

Technical Datasheet



PolyGard®2

Sensors for car parks and tunnels

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Specifications subject to change without notice.
Up-to-date data sheets and user manuals can be found in the download area of www.msr-24.com.
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■ All Products
■ Made
■ in Germany

DESCRIPTION

Sensor system with exchangeable sensor element including digital value processing, temperature compensation and self-monitoring algorithm for the continuous sensing and control of the ambient air to detect harmful gases and vapours.

The X-Change sensor consists of the Sensor Board with housing (SB2) and the Sensor Cartridge (SC2). The sensor cartridge includes a separate microcontroller. The micro controller evaluates and stores all relevant measured values and data of the sensor element. Via the internal local bus, the sensor cartridge transmits the data to the sensor board. The sensor board can manage up to three sensor cartridges for different gases. The sensor cartridges can be mounted directly at the basic sensor board or as well separately with a remote sensor board. The basic sensor board communicates with the GC-06 gas controller via the RS-485 field bus interface.

Calibration is done either by simply replacing the sensor cartridge or by using the comfortable, integrated calibration routine with password access directly at the system.

APPLICATION

The PolyGard®2 Sensor is used for the detection of CO, NO₂ and/or LPG concentrations in underground car parks, tunnels etc. acc. to EN 50545-1.

FEATURES

- Digital measurement value processing incl. temperature compensation
- Internal functional control with integrated Hardware Watchdog
- Data/measured values in µC Sensor Cartridge, therefore simple exchange of SC uncalibrated <> calibrated
- Up to three gases detectable at one basic Sensor Board
- Sensor Cartridge can be mounted remotely with a remote board to provide for proper mounting heights
- Low zero-point drift
- Good stability to poisoning
- Sensor with long life expectancy
- Modular technology (plug-in and replaceable)
- Easy maintenance and calibration by exchange of the sensor cartridge or by comfortable on-site calibration
- Serial RS-485 interface
- Reverse polarity protected, overload and short-circuit proof
- IP65 version (housing type A in delivery state)
- Warning module consisting of buzzer and status LED red (option)
- LCD display (option)
- Conformity to:
 - EN 50545-1
 - EN 50271
 - EN 61010-1
 - DIN / EN 61508
 - DIN / EN 60079-29-1
 - ANSI/UL 61010 1
 - CAN/CSA-C22.2 No. 61010-1
- Duct mounting kit (accessory)

SPECIFICATIONS

Sensor Board (SB2)

ELECTRICAL	
Power supply	16–29 V DC, reverse-polarity protected
Power consumption (24 V DC)	SB2 + SC2-E1110-FX 8 mA (0.2 VA)
	SB2 + SC2-E1110-FX + SC2-E1130-CX 10 mA (0.25 VA)
	SB2 + SC2-E1110-FX + SC2-P3480-A 56 mA (1.35 VA)
Output for local bus	5 V DC, 250 mA max. Overload, short-circuit and reverse-polarity protected
GENERAL SENSOR PERFORMANCE	
Temperature range	-35 °C to +50 °C (-31 °F to 122 °F)
Humidity range	15–90 % RH not-condensing
Pressure range	Atmospheric ± 10 %
Storage temperature	5 °C to 30 °C (41 °F to 86 °F)
Storage time	6 months
SERIAL INTERFACE	
Local bus	1-wire / 19200 Baud
Field bus	RS-485 / 19200 Baud
Tool bus	2-wire / 19200 Baud
PHYSICAL	
Enclosure plastic type A	Polycarbonate
Flammability	UL 94 V2
Enclosure colour	RAL 7032 (light grey)
Dimensions	(W x H x D) 94 x 130 x 57 mm (3.7 x 5.1 x 2.2 in.)
Weight	Ca. 0.3 kg (0.7 lb)
Package volume	Ca. 4.5 l
Protection class (delivery status)*	NEMA 4X (IP65)
Installation	Wall mounting
Cable entry (pre-embossed)	Standard 2 x M20, 2 x M12
Wire connection: Field bus	Screw-type terminal min. 0.25 mm ² , max. 2.5 mm ²
Local bus	3-pin connector
Cable length local bus for Remote Sensor Board	Max. 5 m
Pre-embossing for the mounting of the SC2	3 x M25 for M25 housing
REGULATIONS	
Directives	EMC Directives 2014/30/EU CE
	Conformity to: EN 50271 EN 61010-1:2010
	Option: ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensor (not if poisoned or overloaded), 2 years on device

*If there are changes to the housing it has to be re-evaluated.

