

**PolyGard®2**

## Sensor Cartridge SC2 for toxic gases and oxygen

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

The sensor cartridge SC2 includes an electrochemical sensor element and an amplifier as well as a  $\mu$ Controller for measured values processing. All relevant data and measured values of the sensor element are stored fail-safe in the  $\mu$ Controller and transmitted digitally via the local bus to the sensor board SB2 or MSB2. The calibration management is also integrated in the  $\mu$ Controller of the sensor cartridge.

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



### APPLICATION

The PolyGard®2 Sensor Cartridge 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  $\mu$ C Sensor Cartridge, therefore simple exchange of SC uncalibrated <> calibrated
- High accuracy, selectivity and reliability
- Low zero point drift
- Sensor with long life expectancy
- Hardware & software according to SIL2 compliant development process
- Modular technology (plug-in and replaceable)
- Easy maintenance and calibration by exchange of the sensor cartridge or by comfortable on-site calibration
- Reverse polarity protected, overload and short-circuit proof
- IP 65 version
- Conformity to
  - EN 50271
  - EN 61010-1
  - ANSI/UL 61010 1
  - CAN/CSA-C22.2 Nr. 61010-1
  - EN 50104 (for O<sub>2</sub>)





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### SPECIFICATIONS

#### Electrical

|                            |                                                 |
|----------------------------|-------------------------------------------------|
| Power supply               | 5 V DC from SB/MSB2, reverse polarity protected |
| Power consumption:         | 50 mA, max. (0.25 VA)                           |
| Serial interface local bus | 1-wire / 19200 Baud                             |

#### Sensor element

|                           |                                    |
|---------------------------|------------------------------------|
| Gas type                  | See Ordering Information           |
| Sensor element            | Electrochemical                    |
| Pressure range            | Atmospheric $\pm 20\%$             |
| Storage temperature range | +5 °C to +30 °C (+41 °F to +86 °F) |
| Storage time              | 6 months                           |

#### Physical

|                         |                                      |
|-------------------------|--------------------------------------|
| Housing M25             | 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 (4.33 in.)                    |

#### Directives

EMC directives 2014/30/EU  
CE  
Conformity to:  
EN 50271  
EN 61010-1:2010  
ANSI/UL 61010-1  
CAN/CSA-C22.2 No. 61010-1  
EN 50104 (for O<sub>2</sub>)

#### Warranty

1 year on material (without sensor element)





