PMA 50 EEX

Oxygen Analyser Series PMA®

Thermostated version PMA 50 EEX
in a wall mounting explosion-proof housing

9-3.15 02.95/01.07

Special Features
Explosion proof according to ATEX and NEPSI for Zone 1
Thermostated, in an explosion-proof housing
Accurate and reliable, small space requirement
Analogue/Digital indicator
Five linear measuring ranges
Physical measuring principle
Small stagnant volume, fast response time
Remote range indication and control
Flow alarm sensor
Status alarm, safety in operation

Application

Due to the extremely fast response time of the M&C magneto-dynamic measuring cell with no stagnant volume as well as the negligible cross sensitivity from other sample gas components, the M&C oxygen analyser PMA 50 EEX is a suitiable and reliable instrument for monitoring oxygen concentrations in various gas analytical process control applications.

Description

The M&C oxygen analyser PMA 50 EEX is a temperature controlled instrument which has been designed for continuous measurements of oxygen concentrations in particle-free and dry sample gas with a flow rate between 0-60 Nl/hr.

The PMA 50 EEX is a reliable and easy-to-operate instrument. It is built into an explosion-proof EEX d e IIC T5 wallmounting housing with stainless steel tubing and certified ventilate arrestors at sample gas inlet and outlet. The transducer unit maintains a constant operating temperature of 55 °C and a flashing LED on the control panel indicates the proper operating temperature of the analyser. The five measuring ranges are displayed on the analogue meter with 30/100% scale and the 100% range on the digital meter. The selected measuring range is displayed on the front panel by LED's. Two output signals are available. The terminals for the incoming power supply, two output signals, remote range indication and control and status alarm are located inside the EEX e box. The sample gas enters the analyser via a ventilate arrestor after it passed through an external sample conditioning system with at least a protective fine filter and flowmeter with needle valve for adjusting the required flow rate of the sample gas (also available with M&C). After passing the M&C measuring cell and the flow sensor, the sample gas leaves the instrument via the certified outlet ventilate arrestor.

Measuring principle of M&C oxygen analyser

The PMA 50 EEX utilises the paramagnetic principle of operation to measure oxygen concentrations. The analyser measures the paramagnetic susceptibility of the oxygen in the sample gas by means of the M&C magneto-dynamic measuring cell. The physical propertys which distinguishes oxygen from other gases is its paramagnetism. It is significantly higher comparing to other common gases. This operation principle is one of the most accurate and reliable procedures to determine the oxygen concentration in a gas mixture from 0 to 100 Vol.%.

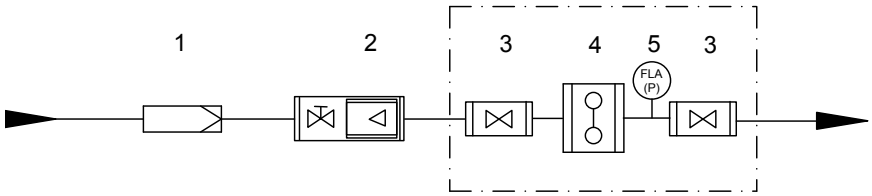
The robust M&C cross-flow cell has no stagnant volume. Advantages are the fast response time, the flow rate up to 60 l/hr, the small volume of 2 ml, the extremely low drift, the absolute linearity and the negligible cross sensitivity against other sample gas components. With a proper sample conditioning and pressure, the M&C cell will never need replacing. The dumbbell with a small mirror at its centre is mounted in a strong inhomogenous magnetic field. The paramagnetic oxygen strengthens the forces on the diamagnetic dumbbell and causes a shifting which is detected by a system consisting of light beam, mirror and a photo cell.

A compensation current is induced via the feedback coil on the dumbbell and leads to a reset of the dumbbell into its zero-position.

The required current is linearly proportional to the oxygen concentration.

