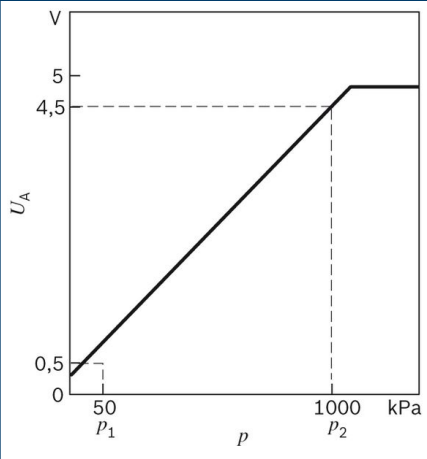


Characteristic curve

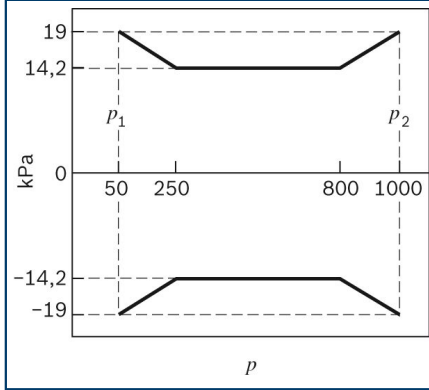




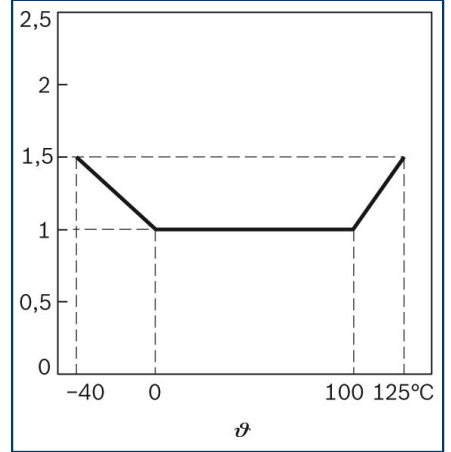
Characteristic curve tolerance



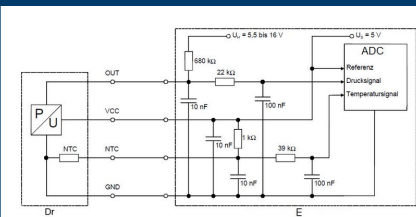
Characteristic curve tolerance



Tolerance extension factor



Recommendation for signal evaluation.



Dr Pressure sensor
E Electronic control unit