Sensor-Cartridge SC2)

ELECTRICAL	
Power supply	5 V DC from SB2, reverse polarity protected
Power consumption:	
Cartridge series SC2-E11XX-X	12 mA, max. (0.06 VA)
Cartridge series SC2-P34XX-A	200 mA, max. (1.0 VA)
Serial interface local bus	1-wire / 19200 Baud
GENERAL SENSOR PERFORMANCE	
Humidity range	15–90 % RH not-condensing
Pressure range	Atmospheric ± 10 %
Storage temperature range ¹	0 °C to 20 °C (32 to 68 °F)
Storage time	6 months
Cross sensitivity:	
Sensor elements CO, NO ₂ ,	See table cross sensitivity for toxic gases
Sensor elements LPG	Detects all combustible gases
Poisoning	Electrochemical sensors are susceptible to poisoning by organic solvents and silicone vapours.
PHYSICAL	
Housing M25 type P	Polycarbonate
Combustion	UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions: M25 housing plastic type P	(D x H) 24 x 22 mm (0.94 x 0.87 in.)
Weight	Ca. 30 g (0.07 lb)
Protection class	IP65
Mounting	Screw mounting
Connection type	3-pin connector
Cable length	110 mm
REGULATIONS	
Directives	EMC Directives 2014/30/EU CE
	Conformity to : EN 50545-1 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensor (not if poisoned or overloaded), 2 years on device

¹A higher storage temperature can have a negative effect on sensitivity and service life.

Gas type	Ordering No.	Measuring range	Accuracy	Display resolution	Repeatability	t ₉₀ time	Zero-point variation	Drift in air		Temperature range	Humidity range (non-condensing)	Life time ¹ in air	Relative Gas density ²
	SC2-	ppm	± % sig.	ppm	<±%sig.	≤ sec.	±ppm	Zero	Gain	°C	>months	Air = 1	
CO	E1110-FX	0-300	2	0.1	5	10	-2-4	0,4	0,4	-15 / +65 ²	72	0.97	1.5-1.8 m
NO ₂	E1130-CX	0-30	5	0.01	2	25	<±0.2	1	2	-20 / +65	24	1.59	0.5-1.8 m
		% LEL	± % LEL	% LEL CH ₄	<±%sig.	≤ sec.	% LEL	< % LEL /month		°C	>months	air = 1	
C ₃ H ₈	P3480-A	0-100	1	0.1	2	15	0.5	0.5	1	-30 / +60	36	1.55	floor

¹ Life expectancy at normal environmental conditions.

² Short-time -20 °C

CROSS SENSITIVITY¹

Gas concentration of cross gas / reaction of sensor

Gas type	ORDERING NO.	Chlorine, Cl ₂	Alcohols	Ethanol, C ₂ H ₅ O	Ethylene, C ₂ H ₄	Carbon monoxide, CO	Carbon dioxide, CO ₂	Sulphur dioxide, SO ₂	Hydrogen sulphide, H ₂ S	Nitrogen dioxide NO ₂	Nitrogen monoxide, NO
	SC2-	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
CO	E1110-XX ²	2/0	2000/5			5 000/0	50/0,5	25/0	50/-1	50/8	100/20
NO ₂	E1130-XX ²	1/1	100/0	500/0	400/0	5000/0	30/-0,6	20/-25		50/0	1 000/0

¹ The table doesn't 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.

All specifications were collected under optimal test conditions.

We confirm compliance with the minimum requirements of the applicable standard.

ORDERING INFORMATION

Sensor-Board (SB2)

SB2-	X-	X	0	X	X	0	0	X	0	X	
									0	No further options	
									A	Version UL/CSA 61010-1 (only in housing type A and C)	Further options
									0	Without built-on warning device	Warnings devices¹
									0	Without display	
									2	With display/keyboard	Display¹
									0	No analog input	Analog Input¹
									0	No digital input	Digital Input¹
									2	RS-485 with DGC-06 protocol	
									4	RS-485 with Modbus protocol	
									8	MSR_D_Bus	Output signal - bus
									0	Without visual / acoustic indicator	
									2	Plug connector for warning module	
									3	Warning module, buzzer & status LED red, mounted on the housing	
									4	Warning module, buzzer & status LED red, as replacement (only for Sensor Board SB2 with connector for warning module)	Visual/acoustic warning indicator¹
									0	No alarm relay	Alarm relay¹
									1*	12 V DC ¹	
									2	24 V DC	
									7*	100–240 V AC / 24 V DC, 15 VA ¹	
									8*	USV 100–240 V AC / 12 V DC, 15 VA, 0,8 Ah ¹	
									9*	USV 100–240 V AC / 24 V DC, 15 VA, 0,8 Ah ¹	Power supply
									0	Without housing	
									A	Housing type A 90 x 130 x 57 mm	
									C	Housing type C 130 x 130 x 75 mm	
									K*	Housing type K ATEX Ø 95 x 82 mm	
									5²	Housing type 5 stainless steel (113 x 135 x 45 mm)	Housing

* Only on request

¹ Not in stainless steel housing

² Only for integration of one sensor cartridge

Remote-Board (RB2)

RB2-	X-	1XXXXXXX-	X	
			0	No further options
			A	Version UL/CSA 61010-1
		1XXXXXXX		Remote Board for remote connection of one SC2 at the SB2
				Version
			0	Without housing
			A	Housing type A 90 x 130 x 57 mm
				Housing