Gas flow diagram PMA 50 EEX

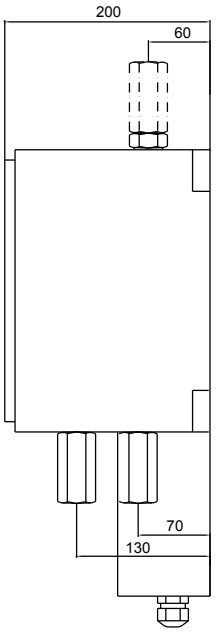
1. External fine filter
2. External flowmeter with needle valve
3. Ventilate arrestor
4. Oxygen measuring cell PMA
5. Flow alarm sensor
   (and at version #:with
   pressure sensor)



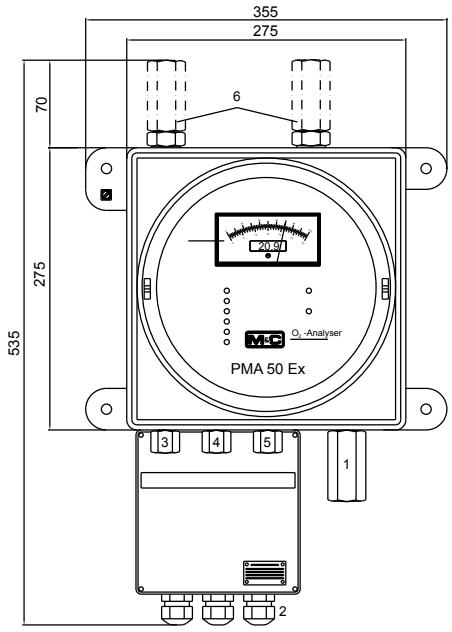
Dimensions

1. Sample gas in/out with certified ventilate arrestors
2. Cable glands 2x PG 13,5; 1x PG 16
3. Zero control
4. Measuring range select
5. Span control
6. Optional purging with certified ventilate arrestors

