



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, NO₂ and/or LPG concentrations in underground car parks, tunnels etc. acc. to EN 50545-1.



Sensor Board with 1x SC2 in A housing

FEATURES

- Digital measurement value processing incl. temperature compensation
- Internal functional control with integrated Hardware Watchdog
- Data and measured values in μ C 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
- Analog version (optional)
 - 4 – 20 mA analog input for external transmitter
 - 4 – 20 mA analog output with selectable signal output for fault etc.
- Reverse polarity protected, overload and short-circuit
- IP 65 version
- 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





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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-F 8 mA (0.2 VA) SB2 + SC2-E1110-F + SC2-E1130-C 10 mA (0.25 VA) SB2 + SC2-E1110-F + SC2-P3480-A 56 mA (1.35 VA)
Analog output signal	Proportional, overload and short-circuit proof, load ≤ 500 Ohm 4 - 20 mA = measuring range 3.0 < 4 mA = underrange > 20 - 21.2 mA = overrange 2.0 mA = fault
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	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 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
Directives	EMC directives 2014/30/EU EN 50545-1 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1 CE
Warranty	1 year on material (without sensor element)





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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 ₂ , NO	See table cross sensitivity for toxic gases
- Sensor elements LPG	Detects all combustible gases

Physical

Housing M25 and bayonet	Polycarbonate
Combustion	UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions: M25 housing	(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 material (without sensor element)

SPECIFICATIONS - SENSOR CARTRIDGE (SC2) / SENSOR ELEMENT

Order No.	Accuracy	Resolu- tion	Repeat- ability	T90 time	Zero- point oscillation	Drift		Temp. range	Life expect. ¹	Gas density	Mounting height
						Zero	Gain				
SC2-	± ppm	ppm	<± % signal	≤ sec.	ppm	< % signal/month		°C	> months	air = 1	
E1110-F	3	0.5	5	30	-2 to 4	0.2	0.4	-10 / +50 ²	72	0.97	1.5-1.8 m
E1129-C	1	0.2	5	45	± 0.5	0.1	0.4	-20 / +50	24	1.04	1.5-1.8 m
E1130-C	0.5	0.1	2	25	< ± 0.2	0.1	2	-20 / +50	24	1.59	1.5-1.8 m
SC2-	± % LEL	% LEL CH ₄	<± % signal	≤ sec.	% LEL	< % LEL /month		°C	> months	air = 1	
P3480-A	1	0.2	1	10	0.5	0.2	1	-20 / +50	36	1.55	floor

¹ Life expectancy at normal environmental conditions.

² Short-time -20 °C





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TABLE CROSS SENSITIVITY OF SENSOR ELEMENT FOR TOXIC GASES¹

Gas	SC2-E1110-F (CO)		SC2-E1130-C (NO ₂)		SC2-E1129-C (NO)	
	Concentration	Reaction	Concentration	Reaction	Concentration	Reaction
	(ppm)		(ppm)		(ppm)	
Acetone, C ₂ H ₆ O	1000	0				
Acetylene, C ₂ H ₂	40	80				
Ammoniac, NH ₃	100	0	100	0	20	< 0.1
Chlorine, Cl ₂	2	0	1	1	10	< 15
Ethanol, C ₂ H ₅ OH	2000	5	100	0		
Ethylen, C ₂ H ₄			500	0		
Iso propanol, C ₃ H ₈ O	200	0				
Carbon dioxide, CO ₂	5000	0	5000	0	50,000	< 0.1
Carbon monoxide, CO			400	0	400	< 0.1
Nitrogen dioxide, NO ₂	50	- 1.0			50	< 5
Nitrogen oxide, NO	50	8	50	0		
Sulphur dioxide, SO ₂	50	< 0.5	30	- 0.6	20	< 3
Hydrogen sulphide, H ₂ S	25	0	20	-25	20	< 30
Toluene, C ₇ H ₈			50	< 1.5		
Hydrogen, H ₂	100	20	1000	0	400	< 0,10

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.

ORDER INFORMATION

SENSOR BOARD SB2

SB2 - **A 2 0 0 X 0 0 X 0**

WARNING DEVICES

0 Without built-on warning device

DISPLAY¹

0 Without display

2 With display/keypad

ANALOG INPUT

0 No analog input

DIGITAL INPUT

0 No digital input

OUTPUT SIGNAL – ANALOG / BUS

2 RS 485 with DGC 06 protocol

3 Analog output & RS 485 with DGC 06 protocol

8 D-Bus (3-wire bus)

VISUAL/ AUDIBLE WARNING DEVICES

0 Without visual / acoustic indicator

ALARM RELAYS

0 No alarm relay

POWER SUPPLY

2 24 V DC

HOUSING

A Housing type A 90 x 130 x 57





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REMOTE BOARD RB2

RB2- **X 10000000**
VERSION REMOTE BOARD
 10000000 Remote Board for remote connection of one SC2 at the SB2, 24 V DC
HOUSING
A Housing type A 90 x 130 x 57

SENSOR CARTRIDGE¹

SC- XXXXX-X	Gas type	Sensor type	Range	Calibration interval
	TOXIC GASES			recommendation
E1110-F	Carbon monoxide CO	EC sensor	0 - 300 ppm	1 year
E1129-C	Nitrogen oxide NO	EC sensor	0 - 100 ppm	1 year
E1130-C	Nitrogen dioxide NO ₂	EC sensor	0-30 ppm	1 year
	COMBUSTIBLE GASES			
P3480-A	Propane C ₃ H ₈	CC sensor	0 – 100 % LEL	6 months

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

EXAMPLE 1

CO sensor in M25 Sensor Cartridge housing, 300 ppm measuring range, with basic sensor board in plastic housing.