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

| Ordering No. | Measuring range | Accuracy | Resolution | Repeatability | t90 Time | Zero-point variation | Drift            |      | Temperature range | Humidity range (non-condensing) | Life time <sup>1</sup> | Relative gas density | Mounting height | Calibration interval <sup>1</sup> |
|--------------|-----------------|----------|------------|---------------|----------|----------------------|------------------|------|-------------------|---------------------------------|------------------------|----------------------|-----------------|-----------------------------------|
|              |                 |          |            |               |          |                      | Zero             | Gain |                   |                                 |                        |                      |                 |                                   |
| SC2-         | ppm             | ± ppm    | ppm        | <± % sig.     | ≤ sec.   | ±ppm                 | < % signal/month |      | °C                | % RH.                           | > months               | Air = 1              | (m)             | Months                            |
| E1125-A      | 0-100           | 10       | 2          | 10            | 90       | 10                   | 1                | 1    | -30 / +50         | 15-90                           | 24                     | 0.59                 | Ceiling         | 12                                |
| E1125-B      | 0-300           | 30       | 4          | 10            | 120      | 50                   | 1                | 2    | -30 / +50         | 15-90                           | 24                     | 0.59                 | Ceiling         | 12                                |
| E1125-C      | 0-500           | 30       | 4          | 10            | 120      | 50                   | 1                | 2    | -30 / +50         | 15-90                           | 24                     | 0.59                 | Ceiling         | 12                                |
| E1125-D      | 0-1000          | 30       | 4          | 10            | 120      | 50                   | 1                | 2    | -30 / +50         | 15-90                           | 24                     | 0.59                 | Ceiling         | 12                                |
| E1193-B      | 0-5             | 0.1      | 0.1        | 2             | 90       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 2.4                  | Floor           | 6                                 |
| E1193-C      | 0-10            | 0.1      | 0.1        | 2             | 90       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 2.4                  | Floor           | 6                                 |
| E1193-D      | 0-20            | 0.1      | 0.1        | 2             | 90       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 2.4                  | Floor           | 6                                 |
| E1181-A      | 0-1             | 0.05     | 0.03       | 4             | 120      | 0.1                  | 1                | 1    | -20 / +40         | 15-90                           | 24                     | 3.09                 | Floor           | 6                                 |
| E1183-C      | 0-100           | 0.2      | 0.1        | 2             | 20       | 1                    | 1                | 2    | -10 / +45         | 15-90                           | 24                     | 0.93                 | Ceiling         | 6                                 |
| E1189-C      | 0-200           | 1.0      | 0.3        | 1             | 60       | 4                    | 1                | 3    | -20 / +50         | 15-90                           | 24                     | 0.97                 | 1.5-1.8         | 12                                |
| E1198-A      | 0-1             | 0.05     | 0.02       | 2             | 80       | 0.1                  | 1                | 4    | -10 / +40         | 15-90                           | 18                     | 1.31                 | Floor           | 6                                 |
| E1185-B      | 0-10            | 0.5      | 0.01       | 2             | 50       | 0.2                  | 1                | 2    | -10 / +45         | 15-90                           | 36                     | 1.09                 | Floor           | 6                                 |
| E1110-C      | 0-150           | 3        | 0.5        | 5             | 50       | 4                    | 0.4              | 0.4  | -15 / +50         | 10-95                           | 72                     | 0.97                 | 1.5-1.8         | 12                                |
| E1110-E      | 0-250           | 3        | 0.5        | 5             | 50       | 4                    | 0.4              | 0.4  | -15 / +50         | 10-95                           | 72                     | 0.97                 | 1.5-1.8         | 12                                |
| E1110-F      | 0-300           | 3        | 0.5        | 5             | 50       | 4                    | 0.4              | 0.4  | -15 / +50         | 10-95                           | 72                     | 0.97                 | 1.5-1.8         | 12                                |
| E1110-H      | 0-500           | 3        | 0.5        | 5             | 50       | 4                    | 0.4              | 0.4  | -15 / +50         | 10-95                           | 72                     | 0.97                 | 1.5-1.8         | 12                                |
| E1190-A      | 0-5             | 0.1      | 0.05       | 5             | 60       | 0.15                 | 1                | 2    | -10 / +45         | 15-90                           | 24                     | 1.66                 | Floor           | 12                                |
| E1187-A      | 0-5             | 0.05     | 0.03       | 2             | 25       | 0.06                 | 1                | 2    | -10 / +45         | 15-90                           | 24                     | 1.18                 | Floor           | 12                                |
| E1196-B      | 0-20            | 0.2      | 0.2        | 2             | 20       | 0.1                  | 1                | 2    | -10 / +45         | 15-90                           | 24                     | 2.26                 | Floor           | 12                                |
| E1197-A      | 0-50            | 0.2      | 0.1        | 2             | 60       | 0.1                  | 1                | 2    | -10 / +50         | 15-90                           | 24                     | 1.19                 | Floor           | 12                                |
| E1188-A      | 0-50            | 0.2      | 0.1        | 2             | 60       | 1                    | 2                | 2    | -10 / +45         | 15-90                           | 24                     | 1.16                 | Floor           | 12                                |
| E1130-A      | 0-10            | 0.5      | 0.1        | 2             | 25       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 1.59                 | 1.5-1.8         | 12                                |
| E1130-B      | 0-20            | 0.5      | 0.1        | 2             | 25       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 1.59                 | 1.5-1.8         | 12                                |
| E1130-C      | 0-30            | 0.5      | 0.1        | 2             | 25       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 1.59                 | 1.5-1.8         | 12                                |
| E1130-D      | 0-500           | 20       | 2          | 2             | 25       | 0.2                  | 1                | 2    | -20 / +50         | 15-90                           | 24                     | 1.59                 | 1.5-1.8         | 12                                |
| E1129-A      | 0-10            | 0.15     | 0.1        | 2             | 45       | 0.5                  | 1                | 2    | -10 / +50         | 15-90                           | 36                     | 1.04                 | 1.5-1.8         | 12                                |
| E1129-B      | 0-20            | 0.15     | 0.1        | 2             | 45       | 0.5                  | 1                | 2    | -10 / +50         | 15-90                           | 36                     | 1.04                 | 1.5-1.8         | 12                                |
| E1129-C      | 0-100           | 0.15     | 0.1        | 2             | 45       | 0.5                  | 1                | 2    | -10 / +50         | 15-90                           | 36                     | 1.04                 | 1.5-1.8         | 12                                |
| E1129-D      | 0-1000          | 20       | 2          | 2             | 45       | 24                   | 1                | 2    | -10 / +50         | 15-90                           | 36                     | 1.04                 | 1.5-1.8         | 12                                |
| Vol %        |                 |          |            |               |          |                      |                  |      |                   |                                 |                        |                      |                 |                                   |
| E1195-A      | 0-25            | 0.5      | 0.05       | --            | 15       | --                   | --               | 0.3  | -10 / +50         | 5-95                            | 24 / 36                |                      | 1.5-1.8         | 24                                |
| E1195-B      | 0-21            | 0.5      | 0.05       | --            | 15       | --                   | --               | 0.3  | -10 / +50         | 5-95                            | 24 / 36                |                      | 1.5-1.8         | 24                                |

