PolyGard®2

SC2 Sensors

with Semiconductor Sensor Element for Refrigerant Gases

FOR **REFRIGERANT** GASES **IN PPM RANGE**

FOR **REFRIGERANT** GASES **IN LEL RANGE (LFL)**

Technical Datasheet

PolyGard®2

SC2 Sensors

with Semiconductor Sensor Element for Refrigerant Gases In PPM Range

FOR **REFRIGERANT** GASES **IN PPM RANGE**

FOR REFRIGERANT GASES IN PPM RANGE

DESCRIPTION

Semiconductor sensor including digital value processing and integrated self-diagnosis, for the continuous monitoring of the ambient air to detect refrigerants.

The intelligent SC2 Sensor for detection of refrigerants includes a semiconductor sensor element and electronics with a measuring amplifier and a µController for the digital processing of the measured values. All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the µProcessor and are transmitted digitally to the Control Module via the local bus.

The maintenance of a device can be done either by simply exchanging the sensor or by using the integrated, comfortable calibration routine directly at the system.

APPLICATION

The PolyGard®2 Sensor SC2 is used to detect a leakage of refrigerants in a variety of applications.

FEATURES

- Digital measurement value processing
- Internal functional control with integrated Watchdog
- Easy maintenance and calibration by exchange of the sensor or by comfortable on-site calibration
- Low zero-point drift
- Sensor with long life expectancy
- Hardware and software according to SIL compliant development process
- Reverse polarity protected, overload and short-circuit proof
- NEMA 4X (IP65) protection (when installed)

FOR **REFRIGERANT** GASES **IN PPM RANGE**

SPECIFICATIONS

ELECTRICAL		
Power supply	5 V DC from Control Module, reverse polarity protected	
Power consumption:	160 mA, max. (0.8 VA)	
Serial interface local bus	1-wire / 19200 Baud	
SENSOR ELEMENT		
Gas type	See Ordering Information	
Measuring principle	Semiconductor	
Measuring range	0-2000 ppm	
Repeatability	± 20 % signal	
t_{90} time	t_{90} ≤ 150 s (for R1234yf, R1234ze, R1233zd, R134a in plastic housing) t_{90} ≤ 180 s (for R1234yf, R1233zd, R134a in stainless steel housing)	
Temperature range	-22°F to 140°F (-30°C to +60°C)	
Humidity range	15-90 % RH non-condensing	
Pressure range	13-16 PSI (90-100 kPa)	
Storage temperature range[1]	32°F to 122°F (0°C to +50°C)	
Storage time[2]	12 months	
Life time[3] in air	> 5 years	
Calibration interval[4]	12 months	
Poisoning	Semiconductor sensors can be poisoned by silicone-containing substances or other catalyst poisons, up to complete loss of sensitivity. Their sensitivity is irreversibly impaired by halogen-containing compounds.	
PHYSICAL		
Housing	**Plastic**	**Stainless steel**
Material	Polycarbonate	CrNi steel: 1.4404
Flammability classification	UL 94 V2	-
Housing colour	RAL 7032 (light grey)	Natural
Dimensions (Ø x H)	Type P: 0.94 x 0.87 in. (24 x 22 mm) Type L: 0.94 x 1.18 in. (24 x 30 mm)	Type S: 1.18 x 2.40 in. (30 x 61 mm)
Weight	0.07 lb (30 g)	0.33 lb (150 g)
Protection class	NEMA 4X (IP65)	NEMA 3 (IP64)
Mounting	Screw mounting, external thread M25 x 1.5 mm	Screw mounting, external thread NPT ¾" ANSI/ B1.20.1 / M30 x 1.5 mm
Connection type	3-pin connector	
Cable length	Standard: 5.91 in. (150 mm) Cable extension 16.4, 32.8, & 49.2 ft	Cable extension 16.4, 32.8, & 49.2 ft

FOR REFRIGERANT GASES IN PPM RANGE

REGULATIONS	
Directives (only in connection with the Control Modules from INTEC)	EMC Directives 2014/30/EU CE UKCA Conformity to: EN 378 EN 14624 EN 45544-1, -3 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
Warranty	1 year on sensors (not if poisoned or overloaded)

[1] A deviating 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.
[3] Expected service life for normal ambient conditions.
[4] Manufacturer-recommended calibration intervals for normal environmental conditions

Semiconductor sensors that have been exposed to an increased gas concentration (> ½ full scale value) during normal measuring operation must be replaced without fail.

