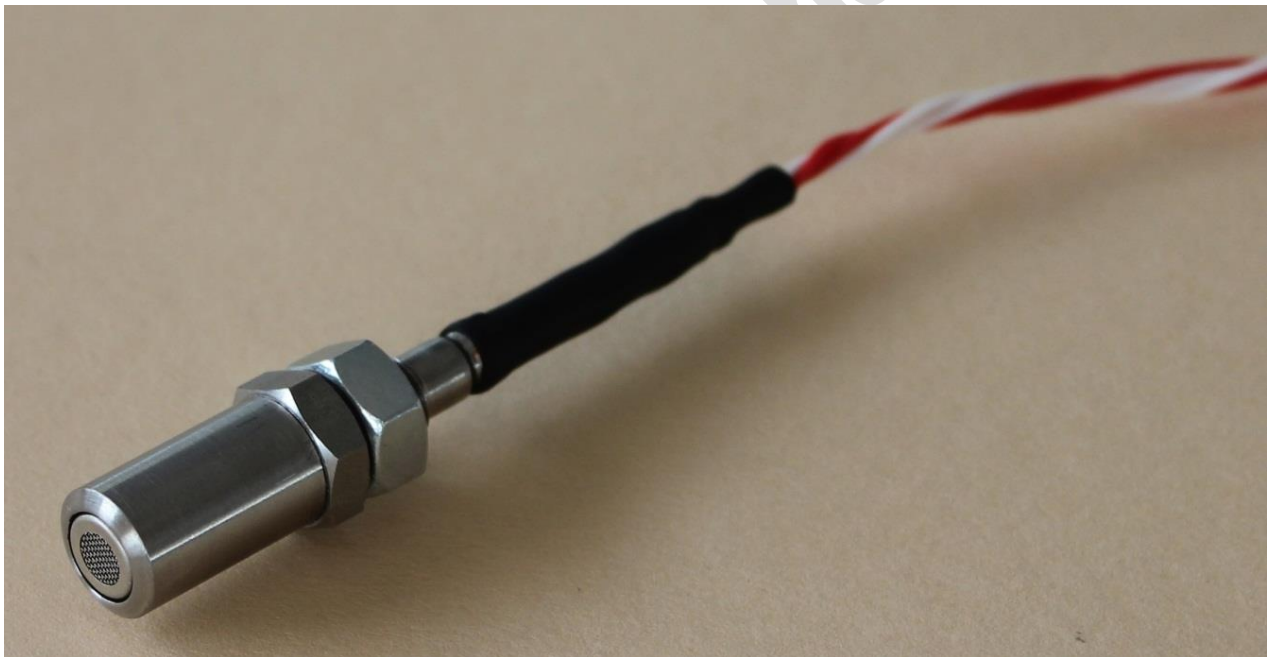


Installation instructions for gas sensor DSN-1 Part.-No. 85000



Content:

1. Functional principle
2. Electric connection for heater
3. Electrical connection Air Quality Element
4. Specifications
5. General note
6. Mechanical Installation

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1. Functional principle

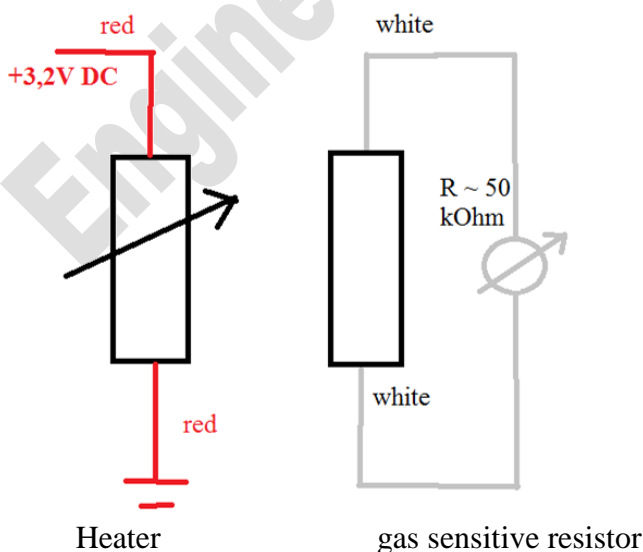
The gas sensor DSN-1 is a mixed potential sensor that detects combustible gases in its environment. "Exhausted" air contains an increasing content of these combustible gases. This sensor is designed as "air quality monitor" surveying rooms where many people are present to regulate fresh air flaps and to control HVAC-systems. Typical applications are in HVAC components in mobiles as well as in buildings, lifts, ships, stores, containers, etc. It helps to monitor the ambient air and to add the needed content of fresh air. It is based on a ceramic substrate on which a heater structure is printed. The heater is able to increase the temperature the cell to 425°C working temperature. Further, there are two electrodes covered by a catalytically active layer consisting of metal oxide components. This active layer works similar to a catalyst used in vehicles. Thermal energy in conjunction with catalyst material causes an exothermic reaction as soon as a combustible gas overflows the sensor cell. Required are flammable, so oxidizable gases. Regarding CO₂ the sensor cell is not sensitive as that gas is already oxidized. The sensor is very sensitive for methane, HC-chains, CO and hydrogen

2. Electric connection for heater

The application is very simple: two red strands are connected to the heating element. (The resistance at room temperature between the two red cables should be ca. 11 ohms.) Experience shows that a heater temperature reaches an optimum at 425 ° C. Therefore a supply voltage of 3.2 V DC has to be applied. The heater shows a resistance of $10 \pm 0.5 \Omega$ at 0°C. At usual operating temperature of 425 °C, the resistance is $25.6 \pm 1.3 \Omega$. The characteristic curve is approximately linear in between. For heating up a current of 0.3 A should not be exceeded. The simplest way is to connect one cable to ground and the other one with a stabilized voltage of 3.2 V DC.