Order number: SB2-A-20020000 & SC2-E1110-F

EXAMPLE 2

CO sensor in M25 Sensor Cartridge housing, 300 ppm measuring range, with basic sensor board for two sensor cartridges in plastic housing.

NO₂ sensor in M25 Sensor Cartridge housing, 30 ppm measuring range, separate mounting with Remote Sensor Board in plastic housing

Order number: SB2-A-20020000 & SC2-E1110-F
RB2-A-10000000 & SC2-E1130-C





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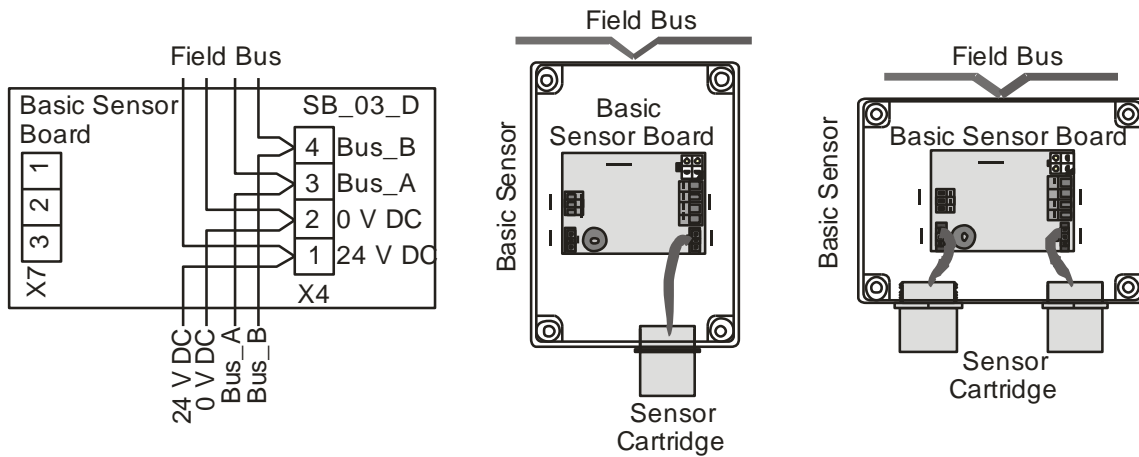
ELECTRICAL CONNECTION

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

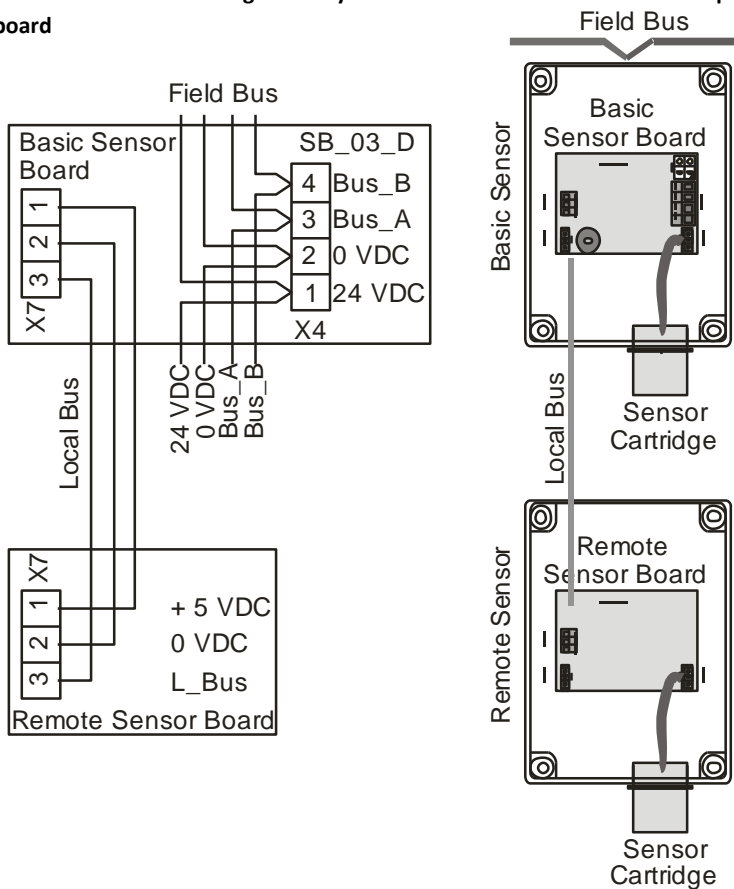
Order No. Basic Sensor Board
 Sensor Cartridge CO 300 ppm
 Sensor Cartridge NO 100 ppm

SB2-A-2002000
 SC2-E1110-F

SB2-A-2002000
 SC2-E1110-F
 SC2-E1129-C



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



Order No.
 Basic Sensor Board SB2-A-2002000
 Sensor Cartridge CO, 300 ppm
 SC2-E1110-F

Order No.
 Remote Sensor Board RB2-A-10000000
 Sensor Cartridge NO₂, 30 ppm
 SC2-E1130-C