All specifications were collected under optimal test conditions.
We confirm compliance with the minimum requirements of the applicable standard.

FOR REFRIGERANT GASES IN PPM RANGE

Group ID	Code	Gas Type	Calibration Gas	Classification	Relative Gas Density[1] Air =1
FR02	2061-01	R23	R23	HFC	2.44
	2061-02	R508b	R23	HFC	3.69
FR03	2063-01	R1234yf	R1234yf	HFO	4.00
	2063-02	R452a	R1234yf	HFO	2.11
	2063-03	R513a	R1234yf	HFO/HFC	3.80
	2063-04	R454c	R1234yf	HFO	3.51
	2063-05	R455a	R1234yf	HFO	3.46
	2063-06	R454b	R1234yf	HFO	2.50
	2063-07	R1234ze	R1234yf	HFO	4.00
	2063-08	R1233zd	R1234yf	HFO	n.d.
FR04	2064-01	R123	R123	HCFC	5.28
FR06	2070-01	R22	R22	HCFC	3.03
	2070-02	R401a	R22	HCFC	3.50
	2070-03	R401b	R22	HCFC	3.42
	2070-04	R402a	R22	HCFC	1.91
	2070-05	R402b	R22	HCFC	2.31
	2070-06	R403a	R22	HCFC	3.65
	2070-07	R408a	R22	HCFC	2.87
	2070-08	R409a	R22	HCFC	3.52
	2070-09	R411a	R22	HFC	2.92
FR07	2077-01	R134a	R134a	HFC	3.59
	2077-02	R407a	R134a	HFC	2.28
	2077-03	R416a	R134a	HFC	4.01
	2077-04	R417a	R134a	HFC	2.43
	2077-05	R422a	R134a	HFC	1.51
	2077-06	R422d	R134a	HFC	1.99
	2077-07	R427a	R134a	HFC	2.67
	2077-08	R437a	R134a	HFC	3.10
	2077-09	R438a	R134a	HFC	2.34
	2077-10	R449a	R134a	HFC	2.68
	2077-11	R407f	R134a	HFC	2.61
	2077-12	R450a	R134a	HFO	3.83
FR08	2080-01	R125	R407c	FC	1.21
	2080-02	R32	R407c	FC	1.82
	2080-03	R404a	R407c	HFC	3.45
	2080-04	R407c	R407c	HFC	2.59
	2080-05	R410a	R407c	HFC	1.52
	2080-06	R434a	R407c	HFC	1.65
	2080-07	R507a	R407c	HFC	2.10
	2080-08	R448a	R407c	HFC	2.62
	2080-09	R452b	R407c	HFO	2.34
	2080-10	R143a	R407c	FC	2.96

[1] 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 ≤ 0.85:	Mounting 1-1.6 ft (0.3-0.5 m) below the ceiling
0.85 < d < 1.15:	Mounting at 4-6 ft (1.2-1.8 m) height
d ≥ 1.15:	Mounting 1-1.6 ft (0.3-0.5 m) above the floor

