

Gas Detection.



Technical Datasheet



PolyGard®2

Sensor SC2

with Electrochemical Sensor Element
for Toxic Gases and Oxygen

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Specifications subject to change without notice.

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DESCRIPTION

Exchangeable sensor including digital value processing, temperature compensation and self-control for the continuous monitoring of the ambient air.

The Sensor SC2 includes an electrochemical sensor element and an amplifier as well as a μ Controller for measured values processing. All relevant data and measured values of the sensor element are stored fail-safe in the μ Controller and transmitted digitally via the local bus to the Sensor Board (e.g. SB2 or MSB2). The calibration management is also integrated in the μ Controller of the Sensor.

Calibration is done either by simply replacing the Sensor or by using the comfortable, integrated calibration routine directly at the system.

APPLICATION

The PolyGard[®]2 Sensor SC2 is used for the detection of toxic gases or for oxygen monitoring.

FEATURES

- Digital measurement value processing incl. temperature compensation
- Internal functional control with integrated Watchdog
- Data/measured values in μ C of the Sensor, therefore simple exchange of the Sensor uncalibrated <-> calibrated
- High accuracy, selectivity and reliability
- Low zero-point drift
- Sensor with long life expectancy
- Hardware and software according to SIL compliant development process
- Modular technology (plug-in and replaceable)
- Easy maintenance and calibration by exchange of the Sensor or by comfortable on-site calibration
- Reverse polarity protected, overload and short-circuit proof
- IP65 version
- Duct mounting kit (accessory)
- Conformity to:
 - EN 378
 - EN 45544-1, -3
 - EN 50104 (for O₂)
 - EN 50545
 - EN 50271
 - EN 61010-1
 - ANSI/UL 61010 1
 - CAN/CSA-C22.2 No. 61010-1



Option: SC2 in plastic housing L with cable extension (fig. w/o laser engraving)

SPECIFICATIONS

ELECTRICAL		
Power supply	5 V DC from Sensor Board (e.g. SB2/MSB2), reverse polarity protected	
Power consumption:	10 mA, max. (0.05 VA)	
Serial interface local bus	1-wire / 19200 Baud	
SENSOR ELEMENT		
Gas type	See Ordering Information	
Sensor element	Electrochemical	
Pressure range	90–110 kPa or 80–120 kPa (NH ₃ , O ₂ , NO, SO ₂ , all CO except for 1110-A, all NO ₂ except for 1130-F, all H ₂ S except for E1197-E)	
Storage temperature range ¹	+5 °C to +20 °C (+41°F to +68 °F) or 0 °C to +20 °C (+32°F to +68 °F) for NH ₃ , CO, NO, NO ₂ , O ₂ , SO ₂ , all H ₂ S except for E1197-E or +10 °C to +30 °C (+50°F to +86 °F) for H ₂ and CO 1110-A	
Storage time ²	Ca. 6 months	
Poisoning	Electrochemical sensors are susceptible to poisoning by organic solvents and silicone vapours.	
PHYSICAL		
Housing	Plastic	Stainless steel
Material	Polycarbonate	CrNi steel: 1.4404
Combustion	UL 94 V2	-
Housing colour	RAL 7032 (light grey)	Natural
Dimensions (Ø x H)	Type P: 24 x 22 mm (0.94 x 0.87 in.) Type L: 24 x 30 mm (0.94 x 1.18 in.)	Type S: 30 x 56 mm (1.18 x 2.20 in.)
Weight	Ca. 30 g	Ca. 150 g
Protection class	IP65 (with accessories C2-Z5 splash protection SplashGuard IP66)	IP64 (with accessory SG_PX2 stainless steel splash protection SplashGuard IP66)
Mounting	Screw mounting	Screw mounting, external thread NPT 3/4" ANSI/ B1.20.1
Connection type	3-pin connector	
Cable length	Ca. 150 mm (5.91 in.) standard version w/o cable extension	Cable extension (1–15 m in metre steps)
REGULATIONS		
Directives (only in connection with the Sensor-Boards from MSR)	EMC Directives 2014/30/EU CE Conformity to: EN 378 EN 45544-1, -3 EN 50104 (for O ₂) EN 50545 EN 50271 EN 61010-1 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	

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

² If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.

