



## PolyGard®2

# Sensor for car parks and tunnels

**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, NO<sub>2</sub> 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 and measured values in µC Sensor Cartridge provide for simple exchange of SC2 uncalibrated <-> calibrated
- Up to 3 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
- Long life sensor
- Modular technology (plug-in and replaceable)
- Easy maintenance and calibration by exchange of the sensor cartridge or by comfortable calibration on site with password access
- Serial RS 485 interface
- Reverse polarity protected, overload and short-circuit
- IP 65 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,
  - DIN / EN 61508, DIN / EN 60079-29-1, EN 61010-1
- ANSI/UL 61010 1 & CAN/CSA-C22.2 No. 61010-1 (optional)



Sensor Board in A housing with  
1x SC2 in plastic housing





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## SPECIFICATIONS - BASIC 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 (IP 65)	
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 <sup>2</sup> , max. 2.5 mm <sup>2</sup>
	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	

**Directives**

EMC directives 2014/30/EU  
 CE  
 EN 61010-1:2010  
 Conformity to:  
 EN 50271  
 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.





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### SPECIFICATIONS – SENSOR CARTRIDGE (SC2) GENERAL

#### 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

Humidity range	15 to 90 % RH not-condensing
Pressure range	Atmospheric ± 10 %
Storage temperature range	5 °C to 30 °C (41 to 86 °F)
Storage time	6 months
Cross sensitivity	
- Sensor elements CO, NO <sub>2</sub> ,	See table cross sensitivity for toxic gases
- Sensor elements LPG	Detects all combustible gases

#### 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	IP 65
Mounting	Screw mounting
Connection type	3-pin connector
Cable length	110 mm

#### 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





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## SPECIFICATIONS - SENSOR CARTRIDGE (SC2) / SENSOR ELEMENT

Gas type	Order No.	Accuracy	Display resolution	Repeat-ability	T90 time	Zero offset	Drift in air		Temp. range	Life expect. <sup>1</sup>	Gas density	Mounting height
							Zero	Gain				
	SC2-	± % signal	ppm	<± % signal	≤ sec.	ppm	< % signal/month		°C	> months	air = 1	
CO	E1110-F	2	0.1	5	10	-2 to 4	0.4	0.4	-15 / +65 <sup>2</sup>	72	0.97	1.5-1.8 m
NO <sub>2</sub>	E1130-C	5	0.01	2	25	< ± 0.2	1	2	-20 / +65	24	1.59	0.5-1.8 m
	SC2-	± % LEL	% LEL CH <sub>4</sub>	<± % signal	≤ sec.	% LEL	< % LEL /month		°C	> months	air = 1	
C <sub>3</sub> H <sub>8</sub>	P3480-A	1	0.1	2	15	0.5	0.5	1	-30 / +60	36	1.55	floor

<sup>1</sup> Life expectancy at normal environmental conditions.

<sup>2</sup> Short-time -20 °C

## TABLE CROSS SENSITIVITY OF SENSOR ELEMENT FOR TOXIC GASES<sup>1</sup>

Gasart	Ordering No.	Chlorine, Cl <sub>2</sub>	Ethanol, C <sub>2</sub> H <sub>6</sub> O	Ethylene, C <sub>2</sub> H <sub>4</sub>	Carbon monoxide, CO	Carbon dioxide, CO <sub>2</sub>	Sulphur dioxide, SO <sub>2</sub>	Hydrogen sulphide, H <sub>2</sub> S	Nitrogen dioxide NO <sub>2</sub>	Nitrogen monoxide, NO	Hydrogen, H <sub>2</sub>
	SC2-	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
CO	E1110-X <sup>2</sup>	2/0	2000/5			5000/0	50/0.5	25/0	50/-1	50/8	100/20
NO <sub>2</sub>	E1130-X <sup>2</sup>	1/1	100/0	500/0	400/0	5000/0	30/-0.6	20/-25		50/0	1000/0

Illustration: Gas concentration of interference gas / reaction of sensor

<sup>1</sup> 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.

<sup>2</sup> Cross sensitivities 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.





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# Sensor for car parks and tunnels