FOR REFRIGERANT GASES IN PPM RANGE

ORDERING INFORMATION

SC2- S20XX-XX-A

	Gas type	Measuring range
S2061-01-A	R23	0-2000 ppm
S2061-02-A	R508b	0-2000 ppm
S2063-01-A	R1234yf	0-2000 ppm
S2063-02-A	R452a	0-2000 ppm
S2063-03-A	R513a	0-2000 ppm
S2063-04-A	R454c	0-2000 ppm
S2063-05-A	R455a	0-2000 ppm
S2063-06-A	R454b	0-2000 ppm
S2063-07-A[2]	R1234ze	0-2000 ppm
S2063-08-A	R1233zd	0-2000 ppm
S2064-01-A	R123	0-2000 ppm
S2070-01-A	R22	0-2000 ppm
S2070-02-A	R401a	0-2000 ppm
S2070-03-A	R401b	0-2000 ppm
S2070-04-A	R402a	0-2000 ppm
S2070-05-A	R402b	0-2000 ppm
S2070-06-A	R403a	0-2000 ppm
S2070-07-A	R408a	0-2000 ppm
S2070-08-A	R409a	0-2000 ppm
S2070-09-A	R411a	0-2000 ppm
S2077-01-A	R134a	0-2000 ppm
S2077-02-A	R407a	0-2000 ppm
S2077-03-A	R416a	0-2000 ppm
S2077-04-A	R417a	0-2000 ppm
S2077-05-A	R422a	0-2000 ppm
S2077-06-A	R422d	0-2000 ppm
S2077-07-A	R427a	0-2000 ppm
S2077-08-A	R437a	0-2000 ppm
S2077-09-A	R438a	0-2000 ppm
S2077-10-A	R449a	0-2000 ppm
S2077-11-A	R407f	0-2000 ppm
S2077-12-A	R450a	0-2000 ppm
S2080-01-A	R125	0-2000 ppm
S2080-02-A	R32	0-2000 ppm
S2080-03-A	R404a	0-2000 ppm
S2080-04-A	R407c	0-2000 ppm
S2080-05-A	R410a	0-2000 ppm
S2080-06-A	R434a	0-2000 ppm
S2080-07-A	R507a	0-2000 ppm
S2080-08-A	R448a	0-2000 ppm
S2080-09-A	R452b	0-2000 ppm
S2080-10-A	R143a	0-2000 ppm

EXAMPLE
R32 sensor, measuring range 0-2000 ppm, order number: SC2-S2080-02-A)

ACCESSORY
Duct mounting kit (order number: PG2-DUCTKIT)

Technical Datasheet

PolyGard®2

SC2 Sensors

with Semiconductor Sensor Element for Refrigerant Gases In LEL Range (LFL)

FOR REFRIGERANT GASES IN LEL RANGE (LFL)

FOR REFRIGERANT GASES IN LEL RANGE (LFL)

Semiconductor sensor including digital value processing and self-control for the continuous monitoring of the ambient air to detect low-flammable refrigerants in the combustible range.

The intelligent SC2 Sensor for detection of low-flammable refrigerants includes a semiconductor sensor element and electronics with a measuring amplifier and a µController for the digital processing of the measured values. All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the µProcessor and are transmitted digitally to the Control Module via the local bus.

The measured value display of the sensors is in % LEL (in this case, the unit "% LFL", which is customary in this trade, is synonymous with LEL).

The maintenance of a device can be done either by simply exchanging the sensor or by using the integrated, comfortable calibration routine directly at the system.

APPLICATION

The PolyGard®2 SC2 Sensor is used for the detection of low-flammable gases of the refrigerant class A2L.

FEATURES

- Digital measurement value processing
- Internal functional control with integrated Watchdog
- Easy maintenance and calibration by exchange of the sensor or by comfortable on-site calibration
- Low zero-point drift
- Sensor with long life expectancy
- Hardware and software according to SIL compliant development process
- Reverse polarity protected, overload and short-circuit proof
- NEMA 4X (IP65) protection (when installed)

