PM 1200

Paramagnetic oxygen sensor

for precise and maintenance-free operation

Description

The PM 1200 paramagnetic oxygen sensor module is designed for incorporation in your analyzer-systems or forthe solution of oxygen measuring problems using a microprocessor or PLC-system.
The modules are maintenance-free, have a long lifetime, give a rapid and accurate signal response and are virtually insensitive to other gases. It has a compact design which meets high quality standards.

Measuring principle

Paramagnetic (partial pressure measuring with a rotatable glass dumbbell). The sensor is heated up to 55°C.
Oxygen is one of few gases showing significant paramagnetic properties which can be used for its measurement using the following method:
A small glass dumbbell filled with nitrogen is placed in an inhomogeneous magnetic field within the measuring cell. The system's position of rest is defined by a light beam, a mirror on the dumbbell and a photo detector. The dumbbell is diamagnetic and tends to turn away from the magnetic field. The paramagnetic oxygen molecules of the sample gas, however, are drawn into the magnetic field, either displacing the dumbbell or forcing it to turn in the opposite direction. The turning is stopped by an opposite magnetic field generated by means of a coil around the dumbbell, the signal of the photo detector (deviation of the dumbbell from its position at rest) determining the necessary current intensity. The difference between the current when pure nitrogen is flowing and the current when the sample gas is flowing across the measuring cell is proportionate to the concentration of oxygen in the sample gas

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Specifications	PM 1200H (heated)
Minimal measuring range	0-5 % O2
Standard measuring range	0-100 % O2, 0-25%, other ranges on request
Output value standard	0-1 V, 0-4 V (galvanic isolated)
Output value (option)	4-20 mA (galvanic isolated)

Operating conditions

Flow	Maximum 250 ml/min (ideal 100ml/min) 18-70 l/h with fix Bypass (Option) 10-90 l/h with flow regulator (Option)
Operating gas pressure	+/-300 hPa (0.3 bar) in operation +/- max. 1000 hPa (1bar)
Operating temperature	5°-45°C, (heated measuring cell up to 55°C)
Storage and transport temperature	-25°C to +65°C
Relative humidity	0-90 %RH

Design

Dimension (W x H x D)	80x78x93 mm without electrical connector gas connection
Weight	ca. 1090 g
Materials of gas conducting parts	PVDF, glass, steel 1.4571, gold, viton, platinum-iridium, epoxy resin, nickel
Gas connections	3 mm, 1/8", 5 mm inner thread (option)
Warm-up time	<1h at 20°C ambient temperature

Measuring details

Repeatability	< ± 0,03 % O2 (time base for gas switch >= 5 min)
Zero point drift	<± 0,1 % O2 / week may be higher during the first days after putting into operation or after longer period of storage or transport
Temperature influence at zero	< ± 0,05 % O2 /°C
Temperature influence span	<± 0,2 % of measured value /°C
Pressure influence on zero	no influence
Pressure influence span	1 % air pressure change causes1% change in reading without backpressure regulator (Option)
Flow error	< 0.2 % O2 for increase of flow from 20 to 100 ml/min reduction to < 0.1 % with in-build fix bypass (option)
T90-time	< 3 s with 150 ml/min flow and gas change from nitrogen to air
Tilt	Zero change <= 0,02 Vol.-% O2 / 1° deviation from the horizontal position

Power supply

Voltage	12-28 VDC
Power consumption	12 W

Typical applications for PM 1200

- Excess oxygen analysis in all types of combustion systems
- Room air monitoring for personnel and product safety
- Monitoring oxygen content in fermentation vessels, biochemical fermenters and sewer gases
- Monitoring atmosphere in fruit stores and hot-houses
- Process analysis for continuous monitoring of required and/or allowable oxygen content
- Monitoring of low-temperature and combustion gases
- Monitoring automotive exhaust and internal combustion engines
- Monitoring blanket gases
- Monitoring tunnel and duct air quality
- Excess oxygen analysis in controlled atmospheres for systems or packaging in food industry
- Monitoring biological and waste gas content
- Excess oxygen monitoring in processes