Front view



Side view



Dimensions in mm

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	Version PMA 50 EEX thermostated oxygen analyser in explosion-proof housing
Part No. 05A1000 : 05A2500 : 05A2505 :	PMA 50 EEX, power supply 230V 40-60Hz, signal 0-1V and 0-20mA PMA 50 EEX/P/PD-1-50, power 230V 40-60Hz, 0-1V / 0-20mA, pressure compensation 0,6 - 1,5 bar abs. with purging the enclosure via two certified ventilate arrestors in the in- and outlet NPT1/4"i PMA 50 EEX/P/PD, power 230V 40-60Hz, 0-1V / 0-20mA, pressure compensation 0,6 - 1,1 bar abs. 05A1000a / 05A2505a / 05A2505a = 115V 40-60Hz (variations of +10% to -15% have no influence on the function of the analyser), 40-60Hz, 35,5VA, power supply via EEx e connecting box, diameter of cable: 5mm - 9mm (PG13,5), 7mm - 12mm (PG16)
Measuring ranges	selectable for 0-1, 0-3, 0-10, 0-30 and 0-100 vol.% O_2 linear and position EXTERNAL
External range indication	externally: Potentialfree contact for all measuring ranges. Capacity 48V DC 200mA DC, Minimum contact rating 5V/1mA; internally : LED indication
Remote range control	Measuring ranges selectable via external potential free contacts 30V DC 3mA DC
Combined analogue/digital indicator	analogue meter with a scale of 0-30 and 0-100% for each selected range digital meter 3 $^1/_2$ digit 9 mm high LCD-indicator for 0-100% O_2 reading, selectivity 0,1vol.% O_2
Output signals	0-10V DC, burden >100 KΩ for range 0-100 % isolated. 0/4-20mA burden 270 Ω for every measuring range, electrically isolated; output voltage max. 15V (ex works). Switchable max. burden 800 Ω, output voltage max. 30V. Output current limiting adjustable 20mA-22mA (20,5mA ex works)
Response time for 90% FSD	< 5 seconds at 60 Nl/hr air
Accuracy after calibration	deviation: analogue signal output = ± 1% of span at range 3 - 100% / digital indicator = ±0,1 vol.% O_2 = ± 2% of span at range 1%
Reproducibility	deviation: analogue signal output = < 1% of span / digital indicator = ±0,1 vol.% O_2
Influence of ambient temperature	no influence up to 50 °C
Influence of barometric pressure	The oxygen reading varies in direct proportion to changes of the barometric pressure # no influence from 0,5-1,5 bar abs. at PMA 50 EEX/P/PD-1-50 with process pressure compensation
Influence of sample gas flow	Variation in gas flow between 0-60 Nl/hr air will cause a difference of < 0,2 vol.% O_2
Sample gas inlet pressure	0,01-0,1 bar g standard or # in case of purging up to 0,5 bar g (PMA 50 EEX required admission pressure for competent flow rate, no pump inside)
Sample gas outlet pressure	outlet of analyser must discharge freely into atmosphere or 0,6-1,5 bar abs. at version # PMA 50 EEX/P/PD-1-50 with process pressure compensation
Flow rate of sample gas	max. 60 Nl/hr (no flowmeter inside)
Temperature of sample gas	-10 °C up to +50 °C dry gas
O_2-transducer temperature	fixed at +55 °C
Ambient-/ Storage temperature	-10 °C up to +50 °C / -20 °C up to +60 °C, relative humidity 0-90% RH
Power supply	internal power unit for 230V$_{AC}$ standard or 115V$_{AC}$ (a)* +/-10%, 40-60Hz, 35,5VA
Electrical connections	terminals 2,5 mm^2, 3x PG cable glands (mains supply, signals, range indication, remote ranging , status alarm)
Materials in contact with sample gas	Platinum, Glass, Stainless Steel 316Ti, Epoxy resin, PTFE, PVDF
Sample gas connection	$^1/_4$" NPTi
Flow alarm	thermo-conductive flow sensor downstream mounted after measuring cell
Status alarm	Change-over contact, switching capacity 250 V AC 2A AC, 48V DC 200mA DC minimum contact rating 50mW for temperature <+45°C / >+60°C, defect light beam, measuring cell not coupled, flow alarm <10 / >70Nl/h, power supply error control, mains voltage breakdown
Protection / classification	IP 54 EN 60529 / Ⓔx II2G EEX d e IIC T5 or Ⓔx II1/2G EEX d e [ia] IIC T5
Certificate No.	KEMA 03 ATEX 2215X
Temperature cutoff	at 72°C via thermal fuse, non-reversible
Housing / colour	wall mounted explosion-proof housing / blue
Dimension / weight	475 (535) x 275 (355) x 200 mm / h x w x d / approx. 22 kg
Options	Part-No. 05A9000: purging the enclosure via two certified ventilate arrestors, for pressures up to max. 1,5 bar abs. and/or corrosive gases, connection $^1/_4$" NPTi, purge gas inlet pressure max. 100 mbar, flow rate 10-60 Nl/hr Part-No. 05A9005: purging the enclosure via one certified ventilate arrestor, for pressure range > 1,1 bar - 1,5 bar abs. and non-corrosive gases, connection $^1/_4$" NPTi Part-No. 05A9015: Zero suppressing type SD-1/50 for PMA-50 pressurerange 0,5-1,5bar abs. Lowest range 97-100% material: SS316, PVDF, Viton. mounted in the PMA-50Ex. Only in connection with PMA50EEx/P/PD-1/50. Externally switchable via potential free contacts, 30V DC 3mA DC Part-No. : Transmitter for measurements of gases from ex-zone 0 Ⓔx II 1/2 G Eex de [ia] IIC T5 Part-No. 90A0009: Measuring cell type PMC-1LB, solvent resistant. Part-No. 90A0006: Measuring cell PMC-1G with glass solder. O-ring made of Chemraz

* Please specify with order.

WARNING! IMPORTANT!

An external fine filter must always be used at the gas inlet of the analyser. Depending on the composition of the sample gas, it may be necessary to use a sample conditioning system.

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