Gas type	Ordering No.	Measuring range ¹	Accuracy		Repeatability	t ₉₀ time	t ₉₀ time (stainless steel housing)	Zero point variation	Drift in air		Temperature range	Humidity range (non-condensing)	Life time ² in air	Relative gas density ³	Calibration interval ⁴
			± % sig.	ppm					< ± % sig.	± ppm					
CO	E1110-A	0-50	2	0.01	3	15	35	1	1	2	-20 / +50	15-90	24	0.97	12
CO	E1110-C	0-150	2	0.1	5	10	40	4	0.4	0.4	-20 / +50	10-95	72	0.97	12
CO	E1110-E	0-250	2	0.1	5	10	40	4	0.4	0.4	-20 / +50	10-95	72	0.97	12
CO	E1110-F	0-300	2	0.1	5	10	40	4	0.4	0.4	-20 / +50	10-95	72	0.97	12
CO	E1110-H	0-500	2	0.1	5	10	40	4	0.4	0.4	-20 / +50	10-95	72	0.97	12
NH ₃	E1125-A	0-100	5	0.1	10	120	200	5	1	2	-30 / +50	15-90	24	0.60	12
NH ₃	E1125-B	0-300	3	0.1	10	120	200	5	1	2	-30 / +50	15-90	24	0.60	12
NH ₃	E1125-C	0-500	3	0.1	10	120	200	5	1	2	-30 / +50	15-90	24	0.60	12
NH ₃	E1125-D	0-1000	3	1	10	120	200	10	1	2	-30 / +50	15-90	24	0.60	12
NH ₃	E1125-E	0-5000	2	1	10	40	120	100	1	2	-30 / +50	15-90	24	0.60	12
NO	E1129-C	0-100	2	0.1	5	20	40	3	1	2	-30 / +50	15-90	24	1.04	12
NO ₂	E1130-A	0-10	5	0.01	2	25	-	0.2	1	2	-30 / +50	15-90	24	2.80	12
NO ₂	E1130-B	0-20	5	0.01	2	25	-	0.2	1	2	-30 / +50	15-90	24	2.80	12
NO ₂	E1130-C	0-30	5	0.01	2	25	-	0.2	1	2	-30 / +50	15-90	24	2.80	12
NO ₂	E1130-E	0-100	5	0.1	2	25	120	2	1	2	-30 / +50	15-90	24	2.80	12
NO ₂	E1130-F	0-5	5	0.001	2	25	-	0.1	1	2	-20 / +50	15-90	24	2.80	12
HCN	E1183-B	0-50	5	0.01	5	30	40	2	1	2	-20 / +50	15-90	24	0.93	6
HCN	E1183-C	0-100	5	0.1	5	30	60	2	1	2	-20 / +50	15-90	24	0.93	6
CH ₂ O	E1185-B	0-10	n.d.	0.01	5	60	-	0.2	1	2	-30 / +50	15-90	36	1.04	6
HCl	E1186-D	0-20	5	0.01	5	60	60	0.5	1	2	-20 / +50	15-90	24	1.27	6
C ₂ H ₄	E1189-C	0-200	n.d.	0.1	5	120	-	5	2	5	-30 / +50	15-90	24	0.97	6
O ₃	E1190-A	0-5	n.d.	0.001	5	60	-	0.1	1	2	-30 / +50	15-90	24	1.66	6
O ₃	E1190-B	0-10	n.d.	0.01	5	60	-	0.2	1	2	-30 / +50	15-90	24	1.66	6
Cl ₂	E1193-C	0-10	n.d.	0.01	5	40	-	0.2	1	2	-30 / +50	15-90	24	2.48	6
Cl ₂	E1193-D	0-20	n.d.	0.01	5	40	-	0.2	1	2	-30 / +50	15-90	24	2.48	6
H ₂	E1194-A	0-1000	n.d.	1	5	70	90	10	1	2	-20 / +50	15-90	24	0.07	12
SO ₂	E1196-B	0-20	3	0.01	2	20	-	0.2	1	2	-30 / +50	15-90	24	2.73	6
H ₂ S	E1197-A	0-50	3	0.01	2	25	70	1	1	2	-30 / +50	15-90	24	1.19	6
H ₂ S	E1197-B	0-100	3	0.1	2	25	70	1	1	2	-30 / +50	15-90	24	1.19	6
H ₂ S	E1197-C	0-200	3	0.1	2	25	70	2	1	2	-30 / +50	15-90	24	1.19	6
H ₂ S	E1197-D	0-500	3	0.1	2	25	70	5	1	2	-30 / +50	15-90	24	1.19	6
H ₂ S	E1197-E	0-1500	3	1	5	60	90	15	n.d.	n.d.	-30 / +50	15-90	24	1.19	6
ETO	E1199-A	0-10	n.d.	0.01	5	150	-	1	1	2	+10 / +30	15-90	24	1.56	12
O ₂	E1195-A2/3	0-25 % vol	2	0.01	n.d.	15	39	n.d.	n.d.	0.4/ 0.6	-40 / +50	5-95	24/36	1.11	6/6
O ₂	E1195-A5/7	0-25	2	0.01	n.d.	15	39	n.d.	n.d.	0.4	-40 / +50	15-90	60/84	1.11	12/12

