

MC2 Sensor

with Electrochemical Sensor Element for Toxic Gases or Oxygen with Analog Output



- Internal functional control with integrated Watchdog
- Easy maintenance and calibration by exchange of the sensor or by comfortable on-site calibration
- High accuracy, selectivity and reliability
- Low zero-point drift
- Sensor with long life expectancy (depending on gas type)
- Hardware and software according to SIL compliant development process
- 4–20 mA (or 2–10 V) analog output with selectable signal output for Special Mode (fault, maintenance, service etc.)
- Reverse polarity protected, overload and short-circuit proof
- IP65 protection (when installed)

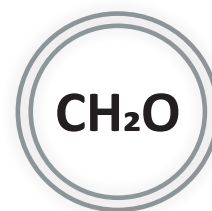
OVERVIEW

Electrochemical sensor including digital value processing and integrated self-diagnosis, for the continuous monitoring of the ambient air to detect toxic gases or oxygen.

The intelligent MC2 Sensor for detection of toxic gases or oxygen monitoring includes an electrochemical cell and electronics with a measuring amplifier and a μ Controller as well as a module with a terminal for the analog output and the external power supply. The μ Processor converts the sensor's measuring signal into a linear 4–20 mA signal (or 2–10 V). All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the μ Processor.

The maintenance of the device can be done either by simply exchanging the sensor or by using the integrated, comfortable calibration routine directly at the system.

The PolyGard®2 MC2 Sensor used to detect toxic gases or to monitor the oxygen content in the ambient air when an analog 4–20 mA (or 2–10 V) signal is required.



APPLICATIONS

- Garage
- Tunnel
- Food
- Beverage dispensing
- Laboratory
- Climate
- Water
- Aquaculture
- Hydrogen
- Battery
- Waste
- Process
- Gas storage

ELECTRICAL	
Power supply	18–29 V DC, reverse-polarity protect.; 18–27 V AC (only for output signal 2–10 V)
Power consumption	23 mA, max. (0.6 VA for 24 V)
Analog output signal	Proportional, overload and short-circuit proof, load $\leq 500 \Omega$ for current signal, $\geq 50 \text{ k}\Omega$ for voltage signal 4–20 mA or 2–10 V = measuring range 3–4 mA or 1.5–2 V = underrange > 20–21.2 mA or 10–10.6 V = overrange 2 mA or 1 V = fault > 21.8 mA or 10.9 V = fault High
SENSOR ELEMENT	
Gas type and measuring range	See Ordering Information
Measuring principle	Electrochemical
Poisoning	Electrochemical sensor elements are susceptible to poisoning by organic solvents.
RECOMMENDED STORAGE CONDITIONS	
Storage temperature range¹	See following tables
Storage time¹	Ca. 6 months
Humidity range / pressure range	See following tables
PHYSICAL	
Housing type P	Polycarbonate UL 94 V2
Housing colour	Similar to RAL 7035 (light grey)
Dimensions (\varnothing x H)	24 x 22 mm (0.94 x 0.87 in.)
Weight	Ca. 30 g (0.066 lb)
Protection class	IP65
Mounting	Screw mounting, external thread M25 x 1.5 mm
Wire connection	Screw-type terminal, 0.25–1.3 mm ² , 3-pin
REGULATIONS	
Directives	EMC directives 2014/30/EU, UL2075 (only for sensor MC2-X-E1110-E-X-P) CE, UKCA Compliance with: EN 378 EN 45544-1, -3 EN 50104 (for O2) EN 50271, EN 50545 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensors (not if poisoned or overloaded)

¹ If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.

OPTIONS	
HOUSING TYPE A	
Material / flammability classification	Polycarbonate / UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions (B x H x D)	94 x 130 x 57 mm (3.7 x 5.1 x 2.2 in.)
Weight / package volume	Ca. 0,2 kg (0.4 lb) / ca. 4,5 l
Protection class	IP65
Mounting	Wall mounting
Pre-embossing for cable entry / sensor	6 x M20/M25
DISPLAY	
LC Display	2 lines, 16 characters each, monochrome
Temperature range	-20 °C to +60 °C (-4 °F to 140 °F)
OPEN-COLLECTOR	
Transistor output (2)	For horn (resettable) and warning lamp
Switching capacity	24 V DC / 50 mA (+ switching)

Gas Type	CH2O (Formaldehyde)
Ordering No.	MC2-X-E1185-B
Measuring range¹	0–10 ppm
Accuracy	n.d. ± % sig.
Display resolution	0.01 ppm
Repeatability	< ± 5% sig.
t₉₀ time	≤ 60 sec.
Reaction time	≤ 5 sec.
Zero-point variation	± 0.2 ppm
Drift in air	< 2% / month
Temperature range	-30°C to +50 °C
Humidity range non-condensing	15-90% RH
Pressure range	90-110 kPa
Storage temperature range²	5 °C to +20 °C
Life time³in air	> 3 years
Relative gas density⁴	1.04 Air = 1
Calibration interval⁵	6 months

Gas concentration of cross gas / reaction of sensor	
Gas Type	CH2O (Formaldehyde)
Ordering No.	MC2-X-E1185-B
Ammonia, NH₃	-
Chlorine, Cl₂	-
Ethanol, C₂H₆O	30/1 ppm
Ethylene, C₂H₄	-
Carbon dioxide, CO₂	-
Carbon monoxide, CO	100/<20 ppm
Sulphur dioxide, SO₂	-
Hydrogen sulphide, H₂S	20/~20 ppm
Nitrogen dioxide NO₂	-
Nitrogen monoxide, NO	-

¹ The table does not claim to be complete. Other gases, too, can have an influence on the sensitivity. The mentioned cross sensitivity data are only reference values valid for new sensors.

² Cross sensitivity data valid for all measuring ranges of the sensor.

¹ Exceeding the measuring range limit will include a risk of damaging the sensor element.

² A deviating storage temperature can have a negative effect on sensitivity and service life.

³ Expected service life for normal ambient conditions

⁴ The recommended mounting height depends on the relative gas density of the type of gas to be monitored. Depending on the relative gas density (d), the following recommendation therefore applies:

$d \leq 0.85$: Mounting 0.3–0.5 m below the ceiling

$0.85 < d < 1.15$: Mounting at 1.2–1.8 m height

$d \geq 1.15$: Mounting 0.3–0.5 m above the floor

⁵ Manufacturer-recommended calibration intervals for normal environmental conditions