PERFECT SOLUTIONS FOR **GAS ALARM** SYSTEMS

Technical Datasheet

PolyGard®2

Sensor SC2

With Electrochemical Sensor Element for Toxic Gases

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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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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 µController for measured values processing. All relevant data and measured values of the sensor element are stored fail-safe in the µController and transmitted digitally via the local bus to the Sensor Board (e.g. SB2 or MSB2). The calibration management is also integrated in the µController 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 and oxygen.

FEATURES

- Digital measurement value processing incl. temperature compensation
- Internal functional control with integrated Hardware Watchdog
- Data/measured values in µC 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
- 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
- Duct mounting kit (accessory)

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, CO, O_2 all NO_2 except for 1130-F)
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_2, O_2 10 °C to 30 °C (50°F to 86 °F) for H_2
Storage time[2]	Ca. 6 months
Poisoning	Electrochemical sensors are susceptible to poisoning by organic solvents and silicone vapours.
PHYSICAL	
Housing in plastic	Polycarbonate
Combustion	UL 94 V2
Housing colour	RAL 7032 (light grey)
Dimensions: Housing type P Housing type L	(D x H) 24 x 22 mm (0.94 x 0.87 in.) (D x H) 24 x 30 mm (0.94 x 1.18 in.)
Weight	Ca. 30 g (0.07 lb)
Protection class	IP65
Mounting	Screw mounting
Connection type	3-pin connector
Cable length	Ca. 150 mm (5.91 in.) standard version w/o cable extension
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	Display resolution	Repeatability	t_{90} time	Zeropoint variation	Drift in air		Temperature range	Humidity range (non-condensing)	Life time[2] in air	Relative gas density[3]	Calibration interval[4]
								Zero	Gain					
	SC2-	ppm	± % sig.	ppm	<± % sig.	≤ sec.	±ppm	< % signal/ month		°C	% RH	> months	Air = 1	Month
CO	E1110-C	0–150	2	0.1	5	10	4	0.4	0.4	-20 / +50	10–95	72	0.97	12
CO	E1110-E	0–250	2	0.1	5	10	4	0.4	0.4	-20 / +50	10–95	72	0.97	12
CO	E1110-F	0–300	2	0.1	5	10	4	0.4	0.4	-20 / +50	10–95	72	0.97	12
CO	E1110-H	0–500	2	0.1	5	10	4	0.4	0.4	-20 / +50	10–95	72	0.97	12
NH_3	E1125-A	0–100	5	0.1	10	120	5	1	2	-30 / +50	15–90	24	0.60	12
NH_3	E1125-B	0–300	3	0.1	10	120	5	1	2	-30 / +50	15–90	24	0.60	12
NH_3	E1125-C	0–500	3	0.1	10	120	5	1	2	-30 / +50	15–90	24	0.60	12
NH_3	E1125-D	0–1000	3	1	10	120	10	1	2	-30 / +50	15–90	24	0.60	12
NH_3	E1125-E	0–5000	2	1	10	40	100	1	2	-30 / +50	15–90	24	0.60	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	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	2	1	2	-20 / +50	15–90	24	0.93	6
HCN	E1183-C	0–100	5	0.1	5	30	2	1	2	-20 / +50	15–90	24	0.93	6
CH_2O	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	0.5	1	2	-20 / +50	15–90	24	1.27	6
C_2H_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	10	1	2	-20 / +50	15–90	24	0.07	12
SO_2	E1196-B	0–20	3	0.01	5	30	0.2	1	2	-20 / +50	15–90	24	2.73	6
H_2S	E1197-A	0–50	3	0.01	5	30	1	1	2	-30 / +50	15–90	24	1.19	12
H_2S	E1197-B	0–100	3	0.1	5	40	1	1	2	-30 / +50	15–90	24	1.19	12
H_2S	E1197-C	0–200	3	0.1	5	40	2	1	2	-30 / +50	15–90	24	1.19	12
H_2S	E1197-D	0–500	3	0.1	5	40	5	1	2	-30 / +50	15–90	24	1.19	12
H_2S	E1197-E	0–1500	3	1	5	60	15	n.d.	n.d.	-30 / +50	15–90	24	1.19	12
ETO	E1199-A	0–10	n.d.	0.01	5	150	1	1	2	+10 / +30	15–90	24	1.56	12
		% vol												
O_2	E1195-A2/3	0–25	2	0.01	n.d.	15	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	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 sensor must be installed at the correct height depending on the relative gas density (d):

d < 0.95: Mount on the ceiling

0.95 < d < 1.05: Mount at a height of 1.5–1.8 m above floor

d > 1.05: Mount at a height of 0.3 m above floor

Exception NO_2: Mounting height: 0.5–1.8 m above floor.

[4] Manufacturer-recommended calibration interval for normal environmental conditions

CROSS SENSITIVITY[1]

Gas concentration of cross gas / reaction of sensor

Gas type	Ordering No.	Chlorine, Cl_2	Ethanol, C_2H_6O	Ethylene, C_2H_4	Carbon monoxide, CO	Carbon dioxide, CO_2	Sulphur dioxide, SO_2	Hydrogen sulphide, H_2S	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_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_2O	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_2H_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		100/0		100/<1			20/10	5/-4	100/0	100/<1
H_2S	E1197-A				100/<1						300/1
H_2S	E1197-B		40/0	20/0	100/<1		100/15				300/<3
H_2S	E1197-C				300/<12						300/<12
H_2S	E1197-D				300/<12						300/<12
H_2S	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-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	
	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*	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_2O	0–10 ppm	
	E1186-D	Hydrogen chloride, HCl	0–20 ppm	
	E1189-C[2]	Ethylene, C_2H_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_2S	0–50 ppm	
	E1197-B	Hydrogen sulphide, H_2S	0–100 ppm	
	E1197-C	Hydrogen sulphide, H_2S	0–200 ppm	
	E1197-D	Hydrogen sulphide, H_2S	0–500 ppm	
	E1197-E	Hydrogen sulphide, H_2S	0–1500 ppm	**Gas type / Measuring range**
	E1199-A[2]	Ethylene oxide, C_2H_4O	0–10 ppm	

[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