<sup>1</sup> Manufacturer-recommended calibration interval for normal environmental conditions





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### CROSS SENSITIVITY<sup>1</sup> - SENSOR CARTRIDGE (SC2) / SENSOR ELEMENT

| Ordering No.         | Alcohols | 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                      |
| E1125-A              |          | 10/0                      | 100/0                                    | 100/0                                   | 200/0               | 5000/0                          | 10/<10                           | 10/<20                              | 20/<2                            | 20/0                  | 1000/-10                 |
| E1125-B              |          | 10/0                      | 100/0                                    | 100/0                                   | 200/0               | 5000/0                          | 10/<12                           | 10/<30                              | 20/0                             | 20/0                  | 1000/-150                |
| E1125-C              |          | 10/0                      | 100/0                                    | 100/0                                   | 200/0               | 5000/0                          | 10/<12                           | 10/<30                              | 20/0                             | 20/0                  | 1000/-150                |
| E1125-D              |          | 10/0                      | 100/0                                    | 100/0                                   | 200/0               | 5000/0                          | 10/<12                           | 10/<30                              | 20/0                             | 20/0                  | 1000/-150                |
| E1193-X <sup>2</sup> |          |                           |                                          |                                         | 300/0               |                                 | 5/0                              |                                     | 20/20                            | 35/0                  | 300/0                    |
| E1181-A              | 1000/0   | 1/0.3                     |                                          |                                         | 100/0               | 500/0                           |                                  | 20/0                                | 10 /4                            | 100/0                 | 3000/0                   |
| E1183-C              |          |                           |                                          | 100/0                                   | 100 /2              |                                 | 20/38                            | 15/25                               | 5/-12                            | 35/0                  | 100 /2                   |
| E1189-C              |          |                           |                                          |                                         | < 60%               |                                 |                                  |                                     |                                  |                       |                          |
| E1198-A              | 1000/0   | 1/1.4                     |                                          |                                         | 100/0               | 5000/0                          | 20/-0.2                          | 1/-2                                | 10/8                             |                       | 1000/0                   |
| E1185-B              |          |                           |                                          |                                         | 10-18%              |                                 |                                  |                                     |                                  |                       | 1-3%                     |
| E1110-X <sup>2</sup> |          | 2/0                       | 2000/5                                   |                                         |                     | 5000/0                          | 50/0.5                           | 25/0                                | 50/-1                            | 50/8                  | 100/20                   |
| E1190-A              |          | 5/45/4                    | 100/0                                    |                                         | 300/0               |                                 | 5/0                              |                                     | 20/10                            | 35/0                  | 300/0                    |
| E1187-A              |          |                           |                                          |                                         | 100/0               |                                 | 100/25                           | 34/8                                | 100/-30                          | 100/0                 | 100/0                    |
| E1196-B              |          |                           | 100/0                                    |                                         | 100/1               |                                 |                                  | 10/0                                | 100/-125                         | 100/0                 | 100/1                    |
| E1197-A              |          |                           |                                          |                                         | 100/2               |                                 | 100/20                           |                                     | 5/1                              | 35/2                  | 100/20                   |
| E1188-A              |          |                           |                                          |                                         | 200/0               |                                 | 5/1                              | 5/8                                 |                                  |                       | 200/0                    |
| E1130-X <sup>2</sup> |          | 1/1                       | 100/0                                    | 500/0                                   | 400/0               | 5000/0                          | 30/-0.6                          | 20/-25                              |                                  | 50/0                  | 1000/0                   |
| E1129-A              |          | 10/15                     |                                          |                                         | 400/0               | 5Vol%/0                         | 20/3                             | 20/30                               | 50/5                             |                       | 400/0                    |
| E1129-B              |          | 10/15                     |                                          |                                         | 400/0               | 5Vol%/0                         | 20/3                             | 20/30                               | 50/5                             |                       | 400/0                    |
| E1129-C              |          | 10/15                     |                                          |                                         | 400/0               | 5Vol%/0                         | 20/3                             | 20/30                               | 50/5                             |                       | 400/0                    |
| E1129-D              |          |                           |                                          |                                         | 300/0               |                                 | 5/0                              | 15/<5                               | 20/<5                            |                       | 300/0                    |
| E1195-X <sup>2</sup> |          |                           |                                          |                                         |                     | 5Vol%/                          |                                  |                                     |                                  |                       |                          |

Illustration: Gas concentration of cross 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.