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

² Expected service life for normal ambient conditions

³ 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 < 0.90: mounting 0.3-0.5 m below the ceiling
 0.90 < d < 1.10: mounting at 1.2-1.8 m height
 d > 1.10: mounting 0.3-0.5 m above the floor

⁴ Manufacturer-recommended calibration intervals for normal environmental conditions

CROSS SENSITIVITY¹

Gas concentration of cross gas / reaction of sensor

Gas type	Ordering No.	Chlorine, Cl ₂	Ethanol, C ₂ H ₆ 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	Hydrogen, H ₂
	SC2-	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
CO	E1110-X ²	2/0.5	2000/5			5000/0	50/0,5	25/0	50/-1	50/10	100/20
NH ₃	E1125-A		100/0		500/0	5000/0	20/-6	25/30	5/-7.5	50/0	100/0
NH ₃	E1125-B		100/0		500/0	5000/0	20/-6	25/30	5/-5	50/0	100/0
NH ₃	E1125-C		100/0		500/0	5000/0	20/-6	25/35	5/-5	50/0	100/0
NH ₃	E1125-D		100/0		500/0	5000/0	20/-6	25/35	5/-5	50/0	100/0
NH ₃	E1125-E	0 %	0 %	0 %	0 %	0 %	<150 %	<70 %	10 %	0 %	<-10 %
NO	E1129-C				300/0		10/0	15/<1.5	5/<1.5		
NO ₂	E1130-X ²	1/0.5			300/0	5000/0	20/0	15/<1		50/0	200/0
HCN	E1183-X ²			100/0	100/2		20/38	15/25	5/-12	25/0	100/2
CH ₂ O	E1185-B		30/1		100/<20			20/20			100/5
HCl	E1186-D	20/0	30/0	100/0	1000/0		100/0	20/31	20/-6	25/0	
C ₂ H ₄	E1189-C				100/<60						
O ₃	E1190-X ²	5/4	60/0	100/0	100/0		5/0	20/-20	5/5	50/0	100/0
Cl ₂	E1193-X ²		60/0	100/0	300/0		5/0	20/-20	20/20	50/0	100/0
H ₂	E1194-A	10/0		100/80	50/200		5/0	25/0	5/0	35/<10	
O ₂	E1195-XX ²										
SO ₂	E1196-B	15/<1		50/<45	300/<1			25/<0,5	20/<-20	50/0-5	400/<1
H ₂ S	E1197-A	15/0		100/0	100/<2	5000/0	20/0		5/<0.5	50/<0.5	
H ₂ S	E1197-B	15/0		100/0	100/<2	5000/0	20/0		5/<0.5	50/<0.5	
H ₂ S	E1197-C	15/0		100/0	100/<2	5000/0	20/0		5/<0.5	50/<0.5	
H ₂ S	E1197-D	15/0		100/0	100/<2	5000/0	20/0		5/<0.5	50/<0.5	
H ₂ S	E1197-E				<5 %		20 %				<5 %
ETO	E1199-A		30/21		100/20			20/40			

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.