Sensor-Cartridge*: Toxic Gases

SC2-	E11XX-XX-	X-	X	
			00	Without cable extension (standard)
			XX ¹	With cable extension: 01, 02, 03, 04, 05 ... 15 max. (length in m)
				Cable
		P		Sensor housing plastic
		S		Sensor housing stainless steel
				Sensor housing
	E1110-FX	Gas type	Measuring range	Gas type/ Measuring range
		Carbon monoxide, CO	0–300 ppm	
	E1130-CX ²	Nitrogen dioxide, NO ₂	0–30 ppm	

Sensor-Cartridge*: Combustible Gases

SC2-	P34XX-X-	X-	XX	
			00	Without cable extension (standard)
			XX ¹	With cable extension: 01, 02, 03, 04, 05 ... 15 max. (length in m)
				Cable
		P		Sensor housing plastic
		S		Sensor housing stainless steel
				Sensor housing
	P3480-A	Gas type	Measuring range	Gas density
		Propane, C ₃ H ₈	0–100 % UEG	(air =1) 1,55
				Mounting- height
				Boden
				Gas type/measuring range/gas density/ mounting height

* Approvals according to EN 50545-1, EN 50271, EN 61010

¹ Only on request in combination with plastic sensor housing

² Not in combination with stainless steel sensor housing

EXAMPLE 1

CO sensor in plastic housing P without extension cable, 300 ppm measuring range, with basic sensor board in plastic housing A

Order number: SB2-A-200200000 and SC2-E1110-FX-P-00

EXAMPLE 2

CO sensor in plastic housing P without extension cable, 300 ppm measuring range, with basic sensor board for two sensor cartridges in plastic housing A

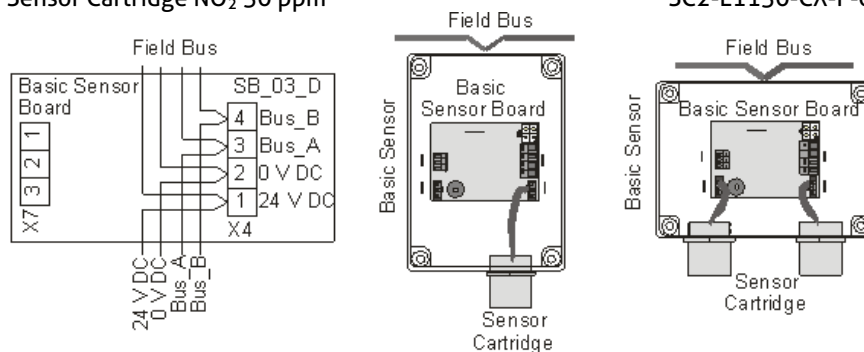
NO₂ sensor in plastic housing P without extension cable, 30 ppm measuring range, separate mounting with Remote Sensor Board in plastic housing A

Order number: SB2-A-200200000 and SC2-E1110-FX-P-00
RB2-A-100000000 and SC2-E1130-CX-P-00

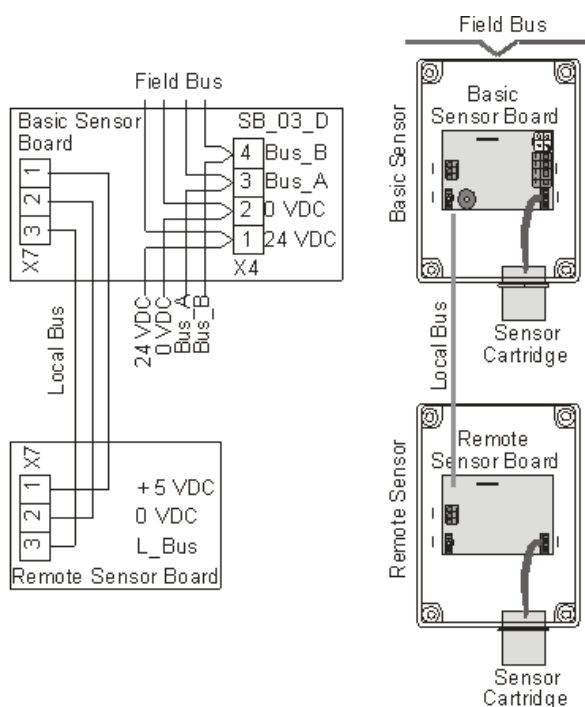
ELECTRICAL CONNECTION

Example with one or two sensor cartridges directly at the Sensor Board

Order No.	Sensor Board	SB2-A-200200000	SB2-A-200200000
	Sensor Cartridge CO 300 ppm	SC2-E1110-FX-P-00	SC2-E1110-FX-P-00
	Sensor Cartridge NO ₂ 30 ppm		SC2-E1130-CX-P-00



Example with one Sensor Cartridge directly at the Sensor Board and one separate Sensor Cartridge at a Remote Board



Order No.

Sensor Board:
SB2-A-200200000

Sensor Cartridge CO 300 ppm:
SC2-E1110-FX-P-00

Order No.

Remote Board:
RB2-A-100000000

Sensor-Cartridge NO₂, 30 ppm:
SC2-E1130-CX-P-00