3. Electrical connection Air Quality Element

After burning off any oxide in non-reducing atmosphere a basic resistance R_{so} of $50 \pm 35 \text{ k}\Omega$ will show up. This burn-off time period can take up to 45 minutes. After the initial start the first resistance measurement should be done after one hour in clean ambient air. This start resistance R_{so} is measured between the white leads. This resistance has to be remembered (learned) by the electric circuit. If now for example, 100 ppm CH₄ overflows the sensor the resistance will be reduced to 60% of its initial value. (see following diagram). If 100 ppm H₂ occurs than the initial resistance will be reduced to only 35% of its initial value. Any chemical reaction leads to a reduction of the electrical resistance. Thus oxidized mixed gases cause a reduction of the electrical resistance. Reaching a certain threshold value can activate for example an air flap or trigger an alarm. The user is facing no limits with his PCB.



4. Specifications

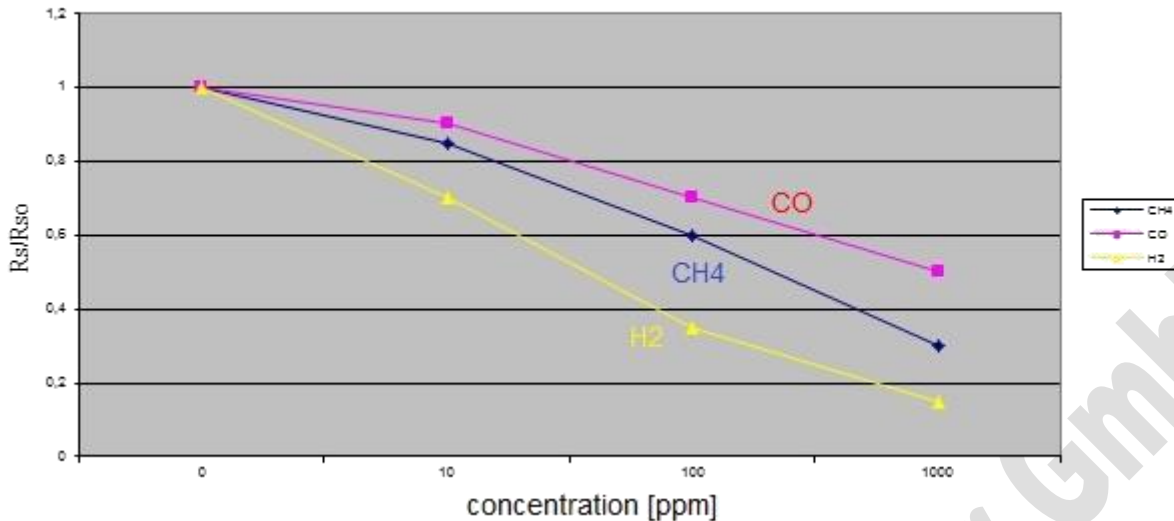
sensor type	mixed potential sensor
specific items	broadband sensitivity, suitable for leakage detection of combustible gases
heater resistance @ 0°C	10+/-0.5 Ohms
operating temperature	425 +/-15°C
heater resistance @ 425°C	25.6+/-1.3 Ohms
heater voltage	3.2V DC stabilized
heater power consumption	415 mW
basic resistance RSO sensor cell	50+/-35 kOhms
cables heater	red wire
cables sensor cell	white wire
dimensions housing	diameter 16 mm
	length 50mm
connection cable	silicone wire 4x0.22mm ²
mounting	thread M8



ready to mount gas sensor DSN-1

As an option narrower tolerances of the basic resistance Rso are available. (additional price!)

characteristic curve DSN-1 @ 425°C heater temperature



5. General note

In a mixed potential sensor multiple gas components lead to the measured signal. In a given case the gas resistor shows an $R_{s0} = 18,000 \Omega$ in pure ambient air. During operation in combustible gases, the initial value decreases to $7,200 \Omega$. This might be an effect caused by 90 ppm H_2 or by 700 ppm CH_4 or by a combination of both gases. A further differentiation is not possible with a wide-band sensor.

If the sensor is not used for several days a contamination of the sensor surface is unavoidable. A new burn-off procedure for 30 to 60 minutes and a recalibration (= memorizing R_{s0}) is inevitable.

6. Mechanical Installation

The sensor should be placed in a dry safe place. It has to be avoided that drops or condensing water vapor might find its way through the wire mesh onto the heated ceramic element. For easy mounting, a hole with a diameter of 8.5 mm (0.33 in) has to be drilled in a metal plate or something similar. The sensor housing can be fixed with a supplied screw M8.

Always good success!

Your Team

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