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### ORDERING INFORMATION

SC2- E11XX-X

|                  | Gas type                                | Sensor type     | Measuring range |
|------------------|-----------------------------------------|-----------------|-----------------|
| <b>E1125-A</b>   | Ammonia, NH <sub>3</sub>                | Electrochemical | 0 – 100 ppm     |
| <b>E1125-B</b>   | Ammonia, NH <sub>3</sub>                | Electrochemical | 0 – 300 ppm     |
| <b>E1125-C</b>   | Ammonia, NH <sub>3</sub>                | Electrochemical | 0 – 500 ppm     |
| <b>E1125-D</b>   | Ammonia, NH <sub>3</sub>                | Electrochemical | 0 – 1000 ppm    |
| <b>E1193-B*</b>  | Chlorine, Cl <sub>2</sub>               | Electrochemical | 0 – 5 ppm       |
| <b>E1193-C*</b>  | Chlorine, Cl <sub>2</sub>               | Electrochemical | 0 – 10 ppm      |
| <b>E1193-D*</b>  | Chlorine, Cl <sub>2</sub>               | Electrochemical | 0 – 20 ppm      |
| <b>E1181-A*</b>  | Chlorine dioxide, ClO <sub>2</sub>      | Electrochemical | 0 – 1 ppm       |
| <b>E1183-C*</b>  | Hydrogen cyanide, HCN                   | Electrochemical | 0 – 100 ppm     |
| <b>E1189-C*</b>  | Ethylene, C <sub>2</sub> H <sub>4</sub> | Electrochemical | 0 – 200 ppm     |
| <b>E1198-A*</b>  | Fluorine, F <sub>2</sub>                | Electrochemical | 0 – 1 ppm       |
| <b>E1185-B</b>   | Formaldehyde, CH <sub>2</sub> O         | Electrochemical | 0 – 10 ppm      |
| <b>E1110-C</b>   | Carbon monoxide, CO                     | Electrochemical | 0 – 150 ppm     |
| <b>E1110-E</b>   | Carbon monoxide, CO                     | Electrochemical | 0 – 250 ppm     |
| <b>E1110-F</b>   | Carbon monoxide, CO                     | Electrochemical | 0 – 300 ppm     |
| <b>E1110-H</b>   | Carbon monoxide, CO                     | Electrochemical | 0 – 500 ppm     |
| <b>E1190-A*</b>  | Ozone, O <sub>3</sub>                   | Electrochemical | 0 – 5 ppm       |
| <b>E1187-A*</b>  | Phosphine, PH <sub>3</sub>              | Electrochemical | 0 – 5 ppm       |
| <b>E1196-B*</b>  | Sulphur dioxide, SO <sub>2</sub>        | Electrochemical | 0 – 20 ppm      |
| <b>E1197-A*</b>  | Hydrogen sulphide, H <sub>2</sub> S     | Electrochemical | 0 – 50 ppm      |
| <b>E1188-A*</b>  | Silane, SiH <sub>4</sub>                | Electrochemical | 0 – 50 ppm      |
| <b>E1130-A</b>   | Nitrogen dioxide, NO <sub>2</sub>       | Electrochemical | 0 – 10 ppm      |
| <b>E1130-B</b>   | Nitrogen dioxide, NO <sub>2</sub>       | Electrochemical | 0 – 20 ppm      |
| <b>E1130-C</b>   | Nitrogen dioxide, NO <sub>2</sub>       | Electrochemical | 0 – 30 ppm      |
| <b>E1130-D*</b>  | Nitrogen dioxide, NO <sub>2</sub>       | Electrochemical | 0 – 500 ppm     |
| <b>E1129-A*</b>  | Nitrogen monoxide, NO                   | Electrochemical | 0 – 10 ppm      |
| <b>E1129-B*</b>  | Nitrogen monoxide, NO                   | Electrochemical | 0 – 20 ppm      |
| <b>E1129-C</b>   | Nitrogen monoxide, NO                   | Electrochemical | 0 – 100 ppm     |
| <b>E1129-D*</b>  | Nitrogen monoxide, NO                   | Electrochemical | 0 – 1000 ppm    |
| <b>E1195-A-2</b> | Oxygen, O <sub>2</sub> , 2 years        | Electrochemical | 0 – 25 Vol. %   |
| <b>E1195-A-3</b> | Oxygen, O <sub>2</sub> , 3 years        | Electrochemical | 0 – 25 Vol. %   |
| <b>E1195-B-2</b> | Oxygen, O <sub>2</sub> , 2 years        | Electrochemical | 0 – 21 Vol. %   |
| <b>E1195-B-3</b> | Oxygen, O <sub>2</sub> , 3 years        | Electrochemical | 0 – 21 Vol. %   |

\* only on request

### EXAMPLE

CO Sensor Cartridge, measuring range 300 ppm

Order number: SC2-E1110-F