FOR **REFRIGERANT** GASES **IN LEL RANGE (LFL)**

SPECIFICATIONS

ELECTRICAL		
Power supply	5 V DC from Control Module, reverse polarity protected	
Power consumption	160 mA, max. (0.8 VA)	
Serial interface local bus	1-wire / 19200 Baud	
SENSOR ELEMENT		
Gas type	See Ordering Information	
Measuring principle	Semiconductor	
Measuring range	0-50 % LEL	
Repeatability	± 20 % signal	
t_{90} time	t_{90} ≤ 150 s (plastic housing) t_{90} ≤ 180 s (stainless steel housing)	
Temperature range	-22°F to 140°F (-30°C to +60°C)	
Humidity range	15-90 % RH non-condensing	
Pressure range	13-16 PSI (90-100 kPa)	
Storage temperature range[1]	32°F to 122°F (0°C to +50°C)	
Storage time[2]	12 months	
Life time[3] in air	> 5 years	
Calibration interval[4]	12 months	
Poisoning	Semiconductor sensors can be poisoned by silicone-containing substances or other catalyst poisons, up to complete loss of sensitivity. Their sensitivity is irreversibly impaired by halogen-containing compounds.	
PHYSICAL		
Housing	**Plastic**	**Stainless steel**
Material	Polycarbonate	CrNi steel: 1.4404
Flammability classification	UL 94 V2	-
Housing colour	RAL 7032 (light grey)	Natural
Dimensions (Ø x H)	Type P: 0.94 x 0.87 in. (24 x 22 mm) Type L: 0.94 x 1.18 in. (24 x 30 mm)	Type S: 1.18 x 2.40 in. (30 x 61 mm)
Weight	0.07 lb (30 g)	0.33 lb (150 g)
Protection class	NEMA 4X (IP65)	NEMA 3 (IP64)
Mounting	Screw mounting, external thread M25 x 1.5 mm	Screw mounting, external thread NPT ¾" ANSI/ B1.20.1 / M30 x 1.5 mm
Connection type	3-pin connector	
Cable length	Standard: 5.91 in. (150 mm) Cable extension 16.4, 32.8, & 49.2 ft	Cable extension 16.4, 32.8, & 49.2 ft
REGULATIONS		
Directives (only in connection with the Control Modules from INTEC)	EMC Directives 2014/30/EU CE UKCA Conformity to: EN 378 EN 14624 EN 45544-1, -3 EN 50271 EN 61010-1:2010 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1	
Warranty	1 year on sensors (not if poisoned or overloaded)	

[1] A deviating 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.
[3] Expected service life for normal ambient conditions.
[4] Manufacturer-recommended calibration intervals for normal environmental conditions

Semiconductor sensors that have been exposed to an increased gas concentration (> ½ full scale value) during normal measuring operation must be replaced without fail.

All specifications were collected under optimal test conditions.
We confirm compliance with the minimum requirements of the applicable standard.

FOR **REFRIGERANT** GASES **IN LEL RANGE (LFL)**

Group ID	Code	Gas Type	Calibration Gas	Classification	Relative gas density[1] Air =1
%LFL	2020-01	R32	R32	HFC	1.82
	2020-02	R455a	R455a	CFC/HFO	3.46
	2020-03	R454b	R454b	HFO	2.50
	2020-04	R1234yf	R1234yf	HFO	4.00
	2020-05	R1234ze	R1234ze	HFO	4.00

[1] 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 ≤ 0.85:	Mounting 1-1.6 ft (0.3-0.5 m) below the ceiling
0.85 < d < 1.15:	Mounting at 4-6 ft (1.2-1.8 m) height
d ≥ 1.15:	Mounting 1-1.6 ft (0.3-0.5 m) above the floor

ORDERING INFORMATION

SC2- S2020-0X-A

	Gas type	Measuring range
S2020-01-A	R32	0-50 % LEL
S2020-02-A	R455a	0-50 % LEL
S2020-03-A	R454b	0-50 % LEL
S2020-04-A	R1234yf	0-50 % LEL
S2020-05-A[2]	R1234ze	0-50 % LEL

EXAMPLE

R32 sensor LFL, measuring range 0-50 % LEL (order number: SC2-S2020-01-A)

ACCESSORY

Duct mounting kit (order number: PG2-DUCTKIT)