All specifications were collected under optimal test conditions.

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

ORDERING INFORMATION

SC2-	E11XX-X(X)-	X-	XX	
			00	Without cable extension (standard) (Standard)
			XX ¹	With cable extension: 01, 02, 03, 04, 05 ... 15 max. (length in m) Cable
		P		Sensor housing plastic (standard)
		L		Sensor housing plastic long (only with cable extension)
		S		Sensor housing stainless steel (only with cable extension) Sensor housing
			Gas type	Measuring range
	E1110-A		Carbon monoxide, CO	0–50 ppm
	E1110-C		Carbon monoxide, CO	0–150 ppm
	E1110-E		Carbon monoxide, CO	0–250 ppm
	E1110-F		Carbon monoxide, CO	0–300 ppm
	E1110-H		Carbon monoxide, CO	0–500 ppm
	E1125-A*		Ammonia, NH ₃	0–100 ppm
	E1125-B*		Ammonia, NH ₃	0–300 ppm
	E1125-C*		Ammonia, NH ₃	0–500 ppm
	E1125-D*		Ammonia, NH ₃	0–1000 ppm
	E1125-E*		Ammonia, NH ₃	0–5000 ppm
	E1129-C		Nitrogen monoxide, NO	0–100 ppm
	E1130-A ²		Nitrogen dioxide, NO ₂	0–10 ppm
	E1130-B ²		Nitrogen dioxide, NO ₂	0–20 ppm
	E1130-C ²		Nitrogen dioxide, NO ₂	0–30 ppm
	E1130-E		Nitrogen dioxide, NO ₂	0–100 ppm
	E1130-F ²		Nitrogen dioxide, NO ₂	0–5 ppm
	E1183-B		Hydrogen cyanide, HCN	0–50 ppm
	E1183-C		Hydrogen cyanide, HCN	0–100 ppm
	E1185-B ²		Formaldehyde, CH ₂ O	0–10 ppm
	E1186-D		Hydrogen chloride, HCl	0–20 ppm
	E1189-C ²		Ethylene, C ₂ H ₄	0–200 ppm
	E1190-A ²		Ozone, O ₃	0–5 ppm
	E1190-B ²		Ozone, O ₃	0–10 ppm
	E1193-C ²		Chlorine, Cl ₂	0–10 ppm
	E1193-D ²		Chlorine, Cl ₂	0–20 ppm
	E1194-A		Hydrogen, H ₂	0–1000 ppm
	E1195-A2		Oxygen, O ₂ , 2 years	0–25 % vol
	E1195-A3		Oxygen, O ₂ , 3 years	0–25 % vol
	E1195-A5		Oxygen, O ₂ , 5 years	0–25 % vol
	E1195-A7		Oxygen, O ₂ , 7 years	0–25 % vol
	E1196-B ²		Sulphur dioxide, SO ₂	0–20 ppm
	E1197-A		Hydrogen sulphide, H ₂ S	0–50 ppm
	E1197-B		Hydrogen sulphide, H ₂ S	0–100 ppm
	E1197-C		Hydrogen sulphide, H ₂ S	0–200 ppm
	E1197-D		Hydrogen sulphide, H ₂ S	0–500 ppm
	E1197-E		Hydrogen sulphide, H ₂ S	0–1500 ppm
	E1199-A ²		Ethylene oxide, C ₂ H ₄ O	0–10 ppm
				Gas type / Measuring range

¹ Sensor housing plastic in combination with cable extension only type L

² Not in combination with stainless steel sensor housing

* Only on request

EXAMPLE

CO sensor, plastic housing without cable extension, measuring range 300 ppm

Order number: SC2-E1110-F-P-00

ACCESSORY

Duct mounting kit

Order number: C2-Z2