## ORDER INFORMATION

### SENSOR BOARD SB2

SB2 - **X X 0 X X 0 0 X 0 X**

**FURTHER OPTIONS**

**0** No further options

**A** Version UL/CSA 61010-1 (only housing A & C)

**WARNING DEVICES<sup>1</sup>**

**0** Without built-on warning device

**DISPLAY<sup>1</sup>**

**0** Without display

**2** With display/keypad

**ANALOG INPUT<sup>1</sup>**

**0** No analog input

**DIGITAL INPUT<sup>1</sup>**

**0** No digital input

**OUTPUT SIGNAL – BUS**

**2** RS 485 with DGC 06 protocol

**4** RS 485 with Modbus protocol

**8** MSR\_D\_Bus

**VISUAL / ACOUSTIC WARNING INDICATOR<sup>1</sup>**

**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 replacem. (only for SB Board with connector for warning module)

**ALARM RELAYS<sup>1</sup>**

**0** No alarm relay

**POWER SUPPLY**

**1\*** 12 V DC<sup>1</sup>

**2** 24 V DC

**7\*** 100 – 240 V AC / 24 V DC, 15 VA<sup>1</sup>

**8\*** UPS 100 – 240 V AC / 12 V DC, 15 VA, 0.8 Ah<sup>1</sup>

**9\*** UPS 100 – 240 V AC / 24 V DC, 15 VA, 0.8 Ah<sup>1</sup>

**HOUSING**

**0** Without housing

**A** Housing type A 90 x 130 x 57

**C** Housing type C 130 x 130 x 75

**K\*** Housing type K ATEX Ø 95 x 82

**5** Housing type 5 stainless steel (113 x 135 x 45 mm)<sup>2</sup>

<sup>1</sup> Not in stainless steel housing

<sup>2</sup> Only for integration of one sensor cartridge

\* only on request





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REMOTE BOARD RB2

RB2- **X** **1XXXXXXXX** **X**

**FURTHER OPTIONS**

- 0** No further options
- A** Version UL/CSA 61010-1

**VERSION REMOTE BOARD**

**1XXXXXXXX** Remote Board for remote connection of one SC2 at the SB2

**HOUSING**

- 0** Without housing
- A** Housing type A 90 x 130 x 57

SENSOR CARTRIDGE<sup>1</sup>

**TOXIC GASES**

SC2- **E11XX-XX** **X-XX**

- 00** Without cable extension (standard)
- XX** With cable extension: **01, 02, 03, 04, 05 ... 15** max. (length in m)
- P** Sensor housing plastic
- S** Sensor housing stainless steel

	Gas type	Sensor type	Range	Calibration interval (recommendation)
<b>E1110-FX</b>	Carbon monoxide CO	EC sensor	0 - 300 ppm	1 year
<b>E1130-CX</b>	Nitrogen dioxide NO <sub>2</sub>	EC sensor	0-30 ppm	1 year

**COMBUSTIBLE GASES**

SC2- **P34XX-X** **X-XX**

- 00** Without cable extension (standard)
- XX** With cable extension: **01, 02, 03, 04, 05 ... 15** max. (length in m)
- P** Sensor housing plastic
- S** Sensor housing stainless steel

	Gas type	Sensor type	Range	Calibration interval (recommendation)
<b>P3480-A</b>	Propane C <sub>3</sub> H <sub>8</sub>	CC sensor	0 – 100 % LEL	6 months

<sup>1</sup>Approvals according to EN 50545-1, EN 50271, EN 61010

**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 & 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

NO<sub>2</sub> 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 & SC2-E1110-FX-P-00**  
**RB2-A-100000000 & SC2-E1130-CX-P-00**





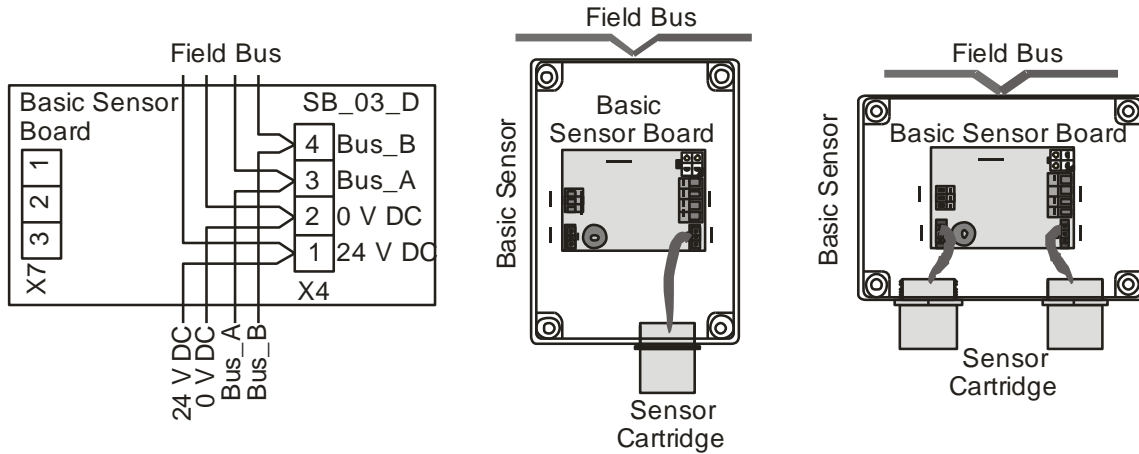
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## ELECTRICAL CONNECTION

Example with one or two sensor cartridges directly at the sensor board

Order No.	Basic 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 <sub>2</sub> 30 ppm		SC2-E1130-CX-P-00



Example with one sensor cartridge directly at the basic sensor board and one separate sensor cartridge at a remote sensor board

